DOI: 10.4025/jphyseduc.v34i1.3457

Original Article

IS PHYSICAL ACTIVITY ASSOCIATED WITH A HIGHER DEGREE OF WISDOM? CROSS-SECTIONAL STUDY WITH HIGH SCHOOL STUDENTS

ATIVIDADE FÍSICA ESTÁ ASSOCIADA COM MAIOR GRAU DE SABEDORIA? ESTUDO TRANSVERSAL COM ESTUDANTES DO ENSINO MÉDIO

Pâmela Moraes Volz[1], Leandro Quadro Corrêa[1], Eduardo Gauze Alexandrino[1], Rodrigo Rodrigues[1], Michael Pereira da Silva[1], and **Samuel Carvalho Dumith[1]**

[1]Federal University of Rio Grande, Rio Grande -RS, Brasil.

ABSTRACT

The aim of this study was to verify the association between the degree of wisdom and the level of leisure-time physical activity (PA) of students from a federal public school in southern Brazil. Observational cross-sectional study with 462 young people of both sexes between 15 and 18 years old. Data collection was performed using a self-administered questionnaire on the REDCap platform. The independent variable was the "level of leisure PA" (inactive, insufficiently active, and physically active) and the outcome was the "degree of wisdom" evaluated through a validated questionnaire (SD-WISE7). There was a linear trend towards an increase in the wisdom score according to the level of PA. This trend and significant association continued in the adjusted analysis, with active students averaging 1.84 points more in the wisdom score compared to inactive students. In conclusion, the wisest young people are also the most physically active young people. In view of the potential beneficial effects, current studies may consider wisdom as a possible mediator of PA with health outcomes.

Keywords: Wisdom; Physical activity; Schoolchildren; Anxiety; Cognitive ability

RESUMO

O objetivo deste estudo foi verificar a associação entre o grau de sabedoria e o nível de atividade física de lazer (AF) de alunos de uma escola pública federal do sul do Brasil. Estudo observacional de corte transversal com 462 jovens de ambos os sexos entre 15 e 18 anos de idade. A coleta de dados foi realizada por meio de um questionário autoaplicável na plataforma REDCap. A variável independente foi o "nível de AF de lazer" (inativo, insuficientemente ativo e ativo fisicamente) e o desfecho foi a "grau de sabedoria" avaliados por meio de questionários validados. Observou-se tendência linear de aumento do escore de sabedoria conforme o nível de AF. Essa tendência e associação significativa se manteve na análise ajustada, com os ativos tendo em média 1.84 pontos a mais no escore de sabedoria em comparação aos inativos. Em conclusão, os jovens mais sábios também são os jovens mais ativos fisicamente. Tendo em vista os potenciais efeitos benéficos, os estudos atuais podem considerar a sabedoria como um possível mediador da AF com desfechos em saúde.

Palavras-chave: Sabedoria; Atividade Física; Escolares; Ansiedade; Capacidade cognitiva.

Introduction

Adolescence, chronologically understood as the period between 10 and 19 years of age, is characterized by profound biological, cognitive, psychological, emotional, and social transformations[1-5]. During this phase, which has a biological beginning and a sociocultural shift[6], the adolescent is affected by pubertal maturation, develops autonomy in relation to the family, is influenced by the peer group, experiences new behaviors and experiences, and develops intellectual, moral, empathic, cognitive, and decentration capacities[2,7,8]. According to the literature, the development of these skills during adolescence is a prerequisite for the development of wisdom throughout life[3,4].

Although the evaluation of the degree of wisdom among young people is relatively recent, especially in epidemiological studies, it is defined as a complex and multidimensional personality trait that involves specific components, such as self-reflection, prosocial behaviors, emotional regulation, acceptance of different perspectives, determination, social counseling, and spirituality[9-12]. Given its characteristics, wisdom is of singular importance in

the lives of young people, as it can positively affect their health and is related to the adoption of a healthy lifestyle[13].

There is an understanding that young people with a higher degree of wisdom are more likely to adopt healthy behavior patterns and habits, such as practicing physical activity (PA)[13]. This is because the specific components of wisdom are positively associated with greater resilience, optimism, and physical and mental well-being, and inversely associated with health risk behaviors, loneliness, depression, and anxiety[9,12].

