

scope

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The journal *Scope (Health & Wellbeing)* aims to engage in multidisciplinary discussion on contemporary research in the landscape of health. It is concerned with views and critical debates surrounding issues of practice, theory, education, history and their relationships as manifested through the written and visual activities, such as original research, commentary, critical debates and methodological considerations surrounding the concepts and theories of health and wellness. *Scope (Health & Wellbeing)* seeks to address the matters which concern contemporary researchers, industry, society and educators in their environments of national and international practice. *Scope's* focus is on building a sense of community amongst researchers from an array of New Zealand institutions with a goal of linking in, and stepping up to a wider international community.

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Scope: Contemporary Research Topics (Health & Wellbeing) 4, Rural (November 2019)

The fourth issue of *Scope: Contemporary Research Topics, (Health & Wellbeing) 4 Rural* – there after known as *Scope (Health & Wellbeing) 4 Rural* – will provide the opportunity for authors from different disciplines to consider, discuss and debate how the 'rural' is understood in relation to health and wellbeing. Papers presented will showcase work drawn from the areas of nursing, medicine, occupational health, sociology, sport, counselling, geography, education, and narrative with a focus on research and community projects which attempt to (re)build and (re)foster the dialogue and engagement of health, wellbeing in the 'rural'.

Submissions for *Scope (Health & Wellbeing) Rural* are invited from researchers, educators, industry, writers, theorists and historians. Submissions should be sent in hardcopy and electronic format by 30 June 2019 for review and potential inclusion in the annual issue to Dr Jean Ross (Series Editor) at Otago Polytechnic/Te Kura Matatini Ki Otago, Private Bag 1910, Dunedin, New Zealand and jean.ross@op.ac.nz. Please consult the information for contributors below and hardcopy or online versions for examples. Peer review forms will be sent to all submitters in due course, with details concerning the possible reworking of documents where relevant. All submitters will be allowed up to two subsequent resubmissions of documents for peer approval. All final decisions concerning publication of submissions will reside with the Editors. Opinions published are those of the authors and not necessarily subscribed to by the Editors or Otago Polytechnic.

Formats include: editorials; articles; perspectives; essays; imagery and conference reports; reports on and reviews of projects, residencies and publications. Other suggested formats will also be considered; and special topics comprising submissions by various contributors may be tendered to the editors. All material will be published both in hardcopy and online. Submissions should engage with contemporary health practices in ways which may contribute to critical debate and new understandings. High standards of writing, proofreading and adherence to consistency through the APA 6th edition referencing style are expected. For more information, please refer to the APA Manual of Style; and consult prior issues for examples. A short biography of no more than 50 words; as well as title; details concerning institutional position and affiliation (where relevant); and contact information (postal, email and telephone number) should be provided on a cover sheet, with all such information withheld from the body of the submission. Low resolution images with full captions should be inserted into texts to indicate where they would be preferred; while high resolution images should be sent separately. Enquiries about future submission can be directed to jean.ross@op.ac.nz.

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"Think! Think and wonder. Wonder and think"

(Dr Suess, 1976, n. d.)

Occupation is a complex concept – as noun, verb or adjective the layers of meaning range from the aggressive occupation of another's territory to the delicate nuances of being pre-occupied with abstract threads of thought. It is about growing throughout life, the process and participation in the journey, as well as the characteristics of where you arrive. Engaging with occupation can be explored across multiple levels from the occupational workload of a muscle, to individual learning, professional identity and construction of societal norms. Every occupational level will be influenced by multiple internal and external environmental factors (Wilcock, 2007). There is nothing static about occupational knowledge, it has questions to be posed and influences to be discovered, all within a changing environmental context.

The very human question of who we are is answered very differently depending on where we are in life, and the differing weight of the multiple influences that lean on us. For the last three decades I have been employed as an educator; yet my unescapable occupation is recognised by family and community as a nurse – the neighbour with the extensive first aid kit, who can translate this letter from the specialist or give ideas of where you can access support! Funnily enough, I see myself as a mum, a partner; a daughter; a sister; a reader; a dreamer and a part-time-would-be poet. I have an occupation destination in mind – a blanket in the garden, books at hand with enough space for visitors and all the people I love.

Tertiary education exists to develop thinking, push new boundaries and explore meanings that shape our future world. This third issue of *SCOPE Health & Wellbeing* collects together articles, research reports and explorations about the notion of "occupation", pulling from a wide range of professional expertise. It celebrates the breadth of wonder; and the curiosity of sport, coaching and exercise professionals, occupational therapists, nurse students and nurse academics, health professionals, engineers, designers and artists.

Sport and wellness based quantitative research explores changing baseball tactics, fatigue in rugby league, coaching in martial arts and muscle contraction with stretching. Body image is researched in relationship to female socialisation and students' food knowledge relationship with their body mass index is explored. Qualitative research is also represented with commentaries on the occupation of sewing, and a study of occupational therapy students' experiential learning opportunities. The Inaugural Oceania Performance Analysis Conference is introduced, resulting in a conference report and six conference proceedings abstracts between pages 136 – 143.

How humans' shape concepts such as dementia and the socialised role of men are explored by authors analysing the content of narratives on living with dementia as a learning resource, and researching historical documents on toilet training. There are case studies on the occupational identity of internationally qualified nurses, mental health and addictions employment for occupational therapists and four separate reports from groups of nursing students researching factors and solutions that influence community health, describing their roles as community developers in rural Otago and South Canterbury.

The dynamic nature of occupation as both a process and outcome is captured in the cover painting by artist Hannah Joynt. Both gentle movement with the wind and the angled trees shaped and formed by their environment portray change. The meadow invites you in, it feels full of light and opportunity – a place to be and explore, while colours are budding with potential new growth. Perhaps I could place my reading rug there?

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OFFENSIVE TENDENCIES OF MAJOR LEAGUE BASEBALL TEAMS, REGULAR SEASON VERSUS POSTSEASON

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ABSTRACT

Within baseball, performance analysis has been widespread for many years, and comparisons between players using key performance indicators (KPI) have been a popular discussion point between fans, those involved in the competition of the sport and academics. With long periods of inactivity between instances of play, the sport lends itself well to sports performance analysis, and the statistics produced often have an impact on the decisions of coaches. In this study, the differences in aggression levels of offensive behaviours in Major League Baseball (MLB) teams in the regular season, compared with the postseason, were analysed with a view to finding differences in the mode of scoring or changes in baserunning habits. The research question seeks to determine whether there is a change in the offensive tendencies of players in the postseason as compared with the regular season.

INTRODUCTION

Due to the highly individual nature of baseball, there are a wide range of possibilities for analysing player performance within a game-based setting.

Batting

One widely used measure is the Batting Average (BA), calculated by the equation $BA = H/AB$, where H is equal to the number of successful hits in play and AB is equal to the number of times at bat (Pankin, 1978). This is considered a very basic statistic, not accounting for the type of hit or the number of bases reached. It also discounts plays where the plate appearance produced a situation where a purposeful hit was avoided – for example, a sacrificial fly or being hit by the pitcher (Lindsey, 1963). Houser (2015) found that BA had a negative correlation with the number of wins, having a slightly negative effect on a team's overall score. Courneya and Chelladurai (1991) offered slightly different results. They concluded that BA was among the highest correlated statistics, equal to slugging percentage (SLG) and on-base percentage (OBP). They argued that these statistics are direct performance variables related to hitting balls, as opposed to statistics such as walks and stolen bases. While BA is considered by some to have weak negative correlations with player performance (Houser, 2015), other statistics are more strongly linked to the performance of players and the win rates of teams.

Otten and Barrett (2013) suggested that On-Base Percentage (OBP) and slugging percentage (SLG) more accurately estimated performance. $SLG = (Total\ bases)/AB$ – is often associated with players who have the ability to hit the ball with power, resulting in obtaining extra bases on the hit. Otten and Barrett described SLG as representing batter effectiveness to produce hits which result in the runner being in a more advanced position than BA is able to represent. When considering the OBP (a measure of the player's ability to make it on base), modelled by the equation $OBP = (Hits + Walks + HBP) / (AB + Walks + HBP)$, this statistic takes into account other avenues through which a batter can successfully placing himself in play, including walks and being hit by the pitch (Houser, 2015). In his study of baseball players conducted between 2000 and 2004, Houser (2015) concluded that OBP was the most statistically significant KPI equation when compared to BA and SLG. Because of the effectiveness of these two statistics, they are often formed into a single equation known as on-base plus slugging (OPS), which is the sum of both statistics combined. OPS is considered the most useful statistic for determining a player's offensive ability, as it not only considers all of the opportunities which the player has to reach the base, but it also factors in the base which the runner reaches in that play, creating a power component (Otten & Barrett, 2013; Demmink, 2010).

Stealing Bases

Often seen as a high-risk play, stealing bases may result in the runner being removed from a potential scoring position, with the reward being an increased opportunity to score on the next play. It describes the act of a baserunner attempting to run between bases when the ball is technically still in play, but when the pitcher is preoccupied with the hitter. Demmink (2010) concluded that the number of attempts at stealing a base in each game was correlated with a team's ability to win the game, although this was disputed by Otten and Barret (2013), who found that performance within both regular and postseasons had a higher correlation with win rates. Courneya and Chelladurai (1991) argued that stealing bases was a primary variable of a player's skillset, but a less significant KPI when compared to other statistics which were hit-focused.

Although the primary measurement of KPIs in baseball are the statistics discussed above, other methods of scoring or advancing are also considered here (Lindsey, 1963). Pankin (1978) studied games played between 1965 and 1975, comparing the effectiveness of different statistics at measuring performance. His KPIs were the offensive performance average (OPA; combined BA and OPS) and stolen bases per AB. His study also considered walks and stolen base attempts, while excluding tactics such as sacrifice bunts to provide a more tactical analysis of the system. He tested this system against another research-derived statistic proposed by Cover and Kielers (1977), which is considered more advanced and computed more advanced variables. Pankin's findings were, however, considered to offer a more holistic approach to the performance of a batter, should he consistently bat. Pankin (1978) found that both his proposed research-driven statistics had a higher correlation coefficient with the number of runs per game than the more mainstream statistics, with a difference of .001 between the coefficients of the research-driven statistics. He argued that the more holistic variable calculations led to more accurate assessments of performance within an applied game setting.

The use of statistics to support various areas of study within baseball presents opportunities for variables to be combined in different ways, and allows exploration of correlations within sets of data.

So-called 'clutch' hitters are also worth considering. The performance of a hitter who is able to excel in high-pressure situations (Hibbs, 2010) can be described in terms of a recurring set of proposed KPIs. While admitting that this scenario was inherently unlikely, Lindsey (1968) argued that clutch hitters could be classified as players with the ability to manipulate the type of hit delivered depending on the requirements of the team at a given point in the game. For Otten and Barrett (2013), clutch hitters are players who modify their performance to improve under high-pressure situations relative to their own regular or expected performances. In an attempt to quantify this phenomenon, Otten and Barret (2013) manipulated their collected data to show the difference in recorded metrics between regular and postseasons. They discovered that postseason win rates were directly correlated with the difference between the batting metrics from regular and postseason, indicating that under the higher pressures

of postseasons matches, the ability to improve batting performance is essential to producing runs. They indicated that this change may not be independent of a change in pitching success, as pitching metrics also increased between regular and postseasons, suggesting the need for further testing of this hypothesis to determine the contributions of both offence and defence.

With such a variety of statistics and statistical approaches to the sport of baseball, analysis of play can be conducted in depth. Through examining statistics-driven KPIs, the probability of a win or loss can be extrapolated and used to evaluate player performance. The literature supports several points of focus for assessing the effectiveness of KPIs. With the acknowledgement of clutch hitters, this area of research may highlight the changes in performance between regular and postseason games due to the high-pressure nature of the postseason. The aim of this study is to determine the likelihood of more aggressive attempts at taking bases in the postseason series due to the increased pressure experienced in these games (Otten & Barrett, 2011).

METHODS

Participants

The study was conducted using two MLB teams from the American League who participated in the American League Division Series (ALDS) during the 2017 postseason. The Boston Red Sox and Houston Astros participated in a 'best of five' series which was concluded after four matches.

Reliability

In order to test the reliability of the coding system and operator, an intra-reliability test was conducted on a randomly selected match of baseball. A percentage error calculation was used in order to determine reliability, resulting in a 0% error margin.

Key Performance Indicators

The KPIs used for this study were based on the aforementioned literature and chosen according to their relevance for offensive strategies and their perceived importance. The KPIs were broken down into four main areas, with further labels and descriptors applied. The areas were: method of out, base-reaching plays, sacrificial tactics and stolen-base attempts. The definitions of the KPIs used in the study are set out in Table 1.

Ethics

Institutional ethical approval was granted by Auckland University of Technology ethics committee prior to the start of the study

Descriptor	Definition
Out	
Tagged/thrown	A situation where the runner is either tagged by the ball held by an opposing player or out via force play
Caught	The ball is caught on the full, resulting in the batter being out
Strikes	When a batter gains 3 strikes
Base Reaching Plays	
Hit	Hit, when a batter successfully hits the ball and reaches at least first base
D	Double, when a batter successfully reaches second base on the same play after they make contact with the ball
T	Triple, when a batter successfully reaches third base on the same play after they make contact with the ball
HR	Home run, when a batter successfully reaches home plate in the same play after they make contact with the ball, resulting in a run scored
RBI	Run batted in, indicates a run scored as a result of the batter making contact, regardless of whether or not the runner makes first base
BB	Base on balls/walks, when a runner gains 5 balls and is awarded first base
Sacrifice Plays	
Sac Fly	When a player intentionally hits the ball upwards and gets out as to allow a runner to advance or score
Sac Bunt	When a player intentionally bunts the ball and gets out as to allow a runner to advance or score
Stolen Base Attempt	
Successful	When a runner successfully advances a base when not entitled to
Caught	When a player is caught attempting to stealing a base

Table 1. List of key performance indicators used in the present study.

EXPERIMENTAL DESIGN

In order to contrast the KPIs, a four-game series was chosen within the regular season, running from 28 September to 1 October 2017. The video footage was obtained from the MLB.TV media centre found on the MLB website (Major League Baseball, n.d.). Broadcasts varied between matches, with three of the regular season matches broadcast by New England Sports Network (NESN) and one broadcast by Fox Sports. Postseason matches viewed for the purpose of this study were all broadcast by Fox Sports.

Data Analysis

Once all data had been collected, the results of the coding were compiled into an Excel (Version 1705) spreadsheet. Averages over the games and series were calculated and used to compare the two series. Raw values were converted into 'per innings' values by dividing them by the number of innings the team played overall – some matches end prematurely as a result of the home team having a higher score in the middle of the ninth innings or, in the case of a tie in the bottom of the ninth, the teams continue until a team wins. (Thus, accounting for and eliminating the variation which may occur from these results was important.) Team KPI statistics were then calculated, with AVG, SLG, OBP and OPS being generated for both teams in both series, and for both teams combined in each series. The totals of the main KPIs were calculated, as well as the collected descriptors' data. From these descriptors, effect sizes and standard deviations were calculated in order to compare the results of the regular season and postseason series. Cohen's d effect size formula (1988) was used to determine the standardised mean as well as the collected descriptors' data. From these descriptors, effect sizes and standard deviations were calculated to compare the results of the regular season and postseason series. Cohen's d effect size formula (1994, 1988) was used to determine the standardised mean.

Results

Of the eight games in which KPIs were recorded, 140 innings were played. Of the four regular season games, three were played for a full 18 innings, with one being concluded in 17 – whereas only one game in the postseason was concluded in 18 innings, with three finishing in 17.

	Regular			Post		
	Tagged	Caught	Strikes	Tagged	Caught	Strikes
	1.00	1.00	1.00	0.56	1.33	1.11
	1.56	0.78	0.67	1.33	1.11	0.56
	1.00	1.38	0.63	1.33	0.78	0.89
	1.22	0.56	1.22	1.33	0.56	1.11
	0.67	1.11	1.22	1.44	0.67	0.89
	0.89	0.89	1.22	1.00	0.50	1.50
	1.56	0.78	0.67	0.78	1.00	1.22
	1.25	0.63	1.13	0.89	0.78	1.33
Mean	1.14	0.89	0.97	1.08	0.84	1.08
SD	0.31	0.27	0.27	0.32	0.29	0.30

Table 2. Counts of methods of out per innings in regular season compared to postseason

Statistical analysis of the effect size using Cohen's d formula (1994, 1988), conducted on the method of outs which occurred per innings, indicated a trivial effect size in the tagged and caught methods. Both tagged and caught out had effect size values of less than 0.2; however, strikeouts had a score of -0.379, considered to be a small change. However, none of the data was deemed to be statistically significant ($P > 0.05$), and therefore no meaningful change was found between the regular and postseason series for the method of out.

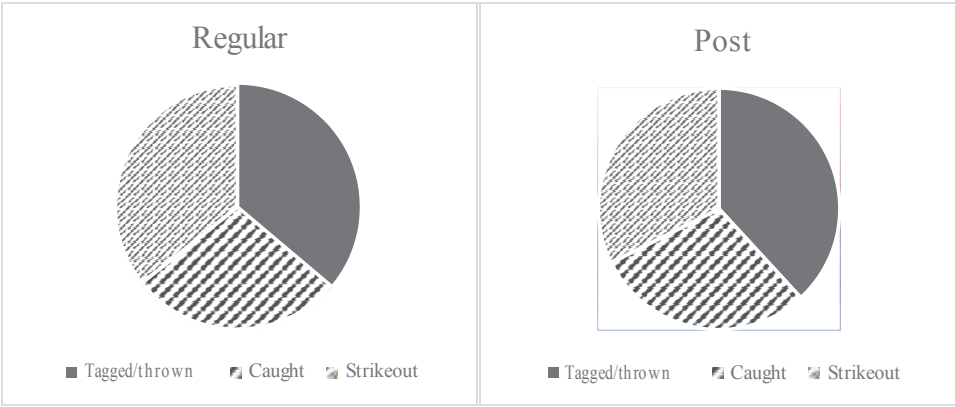


Figure 1. Breakdown of regular season methods of out per innings
 Figure 2. Breakdown of post season methods of out per innings

Base-reaching Plays

With regards to BB, the effect size observed was trivial and was of no statistical significance ($P > 0.05$). The number of hits increased between the regular and postseasons. The effect size measured using Cohen's d (1994, 1988) calculated to 0.84, making it large; however, it was not statistically significant and no meaningful change can be observed ($P > 0.05$). As with the number of doubles observed, the effect size was small and is of no statistical significance ($P > 0.05$).

	Regular	Post
BB	0.396	0.380
H	0.948	1.290
D	0.241	0.193
T	0.000	0.000
HR	0.099	0.194
RBI	0.469	0.599

Table 3. Mean instances per innings for base researching plays in regular and postseason games

No triples were coded over the 140 innings observed. The effect size for the home runs per nine innings was calculated to 0.65, warranting a moderate difference between the means. The difference generates a $P = 0.06$ and so was deemed to be not statistically significant. The analysis of the RBI rates revealed that there was also a moderate increase in the means between the regular and post seasons, although this was deemed to not be statistically significant ($P > 0.05$).

When the correlation coefficient is considered for the hits with reference to the number of runs which occurred within the games, there was a very strong relationship between the number of hits made and the number of runs scored (correlation coefficient = 0.87). Individual correlation coefficients for the regular and postseason series were 0.99 and 0.77 respectively.

Sacrificial Plays

Only a single instance of a sacrificial play was observed within the eight games analysed. One sacrificial play occurred in the first game of the postseason series. Because there is only one point of data within this section, there was deemed to be insufficient evidence for a proper statistical analysis.

Stolen Base Attempts

During the course of the two series, there were six stolen base attempts, with four being successful and two unsuccessful. The greatest number of stolen base attempts occurred in the regular season, with four attempts taking place, three being successful. The postseason only contained two stolen base attempts, with one successful and one unsuccessful. While some data was recorded relating to stolen base attempts, there was not enough data to qualify for statistical analysis, as very high standard deviations indicate that the data was negligible.

Hitting Statistics

An analysis of the hitting statistics indicates a low spread within the data (Table 4). Effect statistics for the data show a large mean difference between all statistical formulas. There was a statistically significant change between the combined OPS for both teams in the regular and postseasons, with a standardised mean difference of 0.86 ($P < 0.05$).

	OPS		SLG		OBP		AVG	
	Regular	Post	Regular	Post	Regular	Post	Regular	Post
Mean	.873	.677	.371	.508	.306	.365	.307	.238
SD	.234	.223	.145	.193	.082	.059	.061	.075

Table 4. Mean and standard deviations for offensive statistic, regular vs. post season.

A value larger than the effect size can be described as large. SLG and AVG also registered an effect size of 0.81 and -1.00 respectively, signifying a large change in the mean of statistical significance ($P < 0.05$), albeit in different vertices. However, OBP had an effect size of 0.82, indicating a large mean difference ($P > 0.05$); therefore, the effect is not statistically significant and indicates that this may not be a meaningful change. This indicates that, of the effects which can be described as statistically significant, the means for both SLG and OPS both increased from postseason to regular season, whereas the means for AVG decreased from regular to postseason. Correlation data for the four primary offensive statistics and the runs per innings were comparatively lower during the postseason, as shown in Table 4. The correlation coefficients for all measures were lower:

	AVG	SLG	OBP	OPS
Regular	0.959	0.974	0.929	0.971
Post	0.296	0.812	0.453	0.768

Table 5. Correlation Coefficient variables regular vs. post season

In summary, there is a significant relationship between hits made and runs scored. Mean OPS and SLG increased significantly from post to the regular season, while AVG decreased significantly from regular to postseason.

DISCUSSION

An analysis of the results from the first section (methods of outs) suggests very few differences between the regular and postseasons. There is some change in the distribution of outs between the caught and strikeout rates. It is important to note that frequencies of outs could not change, as the game demands that three outs mark the conclusion of an innings, so that the analysis of the frequency of individual balls or strikes could be an interesting subject for future research. Based on this preliminary study, a more in-depth analysis of the mechanics of the outs within baseball should be conducted. Further research into the underlying tendencies noted in the regular and postseasons should be undertaken to allow us to better understand the role which the distribution of outs plays in determining changes in external pressures and performance barriers which may affect this KPI.

While Table 2 shows the data for the base-reaching play KPIs, the size of the P values makes the data statistically insignificant. An analysis of the correlation coefficients reveals an observable difference between the coefficients for the regular and postseasons. In this context, the data suggests that the main mode of scoring in the postseason is not simply through gaining hits – instead, there is a greater emphasis on a player being able to remain on base and pick specific times to advance. The opposite is seen in the regular season, where the ability to simply make it on base will most likely lead to a subsequent run. When compared to the aforementioned batting statistics, the SLG also had a higher correlation with run rates than AVG in the postseason, suggesting that the ability to gain extra base hits and advance past first base is an important skill for the postseason, in contrast to a player's ability to simply make first base in the regular season.

The data shown within the results section indicates that there is a statistically significant increase involving noticeable change in the means for the offensive statistics of SLG and OPS. Increased aggressiveness in the offensive play of

a team in the postseason (as opposed to the regular season) is possible. As described in the literature, SLG and OPS are the primary statistics which describe aggressiveness in the batter's initial baserunning (Houser, 2015). This increase in the level of aggressiveness might reflect the emergence of clutch hitters within the team. As Hibbs (2010) argues, the highly demanding atmosphere of postseason matches may account for the increase in these statistics, and make batters more aggressive in their baserunning in order to place themselves in a more advantageous position for the next offensive play.

In their statistical analysis of postseason win projections and regular season batting metrics, Otten and Barrett (2013) discuss the high correlation between win rates in the postseason and batting statistics within the regular season. When compared with the results of the present study, there is an attributable difference between the regular and postseasons, and this increase in mean statistics of batting effectiveness supports the claim by Otten and Barrett (2013) that the pressures of the postseason can affect players' performance. In the present study, the results show that players become less able to make contact with the ball, having a decreased AVG, yet the number of extra bases acquired following a successful hit increases during the postseason.

Another difference in the hitting statistics between the regular and postseasons is the change in correlation coefficients of run rates and hitting statistics. Although there was a noticeable drop in the effectiveness of the AVG statistic in predicting run rates in the postseason, according to Houser (2015) AVG is an inefficient statistic for determining win percentages. Nevertheless, such a notable change signals the possibility that only the more efficient power hitters are able to advance past first base. While SLG increased from regular to postseason, the decrease in AVG may be attributed to the higher number of home runs within the postseason (0.099 per innings in the regular season vs 0.194 in the postseason), as the number of home runs acquired is equal to four hits in the SLG equation.

Returning to the question of pressure within the postseason matches and the phenomenon of clutch hitters, when considering Otten and Barrett's (2011) explanation for clutch hitters and how they emerge in situations where performance above the normal is required, the ability to produce home runs, an instantly scoring play, may be considered one of the most important KPIs to consider when selecting players for a playoff team.

Very few stolen base attempts were made in the postseason, possibly due to the tactical demands of the game and the relative importance of keeping players on base for the postseason. Demmink (2010) has studied the importance of stealing bases and discusses his findings on the increase in win rates as the number of stolen bases increases. Stealing bases also brings an element of risk, as he found that a quarter of players were caught stealing bases. While the successful steal of a base – from first base, for example – would place the runner in a scoring position, there is still a probability of the runner being caught and forfeiting an out and space on a base in that innings (Lindsey, 1963). The relative importance of this move should not be overlooked, however, as in the high-pressure environment of the postseason, pitchers are also under immense pressure to win the game and, as Demmink (2010) found, a pitcher's subsequent performance is adversely affected when a player steals a base. Although only a very small amount of data was analysed with regards to the stealing of bases within a game-based setting, its possible importance should be recognised.

Application to Coaching

The findings of this study may help coaches choose which players to use for the regular and postseasons. The substantial increase in the SLG statistic in the postseason may warrant the use of more power hitters in high-pressure series. Compared to the regular season, where gaining a base hit was of fundamental importance, in the postseason the ability to simply make successful contact and score runs showed a higher correlation, suggesting that players with the highest consistency of contact are preferred.

Limitations

While this paper could serve as a preliminary pilot study, it has some limitations which impact on its findings. One limitation is the relatively small study size. As only eight games were analysed, some variables had very little instances and so were deemed unimportant for the purpose of analysis. With a much larger sample, size trends within smaller variables may become easier to observe and present new areas of analysis. As variability may be present between the play styles of the teams in the MLB, future studies should develop the coding system used here and further test the way in which the variables differ from one another. In addition, only the preliminary round of the postseason was analysed. In order to get a true indication of the effect of the pressures of competing in both regular and postseasons, the effect of the postseason series on subsequent performance should be considered.

With the inclusion of so many variables, the quality of the analysis can be questioned. Because of the variety of outcomes and instances which were coded for, there was a lack of in-depth analysis. Thus some findings were discarded due to a lack of possibly relevant data, which may have had an influence on other statistical breakdowns. These factors indicate the need for future research, where the type and velocities of pitches are analysed and tested against the performance pressures which are present within postseason matches, as opposed to the regular season.

Future Research

Future research might well pursue further analysis of clutch hitters within baseball. As the present study involved a whole-team analysis, using Otten and Barrett (2011) to substantiate its claims, an analysis of individuals and their performance under specific constraints may reveal more about the phenomenon of clutch hitters. While not a new field of research, statistical uncertainties remain about clutch hitters, and the mechanisms responsible for the differences in performance, due to pressures in both regular and postseason matches, should be considered in greater detail.

As mentioned, our study lacked depth in some aspects of its analysis. The field of sports analysis as it applies to baseball would benefit from a coding system designed to further break down the areas considered above. One potential area might be the study of pitch type, speed and location (compared with outcome) in order to build on the groundwork established in this study through the breakdown of methods of outs. Further research into different patterns of baserunning under pressure would also be useful, including analysis of the decision-making process involved. Following this theme, more work on the strategies involved in stealing bases in postseason matches might reveal the role of pressure in the decision-making process and reveal the risk–reward relationship inherent in attempting a base steal.

CONCLUSION

We found some instances within the game of baseball where there are differences in aggression levels of offensive plays in a regular season match compared to a postseason match. Through the statistical analysis, we can pinpoint the areas where performance both increases and decreases as pressure is added in the postseason game. A major finding of the study was the increase in the main power statistic, SLG. Where the AVG decreased, the SLG rose, indicating increased levels of aggression when taking extra-base hits and where players were looking for opportunities to place themselves in a scoring position. The most prominent finding, however, was evidence that postseason run rates had a higher correlation with a player's ability to make an extra-base hit – for example, a double, as opposed to simply making first base. Our research question – to determine the existence of a change in the offensive tendencies of baseball players in the postseason compared with the regular season – has been answered. Our data indicated that there was an attributable change in statistical measures relating to batting between regular and postseason matches.

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MAKING AND DOING AT HOME: PATCHWORK AND OTHER SEWING CRAFTS AS OCCUPATIONAL THERAPY

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INTRODUCTION

The Otago Museum in Dunedin, New Zealand, is home to a sizeable collection of post World War Two textile crafts made as occupational therapy by Frances Jane Eames. Hand stitched patchwork bedspreads, garments, a curtain and a variety of 'soft' toys provide wonderful examples of creativity, but also of making-do, by re-using and recycling of fabrics, prints and surface designs available in the mid-twentieth century. Eames was housebound and often bed-ridden for over fifteen years by what has been described as severe rheumatoid arthritis, and was encouraged and aided by her daughter Jane, a physiotherapist, to keep her hands occupied with these sewing projects that are superb examples of mid-twentieth century women's domestic craft, some of which are now part of Otago Museum Collections. This paper provides context and showcases some of Frances Eames' extraordinary output and offers an opportunity to consider occupational practices of the past in the light of current theory.

Frances was born in England in the late nineteenth century (c.1890) and trained as a nurse/midwife, marrying Norman Barker about the end of World War One, and giving birth to Jane on 20 July 1921. Norman Barker died in England, and Frances then married Albert John Eames in 1925 and the family emigrated from England to New Zealand. Frances continued working at least intermittently in New Zealand as she is listed as a nurse in a Dunedin street directory in the early 1930s (Stone, 1932).

Jane studied physiotherapy in Dunedin graduating in 1943, then worked in private practice and at the Mater Hospital in Dunedin. While she was not trained in occupational therapy, Jane's skills would have led her to realise that her mother needed to have her mind and hands occupied as her condition got worse, and to keep moving those parts of her body that she could move without too much pain. She would have wanted to provide her mother with some goal directed activity that had meaning for her and was a labour of love, (Caulton and Dickson, 2007). She would have been very aware of the loss or limitation of activities that prevented Frances from taking part in normal life on an equal basis with others, and the resultant possibility of feelings of hopelessness, depression, and anxiety (Orchanian, 2012).

Occupational therapy is concerned with the individual's ability to perform life tasks, meet their own needs and be a contributing member of a community (WFOT, 2012). The profession of occupational therapy developed considerably in various parts of the world between World Wars One and Two, partly as a need to return people to combat or productive war work. The first texts and schools were established overseas during World War One and various associations of professionals began in the 1930s. In New Zealand in the 1920s Trained Masseurs' Associations were established as precursors to both occupational and physio therapies (Kai Tiaki, XIII, 1920, p. 42). But despite talk of a team approach to rehabilitation between the disciplines, in Otago at least, Occupational Therapy was established as a separate specialty, becoming a department of the Dunedin hospital in 1941 (Shaw, 2013).

Jane probably helped her mother with many life tasks such as grooming, shopping, cooking, and significantly for this paper; 'to engage in satisfying recreational and avocational pursuits.' (Mosey, 1981, p. 7). So, for her mother; Jane took on the role of occupational therapist as well as physiotherapist, and the collaboration between therapist and client must have been planned by both in order to achieve best possible outcomes. Presumably Jane undertook these roles with the blessing and even prescription of Frances's medical doctor, since that was usual procedure for both professions at this time. Because pain, swelling, 'undue heat' and limited movement characterise various rheumatoid conditions, occupational therapy was done with careful grading and timing. Crafts requiring several distinct movements were thought more suitable (Hick, 1948).

It was apparent that textile and dress items were treasured in this household, as Jane's baby clothes and toys, and the dolls clothes made by her grandmother had been brought to New Zealand and kept, so it was probably inevitable that the therapeutic craft chosen would concern textiles. However, any craft had to be done without machinery, as Frances was often bed-ridden during the 1950s and 1960s. Patchwork fitted this requirement and had been revived as a hobby during World War Two in places such as London, because it was portable and could be done during black-outs. It is of course entirely possible that Frances's interest in patchworking and other textile crafts predated her arthritis, and she had already been joining patches before she became bed-ridden.

To diversify the range of movements and provide alternative recreational and creative interest, as Levine (1987) and Cronin and Graebe (2018) have pointed out was necessary for patients in these circumstances, Frances also made items other than patchwork. Hooked floor rugs that re-used and recycled knitted textiles into modernist designs, dressed dolls and soft toys are part of the Otago Museum collection of her work, but some also went to fundraisers for the Catholic church, schools or charities. Inspiration and patterns for the hooked rugs and soft toys may well have come from craft and home-making magazines of the period, such as *Stitchcraft*, but the materials used were those on hand, or donated by local businesses or friends.



Figure 1 & 2: Humpty Dumpty and dolls. Frances Eames, 1950's-60's. G2008.446, G2008.482, G2008.476. Source: Otago Museum, Dunedin

However, patchwork was the most prolific of the activities, and Frances recycled garment fabric scraps or old sample book pieces into curtains, tablecloths, bedspreads, toilet bags, a skirt and dressing gowns, which were used to decorate, brighten and warm their Dunedin villa. The fabrics to supply this quantity of output must have come in part at least from friends and fellow church members, so social connections were recognised and remembered in the display of the resulting useful household items. As Fitz Gerald (2003) points out, the use of fabric gifts as mementoes included in patchwork was not new.



Figure 3: Padded quilt using printed fabrics. Frances Eames, 1940's-50's G2008.377. Source: Otago Museum, Dunedin

According to Margaret Agutter, writing for *Pitman's Craft for All Series* in 1949, patchwork involved either pieced work where the small geometric shapes are first mounted on paper patterns, or appliqué, where odd shapes or patches are applied directly to a foundation fabric. Agutter (1949) recommended cotton prints and small patterned chintzes as the best materials to use for patchwork bedspreads and curtains, but also stated that silks and satins and 'the modern artificial silks produce a beautifully rich fabric when pieced together'. (p.1)

The fascination of all patchwork lies in the fact that the lovely multi-coloured fabric grows under the needlewoman's fingers, and ambition grows with it. A modest cushion cover has a way of blossoming into a handsome quilt, or full skirted housecoat...' (Agutter; 1949, p.2-3)



Figure 4: Chair back cover: Frances Eames, 1940's-50's, G2008.379. Source: Otago Museum, Dunedin



Figure 5: Single bedspread. 2.54mx1.68m. Hexagonal patchwork of plain and patterned fabrics stitched onto plain green Tobralco fabric. Patches have diameter of 2 1/4 inches, 57mm. Frances Eames, 1940's-50's, G2008.408. Source: Otago Museum, Dunedin



Figure 6: Crazy patchwork bedjacket, embroidered, quilted, padded. Frances Eames, 1930's-50's, G2008.381. Source: Otago Museum, Dunedin

Crazy patchwork is the simplest form of appliqué patchwork according to Agutter (1949). It was a favourite form of patchwork in the mid-late nineteenth century, and ideal for showing off interesting fabrics and embroidery stitches (Fitz Gerald, 2003). New Zealand museums hold wonderful examples of the earlier fashion for crazy patchwork, thereby recording fabrics available to settlers then. 'There is no planned design, and each patch of irregular shape and size is stitched in turn to the foundation material in a gaily coloured mosaic....The foundation...may be of any durable, sound material – cotton sheeting, linen or poplin for cushions, quilts or smaller pieces, soft hessian for hangings or heavy furnishings' (Agutter, 1949, p.17). Crazy patchwork uses 'every scrap of stuff however small or strangely shaped'; 'there is no wastage and much of the charm lies in the odd irregularity of size and shape' (Agutter, 1949, p.2.) 'Appliqué patchwork must afterwards be lined, so that the foundation material should not be too heavy or the finished work will be stiff and bulky' (Agutter, 1949, p. 17).

Frances's crazy patch bedjacket, her only surviving item in this form of patchwork, has a number of patches outlined in feather stitch.



Figure 7: Quilted, padded bedjacket. Frances Eames, 1930's-40's, G2008.382. Source: Otago Museum, Dunedin



Figure 8: Dressing gown, with shawl collar and wide front lapels, knitted fabric tie belt, long sleeves with narrow cuff, domes at waist, slightly gathered skirt, with patch pocket on right hand side. Frances Eames, 1940's, G2008.383. Source: Otago Museum, Dunedin



Figure 9: Dressing gown with collar and buckled belt. Frances Eames, 1940's-50's, G2011.287. Source: Otago Museum, Dunedin

Surviving paper patterns for Frances' patchwork show that she and Jane followed Agutter's instructions to make hexagonal patches from a circle with a radius of one inch, 2.5 cm – 'a very attractive and decorative size to work with' (1949, p.10). Once a shape and template are chosen then an 'ample supply' of paper patterns needs to be cut as accurately as possible. They cut accurate hexagons from old medical journals, magazines and newspapers. The fabrics were cut slightly larger and attached with tacking (or basting) to the paper with edges turned over the paper shape. Then each hexagon was whip stitched to its neighbour, in a technique often referred to as English piecing' (Fitz Gerald, 2003). 'The success of all pieced patchwork depends on the perfect fit of each individual patch; an error of a fraction ... will cause a misfit, out of all proportion to its apparent triviality, when the pieces are sewn together' (Agutter, 1949, p.13).

Agutter's *Modern Patchwork* has a chapter on the patchwork housecoat, a 'coat of many colours'. We don't know for certain that Frances and Jane Barker-Eames had a copy of Agutter's book, but the number of dressing gowns produced by Frances strongly suggests that it was an inspiration.



Figure 10: Dressing gown with cord tie. Five diameter hexagons. Frances Eames, 1950's-60's, G2008.403 Source: Otago Museum, Dunedin



Figure 11: One side of hallway curtain, 1130 at hem x 2240mm. Frances Eames, 1950's. G2008.395 Source: Otago Museum, Dunedin

As well as the dressing gowns Frances made household furnishings such as bedspreads, table covers, armrest protectors and a double-sided curtain that hung in the hallway of their house. There was a sense from one visitor at least of the house being 'papered with patchwork' (White, 2012). Bedcovers (or quilts in American tradition), as well as the other items Frances made are durable, decorative, and lasting 'documents of the everyday lives of... women' (Velde, 1999).

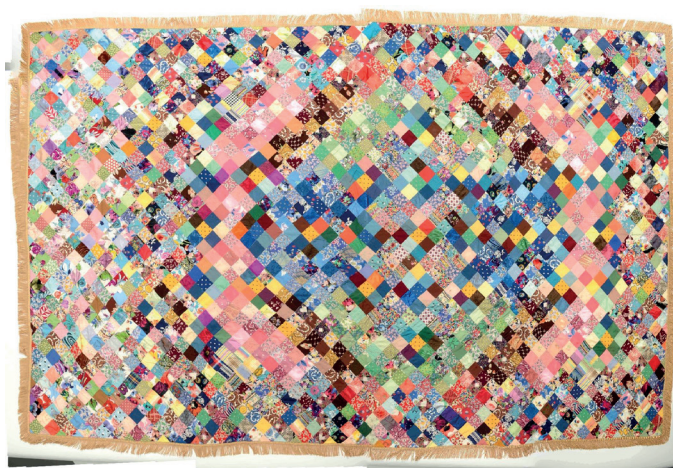


Figure 12: Fringed bedspread. Square patches of 50x50mm on diagonal in a nine patch rhythm of alternate plain and more patterned. Frances Eames, 1940's-50's, G2008.401 Source: Otago Museum, Dunedin

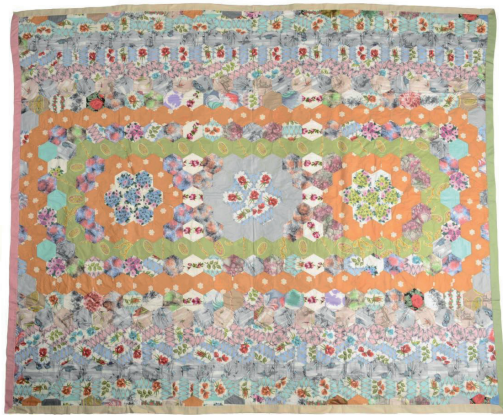


Figure 13: Cotton bedspread made from 613 large hexagon shapes, 1900x1640mm. Frances Eames. 1940's-50's. G2008.405 Source: Otago Museum, Dunedin



Figure 14: Bedspread with lavender theme. Frances Eames. G2011.288 Source: Otago Museum, Dunedin

Many of the fabrics used are repeated among items, so there must have been a reasonable supply of the right kinds of fabric for patchworking, perhaps from parishioners and friends and perhaps some were purchased. Floral fabrics were clearly favourites and the proliferation of daisies and chrysanthemums reflects their ubiquity in fabrics of the mid twentieth century, although it is tempting to also speculate that Frances's Japanese sojourn may have predisposed her to these florals. One can see that Frances became more ambitious and tried more planned designs, no doubt with the assistance of her daughter who did any machine stitching required, such as on the frilled bedspread. Was her aesthetic taste influenced by her time in Japan in the 1920s? That is rather hard to ascertain, since Japanese textile design at that time was inclined towards Western styles, including prints that resembled patchwork (Iwamoto Wada and Irai, 2011).¹

Creative activities such as needlework have historically been used in occupational therapy, but their use has declined in recent decades (Mullersdorf & Ivarsson, 2016). A recent study in Sweden found that occupational therapists still used creative activities to strengthen the clients occupational performance, well-being and self esteem, and a qualitative study in Britain with 35 women aged 18-87 who had acquired a disability or chronic illness in adulthood, found that needlework activities were commonly viewed as providing a means of managing pain, unstructured time, self-image and reciprocal social roles. The women's accounts confirm the value of creative activity for patients learning to cope with chronic conditions (Mullersdorf & Ivarsson, 2016; Reynolds, 1997). Needlework as occupational therapy clearly became a way of life for Frances Eames: we know that she donated some of her output to the church (Malthus, 2014), and that she entered items into Dunedin's Winter Agricultural and Pastoral Shows. She was placed second or third, and at least once first, in the patchwork section of the needlework crafts, and also placed for best-dressed novelty doll on more than one occasion (e.g. Anon, Otago Daily Times, 1961).

She managed to turn industry and keeping occupied into a form of art, incorporating mass-produced textiles in multiple colours and patterns into what Schoeser (2012) has described as 'carefully judged juxtapositions' of small pieces of colour and pattern to create subtle or not so subtle gradations of colour; '...using the simplest of tools: paper, scissors, needle thread, pins and above all hands' (p. 20). We can only hope that in doing so, she managed her pain, filled her days with enjoyable creativity and felt like she was contributing to her community.

Schoeser (2012) has commented that 'Western patchwork, initially a form of necessary recycling, now 'petitions' for the artistry of finely judged assemblages.' (p.365) But in the case of Frances Eames' patchwork the charm of the slightly more random effects gained by using one's own scraps and those from friends, and fabrics not especially made for the craft of patchwork, such as the recycled evening dresses that appear in the curtain, make for a more pleasing outcome. Her patchwork and soft toy legacy leaves us in awe of one sort of occupational therapy: making and doing on a domestic yet grand scale. It provides a wonderful reference library of mid-twentieth century fabrics, prints and surface designs, and ideas for combining them.

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THE INFLUENCE OF FATIGUE ON RUGBY LEAGUE PLAYERS: COMPARING COLLEGE AND CLUB COMPETITIONS

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ABSTRACT

Few studies have considered the impact of varying match duration on injury rate and physiological demands in junior rugby league. Forty-two male junior rugby players from school ($n = 24$; age $M = 16.46$, $SD = 0.83$ years) and club level ($n = 18$; age $M = 17.2$, $SD = 0.55$ years) rugby were filmed in ten competitive matches and analysed using Sportscode Elite (V10, Hudl, USA). The school matches were 30 minutes less than club matches in duration. Data was standardised for duration for each variable. Differences between level were analysed using t-tests. Significant differences occurred in ball carries ($p < 0.001$), injury frequency ($p = 0.029$), passes ($p = 0.0004$) and tackles ($p = 0.006$), with club players experiencing relatively greater scores on each measure. The majority of injuries occurred in the second half, regardless of level (71% school, 73% club). In school rugby 43% of injuries were sustained by the tackling player; whereas in club junior rugby 46% of injuries were sustained by the tackled player. The injury rate (per 1000 hours) was greatest at the junior club level. The results show a difference in the demands on junior players determined by level.

INTRODUCTION

Few studies have considered the physiological demands in junior rugby league and the influence of varying match duration, at junior levels, on injury rate. Previous research has indicated the physiological demands that require players to have good aerobic capacity ($VO_2 \max$), speed, agility, muscular strength and power (Gabbett, 2001). Gabbett (2002) found that the $VO_2 \max$ of junior rugby league players ranged from 32.1 to 46.1 ml/kg-l, showing a decrease in aerobic capacity when compared to professional and amateur players. However, no research has considered the influence of varying duration of match time.

Speed plays an important role in rugby league. Players are required to quickly organise themselves in attacking and defensive situations (Meir et al., 2001). Meir et al. (1993) found that rugby league players rarely sprint more than 40 metres. Junior rugby league players sprinting ten and 40 meters measured 2.58 and 6.63 seconds respectively (Gabbett, 2000, 2002). Amateur senior players were faster and measured 2.17 and 6.04 seconds across the same distances (Gabbett, 2000), and professional players were timed at 1.71 and 5.08 seconds (Meir et al., 2001; O'Connor, 1996; Twist et al., 2014). Rugby league players require agility in order to accelerate and decelerate to change direction (Twist et al., 2014). Gabbett (2002) used the Illinois agility test which found a difference between senior and junior rugby league players of 17.4 and 17.9 – 22 seconds respectively. Currently, the research supports

a difference between age group demands, but has not considered differences in demand due to varying time durations at the junior level.

In rugby league, players are required to generate rapid muscular force. This is important when tackling, pulling, lifting and pushing during games (Gabbett, 2003). Baker (2001 & 2002) showed that the professional rugby league player has greater lower body strength than high school junior rugby league players. Vertical jump is another way of measuring lower muscular strength. The results from junior rugby league players show jump heights of 50-58 cms (Gabbett, 2007). Professional rugby league players have shown a 30% increase in performance of vertical jumps when compared to junior players (Gabbett, 2000). The literature has shown various differences in attributes when comparing senior and junior rugby league players. Aerobic capacity, speed, agility, muscular strength and power are all attributes that are shown to increase when the standard of play increases (Gabbett, 2002).

Effect of Fatigue on Defensive Skills

The success of rugby league games is partly attributed to tackling ability and winning tackling situations (Twist et al., 2012). Gabbett (2008) showed that fatigue produces progressive decrements in tackling technique. Interestingly, players who showed the best technique (pre-fatigue) experienced the greatest reductions in tackling technique when fatigued. If coaches are able to minimise the fatigue associated with game-specific repeat sprint efforts, fatigue during tackling would decrease, allowing for an increase in quality (Gabbett, 2008).

Effect of Fatigue on Attacking Skills

Johnston, Gabbett and Jenkins (2013) suggested that junior rugby league performance decreased due to fatigue during an intensified competition. Major reductions in distance, high-speed sprints, low-speed running and repeated sprint ability were found. Gabbett (2013) showed that higher match intensity, and greater distance covered at low and high speeds, were strongly correlated to winning teams in rugby league competitions. Therefore, reductions in these variables may prove beneficial for the outcome of match play in rugby league (Johnston, Gabbett, & Jenkins, 2013).

Incidence of Injury

Increase in playing standard correlated with increased playing intensity, which has shown an incremental rise in injury rates (Gabbett, 2003; King et al., 2006; Gabbett, 2001). Data was standardised as the number of injuries per 1000 hours of play. Gabbett (2000) provided evidence showing the injury rate of amateur players to be 160.6 per 1000 playing hours. Interestingly, a review of amateur rugby league players participating in a seven-player tournament showed an overall injury rate of 285.5 per 1000 hours. Gabbett (2001) showed that occurrence of injury in amateur rugby league was less than that of professional rugby league, acknowledging reduced playing intensity of amateur matches compared to professional matches as the main reason for this difference. The majority of injuries in amateur (Gabbett, 2001) and professional (Stephenson, 1996) matches occur during tackles. Results from rugby league reveal that tackled players suffer more injuries than the tackling player (Gabbett, 2003; King et al., 2006; Stephenson, 1996). However, this finding is reversed in studies of amateur players, showing the tackler sustaining more injuries than the tackled (Gabbett, 2001).

Reductions in tackling technique due to fatigue in amateur rugby league have been shown to increase injury rate (Gabbett & Domrow, 2005; Gabbett, 2008).

Time of Injury

The timing of injury is important in identifying whether extended game time results in decrements in quality in junior rugby league. Insight as to when injuries occur could provide evidence for making suggestions on how to select and qualify the length of the game. Gabbett (2000) found that in amateur rugby league, more than 70% of

injuries occurred in the second half of play. This reflected the notion that reductions in skill due to fatigue contribute to the occurrence of injuries. Semiprofessional players, however, show a significantly lower rate of injuries sustained in the second half. This conflicting evidence is most likely due to increased levels of aerobic fitness resulting in reductions in fatigue-induced injuries (Gabbett, 2003).

No study has investigated the relationship between injury occurrence and timing of play in junior rugby league. Johnston et al. (2013) showed that junior rugby league players showed increases in muscular fatigue over a five-day competition. Results show that highest decrements in physical performances due to fatigue were observed on days 4 and 5. Although no studies have documented when the majority of injuries in junior rugby league occur in the game, studies have shown that the rate of fatigue induced by game play decreases as the playing standard increases (Gabbett 2000; 2002; 2003).

The few studies that have focused on junior rugby league have found that the physiological demands placed on junior rugby league players differ dramatically from those placed on senior and professional players. This has been attributed to increased fitness and the greater neural and muscular adaptations experienced in training five days a week (professional players), as opposed to two days (junior players). These adaptations to training and increased fitness levels have been shown to reduce the rate of muscular and mental fatigue, which is a causal factor in decrements in skilled performance. Tackle technique in rugby league – and some offensive skills in other sports – have been shown to diminish during fatigue-induced game situations, with the rate of injury increasing as the standard of play increases. While most studies agree that the majority of injuries occur in tackles, there is conflicting evidence whether the tackled or tackling player sustains more injuries. In amateur rugby league, the tackling player sustains the majority of injuries, more often in the second half. It is plausible that similarities in junior rugby league can be found. However, no studies exist documenting the timing of injury in junior rugby league.

There are few existing studies on the effects of match play in junior rugby league, and gaps in research are evident. The purpose of this study was to (1) investigate the impact of varied match duration on performance; and 2) identify differences in injury rate due to match duration in junior rugby.

METHODS

Design

The performance indicators of 42 male rugby players at two levels, school ($n=5$) and club ($n=5$), were analysed using Sportcode Elite (V10, Hudl, USA) during ten competitive games during their season. Both teams had been respective champions of their grade for the past few seasons.

Participants

The school rugby players ($n = 24$; age $M = 16.46$, $SD = 0.83$ years) competed in the College Rugby League (CRL), and the club rugby players ($n = 18$; age $M = 17.2$, $SD = 0.55$ years) in the ARL under-18 open competition (CLBRL). Ten games from each competition were filmed and coded. Written consent was provided by each participant.

Procedure

The procedure followed a variation of the protocol devised by Nicholas et al. (2004). Live footage of each game was captured through a single video camera positioned parallel to the halfway line. Each game was coded (Sportcode Elite V10, Hudl) with reference to the pre-defined performance indicators (Table 1).

Ethics

Institutional ethical approval was granted by Auckland University of Technology ethics committee prior to the start of the study.

Performance Indicators

Performance measures were identified (Hughes & Barlett, 2002) using research from previous studies (Eaves & Broad, 2007; Hughes & Franks, 2004; Lago-Penas, Lago-Ballesteros, Dellal, & Gomez, 2010; Twist et al., 2014). The performance actions were then refined to form an extensive list of key indicators in rugby league (Table 1).

