

Avoiding the Sports (Med) Specialist: The association between sport specialisation and injury among young people in New Zealand

Oliver W.A. Wilson^a, Justin Richards^{a,b}, Simon Walters^c, Chris Whatman^{c,*}

^a Te Hau Kori, Victoria University of Wellington, New Zealand

^b Sport New Zealand and Ihi Aotearoa, Wellington, New Zealand

^c AUT Sports Research Institute NZ, Auckland University of Technology, Auckland, New Zealand

ABSTRACT

Objectives: To investigate (i) the prevalence of sport specialisation among New Zealand youth and differences based on age, gender and sport, and (ii) the association between specialisation level and injury history.

Design: Cross-sectional.

Setting: Sport NZ's Voice-of-the-Participant online survey.

Participants: 15,334 youth aged 8–17 years, across eight major sports.

Main outcome measures: Demographic data (age, gender, ethnicity), sport participation hours, specialisation level (low, moderate, high), and injury history over the past 12 months.

Results: Overall, 12% of youth were highly specialised, with sport-specific variation (range 3–20%). High specialisation increased with age and was more common in males than females. Relative to low specialisation, the odds of reporting an injury were higher for moderate (OR = 1.25, 95% CI [1.14–1.35]) and high (OR = 1.53, 95% CI [1.36–1.72]) specialisation levels. This trend held across age and gender groups, though the magnitude of association varied by sport.

Conclusion: Sport specialisation is present in NZ young people, increases with age and varies by sport. Findings suggest there is an association between the degree of specialisation and injury history. This association is consistent across age groups and genders but varies across sports.

1. Introduction

A positive sport participation experience can offer active adolescents unique wellbeing benefits (e.g. physical, mental, social) beyond participation in physical activity in general (Wilson, Whatman, Walters, Keung, Enari, Rogers, et al., 2022). However, as children go through adolescence, physical activity and sport participation tend to decrease (Eime et al., 2016), as does sport participation breadth (Jayanthi et al., 2013; Post, Thein-Nissenbaum et al., 2017). Moreover, the association between sport participation and wellbeing varies based on the nature of the experience, and the breadth of participation (Wilson, Whatman, Walters, Keung, Enari, Chiet, et al., 2022). Evidence suggests children participating in a range of sports benefit from greater physical and social development and are less likely to drop out (Waldron et al., 2020). Further, participation in multiple settings (e.g. school, competition, social) and sports is associated with better wellbeing among adolescents, again indicating that participation breadth should be encouraged (Wilson, Whatman, Walters, Keung, Enari, Chiet, et al., 2022).

Sport specialisation has been defined as intentional and focused participation in a single sport for a majority of the year that restricts

opportunities for engagement in other sports and activities (Bell et al., 2021). Evidence suggests that specialisation in a single sport can have a negative impact on wellbeing, in part due to a documented association between the degree of sport specialisation and injury (Bell et al., 2018; Carder et al., 2020; Fabricant et al., 2016; Jayanthi et al., 2019). It is however likely this association differs depending on factors such as the unique demands of different sports, gender, and age group. No association between early sport specialisation and injury history has previously been reported among New Zealand (NZ) youth aged 10–13 years ($n = 914$) recruited from a national school competition with a range of sports (McGowan et al., 2020). In contrast, highly specialised youth in a more recent NZ study were more likely to report a history of overuse injury (but not acute injury) (Zoellner et al., 2022), highlighting there are questions pertaining to sports specialisation in young people in NZ requiring further investigation. Additionally, a recent review concluded there are still similar questions and a lack of empirical evidence internationally (Mosher et al., 2021). It is clear further research is required to ensure the available evidence is best able to inform the wide range of youth sport contexts including difference codes, age groups and geographical locations. The objective of this study was to investigate (i)

* Corresponding author.

E-mail address: chris.whatman@aut.ac.nz (C. Whatman).

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differences in sport specialisation based on age, gender and sport, and (ii) the association between the degree of sport specialisation and injury. In doing so, we aim to generate policy- and practice-relevant insights for the promotion of safe, positive sport participation among young people.

