Associations between self-reported fitness and self-rated health, life-satisfaction and health-related quality of life among adolescents

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ABSTRACT

Background/objective: In recent years, there has been an increased interest in the associations between physical fitness (PF) and psychosocial aspects of health. This study aimed to analyse the associations between self-reported PF and self-rated health (SRH), life-satisfaction (LS), and quality of life (QoL).
Methods: This is a cross-sectional study of 3554 adolescents (1652 boys), aged 13–18, from the HBSC Portuguese survey. PF, health, LS and OoL were self-rated.
Results: SRH, LS, and health-related OoL (HRQoL) were significantly and positively correlated with all PF components. From regression model, overall fitness was significantly related with SRH (boys: $\beta = 0.18$, $p < 0.001$; girls: $\beta = 0.16$, $p < 0.001$), LS (boys: $\beta = 0.36$, $p < 0.001$; girls: $\beta = 0.43$, $p < 0.001$), and HRQoL (boys: $\beta = 2.26$, $p < 0.001$; girls: $\beta = 2.54$, $p < 0.001$). Cardiorespiratory fitness was also positively and significantly related with SRH (boys: $\beta = 0.17$, $p < 0.001$; girls: $\beta = 0.11$, $p < 0.001$), LS (boys: $\beta = 0.13$, $p < 0.05$; girls: $\beta = 0.31$, $p < 0.001$), and HRQoL (boys: $\beta = 1.74$, $p < 0.001$; girls: $\beta = 1.57$, $p < 0.001$).
Conclusion: These findings suggest that perceived PF is associated with a better SRH, LS, and perceived HRQoL. A few implications regarding public policies were highlighted.

Introduction

Physical fitness (PF) is associated with health benefits in young people[1] and it is considered an important health status marker that predicts cardiovascular disease and mortality.[2–4] However, aside from the effects on biological parameters, the consideration of associations with psychosocial aspects of health has gained interest in recent years. Constructs such as health perception, life satisfaction (LS), and quality of life (QoL) are included in a broader domain as they pertain to positive health.[5,6]

Beyond the objective measures, perceptions that one can have about their own health and life may add value to further decisions regarding lifestyle behaviour, such as physical activity and nutrition.[5] For instance, self-rated health (SRH) was suggested as a health indicator among adolescents[7] since SRH appears to be a function of adolescents' overall sense of functioning[8] and adolescent's health-related QoL (HRQoL).[9]

Previously, it was suggested that an accurate self-reported measure of fitness could be used to identify low-fit adolescents for targeted physical activity and obesity prevention interventions.[10] However, to the best of our knowledge there is no study addressing the use of self-reported measures of PF with positive health variables such as SRH, LS and QoL. We hypothesized that those who reported higher PF are those who not only perceived better health, but also reported better LS as well as QL. Therefore this study aimed to analyse the associations between self-reported fitness and SRH, LS, and HRQoL among a representative sample of Portuguese adolescents of both sexes.

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Methods

Participants and procedures

This study is based on data from Health Behaviour in School-Aged Children (HBSC) Portuguese survey.[11] HBSC Portugal is one of 43 countries and regions that make up the HBSC Network.[12] The HBSC is a school-based survey of adolescents' health behaviours, carried out every 4 years. Collected data is used for policy and by decision makers to gain new insight into young people's health and well-being, to understand the social and psychological determinants of health, and to incorporate policies to improve young people's lives. The Portuguese HBSC 2014 survey included a representative sample of 6026 students (2872 boys) from 125 public schools, with weighted distributions reflecting the distribution of Portuguese students in grades 6, 8, and 10. For the present study only students from grades 8 and 10 were selected, because they had better awareness of their physical fitness. Students from grade 6 were excluded (n = 2157). In addition, 71 students did not report weight and/or height, 95 did not report their health perception, 149 did not self-report their fitness, and were removed from the sample. The result was a final sample size of 3554 adolescents (1652 boys, 1902 girls), aged 13-18 years (14.75 ± 1.18).

The administration of the surveys was conducted according to standard guidelines from the HBSC survey protocol[13]; the survey was carried out online with the assistance of trained teachers (experts in informatics) during class time. Questionnaires were administered between January and February in 2014. Participation was voluntary and questionnaires were answered anonymously. The questionnaire application took approximately 60 minute. Research was in accordance with the Ethical Committee of OPorto Medical School, and the National Data Protection System, and had the approval of the Ministry of Education. All school administrators gave their consent, legal guardians gave written informed consent, and students provided assent.