Performance indicator	Definition
Successful passes (as % of team passes)	A deliberate attempt to pass the ball to a teammate, resulting in retention of possession.
Successful tackles (as % of team tackles)	A physical act made by the analyzed team that results in halt of play, until the attacker returns to their feet.
Ball Carries	An attempt of the attacking team running the ball towards the defense, gaining meters and getting tackled. Stipulated by a halt of play, resulting in retention of the ball.
Line breaks (as % of total team carries)	An attempt of the analyzed team running the ball towards the defense resulting in a breach of the opposition's defense. This action is classified by no halt in play and no increase in the tackle count.
Points for	An action that results in addition of points to the scoreboard for the analyzed team. When either a try, conversion, drop goal or penalty kick is signaled by the official in charge
Points against	An action that results in the addition of points to the scoreboard of the non-analyzed team. When either a try, conversion, drop goal or penalty kick is signaled by the official in charge
Attacking errors	An action by the analyzed team that results in a hand over of possession. Classified by a knock on, forward pass, offside, out of bounds or false play of the ball at the referees discretion.
Defensive errors	An action by the analyzed team that results in penalization and a reset of the tackle count. Actions include high tackles, dangerous tackles, failure to release attacker and defensive line not receding 10 meters as deemed by the referee.
Incidence of injury	Any pain or disability endured by a player, which results in assessment by the manager immediately or after the match. With particular significance on the timing of injury and who (tackler or tackled).
Send offs	An illegal action that results in a player of the analyzed team being penalized by a yellow card (10 minute absence) or dismissal (sending off) as deemed by the referee.

Table 1. Key Performance indicators identified in junior rugby league

Reliability

Discrepancies of <5% error were achieved, consistent with previous studies (Hughes & Barlett, 2002; Nevill, Atkinson, Hughes, & Cooper, 2002), to prove the reliability of the analysis.

Intra-observer reliability was assessed through repeat analysis of three games. Discrepancies of <5% error were achieved, consistent with previous studies (Hughes & Barlett, 2002; Nevill, Atkinson, Hughes, & Cooper, 2002) to confirm reliability.

Data Analysis

Descriptive statistics present the frequency of each performance indicator. An independent t-test was conducted to establish whether a significant difference existed between groups. Effect size and magnitude measures described the strength (Drinkwater, Hopkins, McKenna, Hunt, & Pyne, 2007).

Player injuries, successful passes and successful tackles were displayed as percentages. As CRL and CLBRL duration differed by 30 minutes, percentage data allowed comparisons to be drawn. To be comparable with previous studies, the injury rate per 1000 hours (IR) was calculated using the equation found in Phillips et al. (1998).

RESULTS

Table 2 shows the descriptive statistics regarding the performance indicators of both college and club rugby league. There were significant differences for level played.

Ball carries showed a significant difference between CRL (M=85, SD= 12) and CLBRL (M=138.8, SD=10.6), $t(7) = -7.3$, $p = 0.0001$). The incidence of injury was significantly different for level, with CRL (M=1.4, SD=1.1) and CLBRL (M=4.4, SD=2.1), $t(6) = -2.8$, $p = 0.029$. Mean passes were significantly different between the levels, with CRL (M=70, SD=1.6) having less than CLBRL (M=132.8, SD=18.1), $t(8) = -5.8$, $p = 0.0004$. College mean tackles – CRL (M=80.2, SD=11) – was less than club, with CLBRL (M=136.8, SD=26.6), $t(5) = -4.4$, $p = 0.006$. Although there was a large magnitude of difference for attacking errors – CRL (M=7-6, SD=1.9) and CLBRL (M=10.2, SD=1.9), $t(8) = -2.1$, $p = 0.067$ – it was not significant.

Performance Indicators	College		Club		t	f	P value	Effect size
	Mean	SD	Mean	SD				
Attacking Errors	7.6	1.9	10.2	1.9	-2.1	8	0.067	LARGE
Defensive Errors	5	3.8	5.8	2.2	-0.4	6	0.697	SMALL
Ball Carries	85	12	138.8	10.6	-7.3	7	0.0001*	LARGE
Injury	1.4	1.1	4.4	2.1	-2.8	6	0.029*	LARGE
Passes	70	16.2	132.8	18.1	-5.8	8	0.0004*	LARGE
Points against	4.8	2.6	4.2	2.8	0.4	8	0.733	SMALL
Points for	7.4	3.8	9.8	6.4	-0.7	7	0.494	SMALL
Send offs	0	0	0.2	0.4	-1.0	4	0.374	MODERATE
Tackles	80.2	11	136.8	26.6	-4.4	5	0.006*	LARGE

Table 2. Mean and standard deviations of performance indicators enabling comparison between college and club rugby league

The majority of injuries occurred in the second half (Fig. 1) – 71% and 73% for college and club competitions respectively. Of the 71% of all injuries that occurred in the second half (Fig. 2) during the college competition, 43% were sustained by the tackling player (TKR). This differs from the club competition, where of the 73% of injuries that occurred in the second half, 46% were sustained by the tackled player (TKD).

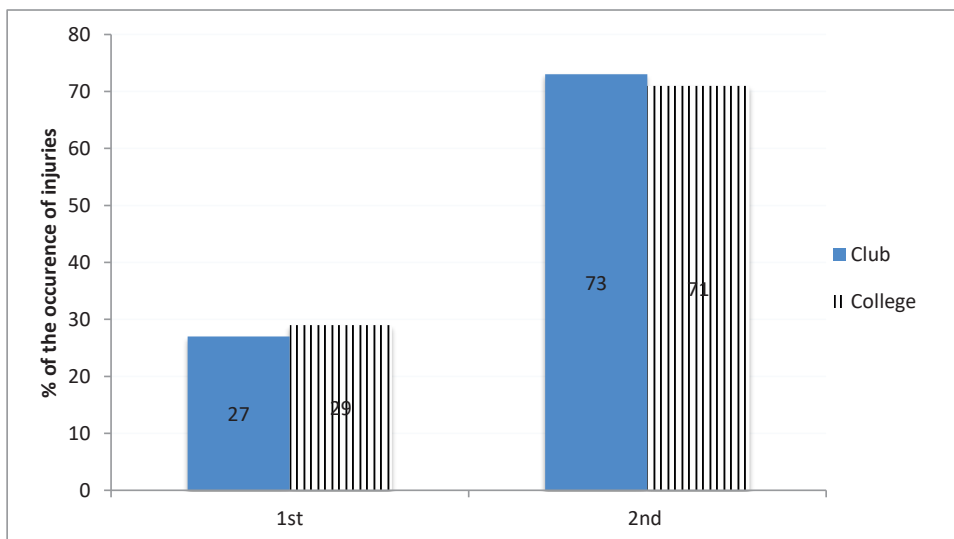


Figure 1. Percentage of injuries in the first and second half regarding college and club rugby league

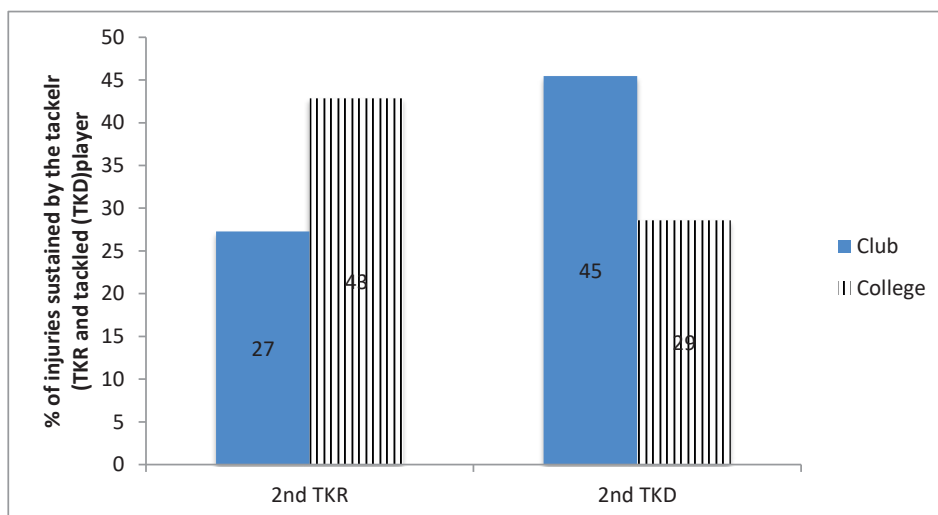


Figure 2. Percentage of injuries sustained by the tackler and tackled player in the second half

There was significant increase in IR for club players (IR = 254.4) compared to college (IR = 129.7); the club IR is almost double the college IR (Fig. 3).

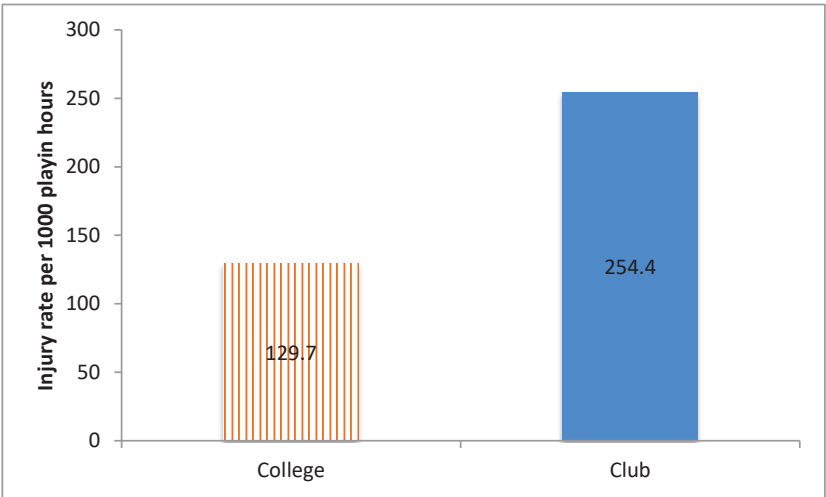


Figure 3. Injury rate of college and club rugby league per 1000 hours of play

Figure 4 compares the percentage of successful tackles in the first and second halves for the college and club competitions. Reductions in the percentage of successful tackles are shown in four out of the five games analysed in the CLBRL competition. However, findings from the CRL competition show that players are equally likely to increase or decrease the rate of successful tackles, indicating that no correlation exists.

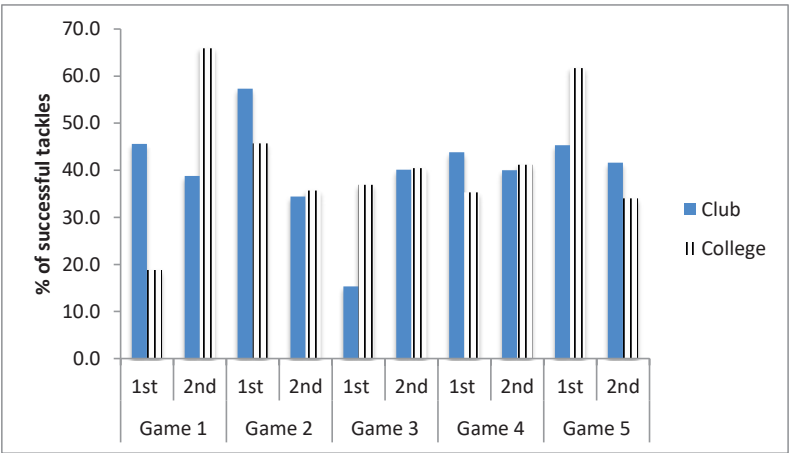


Figure 4. Percentage of successful tackles in the first and second half regarding college and club rugby league

Figure 5 highlights the consistent reduction in the number of successful passes from the first to the second half in both college and club rugby league. Out of the five games played in CRL, four showed decreases in successful passes. The highest percentage reduction was found in game 3 (55%) and the lowest in game 5 (28%). Similar results were found in CLBRL, where the highest decrease in successful passes was shown in game 4 (36%), and the lowest in game 2 (6%).

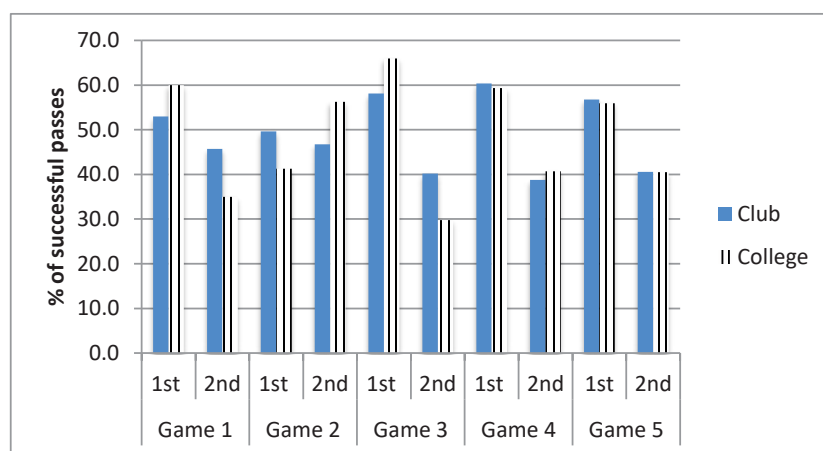


Figure 5. Percentage of successful passes in each half during college and club rugby league

DISCUSSION

The purpose of the present study was to identify the key game-related statistics that would enable comparisons between college (CRL) and club rugby league (CLBRL) in New Zealand. Our investigation specifically explored the performance indicators that directly influenced the quality of game play and incidence of injury, using a combination of frequency and percentage data for each indicator (Hughes & Barlett, 2002). The present study suggests that changes to the duration of play significantly impact the incidence of injury and quality of game play in junior rugby league. Further studies investigating the consequences of extended game time on player fatigue, impacting the quality of play and incidence of injury in junior rugby league, are warranted.

Incidence of Injury

Research into the incidence of injury in junior rugby league is limited (Gabbett, 2014; Johnston et al., 2013). Data that is not collected and analysed in a standardised fashion is not easily comparable. Therefore, previous studies have expressed the incidence of injury in terms of the number of injuries per 1000 hours of play (Phillips, Standen, & Batt, 1998).

The present study shows that the incidence of injury in CLBRL (254.5 injuries per 1000 hours) is higher than that of CRL (129.7 injuries per 1000 hours). A comparable study conducted by Gabbett (2000) showed that amateur rugby league players display an overall injury rate of 160.6 injuries per 1000 hours of play. Although this result is comparable to injuries sustained in CRL (24% increase), the CLBRL format displayed a 58% increase in injury rate compared to the study by Gabbett (2000). Similar research by Gabbett (2002) showed an incidence of injury in amateur Australian rugby league players of 283.5 per 1000 hours, which echoes the results of the present study when compared to CLBRL (254.5 injuries per 1000 hours). Interestingly, the incidence of injury in professional and

semi-professional rugby league has been reported at 346 (Hodgson-Phillips et al., 1998) and 824.7 (Gabbett, 2003) per 1000 hours respectively.

The increased injury rate of semi-professional players compared to amateur players could be expected as a result of the inferior physiological capabilities of players in amateur grades (Gabbett, 2002B; 2003). This is confirmed by findings in previous studies, which suggest an increased playing intensity during games which subject players to higher injury rates (Gabbett, 2004; King et al., 2006). Interestingly, the results of the present study suggest that junior players in CLBRL are comparable with amateur (Gabbett, 2002B) and semi-professional (Gabbett, 2003) rugby league players in this respect.

Although both groups were investigated using the same integrity, the only differences between groups were playing times. The CRL played a total of 50 minutes, a modified version of the National standard of 80 minutes under which the CLBRL completion was governed. This resulted in the CLBRL completing an extra 30 minutes of play, which would provide biased data. However, injury rates were standardised to calculate the number of injuries per 1000 playing hours. Therefore, it is conceivable that the playing intensity of CLBRL is significantly higher than that of CRL (King et al., 2006), which would explain the significantly higher incidence of injury.

The increased period of play allotted to players in the CLBRL is designed for professional players who typically dedicate 5-6 days to improve their power, strength and muscular endurance (Phillips et al., 1998). Their physiological adaptation to training allows professional players to compete at a high standard for a prolonged period of time. It can be suggested that junior rugby league players lack the physiological characteristics to maintain a high quality of play over 80 minutes of play. The results of the present study and previous literature suggest that junior rugby league players who are subjected to 80 minutes of play show dramatic increases in the risk of injury.

Timing of Injury

The present study found that 71% and 73% of all injuries sustained in CRL and CLBRL occurred in the second half of play respectively. These findings agree with Gabbett (2000), who showed that approximately 70% of injuries in amateur games occurred in the latter half of play. King et al. (2006) suggest that muscular fatigue induced by increased game time is likely to contribute to injuries in amateur rugby league. Contrarily, injuries sustained in the second half are significantly lower (38%) in semi-professional matches (Gabbett, 2003). The reduced injury rate of semi-professionals in the second half indicates the important role that aerobic fitness plays in reducing injuries related to fatigue (Gabbett, 2005). At the same time, studies of professional rugby league prove that players are equally likely to sustain injuries in either half (Stephenson et al., 1996).

To the authors' knowledge, there is no existing study investigating the incidence and timing of injury in junior rugby league. Johnston et al. (2013) is the only study that investigates the influence of muscular fatigue in junior rugby league over a five-day competition. The study revealed that the highest rates of fatigue occurred in the final days of competition. The findings of all the studies discussed here, including the present study, suggest that as the playing standard increases, the rate of fatigue and potential injury decreases (Gabbett, 2000; 2002; 2003). The present study clearly shows that the majority of injuries occur in the second half of competition, similar to findings for amateur matches.

Consistent with the findings of prior studies of amateur (Gabbett, 2002B) and professional (Gissane et al., 2002; Stephenson et al., 1996) rugby league players, the current study found that the majority of injuries were sustained during tackles. We concluded that 57.1% of injuries during tackles were sustained by the tackler (TKR) in CRL. This is consistent with the work of Gabbett (2001), who found that the majority of injuries to amateur rugby league players were sustained by the TKR. However, these results differ from CLBRL, where 59% of injuries were sustained by the tackled player (TKD). This finding is more consistent with professional rugby league players, where the majority of injuries were sustained by the TKD (Gissane et al., 2002; Hodgson-Phillips, 2000). Interestingly, this suggests that the intensity of play in CLBRL is comparable with the professional standard. Further analysis of the

breakdown of injuries in Figures 1 and 2 shows that of the 71% of injuries that occurred in the second half, 43% of them were sustained by the TKR in CRL. This is a blatant indicator proving that as muscular fatigue increases, the rate of injury increases (Gabbett, 2000; 2002; 2003). This finding also demonstrates that increased fatigue correlates to incremental reductions in tackling technique for junior and amateur players (Gabbett, 2008; Johnston et al., 2013).

Results from the CLBRL contradict these findings, as 63% of injuries in the second half were sustained by the TKD. Based on previous research investigating the contribution that fatigue plays in increasing injury rates (McLellan et al., 2011; Twist et al., 2012), this finding suggests that players in the CLBRL competition possess superior aerobic fitness and muscular characteristics, which could in turn be attributed to them performing more frequent higher-intensity trainings sessions, allowing the adaptations acquired from training to improve physical performance. Conversely, the CLBRL players may have been subjected to a higher standard of defensive coaching – more specifically, tackling technique. This could explain the high incidence of injury to the TKD players in CLBRL.

Effect of Fatigue on Defensive Skill

Our findings regarding CRL are in agreement with Gabbett (2008), who show that muscular fatigue results in incremental reductions in tackling technique. Gabbett's study goes on to assert that participants who showed superior tackling technique during the non-fatigued state exhibited the highest decrement in technique in fatigued conditions. This information is vital to coaches and players concerned with preventing injuries due to tackling. Drills focusing on improving tackling should be performed in the fatigued state, rather than in a non-fatigued state. The present study highlights these findings by showing that the majority of injuries sustained by the TKR occurred in the second half in CRL. Gabbett (2013) showed that notable reductions in physical performance occurred in the second half of play (compared to the first half) in junior rugby league. This finding reflects the work of Johnston et al. (2013A), who measured the physiological responses of players during three games of rugby league over five days. This investigation showed steady detriments in successful tackles performed in game 1 (82%), game 2 (82%) and game 3 (72%). These results are in agreement with Johnston et al., (2013B), who showed similar detriments in successful tackles in junior rugby league starting from game 1 (87%), game 2 (84%), game 3 (72%), game 4 (76%) and game 5 (81%). Our findings for CLBRL are congruent with these previous studies, showing consistent reductions in successful tackles from the first to the second half in four of the five games played (Figure 4).

Interestingly, the results of our study indicate that no particular trend could be found for successful tackles in CRL. Figure 4 shows the increases in successful tackles in games 1, 3 and 4, as well reductions in games 2 and 5. This could be credited to the duration of game time allotted to each competition. The CLBRL players experienced a full 80 minutes of play, compared to the modified 50 minutes allotted to CRL. The shorter game resulted in a reduced injury rate and increased quality of play, allowing players in the CRL to maintain a dynamic game. It is well documented that increased duration and intensity of game play correlates to increased rates of fatigue, which in turn reduces players' physical capabilities during games and training (Cormack et al., 2008; Gabbett, 2008; McLellan et al., 2011; Tee et al., 2002; Twist et al., 2012). Our findings suggest that 80 minutes of play is not a suitable format for junior rugby league players to be competing in, due to the increased rate of injuries experienced later in the game. However, further research into muscular fatigue and its associations with injury in junior rugby league is required.

Effect of Fatigue on Attacking Skill

Because decreases in physical performance during tackling have been attributed to the effects of fatigue, it is conceivable that attacking skills suffer similar detriments (Gabbett, 2008). Although there are few studies investigating the effects of fatigue on attacking skills in rugby league (Gabbett, 2013; Johnston et al., 2013A; Johnston et al., 2013B), a plethora of evidence is available in other sports such as tennis, football and water polo (Davey et al., 2002; McMorris & Graydon, 1997; Rampini et al., 2009; Royal et al., 2006).

As shown in Figure 5, our results display a consistent reduction in the percentage of successful passes from the first to the second half in both CRL and CLBRL. The results agree with Davey et al. (2002), who found a 69% and 30%

decline in accuracy for the ground stroke and shots to the right-hand side respectively in fatigued tennis players. This corresponds to the study by Rampini et al. (2009), who showed a decrease in short passes performed from the first to the second half due to fatigue. However, the percentage of successful short passes remained unchanged. This is consistent with Royal et al. (2006), who found a 43% deterioration in technique efficiency in a fatigued state in men's water polo shooting, but with no effect on accuracy. The studies completed by Rampini et al. (2009) and Royal et al. (2006) assessed the performance of highly skilled elite athletes whose bodies have adapted to maintain performance at higher exertion rates. Junior rugby league presents a very different scenario. The physiological immaturity of the players in the present study may explain why, in our findings, the success rate for passes is incrementally reduced as the game progresses.

The combined evidence suggests that attacking and defensive skills are equally affected by muscular fatigue in rugby league and other sports. It is suggested that junior players are more susceptible to injuries due to their immature muscular skeletal system (Hoskins et al., 2006). Evidence of major decreases in distance covered, repeated sprint ability and low-speed running (Gabbett, 2013) concur with the present study's findings of reductions in attacking and defensive skills due to fatigue. Any prolonged period of play is likely to stimulate and increase the rate of muscular fatigue and therefore injuries, subsequently reducing the quality of play in fatigued conditions (Johnston et al., 2013A).

CONCLUSION

This study provides useful insights into the quality of game play when comparing college and club rugby league in New Zealand. It is evident that the incidence of injury in club rugby league is significantly higher than that of its college counterpart. Our findings show that the rate of injury for the CLBRL is comparable to that of semi-professional players. Our study also investigated the timing of injury. Agreeing with previous studies investigating amateur matches, we found that the majority of injuries occurred in the second half of play in both college and club matches.

To the authors' knowledge, the present study is the first to investigate the effect of fatigue in both defensive and attacking skills in junior rugby league. We have shown that muscular fatigue induced by game play progressively reduces the number of tackles performed, from the first to the second half of play, and produces incremental decreases in tackling technique, thus increasing the risk of injury to the tackling player. In alignment with the previous literature, we found that the percentage of successful tackles diminishes when comparing the first and second half of play in junior rugby league.

Application

Our findings underlined the correlation between detriments in player performance and muscular fatigue induced by game play. If coaches are able to reduce the effects of fatigue through match-specific training programs over a given period of time, the physiological adaptations achieved would reduce game-related fatigue and subsequently the incidence of injuries during tackles and later in the game. Consistent with the previous literature, we found that muscular fatigue plays a vital role in the progressive reduction of both attacking and defensive skills. Fitness programs focused specifically on increasing muscular strength and endurance may play a protective role here, allowing players to endure physical contact and minimise muscular fatigue respectively. Gabbett (2008) showed that players with the best tackling technique in a non-fatigued state showed the greatest reduction in technique under fatigued conditions. Our study suggests that similar detriments exist for attacking skill. Thus it is essential that training focused on improving both defensive and attacking technical skills be performed in the fatigued state, simulating game-specific environments.

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IS THE GENDERED NATURE OF TOILETING CARE AND TOILET TRAINING SHIFTING?

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INTRODUCTION

Toilet training is a co-occupation involving an adult and child who are interactively shaping each other; involving the teaching and learning of cultural practices that will enable the child to urinate and defecate in an appropriate place and manner for a particular cultural setting (Aitken, 200; Wolraich & Tippins, 2003). These practices are determined by the conditions unique to a specific historical time and context. In Aotearoa New Zealand in 2018 this role is shared by a range of adults, mostly parents, and early childhood teachers. Media advertisements for nappie (diaper) products and trainer pants in Aotearoa New Zealand present this role as within the domain of concern for both male and female adults. I argue that this has not always been the case, however.

This article proposes that the gendered social construction of toilet training is undergoing a shift. With a change of discourses comes change of practices, subjectivities and opportunities. As either parent is now sanctioned as an appropriate person to carry out toilet training and toileting care for their child, both parents are also given the opportunity to engage in this co-occupation, thereby dismantling the argument for the gendered suitability of mothers as the adult primarily responsible for socially shaping their child's toilet learning.

Co-occupation occurs when the co-creation of shared meaning is engaged in by two or more people; it encompasses three elements – shared physicality, shared emotionality and shared intentionality (Pickens & Pizur-Barnekow, 2009). This article illustrates how, historically, fathers were excluded from the co-occupation of toilet training in Aotearoa New Zealand during the 1950s due to the belief that fathers were unable to engage in shared emotionality or shared intentionality, compounded by limited opportunities to engage in shared physicality.

METHODOLOGY

This paper utilises a poststructuralist Foucauldian genealogical lens (Foucault, 1977). A genealogical analysis describes how discourses emerge from the “conditions of possibility” (opportunities provided) specific to a particular historical context. Discourses are both a phenomenon and a form of social action that shape how a specific phenomenon such as toilet training is understood and carried out (Rudman, 2010). The carrying out of an action is shaped by society, and the person engaging in the action also shapes the understanding of how and when this occupation should be carried out, and by whom. Therefore it could be argued that every occupation is a co-occupation with society.

Occupation is a word that has many meanings and definitions attached to it (Wilcock & Hocking, 2015). For the profession of occupational therapy, occupation is seen as health-influencing, multi-dimensional and complex. The complexity of occupation and co-occupations relates to its ongoing subjection to societal influences, which

rise from the social, physical, institutional and cultural environment; therefore the knowledge which shapes the understanding of an occupation is historically and culturally situated (Wilcock & Hocking, 2015). The cultural value placed on different occupations and co-occupations, and the practices created through engaging in occupations, are mediated through the process of discourses.

Discourses are productive: they shape knowledge, actions and people's subjectivities (Foucault, 1977). Subjectivities are identities that people take on, or others place on people, and relate to the development of a person's sense of self and the actions and occupations they carry out (Lupton & Barclay, 1997). There are multiple discourses present within a society, and therefore multiple possible subjectivities and ways of engaging in the co-occupation of toilet training. Co-occupation is one way in which social messages and ways of doing are transmitted from one generation to another.

This article is informed by the author's PhD studies (Robinson, 2018). Following Hook's (2001) methodological interpretation of Foucault's genealogical work, I embarked on a discourses analysis of toilet training texts using a biopolitical focus. Biopolitics is a Foucauldian concept which describes how the state is concerned with the population's health and wellbeing. This methodological focus is in alignment with the profession of occupational therapy's understanding of occupations as health-related and complex (Wilcock & Hocking, 2015).

Occupations and co-occupations are based on a shared understanding of what, how and whom should engage in them, the enactment of this knowledge being demonstrated by groups of people carrying out occupations in roughly similar ways. This engagement in similar ways of doing is maintained by the process of normalisation. Foucault's thinking is central to understanding why people self-govern their behaviour through normalising influences, and how they indirectly manipulate others into conforming (Rose, 1992). A biopolitical focus throws light on the normalised behaviour relating to toilet training in the 1950s, and reveals the elements that were sufficiently compelling to make the population comply of its own accord with this co-occupation, in ways specific to this period.

Identifying the conventional discourses of the 1950s has assisted in identifying discourses in contemporary Aotearoa New Zealand by utilising the notion of the "history of the present" (Foucault, 1977). This methodological tool was deemed essential, as discourses and discursive actions that make up our everyday doing are taken-for-granted truths, and are therefore difficult to identify without utilising the distance offered by a different historical context.

In the study, statements drawn from influential texts on parenting and toilet training that were circulating in Aotearoa New Zealand during the 1950s, and which demonstrate the process of socialising a child from 'instinctual' to toilet-trained, were selected and reviewed. These texts provided the data which was used to complete the discourse analysis presented below (Bevan Brown, 1950; Bowlby, 1953; Deem & Fitzgibbon, 1953; Keritepu, 1956; Phillips, 1955).

This paper begins by considering the roles of women and men in the 1950s. I then show how fathers were excluded at a temporal level, as well as at a discriminatory level. I conclude by allowing readers to consider if they are also experiencing a shift in discourses relating to the gendered role of toilet training within their own contextual space.

GENDERED ROLES

Gendered roles are socially constructed roles associated with the biological sex of the person involved in the behaviour. In the creation of a gendered social role, a range of behaviours and attitudes are scripted as appropriate and desirable, but also potentially limiting (Estes, Biggs, & Phillipson, 2003). In Aotearoa New Zealand, the 1950s have been described in many ways – often fondly as the nation's golden years, but also as a decade when clear gendered expectations were placed on both men and women. The 1950s achieved its 'golden years' status as a result of the economic security enjoyed during these years, with unemployment at very low levels (May, 2013). It was also a time marked by a strong gender-based division of labour (Estes, Biggs, & Phillipson, 2003; May, 1992), which reflected an

idealised family-based society, with women staying at home engaging in the vocation of motherhood, caring for the growing population of 'baby boom' infants.

As mothering was seen as a vocation (Kedgely, 1996), this enabled young women, many of whom who had just left school, to go straight into the role of motherhood. This situation meant that many women had limited time for career development, as it was the practice to leave work within the first few months of becoming pregnant (May, 1992), which limited their ability to re-enter the work force. This practice was sanctioned by successive governments through unequal pay structures, limited provision of child care facilities and an underlying belief that the emotional health of children required consistent attention from their mothers (Bevan-Brown, 1953; Kedgely, 1996; Tennant, 2007). Discourses influenced by John Bowlby's report to the World Health Organisation (1951) on maternal deprivation reinforced this mindset (Kedgely, 1996; May, 1992; Pool et al., 2007). Bowlby's report was interpreted as meaning that mothers needed to be in constant attendance on their children (May, 1992).

In addition, the New Zealand government took steps to increase the wages of working people. While this enabled one income to meet the needs of the family, it also created an expectation that men would be the sole income earner (May, 1992), thus limiting the time available to men to father their children in a hands-on way (Bryder, 2003). This practice was reflected in an article published in the *New Zealand Women's Weekly* in 1959: 'Millions of fathers leave home early in the morning and get back just in time for dinner at night' (Popenoe, 1959, p. 37). Therefore, just as there was a gendered expectation for mothers to engage in child care and household tasks, there was an equally gendered expectation for fathers to be the primary income provider, usually away from the home environment.

INSTITUTIONS MAINTAINING CONVENTIONAL PRACTICES

During the 1950s, there were three influential women's organisations which supported mothers and children – the Maori Women's Welfare League, Parents Centre and Plunket. The Maori Women's Welfare League provided health services and support to Maori mothers and babies; Parents Centre was a volunteer organisation which followed what was considered at the time to be fringe practices, influenced by psychoanalytical knowledge; while the Royal Society for the Health of Women and Children, better known as Plunket, was the predominant authority on child and maternal welfare and provider for Pakeha women and children. Each of these organisations identified a need to educate mothers in the role of parenting. This educational need emerged out of new knowledge of maturation processes emerging from the 'ages and stages' research led by American-based child development specialists Arnold Gesell and Frances Ilg, which merged with current psychoanalytical perspectives (Beatty, Cahan, & Grant, 2006).

Although initially targeting mothers, in the 1950s educational opportunities in child care expanded to include fathers (Deem & Fitzgibbon, 1953; Bell, 2004). Interestingly, education targeting fathers was more practical in its application: how to build baby furniture or help with clearing away the dishes at night (Deem & Fitzgibbon, 1953). Advice was also pitched through popular media sources. For example, the *New Zealand Women's Weekly* (a popular women's magazine) utilised a male columnist, Brian Knight (BA, Dip Ed.), who provided advice on 'the problems of fatherhood from mending leaky taps to questions in up-to-date analytical psychology' (Knight, 1953d, p. 56), and also to the fathering demographic.

Although Brian Knight proposed that fathers be more involved in childrearing, he was careful not to undermine wives' "responsibilities." His articles were pitched at parents whose children were older, able to speak, walk and catch a ball (Knight, 1953a, 1953b, 1953c). Specific tasks held to be the legitimate responsibility of the father were also outlined in an article by Dr Paul Popenoe, an American expert in family problems. Also writing in the *New Zealand Women's Weekly*, he asserted that the father's role in the home was to model to his children an appropriate attitude towards his wife; link the family with the outside world; be kind and intelligent, but possessed of firm authority; and to take on a large part of the responsibility for sex education and financial authority within the home (Popenoe, 1959, p. 37). Caregiving tasks are noticeably absent from this list.

Fathers were encouraged to be involved with younger children through activities such as making toys for playcentre or engaging in working bees (Stover, 1998), once again illustrating how fathers were missing out on opportunities to engage in caregiving tasks directly with their child. While mothers were expected to linger and engage with their children each day when they dropped them off at kindergarten, fathers might experience kindergarten with their child only once or twice a term on a Saturday. The discourse of fathers repairing toys and completing maintenance during this time was also noted by Marshall (1959).

However, a few examples of opposing discourses can be located, including a letter from *Women's Weekly* correspondent 'Glesca,' thanking husbands who helped their wives with young children, including her own husband who gave her the night off by changing a nappy or giving a bottle (Glesca, 1953). In contrast to Glesca's husband, who enabled his own opportunities by giving his wife the night off, other men were constrained from expanding their roles as demonstrated by another correspondent, 'F. M.' (F. M., 1953), who wrote about preparing for his upcoming fatherhood role. He shares people's negative reactions and excluding behaviours, including a retailer refusing to sell him a modern parenting book. He talks about the challenges encountered in his quest to be an involved father: 'It is the modern husband who is ignored, pitied, patronised and painstakingly instructed. He really does feel that when his views are asked for it is only because his is the hand that may write the cheque' (F. M., 1953, p. 59).

Therefore, although we can find a few examples of subjugated discourses of fathers as active caregivers in the lives of their young children, the dominant discourses situate fathers as effectively excluded from the lives of their children, especially infants and toddlers (Burgess, 1997). Thus the absence of evidence of fathers engaging in toilet training their children is hardly surprising. An American study by Klatskin (1952), using a sample drawn from three socioeconomic categories of fathers' employment, sought information about the time fathers spent participating in the care of their child. As a result of analytical challenges, Klatskin devised three broad time categories for this question: minimal participation (an estimated time of under 15 minutes a day), moderate participation (15 to 30 minutes a day) and maximal participation (over 30 minutes a day). Two-thirds of the 93 fathers surveyed – irrespective of whether they worked in professional or managerial positions, white collar or skilled employment, or in semi-skilled or labouring jobs – spent less than 30 minutes a day interacting with their child. Although Klatskin's study was undertaken in the US, it suggests the general level of fathers' participation in caregiving in the 1950s.

Even Bevan Brown, a prominent New Zealand Freudian-trained psychiatrist who had a strong influence of the philosophy of Parents Centres, suggested that a father's role in the first year of a child's life should be a supporting one (Bryder, 2003), thus reinforcing the discourses of the primary importance of the maternal–child relationship and the gendered suitability of women for caregiving roles.

Although psychoanalytical discourses provided more space for the infant's emotional health and relationship with the father to be acknowledged, the focus on maternal bonding had ignored Bowlby's endorsement of a mother substitute, which would have enabled a more active role for the father or other consistent caregiver (Bowlby, 1953). Combined, these factors led to the exclusion of fathers in caring for young children and the limiting of the female role to that of mother only (Bryder, 2003; May, 2013), therefore affecting the opportunities and choices open to both men and women.

Gendering women as caregivers, and therefore wholly responsible for toilet training their children, was the result of psychoanalytical and other intersecting discourses and the practices they engendered. For a family to contest the prevailing view meant resisting discourses which were formally maintained by government initiatives and legislation, medical structures and taken-for-granted truths. Dissatisfaction with and resistance to these restricted gender roles can be clearly seen in the examples of F.M. (F.M., 1953), who wanted to be an active, involved father; and the husband of Gelsca (Gelsca, 1953) who willingly and spontaneously carried out nappy changing (at least when he chose to give his wife a night off).

Further questioning of gendered roles and the belief that bonding with and caring for babies was an instinctual,

female-only ability was raised by Quintin Brew, an educational psychologist and the husband of Helen Brew, founder of Parents Centre. At the 1957 Parent Centres conference, Brew argued that men were capable of responding to the subtle, non-verbal communication of their babies, thus questioning the social construction of beliefs about fathers' abilities in this area (Dobbie, 1990). Linking this to the three elements of co-occupation outlined above (Pickens & Pizur-Barnekow, 2009), fathers were excluded from engagement in the shared physicality of the task of toilet training, potentially because of reduced opportunities due to time limitations. Furthermore, Brew's comment also highlights the potential discrimination inherent in New Zealand society's understanding that fathers and young children could not engage in shared emotionality and shared intentionality.

SPACE FOR NEW DISCOURSES AND PRACTICES

In 2011 the Ministry of Social Development funded a series of parenting resources, *Strategies with Kids, Information for Parents (S.K.I.P.)*. One resource specifically targeted toilet training, an 8-page booklet with five illustrations. On the first page, a mother kneels by the toilet with her arm around a young child's shoulder, presenting the toilet to him. The fourth illustration shows a child pulling at the shirt-tails of his father who is walking away, half turning around and engaging in eye contact with his son, who is communicating the need to be taken to the toilet. These illustrations reflect how, in New Zealand, the decreased exclusion of fathers in the body-waste management of their children is being endorsed at government ministry level.

CONCLUSION

I have demonstrated how, in the 1950s, men were limited in their opportunities to engage in the co-occupation of toilet training their children. This situation was the result of gendered expectations which created temporal limitations on interactions between fathers and young children, as well as potential discrimination forming barriers to fathers' abilities to engage at a co-occupation level with young children.

In Aotearoa New Zealand in 2018, discourses of fathers as early caregivers of young children are prominent in the media due to the willingness of Prime Minister Jacinda Ardern's partner, Clarke Gayford, to take a lead role in the care of their recently born daughter. Hopefully, this flood of new discourses will shift what was once the strongly gendered discourse around toilet training to one with more balanced roles and subjectivities that will benefit all parties involved.

In conclusion, I suggest that toilet training discourses in the second decade of the 2000s are creating a new taken-for-granted truth about how both parents can engage in the toileting care of their children. Although continuing challenges involving limitations on parents' and children's time together and underlying discrimination in the area of gendered abilities still lurk in contemporary discourses, they are no longer taken as truths which cannot be contested. As Foucault himself was opposed to telling people what to think, in keeping with my Foucauldian influences in this paper I have attempted to encourage the reader to consider if they are also experiencing a shift in discourses relating to the gendered role of toilet training within their own contextual space.

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COMPARISON OF ADOLESCENTS LIVING WITH SENSORY INTEGRATION DIFFERENCES.A PILOT STUDY

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INTRODUCTION

The purpose of this pilot study was to begin to ascertain whether adolescents with Autism Spectrum Disorder (ASD) and/or Sensory Integration Disorder (SID) report different sensory processing styles as they mature, in comparison to age matched typically developing individuals. This research inquiry stems from observations made by the author of individuals with sensory integration differences, in particular the use of self-regulating sensory strategies that are adopted as they mature.

Sensory Integration

The concept of sensory integration developed during the 1960s from a body of work by occupational therapist A. Jean Ayres. The way in which sensory processing and motor planning disorders interfere with learning and daily life interested Dr Ayres (Cribbin et al., 2003). Since then sensory integration theory has evolved into one of the most studied and developed theoretical frameworks in occupational theory (Cermak, 1994). Sensory integration is defined by Ayres (1979) as:

The organization of sensory input for use. The 'use' may be a perception of the body or the world, or an adaptive response, or a learning process, or the development of some neural function. Through sensory integration, the many parts of the nervous system work together so that a person can interact with the environment effectively and experience appropriate satisfaction (p.184).

All the information we receive from our body and surroundings comes to us through our sensory systems. Our seven senses; touch (tactile), movement (vestibular), body position (proprioception), sight (vision), sound (auditory), smell (olfactory) and taste (gustatory), gather information which then enters central processing networks within our brain where it is organised and interpreted (Cribbin et al., 2003). As information from multiple sensory systems is processed reactions to sensory input are graded in an adaptive manner, known as sensory modulation (Miller, 2014). In everyday life, we are not often aware of any one sense as they usually work together and integrate in an automatic way providing us with a sense of who we are, where we are, an understanding of our surroundings and happenings around us and how we should respond.

When sensory information from one's body and the environment does not integrate in the brain as it should, or the brain cannot sort out, filter, analyse or organise sensory messages, this is known as a sensory integration dysfunction (Ayres, 1979). Differing terminology is used within the literature to describe and label sensory integration differences, such as sensory processing disorder, sensory modulation disorder and sensory integration disorder. A person experiencing this disability is unable to respond to sensory information in order to behave in a consistent and

meaningful way, this can lead to an adaptive response, which may not be beneficial in the circumstances (Cribbin et al., 2003).

Sensory processing difficulties exist on a continuum of increasing severity, three distinct levels are portrayed, mild, moderate and severe. Depending on how the person is feeling at the time, individuals may be more easily (or not) aroused and then distressed by sensory stimuli (Heller; 2003).

There are many signs of SID including over or under-sensitivity and reactivity to touch, movement, sight and sounds. There are also co-ordination difficulties, in relation to whole body and/or fine hand movements, as well as complications in organisation of behaviour, such as planning and carrying out everyday activities (Cribbin, et al., 2003). Individuals living with SID often have other issues such as impaired motor development, a learning disability or nervous system or brain disorders such as autism (Fisher & Murray, 1991).

Sensory processing and ASD

Autism characteristics as described by high functioning individuals with ASD, such as Temple Grandin and Donna Williams widely report impairments with modulating sensory input; experiences of hyper- and hyposensitivity, visual distortion, sensory overload and sensory shutdown (Williams, 1992. Grandin, 1995. Tomchek & Dunn, 2007). Scott Tomchek in his 2005 Doctoral Dissertation 'Characterizing Sensory Processing in Autism Spectrum Disorder' notes:

The neuroscience literature generally presents material at the level of processes and neural mechanisms, whereas the occupational therapy literature generally conveys information at the level of experience or behaviour. Given the overlap in terminology, both fields describe and provide evidence of impaired sensory processing in autism (p.17).

Visual response in the form of avoidance of eye contact, is described as an early behaviour demonstrated in social settings by many individuals with ASD. It has been theorised, this particular behaviour is self-regulatory in nature, a means of compensating for visual input modulation difficulties (Tomchek & Dunn, 2007). Miller (2014) also makes comments of co-occurrence of the two distinct conditions ASD and SID within individuals. Miller, a practicing occupational therapist and active researcher, concludes that most (perhaps all) children with ASD have sensory issues.

Sensory Profiling

Sensory profiling measures an individual's responses to sensory events in daily life. When sensory integration differences are suspected, occupational therapists administer sensory profiles as part of an assessment process. Together with direct observations, the completion of a sensory profile assists identification of sensory processing patterns, which guide diagnosis and intervention decisions. There are a number of tools available to occupational therapists which evaluate sensory histories to build a sensory profile. Individual profiling tools are often standardised for specific age groups. Profiling responses are generally gathered through tick-list questionnaires made up of statements describing specific sensory events. Profiles which question sensory histories yield information about the person's sensory processing skills and record how they change over the life span (Kientz & Dunn, 1997).

Relevant Prior Research

A study published in 2009 by Cane, Goddard and Pring did include the examination of adult participants with and without ASD by means of a sensory profiling tool. A total of 36 adult participants were assessed for levels of sensory processing during their every-day lives, participants completed a self-report questionnaire survey, the Adult/ Adolescent Sensory Profile (AASP). Half of the participants had diagnosed ASD, the other half without a diagnosis were comparison participants. The study results suggest '... that levels of unusual sensory processing do not dissipate across the lifespan' (p 222).

A more recent study undertaken during 2012 by Hungarian academics Marietta Kekes-Szabo and Anges Szokolszky. Explored and compared how typically developing children and children with ASD perceive the world and select information. The sampled 30 children aged between two & seven, and 17 children aged between two & seven and a half who did not have an ASD diagnosis. Kekes-Szabo and Szokolszky selected the SPCR questionnaire as their evaluative tool, based on research undertaken by Robinson and Johnson in 2010, which described the SPCR as a useful and valid tool to evaluate the sensory and perceptual experiences of individuals on the ASD spectrum. On evaluation of the completed questionnaires Kekes-Szabo and Szokolszky concluded they found '...children with ASD displayed increased sensitivity compared to typically developing children in most of the seven sensory modalities'. Also that '... parents of children with ASD indicated a higher frequency of sensory-related unusual behaviour in general, and unusual behaviour specially linked to hyper- and hyposensitivity, compared to the healthy control group'. (p 390)

METHOD

This study compares the current sensory profiles of adolescents with ASD and/or SID alongside age matched typically developing individuals. Participants were asked to complete Olga Bogdashina's Sensory Profile Checklist-Revised (SPCR). Data obtained from the SPCR responses was presented for analysis as illustrative graphs. Of particular interest was whether or not participants were able to identify at what age they became aware of their individual sensory difference. Also, if they are able to classify what contributed to any change in behavioural reactions to sensory stimuli.

Five adolescents with ASD and/or SID (age 16-17) completed and returned the checklist, the support of their families/ caregivers was used if required. Five similarly age matched typically developing individuals (age 14-17) independently completed and returned the SPCR.

The SPCR is a screening tool designed to compile a sensory profile for children on the autism spectrum. The question-based tool requires response to listed descriptors of behavioural reactions to sensory stimuli (Kekes-Szabo & Szokolszky, 2012).

All seven sensory systems are measured by 20 categories summarising possible sensory experiences in ASD. These 20 categories are; 1. Gestalt perception (inability to filter, screen, distinguish, coordinate sensory stimuli) 2. Inability to stop feeling the change (prolonged perception). 3. Fragmented perception (uneven 'in-bits' experiences) 4. Distorted perception. 5. Delayed perception. 6. Intensity with which the senses work (hyper-, hypo). 7. Sensitivity to disturbance by some stimuli. 8. Fascination with certain stimuli. 9. Inconsistency of perception (fluctuation between hyper- and hypo-) 10. Vulnerability to sensory overload. 11. Systems shutdowns ('tuneouts') 12. 'Sensory agnosia' (difficulty interpreting a sense). 13. Mono-processing (one sensory channel working at a time). 14. Peripheral perception (avoidance of direct perception). 15.

Compensating for unreliable sense by other senses. 16. 'Losing oneself' in stimuli, resonance. 17. Daydreaming (e.g. 'seeing' or 'hearing' thoughts, 'feeling' events, 'hallucinations' relating to smell and taste, experiencing movement while still). 18. Synaesthesia (e.g. smelling sounds, tasting colours, involuntary body postures and movements as a response to stimuli). 19. Perceptual memory, associative ('serial') memory (e.g. memory triggered by sensory stimuli). 20. Perceptual thinking (e.g. visual thinking 'thinking in pictures', proprioception thinking through body 'movement images') (Bogdashina, 2016).

Each category is broken down into statements that cover possible patterns of sensory experiences for participant response. For example; behaviour relating to vision statements include "Constantly looks at minute particles, picks

up smallest pieces of fluff"; "Covers, closes or squints eyes at bright light" and "Looks down most of the time".

The SPCR instructions direct the selection of an appropriate answer to the statement(s) described by 'ticking' any of four given options.

These options are listed with instruction;

- WT- Was true in any time in the past: in brackets, specify the age of the child when the statement was true.
- T- True now (if it was true and is true now, tick both answers).
- F- False (if the statement is not true).
- NS- Not sure or don't know.

Bogdashina describes the tool as an 'inside-out' approach to sensory profiling, maintaining it does not focus only on dysfunctional sensory experiences, as it includes the profiling of sensory strengths as well as deficits (Bogdashina, 2016).

A licence application was applied for and granted by Jessica Kingsley Publishers (facilitated by PLSclear) to reproduce and use Bogdashina's Sensory Profile Checklist- Revised (SPCR) as published in *Sensory Perceptual Issues in Autism and Asperger Syndrome. Different Sensory Experiences- Different Perceptual Worlds*. (2nd ed) London: Jessica Kingsley Publishers.

Minor changes were made to profile instructions for the purpose of this study, these included:

Additional instructions for completing the checklist, clarifying participants could either complete the checklist themselves by questioning 'Do I....?' for each statement or a parent or caregiver could report on their behalf. Explanation of WT (Was true) & T (True) responses were requested, in particular if the participant (or caregiver) completing the questionnaire had the ability to identify what contributed to the change. (e.g. self-initiated responses result of professional therapy and guidance, family support). No personally identifiable information was collected. A coversheet including two questions was added to the SPCR;

- What is your age? ___ years
- Please circle
Do you have a diagnosis of Autism Spectrum Disorder (ASD)? Yes No
Do you have a diagnosis of Sensory Integration Disorder (SID)? Yes No

Definition statements for both proprioception and vestibular systems were added prior to these category sections of the checklist. Three behaviour statements were removed as they were considered inappropriate and superfluous

for adolescent participants. Two from the olfaction section which directly related to toileting problems. One from the proprioception section, which questioned Echoemotica (the copying of others' emotions).

Ethical approval to conduct the study was gained from Otago Polytechnic Research Ethics Committee during 2017. Recruitment of participants was from the Autism New Zealand community and local secondary school aged students. Requests for participation took place through electronic Bcc emailing and messaging via closed group newsletters, and as a 'pick-up' document package, from the Otago region transition from school to life and careers: Transition Expo 2017. The study documents, including informed consent paperwork, were distributed independently of the author, with return addressed envelopes. Participants completed the SPCR at their own convenience. Inclusion criteria for responses was the first five completed SPCR responses from adolescents who identified as having an ASD and/or SID diagnosis, and the first five adolescents who did not identify with either diagnosis.

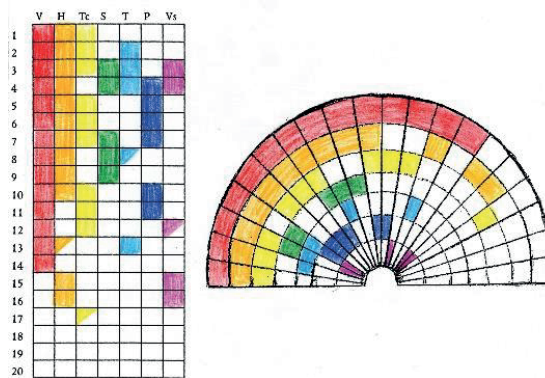


Figure 1. Sample table and Rainbow

The data obtained from the ten returned SPCR responses was presented for analysis as individually compiled illustrative graphs. Then in graphic 'rainbows' as prescribed by Bogdashina (Figure 1). Each coloured box in the graphs represents specific sensory features experienced by the individual. The numbers (1-20) in the table correspond with the 20 categories listing the sensory experience statements for participant response, the top axis listed abbreviations of the seven sensory channels (V, H, Tc, S, T, P, Vs). Differing colours were used as instructed by Bogdashina to represent each sensory channel: for example, red signifies vision (V), orange-hearing (H), yellow-tactility (Tc), green-smell (S), blue-taste (T), indigo-proprioception (P) and violet for the vestibular sense (Vs). Bogdashina (2016) ascertains once a graph is 'coloured' it is fitting to display the sensory profile as a rainbow prism, she states

...seems appropriate to show the sensory profile of an autistic individual in the form of curved lines rather than a straight line, as not all sensory differences are deficits; some are better described as superabilities (or gifts) that can be successfully used in the treatment of autistic people. (p.213)

For the purposes of this study T (True now) responses were recorded as a full block of colour; WT (Was true) responses were recorded as a half-coloured block.

FINDINGS

Visual analysis of illustrative SPCR graphs for each participant, alongside additional accompanying comments, revealed a strong distinction between participants who identified a diagnosis alongside the comparison group, of those who do not have a clinical diagnosis (Figures 2-11).