2. Methods

2.1. Participants and procedures

Data were collected as a part of Sport NZ's Voice-of-Participant (VOP) survey in the early 2020s. The VOP survey, conducted annually, is a tool for National Sports Organisations (NSOs) to gain a greater understanding of participant experience including behaviors, attitudes and needs. All NSOs are invited to participate in the survey, which takes place in two waves annually (i.e. summer and winter). Sports that choose to take part are provided with a link to the survey that is distributed through existing club and community communication channels of the participating NSO. Eight NSOs agreed to participate and respondents from these sports have their data included in this study. The full dataset includes responses from children and adults, but the current study focuses on data collected pertaining to children and adolescents aged from 8 to 17 years. Data were self-reported by participants or with the assistance of the participant's parent/guardian (71%), as indicated by the double-barreled nature of items (see details in description of measures below), which were presented to the child or parent/guardian using different phrasing depending on responses. Participants who did not have complete data for all variables of interest in this study were excluded from the analyses ($n = 499$), which was conducted using the results from 15,334 young people. Sensitivity analyses indicated that the degree of specialisation and rates of reported injury did not differ between those who were included and excluded from analyses.

2.2. Measures

Demographic characteristics. age (years), gender (male, female, another gender), and ethnicity.

Injury. Have you/has your child been injured while <playing> or training for <sport> in the last 12 months? Response options were: 'Yes, one injury'; 'Yes, more than one injury'; 'No'; and, 'Can't remember'. Participants were categorised as either having 'no' or 'any' (one or more) injury. Participants with 'Can't remember' responses were excluded. No specific definition for injury was provided.

Specialisation. Specialisation level was rated based on the answers to four questions previously reported by McGowan et al. (2020). In relation to the past 12 months, participants were asked to respond 'Yes', 'No', or 'Don't know' to the following items: (1) 'Is <sport> the sport that is most important to you/your child?'; (2) 'Did you/your child train/compete more than 8 months out of the year in <sport>?'; (3) 'Have you/has your child only ever trained/competed in just <sport>?'; and, (4) 'Have you/Has your child quit all other sports specifically to focus on <sport>?'. Note, the fourth item was only presented to those who responded 'No' to the third item. Responses of 'Yes' were coded as one and other responses as zero, and the four items summed to provide an indication of the level of sport specialisation. The degree of specialisation was categorised based on the sum of responses to these items as: low (0-1), moderate (2), or high (3) (note the maximum score is 3 as a yes answer to the final two questions is not plausible).

Sport participation hours. Participants were asked to report how many hours they participated in their sport on a weekly basis. Participants were categorised into four groups based on the distribution of the data: 0-4 h, 5-8 h; 9-12 h, 13-20 h.

2.3. Analyses

Analyses were conducted using SPSS (Version 28.0). Descriptive statistics were computed to describe the sociodemographic

characteristics of the sample. The following variables were included as predictors and/or covariates in the analyses: age, as a continuous variable; gender, as a dichotomous variable (males, females, with participants identifying as 'another gender' excluded from analyses) ethnicity, as a categorical variable with participants categorised into one of six groups (Māori, Pasifika, Asian, Middle Eastern/Latin American/African (MELAA), European, Other) using methods detailed elsewhere (Wilson, Whatman, Walters, Keung, Enari, Rogers, et al., 2022); and, sport (sport 1 to sport 8). Gender differences in the odds of being categorised as highly specialised were examined using binary logistic regression analyses. The association between the degree of specialisation and any injury were examined using binary logistic regression analyses stratified in an overall model controlling for all covariates, as well as stratified by age group (8-11 years vs. 12-14 years vs. 15-17 years) and sport also controlling for covariates. Prior to performing the logistic regression, checks were performed to ensure assumptions regarding multicollinearity of predictors were not violated. The impact of clustering by school and/or club could not be considered as this data was not available. We calculated 95% confidence intervals (CIs) for all of the reported odds ratios and used these to assess statistical significance (i.e. 95% CIs not crossing 1.0 is equivalent to $p < 0.05$).

