

RELATIONSHIP BETWEEN QUALITY OF LIFE AND RESILIENCE AMONG SPORT-ACTIVE SINGAPOREAN YOUTH

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Abstract. *Purpose:* The study examines the relationship between paediatric quality of life (PEDS QL) and resilience, measured by the Singapore Youth Resilience Scale (SYRESS) among sport-active youth transiting from primary to secondary school education in Singapore. *Method:* The participants were 137 student-athletes aged 12.7 ± 0.3 years, height 156.0 ± 12.9 cm, and body mass 46.4 ± 10.2 kg. PEDS QL and SYRESS questionnaires were administered at the start of the academic year and repeated again six months later. *Results:* Total health (PEDS QL) scores were significantly greater at baseline than when measured six months later (77.3 ± 11.9 vs 72.1 ± 11.8 ; $p < 0.05$) but there was no significant change in the SYRESS score (198.2 ± 25.3 vs 194.0 ± 27.4 ; $p > 0.05$). Total health in PEDS QL was significantly correlated to SYRESS scores at both time points (Baseline $r_s = 0.61$, $p < 0.01$; baseline plus 6 months $r_s = 0.58$, $p < 0.01$). *Conclusions:* The results reflect a linkage between student's resilience and Peds QL outcomes. Student-athletes perceived the transition from primary to secondary school to be a difficult period and sport-active youth are a unique population compared to normal school going youth.

Keywords: Quality of life, Resilience, sport-active youth, Singapore, secondary school transition.

Introduction

After six years of compulsory primary schooling (Primary 1-6), beginning at age 6, Singaporean children transit to a secondary school education (Secondary 1-4 or 5), on the merit of nationalised examination results for another four to five years. In terms of academic coverage of subjects, there is a significant increase from 4 to 9 academic examinable subjects in the transition from Primary 6 to Secondary 1. Additionally, in secondary school, youths are exposed to many different sports, where they are encouraged to enrol in 'after-school' co-curricular activities (CCA). CCAs complement the academic curriculum and contribute to students' holistic development. Participation in organized sports is a popular mechanism of achieving adolescent physical activity. It also brings about many health-related benefits which includes physical and psychosocial benefits (Côté, Strachan, & Fraser-Thomas, 2008). Recent statistics from the National Youth Council revealed that regular participation (1 to 2 times a week) of Singaporean youth aged 13 to 10 is at 64.8% which represents an increase from previous years (NYC, 2012).

The period of transition from primary to secondary school is believed to pose challenges or threats to adolescent well-being and quality of life (Seidman, Allen, Aber, Mitchell, & Feinman, 1994; Sirsch, 2003; Zeedyk et al., 2003). In a new environment, adjustments to social, academic and sporting factors would have to be made. Examples of such adjustments include an increase in disciplinary rules and regulations, an increase in opportunities to pursue different sport and activities, new teachers and coaches to interact with and also a new set of school peers (Seidman et al., 1994). In the Singaporean context, there is also an increase in academic workload from four to up to nine examinable subjects. Failure to successfully navigate and cope with it might have an impact on their well-being, mental health and also academic performance (Zeedyk et al., 2003). With changes and transition coming in quickly, there are always added challenges during this developmental adolescent phase both in the academic environment and also in sport competition. It is also in this period that quality of life (QoL) across several domains are affected (Seidman et al., 1994; Sirsch, 2003). QoL assesses an individual's perceptions of their position in life, in the context of the culture and value systems in which they live, in relation to their goals, expectations, standards and concerns. A Singaporean-based study on local primary schools pupils showed that increased school-based physical activity over a 40-week period improved the quality of life of students (Chia, Mukherjee, Nasrun., & Lim, 2013). On the other hand, adolescent athletes that are active in sport participation in inter-school or club sport reported better quality of life (QOL) compared to healthy individuals who do not participate in sport (Lam, Valier, Bay, & McLeod, 2013; Snyder et al., 2010).

Even though it may be logical to classify athletes as members of a healthy adolescent population, there is evidence, which show that athletes are a special and unique population where adolescent athletes scored better overall QoL than their non-athlete counterparts as well as enhanced mental, emotional and social health. Male adolescent athletes also have significantly higher scores compared to female adolescent athletes (Lam et al., 2013; Snyder et al., 2010). This suggests that sport and physical activities can be used as a means of improving the quality of life. Additionally youths who engage in sport on a regular basis should be treated as a different population group.