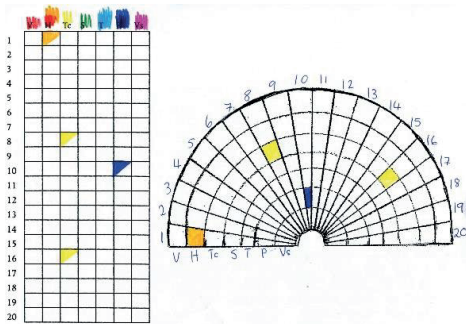


Figure 2. Participant 1: No Diagnosis

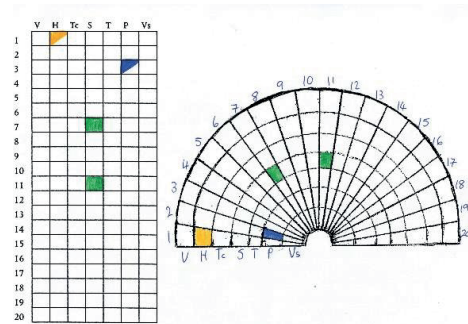


Figure 3. Participant 2: No Diagnosis

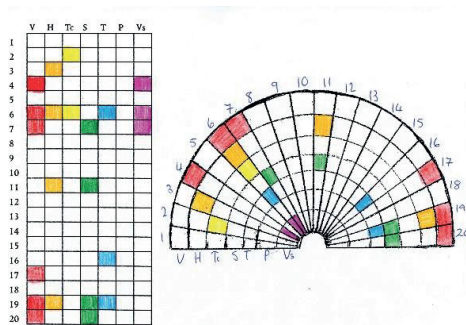


Figure 4. Participant 3: No Diagnosis

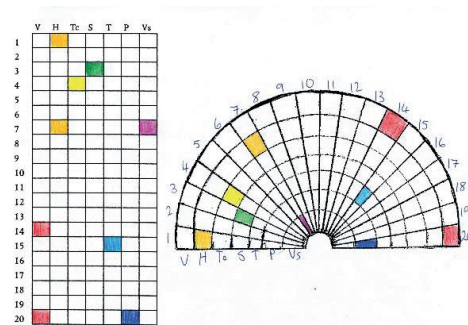


Figure 5. Participant 4: No Diagnosis

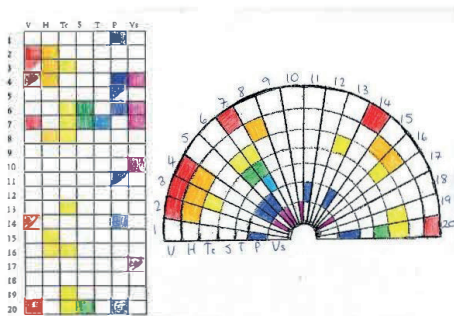


Figure 6. Participant 5: No Diagnosis

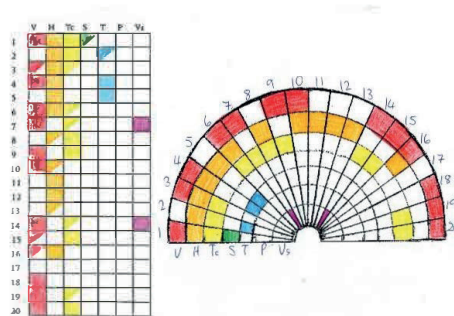


Figure 7. Participant 6: ASD Diagnosis

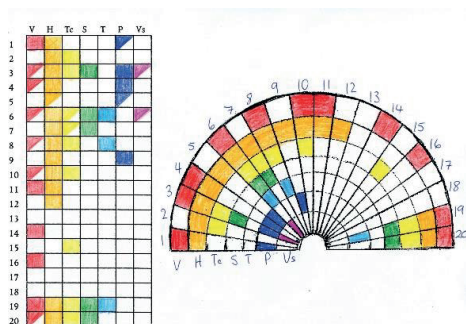


Figure 8. Participant 7: ASD Diagnosis

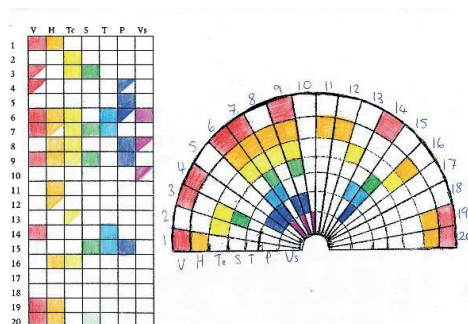


Figure 9. Participant 8: ASD Diagnosis

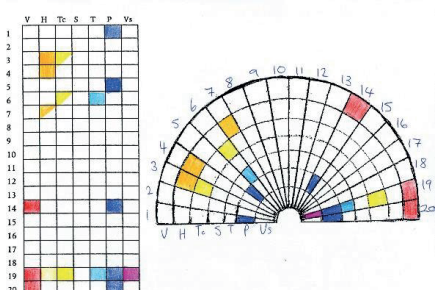


Figure 10. Participant 9: ASD (Comorbid) Diagnosis

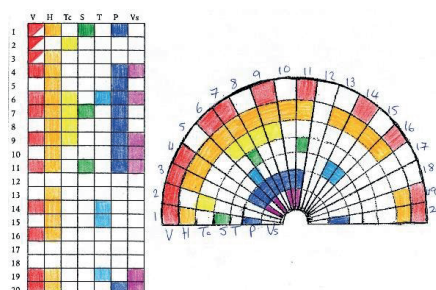


Figure 11. Participant 9: ASD & SID Diagnosis

The varying density of the T and WT coloured responses across all ten participants, clearly demonstrates the least recorded sensitivities by four of the five participants who did not 'circle' an ASD or SID diagnosis (Figures 2-5). These four profiles indicate limited sensory experiences as identified in ASD by the SPCR screening tool. Participant one recorded all four responses as WT (Figure 2). Of the five who did not identify with a clinical diagnosis, participant five responded with the highest rate of behavioural reactions to sensory stimuli, across all seven sensory systems as a mix of both T and WT responses (Figure 6). Only one participant without a diagnosis added a 'one word' comment to identify their response to a statement they considered T; specifying 'scarping' as a sound that frustrates them.

All five of the questionnaire profiles completed by participants who are on the autism spectrum were able to identify specific responses to sensory experiences. Adding additional explanatory comments beside a good number of the statements. This supplementary information included a number of examples of noted changes in their processing of sensory information throughout their life span to date. Listed below are a selection of the commentaries added:

"Was fascinated with certain sounds in particular the clicking of light switches, this behaviour stopped at age seven"

"Until recently being in crowds would often result in a meltdown"

"Fascinated with water movement, flicking"

"Stopped smelling all new objects. 11-12"

"Same Hair Dresser for 9 years so he tolerates having a haircut"

"Hates certain songs"

"He is very aware that people are happy or sad but often not sure how to deal with it"

"Age 14 - still can't tie shoe laces"

"Slept with head hard against headboard age 8 started use of weighted blanket which helps"

"Little bit distressed by clothes rubbing on skin up to 10yrs ish"

"Changed to gluten free at 5yrs, much improved eye contact & awareness in the world"

"Spinning on office chair, riding on ski biscuits seem to settle and relax him, especially if wound up about something"

"We struggle at the end of each season with clothing"

"Disliked brushing teeth this took a long time 1-11"

"Only eats crunchy food"

"Has played with dough since preschool, still daily models with plasticine"

"Stopped eating erasers and pencils at 17"

"Climb under things if I need to calm down"

The majority of these comments imply they have been written by either a parent or caregiver. During a diagnostic period often caregivers are asked by an occupational therapist to undertake a sensory profile, when dysfunction is identified therapeutic sensory practices are prescribed. This experience encourages caregivers to take particular notice of sensory modulations, both current and retrospective.

A small number of self-regulating sensory strategies are identified and discussed, alongside age ranges of when sensory changes have been experienced. For example, use of therapeutic weighted blanket to aid sleep, self-regulation through body movement by spinning on a chair and hand modelling of a dough medium. Specific classification of what did or may have contributed to the adaptive strategies was limited.

Alongside the explanatory comments, all five participants with ASD recorded WT responses within their profiles, whereas the typically developing adolescents record less on average WT responses, two profiles did not record any identifiable changes in their range of sensitivities. This result suggests the typically developing individuals have experienced less change in their sensory systems, or they are less aware of sensory integration in comparison to those with ASD.

The five sensory profiles of the clinically diagnosed participants demonstrate a trend across all seven sensory systems, of recognised sensory experiences. Vision and hearing are predominately the sensory channels recording the greatest T and WT responses (Figures 7-11). These results suggest that sensory processing experiences of individuals with ASD and/or SID are significantly heightened in comparison to those of typically developing peers across all of the seven sensory modalities. Of interest is the one participant who identified a comorbid diagnosis (not SID) together with ASD (Figure 10). Their sensory profile has the least 'colour' of the five profiles with ASD, their sensory experiences could be less specific to ASD due to additional clinical impact.

Several trends have been observed in this small set of data. The limited reporting of sensory awareness or differences by the typically developing individuals in comparison to the group with an ASD diagnosis. The prevalence of sensory

processing differences and self-regulating behaviours recorded across their life span by the ASD individuals, this experience was not shared by the typically developing adolescents. These findings present useful avenues for further, increased sample size research into sensory processing patterns of adolescent individuals with sensory integration differences.

CONCLUSIONS

It is difficult to consider this study's findings alongside similar studies which also aim to gain better understanding of sensory integration as the majority of research cited in the area of sensory integration and ASD has focused on children, rather than adolescents and adults. Differentiation of sensory processing differences have been recognised in comparison studies of children across the autism spectrum, also ASD subjects alongside others with varied learning disabilities, as well as children who are typically developing (Cane, Goddard & Pring, 2009). Interestingly, only one participant identified a dual diagnosis, an explanation for this could lie with the current small number of health professional specialising in sensory integration in New Zealand.

This pilot study contributes to a growing awareness and understanding of both ASD and SID, it highlights the prevalence of sensory difference within the ASD population.

ACKNOWLEDGEMENTS

Thanks go to Autism New Zealand for showing an interest and supporting this project; through sharing a 'call for participants' with their community. The studies participants and their families, who were willing to share their experiences of how best they live with sensory differences.

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EFFECTIVE COACH FEEDBACK AND FIGHTER APPLICATION IN MIXED MARTIAL ARTS

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INTRODUCTION

Mixed Martial Arts (MMA) is an emerging sport which involves competitors in a ring or cage utilising strikes as well as submission techniques to defeat opponents. The MMA Unified Rules of Conduct was established in 2000, allowing for regulated MMA events for an international audience. While MMA is practiced worldwide, with fighters incorporating martial arts ranging from kickboxing and wrestling to karate and Brazilian jiu-jitsu (Ford, 2015), there is minimal existing research designed to aid the development of performance in MMA.

Effective coaching is vital to an athlete's optimal sporting performance (Hughes & Franks, 2007), so that increasing our understanding of 'what is effective coaching' can challenge poor coaching behaviour and improve MMA athlete performance. Coaching feedback has traditionally been associated with subjective rather than objective measures. Research has shown that using a systematic analysis provides valid and reliable understanding of 'effective coaching variables' and reduces coach bias (Hughes & Franks, 2007).

Feedback provided by coaches can be both motivational and informational. Motivational feedback is useful, as it aims to provide the athlete with encouragement to repeat good performances (Hughes & Franks, 2007) and to reduce errors, thereby enabling the athlete to get closer to delivering their desired performance. Accurate informational feedback delivers salient information to encourage specific changes in performance, which will lead either to continued performance, if the result was successfully achieved, or a change in performance if it was not. Inaccurate feedback leads the athlete to deliver a sub-optimal performance (Cannon & Witherspoon, 2005). Therefore, effective informational and motivational feedback from a coach during training is paramount to a fighter's performance.

MMA is an emergent and exciting sport which continues to take big strides in its development, particularly at the professional level. As a result, there is an opportunity to improve fighter performance through an analysis of coaching behaviour. A coach's skill in providing feedback and instruction is known to be influential in helping athletes to perform at their optimal level. The previous research discussed above has touched on this link between coach feedback, athlete application and performance.

In mixed martial arts, each fight consists of three (preliminary and main card) or five (championship) rounds, with a 1-minute break in between each round (UFC, 2015). The coach uses the 1-minute break to deliver optimal (in terms of type, duration and complexity) feedback to the athlete. Analysis of coach feedback and fighter performance

allows us to assess a fighter's progress (Hughes & Bartlett, 2002) and to understand which coach behaviours are more effective. The hypothesis is a simple one: the more effective the coach feedback (in terms of the level of application shown by the fighter) during the break, the better the fighter can either maintain his dominance or try to shift the momentum of the fight in his favour.

This study will measure both the fighter's application of their coach's feedback (communicated during the 1-minute break) and the kinds (type and method) of feedback used by coaches.

METHOD

Participants

Participants in the three professional MMA divisions (championship, main card and preliminary) were analysed, championship being the highest level. The fights studied involved 36 fighters and 36 head coaches (Table 1).

Division	Weight						
	Fly	Bantam	Feather	Light	Welter	Middle	L Heavy
Championship (n = 12)	2	2	0	0	4	0	4
Main Card (n = 12)	2	0	0	4	0	2	4
Preliminary (n = 12)	0	2	2	4	2	0	2

Table 1. Fighter Divisions and Weight.

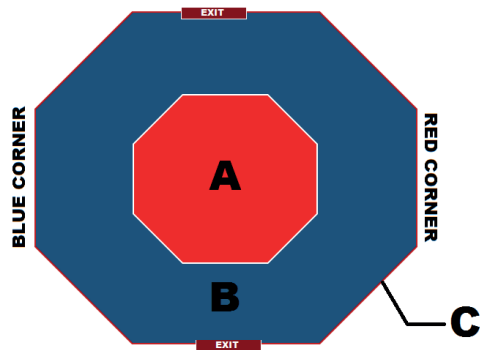


Figure 1. Floor Map of MMA Octagon.

Coach Behaviour (Type and Method of Feedback)

The type and method of coach feedback provided during each 1-minute break between rounds and the corresponding performance actions of the fighter (post-coach feedback) were observed and coded using Sportscode™V10 (Hudl, USA). The observation system was based on the protocol developed by Mesquita et al. (2008), used in their study of judo coaches (Table 2).

Nature of Coach Feedback	
Prescriptive	The coach gives an indication that the athlete should respect in the next combat, imposes a solution, possibly underlining the mistakes to avoid.
Descriptive	The coach describes the way the athlete accomplished any previous action
Positive Evaluation	The coach evaluates the athletes' performance in a positive way or he praises or encourages the athlete
Negative Evaluation	The coach evaluates the athletes' performance in a negative way reflecting disapproval
Form of the Information	
Verbal	The coach transmits the information in an exclusively verbal way
Visual	The coach transmits the information in a non-verbal way, through gestures or facial expressions, which may show approval, disapproval or demonstration 'simulation'
Kinesthetic	The coach transmits the information manipulating the athletes body
Combined (Verbal/Visual or Verbal/Kinesthetic)	The information is transmitted in a verbal and gestural way or in a verbal way with manipulation of the athletes' body respectively.
Motivational Feedback	Non-technical information to inspire athlete to perform

Table 2. Observation system of coach instruction

The Fighters

The feedback or instructions communicated by the coach between rounds were coded to reflect their type and method, and differences were determined by fight outcome. The mean level of fighter application of coach feedback (i.e., the frequency that the fighter employed the actions suggested by the coach) was determined, then compared by outcome (Table 3), division and round.

Ethics

Institutional ethical approval was granted by Auckland University of Technology ethics committee prior to the start of the study.

Win C	Winning fighters in Championship division
Loss C	Losing fighters in Championship division
Win M	Winning fighters in Main Card division
Loss M	Losing fighters in the Main Card division
Win P	Winning fighters in Preliminary division
Loss P	Losing fighters in the Preliminary division
R1R2	60 second break in between rounds 1 and 2
R2R3	60 second break in between rounds 2 and 3
R3R4	60 second break in between rounds 3 and 4 (Championship only)
R4R5	60 second break in between rounds 4 and 5 (Championship only)

Table 3. Fighter Division, fight outcome and rounds

Striking Actions	Definition
Punch	Successful strike which connects with opponent with a closed fist
Elbow	Successful strike which connects with opponent with the point of the elbow
Kick	Successful strike which connects with opponent with the foot, leg or heel
Knee	Successful strike which connects with opponent with the kneecap and surrounding area of kneecap
Grappling Actions	
Clinch	A grapple at close quarters with opponent, to be too closely engaged for full arm blows
Submission	Attempts at yielding the opponent with a grapple with the intent to finish the fight
Takedown	A grappling manoeuvre where the opponent is brought down to the mat from a standing position
Guard	Execution of a ground grappling position where fighter has their back to the ground while attempting to control the other fighter using their legs

Table 4. General Performance Indicators

Fighter Application of Feedback

Fighter performance indicators ($n = 8$) were categorised into two groups: general and coach feedback-dependent. General performance indicators were those used in actions by the fighter during the bout and consisted of striking (offensive or defensive) and grappling techniques (Table 4).

The coach feedback-dependent performance indicators were those observed being communicated by the coach to his fighter during the 1-minute breaks between rounds.

For example (Figure 2 and Table 5), during one such break, the fighter was instructed by his coach to keep his opponent pressured by *driving forward*, stay in the *centre of the ring* and concentrate on using *body kicks*.

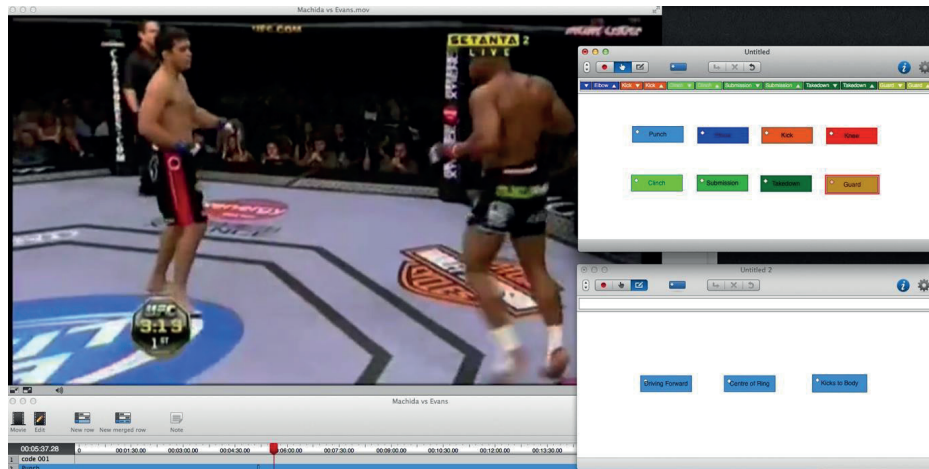


Figure 2. Screenshot of SportsCode Gamebreaker software (Sportstec, 2015)

Coach Feedback	Fighter Application of Coach Feedback
Drive forward	Obvious forward movement fighter towards opponent
Centre of ring	Duration fighter is in the “Centre of ring” (Figure 2)
Kicks to body	Successful strike which connects with opponent’s torso with the foot, leg or heel

Table 5. Example of coach feedback dependant indicators used by a coach.

When observing and coding the actions of the fighter, the general code window layout remained constant, while the coach feedback-dependent code window layout could change with each round to correspond to the coach's instructions to the fighter (e.g., Figure 3).

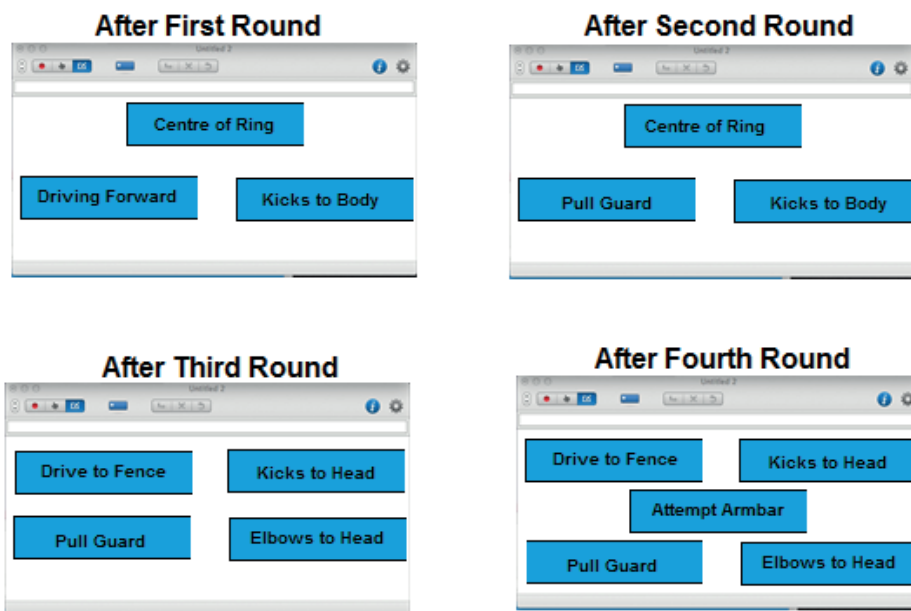


Figure 3. Example of coach feedback dependent code window formats

To measure the effectiveness of 'coach feedback translating into fighter action,' a feedback application grading system was used (Table 6). For example, if a fighter followed one out of three instructions, this was coded as a 2 (low application); if a fighter followed two out of three instructions, this was coded as a 4 (high application).

Reliability

Hughes and Franks' (2007) intra-operator percentage error calculation ($\frac{\sum(\text{Mod}(V_1 + V_2))}{V_{\text{totmean}}} \times 100$) was used to confirm the reliability of the coding of the nominal data collected. A single bout was coded four times, under identical working conditions, one week apart. The operator was 98% accurate in their reliability in terms of the behaviours coded (Table 7).

RESULTS

Coach Behaviour Analysis

Frequency of Coach Feedback. The quantity of feedback communicated by the coaches increased as the fight progressed. This trend occurred in each of the divisions coded (Figure 4).

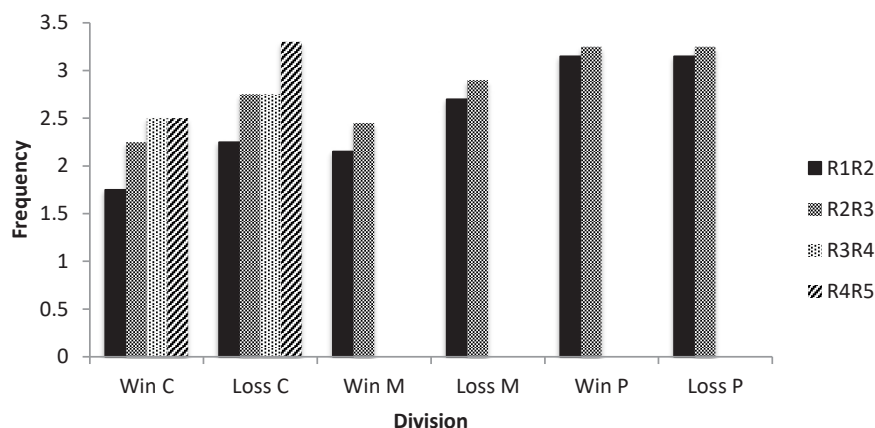


Figure 4. Frequency of coach communication per round

Coaches of losing fighters ($M = 2.95, SD = .6$) communicated more feedback than did winning coaches ($M = 2.57, SD = .72$). Preliminary division fighters received the greatest amount (40%) of feedback from their coaches, while championship and main card fighters received the same amount (30%). Because championship fighters have a maximum of five rounds compared to the main card fighters' maximum of three, championship fighters received less information relative to the other divisions.

Methods of Feedback and Divisional Differences

When fighter division is considered, coaches at championship level offered a greater proportion of verbal feedback, while the preliminary-level coaches used more combined (visual/verbal or verbal/kinaesthetic) feedback, although this association was not statistically significant ($p = .79$) (fig 5). There was no association between fight outcome (win/loss) and the method of feedback used ($p = 0.09$).

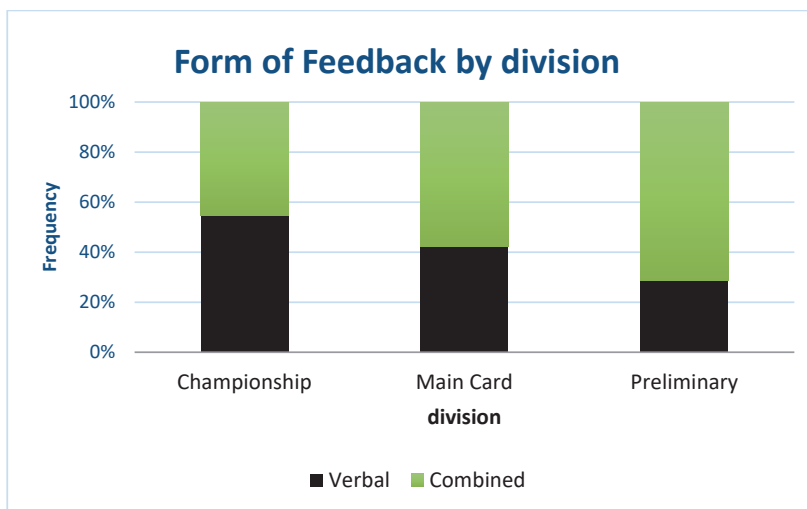


Figure 5. Percentage of form of coach feedback by division

Types of Coach Feedback

From the 36 fights coded, coaches used prescriptive feedback 50% more frequently than other methods of feedback. Descriptive and negative feedback were the next most frequent categories, with positive evaluation being the least expressed method of feedback. Championship fighters were the main recipients of prescriptive feedback (Figure 6).

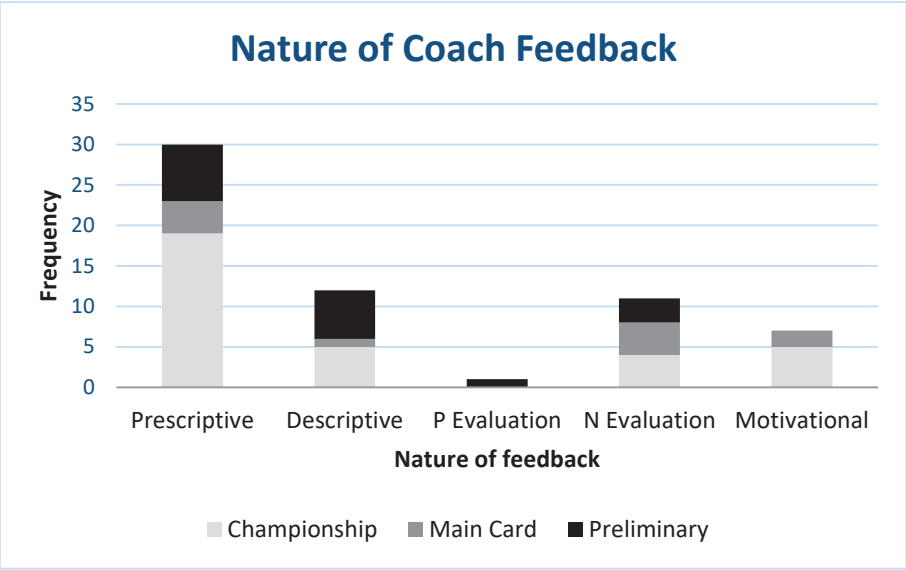


Figure 6. Frequency of Nature of coach feedback and fight level

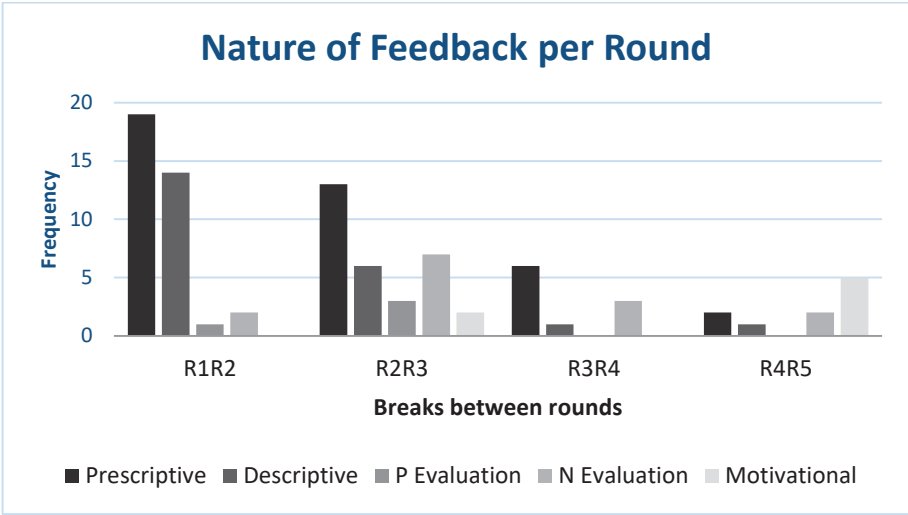


Figure 7. Frequency of Nature of coach feedback per round

This greater use of prescriptive feedback occurred during the first three 1-minute breaks (Figure 7). As a fight progressed, the feedback type used by the coach changed. Descriptive feedback was most frequently used during R1R2, whilst negative evaluative feedback increased in R2R3 and remained present in R3R4 and R4R5. Positive evaluation was typically used in R1R2 and R2R3, but not communicated in R3R4 and R4R5. Motivational feedback was communicated in R2R3 and R4R5, and was the method of feedback least used by the coaches.

Fighter Application of Coach Feedback

Outcome of Fight. Analysis by fight outcome showed that application of coach feedback made a significant difference. Winning fighters ($n = 44, M = 4.14, SD = 1.02$) were significantly more likely to have applied coach feedback ($t(86) = -2.87, p = 0.005$, two-tailed) than losing fighters ($n = 44, M = 3.56, SD = 0.82$). The magnitude of the differences in the means (mean difference = $-.57$, 95% CI $(-.96 \text{ to } -.18)$) was moderate (eta squared = $.09$). Figure 8 suggests a trend of “reduced application of feedback” by losing fighters at each level of MMA.

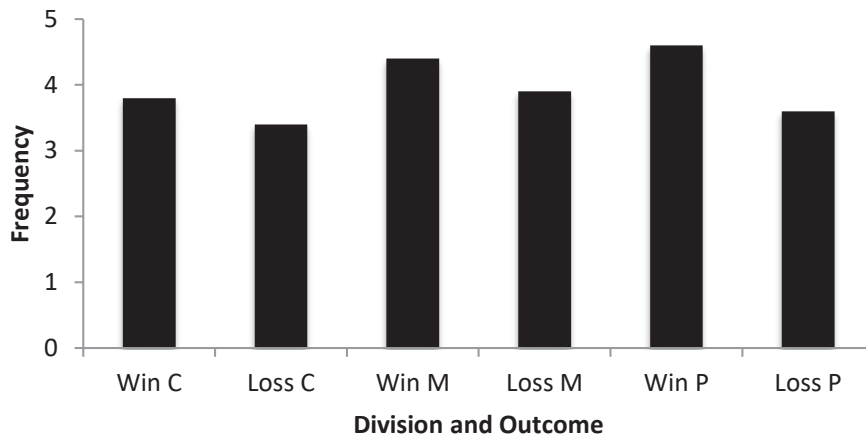


Figure 8. Mean frequency of information applied by the fighter (by division)

Influence of Particular Round

A paired-samples t -test evaluated the impact of ‘round’ on a fighter’s level of application of feedback. There was a statistically significant decrease in the application of coach feedback from the first round ($M = 4.47, SD = .56$) to the final round ($M = 2.5, SD = 1.18$), ($t(35) = 9.44, p = 0.001$, two-tailed). The mean decrease in application was 1.97 , with a 95% CI ranging from 1.55 to 2.40 . The eta squared statistic ($.72$) indicated a large effect size.

Mean information applied by fighters in all divisions showed a decreasing trend as rounds progressed (Figure 9). Negative trends were exaggerated as fighters proceeded through their fight, and these were particularly evident in the championship division. The greatest decline in the application of information was displayed by the losing preliminary division fighters.

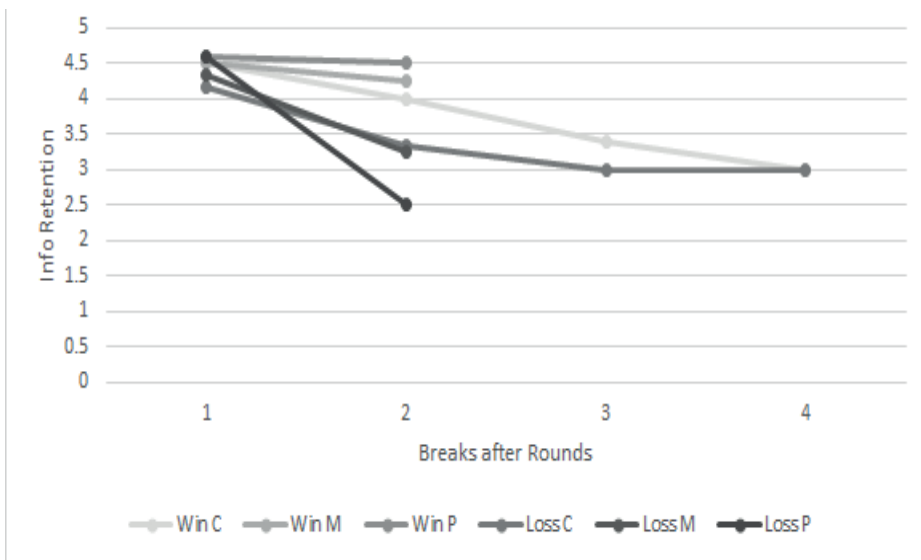


Figure 9. Fighter application of coach feedback

Although losing fighters were given more feedback than winners in the same division, they applied it less frequently – suggesting that the more feedback given to a fighter, the less information they applied (Figure 10).

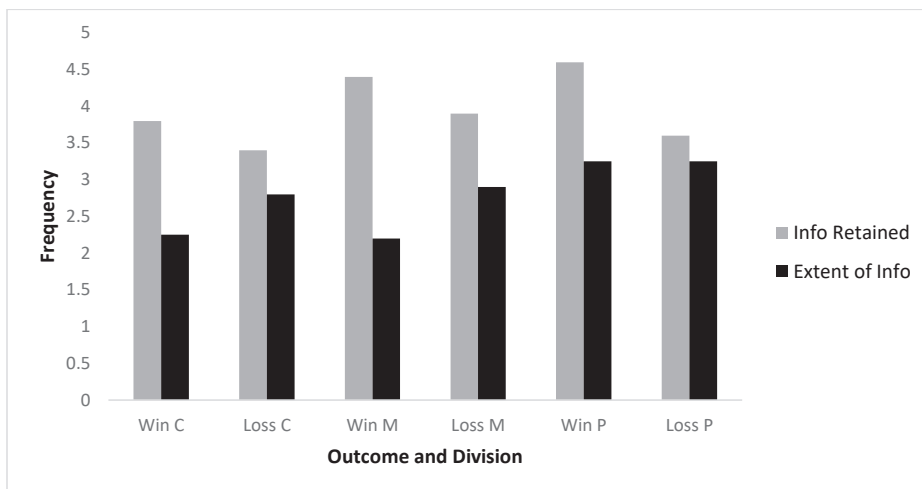


Figure 10. Quantity Fighter applied feedback and quantity of of coach feedback

DISCUSSION

The purpose of our research was to understand the type and method of coach feedback and fighters' application of this feedback, and to investigate its relationship with fight outcomes. The study was divided into two components – information application and amount of feedback offered. We considered that these two aspects could well determine whether the coach's instructions during a fight have an impact on the fighter's performance. In addition, further research was conducted to determine which type of feedback was most effective, with a view to establishing the optimal type and method of feedback delivery.

Fighter Information Application

The hypothesis for information application was that the more thoroughly the fighter applies the coach's feedback, the more likely the fighter is to win the fight. Results showed that as the rounds in a given fight progressed, the association between the instructions given to the fighter and their execution began to decrease. Such a staged decline could be caused by fatigue. Under these conditions, fighters' neuromuscular junction processes begin to slow down due to the extensive amount of energy expended (Marieb, 2012). Takahashi et al. (2006) concluded that muscle fatigue and recovery affect arm movement, especially during intensive exercise.

Our results also revealed that preliminary-level fighters applied the most coach information, possibly due to their lack of experience and knowledge compared to more seasoned fighters. This suggests that preliminary-level fighters rely more on their coach's decisions than their own.

These results contradict the findings of Januário et al. (2013) and Mesquita et al. (2008), who concluded that athletes unsuccessfully applied most of the information given by their coaches, and that feedback coherency was in inverse proportion to the number of instructions provided. Nonetheless, the present study has demonstrated the importance of feedback, as our results showed that winning fighters applied more information than did losing fighters. Thus, applying and adhering to the coach's feedback does indeed have an influence on a given fight, thus confirming our hypothesis. According to Grădinaru et al. (2014), sporting outputs are determined by several factors involving the athlete including motor memory. The more information applied, the more likely the fighter will win.

The Amount of Information Delivered by the Coach

Our hypothesis also stated that the more information given to a fighter, the more likely the fighter will win. Our results showed that the *quantity* of coach feedback increased per round. This could be due to the longer time the coach has to observe the fighter during the fight. According to Hughes and Franks (2007), information leading to the success or failure of a performance is crucial to the athlete. It can lead either to continued performance, if the outcome was successfully achieved, or a change in performance if it was not. Our results also showed that preliminary-level fighters were given the most information, further justifying the preliminary division's need for feedback due to less experience in the sport.

Losing fighters within all divisions had more information given to them than winning fighters. This raises the issue of information overload. In the integrated marketing communications framework (Kotler and Armstrong, 2010), exposure to an excessive amount of information containing different messages can cause an individual to become overwhelmed and confused, thus countering our hypothesis. In fact, according to the study (Figure 10), the fewer instructions given to fighters, the more information they apply; and the more information they apply, the more likely they are to win. This conclusion is backed up by the research conducted by Rosado (2008), who concluded that athletes had greater difficulty in applying information when that information was lengthy and poorly contextualised.

The Types and Methods of Feedback from Coaches

Following the completion of our research, additional analysis was conducted in order to expand on the information gathered. This examined the most effective and most common types and methods of feedback. According to our findings, motivational feedback was the least used, occurring only during the final break of a fight. This might be related to a concept known as combat motivation. First reported in soldiers, it describes the psychology of disciplined individuals in combat, in particular the revitalisation of an individual's fighting spirit during combat when given incentives to continue fighting (Kellett, 2013). Our results also revealed that combined feedback, involving information delivered both verbally and kinaesthetically (Mesquita, 2008), was used most in the preliminary fighter division. Once again, this underlines the need for more feedback for less experienced fighters.

Finally, our findings showed that prescriptive feedback was the most common type of feedback, pointing to performance errors and solutions to remedy them (Mesquita, 2008). By contrast, descriptive feedback identifies and encourages positive aspects of performance; according to Wrisberg (2007), this type is most suitable for experienced athletes, whereas prescriptive feedback suits less experienced individuals who require more detailed instruction. These considerations further develop the information gathered on the differences between seasoned and less experienced MMA fighters.

Limitations

The limitations of this study may have affected the accuracy and reliability of its findings. Firstly, the sample size of the study was restricted to 18 fights, involving 36 coaches and 36 fighters. This may not be a sufficiently representative sample to yield definitive results that would apply to all mixed martial arts situations. Secondly, the subjectivity of the individuals studied may have been a limiting factor, as each fighter thinks and behaves differently and each coach operates differently from their peers. Nonetheless, this study has identified some clear trends and conclusions regarding the influence of feedback on mixed martial arts fighters.

Applied recommendations for MMA coaches from this study could be summarised as: the fewer instructions given by the coach to the fighter, the more information the fighter will apply; and the more information they apply, the more likely they are to win.

CONCLUSION

This study of coaching behaviour in a mixed martial arts context has shown that less experienced fighters require additional feedback and instructions from their coaches compared to more experienced and knowledgeable fighters. Prescriptive feedback communicated visually and verbally is the most effective way to deliver this information. Most importantly, the less information given to the fighter, the more they are likely to apply it – and the more information they apply, the more likely they are to win the fight.

The conclusions drawn from this study can be practically applied to the sport of mixed martial arts and to general coaching strategies during combat sporting bouts. Our research has highlighted the value of feedback provision between rounds of a fight, as this has a definite influence on the outcome. Coaches should monitor the feedback they give to their fighters to ensure its effectiveness and efficiency. Further research should be conducted on this aspect of the sport. In particular, the optimal number of coaches engaged in providing feedback and the specific content of this feedback would be useful subjects for research in future studies.

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DOES STRETCHING THE ANTAGONIST MUSCLE INCREASE POWER OUTPUT IN AN AGONIST MUSCLE CONTRACTION?

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INTRODUCTION

In an athletic setting, it is not uncommon to see athletes participating in stretching prior to physical activity. The American College of Sports Medicine (ACSM) recommends stretching all major muscle groups twice per week for 10-30 seconds per exercise (ACSM, 2013). Stretching is frequently adopted by those aiming to reduce risk of injury and improve athletic performance by increasing Range of Motion (ROM) (Brandy, Irion, & Briggler, 1997). However, information is increasingly coming to light that stretching does not in fact reduce the risk of local muscle injury (Shrier, 1999) and actually reduces athletic performance (Shrier, 2004).

Multiple studies have been completed of the relationship between stretching and ROM, and stretching and risk of injury, as well as stretching and athletic performance; however, few have studied the relationship between stretching the antagonist muscle prior to an agonist muscle contraction. The late Charles Poliquin, world-renowned strength and conditioning coach, long advocated that the antagonist muscle should always be stretched prior to completing an agonist muscle contraction in order to increase power output (Poliquin, 2017). He urged:

Always stretch the quadriceps between hamstrings sets. Increasing the range of motion of your quadriceps prior to a leg curl exercise will increase the amount of motor units used in the hamstrings during the exercise and therefore the effectiveness of the chosen exercise. Since the quadriceps is the antagonist muscle to the hamstrings, and that stretching will allow it to relax, the force of the contraction in the hamstrings will be much greater in the subsequent contraction. (T-Nation, 2008, Website)

LITERATURE REVIEW

To the best of the authors' knowledge, there has only been one previous study published on the relationship between antagonist stretching and enhanced power in subsequent muscle contractions (Sandberg, 2012). This study is mentioned later in the literature review and will serve as a guideline to support the current study and motivate further investigation of this topic. The theory, anecdotally promoted by Charles Poliquin, has been frequently discussed by strength and conditioning coaches in recent times. With the limited amount of research on this subject, the authors decided to review the factors that inform the reasoning behind Poliquin's theory; these include stretching and ROM, as well as stretching and its relationship to power and force production.

Stretching and ROM

Amiri-Khorasani and Kellis (2015) examined the effects of different agonist and antagonist stretching arrangements within a pre-exercise warm up on static and dynamic ROM. Sixty trained male subjects volunteered to participate in this study. Dynamic and static stretching of both the hip flexor and extensor muscle was completed, leading to an increase in both static and dynamic ROM at the hip. It was concluded that dynamic stretching of the hip flexors and static stretching of the hip extensors was the best arrangement, producing more post-activation potentiation on agonist muscles and less muscle stiffness in antagonist muscles. It can be assumed that with a decrease in antagonist muscle stiffness, agonist muscles will travel through an unrestricted ROM.

Buchbinder, Burns, Cook, Landorf and Randford (2006) completed a systematic review of randomised trials to examine the effects of static calf muscle stretching compared with no stretching. Results showed that calf muscle stretching provided a small yet significant increase in dorsi flexion, with optimal stretching sessions lasting up to 30 minutes in length. It can be assumed that with an extended range of motion of an unrestraining antagonist muscle group, this will allow for greater motor recruitment and force production in the antagonist via reciprocal inhibition.

Godges, Longdon, MacRae, MacRae and Tinberg (1989) completed a study to compare two commonly practiced stretching techniques to establish which is most effective in gaining hip ROM and gait economy. Seven young males aged between 18 and 22 participated in the study, where they completed both static and proprioceptive neuromuscular facilitation (PNF). The results showed that both the static stretching and PNF resulted in significant improvement of both hip flexion and hip extension. These results suggest that a single bout of either stretching technique will result in an effective improvement in hip ROM.

Stretching and Power

Cornwell, Kokkonen and Nelson (1998) completed a study analyzing the effects of acute muscle stretching on maximal strength performance. Fifteen female and 15 male untrained individuals participated in the study, which required them to perform a one repetition max (1RM) prone-knee flexion and 1RM seated-knee extension on two successive days. On each day, one of two treatments was adopted (stretch vs. non stretch) before the testing was repeated to note any variance in results. For both the knee flexion and knee extension, a decrease in the participants' 1RM was noted after adopting the stretching protocol. The authors suggest that acute stretching of the prime (agonist) mover muscles should be avoided prior to maximal strength output.

Behm, Cahill, Carroll, Power and Young (2004) analysed the effects that an acute bout of static stretching have on force and jumping performance. Twelve participants took part in the experiment and were tested either before and after static stretching of the quadriceps and plantar flexors or tested on a similar period for control (no stretch group). The tests included (but were not limited to) maximal voluntary force, electromyography activity and vertical jump measurements. The results showed that after static stretching, there were significant decrements in torque/force of the quadriceps on maximal voluntary force; however, there were no significant changes on vertical jump height. The authors concluded that the parallel duration of changes in ROM and force output might offer further evidence suggesting that static stretching reduces force production.

Beck, Coburn, Cramer, Housh, Johnson and Weir (2005) completed a study on the acute effects of static stretching on peak torque, mean power output, electromyography and mechanomyography. The authors ran 21 volunteers through maximal voluntary concentric isokinetic leg extensions for the dominant and non-dominant limbs. Following the tests, the dominant leg extensors muscles were stretched with four different static stretching exercises before the initial tests were repeated. The study findings suggested that stretching induced decreases in both force production and muscle activation; the authors attributed these decreases to the central nervous system inhibitory mechanism.

Reliability and Validity of GymAware Software

Drinkwater, Galna, Hunt, McKenna and Pyne (2007) completed a study to analyse the reliability and validity of the GymAware optical encoder to measure displacement data. Three GymAware sensors were attached to a calibration rig, specifically designed to accurately calibrate dynamometry equipment. The study concluded that the GymAware optical encoder validated its ability as a linear position transducer which can calculate other strength and power variables through the differentiation of measured displacement data. The encoder was highly reliable, with little to no variation between sets or different sensors.

Antagonist Stretching on Agonist Power

Sandberg (2012) completed a study of the acute effects of antagonist stretching on jump height and knee extension peak torque. Sixteen active males participated in the study, which required them to be tested for both vertical jump height and isokinetic torque production in a knee extension. Participants performed these tests in a randomised counter-balanced order with and without prior antagonist stretching. Post antagonist stretching, vertical jump height and power was significantly higher. The results suggest that stretching the antagonist hamstrings prior to knee extension increases torque production, and that stretching the hip flexors and dorsi flexors may enhance jump height and power. This strengthens the theory that antagonist stretching increases agonist force and power. This is the first published study on this subject and will serve as a guideline for the current study.

METHODS

The aim of our study was to test Charles Poliquin's anecdotally promoted theory that antagonist stretching should be performed prior to agonist muscle activation, as this will allow for a more powerful and forceful contraction. We sought to use Sandberg's (2012) study as guideline and further validate the results found in his study. It was then hoped that the results could be used by the researcher as anecdotal evidence for future implementation and to aid the participants' future athletics endeavours. Following consultation with the Kaitohutohu Research Committee, ethical consent was granted by the Otago Polytechnic Ethics Committee.

Study Design

The study took the form of a within-subjects design and involved participants completing a series of trial tests and stretching protocols in a randomised counter-balanced order.

Participants

The study recruited 16 trained and active participants who are frequently required to perform explosive power or plyometric exercises such as jumping and weightlifting. This approach was essential to reduce any improvements in jumps or in either of the lifting exercises through minimal practice alone – known as the learning effect. As a result, basketball and volleyball players, as well as Olympic weightlifters, were recruited for the study. Not only did this result in more reliable results, but also the findings of the study would be relevant to the participants in increasing their athletic performance. All participants were free of injuries or illnesses, had received an information sheet and provided written consent.

Equipment/Materials

The equipment required in the trial was all freely available at the Otago Institute of Sport and Adventures Tapuae gym facility. It included: (a) a leg extension machine, (b) a cable curl machine, (c) a Vertex vertical jump device, (d) a stationary bike, (e) GymAware optical encoder and software, and (f) a laptop (researchers' personal password-protected device).

Procedure

This within-subject design study involved 16 trained and active Olympic weightlifters, basketball and volleyball players completing a series of trial tests and stretching protocols in a randomised counter-balanced order. Two series of tests were undertaken each day and were split into two categories, isolation and compound. Before testing began, participants performed a basic aerobic warm up which involved them riding a stationary bike for five minutes. For the isolation trials, GymAware software was used to calculate maximum velocity. The first isolation test was the standing strict cable curl (performed at 15 kilograms for males and 10 kilograms for females;), in which the bicep performs the role of agonist and triceps the role of antagonist. The second isolation test involved the single-legged seated leg extension (performed at 15 kilograms for males and 10 kilograms for females), in which the quadriceps plays the role of agonist and hamstrings the role of antagonist. The isolation trial tests were repeated five times for each movement to determine an average.

The compound trial involved only one test, the vertical jump, in which the gluteus maximus, quadriceps and gastrocnemius serve as the main agonists and the hip and dorsi flexors serve as the main antagonists. The vertical jump was selected due to its ease of performance and its common use in the field for measuring power. Participants repeated jump attempts five times to determine an average. Jump heights were recorded by the Vertec Jump Device and the Harman Equation was used to calculate power (Frykman, Harman, Kraemer, Rosenstein, & Rosenstein, 1991). Both Team A and Team B performed all test trials on day one, Team A with the stretching protocol and Team B without. Three days later, the roles were reversed.

Stretching Protocols

Stretching treatments were performed in both the isolation and the compound trials. The standing strict cable curl test involved the participants performing a standing behind the head tricep stretch (Appendix 7). The leg extension required the participants to perform a lying partner-assisted hamstring stretch (Appendix 8). Lastly, the vertical jump required the participants to perform a kneeling Sanson-style hip flexor stretch (Appendix 9) and split stance dorsi flexor stretch (Appendix 10). The treatment of stretches required participants to perform three sets of 30-second stretch intervals with 20 seconds rest between sets – previous research recommends 30-second holds for static stretching (Chan, Hong, & Robinson, 2011).

Data Management, Process and Analysis

All data was stored and managed in a password-protected, electronic format. Analysis of the raw data was completed by comparing the differences between un-stretched results and results after completing the stretching protocol for individual participants. Data was recorded into a template for analysis through the use of a simple, structured table (Appendix 12).

RESULTS

In total, 16 trained participants were recruited based on their athletic pursuits and capabilities. All participants (Mean $[M] = 24$ years, Standard Deviation $[SD] = 3.3$ years, Range $[R] = 13$ years) completed both the non-stretching and stretching trials for the strict cable curl, leg extension and vertical jump. The average height and weight of the participants was $M = 173$ centimeters (cm), $SD = 9.9$ cm, $R = 26$ cm and $M = 80$ kilograms (kg), $SD = 14.4$ kg, $R = 42$ kg, respectively.

Statistical analysis of both the control (pre-testing/non-stretch) and intervention (post-testing/stretch) groups was completed for both orders of the counterbalanced experiment. Data was recorded as a Mean \pm Standard Deviation; change between control and experimental trials as well as statistical significance through probability values ($P \leq 0.05$) and effect size using Cohen's D for all dependent variables were calculated and summarised in Table 1 below.

Exercise:	Non Stretch:	Stretch:	Change:	P:	ES:
Cable Curl (M/PS)	0.51925 \pm 0.16504	0.63288 \pm 0.20093	0.11363	0.0907	0.688
Leg Extension (M/PS)	0.62663 \pm 0.1022	0.64813 \pm 0.12985	0.0215	0.6039	0.214
Vertical Jump (CM)	51.825 \pm 9.76739	53.025 \pm 10.69875	1.2	0.7427	0.122
Vertical Jump (Watts)	7938.875 \pm 973.85727	8010.9375 \pm 1061.24464	72.0625	0.8427	0.0739
NB: All trials represented as Mean \pm Standard Deviation					

Table 1: Statistical analysis on both the control (pre-testing/non-stretch) and intervention (post-testing/stretch) groups.

Isolation Trials

Both the strict standing cable curl and leg extension recorded a perceptible increase in power (M/PS) from adopting the stretching protocol (see Figure 1). Probability value ($P > 0.05$) suggested that the results were not statistically significant, and effect size was small and trivial for the cable curl ($ES: 0.35-0.8$) and leg extension ($ES > 0.35$) respectively.