3. Results

3.1. Participant characteristics

Participant characteristics are reported in Table 1. The mean age of participants was 11.6 ± 2.5 years. Among all participants, 12.2% were categorised as highly specialised, 28.9% moderately specialised, and 58.9% low specialised. Also, of all participants, 21.0% reported one injury in the last 12 months, and 10.6% multiple injuries. As can be seen in Table 1, results also suggest a trend in the proportion of respondents categorised as highly specialised, participating in large volumes of sport, and reporting one or more injuries each appearing to increase with increasing age.

3.2. Age, gender and high specialisation

Rates of high specialisation increase by more than 10% from the ages of 12 through 14 years, essentially doubling during this two-year span (Fig. 1). Another 5% jump is observed between the ages of 15 and 16 years. A gender difference in the proportion of young people categorised as highly specialised was evident across ages (Fig. 1). Males were found to have higher odds of being categorised as highly specialised (OR = 1.15, 95% CI [1.00-1.32]) compared to females whilst controlling for age, ethnicity, sport, and sport participation hours.

3.3. Association between specialisation and injury

After adjusting for covariates (age, gender, ethnicity, sport, and sport participation hours) the odds of reporting any injury were higher among those with moderate (OR = 1.25, 95% CI [1.14-1.35]) or high (OR = 1.53, 95% CI [1.36-1.72]) levels of specialisation compared to those with low levels (this association was consistent across genders). The odds of reporting any injury were also higher among those who reported participating in their sport for 5-8hrs (OR = 1.29, 95% CI [1.18-1.40]) or 9-12hrs (OR = 1.55, 95% CI [1.34-1.79]) or 13-20hrs (OR = 1.88, 95% CI [1.48-2.38]) compared to those participating in 0-4hrs.

Stratification by age. Findings reported in Table 2 demonstrate that the association between the level of specialisation and any injury is consistently higher with increasing levels of specialisation across age groups whilst controlling for socio-demographic characteristics, sport, and sport participation hours. In each model sport was a significant predictor of injury history ($p < 0.001$), justifying subsequent stratification of analyses by sport.

Stratification by sport. Before reporting on the association between

Table 1
Participant characteristics.

	8-11 years (n = 8025)		12-14 years (n = 5137)		15-17 years (n = 2172)		Total	
	n	%	n	%	n	%	n	%
Gender								
Male	5806	72.3	3329	64.8	1210	55.7	10345	67.5
Female	2219	27.7	1808	35.2	962	44.3	4989	32.5
Ethnicity								
European	4764	59.4	3037	59.1	1243	57.2	9044	59.0
Māori	1615	20.1	1039	20.2	474	21.8	3128	20.4
Pacific Peoples	617	7.7	448	8.7	218	10.0	1283	8.4
Asian	536	6.7	294	5.7	124	5.7	954	6.2
MELAA	278	3.5	163	3.2	77	3.5	518	3.4
Other	215	2.7	156	3.0	36	1.7	407	2.7
Sport participation hours								
0-4 hrs/wk	5852	72.9	2540	49.4	608	28	9000	58.7
5-8 hrs/wk	1837	22.9	1995	38.8	995	45.8	4827	31.5
9-12 hrs/wk	259	3.2	477	9.3	410	18.9	1146	7.5
13-20 hrs/wk	77	1.0	125	2.4	159	7.3	361	2.4
Injury								
None	6371	79.4	3210	62.5	914	42.1	10495	68.4
One	1155	14.4	1293	25.2	766	35.3	3214	21.0
More than 1	499	6.2	634	12.3	492	22.7	1625	10.6
Specialisation level								
Low	5264	65.6	2894	56.3	874	40.2	9032	58.9
Medium	2148	26.8	1540	30.0	744	34.3	4432	28.9
High	613	7.6	703	13.7	554	25.5	1870	12.2