Sex differences in health outcomes on physical and psychological factors in early to mid-adolescence are documented (Sweeting & West, 2003). Regardless of the instrumentation used to measured health outcomes such as QoL, research shows that female participants usually score lower on the emotional scale rating (Jörngården, Wettergen, & von Essen, 2006; Reinfjell, Diseth, Veenstra, & Vikan, 2006; Upton et al., 2005). A Singaporean-based study on youths also supported the results seen in these Western populations (Yeo, Ang, Chong, & Huan, 2007). However, Yeo et al. (2009) reported that female adolescent reported higher positive adjustment towards school life and better interpersonal relationships compared to their male counterparts. The difference in emotional distress could be explained by gender role expectations in which femininity is associated with an expression of emotions, whereas masculinity is

associated with active problem solving and a suppression of emotions (Ptacek, Smith, & Dodge, 1994). These male-female dispositions explain the difference in attitudes towards handling events and situations between genders. Furthermore, female participants tend to perceive stressful events more extremely than male participants, either positively or negatively and hence they respond differently to their emotional states (Newcomb, Huba, & Bentler, 1986).

Improving and developing the resilience of individuals are important for improving the well-being of youths. A key requirement of resilience is the presence of both risks, and factors that promote a positive outcome or reduce and avoid a negative outcome (Fergus & Zimmerman, 2005). In the context of the present study, the risk faced by participants is the transition from primary to secondary school while the positive outcomes are seemingly the holistic development of youths through the participation in school CCAs. A measurement of the outcome of resilience could indicate a positive adjustment (e.g. transition) as showed by a healthy development (e.g. quality of life). Having a high resilience would enable one to cope with change or stressors when the need arises (Davydov, Stewart, Ritchie, & Chaudieu, 2010). In the Singaporean context, the relationship between resilience and quality of life remains unknown.

Purpose, tasks of the work, material and methods

The aim of this study was to investigate and track the quality of life and resilience of sport-active youths within an academic year, following the transition from primary to secondary school. Secondly, it was to examine the relationship between quality of life and resilience in adolescence.

Method

Participants

The participants were Secondary 1 student-athlete intakes, via a convenience sampling approach recruited from two local secondary schools in the new academic year. Student-athletes are youths enrolled in the schools' sports team or sports core-curriculum (CCA). The students and parents were briefed about the research study and were allowed to opt out of the study if they did not wish to participate. Student and parents' assent and consent were obtained prior to participation in the study. Institutional ethics clearance for the study was sought and granted (IRB 12/04/17).

Conduct of the research

The study was conducted in a physical education setting where participants were monitored in two stages, six months apart within one academic year. The questionnaires were administered by the researcher in the presence of the physical education (PE) teacher before the start of their PE class or sport training. Students answered the questionnaire in a quiet classroom or in the multi-purpose hall of the school. For both occasions when the questionnaires were administered, the measurement conditions were the same- that is they were obtained at the same time of the day, and on same day of the week for both baseline and follow-up measurements.

The baseline data collection was conducted at the start of the academic semester at the beginning of the year where a total of 153 students were enrolled. Complete data from 151 students (compliance 98.7%) were used for the analysis of the baseline results. In the follow-up data collection, 10 students did not complete the follow-up and after adjusting for incomplete answers, a total of 137 (82 males, 55 females) matched pairs with complete data were used for the subsequent baseline-follow up analyses. Missing data were due to an absence from PE, or a failure to turn up on the test date or having incomplete questionnaire responses.

Measures

Health related quality of life (HRQOL) was measured by the PedsQL 4.0 (Pediatric Quality of Life Inventory Version 4.0). The PedsQL 4.0 is valid and reliable (Varni, Seid, & Kurtin, 2001) and were used in Singaporean school contexts (Østbye, Malhotra, Wong, Tan, & Saw, 2010). The PedsQL 4.0 is a 23-item questionnaire with Generic Scales that are designed to measure the core dimensions of health as delineated by World Health Organisation. The questionnaire takes less than 5 minutes to complete and covered four domains: physical (8 items), emotional (8 items), social functioning (5 items), and school functioning (8-items). The instructions enquire about how much of a problem each item has been during the last month. The items are reverse-scored and linearly transformed to a 0–100 scale (0=100, 1=75, 2=50, 3=25, 4=0), so that higher scores indicate better HRQOL. A total scale score is derived by the mean of all 23 items, which provides an overall measure of the HRQOL.