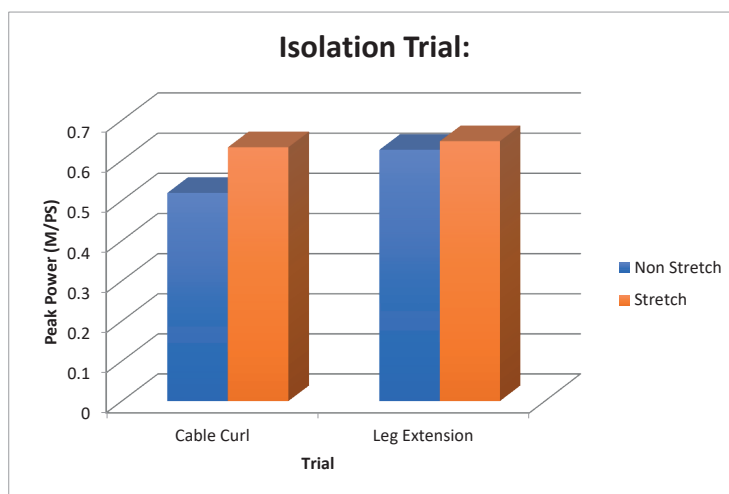


Figure 1: Isolation Trial Results (means represented)

Compound Trial

Vertical jump testing recorded a perceptible increase not only in jump height (cm), but also in power (w) between the control and intervention trials (see Figures 2 and 3). Statistical analysis found that probability value was not significant ($P > 0.05$) and effect size was trivial ($ES > 0.35$).



Figure 2: Jump Height (means represented)

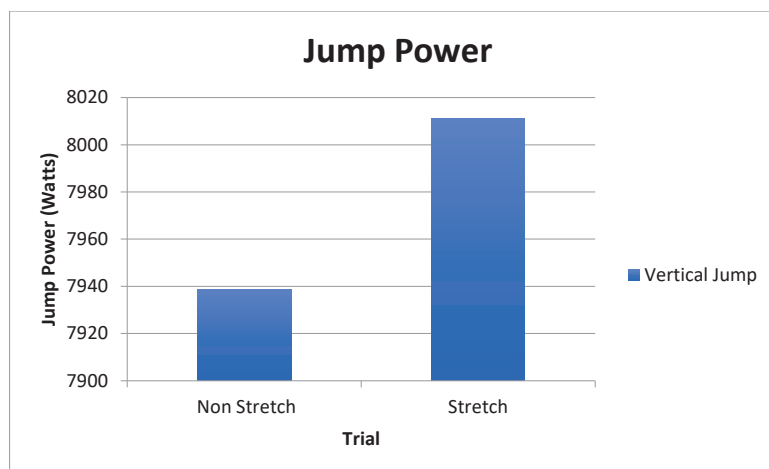


Figure 3: Jump Power (means represented)

DISCUSSION

Isolation Trials

The strict standing cable curl and seated leg extension isolation trials provided the first key findings of this study. These trials showed that performing antagonist stretching of the triceps and hamstrings (three sets of 30 seconds on, followed by 20 seconds rest) may increase power output in elbow flexion and knee extension-based movements. The strict standing cable curl and seated leg extension saw a mean increase of 0.11363m/ps or 11.3cm per second and 0.0215m/ps or 2.15cm per second respectively. Statistical analysis was completed and showed that probability value was not significant ($P > 0.05$) and that effect size, according to Rhea (2004), was small and trivial for the cable curl ($ES: 0.35-0.8$) and leg extension ($ES > 0.35$) respectively. These results give evidential support to back Poliquin's anecdotally based theory that antagonist stretching will increase power; this may be due to the increased range of motion now available throughout a contraction, and thus the potential to recruit greater number of motor units (Poliquin, 2017).

Compound Trials

The vertical jump provided a further two important findings that are more applicable to an athletic setting. This trial showed that performing the aforementioned stretching protocols of the hip flexor and ankle dorsi flexor musculature may improve jump height and power output. The vertical jump recorded a mean increase of 1.2cm in height and 72.0625w. Statistical analysis found that probability value was not significant ($P > 0.05$) and effect size was trivial ($ES > 0.35$) according to Rhea (2004). However, it can still be assumed that performing antagonist stretching prior to completing power-based exercises such as the vertical jump may result in increased performance such as jump height and power output. These results further support Poliquin's theories and give additional weight to Sandberg's (2012) findings, with an uncanny similarity in results. The current study recorded a 1.2cm increase in means from the control trial's 51.825cm to the intervention trial's 53.025cm, while Sandberg's control trial's 58.6cm also recorded a 1.2cm increase in means, with his intervention trials averaging 59.8cm. In a further case of uncannily similar results, a study by Church, Crist, Moode and Wiggins (2001) examined the effects of PNF stretching on two agonist muscles (hamstrings and quadriceps) prior to performing the vertical jump. PNF stretching of the hamstrings and quadriceps saw a 1.47cm decrease in jump height.

Limitations

The authors aimed to minimise as many limitations of the present study as possible through rigorous research on the previous literature, pre-planning, supervisor and tutor mentorship and ethical consultation. However, as with all studies, limitations were still present and were controlled to the highest degree possible. They were divided into one of three categories: participants, equipment and study protocol.

The participant criteria for this study provided the first complication. The study recruited a mix of intermediate to advanced trainees with experience in volleyball, basketball or weightlifting to minimise the learning effect. However, this meant that the participants were heavily involved in their own athletic pursuits and still actively training and competing. Although the author attempted to minimise the complications arising from this by scheduling selected testing slots and recommending that training or competing the week of testing be avoided, he still heard of participants experiencing delayed onset muscle soreness (DOMS) and muscular fatigue on testing days, which may have adversely effected testing performance. Another issue that could have potentially effected results was nutritional choices and sleeping patterns around testing days.

The second area of limitation related to the equipment used in the study, specifically the GymAware Optical Encoder. Halfway through pilot testing, problems arose with the encoder cord and tassel retractor. To address this issue, the owner sent the device overseas to its country of origin to be repaired under warranty. Unfortunately, this occurred during testing of the isolation movements and meant that one group had a seven-day intermission period between control and intervention trials. Whether or not this had an effect on the results cannot be determined; it did, however, prompt an alteration in testing procedures.

The third area of limitation related to the study's choice of exercise selection for testing. The vertical jump was adopted due to its common use in the field for determining power in athletes; however, it made it difficult to establish a true antagonist for such a full-body, multi-joint, compound movement. According to Van De Graaff (1998), and also noted by Sandberg (2012), the role of the rectus femoris in the vertical jump is that of a hip flexor; but it also acts as a knee extensor; so can be labeled an agonist and antagonist during different phases of the movement. To minimise this potential confounding factor, the Sanson stretch was utilised to reduce the involvement of quadriceps when performing the hip flexor stretching protocol.

Interpretation

The key results of the isolation trials in this study support Poliquin's anecdotally based theory of stretching antagonist musculature before performing an agonist-based movement to increase joint and exercise ROM and thus increase motor unit activation. However, it is important to note that the increased peak power output noted between the control and intervention trials cannot be interpreted as a result of increased motor unit recruitment without the use of electromyography testing, as seen in Sandberg's (2012) study. T-Nation (2008) and Poliquin (2017) envisaged that Poliquin's theory would be utilised in a hypertrophy-based setting where trainees will be performing isolation exercises with the goal of maximum musculature activation, resulting in muscular hypertrophy. The current study noted an increased force production represented by an increase in peak power output; whether or not this was a result of increased motor unit activation (and therefore future muscular hypertrophy) would have to be further investigated in future research. The use of isolation trials in this study was intended to provide a setting where the theory could be tested in the simplest environment possible.

The key results of the compound trials were the most important for the authors, as coaches and athletes, as they took Poliquin's theory from the realm of the anecdotal to a practical athletic setting which can be utilised in the field of practice or game play. The study's stretching protocol produced precisely the same performance increases in jump height as seen in previous research (Sandberg, 2012). With the increase in not only jump height, but also power output, the results of the compound trials further validate Poliquin's claims and, through replication, back up Sandberg's prior research. According to both the current study and Sandberg's previous research, stretching the

antagonists to the hip extensors and ankle plantar flexors before performing a vertical jump produces significantly higher jump height and power. However, it should be emphasised that the mechanisms of these improvements, as with the isolation trials, cannot be determined without future research.

Practical Application

With the results of the current study validating and replicating the previous research undertaken by Sandberg (2012) and the anecdotally based theory of Charles Poliquin, we can conclude that stretching antagonist musculature before performing an agonist muscle contraction may result in increased power output and thus performance. According to Sandberg (2012), antagonist stretching works best at improving strength at high velocities. The results of the current study back this up, with increased peak power output seen after stretching the triceps and quadriceps before performing the strict standing cable curl and seated leg extension respectively. Similarly, stretching the hip flexors and ankle dorsi flexors during a high-velocity vertical jump resulted in a significant increase in not only jump height, but also in absolute jump power.

It appears that antagonist stretching may result in increased peak power output in isolation-based exercises, as well as in performance and absolute power in high-velocity movements such as the vertical jump. Trainees wishing to achieve muscular hypertrophy may want to incorporate antagonist stretching into their regimen before performing isolation-based exercises with the goal of incorporating heavier weights.

It is vital to note, however, that the mechanisms for these improvements cannot be determined from the current study. Although Poliquin believes that these increases are a result of increased motor unit activation, this is yet to be proven and begs the question of whether or not the implementation of this stretching protocol will result in muscular hypertrophy. Hypertrophy is the result of tension through muscular activation (Andrews et al., 2011), and this study did not look at muscular activation as a mechanism for increased power. Strength and conditioning coaches and athletes may wish to use this information to incorporate antagonist stretching in the field of play to increase performance in high-velocity movements such as jumping, lifting and throwing. It is recommended however, that these methods should first be implemented in training, as responses seem to be individual. With the increase in performance seen in both Sandberg's (2012) research and the current study, the adoption of this method may drastically improve an athlete's field performance and results.

Further research is needed to advance this topic; the authors suggest investigation of different styles of stretching, such as PNF and dynamic, on muscle groups and movements that have not been previously researched. In addition, future research should investigate the possible mechanisms that have resulted in the improvements in peak power output, jump height and absolute jump power.

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EXPOSURE OF THE FEMALE BODY IMAGE IN THE MEDIA AND THE EFFECT ON ATHLETE AND NON-ATHLETE FEMALES' BODY IMAGE DISSATISFACTION

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INTRODUCTION

In Western society, body dissatisfaction (an individual's negative evaluation of the appearance of their body; Joseph & Shiffrar, 2011) has become a cultural norm (National Eating Disorders Collaboration, 2015). It has been found that viewing images of thin, idealised models is associated with body dissatisfaction and low body esteem (Halliwell, Easun, & Harcourt, 2011), as well as giving the perception that being thin is most attractive. The media is filled with images of unrealistic and unattainable thin-ideal bodies. This phenomenon is evident in magazines, TV shows, commercials and, more recently, social media.

Body image is the perception a person has of their physical self and the thoughts and feelings that result from that perception (National Eating Disorders Collaboration, 2015). These thoughts and feelings can be negative and lead to an individual developing body dissatisfaction. Negative body image gives a person a distorted and ashamed feeling about their body, which is sometimes seen as personal failure (National Eating Disorders, 2012). Dissatisfaction with one's body is an internal process influenced by external stimuli such as environmental factors including family, friends, dating partners and the media (Stice & Whitenton, 2002).

Modern ideals of female attractiveness are beginning to change – from extreme thinness to a more toned and fit appearance (Homan, McHugh, Wells, Watson, & King, 2012). Several studies have found that the thin female body images idealised by the media may lead to body dissatisfaction, especially in female athletes (Tok, Gúnes, Koyuncu, Dogan, & Canpolat, 2011), and even more in athletes who participate in leanness-promoting sports (Homan, 2010).

Research according to Swami, Steadman, and Tovée, (2009) and Tok, Gunes, Koyuncu, Dogan, and Canpolat, (2011) has revealed a set of relationships between 'athletes' (those who participate in sport at either recreational or elite level), 'non-athletes' and the ideal-internalisation variable that they are likely linked to. Athletes who participate in performance-promoted sports were shown to have stronger athletic-ideal internalisation, whereas athletes who participate in leanness-promoted sports were reported to have a higher thin-ideal internalisation (Swami et al., 2009; Tok et al., 2011). This is likely due to athletes in performance-based sports, such as rugby or powerlifting, being more reliant on physical strength to succeed in their chosen sport. In comparison, athletes participating in leanness-promoted sports, like track and gymnastics, prefer a relatively small body-frame and are more thin-internalised than athletic-internalised (Kong & Harris, 2015). Presumably, this is because the 'ideal' body image portrayed across the media is predominantly thin.

As noted above, the ideal body image is changing to a more 'toned' physique, although it has been found that those non-athletes who perceive the athletic ideal as most attractive would not make the behavioural changes needed

to achieve such a body shape (Mulgrew & Hennes, 2015). Thin-ideal and athletic-ideal internalisation both have a significant correlation with body dissatisfaction. Many studies (Blum, Johnson, & Rodgers, 2010; Halliwell et al., 2011; Homan, 2010; Tok et al., 2011) have found body dissatisfaction among athletic-internalised participants to be less significant than among thin-internalised participants, although Mulgrew and Hennes (2015), found the opposite result. Multiple studies (Homan, McHugh, Wells, Watson, & King, 2012; Miller & Halberstadt, 2005) agree that some level of body dissatisfaction is evident among most females, regardless of the idealisation they display.

Body dissatisfaction is likely to evolve from an individual having a negative perception of their body, and/or vice versa (Eating Disorder Hope, 2016). Body perception is determined by anthropometric and psychological factors (Fortes, Almeida, & Ferreira, 2014). A significant correlation has been found between females' body image perception and body dissatisfaction, with those who perceive themselves to be larger than they actually measure showing the strongest signs of body dissatisfaction (Blum et al., 2010; Zaccagni, Masotti, Donati, Mazzoni, & Gualdi-Russo, 2014). For female athletes vs non-athletes, Blum et al. (2010) found that body image perception among athletes was on average 20 percent higher than for non-athletes.

When investigating the relationship between Body Mass Index (BMI) and body image perception, Blum et al. (2010) found that athletes with a low-risk BMI (18.5 to 24.9) had a 10 percent more positive body image perception, resulting in less body dissatisfaction, when compared to non-athletes. Overweight participants (BMI of 25-29.9) displayed a 20 percent more positive body image perception compared with non-athletes (Blum et al., 2010).

Negative body image and weight stigma increase unhealthy eating behaviours, with body dissatisfaction the biggest known contributor to the development of eating disorders among females (National Eating Disorders, 2012). Body image and eating disorders correlate closely (Benowitz-Fredericks, Garcia, Massey, Vasagar, & Borzekowski, 2012). It is often dissatisfaction with one's body or appearance that leads women to believe that losing weight would improve their appearance and enhance their feelings about themselves (Eating Disorder Hope, 2016). Because of this link, a change in eating patterns and behaviours is commonly reported (Kong & Harris, 2015) and can develop into food obsession, resulting in detrimental outcomes such as anorexia nervosa, bulimia nervosa and body dysmorphic disorder (BDD) (Eating Disorder Hope, 2016). It has been found that 13.5 percent of athletes have subclinical eating disorders (Sundgot-Burgen & Torstveit, 2004).

Social media is intruding on our lives more than other media, with 2.34 billion users reported in 2016, a figure which is expected to reach 2.95 billion by 2020 (Statista, 2016). This means that exposure to thin and athletic-idealised bodies is becoming unavoidable, and related risks such as disturbed eating behaviours and eating disorders are increasing, in both younger and older age groups (National Eating Disorders Collaboration, 2012).

This is what the media wants. Profits are made by exploiting our insecurities and promoting unattainable ideals of 'beauty' (Eating Disorder Hope, 2016). There are athletic- and thin-idealised models on social media, such as Instagram or Facebook, who are paid to advertise particular products. Consumers are drawn into thinking that they will look like these models if they buy the product being promoted, or that looking like this is the only way to be happy and successful – forgetting that these are paid models who most likely do not even use the product themselves.

Based on the literature reviewed, the purpose of the study was to examine the influence of social media on female body image dissatisfaction.

METHOD

Participants

The participants were 102 volunteer females aged 18 years and over. They included those who participated in sport or regular exercise, and those who were non-active. Participants were excluded if they were not female, or were not 18 or over. The mean age was 28.09 years (SD = 9.93). BMI was calculated from self-reported height and weight, ranging from underweight to obese, with an average of 25.32 (SD = 4.86), a figure which falls within the 'overweight' range.

Design

The study was designed as a multiple-component questionnaire. The main variable was sport and exercise behaviour, with further variables being body dissatisfaction, thin-internalisation and athletic-internalisation, and BMI. An initial pilot study was conducted involving eight volunteer females to obtain opinions on whether images displayed in the questionnaire would give an accurate interpretation of the factors that the researcher was wanting to distinguish. The questionnaire was adapted following the results of this pilot study, although the study design remained the same.

Measures

A survey consisting of 36 questions was used, made up of three parts: demographics; the Sociocultural Attitudes Towards Appearance Questionnaire – 4 (Schaefer et al., 2015); and a Figure Evaluation Scale.

Demographic Information. Participants indicated their age, height and weight, along with measurements of their bust, waist and hips. These measurements were self-reported, and BMI was then calculated by the researcher. Participants (N=102) had a mean age of 28.09 (SD=9.93) and a mean BMI of 25.32 (SD=4.86). Participants were separated into two groups (active and non-active; see Table 1). Active (N=77) participants had a mean age of 27.99 (SD=8.61) and a mean BMI of 25.10 (SD=4.65). Non-active participants had a mean age of 29.04 (SD=11.53) and a mean BMI of 25.93 (SD=5.53). Exercise behaviour within the active participants showed a mean of 8.06 (SD=1.641).

	Active (N=77)	Non-Active (N=24)	Sig (2-tailed)
Age	27.99 (8.612)	29.04 (11.532)	.631
BMI	25.104 (4.651)	25.925 (5.531)	.472
Exercise Behaviour	8.06 (1.641)	a	a
Body Dissatisfaction	1.43 (.677)	1.58 (.584)	.316
Media Pressure	15.3 (5.040)	16.21 (4.890)	.359
Athletic Internalisation	15.45 (5.012)	10.17 (4.239)	.000*
Thin Internalisation	15.25 (5.17)	14.21 (5.308)	.392

Table 1: Mean (SD) scores and significance for age, BMI, exercise behaviour, body dissatisfaction, media pressure, athletic internalisation, and thin internalisation; Scale end points: exercise behaviour, 4-11; body dissatisfaction, 0-2; media pressure, 4-20; athletic internalisation, 5-25; thin internalisation, 5-25; a cannot be computed because variable group does not exist

*correlation is significant at the 0.01 level (2-tailed).

Exercise behaviour. To determine physical activity levels, participants specified whether or not they exercised. If they responded yes, they were then prompted to detail the frequency, intensity, time (length of period at one time) and type.

Sport behaviour. To determine sport participation, survey respondents were asked if they played sport. If they answered yes, they were then asked to determine the type of sport played, as well as the length of time and frequency involved.

Social media use. Participants were questioned whether they used social media on a regular basis, and which sites they used.

Sociocultural attitudes towards appearance questionnaire – 4. The SATAQ-4 (Schaefer et al., 2015) is a 22-item scale with five factors, measuring body image, eating disturbance and self-esteem. The five factors include thin internalisation, athletic internalisation, and family, peer and media pressure. Items are measured on a 5-point scale (1 = definitely disagree, 5 = definitely agree). Developed from the original Sociocultural Attitudes Towards Appearance Questionnaire-3 (Thompson et al., 2004), SATAQ-4 provides a more targeted assessment of internalisation of appearance ideals, and expands the assessment of appearance-related pressures from sources such as media (Schaefer et al., 2015).

Figure evaluation scale. The Figure Evaluation Scale was produced specifically for this study to measure participants' body perception. As the participants were all female, only female figures were used. Participants viewed a selection of six front-view and six rear-view images in random assembly, which varied in range from thin, thin-athletic (defined muscularity), average, average-athletic, overweight and overweight-athletic. Each image variable fit within standard BMI ranges (thin and thin-athletic = underweight; average and average-athletic = normal; overweight and overweight-athletic = overweight). The software used to create the images was MakeHuman 1.1.1. Images were generated to include different body shapes, including defined muscularity and varied shoulder, hip and waist ratios. This was to show the diversity of the female body in relatable terms for the participant. Sizing guides from the Ministry of Health (2017) and clothing retailer Glassons (2017) were used to ensure that measurements of specific areas stayed within average range for each variable. Participants then indicated which figure, for each body area (bust; waist; hips; thighs; buttocks; shoulders; arms), they believed was (i) most closely reflective of themselves (FRS-current) and (ii) which was their ideal (FRS-ideal). Although this scale was designed specifically for this project (to include athletic-idealised body image), it retained properties similar to those found in Stunkard, Sorensen and Schulzinger's (1983) Figure Rating Scale.

PROCEDURE

Maori consultation was undertaken with the Kaitohutohu as part of the ethics application, which was approved by the Otago Polytechnic Ethics Committee.

Participants were recruited via a sponsored public Facebook post including a survey which enrolled females to take part in the study. The online survey was conducted on Qualtrics Survey Software and accessed by following a link from the Facebook page. Participants were then given a brief summary of the study and information about it, and consented by accepting to proceed. The survey, which took no longer than 10 minutes on average, required participants to give demographic details and complete SATAQ-4 and the Figure Evaluation Scale. No incentives were provided. Due to the nature of the study, no personal data or IP address was solicited from participants. This was to protect data and eliminate the possibility of false information being given due to privacy concerns. A professional protocol for data management was in place, with data being kept securely for five years from the date of survey closure before being disposed of.

Risk management. To minimise the risk of negative thoughts or feelings arising after participants had completed the

survey, the survey contained links to relevant health professionals and programmes. It was also recommended that concerned participants see their doctor:

RESULTS

The initial aim of the study was to examine whether exposure to thin-ideal and athletic-ideal female body images in the media affects body image dissatisfaction among athlete and non-athlete females. It was intended to include a varied range of athletic criteria, including leanness-promoted (e.g., track running and gymnastics) and muscular-promoted (e.g., rugby and powerlifting) sports, as well as variations of exercise and frequency. However, because sufficient respondents for each of these variables were lacking, it was decided that athletes would be combined with those who exercised and be described as 'active.' Respondents who stated they did not exercise became 'non-active.' Of the 148 initial respondents, 46 were excluded due to significant amounts of missing data. The remaining 102 participants displayed minimal missing data points (<10). In these cases, an average score was calculated for each relevant section.

Body dissatisfaction in active vs non-active participants

An independent samples t-test was conducted to compare body dissatisfaction (FRS; score range 0-2) in active and non-active participants. There was no significant difference between the scores for active (M=1.43, SD=0.677) and non-active (M=1.58, SD=.584) participants; $t(99) = -1.008, p = 0.316$. These results suggest that body dissatisfaction is evident in both groups, with active participants showing a slightly lower (better) score, although there was not a significant difference with the non-active group.

Effect of media pressure on active and non-active participants

An examination of the effect of media pressure (SATAQ-4; score range 5-20) on active and non-active groups was done by an independent samples t-test. Active participants had a mean score of 15.3 (SD=5.040) and non-active had a mean score of 16.21 (SD=4.890). The results showed no significant difference between the two groups; $t(99) = -0.922, p = 0.359$. This suggests that pressure from the media was not received differently by the two groups.

Athletic internalisation

An independent samples t-test was undertaken to measure athletic internalisation (SATAQ-4; score range 5-25) against active (M=15.45, SD=5.012) and non-active (M=10.17, SD=4.239) groups. A significant difference was observed; $t(99) = 4.670, p = 0.000$. This showed the likelihood of a relationship between athletic internalisation and active and non-active participants. A Pearson correlation was then conducted (see Table 2) to examine this relationship further. There was a positive correlation between athletic internalisation (N=102, M=14.23, SD=5.304) and exercise behaviour (N=77, M=8.06, SD=1.641), $r = 0.331, p = 0.003$. This correlation is significant at the 0.01 level (2-tailed). These results suggest that as exercise behaviour increases (in terms of frequency, intensity and time), so does the level of athletic internalisation.

	Exercise Behaviour	
	<i>Sig (2-tailed)</i>	<i>Pearson's Correlation</i>
Athletic Internalisation	.003	.331**

Table 2: Correlation between exercise behaviour and athletic internalisation
** Correlation is significant at the 0.01 level (2-tailed)

Thin internalisation. Thin internalisation (SATAQ-4; score range 5-25) was compared between active (M=15.25 SD=5.117) and non-active (14.21, SD=5.308) participants using an independent samples t-test. No significant difference was found between these variables; $t(99)=0.860, p=0.392$. These results show that there is no dissimilarity between active and non-active groups in relation to thin internalisation – both groups showed similar scores, and neither was prone to higher or lower scores.

Body Dissatisfaction

Multiple Pearson correlations were completed (see Table 3) to analyse body dissatisfaction against several variables including media pressure, BMI and exercise behaviour and internalisation (combined score). Body dissatisfaction (M=1.47, SD= 0.656) and media pressure (M=15.43, SD= 4.998) showed a positive correlation, although with no great significance; $r= 0.185, p=0.062$, with a $R^2= 0.034$. This would suggest that media pressure has a relatively small (3.4%) effect on body dissatisfaction. BMI (M=25.304, SD= 4.834) had a significant positive correlation at the 0.01 level (2-tailed); $r= 0.294, p= 0.003$, with a $R^2= 0.086$.

	Body Dissatisfaction	
	<i>Sig (2-tailed)</i>	<i>Pearson's Correlation</i>
Media Pressure	.62	.185
BMI	.003	.294**
Active	.316	-.101
-Exercise Behaviour	.016	.274*
Non-Active	.316	.101
Internalisation (total)	.031	.213*
Age	.814	-.024

Table 3: Correlation between body dissatisfaction and media pressure, BMI, exercise behaviour, and internalisation (total).

Notes: *Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Exercise behaviour (M=8.06, SD= 1.641) showed a positive significance at the 0.05 level (2-tailed); $r= 0.274, p= 0.016$, with a $R^2= 0.074$. Thin and athletic internalisation were combined for an average total score (M=14.89, SD= 4.403). A significant correlation was found at the 0.05 level (2-tailed); $r=0.213, p= 0.031, R^2=0.045$. Age (M=28.14, SD= 9.345), resulted in a negative correlation; $r=-0.024, p=0.814, R^2= 0.0005$. The variables that showed positive correlations (media pressure, BMI, exercise behaviour, non-active and internalisation) demonstrate that as each variable increases, so does body dissatisfaction. The variables that showed negative correlations (active participants and age) indicate that as body dissatisfaction increases, these variables decrease, and vice versa.

DISCUSSION

The aim of this study was to determine how body dissatisfaction in active and non-active females was affected by exercise behaviour, BMI, internalisation (thin and athletic) and pressure from the media. This study, although limited in its original scope, has some relevant findings to add to current research. Previous research has also found body dissatisfaction to be evident among most females, regardless of an individual's behaviours such as exercise patterns and media consumption (McDonald & Thompson, 1992; Cardosi, 2006; Derenne & Beresin, 2006; Hausenblas & Fallon, 2006; LePage, Price, O'Neil, & Crowther, 2012; Cohen & Blaszczyński, 2015), as well as their age and BMI (Knauss, Paxton, & Alsaker, 2007; Quick, Eisenberg, Bucchianeri, & Neumark-Sztainer, 2013).

No differences were found in our study between active and non-active groups in relation to body dissatisfaction, further suggesting that females have low body satisfaction for many reasons apart from exercise alone. Societal pressures, such as media and peer appearance conversations, are having an increasing impact on body dissatisfaction levels (Lawler & Nixon, 2011; Cohen & Blaszczyński, 2015).

Consistent with the study hypothesis and previous research (Furnham, Badmin, & Sneade, 2002; Homan, 2010; Koyuncu et al., 2010; Kong & Harris, 2015; Mulgrew & Hennes, 2015), the body dissatisfaction of those who exercise increases as exercise behaviours are stepped up (in terms of frequency, intensity and time). This result could be explained by the 'athletic' idealised image becoming more desirable and publicised by the media on an accelerating scale (Lunde & Gattario, 2017). It could also be due to people having greater body awareness and unrealistic goals to strive for (Furnham et al., 2002). It is important to note that most people over-report their exercise behaviour (Yuen, Wang, Holthaus, Vogtle, Sword, Breland, & Kamen, 2013), either from the honest perception that they are achieving more than they actually are, or they provide misleading information in the belief that this is the level they should be achieving. Most studies of this type include self-reported responses which could misinform results.

Contradicting the consensus, Hausenblas and Fallon (2006) found that exercise *decreased* body dissatisfaction, both in long-term exercisers and those who were usually sedentary but who participated in an exercise intervention. This was thought to be the case because 'active' participants more closely resembled the athletic-idealised ideal, or because exercise increases one's psychological well-being, leading to enhanced self-awareness and body image (Hausenblas & Fallon, 2006; LePage et al., 2012).

Leading on from this point, it is important that we understand the ideal internalisation of individuals, and the body changes they aspire to. Up until recent years, thin internalisation has been most prominent, with the athletic ideal now becoming equally desirable. Crucial to this shift, in this study thin internalisation showed similar results between the active and non-active participants. This shows that the thin ideal is still highly sought after; and that exercise may be undertaken more for body-image reasons, as opposed to health and well-being (Robinson, Prichard, Nikolaidis, Drummond, Drummond, & Tiggemann, 2017).

On the subject of athletic internalisation, our results agree with the hypothesis, and current research, that athletic internalisation occurs more in those who exercise than those who do not (Kong & Harris, 2015; Mulgrew & Hennes, 2015). Again, this is likely to be because sedentary individuals aspire less to conform to images representing a fit and athletic appearance (Peterson, 2003). Although it might be presumed that athletic-idealised images are inspirational for females, promoting a healthier lifestyle, they may be understood differently and lead to higher body dissatisfaction and alter women's reasons for exercising (Robinson et al., 2017). The exercise behaviour of active participants increased with their athletic internalisation, implying that exercise levels may actually increase in an unhealthy manner; rather than for the reasons originally assumed (Robinson et al., 2017).

We found that internalisation was substantially higher when linked with body dissatisfaction. With the combined factors already discussed for thin and athletic internalisation respectively, we anticipated that internalisation levels in general would be high. According to Lawler and Nixon (2011), internalisation may be a psychological process that

leads to body dissatisfaction, along with a focus on body mass for females.

In our study, media pressure was found to make no major difference between active and non-active participants, and there was only a slight suggestion that media pressure had an effect on body dissatisfaction. So it would seem that perceived pressure from the media to look a certain way is responded to no differently by those who are active and those who are not. This supports earlier research that those who exercise and those who do not aspire towards different ideals (Mulgrew & Hennes, 2015).

There is a strong indication in the current study, as well as previous research (van den Berg, Paxton, Keery, Wall, Guo, & Neumark-Sztainer, 2007; Swami et al., 2009) that BMI is correlated with body dissatisfaction, in that body dissatisfaction worsens as BMI increases. Yates, Edman and Aruguete (2004) also found this link to be valid, extending it to a variety of ethnicities and exercise variances. It is important to note here, when comparing exercisers or sport participants, that BMI may show inaccuracies as a result of its failure to consider muscle mass and the weight difference between fat and muscle tissue. Thus people with greater muscle mass can sometimes be considered overweight or obese when the BMI is applied (Rush, Goedecke, Jennings, Micklesfield, Lambert, & Plank, 2007; Garrido-Chamorro, Sirvent-Belando, Gonzalez-Lorenzo, Martin-Carratala, & Roche, 2009).

The limitations of the current study should also be considered when assessing its findings. Firstly, the initial aim of research was to study a variety of participants involved in leanness and performance-based sports. However, because the presence of these variables was insufficient to provide a substantial basis to examine these sports comprehensively, in the study sports players were merged with exercisers. This could imply that the active variable in the study is comprised of a variety of 'athletic' backgrounds, perhaps failing to give an accurate view of what readers assume to be 'exercisers.' The addition of males in the study may have resulted in a higher response rate for sports variables, and this should be considered in further research.

Secondly, media pressure was interpreted only by the SATAQ-4 questionnaire. As all participants agreed that they used social media, it would have been useful to ascertain the time spent in this activity in terms of hours per day or week, in order to refine their media pressure score.

Thirdly, the images used in the Figure Rating Scale may not have portrayed real-life body images for the female respondents, or what they perceived themselves to be. Although images were created to fit within each BMI category (underweight, normal, overweight, obese), and standardised measurements for bust, waist and hips (Glassons, 2017; Ministry of Health, (2017) were given for each variable ('normal' and 'athletic'), the BMI results came back with an average of 25.104 (overweight). This result suggests that despite these images fitting standardised criteria, they may not have depicted the participants' body-image for 'current' and 'ideal.' Also, due to the complexity of the FRS, and the presumed inaccurate results, images were only used to ascertain body dissatisfaction scores. For future studies, a wider range of body-image sizes is recommended, as well as creating a simple, more accurate scoring system for the images chosen.

Fourthly, all data was self-reported by participants, including measurements. This could have resulted in inaccuracies, particularly for body measurements and weight, either by mistake or because participants wished to portray a size other than their actual one. It is presumed that because of respondents' anonymity, this would have been true in only a few cases, but it is nevertheless important to note. Finally, to increase the validity of the study results, it would have been beneficial to ask participants about their ethnicity, race and socioeconomic status. This would provide a deeper understanding and a broader spectrum for comparisons with other research studies.

CONCLUSION

Overall, this study has deepened our understanding that body dissatisfaction, media pressure and exercise behaviour all have correlating relationships among females. It shows the level of pressure from the media, and the effect of this

on females, regardless of exercise behaviour. We conclude that body dissatisfaction is evident among the majority of females, regardless of exercise behaviour and media pressure. The thin-ideal image portrayed in the media is equally desired by females who exercise and those who do not; but it is only those who exercise who tend to desire the increasingly popular athletic ideal. It is important to point out that the exercise variable in this study included females who participated in various types and levels of sports, which may have a bearing on the desire for an athletic-idealised body and higher levels of BMI. These findings are similar to those of Derenne and Beresin (2006), Knauss et al. (2007) and Quick et al. (2013).

Given the results of our study, women need to be aware of the often unrealistic and unobtainable body images portrayed in media. They are not always ideals to aspire to, given that the majority of female models and social influencers are paid or reimbursed to look a particular way. It is unlikely that they achieve their 'image' naturally or in a healthy manner (Gamson, Croteau, Hoynes, & Sasson, 1992). It is especially important for females to understand and pursue the health and well-being benefits of exercise, as opposed to exercising to look a particular way. Body dissatisfaction can be a predictor of health problems such as eating disorders and depression (Stice & Whitenton, 2002). Hausenblas and Fallon (2006) found that exercise can actually decrease symptoms or minimise the risk of these health conditions.

Further research is needed to determine the influence that thin- and athletic-ideal images in the media have on body dissatisfaction among sports players, exercisers and sedentary females. Robinson et al. (2017) found that idealising an athletic image may not actually motivate exercise behaviour. It would be useful to test body dissatisfaction and exercise behaviour both before and after viewing appropriate media images. This would establish the extent to which body dissatisfaction is influenced by the mass media, using a more specific and controlled method. This approach would then supply the evidence needed to establish an exercise intervention for those experiencing an increase in body dissatisfaction, to assess whether exercise can generate a positive influence on an individual's body image.

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A PROGRAMME TO ENHANCE THE SUCCESSFUL TRANSITION OF THE OCCUPATIONAL IDENTITY OF THE INTERNATIONALLY QUALIFIED NURSE(IQN)

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INTRODUCTION

This paper describes a collaboration between Otago Polytechnic and Mercy Hospital, Dunedin, that supported the transition of Internationally Qualified Nurses (IQN) to practice as Registered Nurses (RNs) in New Zealand.

An issue of national significance in nursing today is the supported integration of IQNs into the New Zealand workforce. In 2016, the Nursing Council of New Zealand (NZNC) reported that "around 25% of the nursing workforce is educated outside New Zealand and each year up to 40% of new nurses added to the Register of Nurses have overseas qualifications" (p. 17). These nurses are predominantly of Filipino nationality, the Philippines being the world's leading nurse exporter, with several hundred nursing schools (Brush & Sochalski, 2007). New Zealand, in its recruitment from the Philippines, has an ethical responsibility to support these nurses.

Many IQNs have worked at an expert level prior to their migration. These nurses must understand the vocational and cultural values base of New Zealand as they make their occupational transition. While a body of nursing literature is devoted to nurse migration and IQN support, little is offered in terms of actual strategies to support a smooth transition into a new clinical practice setting. Montayre (2016) promotes the conscious support of IQNs across practice settings: "More support in the clinical environment and from employers such as DHBs and specifically, private health-care providers, is critical" (p. 2). This paper contributes practical and tested strategies to the discourse on IQN support.

BACKGROUND

In July 2016 Mercy Hospital, Dunedin, opened a stand-alone day-stay facility (Manaaki), resulting in the employment of six Filipino theatre nurses. How could the hospital plan and deliver a programme to support the transition of these IQNs? And what was needed to support the almost exclusively New Zealand-trained preceptors or clinical teachers?



Figure 1. Manaaki, Mercy Hospital's stand-alone day-stay facility.

PROJECT PLANNING

The Deming Institute website recommends the Quality Cycle (Plan-Do-Study-Act) as one tool for evaluation and goal redefinition as a project progresses. This cycle was applied to the IQN project to ensure that the steering group remained mindful of project objectives while continuously evaluating the effectiveness of any interventions. This enabled the project to extend beyond an orientation programme, to navigate the complexities of assertiveness training for the IQNs, preceptor training for the RNs and the formation of an ongoing partnership with an expert in IQN transition.

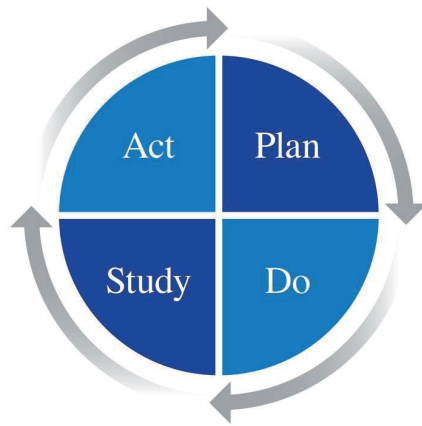


Figure 2. The Deming Institute's Quality Cycle (<https://deming.org/explore/p-d-s-a>). Reprinted with permission. W. Edwards Deming, *The New Economics for Industry, Government, Education*, published by The MIT Press.

This project was motivated by a desire to ensure the seamless transition of the IQNs into New Zealand life and the perioperative team at Mercy Hospital. Mercy Hospital wanted to offer the best possible start to these nurses whom it had recruited from another country. A primary objective was to develop a successful clinical induction programme, tailored to the needs of IQNs. Mercy Hospital wanted to ensure that the IQNs demonstrated the Nursing Council of New Zealand (NCNZ) competencies for RNs, including cultural safety and knowledge of the Treaty of Waitangi. The ongoing provision of safe patient care was also paramount.

The steering group included the director of clinical services, the theatre manager and clinical nurse educator. Key objectives and an action plan were developed. Preparation for the planning meeting included a review of current literature on the needs of IQNs and the issues that they encounter when transitioning to work in a new country (Kawi & Xu, 2009). The sacrifices made by many IQNs include separation from families and small children, sending earnings home and encountering bias from nursing and medical colleagues in the new country (Montayre, 2016). Staff often fail to grasp why IQNs are employed over new graduate nurses, even when it is experienced perioperative staff that are required. IQNs report feeling scrutinised, stereotyped and judged, having to prove themselves clinically (Kawi & Xu, 2009). The planning group was mindful that any induction program would need to take account of these factors.

The action plan identified the following methods of supporting IQN transition:

- Review of the existing literature on IQN transition and support
- Consultation with key stakeholders – managers, preceptors and IQNs
- The establishment of a partnership with a local expert in IQN transition, for ongoing support and collaboration
- Investment in the development of the preceptors – nurses who would work intensively with the IQNs during the six-week or longer supernumerary period
- The development of an orientation programme, creating a safe space to explore what it means to nurse in New Zealand today

A pivotal moment in the project was the development of a relationship with the Otago Polytechnic School of Nursing. The clinical nurse educator at Mercy Hospital approached Otago Polytechnic and was introduced to Geoffrey Harvey (second author), the local Competence Assessment Programme (CAP) provider. He graciously agreed to partner with Mercy Hospital as it implemented the project. The wisdom and practical insights of this expert in IQN transition were to prove invaluable.

During this planning phase, consultation was essential to ensure that all perspectives were represented and all parties committed to the project. Face-to-face meetings with the managers in areas employing IQNs were held to ensure that the project group understood their expectations, addressed their concerns and elicited feedback on proposed staff release for IQN orientation or preceptor training. Credentialed specialists were consulted, and their feedback incorporated into the ongoing plan. Both electronic and face-to-face meetings with preceptors and other theatre staff followed. The second author was available for regular face-to-face meetings, in addition to electronic or phone contact.

PROJECT IMPLEMENTATION

The real success of this project can be traced to the separate elements that together shaped the early months of the IQN transition. The project timeline (Figure 3) reflects these elements, including but not limited to the following:

- A journal club article entitled "Speaking up," completed by IQNs and preceptors. The article explored the concept of a safety culture and the influence that cultural factors have on our ability to speak up in the interests of patient safety.
- A teaching session for preceptors and colleagues provided by the second author. Entitled 'Supporting IQNs,' the session explored the impact of nurse migration on the individual, alongside tips for supporting IQN transition. Best practice from nursing research was utilised to reinforce the importance of fostering skills in "speaking up assertively on behalf of patients" (Rainer, 2015). An eight-hour orientation program, personalised to IQN needs, including an overview of New Zealand work culture and common Kiwi idioms, was held. Expressions such as "right as rain" or "good as gold" required some explanation! The day was informed by current literature, with an emphasis on 'speaking up,' 'asking for help' and 'self-care.'
- A powerful session entitled 'Nursing in this place,' containing insights for survival, was facilitated by a senior Mercy Hospital Filipino nurse. This session resonated with the nurses because of the authenticity that a Filipino colleague brought to it.
- Deliberate psychosocial support in the form of regular social gatherings with food and conversation were held on a Friday after work. Facilitated by two nursing managers, the clinical nurse educator and IQN expert, these gatherings were well attended.
- Regular meetings were held between several IQNs and the nurse educator to offer additional guidance or professional support.

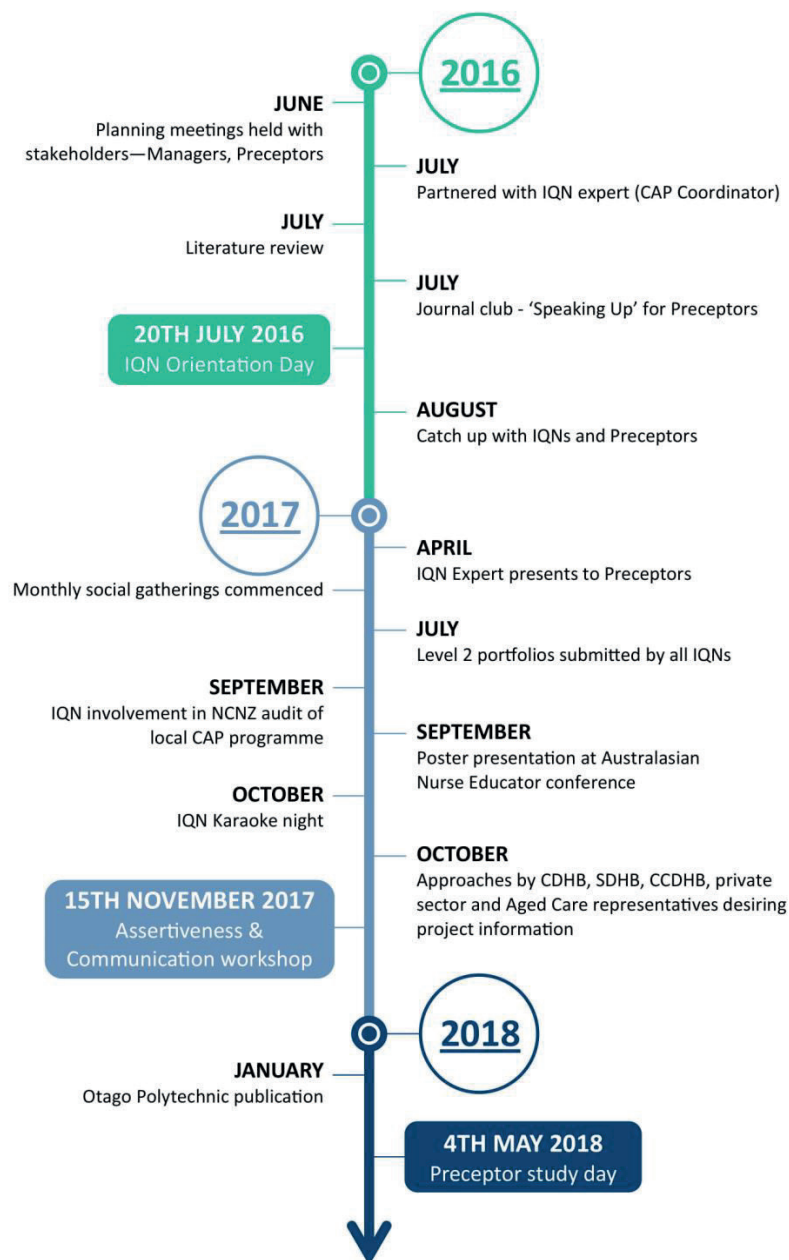


Figure 3. IQN project timeline.

SUSTAINING BUY-IN

To ensure the momentum of the project, the weekly meeting of the clinical services team at Mercy Hospital included a review of the progress of the project and any issues as they emerged. Flexible time frames and interdepartmental teamwork were required in cases where IQNs required extended supernumerary periods or additional training. Structured assessment of essential clinical skills and communication techniques was also employed.

A clinical newsletter informed colleagues of ongoing initiatives to support IQN transition. Nurse managers regularly checked in with the preceptors who worked alongside the IQNs to ensure that issues were identified early, such as the need for additional training or support with a skill. Small things can make a difference. After 12 months of continuous employment, each IQN received a handwritten card and some iconic New Zealand confectionery, an acknowledgement of a milestone reached.

Barriers to successful IQN transition included the complexities involved in applying for New Zealand residency and the relative expense of postgraduate study for non-residents. Senior nurses supported the IQN group with these processes. On the rare occasion that IQNs encountered negative bias or overt racism from colleagues (medical or nursing), managers held courageous conversations, outlining the consequences should unacceptable communication continue.

Another obstacle to successful IQN transition was social isolation and loneliness (Jenkins & Huntington, 2016). Adeniran et al. (2008) describe "the lonely path of transitioning from one country's practice style to another." A senior Filipino team member supported the nurses as they established linkages with the Dunedin Filipino club and the perioperative nurses section of the New Zealand Nurse's Organisation. In the early stages of the project, the project group lacked an understanding of the different ways that other cultures socialise. Our IQN expert and several IQNs indicated that the group had outgrown the Friday social catch-ups, preferring informal socialisation off the hospital campus. The IQN group enjoyed sharing music, food and sport. The authors planned a shared meal and a karaoke evening at the local Manila Grill restaurant, with preceptors and theatre colleagues showing great enthusiasm for the idea. The evening that followed proved to be a cross-cultural learning experience as Mercy Hospital colleagues stepped outside their comfort zones to enter the world of Tagalog menus and karaoke lyrics.



Figure 4. IQN group karaoke evening, Manila Grill restaurant, Dunedin. Photograph: Kerry Davis.

OUTCOME

Mercy Hospital continues to benefit from the successful integration of the IQN group into the perioperative team. The practice of the IQN cohort has flourished, as evidenced by the following results:

- 100% of these nurses continue employment in perioperative settings.
- 100% of these nurses have achieved a Level 2 or 3 portfolio in the national Professional Development and Recognition Programme (PDRP). This NZNC-approved programme measures nurses against occupational competencies, including professional responsibility, the management of care and interpersonal communication.
- A progressive shift in the attitudes of colleagues who now better understand the IQN reality and actively support the transition process.
- Mercy Hospital is benefiting from a more diverse workforce, consistent with its core value of *whakaute* (respect)
- The IQN group have taken up various specialty roles in the organisation, including that of intravenous link nurse, health and safety representative and hand hygiene auditor
- The IQN group has enjoyed success in several ways – one IQN received an International Nurses Day scholarship for postgraduate study in 2018 and acceptance of a report for publication in a national professional journal.
- One of the IQNs accepted an invitation to speak to the NZNC panel at the 2017 audit of the Otago Polytechnic's CAP program.

EVALUATION

Mercy Hospital invited the IQNs to comment on their employment experiences. Feedback from the IQNs indicated that they took comfort in knowing that colleagues understood their journey as migrant nurses. The deliberate support provided to ensure that the IQNs felt welcome and comfortable in the workplace had eased their transition to a foreign land. The IQNs indicated that they desired professional extension beyond the initial social support. They wanted to assimilate, no longer being treated as different or special. This feedback informed future planning as the project progressed.

This project has captured interest both locally and nationally. The retention and successful supported transition of IQNs affects the entire health-care sector. Approaches from several DHBs, managers in the aged-care sector and private hospitals reflect an increasing reliance on IQNs and a desire to better support their transition. Otago Polytechnic has promoted the transition project and its pivotal role in the collaboration in a recent publication.

The authors presented the project at the 2017 Australasian Nurse Educator Conference (ANEC), winning the best poster prize. This recognition is testament to the broad applicability of the learnings gained and the ongoing issue that IQN support presents in this country. A NCNZ representative requested aspects of the project for consideration with the 2018 review of the Competence Assessment Programmes for new IQNs. The mandatory professional portfolio and communication competencies for IQNs both captured interest. With a projected workforce shortage of Registered Nurses, New Zealand continues to rely on IQNs. This project contributes simple yet meaningful and tested strategies to the sector-wide issue of IQN transition and support.

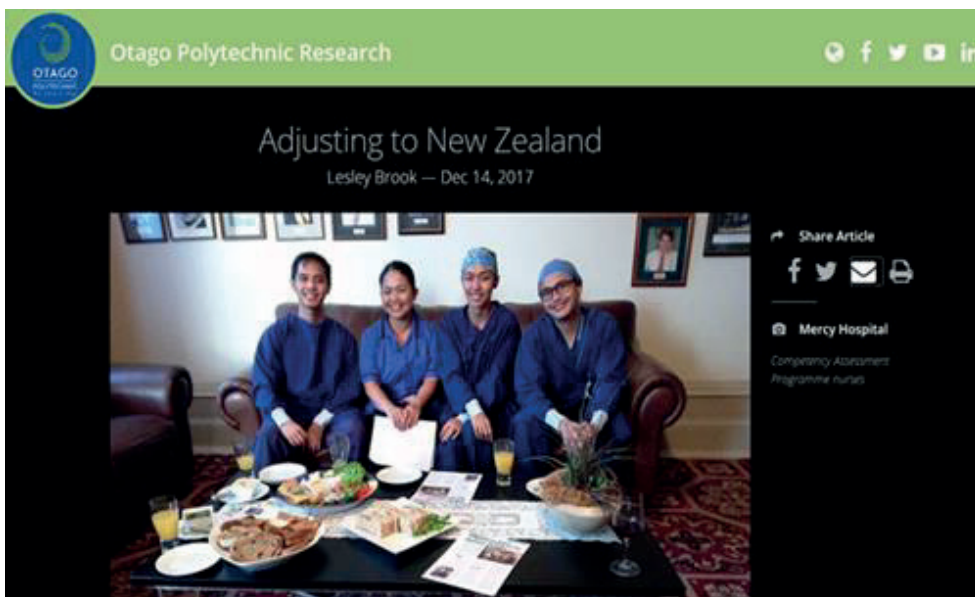


Figure 5. Otago Polytechnic research publication on the IQN integration project.

INTERPROFESSIONAL COMMUNICATION AND ASSERTIVENESS

The literature on IQN transition suggests that acculturation takes, on average, two years. One year into this project, feedback from clinical managers at Mercy Hospital indicated that communication techniques warranted a further investment. Specifically, confident and assertive speech was proving a challenge for some nurses within the clinical teams. This was consistent with a recent statement made by the New Zealand Nurses Organization (NZNO) that "Effective communication does not depend on language skills alone but also on cultural awareness and understanding" (2018, p. 7). We responded to this request with a practical communication workshop in November 2017. The P-D-S-A cycle was again employed, and a creative solution found by the authors, in collaboration with Mercy Hospital's 'people and capability manager.'

Entitled 'Interprofessional Communication and Assertiveness,' this 90-minute evening workshop involved the IQNs alongside Mercy Hospital's new graduate nurses, for whom communicating as Registered Nurses in New Zealand was also relatively new. The workshop explored the responsibility that nurses have to communicate effectively for the benefit of patients and colleagues and the impact of culture on communication. Barriers to effective communication were identified, including slang, accents and fear of the telephone. The participants learned a model of 'assertiveness rights' before engaging in role-play of various clinical scenarios, which included 'confidently phoning a specialist late at night to discuss a patient of concern' or 'asking a reluctant theatre colleague to cover meal breaks.' The workshop evaluated highly, with several IQNs stating that they now felt confident to attempt the new techniques in practice. No new communication issues have been reported since the workshop.