Perry et al.[13] found that young people with a high degree of wisdom were significantly less involved with substance use and problematic behaviors compared to those with a low degree of wisdom. Although wisdom encourages the adoption of healthy lifestyles and habits[13], such as the practice of PA by young people, and this behavior is directly associated with the improvement in some physiological and cognitive aspects[14,15], the association between the degree of wisdom and the practice of PA has not yet been studied.

The literature demonstrates that wisdom prerequisites are substantially developed during adolescence and that the practice of PA can bring different benefits to the health of young people, such as improvement in several neurophysiological parameters[16], and cognitive[16] and emotional capacity[16]. Thus, the objective of the present study was to verify the association between the degree of wisdom and the level of PA in young people from a federal public school in the south of Rio Grande do Sul in the year 2022.

Methods

Sample

This is a cross-sectional, observational study conducted with young people of both sexes, enrolled and regularly attending physical education classes at the Rio Grande campus of the Federal Institute of Education, Science and Technology of Rio Grande do Sul, which was intentionally selected for the study in the year 2022.

Information was collected between October and November 2022 during physical education class hours, through a questionnaire self-administered by the young people and answered on individual tablets made available for the study. The Federal Institute of Education, Science and Technology of Rio Grande do Sul has 514 students enrolled in the 1st, 2nd, 3rd, and 4th years of high school, however, only the 480 who are regularly enrolled in the 1st, 2nd, and 3rd years and regularly attending physical education classes were eligible for the study. The 4th year students were excluded from the sample, considering that they do not have the discipline of physical education in their curriculum. Students who missed class, were involved in other activities on the days of data collection, or who did not adequately complete the research instrument were considered losses. Refusals were defined as those young people who refused to participate in the study. Completing the questionnaire took between 20 and 30 minutes. The data were stored on the REDCap® platform (acronym in English for Research Electronic Data Capture)[17]. The participants signed the assent form agreeing to participate in the study and their parents or guardians signed the free and informed consent form. The study was approved by the Research Ethics Committee of the Federal University of Rio Grande, nº 3.824.558, CAAE: 26359019.00000.5324.

Procedures

Wisdom was assessed using the abbreviated SAN DIEGO wisdom scale (SD-WISE 7), proposed by Thomas et al.[12]. This scale is made up of seven statements: 1) I remain calm under pressure; 2) I avoid self-reflection; 3) I like to be exposed to diverse points of view; 4) I tend to postpone making decisions for as long as I can; 5) I often don't know what to say to people when they ask me for advice; 6) My spiritual belief gives me inner strength; 7) I avoid situations where I know my help will be needed. For each of the statements, the participants

chose one of the following response options: "I totally disagree, disagree, neutral, agree, totally agree". The reliability coefficient for the SD-WISE-7 scale score is ω = 0.7412. The total score reflects an average of responses to individual items, taking into account reverse coding (Questions 2, 4, 5, and 7). The instrument generates a score ranging from 7 to 35 points and, for this study, the score was evaluated both numerically continuously and dichotomously, where it was divided into quartiles. The last quartile (25%) (which indicates higher scores and consequently a greater degree of wisdom) was isolated and compared to the lower quartiles.

The level of leisure-time PA was assessed using the National School Health Survey (PENsE) questionnaire, with a record of the last seven days. The young people were asked the number of days per week they engaged in PA and the daily time spent on these activities. Subsequently, the days of activity were multiplied by the time spent practicing that activity to obtain the PA involvement time score. Young people who presented scores ≥ 300 min were classified as physically active, those who reported performing PA but did not reach this score were classified as insufficiently active, and those who did not perform PA on any day of the week were classified as physically inactive as recommended by the Physical Activity Guide for the Brazilian Population[15].

The intervening variables evaluated were: age “complete years”; sex “male or female”; skin color “white, black, yellow, brown, indigenous”; grade “the student is studying in”; shift “morning, afternoon, night, full-time”; work “yes, no, professional internship, volunteer work”; course “Electrotechnical, Refrigeration and Automation, Computing for the Internet, Geoprocessing, Industrial Automation, Mechanical Manufacturing”, index of goods (quartiles), alcohol consumption “yes, no”, smoking habit “yes, no”, habit of watching TV “yes, no”, time using smartphone, social support from parents and friends for the practice of PA” yes, no” using the Social Support for PA in Young People (ASAFA) scale, validated in Brazil by Farias et al., [18] and previously used in another population[19] “yes, no”.