Resilience was measured by the Singapore Youth Resilience Scale (SYRESS) (Lim, Broekman, Wong, Wong, & Ng, 2007). The SYRESS is a self-rating scale of 50 questions that requires the respondent to indicate how much he/she agrees with each statement on a 5-point Likert scale ranging from "never" (1) to "always" (5). Scores range from 50 to 250 with higher scores denoting higher resilience. Anthropometric measurements are provided by the physical education teachers where measurements are taken yearly during PE class. BMI is derived from using the height and weight by the formula - $\text{Weight (kg)} / [\text{Height (m)} \times \text{Height (m)}]$. Weight status is interpreted by the guidelines by the health promotion board (HPB, 2002).

Statistical Analyses

The mean score data are presented as mean \pm SD. Data are separated into male and female. Gender differences are compared using independent-sample *t* test. Baseline and follow-up scores were compared using paired sampled *t* test with effect sizes (Cohen'd). The following criteria were adopted for interpreting the magnitude of change: 0.2 (small), 0.5 (moderate), and 0.8 (high). Associations between variables (PEDsQL and SYRESS) were assessed using Pearson's product-moment correlation coefficients and linear regression analysis. Statistical significance was accepted at $p < 0.05$.

Results

Participants

A total of 153 student athletes participated in the studies after parental consent. After adjusting for incomplete answers and matched pair samples of both baseline and follow-up measurements, a total of 137 (82 males, 55 females) paired-sample data were used for the analysis. To evaluate dropout bias, those data set dropped, were compared with the data set used for the analysis. There were no significant differences for mean PEDsQL scores ($p=0.40-0.96$) and no significant difference for mean SYRESS scores ($p=0.12-0.16$). The mean ages of the students were 12.7 ± 0.3 years; male 12.6 ± 0.3 years, and female 12.7 ± 0.3 years. Overall mean height was 156.0 ± 12.9 cm; male 155.5 ± 10.0 cm and female 156.8 ± 16.5 cm. Overall mean weight were 46.4 ± 10.2 kg; male 44.7 ± 10.3 kg, female 49.1 ± 9.5 kg. BMI-for-age for both genders was classified with the percentile chart by MOH. There are 7 (5.1%) severely underweight; 2 (1.5%) underweight; 121 (88.3%) acceptable weight; 6 (4.4%) overweight; and 1 (0.7%) severely overweight. Ranges of sports included were both individual based sports and team-based sports (track and field, netball, badminton, soccer and swimming).

Paediatric Quality of life & SYRESS

Descriptive statistics of PEDsQL are presented in Table 1. There is a gender difference in physical health. Male participants scored significantly higher than female participants in physical health both ($p<0.05$) at baseline and follow up time points. Male participants also scored significantly higher than female participants in SYRESS at follow up measurement ($p<0.05$).

Table 1:

Mean scores of PEDsQL of male and female participants at baseline and follow-up

Variables	Overall (N=137)		Male (n=82)		Female (n=55)		t	df	P value
	M	SD	M	SD	M	SD			
Physical health	79.9	11.4	81.8	10.7	77.0	11.9	2.43	135	0.02*
Emotional health	76.6	17.9	77.7	18.4	75.1	17.0	0.82	135	0.42
Social health	78.8	16.2	79.5	16.3	77.7	16.3	0.65	135	0.52
School Function	71.4	16.9	70.7	18.5	72.4	14.2	-0.57	135	0.57
Psychosocial health	75.8	14.4	76.0	14.6	75.1	14.1	0.35	135	0.73
Total health	77.3	11.9	78.1	11.9	76.0	11.9	0.98	135	0.33
SYRESS	198.2	25.3	200.6	25.6	199.5	25.4	1.37	135	0.17
Follow-up Scores									
Physical health	82.6	11.9	84.5	11.2	79.1	11.6	2.46	135	0.02*
Emotional health	70.9	18.1	71.8	19.8	69.7	15.3	0.68	132.16	0.50
Social health	77.3	16.8	77.3	18.2	77.3	14.5	-0.01	131.18	0.99
School Function	67.3	17.5	67.1	19.4	67.6	14.3	-0.20	133.62	0.85
Psychosocial health	66.5	13.9	66.8	15.8	66.2	10.6	0.27	135	0.79
Total health	72.1	11.8	72.9	13.2	70.8	9.1	1.11	134.90	0.27
SYRESS	194.0	27.4	194.6	24.6	185.6 ±	28.3	3.00	135	<0.05*