PRECEPTOR DEVELOPMENT

Written evaluations of the Interprofessional Communication and Assertiveness workshop included several suggestions that preceptors would also benefit from the workshop. It was felt that a broader discussion of the impact of culture on communication would foster and reinforce effective communication strategies in practice. A further eight-hour preceptor study day was planned for May 2018. The day included general themes of preceptorship

and a workshop entitled 'The International Nurse Preceptee,' which explored the role of the IQN in the New Zealand workforce. Facilitated by the second author; this session afforded the preceptors an understanding of the unique experiences of IQNs and how best to support their learning and transition. The afternoon utilised a 'speed dating' format where pairs of nurses rotated through real-life scenarios, including 'giving feedback' and having 'the hard conversations.' The hard conversations involved issues of clinical competence and failure to meet expected standards.



Figure 6. 'Speed dating' role-play, preceptor study day, May 2018. Photograph: Kerry Davis.

CONCLUSIONS

The New Zealand health-care system is entering a phase of increased investment in nursing staff, many of whom will be IQNs. This presents an opportunity to proactively invest in the successful transition of these nurses. In collaboration with Otago Polytechnic, Mercy Hospital has successfully implemented a two-year program in support of IQN transition. This transition support continues, alongside ongoing recruitment. It is our hope that in sharing the key initiatives and subsequent learnings from this project, other organisations will be inspired to take up the challenge of supported transition of our IQN colleagues.

ACKNOWLEDGEMENTS

Kerry would like to thank the Management and Preceptors at Mercy Hospital for their investment in IQN transition. Finally, thank you to the IQNs themselves, sacrificing much while bringing their skill and passion to this country. It is hoped that elements of this project may afford some transferability to other settings.

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I DO, THEREFORE I UNDERSTAND: INTRODUCING OCCUPATION ANALYSIS THROUGH EXPERIENTIAL LEARNING

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INTRODUCTION

Occupational therapy is based on an understanding that humans are occupational beings. Enabling occupational therapy students to understand the central place of occupation, as both means and ends of practice, is vital to the theory and practice of their training (Gray, 1998). Within the occupational therapy profession, this is referred to as “developing an occupational perspective” (Hemmingsson & Jonsson, 2005; Kirsch et al., 2009; Njelesani, 2014; Whiteford & Townsend, 2011). While there are differing interpretations of the expression “occupational perspective,” it generally includes a range of common constructs. For example, (i) an occupational perspective is seen as relevant across multiple levels, from individuals to the wider society and embedded communities (Wilcock, 2007); and (ii) contextual factors are usually considered, most notably the occupational interaction with the environment in its multiple variations (physical, social, cultural, political and virtual) (Townsend, 1997). In addition, it is usually acknowledged that occupations can be (iii) connected to health and wellbeing/Hauora (Hemmingsson & Jonsson, 2005). (iv) In order to understand an occupational perspective, it is necessary to take into account both occupational form, function and meaning; and (v) engagement in one’s occupation contributes to a sense of being, becoming and belonging (Hitch, Pepin, & Stagnitti, 2014; Huot & Ruman, 2011; Wilcock, 2007).

If an occupational perspective is indeed a ‘cornerstone’ of the occupational therapy profession and the clinical reasoning of practitioners, the question must be asked: How are occupational therapy students educated to not only understand, but also practice with an occupational perspective?

This article examines a first-year degree course, Foundations of Occupational Therapy, taught in the revised Bachelor of Occupational Therapy program (2018) at Otago Polytechnic. As the name suggests, Foundations of Occupational Therapy (hereafter *Foundations*) is intended to provide base, or platform knowledge, for first-year students, to which they can refer, and build on, throughout the program. *Foundations* introduces the concept of an occupational perspective and provides theoretical and experiential learning opportunities to assist students to develop their own understandings.

What follows is an examination of how experiential learning was used in *Foundations*, developing students’ understanding of an occupational perspective through course teaching, practical workshops and occupation analysis.

Experiential learning is essentially learning through doing or, more specifically, reflecting on doing (Felicia, 2011). It is a powerful and proven approach to human learning which has enabled our evolution as a species. Aristotle recognised the link between learning and doing in ancient Greece, while Kolb was central to the contemporary framing of experiential learning in education (Kolb, 2015). Experiential learning is an essential component for action-

competent students and eventual therapists. Action competence facilitates the development of competencies (skills and understanding) that enable students to take critical action (Tasker & Hipkins, 2000).

The success of an experiential approach is measured, in this situation, by teacher and student feedback and assessment quality, as well as by feedback from those facilitating the workshops. A critique is provided of the workshops, followed by recommendations for future delivery.

A HISTORY OF EXPERIENTIAL LEARNING AT THE OTAGO POLYTECHNIC OCCUPATIONAL THERAPY SCHOOL

The School of Occupational Therapy at Otago Polytechnic has, since its inception, committed itself to a strongly practical curriculum. This is evident in traditional occupational therapy student fieldwork placements, engagement in occupation-based workshops on campus and participation in local community-based programmes in Dunedin and, more recently, Hamilton (Caulton & Dickson, 2007).

Being a student at the Occupational Therapy School means there is an expectation that community involvement moves beyond participation. Pairs or groups of students are tasked with facilitating events or projects that meet occupational needs. The ability of students to be effective in this facilitation is dependent on them having an occupational perspective they can apply. Since the founding of the school in 1990, an occupational perspective has been fostered in students through courses with titles such as Occupation, Therapeutic Occupation, Participation in Occupation, Human Occupation, and Occupational Science. Specific fieldwork placements have taken an occupational approach to community engagement and partnerships, notably Fieldwork Two (in multiple incarnations over the second and first years of the Bachelors programme) and Fieldwork Five. In addition to these courses, emerita lecturer Rosemary Caulton edited and produced *The Occupation Journal* from 1993 to 2003. This journal documented engagement in occupation and stories from practice, highlighting the importance of meaningful occupation for both clients and humanity in general.

Foundations is thus a continuation of the school's focus on occupation. It is situated as an experiential approach to education.

FOUNDATIONS OF OCCUPATIONAL THERAPY: CONTINUING AN EXPERIENTIAL APPROACH

Foundations of Occupational Therapy is a Year one /semester one course. The term “foundations” was chosen to emphasise the role of the course in laying the foundations on which occupational therapy practice will be built throughout the three-year degree.

The course is presented in three modules: humans as occupational beings; student engagement in occupation; and introduction to occupational therapy models and frameworks. The course outcomes state that at the completion of the course, it is expected that students will be able to:

1. Discuss the significance of occupation to health and wellbeing
2. Articulate the whakapapa of occupational therapy practice
3. Interpret a variety of situations using models or frameworks of occupational theory
4. Apply the concepts of the occupational therapy process to simple scenarios

An occupation perspective is introduced in module one via readings, lectures, film analysis and engagement in practical class-based activities. In module two, students engage in a range of workshops which provide the basis

for Assessment One of this course, an occupation analysis. The premise is that the student reflects on their own experience and draws on research to understand the engagement of others in the chosen occupation, and associated links with health and wellbeing/Hauora.

The structure of the assessment is adapted from the third edition of the American Occupational Therapy Association's "Occupational Therapy Practice Framework: Domain and Process" (2017). This framework seeks to describe the central concepts that ground occupational therapy practice, while building a common understanding of the basic tenets and vision of the profession. A breakdown of the applied sections of the framework is included in a later section of this paper (Assessment One: Occupational Analysis).

Module three links foundation knowledge to the occupational therapy problem-solving process and practice frameworks. These frameworks include the Model of Human Occupation (Kielhofner, 2002); Person, Occupation and Environment; and The Associated Canadian Model of Occupational Performance (Law, Cooper, Strong, Stewart, Rigby, & Letts, 1996). Students are tested on this knowledge through Assessment Two, an exam.

The *Foundations* course is intended to scaffold students into Years two and three, where they will engage in courses entitled "Informing Practice: Occupation" and "Complexity in Practice: Occupation." These courses build students' knowledge, skills and attitudes in regard to the use of occupation as a means or an end, where 'ends' are defined as goals and 'means' are the ways that these goals are achieved. Fieldwork placements allow the testing or application of this learning.

The remainder of this article focuses on module two of *Foundations*, where engagement in occupation is used as the basis for experiential learning – hence the paper title, "I do, therefore I understand." It describes the specific set of activities that underpinned the course in 2018.

WORKSHOP OVERVIEW AND EXPERIENCES (MODULE TWO)

Module two of *Foundations* involved preparing students to complete a range of activity workshops. The workshops ran in weeks five and six of the course and were all approximately three to four hours in length. Each student had to choose two workshops from a list of seven topics. They were prompted to challenge themselves when making their choices by choosing topics they were unfamiliar with or that were outside their comfort zone.

The workshops were facilitated by experts. Students were given introductory information about their chosen workshops, including multimedia and written resources. These resources included fiction and nonfiction accounts, technical information, films and documentaries, and articles that linked occupation to health and wellbeing/Hauora.

What follows is a brief overview of the workshops that were on offer to Dunedin students in 2018.

Art project: This workshop was facilitated by a Master of Fine Arts graduate who has an interest in community-based art projects. Students who attended this workshop at the Otago Polytechnic Art School worked in the medium of textiles (fused materials). The work of individual students was brought together to make a combined artwork which hangs in the Occupational Therapy School.



Figure 1. Student works from the art project, part of module two of the Foundations of Occupational Therapy course, 2018.

Basic baking: The focus of this workshop was to introduce students with limited baking experience to some simple recipes. This workshop was run in the Occupational Therapy School's kitchen by one of the course coordinators.

Parafed sports: This workshop was made up of two one-hour sessions facilitated by members of the Halberg Trust (<https://www.halberg.co.nz/>) and Sports Otago (<http://www.sportotago.co.nz/>). Students were introduced to adapted sports and had a chance to play alongside children and young adults who are associated with the Halberg Trust.

Making with Hatch: Hatch (<https://hatch.education/>) is an organisation which focuses on project-based learning to promote problem-solving and creativity. It is based at Otago Polytechnic and runs a number of programs for primary-aged children. Projects involve engineering, design and construction. For this workshop, students designed and constructed objects that incorporated textiles and electronics.



Figure 2. Student work from the Hatch workshop, part of module two of the Foundations of Occupational Therapy course, 2018.

Circus arts: This workshop was run by one of our Year two occupational therapy students who has extensive experience in circus arts performance and teaching. It was run at the Otago University Clubs and Societies building, using their resources. Students were introduced to circus tricks and performance routines.

Horticulture: Students attended the Otago Polytechnic horticulture department for this workshop. They were involved in propagation activities, as well as creating activities which utilised plant products and produce.

Beach activities: This workshop was run at Brighton Surf Club just south of Dunedin. Here students were given an overview of the occupations entailed in surf lifesaving, after which they experienced water-based activities and a selection of competitive surf lifesaving events.



Figure 3. Images from the beach activities workshop, part of module two of the Foundations of Occupational Therapy course, 2018

ASSESSMENT ONE: OCCUPATIONAL ANALYSIS

On completion of their two chosen workshops, each student selected one experience to focus on when writing up Assessment One – an occupation analysis using a set framework (an adaptation of The American Occupational Therapy Association’s “Occupational Therapy Practice Framework: Domain and Process,” 2017). Students had 2500 words in which to demonstrate their understanding of their chosen occupation, and they were expected to draw on both their own experiences and the references provided. Appendices could be included, such as specific instructions and recipes, supporting media links or articles, images and transcripts of interviews undertaken by the students. Assessment One was worth 40% of the course grade.

The following sections made up the framework analysis:

Occupation classification and description: In this section, students provided a classification and description of their chosen occupation. A short referenced statement identified the key elements of their chosen occupation and included the categorisation of the occupation. These categories could include games, sports, crafts, performance and art.

Occupational purpose: Here students described an example of successful engagement in their chosen occupation. This included the end goals, and whether these could be measured. It also included a consideration of the potential range of purposes or intentions adopted by individuals dependent on factors such as age, gender, social or competitive approach, and whether the occupation was considered a pastime or an income-generating activity.

Context and environment: Students commented on cultural, personal and political aspects of their selected occupation, providing at least one example of each related to their own experience of the occupation involved. The environmental analysis required students to provide examples of physical, virtual and social elements of the environment in terms of their relevance to the requirements of their occupation. They were encouraged to consider the environment in terms of affordances and pressures, boundaries and restrictions.

Occupational requirements: For this section, students focused on a specific technical feature of their chosen occupations – e.g., a recipe, set of craft instructions or rules for game play. Having made their choice, they documented equipment and material requirements, as well as tips and traps and set processes and rules.

Occupational performance patterns: Students identified one example each of a habit, routine, role and ritual associated with their occupation. Examples could be personal (relating to someone they know) or drawn from their research.

Values and beliefs: This section provided the students with an opportunity to reflect on the meaning of the work to themselves, and others, through a review or interview. Students could choose to interview someone involved in the chosen occupation, providing a summary of the personal values and beliefs central to their work, and the meaning they derived from it. Alternatively, they could review a film, book (fiction or nonfiction), documentary or podcast related to the occupation.

Significance of occupation to health and wellbeing/Hauora: The final section of the assessment related directly to the course outcome of identifying the link between occupation, health and wellbeing/Hauora. To do this, students provided some brief commentary on an academic article (qualitative or quantitative), a media source (a website, blog, magazine, or newspaper article) and an organisation (a group recognising the link between occupation, health and wellbeing/Hauora). References and links for these sources were required both in the text and on a separate reference page.

WORKSHOP AND ASSESSMENT FEEDBACK

Following the workshops, students completed feedback and reflection sessions. These classes allowed students an opportunity to reflect on their experience while considering how they would apply their experience to Assessment One. This also provided the lecturer with an opportunity to review the different activity workshops that were offered in 2018, taking student feedback into account. In addition, *Foundations'* teaching staff collected feedback from workshop facilitators and reviewed all workshop sessions for module two, as part of a formal course review. After the completion of the Foundations course, feedback was collected via Otago Polytechnic student surveys.

A review of feedback elicited the following themes:

WORKSHOPS

- Students found most of the workshops to be challenging and rewarding. They were able to see the application to Assessment One after the reflection sessions.
- The clear majority of students felt they had gained knowledge and skills from the workshops, which also gave them insight into why people engage in those particular occupations and the meaning and purpose attached to them.
- A small group of students felt they did not personally “enjoy” a workshop experience, but they could, to differing extents, understand why others might engage in the occupations pursued in the workshop.
- Students valued workshops where the facilitator shared their experiences and helped guide them through activities. Many students enjoyed the workshops which linked to community groups, such as the Halberg Trust and the Brighton Surf Club.

ASSESSMENT ONE

- There was a range of assessment results. Most of the students passed the assessment and there were several exceptional assignments.
- Students who failed this assessment, or did poorly, noted that they found the link between the workshop experience and application to a framework problematic. In retrospect, they understood that more effort was required, including greater depth of reflection, correct application of framework terminology and the use of credible source materials (academic and non-academic). Setting expectations for work standards was an issue identified in the course review.
- Most of the students valued the opportunity to research multimedia sources and carry out semi-structured interviews with people involved in various occupations. This research often elicited much valuable information. A commonly identified issue was the difficulty of editing this information to fit the word limit of the assessment, while appreciating how appendices could be used.
- Students felt that the framework guided their reflection, research and documentation.
- Students saw the assessment as valid. The framework allowed them to draw on their experiential learning, helping them understand what taking an occupational perspective might entail.

DISCUSSION

The workshop experiences and Assessment One appear to provide a valid approach to teaching an occupational perspective, providing a base for Year two and three courses, where an occupational perspective will be applied to scenarios and be used on fieldwork placements. Developing an occupational perspective is important to enable students to become action-competent occupational therapists, recognising the value, meaning and purpose of occupations for those with whom they work (Hemmingsson & Jonsson, 2005; Kirsch et al., 2009; Njelesani, 2014; Whiteford & Townsend, 2011). Taking this perspective will assist them to be effective in their adaptation, advocacy, grading, goal setting (ends) and use of occupation in practice (means).

The ‘doing’ of the workshop activities, followed by the structured analysis of Assessment One, provided students with a guided learning experience, as well as a point of reference for future theory and practice experiences. Students were asked to reflect on occupation through their own experience, as well as seeking understanding of why others engage on multiple levels across society and culture (Wilcock, 2007). This involved the analysis of form,

function, purpose and meaning of occupation to themselves and others, while also considering the occupational interaction with the environment (Hitch, Pepin, & Stagnitti, 2014; Huot & Ruman, 2011; Townsend, 1997; Wilcock, 2007). Importantly, the learning experiences in this course guided students in making the link between occupation, health and wellbeing/Hauora, occupational therapy's chief domain of concern (Hemmingsson & Jonsson, 2005).

At the time of writing, the first year of students in the revised curriculum are still to complete their courses. The *Foundations* course is an intended point of reference for their Fieldwork Two community placements, where students will work in groups to facilitate an event for communities which meets a recognised need. Review of this course and student feedback will provide a clearer picture of the linking or scaffolding of experience.

Review of the Foundations course has resulted in several proposed changes for 2019, focused on enhancing students' experiences, outlining assessment expectations and improving reflective practices. With first-year courses, there is an emphasis on scaffolding academic and reflective expectations. In 2019, there are plans to provide assessment examples that detail application of the framework to a given occupation and set expected standards for student work. These examples are likely to be drawn from this year's student works (with consent). In addition to this, teaching sessions and online content will be strengthened to provide examples of framework application – for example, asking students to clarify the differences between occupational roles, routines and habits. Currently, students are introduced to reflective practice in another Year one course, Professional Practice. Although links are made between this course and *Foundations*, there is an identified need to strengthen reflective practice. This will mean building on the introduction offered by Professional Practice and the use of a reflective cycle (Gibbs, 1988). Gibbs' reflective cycle is a theoretical model often used by students as a framework in coursework or assignments that require reflective writing.

In regards to the workshops that will be offered in 2019, there are plans to strengthen community links and engagement, while retaining those workshops where students felt they learned core applicable skills (e.g., basic baking). Community connections in 2019 may include local Men's Sheds groups, SuperGrans, Age Concern and the North East Valley Project. As with the circus arts workshop this year, we will continue to draw on the expertise of our current students (Years two and three). This will not only enable the sharing of expertise, but will also involve facilitators who have knowledge of *Foundations* and the expectations of the course.

As the revised curriculum rolls out for Years two and three of the Bachelors program, there will be a need to monitor, and later audit, experiential learning and the teaching of an occupational perspective. This will take the form of course reviews and student feedback, and will also involve research and documentation of the practices pursued across the year courses. Ideally, in this way it will be possible to identify continuity and scaffolding of learning, as well as gaps and mismatches in application and teaching content. The end goal of this process is for graduates to be able to apply an occupational perspective to their practice, where action is taken, and justification given, based on reflective reasoning (action competence).

The review of the Foundations course conducted in this article has its limitations. Although there are strong indications of the worth and effectiveness of *Foundations* in building an occupational perspective, the validity of these findings is limited by the methodology applied. This discussion is based on findings collected from feedback and review, which was guided by the set procedures and systems of Otago Polytechnic and the School of Occupational Therapy. There are plans to use a formally research methodology to review the effectiveness of both the Foundations course and the associated fieldwork placement in Year one of the Bachelors program (Fieldwork Two). This would involve capturing student perceptions before, during and following course completions, providing more detail and enhanced validity regarding the worth and effectiveness of courses.

CONCLUSION

An occupational perspective is central to occupational therapy practice. A competent therapist needs to recognise when, why and how engagement has been affected following incident, illness or disability. Therapists also need to reflect on the impact of these changes on a person's occupational identity. This entails a focus on understanding what individuals and communities 'do' and how meaning and purpose is attributed to occupation. Therapists become effective practitioners through gaining the kind of understanding that enables them to use occupation as both ends and means.

An introduction to the framework for occupational analysis is supported through the use of different kinds of literature, constructivist teaching and experiential learning experiences. Review of the first year of this course has provided positive feedback, indicating that students are engaged and are learning to apply and reflect on occupational perspectives.

As the revised Bachelor of Occupational Therapy program rolls out in Years two and three in 2019, there will need to be research and review of how this learning is scaffolded, with the goal of graduating action-competent therapists.

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I'M JUST STRAIGHT-UP DEMENTED: AN EXPLORATION OF DEMENTIA IN FICTION

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INTRODUCTION

Whether known as 'medical humanities,' 'arts and health' or 'arts and medicine,' these terms all refer to a collaborative relationship between an art form (such as poetry, fiction, dance, theatre, or visual arts) and health, in its broadest sense. Much has been written on the benefits of the arts in the education of health professionals and on the value of the humanities to gerontology (Falcus, 2014). Such an approach encourages nurses, doctors, allied health professionals and others to view the world and, more specifically, the world of their patients, from a wider and more holistic perspective than the one which is more evident and accessible in everyday life. The critical thinking associated with examining fictional narratives can challenge assumptions (Zeilig, 2011). This paper presents the results of a broad study of fiction and ageing and examines how people with dementia are represented in two selected works of fiction, where one of the main characters has a dementia.

LITERATURE REVIEW

One of the purposes of studying older people, ageing and old age in fiction and, specifically in this paper, the portrayal of dementia in literature, is to introduce these concepts to nurses from a different perspective to the usual health science-based perspectives on assessment, diagnosis and treatment, and to encourage their engagement with the works. How do writers portray characters with a dementia? What are they saying about them and the context they are placing them in? What do they want the readers' response to be? How does their portrayal fit with your experience of dementia? Zeilig (2011) writes that 'narrative, literary and critical gerontology all share an ability to confront (rather than shirk) the ambiguities and complexities of age, ageing and later life and an interest in quizzing the cultural norms of ageing via non-scientific forms of knowing' (p. 9).

For a long time, nursing has been considered as both a science *and* an art, a concept that Carper (1978) examined in her pivotal work on 'ways of knowing.' Her thesis acknowledges that no one approach to learning or knowledge is superior to another; but that multiple forms of knowledge are necessary to provide holistic care. Zeilig (2011, p. 9) adds that narrative and the literary gerontology of ageing 'quiz the cultural norms of ageing via non-scientific forms of knowing.' Nurses and other health professionals who are exposed to stories or fictional narratives gain the opportunity to learn of other ways of being, seeing old people as humans outside of the health system encounter.

Care of older people and people with dementia is not a popular field of study or work for New Zealand health workers – and yet most have contact with older people, a reality which will be increasingly the case into the future. Ethical reflection, aesthetic and empathetic factors are the rationale most often given by scholars for studying literature and medicine. Health professionals often encounter challenging clinical situations which require ethical debriefing and reflection. Macnaughton (2011, p. 938) believes that 'there is a sign that research in medical humanities has the potential to mount a persuasive challenge to medicine's ways of teaching, working and finding out.'

METHODS

Rationale for selecting fiction for analysis

It is now well recognised, in New Zealand and globally, that as the population ages, so does the incidence of dementia. In response to this, a growing body of literature, both fiction and non-fiction, is being published. In New Zealand in the last two years alone, at least three significant books have been published on the topic: a collection of poetry about a grandmother with dementia (Breslin, 2017); a self-help book giving advice to both professional and family carers on how to communicate with someone with dementia (Caughey, 2018); and a daughter's memoir of her mother with dementia (Desmond, 2018). Memoirs, essays, blogs, journalism, children's literature, thrillers, fiction, poetry and plays on the subject are proliferating, commenting on and perhaps helping to make sense of events and responses when someone the authors know or have observed has dementia. These writings come from a variety of sources: adult children, carers, professional writers, journalists and people who have dementia themselves; and they address a wide range of subject matter including communication, grief, strategies for coping and 'management' of dementia, early-onset dementia and institutionalised care.

A key criterion for the wider study I undertook was to examine selected works of fiction and poetry only; non-fiction was excluded. Material was sourced from book reviews, by word of mouth from a network of readers, and the researcher's own reading. Various databases were searched (Medicine and Literature, CINAHL, Google Search) to inform the background literature review. Although the wider study examined ten literary works, for the purposes of this paper, only two novels are investigated.

It may be asked what is the rationale for exploring fiction, as opposed to other forms of writing on dementia. The characters in the novels chosen for analysis constitute a creative response to people who are living with dementia, experiencing everyday life with their families and others in their personal worlds and communities; they are simply getting through their days and, as readers, we walk alongside them. Good fiction does not judge, preach or tell the reader how to think about the narrative situation – rather, it leaves the thinking, reflection and interpretation up to the readers themselves. Fictional characters may seek answers from science, as non-fiction sources often do, but it is not the role of fiction to preach or explain, but rather to leave readers to make up their own minds and perhaps leave them with a range of thoughts, questions and emotions ripe for discussion and with the satisfaction of having listened to a skilled, authentic voice. As Hepworth (2000, p. 1) wrote of his own studies on fiction and ageing, 'readers explore fiction as an imaginative resource for understanding variations in the meaning of the experience of ageing in society.' He wrote of the value of 'spaces being opened up by creative licence' (p. 5). Fiction writers have a different impetus for choosing their subject matter. In the novel *Elizabeth is Missing* (Healey, 2014), for example, the protagonist Maud, who has dementia, is loosely based on the author's grandmothers. The combination of creative distance and keen observation works well as Healey employs the literary device of having Maud narrate her own story, from her own perspective.

The two novels to be examined in this paper are *We are not Ourselves* by Matthew Thomas (2014) and *Goodbye, Vitamin* by Rachel Khong (2017), utilising the theoretical framework outlined below. Both novels are by American authors and were published within the last five years. They have many parallels in terms of plot: the characters with dementia are male, in their 50s, university professors in mid-career, living with spouses and children. Despite my wider study being focussed on older people and fiction, the two key characters examined in this paper have early-onset dementia.

Theoretical framework

According to O'Connor and Nedlund (2016), the way in which dementia is viewed by society has passed through four distinct stages (see Table 1): firstly, as a sign of natural ageing; secondly, as primarily a biomedical condition; thirdly, there has been a shift to seeing the person beyond the medical condition; and, most recently, embedding

the dementia discourse within socio-political discourses and practice. This fourth step introduces the language of citizenship and a move away from the individual experience of dementia to an emphasis on how people's experiences are shaped by socio-cultural practices and assumptions. In examining this new lens through which to view dementia, O'Connor and Nedlund state that 'the personal is political' (p. 285) and argue that new possibilities of people living well with dementia are being opened up through 'inclusionary practices' (ibid).

THE FOUR DISTINCT STAGES OF DEMENTIA:
1. A sign of natural ageing
2. Seen primarily as a biomedical condition, disease focus
3. A shift to seeing the person beyond the medical condition; person-centered care
4. Embedding the dementia discourse within socio-political discourses and practice; citizenship focus

Table 1: *The Four Stages of Dementia*, O'Connor and Nedlund, 2016, p.285

Analysis

A combination of content and literary analysis is employed in this study to identify key themes in the two fictional works under consideration. Content analysis, as utilised in qualitative research, refers to the analysis of the themes and patterns that emerge in the narrative content, an approach often used when the study claims no particular methodological or disciplinary roots, as in the current study (Polit and Beck, 2017). Literary analysis investigates authors' creative approach to their narratives – how they formulate plot, characters and chronology, and the devices they use to render their work interesting, readable and believable.

One aim of my research is to examine how the selected novels align with O'Connor and Nedlund's (2016) framework, which outlines the ways in which dementia has been thought about, made sense of, and researched over recent years in both the health setting and in the wider society. A second aim is to argue the case for utilising fiction in the teaching or professional development of health professionals – how fiction can be made accessible and relevant to their clinical practice and ongoing learning.

Synopsis and literary approach of the novels

The first novel to be examined, Matthew Thomas's *We are not Ourselves*, is narrated in the third person, and primarily tells the story of Eileen, who is married to Ed, a 51-year-old American college professor. As the novel progresses, the reader learns that all is not well, and it is eventually revealed that Ed has dementia. From the time of their marriage, Eileen, a nurse and mother of one son, has been an ambitious person; she wants more for the family – a new house, a new neighbourhood, status, social recognition. As the reality of Ed's dementia unfolds and changes in his behaviour and cognition become more and more apparent, Eileen's feelings for Ed and the situation they find themselves in fluctuate wildly. One day – moment even – she wants one thing, and then a moment later, another. Her thoughts and feelings constantly swirl in a contradictory, ambivalent, shifting pattern. She is by turns frustrated, appalled, compassionate and loving. Her former ambitions fade as she and her son spend more and more time attending to Ed's needs.

Goodbye, Vitamin, by Rachel Khong, is narrated in the first person by Ruth, the 30-year-old daughter of middle-aged parents. She has come home for Christmas, fresh from a relationship break-up, to spend time with her parents, and ends up staying for a year at her mother's behest. Her help is needed to care for her father, Howard, who has dementia, and whose unpredictable behaviour and actions require someone to be near him all day. Her mother is still working and is no longer prepared to stay home, as she needs a break from Howard. Ruth's story-telling point of view is often very funny and, although her dry and witty sense of humour is due partly to her age and personality, it is also a way of coping with the situation she finds herself in. The use of humour in her narrative does not mean that the novel shrinks from showing the underlying sadness and pathos of the family's situation.

Although the two novels have similar premises – a family in turmoil as they care for a loved one with a dementia – the authors have adopted very different styles and tones to impart their story to the reader. At 620 pages, *We are not Ourselves* is epic in both length and time span (1951-2011), in the events covered and the characters' gradual life changes. It captures the subtleties and confusions of living with someone whose personality and behaviour is very different from their former selves (hence the title), and the family's gradual realisation of these changes which grow increasingly harder to bear and come to terms with. The narrative does not gloss over the challenges and dramatic incidents experienced, and the reader is drawn into the family's decline, which is chronicled day by day.

In contrast, *Goodbye, Vitamin* is relatively short (198 pages) and covers a single year (Christmas to Christmas) in the life of the Young family. It is written in the form of a diary (kept by daughter Ruth) and thus appears more piecemeal, random and spontaneous on the page than a 'standard' plot-driven novel. The adoption of the diary form is enhanced by the age and preoccupations of its young protagonist – her friendships, romances, ex-lovers and preoccupations are equally covered alongside her almost daily accounts of her father's life. A delightful writerly technique is the inclusion in the narrative of her father's diary, kept when Ruth was a little girl. He puts up small excerpts on post-it notes around the house, in a kind of reciprocity to her contemporary diary-keeping of him.

RESULTS

Thematic analysis of the two novels resulted in the identification of three major themes: naming or not naming (diagnosis); conflict and ambivalence; and the adoption of coping strategies and ways of keeping the dementia sufferer occupied. The explication of these themes, with supporting quotes, is presented in this section. I then explore these themes in relation to the dementia framework set out in Table 1 and discuss the relevance of these fictional themes for health professionals.

A. Naming ... or not naming (diagnosis).

The act of giving a name to an unexplained set of symptoms could be seen to be contributing to the pathologising or medicalising of a person's health situation. Much has been written on the complex issue of receiving a diagnosis (Jutel & Nettleton, 2011), and reactions vary from individual to individual and context to context. While a diagnosis may be spelled out by a medical practitioner, it is not always overtly acknowledged by name by the recipient of the diagnosis and their family or carers in precisely the same way – if at all. This is the case for both wife and carers in the two novels examined in this paper:

The dawning came all at once, though it felt as if it had been heading her way for a while, like a train she'd heard whistle from miles off that was now flying past and kicking up a terrible wind. Still, she couldn't pronounce the sentence in her head, Ed has ... because it was impossible that he had it. He had a demanding job that kept him stimulated. Until recently, he had read constantly, done the crossword puzzle almost every day, exercised four times a week ... maybe it was a tumour ... a glandular problem, a dietary deficiency, a failing organ. Whatever it was she would get it checked out ... She needed to find out if something was wrong with him. (*We are not Ourselves*, p. 309-10).

"Well, I have good news and bad news," Dr Khalifa said. "The good news is, physically, you're as healthy as a horse. A great specimen." She felt a jolt of excitement, then one of fear: "What about the bad news?" He turned to her: "The bad news is your husband likely has Alzheimer's." She gasped; Ed's hand in hers seized into a fist "Are you sure?" she asked. "There's little doubt," the doctor said, with all the detached finality of one of those enormous computers in old movies that spat out answers on punch cards. "I knew it," Ed said grimly. She realized in an instant that he probably had known it, that he might have known it for years. "How can this be? He's barely 51." "It's early, but it happens," Dr Khalifa said. "I'm sorry." ... It was so obvious now that he had Alzheimer's. The news felt old already somehow. (*We are not Ourselves*, p. 322-323)

These excerpts from *We are not Ourselves* reflect the gruelling process of learning a diagnosis. The novelist reveals that the diagnosis had been on Ed's mind and, unconsciously, on Eileen's too for some time ("The news already felt old somehow"). As often with disclosure of diagnoses, shock, disbelief and an extreme reaction set in, but this response can also be coupled with an innate, instinctive knowing, so that the diagnosis becomes a confirmation of what was already felt (Thomas likens it to a train approaching in Eileen's head). Despite this, denial and bargaining set in almost immediately: maybe it is something else? Eileen cannot bring herself to utter the word dementia and it is barely mentioned in the novel, apart from by the doctor.

In *Goodbye, Vitamin*, there is no revelation of the diagnosis in a doctor's clinic but, as in Thomas's novel, there is a reluctance to name (a non-naming) the condition on the part of the narrator's mother:

'Now Mom is asking if I could stay a while, to keep an extra eye on things. By 'things' she means Dad, whose mind is not what it used to be. It comes as a surprise. Things aren't so bad – Dad doesn't seem any different – on top of which, my mother hates to ask for anything. 'Just for the year' Mom repeats. (*Goodbye, Vitamin*, p. 4).

However, the similarity in 'naming avoidance' ends there. On the same page, the narrator of *Goodbye, Vitamin* tells the reader that 'there is, presently, no single test or scan that can diagnose dementia with complete accuracy ... For now, it's a process of elimination ... What my father doesn't have: hyperthyroidism, a kidney or liver disorder, an infection, a nutritional deficiency' ... 'I'm just straight-up demented,' Dad says. (*Goodbye, Vitamin*, p. 4)

B. Conflict and ambivalence

Conflict is experienced by characters in both novels – those caring for their family members and those with dementia themselves. Such subtle and, at the same time, enormous changes in relationships and anticipated relationships create an internal, ambivalent form of conflict and turmoil in all concerned. For Eileen,

There had been times she'd wanted to kill Ed; now that he was declining so quickly, she just wanted him home until Christmas. It shocked her that her goals had dwindled to one, but that was all she could focus on, even now, eight months away from the holiday. Once Ed left, she knew, he was never coming back. (*We are not Ourselves*, p. 441)

At one point, Eileen tells us that she feels like a "widow whose husband is still alive." Once she comes to terms with Ed's decline, she wants to do everything for him she can – but this does not mean she doesn't mourn her former Ed. The contradictory changes in his personality are not lost on her either: She recognises that he "was being stripped of pride, of ego, ruined, destroyed. He was also being softened" (*We are not Ourselves*, p. 429).

At times the conflict is externalised and both male protagonists become irascible, aggressive and even physically violent at times. Ruth narrates an episode where she has cooked a dinner of pork chops and potatoes, a meal specifically requested by her father. But when she dishes up, he shouts at her, leaving her shaken and confused:

'He shouted that he wasn't a child and he knew what tomatoes were and that those were tomatoes, and that he was my father, and what was my problem, that I couldn't show him some respect. My first instinct was to put the steak knife away because I had never seen him like this, and because I was frightened. I put it in my back pocket. He saw what I had done with the knife, seemed insulted that I thought he might be dangerous, and took his plate and threw it against the wall. It shattered, on cue.' (Goodbye, Vitamin, p. 122).

C.Strategies / Occupation

The third theme deals with the ideas, plans and everyday expedients that family members come up with to cope with and manage the situation in which they find themselves and to help the person with dementia remain engaged and occupied – ways of adapting and changing routines or customary approaches in order to facilitate concomitant changes in the dementia sufferer.

In *Goodbye, Vitamin*, although Ruth's mother may not name her husband's diagnosis out loud, her on-line reading of the medical literature convinces her that 'it was the years of cooking in aluminum pots, cooking with canned goods, that led to dementia' (p. 14). As a mother who has enjoyed cooking and even making home-made popcorn for the movies, she now only trusts juices and vitamins. Ruth explains her mother's strategy to us: 'the house is virtually snackless. She's emptied the pantry of food she's deemed harmful. Everything is a potential cause of the disease. Cereals and breads contain sugar, and high blood sugar exacerbates the disease. Saturated fats raise the risk of the disease.' (Goodbye, Vitamin, p. 17). By avoiding certain foods, Ruth's mother believes she has developed a strategy to ameliorate the situation.

A key strategy which permeates the tone of *Goodbye, Vitamin*, albeit one which is never expressly 'applied' as such, is the use of humour. A sense of humour is a way of coping with the enormity of the various life and family challenges demanded, crises which occur on a daily basis. Humour is engrained in the collective psyche of the family. All four family members exhibit a dry and throwaway sense of humour which has always been part of the way they communicate with one another. At times, it could be read as black humour. The novel is peppered with throwaway lines such as Howard's comment on the lack of a precise explanation for his condition: 'I'm just straight-up demented' (Goodbye, Vitamin, p. 4).

This style of familial humour does not feature in the Tumulty family in *We are not Ourselves*. Halfway through the book, as she increasingly comes to terms with her husband's dementia, Eileen knows that she needs to strategise to cope with his inevitable deterioration. She visits the Alzheimer's Association 'to find out what kind of resources might be available' (We are not Ourselves, p. 349). The family lawyer advises her that one way of being able to afford nursing home fees would be to divorce Ed. While Eileen understands the logic of this, she finds it lacking in compassion and resigns herself to the fact that in order to pay for Ed's health care, she will have to 'work forever.' The novel gives accounts of a string of carers employed by Eileen to care for Ed at home while she works, none of which turns out successfully. Finally, Eileen implores her teenage son to stay with him during the day, an arrangement which also has disastrous results.

As a way of occupying her father's time and retaining his dignity, Ruth devises a plan, along with one of her father's students, to re-create 'history classes' which Howard will lead. She runs this idea past the dean, who is adamant that this is a safety issue and must not happen – if Howard turns up on campus, he will call the police. After some covert planning by Ruth and her friend, and with the blessing of her mother, the 'pretend' classes go ahead. They are held at different venues around the town and attended by 'ring-ins' or "enrolled students" – former graduate students who have always admired Howard's teaching and are prepared to go along with the plan. Her father dresses for the classes in an ironed shirt and a shiny tie; he parks in the university carpark and his students call him "Howard." The classes go well and Howard is able to carry out his work as he always did in the past: 'On the drive home, Dad

is chatty. He's happy, he's making plans. He wants to finish writing his book this month, he says. Maybe attend some conferences in the spring. "Sounds great, Dad," I say, as convincingly as I can' (*Goodbye, Vitamin*, p. 58).

DISCUSSION

Through the study of fiction of this kind, health professionals are given an invitation to experience a journey alongside a person with dementia and their family. In the two novels studied, the narrative is told from the sufferer's and their family's perspective, from deep within the family culture and its practices, as opposed to the 'outside' perspective of the health professional.

As discussed above, the understanding of dementia has shifted from being considered no more than a disease state to respecting the person with the condition, and ultimately has moved to the socio-political arena where dementia is viewed in broader terms and people with dementia are seen as co-citizens within society. New Zealand nurse researchers Gilmour and Brannelly (2009) describe a philosophical shift in thinking about dementia in nursing and medical discourses. They equally believe that the way dementia is viewed has progressed through the concepts of subalternity (disempowered or marginalised groups), personhood (respect, recognition and trust) to citizenship (the sufferer is a person with rights and responsibilities who is part of a community). Despite this shift, the authors believe that the 'historically dominant elite and authoritarian accounts of dementia' (p. 240) are still found in some nursing texts. This viewpoint deserves to be challenged, and such a challenge may well be reflected in fiction, short stories, poetry and the arts in general.

In what follows, the themes identified in this paper are discussed in relation to the dementia framework devised by O'Connor and Nedlund (2016) (Table 1).

Dementia as a sign of natural ageing

In the first stage of O'Connor and Nedlund's framework (2016), dementia is seen as a normal part of ageing. This certainly used to be the case, as 'senility' and 'senile dementia' were, at one time, common labels given to older people who were experiencing memory loss. While current medical thinking might acknowledge that some changes in memory and cognition occur as people age, dementia is certainly not seen as an inevitable or 'normal' consequence of growing older – nor is it in either of the novels studied here. The ageing aspect of dementia is particularly poignant in these novels as both sufferers are relatively young (in their early 50s) and both are well ensconced in mid-to-late academic careers. For this reason, the novels do not consider the ageing process (stage one of the framework) at all. In fact, in both novels the narrative begins with stage two, diagnosis.

In *We are not Ourselves*, the bold naming of the condition ('your husband likely has Alzheimers') comes from the health professional. The doctor reveals this by turning to Eileen and referring to Ed as 'your husband.' Immediately Ed is given a label and is not addressed directly, as if the diagnosis had nothing to do with him. Through this action he is marginalised, 'othered', ignored – he is not one of them, and yet the diagnosis belongs to him.

Dementia as a biomedical condition

An emphasis on dementia as a biomedical condition is the second stage in the dementia framework. Although on one level the families in the novels seek a diagnosis and confirmation of what they already suspect, it is still a shock when the information is imparted as a stark, cold "detached finality," as Eileen learns (*We are not Ourselves*, p. 322). The families learn that certain behaviours, rather than a single-word diagnosis, need to be managed as they arise. Despite her reading about the 'plaques and tangles' in the brain that occur in Alzheimer's disease, on a day-to-day basis it is Ruth's relationship with her father which counts – the one she has always had and the new one they are establishing throughout the novel.

Person-centered dementia care

Tom Kitwood (1997) was the first researcher to coin the term 'person-centered care.' At the time, the concept of patient-led care was revolutionary – that the care tasks and lists of health professionals were of secondary importance and that 'one size does not fit all.' With the diagnosis confirmed, both fictional families move to the third stage of the framework, which represents a "shift to seeing the person beyond this," leading to "person-centered care." In reality, this means that both families move on, coping on an everyday basis insofar as the family context and their individual personalities and capabilities allow. This is new territory for them, as they have not felt the need to see their loved one beyond the parameters of a 'medical condition' before. On the one hand it is a straightforward task – but, in a flash, the person with dementia can change and suddenly seem like someone else, a person they do not know and have not met before. Thus 'person-centered care' can be challenging when the sufferer and their behaviour changes and strategies are required to move with the person, not against them. The characters in *Goodbye, Vitamin* perhaps demonstrate more 'successful' and resourceful ways of arranging things so that Howard can remain his 'own person,' utilising more flexible and creative strategies and a wider pool of support than Eileen and her son are able to muster in *We are not Ourselves*.

Dementia as a part of a socio-political discourse including citizenship

While a diagnosis of dementia is never received in a positive light (except that it may offer the relief of a confirmed hunch), viewing the condition in an entirely fatalistic sense contradicts the prevailing health policy doctrine and desired societal attitude. Today, the emphasis in government health strategy is on ageing well and dementia prevention and, if one has dementia, living positively and actively with the condition for as long as possible. In neither of our novels is the dementia discourse embedded within a political discourse (as per stage four of the framework), but social attitudes and discourses become evident through interaction with characters who sit outside of the main families. Stage four of the framework also embodies the notion of citizenship. In a sense, by setting up mock classes for Howard to teach in *Goodbye, Vitamin*, Ruth and others demonstrate respect for Howard as a person and a citizen, recognising that he still has a place in the wider social dynamic of work and useful occupation beyond the confines of the domestic scene. This most recent lens on dementia – a condition that an individual may have, but not one that ultimately defines them and how they live their lives – may appear more often in fiction as societal attitudes and care provision catch up with the theory of citizenship for all.

IMPLICATIONS FOR HEALTH PROFESSIONALS

This paper identifies the value of including fiction and the arts in general in the health professional curriculum. The portrayal of dementia in fiction has been used in this paper to present the lived experience of dementia from within the daily lifeworld of families struggling to come to terms with the unknown and learning how to live with a family member with the condition. Such insights into the domestic context of dementia could not be gained from clinical assessment alone. Fiction exposes an unfettered humanity which can inform and influence the health professional and help them see what a patient's reality may look like.

This paper creates an opening for discussion among health professionals on current attitudes and approaches towards dementia which arise from the intersection of the fictional narrative and recent dementia theory and health strategies.

CONCLUSION

It will be interesting to see if future novels having a central character with dementia embrace stage four, whereby the person is driving their own narrative (Emma Healey's *Elizabeth is Missing* has shades of this), their own decision-making and activity, and is viewed as belonging to a wider social community – rather than being focussed on a narrow, biomedical, understanding of 'care,' which is still the prevalent approach both in society and fiction. Although there is no 'right' or 'wrong' way to approach the realities of a person living with a dementia, the two novels discussed in this paper allow for consideration of three of the four stages of O'Connor and Nedlund's framework in relation to fiction, which in turn has the potential to expose health professionals to new ways of approaching health practices which start with the person at the centre.

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IS THERE A RELATIONSHIP BETWEEN FOOD KNOWLEDGE, DIETARY KNOWLEDGE AND BODY MASS INDEX WITHIN THE TERTIARY STUDENT POPULATION?

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INTRODUCTION

In 2018, New Zealand (NZ) has the third highest rate of obesity in the Organisation for Economic Cooperation and Development (OECD) member countries, and the prevalence of this disease in NZ is increasing (Ministry of Health, 2016; Organisation for Economic Cooperation and Development, 2017). The 2015/16 New Zealand Health Survey found that more than three in ten adults (32%) were obese, a 5% increase since 2006/07 (Ministry of Health, 2016).

The Body Mass Index (BMI) scale is a measure of weight adjusted for height, and is calculated by dividing weight in kilograms by the square height in metres (Ministry of Health, n.d.). The BMI scale is used nationally and internationally as a useful population-level indicator of excess body weight (World Health Organisation, 2016). According to the World Health Organisation's BMI classification, a person can be classified as underweight (BMI <18.50), in the normal range (BMI 18.50-24.99), overweight (BMI >25.00) or obese (BMI >30.00) (World Health Organisation, 2000).

As a person's BMI increases, so does their risk of developing obesity-related diseases (National Heart, Lung, and Blood Institute, 2012). Obesity is currently one of the leading causes of premature death in adults (Bauer, Briss, Goodman, & Bowman, 2014) and has been shown to be more prevalent in places where people have a low level of education or low income (Bauer et al., 2014; Sobal & Stunkard, 1989).

Studies conducted in the United Kingdom and United States suggest that as a young adult, a student's tertiary years are a period in which substantial weight gains can be made (Crombie, Ilich, Dutton, Panton, & Abood, 2009; Finlayson, Cecil, Higgs, Hill, & Hetherington, 2012). A meta-analysis (Vella-Zarb & Elgar, 2009) found that first-year tertiary students gain on average 3.86kg, followed by a slow and steady increase in weight in the following years of study (Gores, 2008). Given that this is a period where young people are setting themselves up for the rest of their lives, their careers, life goals, self-esteem and family could be impacted by this weight gain. It has been suggested that this increase in weight is mainly due to low levels of nutrition knowledge and cooking skills, and that there is a need for strategies to address this issue (Devaux, Sassi, Cecchini, Borgonovi, & Church, 2011; Sakamaki, Toyama, Amamoto, Liu, & Shinfuku, 2005).

It has been observed that, in general, tertiary students do not consume the recommended amount of fruit and vegetables, but have a high intake of saturated fat and alcohol (Deliens et al., 2014). Furthermore, unhealthy habits developed by students in their tertiary years generally persist into older adult life (Ganasegeran, Al-Dubai, Qureshi, Al-Abed, Rizal, & Aljunid, 2012).

The aim of our research was to investigate the relationship between food knowledge (FK), dietary knowledge (DK) and BMI in the tertiary student population. This project was undertaken in order to determine if there were significant correlations between these factors. A correlation would indicate that implementing strategies to increase tertiary students' nutritional knowledge (through nutrition education) could be effective in reducing the prevalence of overweight and obesity in NZ. The working hypothesis for this study predicted a correlation between DK and FK (both independently and collaboratively as total knowledge) with the BMIs of tertiary students.

The definitions of FK and DK are inconsistent within the literature. For the purposes of this study, FK refers to a person's ability to accurately identify common fruits and vegetables, whereas DK refers to one's knowledge of current national dietary guidelines and recommendations. Total knowledge (TK) was the term used to describe the score that participants achieved on both the DK and FK survey combined.

In NZ there is no existing published research that investigates the relationship between FK and DK, on the one hand, and BMI. Existing research is limited to overseas studies that examine either FK or DK independently – but never both together or in comparison.

METHODS

Study Design

This study utilised surveys and quantitative measures to examine the relationship of dietary knowledge (DK) and food knowledge (FK) with body mass index (BMI), within the tertiary student population.

Participants

This study recruited participants who met the following eligibility criteria: currently enrolled in either Otago Polytechnic or Otago University; aged between 18 and 40; and not using a pacemaker or any other electrical device aiding body function (due to the potential risk of device failure during body composition assessment). The study population comprised 52 participants.

A homogenous purposive sampling technique was used to recruit participants. This was done by advertising in local media commonly read by the target student population. Efforts were made to recruit participants from outside the researcher's school by emailing student halls of residence and by placing poster adverts in student association premises.

Procedures

Consultation with the Otago Polytechnic kaitohutohu was undertaken prior to the commencement of this research. Ethical approval was sought and granted on 7 June 2017. Participants were each privately individually assessed under the guidance and supervision of the researcher, at Otago Polytechnic. Informed consent was gained from all participants prior to commencing pre-screening. Eligible participants completed the DK survey and the FK survey. Height and body composition were measured. Following assessment, each participant received a copy of their results and were provided with a tool to assist in interpreting them.

Following assessment, nothing further was required of the participant. Participants received a summary of the study results if they had indicated that they wanted this by ticking the corresponding box on the participant consent form.

Quantitative data collected during assessment included height (cm), weight (kg), BMI (kg.m²), age (years), DK score,

FK score and total knowledge (TK) score. Demographic data collected during assessment included participants' gender; ethnicity, tertiary institution and years in tertiary study.

Equipment

Survey forms were piloted on volunteers ($n=4$) to assess the flow, language and intention of questions. As result of participant confusion, four images in the FK survey were removed and substituted by more suitable images. It was identified during pilot testing that the Tanita scales (used to measure body composition) were inaccurate due to a calibration problem. The In-Body scales were used as a substitute.

To improve the accuracy and reliability of the data, measurements of height and body composition were assessed by the researcher. The equipment required included a tape measure (for height measure) and In-Body machine (to measure body composition); both items were provided by the Otago Institute of Sports and Adventure (OISA). An iPad (provided by OISA) was used by participants to complete the participant screening form and the surveys. Google Forms were used to create and deliver these.

The DK survey consisted of ten multiple choice questions derived from the Eating and Activity Guidelines for New Zealand Adults (Ministry of Health, 2015), compiled for health practitioners and others who provide advice on nutrition and publicly accessible online (Ministry of Health, 2015). The FK survey consisted of 30 multiple choice questions where participants were required to identify each fruit and vegetable pictured by name.

Data Management

Given the face-to-face nature of the data collection, it was not possible to anonymise each participant. However, de-identification was achieved by allocating each participant with a number to which their data was recorded. These numbers were also added to the relevant participant's consent form, but stored separately.

Data Analysis

Standard descriptive statistics including medians, ranges and percentages were used to describe the variables (age, gender; ethnicity, tertiary institution, year of tertiary study, DK score, FK score, TK score and BMI).

Analysis to compare the relationship between variables (BMI, DK, FK, and TK) was completed using Pearson's correlation coefficient, which identifies the linear relationship between the examined variables; statistical significance was set at a p -value ≤ 0.05 .

Scaling

A score of 1 or 0 was given for each survey answer; depending on whether it was correct or not. Participants' scores were then scaled to determine their level of knowledge (see Table 1). Participants' BMI scores were scaled according to the World Health Organisation's BMI classification to determine whether participants were classified as underweight (< 18.5 BMI), normal (18.5-24.9), overweight (25.0-29.9), or obese (≥ 30.0 ; World Health Organisation, n.d.).

BMI (kg/m ²)	Underweight $< 18.5 \text{ kg/m}^2$	Normal $18.5 - 24.9 \text{ kg/m}^2$	Overweight $25.0 - 29.9 \text{ kg/m}^2$	Obese $\geq 30.0 \text{ kg/m}^2$
<i>n</i>	1	25	22	4
%	2	48	42	8

Table 1: BMI Results by BMI Classifications

RESULTS

Sample Demographics

A total of 52 participants were assessed in the study. The sample comprised of 29 females (56%) and 23 males (44%), and the median age of participants was 22 years. Thirty-three of the participants identified themselves as NZ European (63%), six identified as NZ Maori (12%), four identified as Pasifika (8%), three as Asian (6%), and six as Other (12%). Twenty-eight participants (54%) were students of Otago Polytechnic (OP) and 24 (46%) were students of Otago University (OU). Of the participants, four were in their first year of tertiary study (8%), 12 were in their second year (23%), 19 were in their third year (37%), eight were in their fourth year (15%), and nine had completed >4 years of tertiary study (17%).