Statistical analysis

The database, with information from the self-administered questionnaires, was digitally transferred to Excel and subsequently to the STATA 15.1 statistical package where the study analyses were conducted. Initially, descriptive analyses were performed and numerical data are presented as means and standard deviation, median and range (maximum and minimum values), and categorical variables through absolute and relative frequencies. To compare the questions on the wisdom scale with the level of PA in an ordinal or dichotomous way, Fisher's exact test was used. To assess the outcome in a continuous manner with the level of PA, multiple linear regression (crude and adjusted) was used and the results are presented using ß coefficients and 95% confidence intervals (95%CI). To assess the outcome in a dichotomized manner, crude and adjusted analyses were conducted using Poisson regression with robust adjustment for variance, presenting the prevalence ratio (PR) and 95% confidence intervals (95%CI). In the adjusted analysis, all intervening variables were inserted in the model at the same time, with simultaneous adjustment for possible confounders. The statistical significance level adopted by the study was 5% for two-tailed tests.

Results

Of the 480 eligible students, two refused to answer the questionnaire and another 16 did not respond because they were not present in class or did not complete the entire questionnaire. Thus, 462 young people (96.3%) participated in the study, most of whom were male (54.3%), 37.5% were between 16 and 17 years old, 76% were Caucasian, 43.3% were

in the 1st year of their course, 86.6% studied full time, 83.2% did not work, 70.3% lived with three or four people at home, 63.4% reported not drinking alcohol, 94.7% were not smokers, 47.2% did not watch TV, more than 60 % received social support from parents or friends to practice PA, 67.0% did not classify their sleep as good, and 22.8% had severe or extremely severe psychological symptoms (TABLE 1).

Table 1. Sample characterization according to sociodemographic, behavioral, and health variables, Rio Grande-RS, Brazil (n=462)

Variables	N	%
Sex		
Male	251	54.3
Female	211	45.7
Age (years)		
15	42	9.9
16	90	21.2
17	69	16.3
18	223	52.6
Skin color		
White	330	76.0
Black	42	9.7
Yellow	3	0.7
Pardo "brown or of mixed color"	59	13.6
Grade in which studies		
1st year	188	43.3
2nd year	135	31.1
3rd year	111	25.6
Shift in which studies		
Morning	46	10.6
Afternoon	12	2.8
Full-time (morning and afternoon)	375	86.6
Work activity		
Does not work	361	83.2
Salaried employment	15	3.5
Professional internship	50	11.5
Volunteer work	8	1.8
Residents in your home (n)		
I live alone	4	1.0
2	51	11.6
3	159	36.4
4	147	33.9
5	51	11.8
6	18	4.3
7	4	1.0
Course you attend		
Electrotechnical	76	17.5
Refrigeration and air conditioning	64	14.8
Internet computing	63	14.5
Geoprocessing	67	15.5
Industrial automation	95	21.8
Mechanical manufacturing	69	15.9
Alcohol use		
No	268	63.4
Yes	155	36.6
Smoking use		
No	411	94.7

Variables	N	%
Yes	23	5.3
Watch TV		
No	205	47.2
Yes	229	52.8
Parental social support for PA practice		
No	171	39.4
Yes	263	60.6
Social support from friends for PA practice		
No	139	32.0
Yes	295	68.0

Note: PA: physical activity; n: number of participants; min/day: minutes a day; < less than; > more than.
Source: Authors

The mean wisdom score was 23 ± 4, with a median of 23 points and range between 11 and 35 points, as shown in Table 2, which also presents the description of the results for each question of the SD-WISE-7 Scale. It can be observed that the highest percentages of answers that indicate greater wisdom according to the question, occurred in questions seven, two, five, and three, respectively. In question seven, when asked if they avoid situations in which they know their help will be needed, approximately 77% of young people disagreed; in question two, when asked if they avoid self-reflection, approximately 63% of young people disagreed; in relation to question five, when asked if they don't know what to say to people when they asked for advice, approximately 54% of young people disagreed; and in question three, when asked if they like being exposed to diverse points of view, a little more than half (51%) said yes, they agreed.

Table 2. Description of the outcome from questions (construct) on the Wisdom Scale.