^aPsychosocial health is the mean of the sum of emotional and social health and school functioning,

^bTotal Health is the mean of the sum of Physical And Psychosocial

*Sex difference is significant at $p<0.05$

Differences between baseline and follow-up PEDs & SYRESS scores

The magnitude of change from baseline to follow-up measurements for the PEDsQL and SYRESS is presented in Table 2. Figure 1 shows the differences in PEDsQL and SYRESS at baseline and follow-up measurements. Follow up physical health scores were significantly greater than at baseline measurement ($M=-2.7$, $SD=12.1$), $t(136)=-2.6$, $p<0.05$. Follow up measurement of emotional health was significantly less than at baseline measurement ($M=5.7$, $SD=16.1$), $t(136)=4.1$, $p<0.05$. There was no difference ($p>0.05$) in baseline and follow up social health scores. Follow up school functioning was significantly lower than at baseline measurement ($M=4.1$, $SD=17.9$), $t(136)=2.7$, $p<0.05$. Follow up psychosocial health was significantly lower than at baseline measurement ($M=9.1$, $SD=12.4$), $t(136)=8.6$, $p<0.05$. Follow up total health was significantly lower than at baseline measurement ($M=5.2$, $SD=10.0$), $t(136)=6.1$, $p<0.05$.

Table 2

Magnitude of change in PEDs QL and SYRESS from baseline to follow-up measurement

Variables	Baseline		Follow-Up		Change (%)	t	df	p	Cohen's d
	M	SD	M	SD					
Physical health	79.9	11.4	82.6	11.9	+2.7	-2.62	136	0.01*	0.23
Emotional health	76.6	17.9	70.9	18.1	-5.7	4.13	136	<0.05**	-0.32
Social health	78.8	16.2	77.3	16.8	-1.5	1.01	136	0.32	-0.09
School Function	71.4	16.9	67.3	17.5	-4.1	2.67	136	<0.05**	-0.24
Psychosocial health	75.8	14.4	66.5	13.9	-9.3	8.59	136	<0.05**	-0.66
Total health	77.3	11.9	72.1	11.8	-5.2	6.07	136	<0.05**	-0.44
SYRESS	198.2	25.3	194.0	27.4	-4.2	1.87	136	0.06	-0.16

*Follow-up scores are significantly higher, **Baseline scores are significantly higher

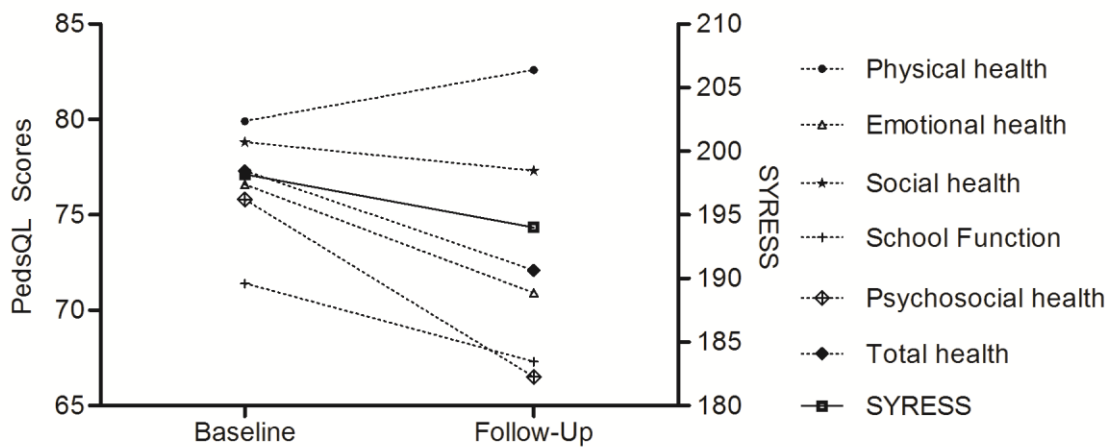


Figure 1. Changes in PEDs QL and SYRESS between baseline and follow-up. Follow-up PEDS QL scores for emotional, psychosocial and total health are significantly lower than at baseline ($p < 0.05$). Follow-up scores of physical health are significantly higher than at baseline ($p < 0.05$)

Relationship between PEDsQL and SYRESS

The association between PEDsQL and SYRESS is presented in Table 3. The PEDsQL sub-scale scores have moderate correlations with SYRESS (range 0.42-0.61) and are significant at $p < 0.05$. Linear regression analysis showed SYRESS to be a significant predictor for PEDsQL at both baseline ($\beta = 0.60$, $p < 0.05$), follow up ($\beta = 0.51$, $p < 0.05$) measurements with an explained variance of 36.2% and 26.3% respectively (Figure 2).