Body Mass Index

The study sample represented a range of body mass index (BMI) scores (17.9 – 36.7 kg/m²), with a median BMI score of 25 kg/m². Results shown in Table 2 reveal that one (2%) of the participants was underweight (<18.5 kg/m²), most ($n = 25$; 48%) were in the normal range (18.5 – 24.9 kg/m²) or were overweight ($n = 22$, 42%) (25.0 – 29.9 kg/m²), and four (8%) were obese (≥ 30.0 kg/m²).

Subscale	Median	Lowest	Highest	Range
DK Score	5	4	7	3
FK Score	29	20	30	10
TK Score	34	26	37	11

* Maximum score on each subscale = 10 ** Maximum score on each subscale = 30 *** Maximum score on each subscale = 40

Table 2: Knowledge Scores

Knowledge Scores

As Table 2 shows, the median total knowledge (TK) score was 34. Of the 52 participants, all scored $\geq 26/40$. Fifteen (29%) participants scored between ≥ 25 and ≤ 32 (very good TK score) and 37 (71%) of participants scored between ≥ 33 and < 40 (excellent TK score). On average, participants' FK scores were higher than their DK scores.

The median score for DK was 5. Of the 52 participants, one (2%) scored between 0 and 2 (poor DK score), seven (14%) scored either a 3 or 4 (fair DK score), 33 (63%) scored either a 5 or 6 (good DK score), 11 (21%) scored a 7 (very good DK score), and no participants scored ≥ 8 (see Table 2). These scores represent the level of knowledge that participants had of the NZ Ministry of Health's dietary guidelines as measured by this survey. An impressive 42 (81%) participants correctly answered the question, "How many servings of fruit and vegetables are adults recommended to eat per day?"

Although, on average, DK was shown to be at a good level, only six (12%) participants correctly answered the question, "What is one serving of cooked grain food equivalent to?," and only three (6%) correctly answered the question, "How many servings of grain foods are adults recommended to eat per day?" These results indicate that while the sample had a high level of knowledge of the dietary guidelines for fruits and vegetables, they showed a low level of knowledge of grain foods.

The median score for FK was 29. Of the 52 participants, all scored ≥ 20 , three (6%) scored between ≥ 19 and ≤ 24 (very good FK score), and 49 (94%) scored ≥ 25 (excellent FK score). These scores represent the excellent ability of

participants to identify common fruits and vegetables as measured by this survey.

Table 3 demonstrates the median scores obtained by participants for DK, FK and TK according to their BMI classification. These results show that obese individuals and those of healthy weight have comparable levels of DK, FK and thus TK.

Correlations

Pearson's correlation coefficient was used to measure the strength of the linear relationship between the variables. As Table 5 and Figure 3 show, no significant correlation was found between TK scores and BMI ($r = -.080, P = 0.571$). Pearson's correlations were performed on DK scores and FK scores independently. No significant correlations were found between DK scores and BMI ($r = -.119, P = 0.401$) or between FK scores and BMI ($r = -.037, P = 0.795$) (see Table 4).

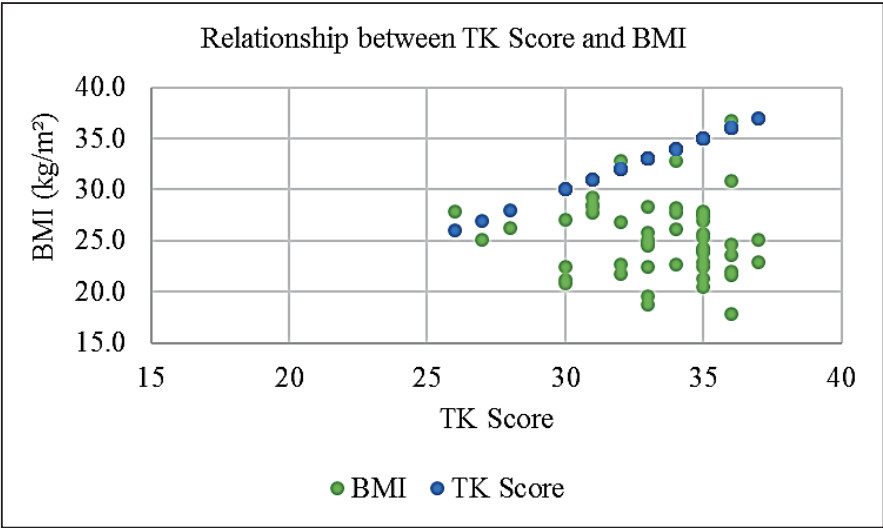


Figure 1: Scatter plot graphy demonstrating the relationship between TK Score and BMI

Subscale	BMI classification, median			
	Underweight <i>n</i> = 1	Normal <i>n</i> = 25	Overweight <i>n</i> = 22	Obese <i>n</i> = 4
DK score*	7	6	5	6
FK score**	29	28.5	28	29
TK score***	36	34.5	33	35

* Maximum score on each subscale = 10 ** Maximum score on each subscale = 30 *** Maximum score on each subscale = 40

Table 3: Knowledge Scores by BMI classification (n=52)

Measure	DK Score	FK Score	TK Score
Pearson's correlation coefficient	-0.119	-0.037	-0.080
P- value	0.401	-0.795	0.517

Table 4: Correlations between Knowledge Scores and BMI

DISCUSSION

This study was designed to examine the relationship of dietary knowledge (DK) and food knowledge (FK), independently, and combined as total knowledge (TK), with body mass index (BMI) within a tertiary student population. The results demonstrated no significant correlations between tertiary students' knowledge of national dietary guidelines and their ability to identify common fruits and vegetables, on the one hand, with their BMI scores.

The study findings failed to support the research hypothesis which predicted a correlation between DK and FK (both independently and combined as TK) and BMI. This is likely to be due to the sample group being a well-educated population, whose food knowledge was high irrespective of BMI levels. This result differs from what has been found previously in other parts of the world, and further research is needed in this area (Devaux, Sassi, Cecchini, Borgonovi, & Church, 2011; Sakamaki, Toyama, Amamoto, Liu, & Shinfuku, 2005).

To ensure that the sample group was a fair representation of the total student population, respondents' gender and ethnicity statistics were compared to Otago University and Otago Polytechnic student demographics. Of Otago University's 2016 student cohort, 58% were female and 42% were male (OUSA, personal communication, October 24, 2017) – almost identical to that of the sample group. Of Otago Polytechnic's 2016 student cohort, 64% identified themselves as NZ European and 9% identified themselves as NZ Maori (OPSA, personal communication, October 24, 2017) – very similar to the make-up of the sample group. We did not consider ethnicity as a factor in the study results, as the purpose of understanding the demographics was to generalise the results. Further research could include the impact of ethnicity on food selection and knowledge in this population.

Our results indicated that overweight and obese individuals and those of healthy weight have comparable levels of DK and FK. This suggests reasons other than individuals' level of knowledge that account for the higher BMI scores of the overweight and obese participants. This assumption is supported by the literature, which suggests that nutritional knowledge alone is not a substantial risk factor in the development of obesity (Wardle, Parmenter, & Waller, 2000; Wright & Aronne, 2012). Stark (2013) makes the crucial point that nutritional education alone, although essential, is typically insufficient to facilitate behaviour change due to its failure to specifically address the personal, behavioural, and environmental barriers to healthy eating (Stark, 2003).

As measured by the BMI scale, most participants were found to be of normal body weight ($n = 25$; 48%). However, a high proportion of participants were overweight ($n = 22$; 42%), which corresponds with the findings of research conducted on a much larger scale (Peltzer, Pengpid, Samuels, Özcan, Mantilla, Rahamefy, & Gasparishvili, 2014). This proportion of overweight tertiary students is particularly concerning in light of recent literature presenting evidence that a person's risk of unhealthy weight gain will continue to increase with age (Al-Kilani, Waly, & Yousef, 2012; Gores, 2008). People who are overweight in their tertiary years are expected to gain an additional 1.9kg per decade (Meeuwssen, Horgan, & Elia, 2010), further increasing their risk of developing obesity and obesity-related diseases in the future (National Heart, Lung, and Blood Institute, 2012).

We found that participants' knowledge of dietary guidelines (DK) was inferior to their ability to identify common

fruits and vegetables (FK). From the DK survey, 42 (81%) participants were correctly able to identify the number of servings of fruit and vegetables that adults are recommended to consume per day. This may be due to the efforts of the New Zealand charitable trust 5+ A Day, which actively promotes the Ministry of Health's (2015) recommendation to 'Eat at least 5 servings per day: at least 3 servings of vegetables and at least two servings of fruit' (p. 13).

Of most concern was the participants' level of DK revealed in the two questions relating to grain foods. Although overall, participants' DK was found to be good, only six (12%) participants could correctly identify what a serving size of cooked grain is equivalent to, and only three participants (6%) were able to correctly identify the number of servings of cooked grains that adults are recommended to eat per day. It is possible that this low level of knowledge is linked to current trends within the diet industry. The paleo and the ketogenic diets are two well-publicised diets which have demonised carbohydrates as 'toxic,' regardless of their source (WebMD, n.d.), causing the general public to develop a fear of this essential macronutrient (WebMD, n.d.). In contrast, research-based national guidelines developed by the Ministry of Health (2015) emphasise the benefits of consuming carbohydrates from particular sources, stating that 'Eating whole grain and high fibre grain foods is linked with a lower risk of cardiovascular disease, type 2 diabetes, weight gain and some cancers' (p. 15). It is important that educators and public health workers are made aware of the low level of tertiary students' knowledge of the guidelines and recommendations for grain foods specifically.

The sample group's ability to identify common fruits and vegetables (FK) was found to be excellent. This again could be due to the successful promotion of the 5+ A Day program throughout New Zealand, with a particular focus on primary schools (5plusaday, n.d.). The program provides curriculum-linked resources promoting awareness, understanding and knowledge of the importance of eating "five plus" servings of fruit and vegetables per day (5plusaday, n.d.). The program's resources are produced and distributed free to educators and health professionals. The program not only promotes consumption recommendations, but it also increases awareness and knowledge of common fruits and vegetables through visual and practical resources and activities (5plusaday, n.d.). As the median age of participants in this study was 22, it is likely that the sample population had participated in the 5+ A Day program throughout their primary school education.

Limitations of the study

Although participants were recruited from two separate tertiary institutions in Dunedin, the external validity of the study is compromised due to the potential for self-selection bias, since participants volunteered to take part. The invasive face-to-face nature of the assessment, and the potentially sensitive data collected, may have also deterred eligible participants from volunteering. The multiple-choice method of surveying used to assess knowledge placed limited emphasis on the practical dissemination of knowledge and allowed for participants to guess answers if they were unsure. It is also important to note that the findings may be subject to bias, given the small sample size and the inclusion of participants who were enrolled in a course that included a nutrition education component.

CONCLUSIONS

Within the sample of tertiary students chosen, this study found no significant correlation between total knowledge (TK) and body mass index (BMI). Overweight and obese participants were found to have comparable levels of TK compared to participants of a healthy weight. Although most participants were of normal weight, a large proportion of participants were overweight. The FK of participants was excellent and although DK levels were good, the study revealed a need for increased promotion of the dietary guidelines for grain foods. We recommend that future research continues to focus on developing a preventative approach to obesity, utilising a longitudinal design and reliable, well-validated measures of DK and FK. It would also be desirable to examine the effects of additional factors, such as years of study completed and ethnicity, on changes in students' BMI during their tertiary education years.

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THE FIRST ANNUAL OCEANIA PERFORMANCE ANALYSIS CONFERENCE

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BACKGROUND

The focus of this conference report is the inaugural Oceania Performance Analysis Symposium, held in Auckland in December 2017. Performance Analysis (PA) is a field of sport science which focuses on providing an objective way of recording performance so that key elements of performance can be quantified in a valid and consistent manner. While PA is a relatively new discipline of sport science, the field has grown rapidly in the past 20 years. ISPAS Oceania – the organising body behind the conference – is a subcommittee of *The International Society of Performance Analysis in Sport (ISPAS). ISPAS, and its predecessor the International Society of Notational Analysis of Sport (ISNAS, founded 1991), was founded:

to improve the international cooperation in the field of Analysis of Sport. Obviously, the internationalization of this discipline is of great importance for the exchange of views, the discussion and presentation of current research results as well as the realization of joint research projects. Until now the Society has existed quite informally – its main purpose was to ensure the continuing excellence in its World Conferences in Liverpool (1991), Cardiff (1993), Turkey (1995), Porto (1998), Cardiff (2001), Belfast (2004) and Szombathely, Hungary (2006). But now with the rapid growth of Performance Analysis as a discipline and career, there is a need for the Society to assume more formal responsibilities (www.ispas.org).

The rapid growth of performance analysis as a discipline has led to the need for a sub-branch of ISPAS to be organised in the Oceania region, principally covering Australia, New Zealand and the Pacific Islands. ISPAS International has supported the formation of the committee to encourage membership of ISPAS and to support the provision of accreditation through the ISPAS Pathways (www.ispas.org). ISPAS Oceania exists to provide an infrastructure for professionalisation, information and training opportunities for all performance analysts within Australia, New Zealand and Pasifika, whether they be interested amateurs, professional consultants or academics. One of the first activities agreed by a PA working group was the development of an annual Performance Analysis Symposium, mirroring, in a smaller way, the World Congress of Performance Analysis. This conference report will cover the first annual symposium, including an overview of keynote speakers, oral presentations and the AGM.

First, an overview of performance analysis is provided for those unfamiliar with this discipline of sport science.

Performance Analysis

PA has developed as a broad term that covers many areas of sports science. Although it has attracted research in many different sports and areas of sports science (Bampouras, Cronin, & Miller, 2012), it is commonly seen as a form of notational analysis (NA). NA can be defined as an objective way of recording information about a performance so that critical moments can be quantified in a consistent and reliable manner. NA allows for accurate and objective qualitative and quantitative feedback (Hughes et al., 2015). Five functions of notational analysis, identified by Hughes and Franks (2008), are: 1) to provide immediate feedback; 2) to assemble materials for database development; 3) to indicate areas that mandate improvement; 4) to evaluate specific aspects of performance; and 5) to operate as a selection mechanism in assisting coaches and athletes.

PA has also been significantly influenced by the field of biomechanics (Bartlett, 2001; Hughes & Bartlett, 2008). The commonalities that the fields of PA/NA and biomechanics share include the goal of enhancing performance, the analysis of player movement and reliance on information technology. Both of these fields involve the use of video analysis, video-based technology and computer software, while also providing important feedback to both the coach and performer to improve performance (Bartlett, 2012; Hughes and Bartlett, 2002). PA can be traced back to Charles Reep's notational analysis of information in English football matches beginning in 1950 (Pollard, 2002). Reep's analysis of passing sequences in football influenced how the game was played for many decades.

Equally, the field of sports biomechanics has its origins in the explanation of athletics technique pioneered around the same time as Charles Reep's work. The application of sports biomechanics to competition can be identified in Gideon Ariel's analysis of Bob Beamon's long jump world record during the 1968 Olympics (O'Donoghue, 2009). Ariel claimed to be the first to use cameras for capturing information which could then be analysed by a computer to identify faults in technique and performance.

More recently, Glazier (2010) has redefined performance analysis so as to give it a broader scope. He claims that all sport science disciplines look to enhance performance and produce and interpret data, as well as assess performance against parameters or indicators. These are the same criteria given by Hughes and Bartlett (2008) in explaining that performance analysis consists of notational analysis and biomechanics. Glazier further suggests that performance analysis should cover not just notational analysis and biomechanics, but also sports psychology and physiology (Glazier, 2010).

The professional terms that sports industry practitioners have adopted reflect this broader definition, and include various titles and roles such as data analyst, video analyst, coach analyst, sport scientist, biomechanist and technologist. In this article, performance analyst is adopted as an umbrella term for these different title and roles. Recent literature has enhanced our understanding of the diverse role that the performance analyst can play in the high-performance sport environment (e.g., Groom, Cushion, & Nelson, 2012; Middlemas & Harwood, 2017; Middlemas, Croft & Watson, 2017).

We envisage that this report will be of direct benefit to organisations supporting and developing analysis professionals within New Zealand, Australia and the Pacific Islands. An important focus of the new ISPAS Oceania committee involves providing guidance to organisations regarding accreditation and remuneration for performance analysts.

First Annual Oceania Performance Analysis Symposium

The inaugural Sport Performance Analysis Symposium and AGM was held on 15 November 2017 at Auckland University of Technology prior to the two-day Sports Performance Research Institute (SPRINZ) conference. The symposium was organised by members of ISPAS Oceania, a newly formed subcommittee of the International Society of Performance Analysis in Sport (ISPAS; see AGM report below for further details). Performance analysis practitioners, academics, students and coaches from New Zealand, Australia and the Pacific Islands gathered for the one-day symposium.

ANNUAL GENERAL MEETING

A key purpose of the symposium was to host the first annual general meeting of the ISPAS Oceania Committee. The subcommittee assumed the following purposes and objectives, in line with the international body:

- dissemination of scientific knowledge concerning performance analysis of sport
- providing a forum for the exchange of ideas
- gathering and disseminating information, scientific knowledge and materials relating to the performance analysis of sport

The following people were elected to the ISPAS Oceania subcommittee as members:

- Kirsten Spencer, Auckland University of Technology (president)
- Hayden Croft, Otago Polytechnic (chairperson)
- Piet Van Hasselt, Canterbury University (secretary)
- Sam Robertson, Victoria University / Western Bulldogs
- Jamie Tout, VX Sports
- Matt Toulson, HUDL
- Peter Lamb, Otago University
- Paul Warren, New Zealand Cricket
- Simon Middlemas, Otago Polytechnic
- Stafford Murray, High Performance Sport New Zealand (HPSNZ)
- Jason Healy, New Zealand Rugby
- Simon Briscoe, HPSNZ

INVITED KEYNOTE SPEAKERS

The symposium featured a number of original research contributions in the form of featured speakers and peer-reviewed presentations. Dr Kirsten Spencer (senior lecturer at AUT) opened the symposium by discussing her research on netball. 'FutureFern to Fast5' is a research project she has conducted with Sophie Wolf for NZ Netball. This explores the impact of small-sided games (6v6) on game-specific factors such as player decision-making, game-specific learning, whistle stoppage, shooting opportunities and psychological factors such as player engagement and intrinsic motivation. These elements are contextualised around four main themes, described as fast, change, focus and motivation. The findings of this project underline the relevance of a constraint-led perspective for developing young netball players and the role of performance analysis as a data collection tool in applied research projects.

Dr Sam Robertson is an associate professor at Victoria University and head of Research & Innovation at Western Bulldogs AFL. He presented on the role of performance analysis in developing and delivering a successful culture within AFL, including improving decision-making and answering complex problems. He shared innovative examples of analysis work conducted with the Bulldogs, including player coupling, predicting ball and player movement, and attempts to define and measure pressure. He also spoke of the ongoing resistance to PA within sport, generated in part by inconsistent application and poor integration, lack of awareness and the need for continual reflection and innovation.

In a paper entitled "What Information is used by Coaches when Making Decisions During a Match?," Hayden Croft (principal lecturer at Otago Polytechnic) presented his research exploring coaches' use of performance analysis in rugby and netball. The aim of this project was to use qualitative methods (e.g., content analysis of rugby and netball coaches' audio during matches) to capture and analyse coaches' communication during competition. The aim was to provide a framework which practitioners can use to design coach-driven PA systems. His findings – broken down into tactical, technical, physical and psychological themes – also provide an insight into coaches' communication under pressure, including the use of robust language and emotional responses.

The day concluded with a series of presentations by experienced practitioners. Feature speakers included Jamie Tout (VX Sports) who spoke about the traps of sports analysis in his presentation "Don't be Baffled by the Bullsxxxt." All Blacks analyst and Blues rugby coach, Alistair Rogers, presented reflections on his career and use of analysis in "Performance Analysis, A Game Changer? Absolutely!" while HPSNZ analysts Stafford Murray and Deborah Sides discussed the journey undergone by the PA service within The English Institute of Sport. They presented several case studies from UK elite sport and concluded that PA should be driven by gaps in performance rather than technology, and emphasised the importance of an analyst's interpersonal (soft) skills.

PEER-REVIEWED ORAL PRESENTATIONS

The symposium featured original research contributions. Submissions were reviewed by the conference organising committee and organised as ten-minute oral presentations, with five minutes for questions. These presentations reflected the broad focus and multi-disciplinary nature of performance analysis and attracted presenters from Australia and New Zealand.

The conference proceedings are reproduced in full below.

USING WEARABLE MICRITECHNOLOGY TO MEASURE PRECISION OF PRE-DETERMINED CHANGE-OF-DIRECTION INCIDENTS OF VARYING ANGLES

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INTRODUCTION

Cumulative change-of-direction incidents can elicit high levels of musculoskeletal and neuromuscular fatigue which may alter mechanical loading on lower-body joints and subsequently reduce mechanical efficiency, underpinning an increased risk of injury. Inertial sensors have previously shown the capability to accurately identify and differentiate between a variety of sports-specific movements. Therefore, the aim of this study was to determine whether an accurate and reliable algorithm could be developed to calculate the precise angle from a range of pre-determined change-of-direction incidents.

METHODS

Six recreationally active males (Age: 29 ± 0.5 years, Height: 181 ± 5.6 cm, Weight: 79.4 ± 5.3 kg) initially completed five consecutive individual change-of-direction trials at four pre-determined angles (45° , 90° , 135° , 180°), both left and right, for a total of 240 trials. Participants were fitted with a commercially available microtechnology unit (Optimeye, S5, Catapult Innovations, Melbourne, Australia) posteriorly trunk-mounted in a manufacturer-supplied vest. Tri-axial data from the accelerometer, gyroscope and magnetometer were extracted using manufacturer-supplied software prior to a series of data integration techniques combining each of the three inertial sensors before obtaining the final Yaw angle using a complementary filter. This data was then subject to a series of signal-processing techniques (Gaussian filter, edge detection, non-maximal suppression and threshold procedure) to precisely determine the angle of each change-of-direction incident, thus creating an algorithm. This algorithm was then tested on the same participants who completed five laps of a pre-marked change-of-direction course. Each lap consisted of three change-of-direction incidents in each direction (left and right) at identical angles (45° , 90° , 135° , 180°) for a total of 720 change-of direction-incidents. Reliability was assessed using a Coefficient of Variation (CV) expressed as a percentage error.

RESULTS

Descriptive statistics are reported as Mean \pm Standard Deviation across all participants, for each angle, in each direction (Table 1). All angles in both directions displayed 'good' reliability (CV < 5%).

	45°		90°		135°		180°	
	Mean \pm SD	CV (%)	Mean \pm SD	CV (%)	Mean \pm SD	CV (%)	Mean \pm SD	CV (%)
Right	44.7 \pm 2.0°	4.6	90.4 \pm 3.4°	3.8	133.5 \pm 3.3°	2.5	183.1 \pm 3.5°	1.9
Left	43.6 \pm 1.7°	3.9	89.0 \pm 2.5°	2.8	135.3 \pm 2.8°	2.1	180.3 \pm 4.4°	2.5

Table 1. Reliability and descriptive measures for all subjects between four pre-determined change-of-direction angles.

CONCLUSIONS

Change-of-direction movement is highly prevalent in a range of team sports and, to our knowledge, is unable to be reliably distinguished from other running variables using a commercially available microtechnology unit. The development of a novel algorithm to accurately identify changes in mechanical loading (angle) during change-of-direction incidents may present a new perspective in athlete monitoring for performance enhancement and injury prevention purposes. While this novel algorithm appears to be reliable across a number of participants (and therefore different running styles), it is currently unknown whether the small amount of error present is a result of system error or human error. Therefore, additional reliability testing is currently in progress, with the implementation of drone video technology to calculate any error present within the system.

PROFILING THE MOVEMENT SEQUENCES OF ELITE AND JUNIOR-ELITE FEMALE NETBALL ATHLETES

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AIM

Quantifying the activity profile of team-sport athletes is useful for training design, specific to position or playing standard. Recently, the activity profiles of netballers was examined by position. The aim of the present study is to quantify activity profiles of the seven netball playing positions across two standards, elite and junior-elite.

METHODS

Fifteen junior-elite (age: 19.3 ± 0.9 years; height: 181.9 ± 8.0 cm, mean \pm Standard Deviation (SD)) and 12 elite (age: 24.8 ± 2.7 years; height: 179.5 ± 6.9 cm) female netballers participated. Spatiotemporal data was collected by radio-frequency (RF) tracking during seven matches. A movement sequencing technique was applied to spatiotemporal data. Athlete velocity, acceleration and angular velocity were clustered via *k*-means. Qualitative labels were assigned to each unique clustered combination of velocity, acceleration and angular velocity movement, forming sequences. Sequences were separated by moments of athlete inactivity. The similarity between each sequence was quantified via the Levenshtein distance. Similar movement sequences were grouped into 25 clusters using hierarchical clustering. The longest common subsequence (LCS) algorithm was used to discover the most common sequences within each of the 25 clusters. Similarities of the LCS results, between playing positions of differing standards, were quantified via the Minkowski distance.

RESULTS

A total of 11 frequently recurring movement sequences were discovered across both playing standards. The GS and GK are the most closely related positions across playing standards. The largest pairwise positional difference was the WA position.

CONCLUSIONS

The movement sequencing technique may distinguish between netball playing positions and standards, although more matches should be included in future comparisons. Examining the movement sequences performed, according to playing standard and position, may allow the design of specific training drills to assist transition from the junior-elite to the elite level.

PRODUCING SILHOUETTE-BASED AUGMENTED FEEDBACK: WHAT ELEMENTS OF PERFORMANCE CAN A GOLF COACH ANALYSE?

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INTRODUCTION

Video systems and technology supporting sport-specific or general sport science include various video sources, as well as software and architectures that are designed to work on a single device (e.g., a mobile or tablet) or in distributed processing off- and on-line scenarios (such as remote coaching and media-sharing cloud services). The challenges of this case study involve producing software utilities to support analytical common-sense feedback with an increased preservation of privacy levels, while minimising bias and diagnostics uncertainties associated with video analysis.

METHODS

Experimental evidence from collected data using a variety of video equipment (mobile, Kinect sensors, sport and DV cameras) on a shortened-size golf driving range has influenced various algorithm design approaches to eliminate redundant information, support swing analysis and enable visual feedback annotations. As a result of golf coaching-driven experimental software design on foreground/background separation from image and video, the produced silhouette-based algorithms allow the user to reduce or eliminate background information, obfuscate personal information from the golfer's body during on-line video streaming or select a video filtering method on collected videos from previous training sessions. One of the challenges with silhouette-based algorithm development was in moving and non-moving foreground/background pixel information, found on collected golf swing data.

RESULTS

The results achieved regarding silhouette filtering with edge-detection algorithms demonstrate their application in golf-swing analysis and potential for broader use in rehabilitation and general sport science. The examples of incorporated video analysis and diagnostic feedback for amateur-level golfers include correcting common errors associated with stance and swing-plane performance elements that are well established in golf literature.

CONCLUSIONS

Future work on silhouette-based video streaming solutions will include further algorithms advancements, and annotation automations combined with AI approaches for diverse contexts and disciplines. The benefits of on-line immediate motion analysis can be applied to healthcare, including post-surgery and elderly activity monitoring while preserving privacy.

VISUAL REPRESENTATIONS OF RUNNING PERFORMANCE IN HALF MARATHON COMPETITIONS

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BACKGROUND

Long-distance running is one of the most popular daily sports, through which participants can retain their health and take care of their bodies. Millions of people around the world run for different reasons such as recreation, professionalism, mental balance or fun. Analysing half marathon running events could further help us to understand the motivations of runners as well as identify the effects of the running environment on performance.

AIM

The main goal of this research is to design mathematical and information technological (IT) models and tools through which athletes' performance during long-distance running competitions can be realised using the advantages of visual data representation. It would be very useful if this model would allow us to compare different running competitions, even where running distances are different.

METHODS

For this research, a range of mathematical and statistical tools have been used, including classification, cluster and dispersion analysis, complemented by relevant sport science theorems and practical experience. A graphical desktop application was designed and implemented in C++ language using OpenGL (Open Graphics Library) and GLUT (OpenGL Utility Toolkit) graphical tools and libraries for realising the models. In the data processing phase, conventional Big Data techniques and concepts were applied, such as the identification and interpolation of missing or inaccurate data.

RESULTS

I created a desktop application through which a given half marathon can be visualised based on running time and distance. In addition, a second visual tool has been designed which is capable of characterising given competitions according to the age and speed parameters of the runners.

CONCLUSIONS

Using these models, different long-distance running competitions can be compared with each other in a variety of ways. This presentation will describe my research to date and present a real example of how we can use these tools according to the results of the Auckland Half Marathon and the Budapest Half Marathon in 2017.

ISO-LINE MAPPING OF SPORTS ACTIONS

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BACKGROUND

In recent years, sports performance and player tracking data have become more readily available to sports clubs, coaches and analysts. While seemingly endless supplies of data are available, reducing these data in meaningful ways that inform tactical and strategic planning and performance analysis still remains a challenge.

AIMS

This ongoing project is focussed on assigning representative performance outcomes to 2D field positions, which reflect the unique dynamics of the match.

METHODS

We developed a modelling approach based on measurements of performance (z), as a function of their respective spatial locations (x, y). First, a grid is applied to the pitch (mesh size varies by sport, but usually around 0.5 m); performance measures are then estimated at each grid node using exponential smoothing. Finally, *iso*-lines are calculated continuously across the pitch and plotted on a map of the pitch.

RESULTS

So far, the method has been applied to golf (2003–2017 PGA TOUR seasons), soccer (women's FIFA World Cup 2007), and field hockey (2008 Olympic Games). In golf we have developed a new performance statistic, 'Shots Saved,' that is independent of other shots played on a hole; we also provide maps of each hole, visualising the difficulty inherent in different areas. Soccer applications have provided strategic insight into free-kick 'danger zones,' based on the *iso*-maps. In field hockey, certain pitch locations have been assigned likelihoods of leading to shot attempts on goal, regardless of the frequency of actions in those locations.

CONCLUSIONS

The *iso*-line method can readily be applied to other sports for which location-based performance information is available. By providing data visualisation and outcome information with respect to the specific dynamics of the match, performance data are meaningfully presented to be used directly in designing pre-match strategies and post-match performance analysis.

THE IMPORTANCE OF PLAYING GAMES EARLY IN AN AFL CAREER

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AIM

Young players entering the Australian Football League (AFL) are typically immature from both a physical and technical viewpoint. At the request of the senior coach of the Essendon Football Club, Melbourne, we set out to determine whether it was better to give top draft picks time to develop at the second level of football or play them in the AFL team as early as possible.

METHODS

The first 25 selections from each of the 2005 to 2014 national drafts ($n=250$) formed the sample evaluated. Logistic regression models were produced in R (R Foundation for Statistical Computing, Vienna, Austria) that determined the probability that a player would reach 50 games in eight seasons, 50 games in four seasons and 100 games in eight seasons following their first season. The mean number of games played by players who had played 15 to 19 games or 20+ games in their first season was also established following each season.

RESULTS

The findings report the probability of reaching the appropriate game milestone, given the number of games played in the first season. The probability of achieving 50 games in eight seasons was almost 50%, even if no games were played in the first season; however, that probability decreased considerably when the milestone difficulty was increased.

CONCLUSIONS

This research has implications for football coaches, strength and conditioning and recruiting practices. Practically, if team performance will not be overly affected, first-year players should be given opportunities to play AFL football as their probability of achieving significant milestones is improved. There is also no evidence to suggest that deliberately limiting first-year players makes any difference to the overall number of games played in the first eight seasons.

BEHIND CLOSED DOORS: THE ROLE OF DEBRIEFING AND FEEDBACK IN A PROFESSIONAL RUGBY TEAM

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BACKGROUND

Despite the popularity of performance analysis in high-performance rugby environments, limited attention has been paid to understanding how coaches and practitioners use this information to impact on performance.

AIM

The aim of this case study was to gain an in-depth understanding of how a professional rugby team – playing in New Zealand's ITM cup competition – uses post-match and pre-match meetings to debrief after performance and pre-brief prior to future performance.

METHODS

Multiple ethnographic techniques were employed to generate a comprehensive picture of the study phenomena, including participant observation, video recordings, formal and informal interviews, field notes, descriptive statistics and document analysis. Each meeting was transcribed separately and analysed using an inductive content analysis process, and themes were identified.

RESULTS

The case study explores how four key factors – the role of the coach-facilitator, player engagement, leadership, and the balance between reflection and preparation – impact on the debrief / pre-brief process. The findings reveal that while considerable emphasis was placed on the importance of player learning and engagement in team meetings, delivery was often ad hoc, coach-driven and results-focused.

CONCLUSIONS

This case study showed how debriefing can be a valuable tool for assessing, modifying or setting new short-term process goals, rather than long-term or seasonal goals. There are benefits from coaches and practitioners understanding athletes' preference for receiving feedback and providing opportunities for players to access feedback in a way that works for them. However, the study raised question marks over whether the players in the study team were able (or willing) to reflect honestly on their performance, and take responsibility for this during the debrief process. Coaches and practitioners may benefit from establishing consistent debriefing practices at all levels of their player pathway.

SUMMARY OF CONFERENCE REPORT

A reflection session was held at the end of the symposium. Three key messages stood out. Firstly, there is a high cross-over between performance analysis and coaching, and many coaches (including strength and conditioning coaches) attended the symposium. Secondly, as PA is a relatively new discipline of sport science and one which is rapidly growing, there is a need to better understand the employment conditions of neophyte practitioners working as performance analysts within sport. There is a perception that many neophyte practitioners work in low-paid positions, often under temporary contracts and limited supervision. Thirdly, it was recognised that there was a need for further research which can bridge the gap between research and practice within performance analysis. The second Sport Performance Analysis Symposium will be held on Wednesday 14 November 2018 at Auckland University of Technology (www.autmillennium.org.nz/special/sprinz2018).

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OCCUPATIONAL THERAPY AND EVIDENCED BASED SUPPORTED EMPLOYMENT IN MENTAL HEALTH AND ADDICTIONS: SHOWING THE WAY OR GETTING IN THE WAY?

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INTRODUCTION

Employment, that matches a person's skills, strengths and interests, is evidenced to improve mental and physical wellbeing (World Health Organisation, 2014). International literature suggests that between 70-90% of people who experience mental health and addiction issues worldwide want to work (Morgan, et al, 2017, Peterson, Gordon and Neale, 2017), a recent survey established that this figure is 80% in New Zealand (Zealand, 2014). This is one of the highest 'want to work rates' of any group of people who experience health and disability issues (Zealand, 2014). However the number of people who have a job and experience a mental health or addiction issues is estimated to be as low as 20% (Jonsdottir & Waghorn, 2015.). People diagnosed with psychosis face one of the highest disadvantages within this group with only an estimated 6% of this population currently in work (Jonsdottir & Waghorn, 2015, Morgan et al, 2016). People who identify as Maori face greater health, social and economic inequities than the general population including poorer mental health, higher rates of addiction, imprisonment and unemployment (Harris, et al, 2012, Marriot & Sim, 2015, Tauri, 2005). The reasons for this injustice are multifaceted and complex but their presence strengthens the need for culturally appropriate, evidenced based, high quality employment support provision in New Zealand for all people who have a mental health or addiction issue.

Occupational therapy and employment

The World Federation of Occupational Therapy (OT) (2015) defines the aims of OT as 'the use of occupation to develop, promote, maintain and restore function through participating in activities of daily life'. This philosophy is mirrored by the OT Board of New Zealand (2015) that states OTs should value recovery, its principles, and work within a socially inclusive framework that includes a person's employment aspirations. Work is a core occupation of working age adults, it provides a multitude of benefits including increased self-esteem, self-worth, confidence, sense of identity, social inclusion and citizenship (Hamer et al., 2014) as well as increasing a person's income and potentially lifting them out of poverty (Macintyre, 2018).

OTs are well placed to guide individuals on their vocational journey because they have the necessary skills and training to explore meaningful activities and their complexities alongside analysis of a person's role performance (Davis & Rinaldi, 2004, Priest & Bones, 2012). This suggests that supporting the work aspirations of people receiving care from mental health and addiction services should be a core component of the role of an OT (Smith et al, 2017).

Traditional vocational rehabilitation grew out of the closure of mental health institutions in the 1970's and 80's, occupational therapy was at the forefront of delivering these interventions (Marx et al., 1973). Activities included social skills training, confidence building, and occupations designed to improve a person's daily structure and routine. This approach is often referred to as train then place in the literature. It may also involve attending a narrow range of 'work focussed activities' such as horticulture programmes or production line work in factory style environments (Lockett, Waghorn & Kidd, 2018).. Typically this work is either unpaid or provided under the minimum wage exemption act (1983) which allows employers to pay people with a disability substantially less than the minimum wage on the grounds of poor productivity (Ministry of Business, Innovation and Employment, 2018).

A paradigm shift

In the late 1990's a group of researchers in the US noticed that there was a large variance in outcomes across vocational rehabilitation programmes. Together with practitioners, participants of employment support programmes and their families they set out to establish distinguishing features of high and low performing employment services. The practices that defined the high performing services were distilled into a new approach called Individual Placement with Support (IPS). There are eight practice principles, described in table 1, each of these principles are based on evidence of best practice and have been rigorously tested (Bond, 2004).

1	Zero exclusion	People are not excluded on the grounds of symptoms, illness, work history or perceived readiness, addiction or use of substances, criminal convictions, homelessness or any other factor.
2	Rapid job search	Job search starts within four weeks of programme entry.
3	Individually tailored	Job search is based on a person's individual preferences rather than what jobs are available or the opinion of the employment specialist.
4	Focus on competitive employment	All jobs pay at least the minimum wage, are not created for or specifically set aside for people with disabilities.
5	Financial guidance	This is provided to everyone to ensure they receive information that explains their individual situation and includes details about all of their government entitlements.
6	Job development	Employment specialists get to know employers in their local communities and build relationships with them to create a network of employers.
7	On-going support to employee and employer	Support is individualised to each person and their employer, it is provided for as long as it is required.
8	Integrated employment and clinical support	People who face multiple barriers to employment due to health or disability achieve the best results when employment and clinical supports work closely together.

Table 1: Eight IPS practice principles (Bond, 2004)

There are now over 20 randomised control trials (RCT's), eight systematic reviews including two Cochrane reviews and numerous real world examples published in the literature demonstrating that adherence to this approach increases a person's chance of getting and keeping a job by around threefold compared to traditional methods (Metcalf, Drake & Bond, 2017). Participants also found work faster; kept jobs longer; worked more hours and earned more money than in traditional vocational rehabilitation programmes (Bond, Drake & Becker, 2008).

A fidelity scale that measures a programme's adherence to the eight practice principles has been developed that demonstrates predictive validity (Kim, et al 2015). There is also a large international learning community collaborative that shares ideas and supports new sites to effectively use of the approach (Johnson-Kwochka, 2017). IPS is frequently referred to as place then train because it acknowledges that many people with a mental health or addiction issue may need assistance to develop work related skills but that this is best achieved 'on the job' through strong integration of employment and clinical care (O'Day et al, 2017). In this approach people are placed into jobs then supported to keep them. IPS also focusses on assisting people into jobs that pay at least the minimum wage, which consumers state that they want as it provides them with the economic resources to alleviate the poverty that they may face and provides monetary reward for engagement in valued activity (Metcalf, Drake and Bond, 2017). These jobs are open for anyone in the community to apply for so they promote social inclusion and prevent the 'othering' of this group of the population that can occur when they are put into segregated employment environments (Marmot et al, 2007, Hamer et al, 2017).

To date there are seven published examples of successful IPS application in New Zealand (Porteous & Waghorn, 2007 Browne et al., 2009 Porteous & Waghorn, 2009, Browne & Waghorn, 2010, Waghorn, et al., 2011 Kongs-Taylor, et al 2013 Lockett, et al 2013), however information pertaining to successful outcomes of IPS with people who identify as Maori is limited in these papers and internationally it is recognised that further research is needed to evidence successes for new populations (Drake & Bond, 2017). In 2017 Northland DHB established IPS in Kaipara district; the programme received specialist implementation support and paid particular attention to culture. This has resulted in around 50% of people engaging with and getting results from the programme identifying as Maori (Priest & Lockett, under review) demonstrating under the right conditions IPS is applicable for both Maori and non-Maori. Further examination of the critical factors for successful engagement and outcome's for Maori is being investigated by the author for their master's thesis.

The evidence for this approach is so robust that it is often described as 'evidenced based supported employment' (Bond, Drake & Becker, 2008) to distinguish it from other forms of supported employment. It is the only approach to supported employment that is recommended in New Zealand policy and practice guidelines (Galletly, et al, 2016, Ministry of Health, 2012). Despite this IPS is not available in routine practice (Lockett, Waghorn & Kidd, 2018) and examples of less effective, non-evidenced based practices that aren't individualised to the person are still delivered by OTs working in mental health and addiction (de Malmanche & Robertson, 2015, Soeker et al, 2018). These papers focus on the experiences of using alternative forms of employment services but they do not report the employment outcomes in a measurable way. Finding and keeping a job are the main reasons people seek employment support so it is vital to report on outcomes as well as experience.

DISCUSSION

Individual barriers

The low expectations which healthcare professionals have in regards to people with mental health and addiction issues are one of the greatest influences on whether a person will engage with employment support (Rinaldi et al, 2010). Some clinicians do not believe that anyone on their case list can get paid work despite irrefutable evidence to the contrary (Marwaha, Balachandra, & Johnson, 2009). This may be caused by the pervasiveness of the medical

model which emphasises symptoms and cure rather than recovery, functional ability and the social determinants of health (Shepherd, et al, 2012). Robertson and Collinson (2011) found that services are often focused on risk and risk management and shaped by rare and catastrophic events that do not reflect the everyday risk faced by most people with mental health issues. This can create an environment where practitioners retreat into conservative actions, interventions and recommendations.

Volunteering is often perceived as one such 'low risk' activity a clinician might recommend to someone who articulates a desire to work. However, many people who experience mental health and addiction issues are living in poverty (World Health Organisation, 2014, OECD, 2016) and express a desire to work because they need to earn money (Reddy Llerena, & Kern, 2016). This can lead to the person opting out of the clinicians recommended course of action and feeling dissatisfied (Areberg & Bejerholm, 2013). Consequently the clinician then concludes that the person was not able to complete this simple task so could not cope with the complexities of work, reinforcing the cycle of low expectations. It is a well recorded phenomenon that excluded populations are frequently blamed for the injustices they face, rather than exploring whether the systems and services provided are adequate for their needs (Penney, Barnes, & McCreanor, 2011, Corrigan, 2000). Clinicians may also make an assumption that volunteering leads to paid work but this is not supported by evidence or practice (REF).

The clinician's personal experience of work can also influence their perception of whether working is advisable, particularly if the clinician has experienced their own mental health issue due to work pressures (O'Connor, Neff, & Pitman, 2018). If a clinician feels burnt out, stressed and disillusioned with their job this can lead them to believe that working would be a poor choice for someone who may have lower levels of resilience (Burgard & Lin, 2013). In addition, Ray et al (2013) identified that mental health professionals can develop 'compassion fatigue' due to work place stress that can affect the quality of care they are then able to deliver.

Mental health workers are often concerned about the discrimination a person may face from employers or co-workers and feel ill-equipped to advise on what a person who experiences mental health or addiction issues may say about their particular issue to prospective employers (Shepherd et al, 2012). This is a real concern for many job seekers but is actually addressed by the IPS worker with a negotiated plan (Hielscher & Waghorn, 2015). However, clinicians may not be aware that this is one of the main tenants of an IPS programme.

We had to examine the thought that we were becoming barriers to people starting work, rather than helpful, because we were determining when we felt they were ready to go to work – as if that was something we had ownership over.

CMHC team manager, ADHB, (Kongs-Taylor, & Locket, 2016).

Individual Practitioner Solutions

Having an IPS worker in the team who is able to obtain a job for someone facing multiple barriers to employment, creates practice-based evidence that this is possible. Having regular feedback regarding examples of people who have obtained employment, alongside challenges to traditional beliefs (Memish, et al, 2017) and an approach that engenders hope further supports attitude change (Rinaldi, Miller & Perkins, 2010).

It is important for technicalities of the model to be fully understood. Frequent observation from practice is that clinicians are often waiting for a person they support to display behaviour that they consider work ready, such as getting up 'on time' in the morning. This however is a poor indicator of employment success as the person may be more suited to working night shifts (Gilbert and Papworth, 2017). It is important that these options are explored and explained to clinicians, some of whom may also have a limited understanding of the diversity of the labour market (Slade et al, 2014). Boutillier, et al., (2015) suggests that if mental health and addiction services are to adopt

true recovery principles clinicians should completely withholding from giving advice and instead empower the person to decide on the course of action for themselves.

OT's are well placed to support mental health and addiction team to change attitudes, values and discriminatory practices as well as supporting the application and delivery of IPS. There are two papers that describe how an OT can do this in detail (Waghorn, Lloyd & Clune, 2009, Priest & Bones, 2012). IPS is not routinely part of routine undergraduate teaching so they may not be aware of the approach. It is the author's view that OT schools could incorporate teachings on this topic to skill OT's with information on the evidence base and its occupational injustice.

System and legislative barriers

Unlike other developed countries New Zealand ascribes to a national minimum wage exemption for people with disabilities. This allows a person's productivity to be measured against a set of timed tasks. If the person cannot complete these tasks they are then exempt from being paid the minimum wage. The assessment comprises of a set of timed tasks that may not match the job a person wishes to do, moreover the assessment is not evidenced based (Ministry of Business Innovation and Employment, 2018).

Arguably paying a person less because of a perceived lack of productivity is adding to their stigma and sense of 'other' or 'less than' the rest of the population. In contrast IPS ensures adaptations are applied to the environment or task to meet the individual's needs, abilities, strengths and talents (Waghorn et al., 2009). Coupled with a suitable job match and personalised in work supports IPS ensures the employer has a productive employee (Mueser et al., 2001) that then justifiably earns a wage equal to that of their colleagues.

The other main issue is securing on-going funding for IPS programmes. IPS is evidenced to improve a person's health and therefore provide cost savings to the health service as well as reducing reliance on welfare benefits which provides cost benefits to the welfare system (Lockett, Waghorn & Kidd, 2018). The cost savings that a return to work provides two currently separate and fragmented systems means that neither wants to lead on funding for IPS (Lockett et al., 2018) and several of the New Zealand IPS sites in the literature are no longer in existence due to withdrawal of funding (Priest & Lockett, under review).

System and legislative barrier solutions

Whilst the minimum wage exemption is legal in New Zealand but it has been questioned as to whether it is fair or ethical for some time (Mental Health Commission, 1999). Paying people less on the grounds of disability perpetuates a cycle of low expectations (Peterson et al., 2017) and could also detrimentally affect a person's motivation (Reddy et al., 2016). However OT's may not have considered or reflected on issues of parity and occupational justice in relation to this issue. It is the author's opinion that OT's in New Zealand requires education, training and information on this issue.

Lockett et al., (2018) suggest a range of welfare reforms that could support health and welfare working together to provide jointly funded IPS in New Zealand. This approach has been successfully used in some US sites but its implementation is patchy (Mueser & Cook, 2016). A newly formed joint health and welfare unit in the UK has recently received a large investment for the sole purposes of providing joined up funding to expand IPS (England, N.H.S. 2018). New Zealand could follow these practices and significantly improve the lives of people with mental health and addiction issues by expanding IPS provision.

CONCLUSION

Occupational justice recognises the rights of individuals to participate in activities in an inclusive way, regardless of health, disability, social class, ethnicity or any other difference. People who experience mental health and addiction issues want to work but have low rates of employment despite the availability of a clearly defined, effective, measureable, evidenced based set of principles that could dramatically increase the number of people in work. This is an occupational injustice created and perpetuated by individual clinicians, the healthcare systems and legislative barriers.

OT's are well placed to tackle this through a range of actions. On an individual level they can learn about the evidence base, champion the issue in their workplace, revise any less effective practices they may be using to align them with the evidenced practice principles and support other to raise their expectations for this marginalised group of people. OT schools could review and withdraw from placements offered at traditional vocational rehabilitation to prevent a new generation being educated in less effective practices. OT schools could also assist in education at both under and post graduate levels. At a national level OT's could lobby government to end the use of the minimum wage exemption with all disabled people and offer creative, individualised solutions to ensure people who want to work are able to do so in a way that is inclusive, ethical and fair.

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TRAINING MODALITY PRACTICES OF MASTERS CYCLISTS: AN AUSTRALIAN STUDY

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INTRODUCTION

During the last three decades, there has been a significant increase in the number of masters athletes (over 35 y) participating in various competitive sport events (Leyk et al., 2009; Knechtle, Knechtle, Rosemann, & Senn, 2011; Lepers, Rust, Stapley, & Knechtle, 2012). The growing number of middle-aged and older competitors may be due to health and fitness, social and recreational reasons (Macgregor, Roby, & Reaburn, 2016). However, for many elite-level athletes, the major challenge is to test their own performance limits with increasing age and compete against age-matched peers (Dascomb & Raeburn, 2007).

Masters athletes are faced with the challenges caused by age-related changes in physiological systems and health affecting trainability. Research on masters runners has indicated that endurance performance is associated with the training volume (Wroblewski, Amati, Smiley, Goodpaster, & Wright, 2011). However, it seems that even among elite-level athletes, aging leads to reduction in training volume. The few available studies on masters athletes indicate that the decline in training volume is evident for both endurance and sprint/power athletes (Easthope, Hausswirth, Vercruyssen, & Brisswalter, 2010). It could be hypothesised that in the majority of aging athletes, reduced training volume is necessary to avoid overtraining.

Unexpectedly, a study by Appleby and Dieffenbach (2016) found that most masters cyclists do not have coaches, especially since competitive cycling is often considered one of the toughest endurance events. Surprisingly, little attention has been paid to masters athletes' competitive performance and training practices. Given that there are many age-related physiological changes, the information obtained from young riders may not give viable conclusions for masters cyclists. For this reason, this study set out to determine the current modes of training adopted by masters cyclists competing at state level in Australia.

METHODS

Experimental Approach to the Problem

The project used a mixed-methods approach and thus a combination of both qualitative and quantitative data collection (Christensen, Johnson, & Turner, 2011). Phase one used the focus group technique to develop the online survey tool, which was used to examine the current training practices of masters cyclists. Phase two comprised the online survey that was designed to gather quantitative data examining the training practices of masters cyclists.

Following ethical approval from the CQUniversity Human Ethics Research Panel (approval number 12-06-135), an email invitation was sent to ten local male and female masters cyclists from the Rockhampton Cycling Club asking them to participate in a focus group session designed to develop and refine an online questionnaire. Each participant received an invitation, an opt-in option, an information sheet and an informed consent document, giving the date, time and venue of the focus group. Each potential participant who responded to the e-mail invitation was then sent an email seven days before the planned focus group as a reminder, and then again on the day of the focus group meeting. Refreshments in the form of sandwiches, coffee, tea and juice were provided to the participants.

Upon arrival at the venue, the signed informed consent forms were collected from the participants. Participants were seated around a meeting table in a meeting room at CQUniversity. A series of open and closed questions were asked to initiate and facilitate discussion between the focus group participants. The focus group was recorded following consent of the participants, who were again reminded of the opt-in nature of the research and informed that if they wished to leave the meeting at any stage there was no penalty or prejudice attached.

The research project received the written support of Cycling Queensland, which provided their permission to send the online survey link to their 2012-13 membership e-mail database. An email was sent by Cycling Queensland to all current members, inviting them to participate in the research. In the email, each participant received an invitation, an opt-in option, and a hyperlink to the online questionnaire using Survey Monkey. The estimated time to complete the online questionnaire was 20 minutes, and included questions about recovery practices and the perceived benefits and constraints of participating in cycling in Queensland.

The online questionnaire included the following questions:

- What is your age at the time of this online questionnaire?
- Gender (male or female)?
- What is your height in cm?
- What is your weight in kg?
- Over the past 12 months, as an average per week, please indicate:
 - Training per week for cycling
 - Average km per week on the bike
 - Different types of training undertaken

The training questions included distance and time spent training (both 'on the bike' and 'off the bike'). There was also a specific question on whether the masters athletes were competing for fitness or to win competitions (specific training objectives). Furthermore, specific questions were asked about training 'off the bike,' whether participants attended a fitness centre or gym and if they undertook weight or resistance training.

Participants

Members of Cycling Queensland, Australia, comprised the sample population for this study. A total of 371 individuals completed the online survey. The respondents were distributed across gender and age lines – 90.56% of the respondents were male (n=336), while females (n=35) comprised 9.43%. The mean age of participants was 46.0, with N=36 aged 18-29, 134 aged 30-44, 102 aged 45-54 and 99 in the 55+ age category. The gender distribution was approximately constant over the age categories, with the mean ages of male and females in the sample not differing significantly; $t(3) = 2.17, p = .54$.