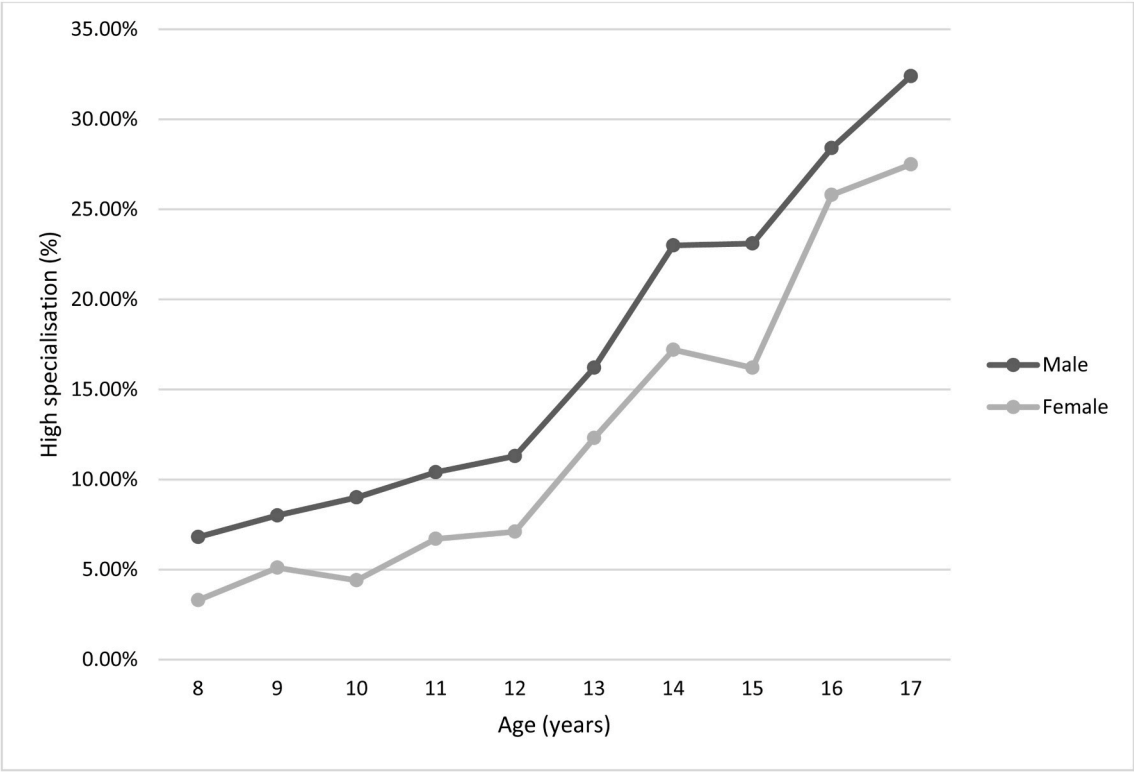


Fig. 1. Age vs. high specialisation.

sport specialisation and reported injuries across sports, it is worth noting that the degree of sport specialisation varied considerably across sports. The proportion of young people considered highly specialised was highest for Sport 1 followed by Sport 7 and Sport 3 for which the proportion of highly specialised young people was greater than 13%. The proportion of young people considered highly specialised ranged from 8 to 10% for Sport 2, Sport 4, and Sport 6. Finally, the proportion

considered highly specialised was lowest for Sport 5 and Sport 8.

The magnitude of the association between level of specialisation and injury history varied by sport (OR range 1.30 to 1.95). Though not all odds ratios were statistically significant, an overall trend indicated higher degrees of specialisation were associated with higher odds of any injury in all sports. This trend was statistically significant for Sport 1 and Sport 3, whereas for Sport 6 and Sport 7 the odds of reporting any injury

Table 2

Association between specialisation and injury stratified by age.

Specialisation level	8-11 years OR (95% CI)	12-14 years OR (95% CI)	15-17 years OR (95% CI)
Low (Referent)			
Mid	1.26 (1.11-1.43)	1.22 (1.06-1.40)	1.31 (1.07-1.61)
High	1.36 (1.11-1.67)	1.57 (1.31-1.89)	1.69 (1.32-2.16)

Note. Controlling for age, gender, ethnicity, sport, and sport participation hours.

were significantly higher only among those with high levels of specialisation compared to those with low levels of specialisation. For the remaining sports (Sport 2, Sport 4, Sport 5, and Sport 8) odds ratios were not statistically significant (Table 3).