Measures

Actual weight (to the nearest 0.5 kg) and height (to the nearest 0.5 cm) were also self-reported. Body mass index (BMI) was then calculated based on mass (kilograms) divided by height (square metres). Adolescents were classified into normal weight, overweight, and obese categories according to age- and sex-specific cut-off points proposed by the International Obesity Task Force.[14]

The perception of adolescents about their health was collected through the question, "You would say your health is … ?" Answers were given, through selection, on a 4-point scale (poor, fair, good, and excellent).[15]

To identify the opinions about LS, the Cantril Self-Anchoring Striving Scale[16] was used. Adolescents indicated where they stood on a 10-point ladder, with zero being the 'worst possible life' and ten being the 'best possible life'.

HRQoL was assessed by KIDSCREEN-10. It contains 10 items regarding family life, peers, and school life. The items result in one global score. This one-dimensional measure represents a global score adequate for use in large (epidemiological) surveys, as described elsewhere.[17,18]

PF was measured using the international fitness scale (IFIS), which is a self-administered scale to assess PF. The IFIS is composed of 5 questions about the perceived adolescents' overall fitness, cardiorespiratory fitness (CRF), muscular fitness, speed and agility, and flexibility in comparison with their friends' PF. Each response was given on a 5-point scale (very poor, poor, average, good and very good). It has been shown that the IFIS is reliable in

adolescents,[10] and for the present data the reliability was good, with an alpha of 0.86.

Statistical analyses

Descriptive statistics (means, standard deviation and percentages) were calculated for the entire sample, and according to sex. Ordinal variables were treated as continuous.[19] All variables were tested for normality prior to any analyses. The normality of the variables were tested by Kolmogorov-Smirnov test, and homogeneity of variance were tested by Levene's test. Chi square and Student t-test were used to assess the differences between sexes in BMI, SRH, LS, HRQoL, and PF components. Pearson product-moment correlation coefficient was used to examine the relationship between SRH, LS and HRQoL with the different components of PF. To analyse the effect of the PF components on SRH, LS, and HRQoL several linear regression analyses were conducted. Assumptions of linearity were verified and multicollinearity was checked using the variance inflation factor (VIF). VIF values were less than 5 in all analysis, indicating that there was no multicollinearity. All analyses were adjusted for age and BMI zscore, and were run separately for boys and girls because it was observed that there were significant differences between sexes on all variables under study. All statistical analyses were performed using IBM SPSS Statistics 22.0. The level of significance was set at 0.05.

Results

Table 1 shows the sample characteristics, and results of BMI zscore, BMI category, SRH, LS, HRQoL, as well as PF components. The proportion of overweight and obese boys was significantly higher in boys than girls ($\chi^2(2) = 8.542$, $p = 0.014$). Moreover, boys presented a significantly higher value in SRH (t (3552) = 13.653, $p < 0.001$), LS (t (3552) = 7.167, $p < 0.001$), and HRQoL (t (3552) = 13.310, $p < 0.001$). Likewise, boys reported better overall PF (t (3552) = 16.897, $p < 0.001$), CRF (t (3552 = 18.473, $p < 0.001$), muscular fitness (t (3552) = 20.289, $p < 0.001$), speed-agility (t (3552) = 20.271, $p < 0.001$), and flexibility (t (3552) = 7.167, $p < 0.001$) than girls did.

The correlation between SRH, LS, HRQoL, with PF is shown in Table 2. The data showed that all variables were significant and positively correlated with PF components, although some sex differences were seen. For boys, the strongest correlations were between overall fitness and SRH (r = 0.43, $p < 0.001$), as well as between CRF and SRH (r = 0.42, $p < 0.001$). For girls the data showed that the strongest correlations were found between overall fitness and HRQoL (r = 0.43, $p < 0.001$), as well as SRH (r = 0.34, $p < 0.001$).

Results of the multivariate linear regression for the relationship between physical fitness components and SRH, LS, and HRQoL are shown in Table 3. For boys and girls, overall fitness was significantly related to SRH (boys: β = 0.18, $p < 0.001$; girls: β = 0.16, $p < 0.001$), LS (boys: β = 0.36, $p < 0.001$; girls: β = 0.43, $p < 0.001$), and HRQoL (boys: β = 2.26, $p < 0.001$; girls: β = 2.54, $p < 0.001$). CRF was also positively and significantly related to SRH (boys: β = 0.17, $p < 0.001$; girls: β = 0.11, $p < 0.001$), LS (boys: β = 0.13, $p < 0.05$; girls: β = 0.31, $p < 0.001$), and HRQoL (boys: β = 1.74, $p < 0.001$; girls: β = 1.57, $p < 0.001$). Is it clear that the strongest relationships were between overall fitness, CRF, and HRQoL.

Discussion

Based on a representative sample of Portuguese adolescents, this study aimed to examine the associations between PF perceptions (self-reported) and SRH, LS, and HQoL. To the best of our