Statistical Analyses

Data was analysed by the R statistical programming team using standard non-parametric bivariate statistics from the core package, and stepwise multivariate regression methods from the well-known MASS library. The 371 responses were collated and analysed using the R open-source statistics environment.

RESULTS

According to this study, the current training modes for masters cyclists included endurance training on the bike and off the bike (running and/or swimming); strength training on the bike (with events such as biking to the hills) and off the bike (including resistance training in the gym); speed power training on the bike (which entailed sprint work) and off the bike (which entailed plyometrics, flexibility training such as stretching or yoga, skill training, and attending fitness classes at the gym).

Gender	Weights	Gym		<i>Total</i>
		No	Yes	
Female	No	26	6	32
		<i>81.2 %</i>	<i>18.8 %</i>	<i>100.0 %</i>
		8.3 %	10.5 %	8.6 %
	Yes	2	1	3
		<i>66.7 %</i>	<i>33.3 %</i>	<i>100.0 %</i>
		0.6 %	1.8 %	0.8 %
Male	No	251	38	289
		<i>86.9 %</i>	<i>13.1 %</i>	<i>100.0 %</i>
		79.9 %	66.7 %	77.9 %
	Yes	35	12	47
		<i>74.5 %</i>	<i>25.5 %</i>	<i>100.0 %</i>
		11.1 %	21.1 %	12.6 %
<i>Total</i>		314	57	371
		<i>84. %</i>	<i>15.4 %</i>	<i>100.0 %</i>
		100.0 %	100.0 %	100.0 %

Fisher's $p=0.071 \cdot df=3 \cdot \Phi_c=0.126$

Table 1. Cross tabulation of gym and weight training activity (Bold numbers add down the table; italic numbers add across the table)

Table 1 summarises the proportion of males and females who did gym and weight training. Fisher's exact test with Monte Carlo simulation showed a non-significant relationship between these three variables. However; this test might be undermined by the relatively low cell counts among females who undertook each type of training. Considering bivariate relationships for gender and the likelihood of undertaking each type of training, no relationship was observed between gym ($\Phi(1)=0.041, p=.459$) and weight training ($\Phi(1)=0.046, p=.601$). When gender is left out of the analysis, there is a significant positive association between visiting the gym and undertaking weight training ($\Phi(1)=0.116, p=.034$) (Table 2).

Gym	Weights	Age				Total
		<30	30-44	45-54	55+	
No	No	27	105	70	75	277
		9.7 %	37.9 %	25.3 %	27.1 %	100.0 %
	Yes	75 %	78.4 %	68.6 %	75.8 %	74.7 %
		2	13	14	8	37
	Yes	5.4 %	35.1 %	37.8 %	21.6 %	100.0 %
		5.6 %	9.7 %	13.7 %	8.1 %	10 %
Yes	No	5	11	16	12	44
		11.4 %	25 %	36.4 %	27.3 %	100.0 %
	Yes	13.9 %	8.2 %	15.7 %	12.1 %	11.8 %
		2	5	2	4	13
	Yes	15.4 %	38.5 %	15.4 %	30.8 %	100.0 %
		5.6 %	3.7 %	2 %	4 %	3.4 %
Total		36	134	102	99	371
		9.7 %	36.1 %	27.5 %	26.7 %	100.0 %
		100.0	100.0	100.0	100.0	100.0
		%	%	%	%	%

Fisher's $p=0.546 \cdot df=9 \cdot \Phi_c=0.081$

Table 2. Cross tabulation of gym and weight training activity by age category (Bold numbers add down the table; italic numbers add across the table)

Weight and gym activity by age category are shown in Table 2. Log-linear analysis did not reveal any significant relationship between age category and the likelihood of undertaking weight training ($\chi^2(3)=0.756, p=.860$) or gym training ($\chi^2(3)=2.126, p=.547$). Table 3 summarises the relationship between gym training and specific training objectives. Those participants who undertook gym training were more likely to nominate weights (strength) training as a specific training objective $\chi^2(1)=4.291, p=.038$. However, no such relationship was found for fitness $\chi^2(1)=0.682, p=.409$.

<i>Gym</i>	<i>Weights</i>		<i>Total</i>	<i>Fitness</i>		<i>Total</i>
	No	Yes		No	Yes	
No	182	132	314	260	54	314
	58 %	42 %	100.0 %	82.8 %	17.2 %	100.0 %
	88.3 %	80 %	84.7 %	85.5 %	80.6 %	84.7 %
Yes	24	33	57	44	13	57
	42.1 %	57.9 %	100.0 %	77.2 %	22.8 %	100.0 %
	11.7 %	20 %	15.4 %	14.5 %	19.4 %	15.4 %
Total	206	165	371	304	67	371
	55.5 %	44.5 %	100.0 %	81.9 %	18.1 %	100.0 %
	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %

$\chi^2=4.291 \cdot df=1 \cdot \Phi=0.115 \cdot p=0.038$ $\chi^2=0.682 \cdot df=1 \cdot \Phi=0.053 \cdot p=0.409$

Table 3. Relationship between gym training and specific training objectives: weights and fitness (Bold numbers add down the table; italic numbers add across the table)

The relationship between gym training and specific training objectives is summarised in Table 3. Those participants who undertook gym training were more likely to nominate resistance (strength) training as a specific training objective $\chi^2(1)=4.291, p=.038$. However, no such relationship was found for fitness $\chi^2(1)=0.682, p=.409$. Table 4 shows the corresponding relationships between (off-bike) strength training and resistance and fitness objectives. Off-bike strength training was strongly related to fitness objectives $\chi^2(1)=45.008, p<.001$, but was unrelated to weights $\chi^2(1)=0.996, p=.318$.

<i>Strength (Off-bike)</i>	<i>Weights</i>		<i>Total</i>	<i>Fitness</i>		<i>Total</i>
	No	Yes		No	Yes	
No	182	24	206	194	12	206
	88.3 %	11.7 %	100.0 %	94.2 %	5.8 %	100.0 %
	56.7 %	48 %	55.6 %	63.8 %	17.9 %	55.5 %
Yes	139	26	165	110	55	165
	84.2 %	15.8 %	100.0 %	66.7 %	33.3 %	100.0 %
	43.3 %	52 %	44.5 %	36.2 %	82.1 %	44.4 %
Total	321	50	371	304	67	371
	86.5 %	13.5 %	100.0 %	81.9 %	18.1 %	100.0 %
	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %

$\chi^2=0.996 \cdot df=1 \cdot \Phi=0.060 \cdot p=0.318$ $\chi^2=45.008 \cdot df=1 \cdot \Phi=0.355 \cdot p=0.000$

Table 4. Relationship between strength training (off-bike) and specific training objectives: weights and fitness (Bold numbers add down the table; italic numbers add across the table)

Table 4 shows the relationships between (off-bike) strength training and weight and fitness objectives. Off-bike strength training was strongly correlated to fitness objectives $\chi^2 (1)=45.008, p<.001$, but was unrelated to weights $\chi^2 (1)=0.996, p=.318$.

Strength Training (Off-bike)	Speed/Power Training (Off-bike)		Total	Endurance Training (Off-bike)		Total
	No	Yes		No	Yes	
No	206	0	206	156	50	206
	100 %	0 %	100.0 %	75.7 %	24.3 %	100.0 %
	61.7 %	0 %	55.5 %	59.1 %	46.7 %	55.5 %
Yes	128	37	165	108	57	165
	77.6 %	22.4 %	100.0 %	65.5 %	34.5 %	100.0 %
	38.3 %	100 %	44.5 %	40.9 %	53.3 %	44.5 %
Total	334	37	371	264	107	371
	90 %	10 %	100.0 %	71.2 %	28.8 %	100.0 %
	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
$\chi^2=48.844 \cdot df=1 \cdot \Phi=0.372 \cdot p=0.000$			$\chi^2=4.224 \cdot df=1 \cdot \Phi=0.113 \cdot p=0.040$			

Table 5. Relationship between undertaking off-bike strength training and other forms of off-bike training (Bold numbers add down the table; italic numbers add across the table)

For off-bike training objectives, there was a marked correlation between strength and speed/power objectives, as shown in Table 5. Every respondent indicating speed/power training was also undertaking strength training, leading to a strong association between these objectives, $\chi^2 (1)=48.844, p<.001$. There was a less marked, but significant, association between strength training and endurance training, $\chi^2 (1)=4.224, p=.040$. However, there was no association between endurance training and speed/power training $\chi^2 (1)=1.176, p=.279$.

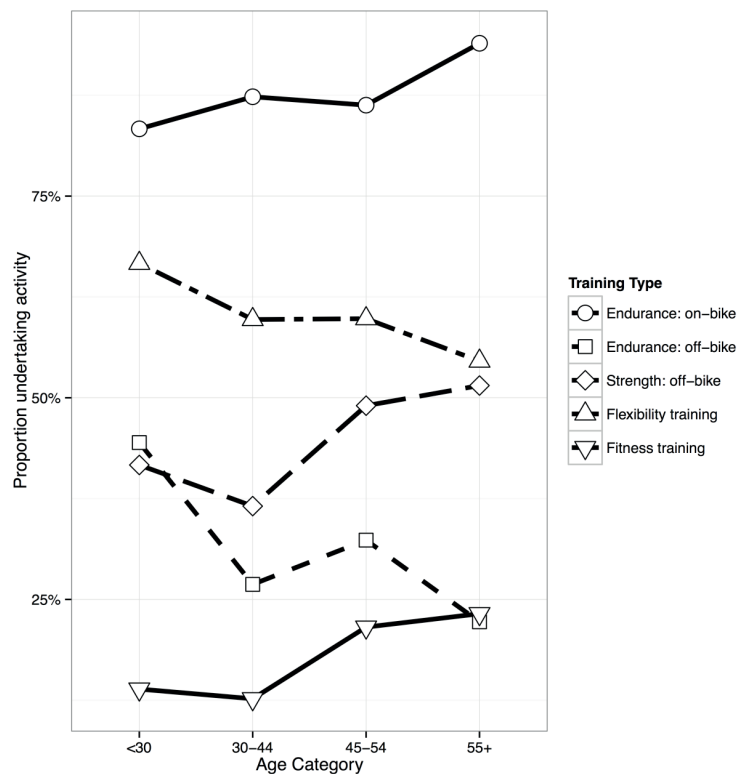


Figure 1. Graphical representation of age effects on training type.

In order to better understand the overall differences in training style between older and younger participants, a linear regression model predicting age of respondent was considered, using all training measures as candidate predictors. Stepwise model selection was performed, using the Akaike Information Criterion (AIC), which balances explanatory power with model parsimony, to select predictors. Figure 1 summarises the final (minimum AIC) regression model. The final model indicates that older participants were more likely to undertake on-bike endurance training, and less likely to undertake off-bike endurance training. Older participants were also less likely to undertake some form of flexibility training.

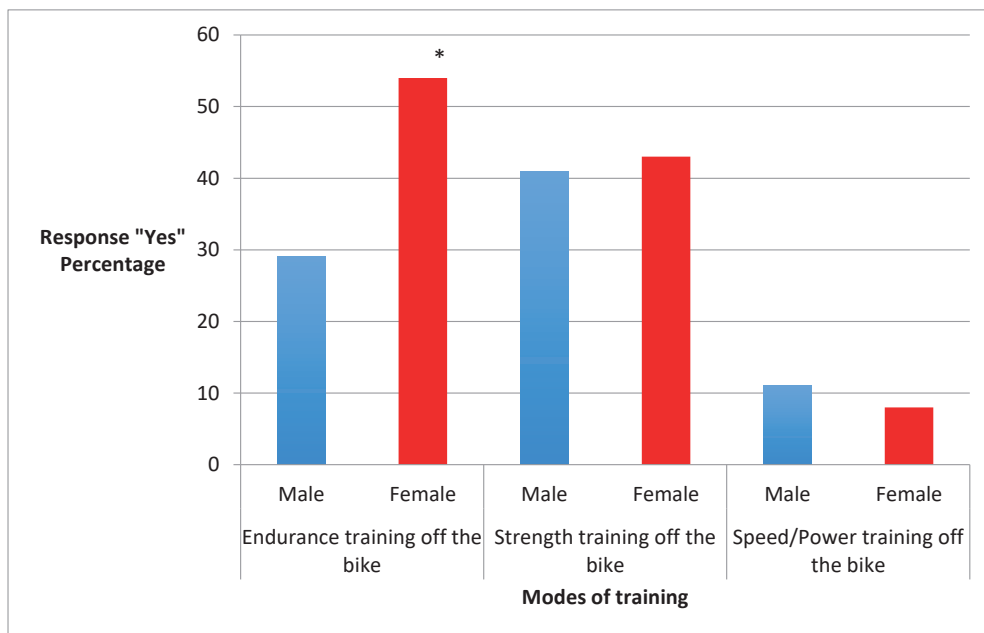


Figure 2. Training type conducted on the bike (percentages) for male and female masters cyclists. * denotes significant difference ($p < 0.05$) between male and female cyclists.

Figure 2 shows the proportion of respondents who undertook various modes of training; error bars indicate 95% confidence intervals of the proportion. The figure illustrates that there were large and significant differences in the proportion of respondents undertaking each form of training, with the exception of on-bike endurance and strength training. No gender differences were observed in terms of undertaking on- versus off-bike training for the three different training objectives. However, the small proportion of females ($N=35$) meant that the likelihood of detecting valid gender differences was extremely low. No age differences were observed in terms of preferring on- or off-bike training for increasing strength or speed/power. However, those participants who undertook off-bike endurance training were younger ($M = 43.6$) than those who did not ($M = 47.5$), $t(222.0) = 2.89$, $p = .004$. Although falling just short of the .05 criterion for a two-tailed test, those participants who indicated the use of on-bike endurance were older ($M = 46.8$), compared to those who did not ($M = 43.0$), $t(52.8) = 1.82$, $p = .073$.

DISCUSSION

In terms of gender difference, the study showed that females (55.6%) preferred to undertake endurance training off-the-bike $2(1, N = 208) = 7.37$, $p = 0.01$, compared to males (29.3%), suggesting that females had greater variety in their modes of training. However, the results showed no significant difference in any training variables between age groups. Our study also showed that masters cyclists undertook minimal training off the bicycle. Kraemer et al. (2001) state that resistance training is believed to increase muscle strength, muscle endurance and sprint performance, which are considered important in improving maximal, endurance and explosive muscle force – the determining factors of the level of performance achieved in sport. Lepers et al. (2012), found that endurance

appears to be maintained until 35–40 years of age, followed by modest decreases until 50, then declining into older age. This is mainly the result of the physiological factors that contribute to age-related declines, which can be regulated by changing the intensity and volume of older endurance athletes' training regimes (Reaburn & Dascombe, 2008).

Our study also shows that masters cyclists use a blend of vigorous training methods, techniques and workouts. With the majority indicating that they engaged in several modes of training, most cyclists believe that varied training plays an important part in cycling performance. However, with a limited number of masters cyclists engaging in strength and speed power training off the bike, it is apparent that most of the training practices taken up by masters cyclists in Australia are based on cycling activities.

This study indicates that the performance levels of masters cyclists are likely to be extended beyond the ordinary competing age. This is mainly boosted by sports-specific training. Sillanpää, Häkkinen, Holviala and Häkkinen (2012) observed that regular physical training is an effective tool in preventing age-related losses in muscle mass, decline in physical and functional performance and several age-related diseases. Modes of training chosen by masters cyclists were able to achieve these goals since they entail gradual and progressive increase in aerobic training; extensive use of resistance and circuit training to develop muscular strength; plyometric training and bounding to develop explosive muscle power; and stretching and the use of active recovery processes.

Another finding of our study is that the modes of training adopted by masters cyclists may differ according to gender. For example, females used endurance training off the bike, while males only used this sparingly. Endurance training off the bike involved events such as running and swimming. According to Etter et al. (2013), an increase in female participation and an improvement in performance has been observed in studies investigating the participation and performance trends of female endurance runners during the last three decades. Another aspect linked to the increase in participation by female triathletes is motivation to win prize money, having fun and staying in good health (Etter et al., 2013).

Apart from being an indicator of gender differences in some modes of training for masters cyclists, this result is also an indicator that women might have greater fatigue resistance than men and that their performances might be equal or better than their male counterparts. This also confirms that there is no increased decline with aging in the longer endurance events for female performers compared to males (Baker & Ta, 2010). In addition, Esteve-Lanao, Foster, Seiler and Lucia (2007) observed that endurance runners spent the majority (71%) of their training time working at low intensities. However, they trained for longer.

The current study also discovered that masters cyclists only undertake limited strength training and speed power training off the bike. This appears to be a gap in the training habits of older cyclists. According to Lepers et al. (Lepers et al., 2012), in terms of the overall time taken, endurance and ultra-endurance performance is maintained until 35–40 years of age, followed by modest decreases until 50, with a progressive decline in performance thereafter, with the greatest declines occurring after 70. This is mainly the result of physiological factors, both central (maximum heart rate; maximum stroke volume; blood volume) and peripheral (muscle mass; muscle fibre composition, size and capillarisation; muscle enzyme activity), which contribute to age-related declines in endurance performance in older athletes. However, these physiological factors can be regulated by changing the intensity and volume of training regimes for older endurance athletes (Reaburn & Dascombe, 2008; Wang, 2008).

Maintaining and enhancing physical and physiological fitness in old age has been identified as an important step towards living better lives (Sillanpää et al., 2012). Quality of life is an aspect of health experienced from the subject's point of view, and could also be expressed as "subjective health" or "functional status and well-being" (Sillanpää et al., 2012). Masters cyclists adopt different modes of training for different reasons including improvement in sports performance, better health and even just for fun (Reaburn & Dascombe, 2008). Improvement in an athlete's quality of life has been shown to result from different modes of training.

Endurance training has also been observed to improve certain dimensions of HRQoL in middle-aged people (Sillanpää et al., 2012). As a result, masters athletes have the opportunity to face the effects of ageing with minimal interference by co-morbidity and sedentarism (Michaelis et al., 2008). However, the lack of organised training modes may encourage masters cyclists to engage in ineffective training practices which could limit these positive effects and, in the worse cases, cause over-training syndrome and affect the individual's health.

While opening the door to further research on masters cyclists, this study has identified the different training modes adopted by masters cyclists in Queensland, Australia. There are indicators that, since masters cyclists often train with little guidance from coaches (Appleby & Dieffenbach, 2016), they may be engaging in unorganised and even detrimental training. Hence the need to focus on developing organised training for masters cyclists, both on and off the bike, with a view to finding ways to optimise masters cyclists' training.

CONCLUSION

The study found that female riders prefer to undertake endurance training off the bike, as compared to males. Our findings also show that the majority of both genders do not undertake strength or power speed training off the bike, and that there is no difference for age. As resistance training has been shown to increase muscle mass and muscular strength, and is also associated with improved endurance performance, masters cyclists may benefit from undertaking increased training off the bike. In light of our findings, it is recommended that coaches and athletes need to scrutinise the different types and modes of training undertaken by masters cyclists in order to improve performance.

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A SUSTAINABLE COMMUNITY DEVELOPMENT PROJECT FOR THE RESIDENT MOTHERS & INFANTS OF TARRAS

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Figure 1: Rural Mothers Matter Too
Source: Authors

INTRODUCTION

As third year nursing learners at Otago Polytechnic, part of the course requirement for our Primary Health clinical placement was to complete a community assessment on the small community of Tarras, Central Otago, Otago, New Zealand. In identifying health needs within this community, we started by conducting an assessment of the area through foot and windshield surveys. Following this, we carried out several interviews with local residents in the region. The learners then identified sexual safety as one of the health needs, investigated health promotion strategies to support recommendations and create resources aiming to improve the safety of the community

COMMUNITY PROFILE

The Tarras community is found between Luggate boundary and Lindis Valley. The terrain itself encompasses the Lindis Pass, Clutha River and head of the Cromwell Basin (Central Otago District Council, 2007). It is located

35 kilometres north of Cromwell on State Highway 8 (Central Otago District Council, 2007). The Tarras area is predominantly made up of agriculture and sheep farms. In recent times several vineyards have been developed in the area (Central Otago District Council, 2007).



Figure 2: Map of Tarras

Source: <https://www.google.co.nz/maps/place/Tarras+9383/@44.8112119,169.3209839,11z/data=!3m1!4b1!4m5!3m4!1s0xa82ac5ab544930c5:0x500ef868479cdf0!8m2!3d-44.8366142!4d169.4128165>

Tarras was named after Tarras Water, who was an early settler arriving from Dumphries, Scotland. Due to Tarras being the core of the local farming district, it has now become a vital stop for tourists to visit due to the Merino Shop. Furthermore the attainable area of Tarras caused by the Lindis irrigation scheme which began in 1920 and still contributing today. In Tarras there is also a goldfield, the Lindis Goldfield. This area was discovered in 1861 by diggers. The Lindis Pass is on the main tourist route, increasing the tourist population of Tarras. Thomson Saddle was a route for Māori travelling from coastal Otago to Wanaka and the mountain passes beyond which lead to the West Coast settlements (Tarras, 2018). The history of the Tarras district has been represented in tapestry. Thirty-seven kneelers have been completed and placed in the Tarras church, as a result of New Zealand Women's Suffrage Committee grant (Gibson, n.d.). Women from the district met once a week during the winters of 1993 and 1994 to discuss and work their tapestries. They are made of Merino wool produced in the Tarras district and all were blocked and completed by Kath Templeton (Gibson, n.d.). Family surnames, and often Christian names were stitched around the perimeter of each kneeler. These kneelers still remain in the Tarras church today, see Figure 2 below.



Figure 3: Tarras Kneelers
Source: Abby Robinson

THE RESIDENTS OF TARRAS

According to the 2013 census there are 17,895 people living in the Central Otago district. Which is a significant increase of 7.5% since the 2006 census (New Zealand Government, 2013). It makes up less than 1% of New Zealand's total population. Within this, 1,299 Māori live in the area, an 11.9% increase since 2006. It is apparent that the community is fast growing. This is an indication of appeal as a place to live and work. Within the year 2016 to 2017, there was a 3% growth in population almost 1% greater than New Zealand as a whole (New Zealand Government, 2013). This population growth was due to net migration of 600 people. The median age that lives in Central Otago is 47 years old. As well as, 21.3% aged 65 years and over (New Zealand Government, 2013). Overall, Central Otago has a greater population of elderly, in comparison to the rest of New Zealand. As well as this it has less young people (0-14 years) of 17.7% (New Zealand Government, 2013). The dependency ratio of people living in Central Otago that are outside of the working age is 69.9% (New Zealand Government, 2013). There are limited recordings on the population of Tarras alone. However, according to Central Otago District Council (2007), there was 231 people recorded to be living in Tarras as of 2006. This is the most up-to-date statistic of the Tarras population. Tarras is focused predominately on its agricultural farming, however two thirds of the community make a living from something other than farming (Central Otago District Council, 2007).

Ethical Approval was granted by Otago Polytechnic Ethics Committee, including Māori consultation with the Kaitohutohu office at Otago Polytechnic.

IDENTIFIED VULNERABLE GROUPS

- Young Mothers with children 0-4 years
- Children years 1-8
- Full time residents in Ardgour Valley
- People vulnerable to needing emergency care
- Elderly (65 years+)
- Youth (16-20 years)

EVIDENCE AND FINDINGS

Out of the potential health needs we identified for the Tarras community, we decided to investigate the potential health issues around mothers with infants/ young children in the Tarras community. It was after a foot survey we completed in Tarras that we noticed a lot of the population were young families. A large number of these young families included first time mothers or mothers with one or more children. We immediately noticed that these mothers were isolated from access to maternal supports. In a large built up township there are numerous permanent supports put in place to meet the health needs of their population. Within these larger townships there is available access to a range of specific supports for expectant, new or struggling mothers. Because of the small population in Tarras and location the access to similar supports is limited. Throughout our literature review we will discuss the closeness of the Tarras community and the non-governmental support they receive within the community. We will then discuss the differences between play group and pre-school and what Plunket is, current supports in place within New Zealand communities and support in rural communities like Tarras.

IMPORTANCE OF A CLOSE-KNIT COMMUNITY

Tarras is an extremely small tight-knit community. This was evident immediately upon investigation. They had a number of community groups in place such as their local rural women's group and local playgroup. These groups meant the community was efficient in providing independent/ non-government support to locals. The effectiveness of these supports was a lot higher in comparison with other rural communities in Central Otago. Small rural townships around Tarras had community groups available, however, not groups that advocated for change or support within their community. These groups in Tarras allow for social support for community members and advocate for necessary societal changes. Social support is known to have a direct relationship on health and well-being (Letzak, 2009). People with high levels of social support experience less stress when in stressful situations and are able to cope with stress more successfully (Letzak, 2009). This is important for young mothers in Tarras. Pregnancy, childbirth and motherhood can be an exceptionally stressful time for females. This stress is heightened by lack of access to correct supports in place for mothers.

The community support in Tarras provides a social support for local mothers. Specifically, the local playgroup. Social support is also an important factor in child and adolescent wellbeing due to poor social support correlating to higher levels of mental illness, poor school performance and delinquency (Letzak, 2009). The closeness of the Tarras community is also effective for the exchange of knowledge and resources between community members. Because of closeness between the community mothers are able to share and receive knowledge and help from a range of members within the community. This is important for mothers as the engagement between community members emphasizes support and decreases possible feelings of loneliness and isolation (Weerts & Sandmann, 2016). These non-government local groups help to meet the needs of their community members. They play a vital role in providing social support for mothers.

The local Rural Women of Tarras offers friendship and support for women of all ages who share an interest in rural groups. They meet monthly and cater for a wide range of interests. Their aim is to build community spirit throughout Tarras. They advocate for Tarras on a New Zealand wide level through interaction with Rural Women New Zealand. The group play a strong role in highlighting societal needs within the Tarras community. Currently there are no services available locally for young mothers in the Tarras community. The support of the community plays a vital role in providing social support for these mothers and their children. However, there is still an evident gap between health services and local Tarras Mums. The Tarras Rural Womens' group could potentially help bridge this gap between these services and local mothers. They can advocate for a two-way approach in which institutions and community members collaborate to develop face-to-face, frequent and local support for young mothers.

PLAYGROUP VS. PRESCHOOL

Tarras is rural community with limited access to health professionals and support. Early childhood education available within this community is a play group but there is no preschool available. Preschools are teacher led services where 50% of the supervising adults must be qualified or registered whereas play groups are parent led services where children are educated and cared for by their parents, caregiver of family (New Zealand Immigration, 2017). The main aim of a playgroup is to provide a learning environment that is suited to the interests and learning needs of individual children as well as providing an opportunity for the parents to gain social support (Ministry of Education, n.d.).

Social support is based upon personal relationships where people feel they are cared and valued through the belonging of a network which is known to have positive effects on health and wellbeing (Hancock, Cunningham, & Lawrence). Social isolated parents involved in playgroups can find this resource useful to help build their social support networks. Consistent attendance at the playgroups can also act as a protective factor against poor social support outcomes (Hancock et al., 2015). The three types of social support include; informational support (the

provision of information or advice), tangible or instrumental support (the provision of aid or services) and emotional support (being able to confide in and rely on others (Hancock et al., 2015). Hancock (2015) study expresses that there has been associations between social connection and engagement and physical and psychological wellbeing. Social support is recognised as an important resource for parents of young children as the transition to parenthood can be challenging with stress, financial changes, new responsibilities and the deprivation of sleep. Social support has many benefits for parents and higher levels of social support are linked to better health outcomes. This includes better health for women pre- and post-natal, lower rates of depression and stress, increased parent self-efficacy and more secure mother-infant attachments (Hancock et al., 2015).



Figure 4: Tarras Play Group Premises
Source: Abby Robinson

Supported playgroups have the focus of increasing well-being and development for both the children and parents. Playgroups allow parents to strengthen their skills, learn about child development, reduce social isolation and build stronger communities. (Stuart, 2016). They also provide an opportunity for families to be linked with other services (Stuart, 2016). Community playgroups are run without the support of a paid facilitator where supported playgroups are facilitated by one or two paid staff with qualifications to engage and support families (Stuart, 2016). Supported playgroups target families experiencing multiple complex needs, or specific populations (e.g., refugee families, Aboriginal families, young parents, or families facing substance abuse or mental health issues) (Stuart, 2016).

Plunket is a national not-for-profit organisation, community-owned and governed who provide a caring, professional well child and family and whānau service. They aim to provide a positive environment to parents and offer access to services for all children and families regardless of ethnicity, location or ability to pay (Plunket, 2018a). Plunket has three strategic goals for the five year strategy to become a modern, relevant and responsive organisation that will be at the heart of supporting the next generation of New Zealanders. The three goals include; Healthy Tamaki, Confident whanau and Connected (Plunket, 2018b). Plunket also offers a toll-free parent helpline advice service called PlunketLine and this is available to all families, whānau and caregivers 24 hours a day, seven days a week. Calls are free from cell phones and landlines on the 0800 number for all parenting advice and help. (Plunket, 2018c). Plunket offers one on one services with the mother and child but this service is not delivered to the Tarras community. Plunket offers a lot more resources and support to mothers than a play group and a resource like this may be a missed opportunity for mothers in the Tarras community.

SUPPORT AVAILABLE TO MOTHERS IN COMMUNITIES THROUGHOUT NEW ZEALAND

In New Zealand it is recognised that mothers do need support with their children within the community. After visiting Tarras our group believes that Tarras as a community does not provide enough of this support for the

mothers and the mothers within Tarras are still undergoing much mental stress. To look into this for the Tarras Community we have decided to look into what New Zealand does as a whole and what support is available for mothers and what health consequences the mother and child might be going through.

Well Child is a first support system that New Zealand offers under the Ministry of Health, this system provides free health checks for children (New Zealand Now, 2018). The Well Child programme provides service for New Zealand children from birth to 5 years old. The schedule of checks are:

1. Birth
2. First week check
3. 2-4 weeks
4. 8-10 weeks
5. 3-4 months
6. 5-7 months
7. 9-12 months
8. 15-18 months
9. 2-3 years
10. 4 years (before school begins)

Well Child helps mothers keep on top of their children's health, their aims being to provide the mothers with knowledge and skills to respond to your child's needs at the different stages of their development, provide reassurance that your child is developing normally, through growth and development assessments, inform parents about immunisations and provide them, support and help you to identify your needs as a parent (The Well Child, 2018).

Many mothers within New Zealand need help mentally after having children, mothers may experience Post-natal depression which is common and affects 1 in 5 women. Post-natal depression leads mothers to feeling anxious and isolated and fearful of how they're coping after birth. Unfortunately, there is no New Zealand organisation that provides care and help for this specifically but within different communities and areas there are organisations such as Wellington. Wellington provided a telephone support line that anyone can use, they also have a helpful website called 'Post & Ante-Natal Distress Support Group Wellington' (PND, 2018).

Well Child and Post and Ante-Natal Distress Support Group Wellington are two big support systems New Zealand provides for mothers struggling after giving birth. Well Child is more for physical health of the child to keep mothers reassured and the support group provides more one on one low cost counselling care for the mother and her mental health.

In rural places such as Tarras, mothers do not receive satisfactory one on one care for their mental health which is why they become so run down. For mothers to access help for themselves in rural communities, the best option is online options. There are multiple online options such as the Post & Ante-Natal Distress Support Group in Wellington but there isn't one on one care available in person.

SUPPORT IN RURAL COMMUNITIES

One in four New Zealanders are situated in rural areas, with a larger amount of vulnerable groups within this group (Ministry of Health, 2011). These groups including: children, older people and Maori people. A priority for the government is to make sure quality services are being offered to people living rurally (Ministry of Health, 2011). There are some services in place to help people in these areas get the most efficient care possible. Including mobile services that can travel from town to town to ensure the residents are looked after: Mobile breast screening, oral health clinics, surgical, and psychiatric outreach are the mobile services that go to some rural areas where they are needed. As well as this, there are in home services such as well child and primary maternity help (Ministry of Health, 2011). However these services are mainly offered to the 'bigger' rural communities, and potentially not to isolated small towns like Tarras. Isolation causes several health issues for people especially vulnerable groups. Access to healthcare is vital for several reasons such as:

- Social, mental and physical health
- Disease prevention
- Diagnosis and management of illnesses
- Quality of life
- Prevention of death
- Expectancy of life

(Rural Health Information, 2017).

IMPLICATIONS FOR MOTHERS, CHILDREN AND COMMUNITY

Implications of geographical isolation for mothers is a significant problem for mothers in rural areas (Mother's Matter, 2016). It can lead to added stress and anxiety, not only mothers who are in poor health, however also if they are fit and well (Mother's Matter, 2016). Women with post-natal depression and/or anxiety disorders have been found that isolation and not enough support causes their existing conditions to worsen while adding other issues into the mix as well (Mother's Matter, 2016). The GP's are often a decent drive away and the practice is often busy or overworked. As well as this, there are limited specialist support such as mental health (Mother's Matter, 2016).

Rural living also has a great impact on children and their wellbeing. There are several constraints for the child that are similar to that of the mother. The lack of accessibility of health services impacts on the child greatly. It is found that children in rural areas are less likely to get regular check-ups from the GP or dentist. This causes several implications for the child's health. As well as this, their mental health may be compromised as rural areas are known to have less after school activities and sport to encourage the children to socialise with peers. Therefore causing isolation and loneliness due to geographical location. From this we used the Ottawa Charter (World Health Organisation, 2018) to build our resources for our health promotion.

HEALTH PROMOTION MESSAGE AND RESOURCES

We decided to target the local and National Plunket association to raise awareness for the rural mothers of Tarras by constructing a Facebook page called:

Rural Mothers@ruralmothersmatteredtoo.

This page was made in an effort to start the process of getting more support to these women in need. A stepping stone platform that will hopefully set off further action from Plunket and any other support we can get. Our aim is to have a designated Plunket nurse to oversee the page who mothers can interact with, ask questions and potentially organise meetings. This is an online forum to have distance support when needed which will hopefully be the bridge for further action.

Alongside this resource we also have two recommendations to address this issue:

1. Introduce face to face support by implicating the visitation from a Plunket nurse once a month minimum to the playgroup to provide education sessions to mothers. During this visit, if possible the Plunket nurse does one to two home visits
2. Allow access to constant communication with the Plunket nurses via the Facebook page we have created that includes the mothers of the Tarras Playgroup.
3. Plunket has three strategic goals for the five-year strategy to become a modern, relevant and responsive organisation that will be at the heart of supporting the next generation of New Zealanders. We believe by increasing support for rural mothers in Tarras, Plunket will be effective in creating a responsive organisation that supports New Zealand in a modern and relevant way. By introducing face-to-face local support through education sessions in the playgroup for the Mothers in Tarras they will feel cared and valued through a network that will have positive effects on their health and wellbeing. By introducing home visits from the Plunket nurse Tarras mothers will receive satisfactory one-to-one care. This is vital for their mental health to ensure they do not become run down and are coping appropriately with motherhood.

Constant access to communicating with a Plunket nurse will ensure the mother is on top of their child's needs such as providing the mother with education and providing the mother with assurance that their children are developing normally through growth and development assessments. It is also important mothers receive information about immunisations for their children which nurses can provide them with (Well Child, 2018). Mothers resort to getting support from online and social media resources in order to compensate for the lack of face to face support. It has been found that 75% of parents use social media as a way of finding parenting related information as well as receiving and giving social support (Duggan, Lenhart, Lampe, & Ellison, 2015). This page would be a stepping-stone for at least getting distance support, which will then ideally lead, onto organising face-to-face support.

CONCLUSION

Our hope is to get the support of the Rural Women of Tarras in order to advocate our findings and recommendations. We believe with the support of your group we can decrease the geographical and social isolation that Mothers in Tarras face. As the population of mothers and young children in Tarras is constantly growing we believe our project will ensure this growth is sufficiently met and the health and well-being of these mothers and their children is optimised.

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Tarras Rural Women

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TEMUKA, SOUTH CANTERBURY, NEW ZEALAND: COMMUNITY ASSESSMENT, NEEDS ANALYSIS AND HEALTH PROMOTION

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INTRODUCTION

This report outlines the community assessment, health interventions and recommendations, and evaluation of the Temuka, South Canterbury area by a group of Year three students from the School of Nursing at Otago Polytechnic, over a three-week period in August, 2018.

The students undertook a community profile of Temuka based on the Community as Partner model (Francis, Chapman, Hoare & Birks, 2013) and the CHASE model developed by Ross, Crawley and Mahoney (2017) to support the student's learning and outcome for this project.

Temuka is a rural town in a river delta surrounded by productive agricultural industry. It is 15 kilometres north of Timaru which is the main city and the rural hub of the South Canterbury region in the South Island of New Zealand as depicted in Figure 1.



Figure 1: Map of Canterbury New Zealand

Source: New Zealand Tour Maps

The town of Temuka is South Canterbury's second largest centre and is situated on State Highway One, 18km north of Timaru and 145km south of Christchurch (Wilson, 1991). It lies on the southern part of the flat alluvial Canterbury Plain near the junction of the Temuka and Ōpihi Rivers (McLintock, 1966). The geographic boundaries of this Community Profile includes the following geographical boundaries encompassing the main township of Temuka, and the settlements of Arowhenua, Georgetown, Ōrakipaoa, and Milford Huts.

The Community-as-Partner Wheel (Anderson & McFarlane, 1996 as cited by Francis, Chapman, Hoare & Birks, 2013) was used as a model to assess the community. This model describes the core of the community surrounded by subsystems which aid in identifying the function together as a 'whole' (Francis, et al, 2013). The eight subsystems of the Community-as-Partner Wheel are: communication, recreation, health and social services, physical environment, transport and safety, economics, education and politics and government (Francis, et al., 2013). These eight subsystems influence each other as they are not clear-cut and can overlap each other (Francis, et al., 2013). The information provided in this community assessment was obtained by the students from a variety of resources including data and information collected from a foot survey of Temuka, secondary information in the public domain, primary information obtained from speaking to community leaders, and personal knowledge of the area.

From this, a needs analysis and SWAT (strengths, weaknesses, opportunities and threats/challenges) analysis was developed to identify the vulnerable groups in the community and identified health needs.

Ethical Approval was granted by Otago Polytechnic Ethics Committee, including Māori consultation with the Kaitiaki office at Otago Polytechnic.

Needs analysis

The needs analysis involved mapping the findings of the Community Wheel, and the interviews with community leaders using the social determinants of health. These are the major factors that circumscribe people's life and health and have been found to be more influential in deciding health status than medical care. The ten social determinants of health are: biological or genetic characteristics; the influence of culture and gender; physical environments and geography; social environments including inclusion and exclusion; education and literacy factors; child health and development; employment and financial status; social support networks, including access for vulnerable groups and volunteer networks; health services and resources, and health practices and services that enhance individuals' coping skills (McMurray & Clendon, 2015).

A strong theme of health literacy-related was identified as a risk in Temuka by the students who defined their target population as a cross-section of the vulnerable groups. Therefore, the target population and unmet need was identified as: *Temuka people who are socio-economically disadvantaged and who lack the health literacy and social connectedness to independently access existing affordable health support services available to them. These include, but are not limited to: elderly, Māori, youth, and those with detected and undetected chronic health conditions.* From this a SWAT was developed to identify the major vulnerable populations and their unmet needs in the community and these are replicated in Table 1 below.

Vulnerable populations	Unmet needs
Elderly without sufficient health status, cognitive ability or quality social networks	25% of the community is aged 65 years and over and so are more vulnerable to illness, complex health conditions and mishaps associated with the aging process. The pending shortage of space in the existing rest home could mean that some of the elderly population will need to move from Temuka to access appropriate care. Although it cannot be assumed, of the 555 single occupied homes in Temuka, there is a reasonable chance that many of these are single elderly people. Many of those in the retired population are on a reduced income.
Māori especially males over 40 with lower health literacy	There are approximately 500 Māori living in Temuka (12% of the Temuka community) and are statistically more prone to certain chronic health conditions such as mental illness and diabetes.
Youth lacking social support and access to appropriate health services, especially failing in the education system.	32% of youth lack formal education qualifications and this may indicate an inadequacy of accessing and comprehending health-related information, diminished income and employment security, less control over life circumstances and fewer life opportunities.

Table 1: Vulnerable groups and unmet needs in Temuka
Source: Authors

Access issues

Access to local and national services and supports and funding entitlements may be denied to vulnerable populations – particularly those who live with chronic health conditions and lack health literacy or awareness of the availability of these services. Other access barriers may include:

- Poor promotion of existing services, ineffective outreach, or diminished self-efficacy;
- Failure of the health system to identify candidates for screening underlying health conditions such as diabetes, cardiovascular disease, peripheral vascular disease;
- A stoic rural attitude (of males in particular);
- Out-of-pocket costs, and the inability to have release time from work for health appointments;
- Inadequate public transportation. The lack of appropriate, available, accessible, acceptable and affordable public transportation raises concerns for the safety of those needing to access local and specialist health care out of the district. Absence of transport also increases the potential for social isolation for those across all age groups who have no way of getting around the town and district.
- The prevalence of health care information and communication with service providers such as Work and Income being digitalised lends to the inaccessibility of needed and sought-after information for many due to inadequate digital literacy.

Needs Analysis

We came up with the following question as an identified health need *Among rurally-based, socio-economically disadvantaged people or those with poor health literacy, does plain English health promotion enhance access to health services?*

It is difficult to analyse the health of rural populations because they constitute some of the richest and poorest of New Zealanders, and averages can therefore distort the true picture for those at greatest risk of experiencing health disparities and inequities (Haynes & Gale, 2000). Living in a rural area can be healthier than living in cities in some respects, even taking deprivation into account. A 2007 analysis comparing the health status of rural and urban New Zealanders found rural populations to be healthier than urban populations overall, although less markedly in rural centres than in “true rural” locations. Chronic conditions such as heart disease, diabetes, asthma, arthritis and osteoporosis are less marked in rural areas than in cities, although rural men have more spinal disorders. Rural people have significant protective factors, including better diet and more activity, and their life expectancies are similar to urban counterparts. Rural people tend to drink and smoke more than urban people, however in deprivation, rural people are more likely to reduce consumption.

Access to health care seems to be a problem for some rural people as they utilise health services less, have barriers to accessing eye treatments, with females taking up less immunisation, and rural males more likely to experience injury and poisoning (Triggs, 2007). Rural doctors (GPs) tend to cost less than their city counterparts. True rural populations are more likely to utilise dental care and seek complementary medicines. Females in rural centres like Temuka are the most likely cohort to use hospitals. Rural people report better health status than their urban counterparts, with better physical functioning and role stability in females, and better general and mental health in males (Triggs, 2007).

While it can be argued that there is some degree of personal choice involved in whether individuals have a poor health risk profile, there is clear evidence that external factors such as environment, opportunity, and community

culture have strong influences particularly when the social determinants of health are considered (McMurray & Clendon, 2015). For example, access to affordable healthy food can often be poor in smaller communities and this, coupled with lower incomes in these areas, adversely affects the quality of peoples' diets, and the prevalence of obesity and chronic disease (National Rural Health Alliance, n.d.). Deprivation can exacerbate the remoteness of rural communities, further reducing their access to these determinants. Health risk factors like smoking, excessive drinking, illicit drug use, lack of physical activity, inadequate fruit and vegetable intake and obesity have powerful influences on health, and Australian researchers have found clear inter-regional differences between the prevalence of these (Australian Institute of Health and Welfare, 2017).

BARRIERS TO ACCESSING HEALTHCARE

Access is seen as a key component of health and is a particular challenge in the provision of rural health services. Levesque, Harris and Russell (2013) define access as the opportunity to identify healthcare needs, to seek healthcare services, to reach, obtain and use health care services, and to have a need for services fulfilled in the form of an improvement in health status. Access is recognised as the successful meeting of health-seeking motivation by patients and their families. A model put forward by Levesque, et al., (2013) suggests there are five junctures at which the health system needs to meet individual's health needs, and five corresponding milestones in patients' health seeking behaviour. These are: care that is *approachable* when the patient has sufficient health literacy, beliefs and trust to perceive a need for care; *acceptable* when the patient has sought culturally safe options for care; *available* when the patient has the mobility, transportation and social support to reach out to the health system; *affordable* when the patient has secured sufficient income to pay for health care; and *appropriate*, when the patient has been able to engage with the system, empowered by good quality information. This should result in better health care outcomes, and the ability for the person to prosper with improved health status.

In a rural context, the availability of health care professionals, and the rural culture exacerbate access issues. Specific concerns include socioeconomic deprivation, geographical barriers and distance, transport, telecommunications, the cost of accessing services, and service acceptability. These isolate communities which frequently have poor levels of internet access, education or digital literacy, and socioeconomic deprivation. Overcoming these barriers leads to greater out-of-pocket costs (National Health Committee, 2010).

Transportation, geographic distance and weather issues can be overcome if the rural patient and their family have access to community supports and rurally-located services such as a local van operator (Brundisini et al., 2013). However, even if rural populations seek out health care, one-quarter of New Zealand rural general practices are unable to recruit the necessary number of GPs and one-third of rural pharmacies have difficulty with recruitment (Lawrenson, Reid, Nixon & Laurenson, 2016). This, coupled with low health literacy, makes rural patients feel more vulnerable. A long-term therapeutic relationship is valued; and urban health models culturally marginalise rural patients, especially if their health literacy is low. This is often mitigated, as the students found in Temuka, by a culture of self-reliance and community belonging (Brundisini et al., 2013).

Reducing rural barriers to healthcare

Community cohesion is a significant protective factor supporting the health of people in rural centres such as Temuka (Brundisini et al., 2013). In partnership with Temuka people, healthcare providers have made significant contributions to the improvement of health status in Temuka residents (as shown in the above community assessment), but this cannot result in systematic improvement without the power to address the social determinants compromising rural patients' health status, which is beyond the scope of practitioners to systematically address (National Advisory Committee on Health and Disability, 1998).

Rural access to primary healthcare remains a priority for policy makers. The National Health Committee (2010) identified that to protect and improve rural New Zealand communities' health, more effective investment is required in:

- linking rural communities with comprehensive primary health care;
- supportive technology (medical and non-medical);
- visiting services and transport support;
- supportive business models based on consistent policies;
- community governance enabling tailored, appropriate solutions;
- increased scopes of practice for practitioners such as nurses;
- flexible, sustainable and efficient contract and funding arrangements.

Inequities in health care

The inequity of provision of health care between urban and rural populations is no secret, and the Ministry of Health [MOH] has responded with free and subsidised services designed to close the gap experienced by rural people (MOH, 2011). For instance, its Services to Improve Access scheme offers funding to reduce inequalities among those populations that are known to have the worst health status – Māori, Pacifica, and those with a high deprivation index (MOH, 2014). Here, the problem with averages may work against the most deprived people of Temuka, as the strict funding criteria and population-based funding may exclude economically disadvantaged rural people if their decile rating is masked by the relatively high-income status of land-owners.

Travel costs for GP visits, outpatient attendance and laboratory tests is a significant cost and deterrent of accessing health services. Distance was the major determinant of costs. Around 8% of those surveyed reported receiving financial assistance such as publicly-funded subsidies to support their transportation costs. For 13% of those surveyed, the out-of-pocket cost of transportation and lost wages to visit a free health practitioner/ publicly-funded service was significant. The risk of under-utilisation and inaccessibility is apparent in feedback to the researchers that these costs were difficult to afford, and to justify (Fearnley, Kerse & Nixon, 2016). The concept of access to healthcare is a complex area that combines patients' attitudes, motivations and capacity for reaching out to health services with the ability of the health services to tailor and make available the right care, at the right time, in the right way. The cost of time and transportation in obtaining healthcare imposes and additional cost burden on Temuka people compared with their wealthier or more urban counterparts, including out-of-pocket expenses for seemingly free health services.

Health literacy or illiteracy!

When it comes to socio-economic, and to a certain extent rural New Zealand, information is power and the absence of adequate information is distinctly disempowering. Health literacy intersects a two-way relationship between the person and the health system. For individuals, it is a function of people's general literacy skills and knowledge, along with psycho-social factors, such as familiarity with the health topic and system, the amount of stress the person is under, the time and resources available to the person, and their confidence, attitudes, values and beliefs. However, navigating the health system requires significant literacy skill. The health system is complex and not intuitive to use, with multiple siloes and its own culture, jargon and hierarchies; processes are confusing; funding criteria are complex; health issues can be complicated, especially in the case of chronic or co-morbid conditions; the health workforce can underestimate the communication skills required, and health resources are

complex and come from multiple sources (Falvo, 2011; Ministry of Health, 2012). Meanwhile, people are required to develop ever-increasing health literacy. People are living longer; with a wider range of health issues, there is a trend towards self-management of chronic health conditions and wellness; and ethically there is an emphasis on autonomy, which translates into self-responsibility for health decisions. The health system is in a state of dynamic change, with exponential increases in the number and complexity of new technologies and the amount of health information available, especially on the internet. The New Zealand population exhibit poor health literacy regardless of employment status, educational achievement or ethnicity with vulnerable populations who often need the most empowering health information typically have poor health literacy skills (Ministry of Health, 2012).

Health promotion needs to be understood as comprehensive care, involving not only the provision of health care services, but also knowledge dissemination and the facilitation of access to these services. There is a place for written material in helping people with literacy issues to make sense of their healthcare needs. For instance, a person's literacy may be low, but this does not necessarily prevent them from reading a document, if it is written in plain, concrete terms and they have time to digest the information. Falvo (2011) describes how a simple pamphlet can provide useful patient education that they can refer to at home.

We created a plain-English health resource providing easy to understand information about affordable existing holistic health and social support services would empower our target population to access health services to which they are entitled. This literature review shows that, among rurally-based, socio-economically disadvantaged people or those with poor health literacy, plain English health promotion resources can enhance access to health services.

HEALTH RESOURCE

Considering the key themes from the analysis above (health literacy challenges, access issues, social isolation, cost and transportation), the students decided to develop a plain-English brochure and poster summarising the affordable holistic health and support services available to Temuka people.

- The poster and brochure feature:
- a magpie, which is a recognisably Temuka mascot;
- a plain English format (Did You Know?");
- short, easy to understand list-form descriptions of the services available;
- a focus on free, cheap and subsidised health support options;
- 'calls to action' explaining exactly how to make use of each service.

The resources features a wide range of free and affordable services in one document, with the underlying message being: *Let us navigate the health system so you don't have to.* It provides a one-stop-shop of key information at the fingertips of the reader; in an approachable style and a format that can be taken away and studied in privacy by the people who receive it. The following distribution strategy was developed;

- Sharing the draft resources at a community meeting;
- Gifting the brochure and poster artwork to the community;

- Encouraging the community to fund the printing of the brochure using philanthropic and/or community grant mechanisms such as the Community Trust grants scheme;
- Recommending brochure distribution via a mass mechanism such as the Temuka Telegraph;
- Placement of the posters on the numerous information boards around the town.

A health promotion strategy was developed for the community's use of the resources using a community nursing intervention to outline the aims, goals, activities, learning outcomes if relevant, timeframe, and resources required for a successful outcome of the resource (Francis, et.al., 2013).

Aim	Goals/ success indicators	Activities
<ul style="list-style-type: none"> • To reduce barriers and inequities in healthcare for vulnerable populations (e.g. the elderly, Māori, youth, those with chronic health conditions and the low socioeconomic population) of the Temuka community. • Empower vulnerable populations with useful, understandable information 	<ul style="list-style-type: none"> • Encourage use of existing free and affordable primary health services • Increase target population's ability to self-manage their healthcare needs by reducing their need to hunt for information regarding their entitlements; • Reduce demand for secondary healthcare services by providing information supporting earlier intervention. 	<ul style="list-style-type: none"> • Find out on these populations' behalf what free and inexpensive health and support services are available • Communicate these in a brochure and poster format (see health promotion marketing plan below) • Encourage the widespread distribution of the brochure and poster in Temuka so that it is easy for the target populations to access

Table 2: Health promotion aims, goals and activities
Source: Authors

EVALUATION

Evaluation occurs after needs have been assessed, a diagnosis or problem definition arrived at, goals and plans established, and implementation put into place (Falvo, 2011). Evaluation measures the degree to which the goals have been achieved.

The aims set out in the students' strategy, with attendant success indicators, were to:

- Reduce barriers and inequities in healthcare for vulnerable populations, measured by increased utilisation of existing free health services;
- Empower vulnerable populations to present earlier with health concerns utilising existing affordable services, with a reduction in demand for secondary healthcare services by providing information supporting earlier intervention.

We identified that it is difficult to measure these indicators in a three-week project. However, they held a consultation session with Temuka community leaders on August 2, 2018, and their response about the value of the process, the project, and the resource was favourable. The verbal feedback received at the time acknowledged the comprehensive nature of the brochure, and its integration of a wide range of health-supporting options and intangibles such as transport.