Question	**N**	**%**
I remain calm under pressure (Q1)		
Disagree	183	42.1
Not at all	130	29.9
Agree	122	28.0
I avoid self-reflection (Q2)*		
Disagree	275	63.4
Not at all	97	22.4
Agree	62	14.3
I like being exposed to different points of view (Q3)		
Disagree	86	19.8
Not at all	126	29.0
Agree	222	51.2
I tend to put off making decisions for as long as I can (Q4)*		
Disagree	133	30.6
Not at all	90	20.7
Agree	212	48.7

Question	N	%
I often don't know what to say to people when they ask me for advice (Q5)*		
Disagree	237	54.5
Not at all	83	19.1
Agree	115	26.4
My spiritual belief gives me inner strength (Q6)		
Disagree	188	43.2
Not at all	108	24.8
Agree	139	32.0
I avoid situations where I know my help will be needed (Q7)*		
Disagree	336	77.2
Not at all	62	14.3
Agree	37	8.5

Note: I avoid situations where I know my help will be needed (Q7)*
Source: Authors

Table 3 presents the bivariate analysis of each question on the wisdom scale, evaluating the percentage of young people who agreed with the questions (yes or no), including the questions that had reverse results, according to the level of PA of the young people (physically inactive, insufficiently active, and active). A significant association was observed in questions one, four, and five, depending on the exposure analysis method.
In question one (Q1), there was a significant increase in the percentage of adequate answers according to the PA categories, being greater for the physically active compared to the insufficiently active and inactive students (p=0.001). In question four (Q4), it is possible to observe a small increase in the percentage of adequate answers according to the PA categories, with a significant difference between the physically active and inactive students (p=0.003), whereas in question five (Q5) a greater percentage of adequate responses was given among the active students compared to the insufficiently active and physically inactive students (p=0.035).

Table 3. Distribution of agreement to each question according to the exposure variables.

Exposure	Q1	Q2	Q3	Q4	Q5	Q6	Q7
PA groups	**p=0.001**	p=0.158	p=0.771	**p=0.003**	**p=0.035**	p=0.192	p=0.880
Inactive	17.5	90.4	48.5	39.4	70.1	27.0	91.2
Insufficientl	30.3	84.3	52.3	56.6	71.2	32.8	90.9
Active	38.1	82.5	50.5	58.8	83.5	38.1	92.8

Note: Q1: I remain calm under pressure; Q2: I avoid self-reflection; Q3: I enjoy being exposed to diverse points of view; Q4: I tend to postpone making decisions for as long as I can; Q5: I often don't know what to say to people when they ask me for advice; Q6: My spiritual belief gives me inner strength; Q7: I avoid situations where I know my help will be needed.
Source: authors

Table 4 presents the results of the multiple linear regression of the PA level on the wisdom score of the studied sample. The table shows, with regard to the level of PA, that

based on the ß coefficients, that there was a linear tendency towards an increase in the wisdom score according to the level of PA, and in the crude analysis active students averaged 1.90 more points in the wisdom score compared to inactive students (p<0.001). In the adjusted analysis, the trend and significant association were maintained, with the active students having an average of 1.84 more points in the wisdom score compared to the inactive students (p=0.003).

Table 4. Crude and adjusted analysis in the continuous analysis between the wisdom score and the PA level of the evaluated young people (n=462).

Exposure	Wisdom score (mean)	Crude analysis		Adjusted analysis	
		coefficient ß	95%CI	coefficient ß	95%CI
PA groups					
Inactive	22.2	0		0	
Insufficient	23.0	0.83	-0.04; 1.69	0.45	-0.51; 1.41
Active	24.1	**1.90**	**0.87; 2.95**	**1.84**	**0.68; 2.99**

Note: Adjustments for sex, age, skin color, grade they are attending, study shift, work, course they are enrolled in, index of assets, alcohol consumption, smoking habit, smartphone time, social support from parents and friends to practice PA.
Source: authors

Table 5 presents the results of the Poisson regression of the wisdom score evaluated in a dichotomous way, comparing the scores of the last quartile (75th percentile) with the other quartiles with level of PA. Observing Table 5, an increasing trend can be observed in the percentage of young people who were in the highest quartile of wisdom according to the level of PA, and in the crude analysis, those active young people were 2.39 times more likely to present a higher degree of wisdom compared to inactive students (p=0.001). This association was also observed in the adjusted analysis, however there was a slight reduction in the association measure (PR= 1.93; p=0.02).

Table 5. Association between the wisdom score dichotomized in the last quartile (highest 25 percentile) and lower quartiles in the studied sample in the year 2022 (n=462).