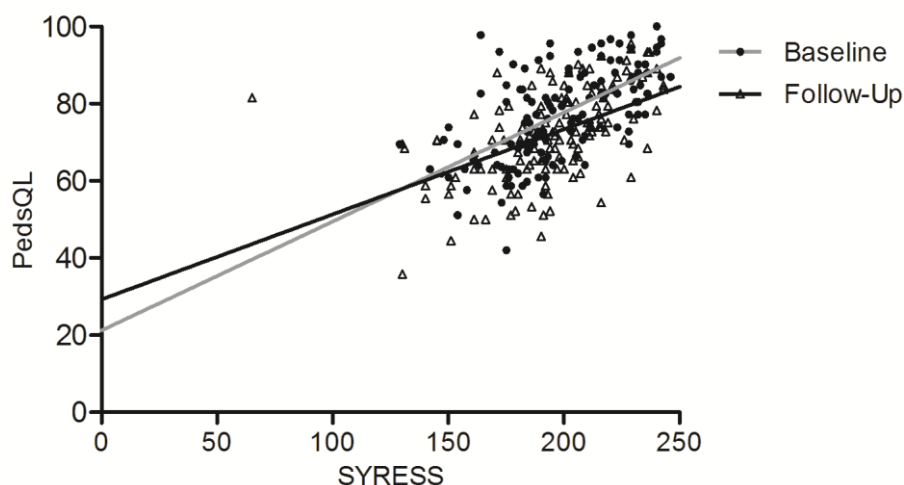


Figure 2. Spearman correlation between PedsQL and SYRESS at baseline and follow-up. The PedsQL-SYRESS relationship at baseline is described by the linear equation ($Y=21.27 + 0.28x$; $R^2= 0.36$, 95% CI (0.22-0.35) and the PedsQL-SYRESS relationship at follow-up is described by the linear equation ($Y=29.31 + 0.22x$; $R^2=0.26$, 95% CI (0.16 – 0.28).

Discussion

The objectives of the research were (i) to elucidate the quality of life of sport-active Singaporean youth in the transition from primary to secondary school and (ii) to examine the relationship between youth resilience and the quality of life of Singaporean youth.

Impact of school transition on quality of life

The transition from primary to secondary school is an important milestone for Singaporean children and their parents. An important finding of the present study was a lower PedsQL score in all aspects, except for physical health of quality of life scores when compared to scores reported for healthy adolescents from Western countries of a similar age group (Varni, Limbers, & Burwinkle, 2007). PedsQL (total health scores) at baseline and six months later were also lower when compared to scores for a wider age range group (age 11-18; $N=1249$) of Singaporean youths (Østbye et al., 2010). The differences between the two Singapore-based studies could be attributed to sample-specific differences (i.e. sample size and age-range) between the two studies.

Managing new peer relationships, increased workload of school and new school routines are among the common worries experienced by students who transit from primary to secondary school (Zeedyk et al., 2003), and a combination of these factors may help to explain the lower scores experienced by Singaporean youths at the beginning of the school year, only to be exacerbated six months later. Only physical health improved significantly over the same time period, more so in male, than in female youths. Sports-active youths in Singapore perceived their daily life to be difficult during this stage of transition from primary to secondary school, and it appears more so for female, than for male youths. The lower quality of life especially for emotional health reported by female adolescents in the present study is well supported by others (e.g. Upton et al., 2005; Yeo et al., 2007).

The present results are in agreement to those reported by others, albeit in an older age group of students. Varni and Limbers (2009) reported on the quality of life of new undergraduate students in the first year of university life where emotional and school functioning scores were distinctively lower compared to other sub-scale measures of quality of life. In the present study, the competing demands of school adjustment, coping with increased academic workload (primary-to-secondary school transition- an increase from four to eight examinable subjects) and coping with sport training and competition, continue to exacerbate the quality of life (social, emotional, psychosocial, school functioning), six months into the new school year. This is indicative that six months is still insufficient for sport-active youth to adjust to life as the quality of life (except for physical functioning) continues to drop.