CONCLUSION

The Temuka community is a resilient, close-knit community with a strong sense of self-determination and inclusiveness. However, some vulnerable sub-populations may be missing out on needed mental and physical healthcare. The reasons for this are complex and relate to the interplay between the health system, and the individuals themselves. The community's strong volunteer network, and its grass-roots health-enhancing services are highly protective of the vulnerable. The areas of greatest risk which we identified came at the intersection of low health literacy, low socio-economic status, and social isolation.

In response to this, the students created an easy-to-digest health resource pointing those people in the direction of existing free services.

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SUSTAINING SEXUAL SAFETY IN OAMARU, NORTH OTAGO, OTAGO, NEW ZEALAND

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INTRODUCTION

As third year nursing learners at Otago Polytechnic, part of the course requirement for our Primary Health placement was to complete a community assessment of South Oamaru. In identifying health needs within this community, we started by conducting an assessment of the area through foot and windshield surveys. Following this, we carried out several interviews with locals in the region. The learners then identified sexual safety as one of the health needs, investigated health promotion strategies to support recommendations and create resources aiming to improve the safety of the community.

South Oamaru is located in the Waitaki District of the Otago Region. Oamaru is situated on the shores of a small bay immediately north of Cape Wanbrow on the coast of North Otago. On the west and south-west, the country rises to rolling downs and, inland about 15–20 miles, to the slopes of the Kakanui Range. Towards the north, the land gradually opens out to terraces and flats of the lower Waitaki Valley. An artificial Harbour, protected by a breakwater extending northward from the bluff of Cape Wanbrow, provides port facilities. The Christchurch-Dunedin Main Highway and the South Island Main Trunk railway pass through the town. There is a branch from Waiareka Junction (2 miles west) to Taylors Siding (about 5 miles north-west), and from Pukeuri Junction (6 miles north-east) to Kurow (37 miles north-west). By road Oamaru is 154 miles southwest of Christchurch (152 miles by rail) and 82 miles north-east of Dunedin (78 miles by rail). Timaru is 53 miles north-east by road or rail (Mckinnon, 2009).

Ethical Approval was granted by Otago Polytechnic Ethics Committee, including Māori consultation with the Kaitohutohu office at Otago Polytechnic.

NEEDS ANALYSIS

From this community assessment, research and consultation, the learners identified four vulnerable groups. These being Māori & Pasifika, young female residents, primary school aged children and young to mid-age adults.

- Māori and Pasifika population tend to have a lower participant rate in early screening for chronic conditions. Meanwhile some of them are not eligible for healthcare. This was identified by a health worker at a medical centre in South Oamaru and a Southern District Health Board (SDHB) representative.
- Young women in South Oamaru were reported to be at greater risk of family violence and sexual violation. This was identified by Police and SDHB representatives.

- The increased use of methamphetamine and other restricted class B drug use is seen in young adults in South Oamaru. This was identified by Police and SDHB representatives.
- The oral health nurse is no longer available in the primary school in South Oamaru due to a decrease in funding. Therefore children must travel to the dentist and parents must take time off work to take them. While it is free for under 18 year olds, some children are not eligible to access free dental care. This was identified by a school member and SDHB representatives.

Lack of access to services and health support was identified by the learners as a common contributing factor for these health needs. Other barriers noticed were; low social status, lack of social support specific to minor ethnicities mostly Māori population, financial hardship, low employment rate, and the lack of information and knowledge about illness.

The learners decided on two health issues to focus on; the first being and chronic conditions specifically focusing on Type 2 Diabetes are the Māori and Pasifika population and sexual violation among young women. This report concentrates on the latter health issue.

Sexual violence

One area for concern within the South Oamaru geographical area is the alarmingly high prevalence of sexual violence within the community. This was identified as a health need from a representative of the local New Zealand Police serving in Oamaru. The legal term for sexual violence in New Zealand is sexual violation, most commonly known as sexual assault. The legal terms will be discussed in more detail in the section below, but can be summarised as any sexual act that is committed in the absence of consent.

Sexual violation in New Zealand

Sexual assault is a significant problem in New Zealand with around one in five women will be subjected to a form of sexual assault within their adult life (NZ Ministry of Justice, 2018). Prior to age 16, one third of girls will have experienced an unwelcomed sexual encounter (Rape Prevention Education, n.d.).

Sexual violence in New Zealand can be categorised into either family sexual violence, or community sexual violence, as illustrated in the Figure 1 above (NZ Ministry of Justice, 2018). The NZ Violence Clearinghouse (NZFVC) 2014 statistics (NZFVC, 2017) identified that 24% of all women in NZ reported being sexually assaulted in their life, compared to 6% of men, and that in 2016 there were 2,708 reported sexual offences made by over 16 year olds. Additionally young people (16-24 years) are statistically at greater risk of being sexually assaulted than other ages groups, with 90% of those assaults are committed by someone known to the victim (Rape Prevention Education, 2011).

This report will be focusing on sexual violence committed in the community by the people known but not in a familial or intimate relationship, for example a neighbour, a friend, or any other non-relative acquaintances and strangers to the victim. While it is acknowledged by the learners that sexual violations can occur between varieties of different people under different contexts, this report will be generally focused on sexual violations committed by male perpetrators towards female victims.

The Sexual Health Clinic located in Dunedin Public Hospital provides services to victims of sexual assault from the wider Oamaru area. Primary data was gathered from an interview with an employee of the SDHB. She identified that most cases of sexual assault were between people known to each other, which fits into the category of people known to the victim other than family. She also identified that intimate partner violence was an issue within this community, however this report will not be focusing on intimate partner violence due to the wider complexities surrounding the issue. Furthermore, it was also identified by the SDHB employee and the Police that alcohol plays a significant role in up to an estimated 80% of cases, which will be discussed in more detail below.

Circumstances

There are many different circumstances of sexual assault that present at the Sexual Health Clinic. Anecdotally the SDHB employee estimated that 80% of the cases are related to alcohol. She described that the most common circumstances described by women are that they wake up after a night out and discover there is a man in their bed. They may not have any recollection of the night particularly if they have been drugged or were 'drugged with alcohol'. 'Drugging with alcohol' is when a person believes they have received more alcohol than they are requested e.g. a double shot instead of a single. This is a common way that people are sexually assaulted under the influence of alcohol.

Underreporting of sexual violation

It is estimated that only around 9% of all sexual violence is reported to police (New Zealand Police, n.d.). Under-reporting to police could be due to the misconceptions around sexual assault. Rape Prevention Education (n.d.) identified the media as a factor influencing the under-reporting of sexual violation. The media often mislead readers with the information they provide which leads to misconceptions within the community. This information can therefore cause victim blaming and attitudes supporting sexual assault within society. This can influence victim's decision making around reporting sexual assault (Rape Prevention Education, n.d.).

Application to the South Oamaru context

Primary data collected during an interview with the Oamaru Police highlighted that the rates of sexual assault are increasing in the Oamaru area. The SDHB employee identified that victims residing in Oamaru comprised approximately one third of all sexual assault cases reported at the Clinic from the region between Balclutha and Oamaru. This is also evidenced by current news articles found in the regional newspaper the Otago Daily Times; for example, an Oamaru doctor was on trial for charges of indecent assault for attempting to have exploitative sexual connection (Otago Daily Times, 2017a). Another example is, an Oamaru man faced charges of multiple indecent assault, and sexual violation by unlawful sexual connection (Otago Daily Times, 2017b).

The largest age group in the population of Oamaru is females aged 15-64 years, therefore this topic is important as it has the potential to affect a significant portion of the Oamaru population (Statistics NZ, 2013). Maori make up 6.7% of the South Oamaru population therefore the learners explored the differences in cultural statistics (Statistics NZ, 2013). Pitman (cited by Pihama, Nana, Cameron, Smith, Reid, Southey, 2016) provides a Maori view of sexual violence that states that Maori consider that rape is a violation of mana, status and dignity for the victim. Any form of violence against Maori women is viewed as extremely serious (Pihama, et.al, 2016). Pasifika make up 2.5% of the South Oamaru population. According to the WHO 2005 New Zealand Violence Against Women Survey, 29.1% of Maori women experienced sexual abuse, compared to 16% of Pakeha women, 4.9 % of Pasifika women and 3.8% in Asian women (Pihama, et.al, 2016). This study shows that sexual violence is identified within each of these ethnicity groups.

The process of reporting sexual assault within Oamaru

The advice given to all victims of sexual assault in Oamaru is that the first step is reporting the incident; if it has just happened call 111, or go to the police station where the victim can request to speak in private. It is encouraged that a support person is present, however a support person who works for Rape Crisis should be available. The victim will be asked for personal details and a brief outline of what happened so the victim can be linked with the best ongoing support. A trained police investigator will complete an initial short interview to ensure the safety of the victim. A specialist sexual assault support person will be assigned to the victim, however, it is the individual's choice whether to accept the support. If wanted, the support person will be available throughout all stages of the investigation. A medical examination is sometimes completed with the purpose of checking any health concerns e.g. STIs or pregnancy and to assist police investigation and forensic evidence if appropriate and only if the victim agrees.

Finally, there is a formal interview conducted by a specialist interviewer which is electronically recorded for future court proceedings (New Zealand Police, n.d.).

There are two sexual assault support centres within the southern region. The first and most accessible to Oamaru is, Rape Crisis Dunedin which aims to empower female survivors of historical, current or ongoing instances of rape and sexual abuse. This service offers free counselling to survivors of sexual abuse, support to friends and whanau of survivors, 24/7 phone support for survivors and their friends and whanau, and provide education to community organisations. It is located at 111 Moray Place, Dunedin, phone 03 474 1592, national 24hour Helpline 0800 883300, email rcrisis@xtra.co.nz, website www.rapecrisisdunedin.org.nz (Rape Prevention Education, 2011). Rape Crisis Dunedin run the following workshops for youth and community groups, sexual harassment prevention, healthy boundaries, supporting survivors, bystander intervention and rape awareness (Rape Crisis Dunedin, n.d.). Further services that offer ongoing support and counselling include, Male Survivors of Sexual Abuse Trust (MSSAT), Otago Psychology & Counselling Support, Safe to talk Sexual Harm Helpline, Shakti New Zealand providing help for Asian, African and Middle Eastern women and children who have experienced sexual abuse, Victim Support and Women's Self Defence Network (Healthpoint, 2018).

The second is Southland Help Rape and Abuse Support Centre in Invercargill. This provides a non-discriminatory, non-judgmental, confidential and free service, offering support, counselling information, advice and education to survivors of rape and sexual violence regardless of circumstances. Although this service is in Invercargill it is still available to support Oamaru victims through phone 03 218 4357, email contact@southlandhelp.nz or through their website www.southlandhelp.nz (Rape Prevention Education, 2011).

The law

Sexual violation is defined as the act of raping a person or having unlawful/non-consensual sexual connection with another person (New Zealand Legislation, 2017). The law is very specific for male on female rape however; is not specific in other circumstances; *"Person A rapes person B if person A has sexual connection with person B, effected by the penetration of person B's genitalia by person A's penis"* unlawfully (New Zealand Legislation, 2017, p. 92). This explicitly states that rape occurs when a male unlawfully penetrates a female's genitalia with his penis. However, the other circumstances e.g. female on male, female on female and male on male are much less specific in regards to criminal offences. New Zealand Legislation states that *'Person A has unlawful sexual connection with person B if person A has sexual connection with person B (a) without person B's consent to the connection; and (b) without believing on reasonable grounds that person B consents to the connection.'* (New Zealand Legislation, 2017, p.92).

Consent as a legal definition

Somewhat frustratingly, the law talks about consent, however it does not give a definition of what consent actually is. It only sets out the circumstances under which a person cannot consent. According to The Crimes Act 1961 the circumstances that are considered non-consensual sexual activity in New Zealand are considered if;

- actual force or the fear of threatened force is used against a person to make them engage in sexual activity, when someone uses coercion to ascertain consent,
- if someone is in a position of power; such as an employer towards an employee, and uses the power to coerce,
- the person is intoxicated, or under the influence of illicit drugs to the point where they cannot make informed decisions around sexual activity. This point in particular is the cause of a lot of misconceptions around alcohol and consent, and will be discussed in more detail in the section below,
- the person has passed out or is asleep,
- the person is under the age of sixteen,

- if someone is so affected by an intellectual, mental, or physical disability that they are unable to refuse sexual activity, and
- the lack of physical force or resistance does not equate to consent (New Zealand Legislation, 2017).

Alcohol and sexual violation

Alcohol is a significant contributing factor and increases the risk of sexual assaults. The alcohol-related harm to others study carried out in New Zealand found that 1% of female and 0.4% of male participants reported a sexual assault in the previous 12 months (Connor; You & Casswell, 2009). Of these, 45% experienced more than one assault. The identified vulnerable populations within this study were; females, those aged 18-25, Māori, those who were single or separated, those who drank more than 6 drinks on one occasion and those who drank more frequently. An astounding 26% of alcohol related sexual assaults occur in bars, pubs and clubs; which was the most common location found in the study. Over 50% of all sexual assaults reported were by offenders who had consumed alcohol. The highest percentage of the incidents in the study were attacks by strangers/non-family members (Connor et al., 2009). These results show the seriousness of the sexual assault problem within New Zealand.

Alcohol and consent

Alcohol related sexual assaults are also much more prevalent because of the inability to consent. Sexual assault isn't always an attack. It can be in circumstances where a woman is being taken advantage of in her intoxicated state, for example at a party, in a bar or club or any other drinking situation. New Zealand law states that a person cannot consent to any sexual activity if they are so affected by alcohol or other drugs that they are unable to provide consent or refuse (New Zealand Legislation, 2017).

Alcohol Induced Amnesia

There are two types of alcohol induced amnesia; en bloc and fragmentary blackouts (Hartzler & Fromme, 2003). En bloc amnesia is the permanent memory loss during a specific time period (Hartzler & Fromme, 2003). Fragmentary blackouts are a form of memory loss that can be reversed with the assistance of triggering cues (Hartzler & Fromme, 2003). The problem with these alcohol associated amnesias is the social problems that occur with them including sexual violation. This can cause distress for the victims knowing that they cannot remember the events of the previous night. Alcohol induced amnesia causes problems with consent and means that further investigation and forensic evidence is required to conclude the events of the blackout period.

Effects on the individual

A victim of sexual assault is likely to experience negative effects on their physical, emotional, mental and spiritual wellbeing. These effects may occur immediately but can sometimes take weeks to years to impact on a victim. A person may experience some or all of the following psychological effects after sexual abuse; fear, anxiety, shock, shame, self-blame, numbness, disbelief, panic, shaking, anger, loneliness, embarrassment, irritability, guilt, powerlessness, loss of control, vulnerability, feeling disconnected, distress and/or confusion (New Zealand Police, 2018). Physical effects after a sexual assault may include but are not limited to, changes in eating patterns, sleeping patterns, eating disorders, fatigue, gastrointestinal irritability, headaches, HIV/AIDS, muscular tension, nightmares, physical injuries, pregnancy, sexually transmitted infections, substance abuse, pain, stress related depression, immune system responses (University of Michigan, 2015). Cognitive effects may include the following feelings and thoughts, confusion, difficulty concentrating, flashbacks, self-blame, trying to forget, thinking they are damaged goods or dirty, scared about what people may think, 'why me?', 'will others reject me?', 'will they blame me?' questions (University of Michigan, 2015). Some social effects may include, difficulty accomplishing tasks, problems with intimacy, difficulty around men or afraid around people that have similar attributes to the perpetrator. Also, discomfort around other people, disruption in

sexual relations, fear of being alone, fear of leaving the house, fear in crowds, hypersensitivity, loss of trust in others, withdrawal from friends and family, relationships and/or hobbies (University of Michigan, 2015).

THE 10 STAGES OF HEALING

Rape crisis describes common processes including the healing process that occurs following a sexual assault and enables the victim to become a survivor. These healing process is described below;

1. The decision to heal - recognise the effects that the event had and make a commitment to heal.
2. The emergency stage - dealing with memories and feelings is upsetting but important to move forward.
3. Remembering - remembering is the process of getting back both memory and feeling.
4. Believing it happened – acknowledging the assault hurts the victim is vital.
5. Breaking the silence - telling another person about what happened is a powerful healing and can help dispel shame.
6. Understanding that it wasn't their fault - survivors must place the blame on their offenders.
7. Making contact with the child within - this can help them feel compassion for themselves and more anger towards the offender.
8. Trusting themselves - learning to trust their own perceptions.
9. Grieving and mourning - grieving is a way to honour pain and move into the present.
10. Anger - directing anger at the perpetrator; and at those who didn't protect, is pivotal to healing (Rape Crisis Dunedin, n.d.).

Resource development

The health promotion resource that was developed by the learners from the primary and secondary data sources were two safety posters that could be displayed in alcohol serving venues in Oamaru. The posters aim to increase awareness and personal safety, and ultimately to decrease the rate of sexual assaults in the community. The reason they will be displayed in bars and pubs is because literature suggests that 26% of sexual violations in New Zealand occur in bars, clubs or pubs (Connor et al., 2009). Also supported by primary data is that approximately 80% of sexual violation cases in New Zealand have alcohol as a significant associated factor in either or both the perpetrator or victim. This can be both related to sexual assault attacks or the lack of consensual sexual intercourse. Both of these matters would be addressed as the woman who is feeling uncomfortable is able to go to the bathroom, remove a tear tag off the poster, give it to the bar tender and be removed from the dangerous situation. This is a discrete way to leave the company of the potential offender without causing alarm.

Adaptation from Angel Shots

When developing the safety posters, reference was taken from the 'Angel Shot' concept used widely throughout bars and clubs in many parts of the world. This concept was developed as a discrete way to keep women safe

when they may be feeling threatened or otherwise unsafe in social situations, such as on a first date or a night out. Women can order a specific angel shot (below) to help the bar staff to identify what help or support the woman needs or wants. The concept being a poster like the one the learners designed, would be displayed in the women's bathrooms, and should a woman order one of these shots, the bar staff would assist her with whatever help she may require.

The 'Angel Shot' idea, as the tear off strip on the safety posters, would act as a discrete way of communication between an unsafe individual and bar staff. This idea was built on for the Oamaru community, and simplified, as the practice of 'Angel Shots' may not be widely recognised within the rural New Zealand setting. Instead of having to remember which 'Angel Shot' to order; if a woman found herself feeling unsafe in a bar or pub in Oamaru, she would simply have to tear off an Angel tag and present it to bar staff, who would then discretely approach her and assist as needed.



Figure 1. Angel shots

Source: Original graphic by Kaylin Burke and Cronkite News (2017)

CONCLUSION: THE 5 A'S

Following a community profile and needs analysis, the student group identified sexual assault of women in South Oamaru as the key need that they wanted to address for this project. They have included a literature review and have designed a health promotion message that can be used in the area. Finally they have applied the 5 A's of primary health care to support this message.

- Accessible - These posters will be accessible in all women's bathrooms of licensed alcohol venues. This gives women the opportunity to remove themselves from a potentially harmful situation.
- Affordability - The posters are very affordable for businesses because it is simply a poster that gets printed out. It

supplies 9 tear off tags before the poster needs to be replaced.

- Acceptability - This concept will be acceptable within the community because of the high rates of sexual assaults in Oamaru. Therefore, this would be welcomed as a safety plan on a night out.
- Availability - These posters would be available for use in all bars, clubs, pubs and other licensed venues in Oamaru. With exposure throughout Oamaru, women will know that there is always a safe option to remove themselves from a potentially dangerous situation.
- Appropriateness - This concept will be appropriate for the differing needs and preferences within the community because of the two different types of posters developed. This means that venues will be able to choose the most appropriate option to their patrons. This is also appropriate to the different ethnicities within the community, because it uses simple words and symbols to convey the point to people who may not use English as their first language. Furthermore, the posters are appropriate for the intoxicated audience because it displays a large font, striking colours, and pictures to portray the message to those who may be otherwise impaired. It is also appropriate for the individual women because it is a discrete way to let someone know that they are not comfortable in their situation and that they need help.

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A HEALTH SUSTAINABILITY PROJECT FOR THE COMMUNITIES OF MILTON OTAGO, NEW ZEALAND

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INTRODUCTION

The following community and health promotion project focuses on the community of Milton in the Tokomairiro district, Otago, New Zealand. The purpose of this project was to create a community profile for these townships based on Anderson and McFarlane's (1996) community wheel, and use these profiles to identify key health needs within this community. Using primary and secondary data collection we have generated a community profile. We then identified health needs within the community and then undertook a literature review relating to these needs. Our last step was to create health promotion resources that can be used to improve the quality of health within this community. The health needs identified and the resources we created are presented in part A and part B in this paper.

MILTON

Milton is in the Tokomairiro district which loosely translates to 'a place where canoe must be poled.' This relates to the vast wetlands that are common in the district. (Milton NZETC, 2016)

Milton is a prosperous town, situated 50 kilometres south-west of Dunedin. Milton dates from the year 1860, when Mr. W. H. Mansford bought half an acre of land and built a store. Previous to this, Mr. Peter McGill's flour mill had been in operation, where the present highly-improved mill stands. Under the impetus of the diggings, Milton made such progress that it was proclaimed an incorporated town in 1866, and a mayor and council were elected (Milton NZETC, 2016).

Milton's early history was strongly affected by the discovery of gold by Gabriel Reid at Gabriel's Gully close to the nearby township of Lawrence. The first European settlers of the Milton began to settle on the eastern side of the Tokomairiro plain building the first township at Fairfax in 1850, now known as Tokoiti. During the gold rush years of 1860's, Milton grew greatly and was a major staging post for prospectors heading to the goldfields. As communication with the goldfields in the interior became more important, and the desirability of the town increased, the town boundaries widened onto the plains around the Tokomairiro river (Milton District, n.d.). The Tokomairiro High school, was founded in 1856, only eight years after the province itself, and was one of the leading schools for many years thereafter.



Figure 1: Milton
Source: Tomas Woodford-Webb

Community Assessment

We undertook a primary and secondary data analysis using the community assessment wheel by Anderson and McFarlane (1996). This tool is used as a guide to undertake our assessment with a focus on health. 1,926 people usually live in Milton. There has been a population increase of 2.1%, since the 2006 Census. Milton has 11.4% of Clutha District's population. There are 798 occupied dwellings and 66 unoccupied dwellings. The median age is 41.7 years, 19.6% of people are aged 65 years and over and 21.5% of people are aged under 15 years.

A healthy community is one in which there are opportunities for people to achieve and maintain a high level of health and wellness. People are supported to make healthy lifestyle choices, have access to good nutrition, young families are supported, children are nurtured, older people are valued and policies are inclusive. The health of a community is multi-dimensional and is a product of empowered people, social inclusion, participation by members in community development, collaborative interaction with healthy physical, social and spiritual environments along with resources and services which are accessible, affordable and equitable (McMurray, & Clendon, 2015). Rural communities face their own unique challenges, some of which impact upon mental health, such as isolation, resilience and family dynamics.

Ethical Approval was granted by Otago Polytechnic Ethics Committee, including Māori consultation with the Kaitohutohu office at Otago Polytechnic.

From this community assessment, research and consultation with professionals in the community, we identified two health needs of vulnerable populations

Identified health needs

Mental well-being in children within the rural community and limited after-hours health care and emergency response in the Milton area. We have separated these two health needs into part A and part B of this paper:

PART A

Identified health need - Mental Health of School Aged Children

These children in Milton are exposed to the physical distance and social isolation that rural communities experience. This is in direct contrast to children who live in urban areas where such disparities are not as relevant.

Mental health is a current health priority for the New Zealand government. The Prime Minister's Youth Mental Health Project is rolling out programmes and activities in schools through health and community services and online to improve the mental health and well-being of young children. SPARX is a self-help e-therapy tool that teaches young people the key skills needed to help combat depression and anxiety through a child-friendly game format. This programme uses proven cognitive behavioural therapy techniques and is a place for whānau and friends to help young people enjoy positive mental health and well-being (Ministry of Health, 2018).

About 25,000 children have been diagnosed with behavioural and emotional problems, with anxiety the fastest growing condition, according to the Ministry of Health children's health report (Ministry of Health, 2017). Among 11-year-olds, there is up to 18% 1-year prevalence of anxiety, rising to 35% - 40% in 18-year-olds. Childhood anxiety commonly precedes adolescent depression and studies comparing anxiety and depression have revealed a common genetic predisposition for these disorders. In the presence of both anxiety and depression, there is an increased risk of developing a comorbid substance disorder (Otago University, 2010).

Mental Health of Primary aged children (Years 1-6)

The Labour-New Zealand First coalition policy announcement wants to address children's mental health and behavioural issues by piloting counsellors in primary schools is an acknowledgement of the difficulties and anxieties children face (Central, 2017). Within Milton Primary School there will soon be a third year counselling student available for the children to access on a weekly basis.

Anxiety is defined as an emotion characterized by feelings of tension, worried thoughts and physical changes. People with anxiety disorders usually have recurring intrusive thoughts or concerns and often accompanied by nervous behaviour (American Psychological Association, n.d.). Anxiety becomes disruptive to children's ability to progress socially, academically or developmentally. Through the use of books children can learn about anxiety, how to speak about it, and how to respond to it. Books can help in effective ways to use stories to support children in their learning about anxiety (Wilson-Hughes, 2017). Books that are specifically written about anxiety or the struggles of anxious characters are designed to help children learn anything that may be missing from their anxiety management. They can help broaden their emotional vocabularies and toolkits without specifically targeting anxiety or focusing on managing particular issues (Wilson-Hughes, 2017). Books are a positive influence in primary schools to normalise anxiety and gently show children that these anxieties are largely unfounded and certainly unhelpful, without being dismissive or condescending. 'Maia and the worry bug' is a New Zealand book and also available in Te Reo Māori that is used throughout New Zealand primary schools. Another option teachers can use is general children's books as prompts for discussion and learning. This is best for learning about particularly sensitive issues about their anxiety and may respond better to a more gentle approach. Whenever a situation arises in a story that the child may have some level of anxiety about, pause, wonder with them about how the character is feeling, and how other characters might feel in their position. Encouraging the child to guess which anxieties lie behind the calm veneers of their heroes may help them have the confidence to own up to their own anxious situations (Wilson-Hughes, 2017).

Childhood stress is an indicator for adulthood stress, and stressful life events have been shown to be related to reduced academic performance among individuals (Napoli, Krech, & Holley, 2005). There has been an increasing incidence of children presenting with anxiety and stress related problems and therefore will continue to rise if early intervention programmes are not implemented. The principal of Milton Primary School identified increasing anxiety among their school children as a growing problem. Anxiety can be detrimental to children's everyday life, at school,

which can slow down their development and have a significant effect on their schooling and relationships (Anguita, 2014).

The principal of the school highlighted that the teachers are in the process of introducing play based learning into their classroom programmes at the beginning of the school day to help children with anxiety settle for the rest of the school day. Play is an important component in normal child development and is a way children develop their social and emotional skills. It is their language, their work and their relaxation (Kids Matter, 2018). Play is a way that children can express themselves and their feelings before or when they do not have the words to say how they feel. It is how they learn and build confidence in themselves (Kids Matter, 2018). Research indicates that programmes in schools that focus on stress reduction, lead to improvements in academic performance, self-esteem, mood, concentration and behavioural problems (Mental Health Foundation, 2012).

While it may be difficult to change a child circumstances that may cause anxiety and behavioural issues, there are interventions that could be implemented in schools, such as mindfulness and sensory modulation that could give these children coping skills and enhance their present and future well-being.

Mindfulness

Mindfulness is an activity that can reduce stress and anxiety. Mindfulness is having the ability to be open, accepting and having an enhanced ability to respond to the present moment (Mental Health Foundation, 2012). Mindfulness allows people to become more aware of their body sensations and the way they are feeling and thinking (Hardy, 2015). Mindfulness can help children make sense of their emotions and their connections to the world and others around them (Mindful NZ Schools, n.d). It helps children regulate difficult emotions such as fear and anger, through breathing and grounding techniques. Mindfulness helps children to understand what another person is thinking or feeling, which helps improve their awareness of others and helps with building positive relationships (Kids Matter, 2018). Mindfulness has a positive effect on the mental health of children as it has been shown to reduce the severity of depression, anxiety and Attention Deficit Hyperactivity Disorder (ADHD). Mindfulness builds resilience by giving children skills to help them cope better with stress, but also helps engage with themselves and the world in a deeper way (Kids Matter, 2018).

Sensory modulation

Sensory modulation is a therapeutic approach that focuses on using a person's senses to promote mental well-being. It involves supporting and guiding people to gain skills in self-management and changing emotional states. It allows people to learn self-soothing techniques and change their current emotional and behavioural responses to a stressful situation (Te Pou, 2016). Sensory modulation is about using sight, smells, sounds and movement. Weighted blankets, music, lighting, essential oils, massage, sour lollies all help engage the senses are commonly used in sensory modulation therapy (Te Pou, 2016).

Although there seems to be limited research about using sensory modulation in school aged children, there is however research that links the effectiveness of sensory modulation as an intervention for mental health disorders. Children who have autism, sensory processing difficulties and ADHD typically respond well to either weight or pressure (Sensory Toy Warehouse, 2018). Deep touch pressure also causes the release of both serotonin and dopamine in the brain. These neurotransmitters produce a feeling of calm within the nervous system which benefits individuals with high levels of anxiety. By helping to calm these individuals, deep touch pressure improves their ability to cope with stress and anxiety, giving them more control over their life (Tjacket, n.d.).

Teachers at Milton Primary school may find it helpful to embed principles of mindfulness and sensory modulation into their play-based learning classroom environments, as it may help not only the mental well-being of children with anxiety, but could have positive effects for every child at school.

RESOURCES WE DEVELOPED TO IMPROVE HEALTH

We decided to develop two resources we hope the Milton Primary School will uptake and implement into their school.

Resource: Stress Lightbulb and Instructions for Use

A printed light bulb stress toy with a simple and easy to understand message (1 2 3 4 5 Breathe) to distribute to the primary school aged children. This is to encourage them to be self-aware when they become anxious or stressed, remind the child to take some initial steps to de-escalate themselves and to seek further support from their teacher. We hope that this will form the basis for acknowledgement and individual mindfulness.




Figure 2: Stress Lightbulb
Source: Authors

RESOURCE: INSTRUCTIONS FOR USING STRESS LIGHTBULB





We will follow this first resource up with a printed document, that summarises effective strategies and pathways the teachers can support the anxious children when they seek further support or if the teacher recognises that a child is becoming distressed. We hope this resource will give the teaching staff a basis to support the children within their classes who do struggle with anxiety.

Instructions for your Lightbulb moment:

- Each child to have their own lightbulb moment!
- Encourage early intervention and prevention of the impact that anxiety has on the individual child and the overall learning environment.
- Encourage the children to acknowledge and recognise their feelings and encourage self-awareness and to begin to build resilience and regulate their emotions.
- The message on the lightbulb is to remind the child to take a moment, count to five and engage in deep breathing whilst having something physically to touch if they feel the need to engage in the sense of touch.
- When using this tool, it will help deescalate children from the overwhelming emotions they are feeling. This will help children to feel empowered and encourage them to seek further support from you as a teacher.



Quick Ways to Calm Down

 Puffer Fish Puff Puff your cheeks like a puffer fish! Fill your cheeks with air and hold for 5 seconds.	 Clam Cuddle Cuddle yourself like a clam. Place your hands on the opposite shoulders and squeeze.	 Turtle Tongue Poke your tongue out like a turtle pokes out its neck. Stick your tongue out and quickly hide it again.	 Starfish Stretch Stretch out like a starfish. Place your arms up over your head and stretch out wide. Stretch your legs out wide too.
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The future is bright

Figure 3: Instructions for using Stress Lightbulb

Source: Authors

PART B

Identified health need-Limited After-hours Health and Emergency Care

Through the primary data collection process we identified that emergency services support in the Milton area was insufficient. Our interviews with the chief fire officer, paramedic and practice nurse all showed that the community was left under-resourced when emergency response was needed elsewhere for acute medical emergencies. Milton is a well-established community with many health resources available. However, the only paramedic in Milton stated he sometimes felt alone and scared when responding to emergencies especially by himself due to being the only fully trained 'first responder' in the community. Others in the Milton community stated that there was a feeling of isolation in the town when the only ambulance was called elsewhere, as it is a timely process for other ambulances to reach Milton. We wanted to explore the research surrounding emergency medical response in rural communities.

Milton has a medical centre which is open from 8am-5.30pm, Monday to Friday with a late night clinic every second Wednesday from 5pm-7pm by appointment only (Health Point, 2018). After-hours care is not available at this clinic. The closest after-hours care is in Balclutha which is a 20 minute drive from Milton (25.2km) via SH1 (Google Maps, 2018). An after-hours service is supported by inpatient medical and nursing staff at Balclutha Hospital (Clutha Health First), allowing access to healthcare 24 hours a day. Patient access for after-hours service is through a triage service by phone. Clutha Health First also runs urgent clinics in the weekends from 9am-6pm, outside of the set week day hours of 8:30am-6pm (Clutha Health First, 2018). The after-hours service also comes at a cost and is a barrier for seeking after-hours care. Aside from this after-hours care can be sought from the Emergency Department at Dunedin Public Hospital, a 40-45 minute drive away.

When talking to the St John paramedic and Chief Volunteer Fire Officer in Milton, we found that there is a St John ambulance service in Milton which is run mostly by volunteers. There is one paramedic and only one ambulance, therefore if the ambulance has been called to an emergency and needs to take someone to Dunedin Hospital, the ambulance will be out of Milton for prolonged periods of time, leaving no ambulance for further emergencies if they arise. The paramedic works from 8am-5pm Monday to Friday. A point to note is that the medical centre is also operating Monday to Friday from 8am-5pm, so from 8am-5pm there is sufficient healthcare but not from 5pm-8am. There is also a fire brigade in Milton. The firefighters are all volunteers and there are approximately 25 members. However, most members work outside of Milton, therefore they may not always be able to make a callout. The volunteer fire brigade are trained in comprehensive first aid but are not trained first responders. The majority of their callouts are motor vehicle accidents and specific medical events such as cardiac arrests and seizures. The most common age groups they are called out to are elderly and children. If the St John ambulance is outside of Milton, the fire brigade sometimes attends the callouts the ambulance would normally go to, and provides first aid and reassurance until further help arrives.

As Milton is considered a "rural" township, funding can be scarce as with other rural areas. WellSouth is the primary health organisation, funded by the Southern District Health Board. It provides healthcare service funding to medical practices and accredited Māori and Pacific Island agencies in Otago and Southland. This includes, the Milton Medical Centre and Clutha Health First. However, not all healthcare costs are funded. For some people, cost may be a barrier for seeking healthcare.

No public transport runs from Milton to Balclutha or Dunedin therefore access may be limited for those people who do not have a personal vehicle. It is a 20 minute drive to Balclutha therefore the cost of travel may be acting as a barrier to accessing after-hours care in Balclutha. As well as this, the emergency department in Dunedin is even further away. This contributes to people not seeking after-hours care.

PRIME stands for 'primary response in medical emergencies'. There is no PRIME nurse or PRIME practitioners in the Milton area (St John New Zealand, 2018). The closest PRIME practitioner is in Outram but this service does

not cover the Milton area as discussed with PRIME National Headquarters. The General Practitioners (GP's) and some of the nurses who work at the medical centre do not live in the Milton township, so this makes it difficult to provide after-hours support.

Barriers to health of rural communities

Due to urbanisation, smaller communities are often disadvantaged, finding it harder to compete for medical, nursing, and specialist services in their community (Clendon & McMurray, 2015). According to Hartley (2004), rural residents tend to smoke more, exercise less, have less nutritional diets, and are more likely to be obese than suburban residents. Clendon and McMurray (2015) add that there is less preventative care such as screening in rural communities due to individual reluctance as well as pressure on health professionals. Bushy (2000), states that the decreased use of health screening may be due to decreased literacy skills, impaired access, as well as the belief about health; that prevention of disease is not important to them if they are still able to work.

Bushy (2000) also suggests that persons living rurally more often seek health care once they become gravely sick or incapacitated. Fraser (2006) concluded that there is a lack of national health data in New Zealand on health needs and health conditions on those living in rural communities.

Rural communities experience barriers to their healthcare due to many factors. Royal Health Information (2017) states that for rural residents to have good healthcare, they must have:

- Finances to pay for service
- Transportation and time off work
- Ability to communicate with healthcare providers
- Ability to use services and trust their privacy
- Have confidence in quality of the care they receive.

Health professionals in rural areas

Access to healthcare services is critical to good health, yet rural residents face a variety of barriers to access services (Ministry of Health NZ, 2011). The biggest single issue facing remote hospitals and rural GP practices in New Zealand is the shortage of medical professionals and this has been the case for many years. There are several factors that contribute to this shortage such as funding shortfalls, decreasing rural populations and the closing of some facilities. In a few rural places, conversely, increased population growth has placed pressure on existing small rural practices (Ochre Recruitment, 2018).

Primary health care is the most basic, and along with emergency services the most vital service needed in rural communities (World Health Organization, 2018). Primary health care providers offer a broad range of services and treat a wide spectrum of medical issues. Primary health care serves as a first entry point into the health system, which can be particularly important for groups such as rural residents and racial/ethnic minorities, who might otherwise face barriers to accessing health care (Ministry of Health, 2001).

Statistics from the Ministry of Health state that one in four New Zealanders live in rural areas or small towns. Also, rural areas have a higher proportion of children and older people living there. Thirty two percent of Māori live in rural areas, compared with twenty three percent of non-Māori (Ministry of Health, 2001). Of particular concern is the significantly poor health conditions of rural Māori compared with urban Māori and rural non-Māori. If we

are to reduce inequalities, it is vital that enough health practitioners with appropriate skills are accessible to rural communities (Ministry of Health, 2001).

An article from Ochre Recruitment suggests that filling New Zealand's rural medical positions remains a constant challenge (Ochre Recruitment, 2018). A survey from Ochre Recruitment also recognised that just over a third of all rural medical jobs in New Zealand were found to be vacant or temporarily filled by locum placements. Most hospital managers disclosed that they struggled to source suitably qualified staff for rural GP positions. While the workforce situation was found to be greatly improved in the 2016 survey, approximately 25% of hospital managers still indicated a serious or critical shortage (Ochre Recruitment, 2018). Health care workforce shortages have an impact on access to care in rural environments. A shortage of health professionals in rural New Zealand also limits access to care by limiting the supply of available services. The Milton Community Medical Centre is staffed by four registered nurses that work part time and two GP's who do not live in the Milton Community. Because the two GP's live in Dunedin and commute to Milton each day, they are not available for after-hours calls. If the GP's were to live in the Milton community, there would be potential for an after-hours on call service that would benefit the community.

Emergency response in rural areas in New Zealand

Emergencies happen all the time, every day, all around the world. There is no cap on health and emergency care. However, a challenge in emergency care is attending to rural areas. This section of the literature review will focus on literature related to emergencies in the rural area, how they are dealt with and what is in place to support rural communities in relation to emergencies. Inequities between urban and rural care are evident across the continuum in rural communities. The distribution of health professionals and research gaps in rural healthcare exist, and act as a barrier to better rural health care (McMurray & Clendon, 2015).

According to a 2017 Stuff article a St John representative stated emergency crews who arrive first at the scene of a tragedy have found that small details can be the difference between life and death when emergency strikes in a rural area. Knowing farm property names and their RAPID numbers when calling 111 could reduce the time it takes for emergency services to reach the scene. It is also important to note if the area is only accessible by 4WD or if there are any landmarks because that this may help pinpoint the location (Taunton, 2017).

It is also encouraged for people living in rural communities to be first aid trained. St John first aid trainer Tracy Sherwood said the organisation was seeing an increase in farm staff receiving first aid training through a range of courses. "You are isolated so it's important that you know what those basic first aid requirements are, especially things like monitoring and maintaining an airway for the fire service or ambulance staff to arrive," she said. A basic first aid course - what they call 'basic life support' - is a morning course from 8am until lunchtime and that could save a life (Taunton, 2017).

It is important for people working in rural healthcare to be well connected with other health professionals like them to maximise the care they give. A great resource for this is the Rural General Practice Network. The network was established in the early 1990's by a small group of rural GP's to provide a support network for their colleagues. The network has grown into a professional organisation with an executive board consisting of rural hospital doctors, GP's, rural nurses and more. The group has an annual conference which enables like-minded practitioners to gather and discuss rural health issues and experiences. Memberships are available for all people working in the rural healthcare sector. This is a valuable resource for healthcare professionals in the rural sector; and may help contribute to positive initiatives related to handling emergencies in rural areas (New Zealand Rural General Practice Network, 2018).

The NZ government is committed to ensuring a safe backbone of acute and emergency services throughout the country. It is an essential requirement of our publicly funded health system. Through the initiative "roadside to bedside" an acute management system is in place to ensure people get "the right care, at the right time, in the right

place, from the right person."The framework for acute management released in 1999 has key elements including: transferring patients with acute health needs to the nearest hospital capable of providing definitive care, ensuring appropriate and timely access to resuscitation and stabilisation services for all emergency patients, ensuring an appropriate emergency transport system and more. It aims at ensuring rural health professionals are supported and well linked into a network of providers. As well as this, they provide rural populations with certainty about their ability to access the most appropriate place of care within the optimal time frame. The PRIME scheme developed from this network is now in place in many rural areas around New Zealand (New Zealand Government, 1999).

Rural areas also rely heavily on volunteers for support. According to a 2017 Volunteering New Zealand report, over 1.4 million New Zealanders volunteer in some form, giving 157 million hours of their time each year (Foxcroft, 2018). Volunteer first responders who live in rural areas often know areas well and are able to reach emergencies faster than emergency services. Thus, this is an important aspect for emergencies in rural communities, especially volunteer firefighters and St John members.

Rural Health Alliance Aotearoa New Zealand (RHAANZ) is however calling for more equitable access to services for rural people. Many rural areas are losing hospitals, emergency services and have under funded health services. With over 600,000 kiwis living rurally, something needs to be done (The Country, 2018). The RHAANZ created a strategy for healthy rural communities from 2014-2017 which included, supporting initiatives designed to improve access to after-hours services in rural areas. The strategy is vital to the whole country as Rural New Zealand is the heart of Aotearoa, it is essential for the economy with the whole nation benefitting when rural communities experience optimal health and well-being (Rural Health Alliance Aotearoa New Zealand, 2014). However, unfortunately in March of 2018 RHAANZ had to cease its operations due to the government's failure to provide the core funding needed; this is a huge loss for the rural community (Rural Health Alliance Aotearoa New Zealand, 2018).

As part of the Budget 2017, Health Minister Jonathan Coleman announced a plan for \$59.2 million in funding over the next four years for the ambulance sector. The funding will go towards introducing 375 new emergency medical and paramedical roles across the country which will bring an end to single crewed ambulances which is often an occurrence. This will save more lives and make it safer for crews. Ambulance providers will continue to work closely with Fire Crews to maximize efficiency and response to emergencies. New legislation in 2017 also created a single fire organisation- Fire and Emergency New Zealand, which brings together New Zealand's urban, rural, paid and volunteer firefighters. Expanding rural healthcare by combining all first responders in an area is something worth looking into, as rural areas in NZ are often a long distance from a main hospital, even with the use of emergency helicopter services. Rural areas need high quality medical and emergency care, if not more than urban areas due to their often isolated areas (Otago Daily Times, 2017).

According to a University of Otago study, official figures estimate that one quarter of New Zealanders live in rural areas or small towns. GPs in these areas spend much of their time providing after-hours care as hospitals are often quite a distance away. There are issues surrounding after-hours care in rural communities due to being understaffed, GPs actually living out of the area, and the ageing GP population. Having to be on call is one of the reasons that GPs choose not to work in rural areas. Barriers to seeking after-hour' for patients care can include distance and cost barrier (Johnson, University of Otago, 2018).

In a study carried out on rural areas in the Canterbury region, the rural population seemed less likely to seek care for medical issues after-hours unless it was an actual medical emergency. An attitude was expressed of not wanting to "waste everyone's time." Telephone services such as Healthline were rarely used, this may be as some people do not know this service exists or how it works. It came up that weekend surgeries in some rural towns could also be beneficial to save trips into cities over the weekend, allowing GPs to see patients with minor issues without having to travel (Johnson, University of Otago, 2018). This information could definitely benefit members in our Milton/ Waiholia community.

Distance to hospital and prognosis

In emergency situations such as trauma and acute medical events, longer travel time is associated with higher mortality rates, therefore it is vital for fast transportation and initiation of treatment (Nicholl, West, Goodacre, & Turner, 2007). A review in Switzerland showed that mortality was increased for all ages regarding acute Myocardial Infarction (MI) with increased distance to a central hospital (Berlin, Panczak, Hasler, & Zwahlen, 2016). The same review showed that mortality was also increased for stroke patients over 65 years of age. In the United States, the time to get to a coronary intervention facility during a cardiac trauma was significantly varied depending upon the location of a patient. The study explained it took on average 5.5 minutes to reach the facility for those in urban environments, 10 minutes for suburban, and an average of 35.9 minutes for those in rural environments (Bates, Wang, Bradley, & Krumholz, 2006). There was also a relationship found in a study by Nallamothu (2006), showing that a person's first MI mortality increases with distance to hospital, as well as increasing mortality after hospital admission. This is due to the fact that early commencement of reperfusion therapy for acute MI improves the patients' survivability.

Prime trained nurses in rural areas

"The Primary Response in Medical Emergencies (PRIME) service is a system that contributes to the best possible outcomes of patients involved in trauma or non-trauma, medical, obstetric or psychiatric emergencies in rural areas. It involves a coordinated response by primary health care practitioners, together with ambulance services, to emergencies in rural areas" (New Zealand Rural General Practice Network Inc, 2006, p.4). An emergency can be defined as "a sudden potentially dangerous, unforeseen injury or illness that constitutes an immediate threat to a person's health or life and requires urgent attention" (Horner, 2008, p. 125). As evidenced previously, timely access to trauma services and swift treatment for all acute medical needs is essential in achieving the best health outcomes for all emergencies that occur out of hospital (Horner, 2008).

PRIME is a joint service, funded by the Ministry of Health and Accident Compensation Corporation (ACC), and administered by St. John. The programme uses rural nurses and GP's to support the St. John ambulance service in a medical emergency where response times may be longer than usual or where more specialised medical skills would help the patient's condition (St. John, 2018). The scheme gives rural people more security about the immediacy, quality and co-ordination of their emergency services, reducing the effects of distance and isolation on health outcomes (Ministry of Health, 1999).

According to Hore, Coster and Bills (2003), prior to the 1993 health reforms, the management of medical emergencies in rural communities was dependent on local solutions through the knowledge and compassion of concerned community members and local health professionals. Due to this, inconsistencies in standards and practices between differing rural communities were highlighted. Issues were identified regarding the inconsistencies in GP training, knowledge and skills (Hore et al., 2003). Therefore, the PRIME scheme was developed for the purpose of consistency and coordinated response to trauma and medical emergencies within the rural community. This scheme has been operational since 1998 in the South Island and 2000 in the North Island (New Zealand Rural General Practice Network Inc, 2006). It includes primary assessment, essential resuscitation, followed by rapid and safe delivery of patients to the appropriate place of care (Hore et al., 2003).

Training comprises of an initial five day course, with two day refresher courses at two year intervals. The course requirement is pass/fail (PRIME Service Review, 2016). The course content includes training for scene management and safety alongside specific skills to manage airways, breathing, circulation, damage to the brain and spinal cord and environmental injuries (Horner, 2008). According to the service review concern was expressed regarding the maintenance of advanced skills that were not often required in clinical practice, claiming the two yearly refresher course was not sufficient (Horner, 2008). During the consultation phase of the PRIME Service Review (2016), it was recognised that some PRIME practitioners would value additional training in between the mandatory refresher

courses. It was not viable for the PRIME programme to facilitate this, however, PRIME practitioners are welcome, through local arrangements to observe on other medical emergencies where they see fit (PRIME Service Review, 2016).

Following the year long review of the PRIME service published in 2016, upon recommendation, a PRIME committee was established in late 2017. Alongside establishing a national committee, other initiatives from the review have already been implemented. These include, employing additional St. John staff to focus on the PRIME programme, introducing a bi-monthly newsletter keeping PRIME practitioners up-to-date with new information and best practice evidence, and the release of a new 'smart device' application to aide PRIME responders in clinical decision making (Health Central NZ, 2018). Other initiatives said to be implemented by July 2018 include a comprehensive plan to ensure all recommendations within the review are met, new health and safety bundles for practitioners (including hard helmets and high visibility jackets), the purchase of automated external defibrillators (AED) (where practices do not have access to these currently), PRIME education material updated, and the implementation of a new funding model (Health Central NZ, 2018).

The 24/7 essential service throughout 75 regions is provided a total of 1.8million in funding every year. Dalton Kelly, the chief executive of the Rural General Practice Network states this funding is not enough to provide even the basics. He states, many PRIME responders drive their own cars to accidents and until recently, many didn't have the appropriate equipment required (Kelly, 2018). He argues that, with the New Zealand tourism industry being as large as it is and being accessed almost exclusively via rural communities, the medical emergencies involving tourists has impacted hugely on our rural health and emergency response services, with very minimal increase in funding (Kelly, 2018).

The PRIME service is fundamental to rural communities where emergency situations can often be scary and isolating for both the patient and the responder. Having highly skilled health professionals to assist the St. John service in pre-hospital acute care in rural communities is incredibly important in improving the health outcomes of those involved in the medical emergency. As there is only one paramedic in the Milton community who works Monday - Friday, 8am - 5pm, the rest of the time being manned by volunteer ambulance officers, it seems pertinent to introduce a PRIME responder who lives in the community to be of assistance during medical emergencies.

Global initiatives for rural acute emergency

Rural isolation is an issue not only occurring in New Zealand, but around the world. Small communities exist internationally who require health care support, therefore global initiatives have been created to bridge the gap between urban and rural health care delivery. World-wide there are organisations being setup to bring safe and practical health care to all parts of the globe, one organisation being World Health Organization (WHO) which is a pivotal point of reference in healthcare. WHO state the aim of delivering health care is to deliver safe, accessible, high quality, people-centred, and integrated care in order to create and maintain universal health coverage (WHO, 2018). WHO collaborate with other organisations to provide care including World Organization of National Colleges (WONCA). This non-for-profit organization was set up through the World Organization of Family Doctors. They indicated that there are problems that are unique to rural communities, so they have set up the WONCA policy. This outlines several strategies that allocate financial resources as well as establishing structural rural health administrations, increasing rural health research, and to highlight issues indicated from rural doctors. New Zealand is set to host the next WONCA conference in 2020 which would be a great opportunity for rural practitioners from communities nationwide to attend (The Royal New Zealand College of General Practitioners, 2017).

A common system used worldwide currently, is the use of health specific phone services. Health line numbers are often used as a first point of contact for those seeking advice. These services are readily available in New Zealand through government agencies such as Health line which is manned 24/7 by registered nurses. They provide health advice and triage symptoms by assessing people over the phone, alongside giving advice about health services

nationwide to over 1000 New Zealanders every day (Ministry of Health, 2018). Australia has a similar telephone advice line, Health Direct, which provides advice in non-emergency situations as well as a service run by general practitioners to bridge the gaps in after-hour services (Health Direct, 2017).

Telehealth or telemedicine is a global initiative that uses a range of technologies to deliver health care to the public. Some countries deliver diagnostic and treatment services using live video conference between health professionals and health consumers or recorded health histories that can be stored and accessed at a later date. Another initiative, Remote Patient Monitoring (RPM) use devices that transmit data back to health professionals who can interpret and organize care without seeing the patient. Mobile health is a service which delivers education via applications that can be used on a smartphone, computers, and tablets (CCHPCA, 2018; Rural Health Information Hub, 2017). Essentially these Telehealth initiatives can bring more health care services to isolated areas as health care professionals including GP's, specialists, registered nurses, physiotherapists and counsellors can provide services remotely to rural areas. Feedback from those who have accessed telehealth services has been positive. A meta-analysis study comparing Australian telehealth with services that are face to face show similar if not better outcomes in some areas (Bogaardt et al., 2018).

Resources we developed

We decided to develop two resources we hope will benefit the community.

Resource 1

A submission regarding the need for a PRIME practitioner in the Milton area. The submission was addressed to Liz Parker (Ministry of Health) Project Manager for the PRIME Service Review. The submission highlighted the after-hours and emergency resources currently in the Milton area, and how a PRIME nurse would benefit the area

Resource 2

We developed an informative poster that is to be displayed at the local Milton Community Hub displaying a map of the Milton area, health and social services that are available, AED locations as well as distances to after-hours emergency facilities in Balclutha and Dunedin. It also has a list of things to have to "be prepared" in relation to healthcare after-hours such as having a first aid kit, pain relief, and numbers to call first before physically seeking care. Hopefully this will help make the community aware of what is available.

CONCLUSION

Milton is a small rural communities with well-established community supports within the working week. In conclusion this literature review has helped us to identify and understand the vulnerability of the Milton community in relation to the lack of after-hours and acute medical emergency services. Literature nationally and internationally has highlighted the need for increased after-hours and emergency medical support to improve the health outcomes of rural populations.

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