Exposure	Greater wisdom (%)	Crude analysis		Adjusted analysis*	
		PR	95%CI	PR	95%CI
PA groups			**p=0.001****		**p=0.02****
Inactive	12.5	1.00		1.00	
Insufficient	18.2	1.46	0.85; 2.48	0.98	0.54; 1.66
Active	29.9	**2.39**	**1.39; 4.10**	**1.93**	**1.12; 3.33**

Note: * Adjustments for sex, age, skin color, grade they are attending, study shift, work, course they are enrolled in, index of assets, alcohol consumption, smoking habit, smartphone time, social support from parents and friends to practice PA; ** Test for trend.
Source: authors

Discussion

The current study aimed to verify the association between the degree of wisdom and the level of PA practice in young people from a federal public school in the south of Rio

Grande do Sul. It was observed that among the specific components of wisdom, physically active young people showed significantly greater emotional regulation and greater capacity for decision-making and social counseling when compared to insufficiently active and physically inactive students. Furthermore, higher scores on the wisdom scale were associated with being physically active, regardless of how wisdom was analyzed.

Although previous research has demonstrated the association between wisdom and the adoption of healthy behaviors[8,12,13], no research was found that analyzed this association.

Wisdom is considered a social and individual construction, being highly dependent on the context in which young people are inserted. However, there is general recognition that adolescents considered "wise" not only have a higher IQ (intelligence quotient), but also demonstrate other important characteristics and attributes, such as: capacity for self-reflection, adoption of prosocial behaviors, emotional regulation, acceptance of diverse perspectives, determination, social counseling skills, and spirituality. These attributes ensure greater resilience, optimism, and physical and mental well-being, that lead young people to adopt healthy behaviors [3,8,12,13].

With regard to the specific components of wisdom, it was observed that the young people interviewed adopted more pro-social behaviors and had greater capacity for self-reflection and social counseling. Using the SAWS instrument (Self Assessed Wisdom Scale), a study by Fernandes et al.[8] observed that young people showed better results in the components of emotional self-regulation, reflection, and experience. Perry et al.[13], using the Adolescent Wisdom Scale, found that the highest score was observed in the components harmony, intelligence, and spirituality. Although the instruments and components highlighted are different between the studies, there is agreement that they positively affect the health of young people and are significantly related to the adoption of healthy behaviors[8,13].

The healthy behaviors adopted by young people with a higher degree of wisdom include the practice of PA. Studies have shown that this behavior is associated with the different components of wisdom when evaluated in isolation, and not necessarily with wisdom, since there are no studies on the subject. PA is able to promote several benefits for the health of young people, including improvements in physical and physiological aspects, as well as in mental health, reducing the risk of symptoms of anxiety, stress, and depression, in addition to improving mood. PA can also improve cognitive aspects, including school performance, memory, and executive function[14,15].

After analyzing each component of the wisdom scale, it was observed that physically active young people presented greater emotional regulation and greater capacity for decision-making and social counseling when compared with insufficiently active young people and with physically inactive young people. A study developed by Souza et al.[5], found that the practice of PA among young people is significantly associated with the domains of physical well-being and of social support and peer group. Rodriguez-Ayllon et al.[20], found that the practice of PA among young people, is associated with lower levels of mental health problems - symptoms of depression, anxiety, and stress. Oliveira et al.[21] found that the most physically active young people had significantly lower levels of stress compared to the inactive young people. Mendonça et al.[22] reported that social support was significantly associated with the level of PA among young people. The WHO23 highlights, in turn, that the practice of PA is a protective factor against the development of chronic non-communicable diseases (NCDs), influencing the cognition and quality of life of young people[24]. Considering that the isolated components of wisdom were also analyzed in the present study, it is possible to state that the capacity for self-reflection, adoption of prosocial behaviors, emotional regulation, acceptance of different perspectives, determination,

capacity for social counseling, and spirituality are associated with the practice of PA in this population.

It is important to highlight, however, that although quantitative studies on the relationship between wisdom and the adoption of healthy behaviors are relatively recent, both the benefits and the recommendations for the practice of PA at all stages of life are well established in the literature. The elaboration of the Guide to PA and sedentary behavior of the World Health Organization and the Guide to PA for the Brazilian population deserve to be highlighted[20,25], since they directly encourage young people to use wisdom in a reflective and action-oriented way[15,26] and, indirectly, they can also stimulate the development of the components of wisdom.