In the present study, physical functioning scores improved over the six month period and this could be attributed to the participation and training in sport CCAs and also to the physical growth and maturation of the male adolescents in particular. Physical activity engagement and physical conditioning in sport, especially in a period of growth and muscle development (especially for male adolescents) contribute to one's physical ability and health such as improved fitness and strength. Furthermore, engagement in sport competition would bring about further gains due to a higher motivation in competing against or among peers in sport competition.

An unexpected finding in the present research was that the sport-active youth reported lower overall quality of life outcomes than one would expect. In the extant literature, sport-active youths are reported to have significantly greater quality of life, especially for emotional health compared to the general non-athletic population of youths, with female athletes reporting significantly higher social health compared to male athletes, and also higher social health than

non-athletic female youths (Lam et al., 2013; Snyder et al., 2010). The reasons for this difference are not readily apparent, however, it is plausible that sport achievement is considered less important than academic achievement among Singaporean youth compared to the social contexts of other studies, especially when the results emanate from Western contexts. These assertions need to be further examined in future research. Nonetheless, it is apparent that sports-active Singaporean youth are a distinct population on its own, which is different from the general youth population and future research should take this into consideration.

Resilience of youth

The resilience score measured by SYRESS showed a comparable score compared to a healthy adolescent group (Lim et al., 2007). This confirms that there are no differences in terms of resilience between sports-active and healthy adolescent populations. The follow-up scores from baseline values decreased slightly but the decrease did not attain statistical significance. The result affirms that resilience in adolescent is fairly stable and that the mental attributes associated with an individual's resilience remain the same throughout the year despite a decrease in the perception of quality of life. This assertion is supported by research conducted by Masten et al (1999), who reported that resilience is relatively stable over an individual's lifetime. As not all individuals exposed to stressors experience negative psychological effects, the stable resilience scores in the present study indicate that Singaporean adolescents are able to cope with the new stressors brought about by the primary-to-secondary school transition period.

The use of the SYRESS is a useful gauge of the perceived resilience of students and this can help teachers or coaches to monitor the students' perceived resilience rather than using the traditional approach like observing students' behaviour, thereby avoiding observer bias and allow for objective monitoring and tracking over time.

Relationship between youth resilience and paediatric quality of life

The second objective of the study is to investigate the relationship between resilience and quality of life. Results showed a moderate association between SYRESS and the PEDsQL. The moderate positive relationship between Total Health score of PedsQL and SYRESS is seen where a higher resilience is associated with a higher PedsQL score. Linear regression analysis revealed that resilience is a significant predictor for PedsQL but accounts for only 36.2% and 26.3% of the shared variance. Although resilience is not substantially large enough to be used as a predictive outcome for gauging the quality of life of Singaporean youths, the association between SYRESS and PEDsQL showed that resilience plays a contributory role in the adolescents' total health. Previous researchers have discussed the linkage between quality of life and resilience (Lawford & Eiser, 2001). They highlighted the similarities and differences between the concepts of quality of life and resilience and that resilience can explain the variation in quality of life results across childhood and between individual children.

This is the first study that compared the PedsQL scores with a resilience measurement outcome for Singaporean sport-active youth. The positive relationship shown between the two constructs affirm the importance of identifying protective factors and promotion factors in the context of resilience that could predict and explain quality of life outcomes. Future research should examine and explain how a continued engagement in school sport affects these measurements.

Limitation of the research

A limitation of the current study is that it did not account for inter-individual differences in the evaluation of quality of life and resilience. As school transition is not always a negative event, several factors contribute to how well an individual deals with this transition and an identification of these factors would be crucial for a thorough evaluation of how well a student is adapted into his or her environment. Identification of the factors and reasons that contribute to the well-being of the students' school life may contribute to better understanding of the areas that are the causal factors for the quality of life. Another limitation is that the sample is specific to sports-active youth and may not represent the general non-athletic Singaporean youth population.

Conclusion

In conclusion, results of the study showed that sports-active adolescents perceived the transition from primary to secondary school to be difficult, and educators and school administrators may need to mitigate this by coming out with programmes or ways to help smoothen and ease the difficulties faces by youth in this transition. It is also suggestive that sports-active adolescent constitutes a unique population compared to non-sports active adolescent and might need to be evaluated differently compared to normal school-going youth who are not engaged in sport.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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