4. Discussion

The prevalence of high sport specialisation in NZ young people is greater in males than females, and increases from ~5% at 8 years old, to ~10% at 12 years old, and then >25% at 16 years old. Our findings support previous reports that specialisation increases with age (Post, Thein-Nissenbaum et al., 2017) and, when considering our sample is skewed by the inclusion of a greater proportion of younger participants (approximately 50%), are consistent with those from outside of NZ that report 13% to 38% of children are considered to have a high degree of specialisation (Bell et al., 2016; Jayanthi et al., 2015; McGuine et al., 2017; Pasulka et al., 2017; Post, Bell, et al., 2017; Post, Thein-Nissenbaum et al., 2017). Highly sport specialised NZ young people had 53% higher odds of reporting a history of sport related injury compared to those with a low degree of specialisation, independent of the duration of weekly sport participation. This finding based on a large, nationwide sample, across a range of community sports, adds to our understanding of sport specialisation and aligns with previous studies that used similar methods to categorise specialisation and reported an association between a high degree of specialisation and injury among adolescents (Post, Bell, et al., 2017).

The prevalence of high specialisation among those aged 13 years and under is lower than previously reported in New Zealand (25%) (McGowan et al., 2020). However, previous data were drawn from a national age group sporting competition, whereas the sample in the current study arguably better represents the general population. These findings suggest that sport participation among young people in NZ appears to trend from participation in multiple sports towards a singular sport from the age of 12 years, after which there is a marked increase in the proportion of highly specialised young people. This is concerning as participating in multiple sports has been shown to have wellbeing benefits (Wilson, Whatman, Walters, Keung, Enari, Chiet, et al., 2022) and our results suggest that a higher degree of specialisation is associated with young people reporting a sport related injury.

Though there appears to be an association between sport specialisation and injury in some contexts, the mechanisms underlying this association remain largely unknown (Baker et al., 2021; Mosher et al., 2021). Injuries may increase due to high repetition of sport specific movement patterns and/or compromised development of movement capability alongside the increased intensity and competitive nature of sport experience commonly associated with specialisation (Zoellner et al., 2021). These factors are likely to be influenced by the structures and attitudes that exist within the youth sport system and our results suggest they may be sport specific.

With some exceptions (Post et al., 2020), relatively little has previously been reported concerning differences between sports in the association between sport specialisation and a reported injury among young people. Our findings revealed that the magnitude of this association varied across sports, though it is worth noting that some of the variation is likely a function of sample size and that there was an overall common trend indicative of a positive association between the degree or sport

Table 3
Association between specialisation and injury stratified by sport.

Specialisation level	Sport 1 (n = 4142)		Sport 2 (n = 574)		Sport 3 (n = 954)		Sport 4 (n = 1863)		Sport 5 (n = 2234)		Sport 6 (n = 4369)		Sport 7 (n = 816)		Sport 8 (n = 382)	
	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
Low (Referent)	45.0		69.5		58.0		64.9		70.3		61.5		51.8		84.8	
Mid	35.1	1.37 (1.16-1.61)	22.1	1.38 (0.81-2.35)	29.0	1.78 (1.28-2.47)	26.7	1.16 (0.92-1.46)	22.9	1.22 (0.95-1.56)	28.5	1.13 (0.98-1.31)	33.6	1.10 (0.77-1.57)	12.0	0.60 (0.21-1.67)
High	19.9	1.64 (1.34-2.00)	8.4	1.67 (0.77-3.60)	13.0	1.95 (1.24-3.07)	8.4	1.24 (0.85-1.81)	6.8	1.41 (0.95-2.10)	9.9	1.30 (1.04-1.63)	14.6	1.63 (1.03-2.59)	3.1	3.04 (0.71-13.08)

Note. Controlling for age, gender, ethnicity, and sport participation hours.

specialisation and a reported injury across all sports. In addition, findings also suggest that the degree of sport specialisation varied across sports. Further research is warranted to examine why the strength of the association between injury and degree of specialisation may vary between sports, and to determine if participating in multiple sports with similar movement demands alters this association (e.g. multiple racket sports). It is worth noting that differences in the degree of sport specialisation between sports may be attributable, in part, to variations in the delivery structures, and opportunities to participate in sports year-round (or for more than 8 months of the year). A short competition season has previously been suggested as a factor reducing the prevalence of specialisation in American football (McGuine et al., 2017).