A linear trend toward a higher wisdom score was observed according to the level of PA, that is, physically active young people are more likely to have a higher degree of wisdom compared to insufficiently active and physically inactive young people. Although the outcome is different, this result is in line with the studies by Thomas et al.[12] and Bangen et al.[9], Perry et al.[13] who highlighted that young people with a higher degree of wisdom are more likely to adopt healthy behavior patterns and habits and less likely to adopt health risk behaviors. In addition, a recent study of 1,800 students aged 12 to 18 years showed that personal wisdom resources are associated with more favorable emotional intelligence in preventing the onset of 'burnout', as well as in improving personal efficacy, leading to better performance[19].

These data are reinforced by the results of the wisdom score on the level of PA. The model adopted in the adjusted analysis demonstrates that even when other factors are controlled, such as sex, age, index of assets, alcohol consumption, smoking habit, smartphone time, and social support from parents and friends for PA practice, physically active young people are twice as likely to belong to the group of wiser students. The mechanisms that justify these results are uncertain, since they may be related to neurophysiological issues and exposure of young people to family, social, cultural, and environmental influences that were not analyzed[27] and may also refer to the practical and philosophical structure of some sports. Thus, this association suggests that future research should investigate the mechanisms through which wisdom is associated with the practice of PA in young people and the way in which it may influence their behavior; independently of, in conjunction with, or in comparison with other factors. In addition, it is necessary to implement actions aimed at promoting PA in young people, both through the family and the school.

To our knowledge, this is the first Brazilian study to test the association between the degree of wisdom and the level of PA in young people, with a small number of sample losses. However, there are some limitations, such as: (i) the limited external validity because it is not a representative sample of students from Rio Grande; (ii) the lack of validation of the SD-WISE-7 scale in Brazil; (iii) self-selection bias, which may occur in non-probabilistic samples, which could have increased the wisdom score; and (iv) the possible reverse causality bias, inherent in cross-sectional designs, where outcome and exposures are collected at the same time. However, it should be noted that research with representative local samples offers important subsidies for identification and assessment of problems, so that projects and policies can be applied to reduce risk factors for the health and integrity of students.

With regard to the reverse causality bias, it is worth noting that although the wisdom and practice of PA are multidimensional, the practice of PA is also associated with components related to wisdom, as observed in the systematic review and meta-analysis studies developed by Furtado et al.[24], Rodriguez-Ayllon et al.[20], Mendonça et al.[28], and Moreira et al.[29]. Therefore, further studies are necessary to evaluate the bidirectional association between PA and the components of wisdom.

Conclusion

Based on our findings, we can conclude that physically active young people have significantly greater emotional regulation and greater capacity for decision-making and social counseling, and are also wiser when compared to insufficiently active and physically inactive young people. In this regard, it seems important to encourage wisdom and the practice of physical activity (PA) among young individuals, with a focus on maintaining the ability to engage in wise actions, as well as providing additional benefits in terms of physical, mental, cognitive, and social aspects. We rise the hypothesis that wisdom may act as a mediator factor of the relationship between PA and other outcomes, such as mental health and academic performance. However, it is essential to mention the study's limitations, such as the non-representativeness of the sample in relation to the general population and the need for validation of the SD-WISE-7 scale. We recommend longitudinal studies to establish the causality of this association and emphasize the need for integrated approaches that consider both physical and psychosocial aspects when developing health promotion strategies for adolescents.