The case against high sport specialisation during adolescence has been laid out previously, with the perceived competitive advantages not eventuating and young people facing a range of potentially negative consequences including increased risk of injury (Feeley et al., 2015). While a degree of specialisation is likely at some point for those wanting to pursue high-level competitive sport, our findings suggest that even specialisation later in adolescence may heighten the odds of injury. Given peak performance is not possible if unhealthy, the performance of athletes in their sport of choice may be aided by diversity of movement experiences/challenges (Jayanthi et al., 2021) breaks from a single sport, cross-training and/or by maintaining a degree of participation in other sports. To facilitate this type of experience we need a youth sport system that prioritises youth health and wellbeing over performance. A recently published evidence-based national framework for the development of young athletes recommends encouraging diversification within sport, delaying early selection and focusing on accessible/-flexible/inclusive skill development with quality coaching (Lundberg et al., 2025). These authors also emphasise the evidence suggests this approach is complementary not contradictory to the development of elite athletes (Lundberg et al., 2025). We acknowledge that with appropriate resources and expertise it is possible to create a healthy environment for young people who are highly specialised, as has been recently suggested (Mosher et al., 2021), however we would argue this is difficult in a community sport setting and the current evidence suggests the risks may outweigh any long-term benefits.

Our study is not without limitations. Firstly, our data included young people recruited via their participation in a select number of largely team sports, and do not include individual sports and recreational activities where New Zealanders commonly experience injuries whilst participating (Accident Compensation Corporation, 2021). Nor are important demographic characteristics such as social deprivation and (dis)ability nor the nature of the respondent (parent/guardian/child) considered in analyses. It is also possible that a participant could be classified as low specialisation for the sport they were recruited via and moderately specialised in another sport. Furthermore, variation in the sample sizes for each sport likely partially explain differences in the statistical significance of some of the reported results. If between-sport comparison is an objective of future studies, it is important to ensure parity in sample recruitment. Additionally, the cross-sectional nature of this study means it is not possible to determine the direction of causation for the associations we have described between specialisation and injury. Although the existing evidence and theory indicates high specialisation may increase injury risk, our results do not preclude reverse causation in some circumstances. Further our analysis treated participation hours as a potential confounder in the association between specialisation and injury (reporting only the independent association) when in fact they may be a mediator of this relationship. However, our approach accounted for participation hours within the context of a cross-sectional study and in the absence of the longitudinal data that would be necessary to conduct an appropriate mediation analyses. Consequently, there is the need for prospective longitudinal studies, investigating specific sports and underlying mechanisms. Further, our measure of injury was relatively crude, in that it did not determine the nature (acute versus overuse) or severity of the injury. A more nuanced

approach to assessing injury history and examining its association with sport participation/specialisation is warranted (although difficult) and may be facilitated by linking different national datasets that comprise high quality relevant data. Finally, while a consensus definition for sport specialisation was recently published (Bell et al., 2021) there is no consensus on assessment methods. We acknowledge, while our rating method has been commonly used, it is focused on physical behaviors and doesn't capture motivational and social behaviors recently shown to be linked to sport specialisation (Nelson et al., 2025).

5. Conclusions

High sport specialisation is present in NZ young people, increasing from 12 years old and particularly among males. Those who are highly specialised were more likely to report a history of sport related injury, but the magnitude of this association varies by sport. Our results lend further support to a balanced approach to sport participation during adolescence and delayed sport specialisation for enhanced youth wellbeing.

CRedit authorship contribution statement

Oliver W.A. Wilson: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation. **Justin Richards:** Writing – review & editing, Methodology, Conceptualization. **Simon Walters:** Writing – review & editing, Methodology, Conceptualization. **Chris Whatman:** Writing – review & editing, Methodology, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Justin Richards is an employee of Sport New Zealand Ihi Aotearoa, but was not involved in the collection or management of the data used in this study.

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