References

1. Araujo EC. Aspectos biopsicossociais na sexualidade dos adolescentes: assistência de enfermagem. 1996. 173 f. [Dissertação de mestrado], Universidade Federal da Paraíba, João Pessoa, 1996.
2. Pasupathi M, Staudinger UM, Baltes PB. Seeds of wisdom: adolescents' knowledge and judgment about difficult life problems. Dev Psychol 2001; 37(3):351-61. PMID: 11370911.
3. Staudinger UM, Pasupathi M. Correlates of wisdom-related performance in adolescence and adulthood: Age-graded differences in “paths” toward desirable development. J Res Adolesc 2003; 13(3): 239–268. DOI: 10.1111/1532-7795.1303001
4. Baltes PB, Staudinger UM. Wisdom. A metaheuristic (pragmatic) to orchestrate mind and virtue toward excellence. Am Psychol 2000; 55(1):122-36. DOI: 10.1037//0003-066x.55.1.122. PMID: 11392856.
5. Souza ZAA, Silva JG, Ferreira MA. Knowledge and practices of teenagers about health: implications for the lifestyle and self care. Esc Anna Nery 2014; 18(3):400-406. DOI:10.5935/1414-8145.20140057
6. Yeager DS, Dahl RE, Dweck CS. Why interventions to influence adolescent behavior often fail but could succeed. Perspect Psychol Sci 2017;3(1):101-122. DOI:10.1177/1745691617722620
7. Yeager DS, Dahl RE, Dweck CS. Why Interventions to Influence Adolescent Behavior Often Fail but Could Succeed. Perspect Psychol Sci. 2018; 13(1):101-122. DOI:10.1177/1745691617722620
8. Fernandes, HMRT. Sabedoria na adolescência. [Tese de Doutorado em Educação na especialidade de Psicologia da Educação]. Lisboa: Instituto de Educação. Universidade de Lisboa; 2019. World Wide Web:http://hdl.handle.net/10451/38761
9. Bangen KJ, Meeks TW, Jeste DV. Defining and assessing wisdom: a review of the literature. Am J Geriatr Psychiatry 2013; 21(12):1254-66. DOI: 10.1016/j.jagp.2012.11.020. Epub 2013 Apr 15. Erratum in: Am J Geriatr Psychiatry. 2014 Apr;22(4):e1. PMID: 23597933; PMCID: PMC3896261.
10. Thomas ML, Bangen KJ, Palmer BW, Sirkin Martin A, Avanzino JA, Depp CA, Glorioso D, Daly RE, Jeste DV. A new scale for assessing wisdom based on common domains and a neurobiological model: The San Diego Wisdom Scale (SD-WISE). J Psychiatr Res. 2019; 108:40-47. DOI: 10.1016/j.jpsychires.2017.09.005. Epub 2017 Sep 8. PMID: 28935171; PMCID: PMC5843500.
11. Lee EE, Bangen KJ, Avanzino JA, Hou B, Ramsey M, Eglit G, Liu J, Tu XM, Paulus M, Jeste DV. Outcomes of Randomized Clinical Trials of Interventions to Enhance Social, Emotional, and Spiritual Components of Wisdom: A Systematic Review and Meta-analysis. JAMA Psychiatry 2020; 1;77(9):925-935. DOI: 10.1001/jamapsychiatry.2020.0821. PMID: 32401284; PMCID: PMC7221873.
12. Thomas ML, Palmer BW, Lee EE, Liu J, Daly R, Tu XM, Jeste DV. Abbreviated San Diego Wisdom Scale (SD-WISE-7) and Jeste-Thomas Wisdom Index (JTWI). Int Psychogeriatr 2022; 34(7):617-626. DOI: 10.1017/S1041610221002684. Epub 2021 Dec 3. Erratum in: Int Psychogeriatr. 2023 Oct;35(10):587. PMID: 34857061; PMCID: PMC9844079.
13. PERRY CL, Komro KA, Jones RM, Musom K, Williams CL, Jason L. The measurement of wisdom and its relationship to adolescent substance use and problem behaviors. J Child Adolesc Subst Abuse 2002; 12:45-63. DOI: 10.1300/J029v12n01_03

14. Chaput JP, Willumsen J, Bull F, Chou R, Ekelund U, Firth J, Jago R, Ortega FB, Katzmarzyk PT. WHO guidelines on physical activity and sedentary behaviour for children and adolescents aged 5-17 years: summary of the evidence. Int J Behav Nutr Phys Act 2020; 6;17(1):141. DOI: 10.1186/s12966-020-01037-z. PMID: 33239009; PMCID: PMC7691077.
15. Brasil. Ministério da Saúde. Secretaria de Atenção Primária à Saúde. Departamento de Promoção da Saúde. Guia de Atividade Física para a População Brasileira [recurso eletrônico] / Ministério da Saúde, Secretaria de Atenção Primária à Saúde, Departamento de Promoção da Saúde. – Brasília: Ministério da Saúde, 2021.54 p.: il. World Wide Web: http://bvsms.saude.gov.br/bvs/publicacoes/guia_atividade_fisica_populacao_brasileira.pdf
16. Meijer A, Königs M, Vermeulen GT, Visscher C, Bosker RJ, Hartman E, Oosterlaan J. The effects of physical activity on brain structure and neurophysiological functioning in children: A systematic review and meta-analysis. Dev Cogn Neurosci 2020; 45; 100828. DOI:10.1016/j.dcn.2020.100828
17. Harris PA, Taylor R, Minor BL, et al. The REDCap consortium: Building an international community of software platform partners. J. Biomed. Inform 2019; 95:103208. DOI: 10.1016/j.jbi.2019.103208. Epub 2019 May 9. PMID: 31078660; PMCID: PMC7254481.
18. Farias Júnior JCD, Mendonça G, Florindo AA & Barros MVGD. Fidedignidade e validade de uma escala de avaliação do apoio social para prática de atividade física para adolescentes-Escala ASAFA. Rev Bras Epidemiol 2014; 17:355-370. DOI: 10.1590/1809-4503201400020006ENG
19. Supervía PU, Bordás C, Abad JJM. Relaciones entre la inteligencia emocional, el burnout académico y el rendimiento en adolescentes escolares. CES Psicología 2020; 13(1):125-139. doi: 10.21615/cesp.13.1.8
20. Rodriguez-Ayllon M, Cadenas-Sánchez C, Estévez-López F, Muñoz NE, Mora-Gonzalez J, Migueles JH., ... & Esteban-Cornejo, I. Role of physical activity and sedentary behavior in the mental health of preschoolers, children and adolescents: a systematic review and meta-analysis. Sports Med 2019; 49(9):1383-1410. DOI: 10.1007/s40279-019-01099-5. PMID: 30993594.
21. Oliveira JHB. Sabedoria: definição, dimensionalidade e educabilidade. Rev Port de Pedag 2005; 39; 2:151-173. URI: https://hdl.handle.net/10216/101094
22. Mendonça G, Cheng LA, Mélo EN, de Farias Júnior JC. Physical activity and social support in adolescents: a systematic review. Health Educ Res 2014; 29(5):822-39. DOI: 10.1093/her/cyu017. Epub 2014 May 8. PMID: 24812148.
23. World Health Organization. Global action plan on physical activity 2018-2030: more active people for a healthier world. Geneva, Switzerland: WHO, 2019. World Wide Web: https://www.who.int/publications/i/item/9789241514187
24. Furtado GE, Letiere R, Hogervorst E, Teixeira AB, Ferreira JP. Physical Frailty and cognitive performance in older populations, part I: systematic review with meta-analysis. Cien Saude Colet 2019; 24: 203-218. DOI: 10.1590/1413-81232018241.03692017. PMID: 30698254.
25. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon C, et al. World health organization on 2020 guidelines on physical activity and sedentary behavior. BR J Sports Med 2020; 54(24):1451–1462.
26. Lopes IE, Nogueira JAD.; Rocha DG. Eixos de ação do Programa Saúde na Escola e Promoção da Saúde: revisão integrativa. Saúde em Debate 2018; 42(228): 773-789. World Wide Web: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://iris.who.int/bitstream/handle/10665/336656/9789240015128-eng.pdf?sequence=1
27. Souza EA, Filho VCB, Nogueira JAD, Junior, MRA. Atividade física e alimentação saudável em escolares brasileiros: revisão de programas de intervenção. Cad Saúde Pública 2011; 27(8):1459-1471. DOI: https://doi.org/10.1590/S0102-311X2011000800002
28. Mendonça G, Cheng LA, Mélo EN, de Farias Júnior JC. Physical activity and social support in adolescents: a systematic review. Health Educ Res 2014; 29(5):822-39. DOI: 10.1093/her/cyu017. Epub 2014 May 8. PMID: 24812148.
29. Moreira WC, Nóbrega MDPSDS, Lima FPS, Lago EC, Lima MO. Efeitos da associação entre espiritualidade, religiosidade e atividade física na saúde/saúde mental: uma revisão sistemática. Rev Esc Enferm USP 2020; 54 e03631. DOI: 10.1590/S1980-220X2019012903631

ORCID:
Pâmela Moraes Volz: https://orcid.org/0000-0002-8548-7190
Leandro Quadro Corrêa: https://orcid.org/0000-0002-1231-3800
Eduardo Gauze Alexandrino: https://orcid.org/0000-0002-4042-4954
Rodrigo Rodrigues: https://orcid.org/0000-0001-6787-3146
Michael Pereira da Silva: https://orcid.org/0000-0002-7628-3997
Samuel de Carvalho Dumith: https://orcid.org/0000-0002-5994-735X

Received on May 02, 2023.
Reviewed on Jan 02, 2024.
Accepted Jan 02, 2024.

Correspondence address: Pâmela Moraes Völz. Rua Visconde de Paranaguá, 102, sala 411 - Secretaria Geral da FaMed, Rio Grande-RS, CEP 96203-900. E-mail: pammi.volz@gmail.com