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PHYSICAL ACTIVITY, SLEEP QUALITY AND MENTAL HEALTH IN SCHOOLCHILDREN: SYSTEMATIC REVIEW

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ABSTRACT

Objective: The objective was to review the scientific literature about the effects of physical activity, sleep and mental health on schoolchildren. Materials and methods: The study is a systematic review of the literature on scientific articles in scientific journals allocated in the databases: Scientific Electronic Library Online - Sicelo.Org; Latin American and Caribbean Literature on Health Sciences - Lilacs; Dialnet; Red Iberoamericana de Innovación y Conocimiento Científico - Redib; Web of Science; Medline / Pubmed. It was carried out by searching for articles in the databases cited with the following terms: physical activity + sleep + schoolchildren, physical activity + mental health + schoolchildren, sleep + mental health + schoolchildren. With inclusion and exclusion criteria previously determined. Results: A total of 144 published works were found related to the terms used, after reading the articles, 123 articles were introduced in the exclusion criteria and 21 in the inclusion criteria. Discussion: In the articles found in the selected databases, a total of 13.150 school subjects were studied, with a minimum age of 6 years and a maximum age of 19 years, several procedures being used as research instruments. Conclusion: It is concluded that several factors can interfere in the quantity and quality of sleep, in the number of hours of physical activity and in the mental health of the students, but that more studies are needed to see how school stress is related to both the low quality of sleep as well as the amount of physical activity of the schoolchildren.

Key words: Physical Activity. Sleep. Mental Health. Schoolchildren.

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RESUMO

Atividade física, qualidade do sono e saúde mental em escolas: revisão sistemática

Objetivo: O objetivo foi revisar a literatura científica sobre os efeitos da atividade física, do sono e da saúde mental em escolares. Materiais e Métodos: O estudo é do tipo revisão sistemática de literatura sobre artigos científicos em revistas científicas alocadas nas bases de dados: Scientific Electronic Library Online - Scielo.Org; Literatura Latino-Americana e do Caribe em Ciências da Saúde - Lilacs; Dialnet; Red Iberoamericana de Innovación e Conocimiento Científico - Redib; Web of Science; Medline/Pubmed. Resultados: Foi encontrados144 artigos com os termos utilizados na busca, após leitura dos artigos foram inseridos 123 artigos nos critérios de exclusão e 21 nos critérios de inclusão. Discussão: Nos 21 artigos selecionadas foi utilizado como amostra um total de 13.150 escolares, com idade mínima de 6 anos e máxima de 19 anos, sendo utilizados como instrumentos de investigação diversos procedimentos. Conclusão: Conclui-se que fatores diversos podem interferir na quantidade e qualidade do sono, na quantidade de horas de sono, na prática de atividade física e na saúde mental dos escolares, mas que devemos realizar mais estudos para ver como o estresse escolar tem relação tanto com a baixa qualidade do sono quanto com a quantidade de atividade física dos escolares.

Palavras-chave: Atividade Física. Sono. Saúde Mental. Escolares.

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INTRODUCTION

In scientific literature, the concept of physical activity it spreads out in several ways, but all of them come to a similar meaning that, physical activity it's defined as any body movement, performed by skeletal muscles, that end up in energy expenditure greater than in rest (Caspersen, Powell and Christenson, 1985).

In adults, a physically active lifestyle it's related to a decrease in the occurrence of several chronic-degenerative diseases such as a reduction in cardiovascular death index and general. A high quantity of physical activity collaborates to aprimorate the lipid and metabolic profile and decrease the predominance of obesity in both children and adolescents.

Furthermore, it is more viable for a physically active child to become an active adult. As an outcome, from the point of view of public health and preventive medicine, favoring physical activity in childhood and adolescence indicates establishing a solid foundation for reducing the prevalence of sedentary lifestyles in adulthood (Lazzoli and collaborators, 1998).

According to the World Health Organization (2015), a sedentary lifestyle it is considerate the fourth greatest death risk factor in the world, and practice of physical activity, whether low or high intensity, it's essential for the body and mind. As with physical activity, sleep directly relates with health condition and consequently with quality of life.

Said that, sleep is seen as a high complexity biological procedure, mediated by neural and hormonal oscillations, in which alternates between waking moments, acting as a renovator of organic functions, directing to an essential condition for growth (childhood and adolescence), memory, body functioning and for learning (Ropke and collaborators, 2017).

According to Li and collaborators (2014) the quantity and/or quality of sleep are related with the appearance of different cognitive, psychological, immunological and metabolic changes, and are motivated by social, clinical and cultural questions.

Therefore, the need for sleep it's individual and differs in the different phases of life, for example, a baby in its first days of life needs long periods of sleep and as it develops (grows) this dynamic can be modified. And in adolescence, for the maintenance of good physical and cognitive health, it is recommended among 8 to 10 sleep hours per night (Felden and collaborators, 2015). In this sense, not sleeping enough or with quality can entail problems, such as, sleep disorders and in behavior.

According to Muller and Guimarães (2007), the sleep disorders entail in many consequences in people's lives due to the decrease in its daily operation, increase tendency to mental, psychiatric disorders, cognitive deficits, appearance and exacerbation of health problems, accidental hazards, absenteeism, thus compromising the quality of life. In this context, however, in a positive way the regular physical activity practice, and a proper sleep hygiene routine, which has the purpose improve the sleep quality, can help in mental health.

On the other hand, the absence and/or the inadequate physical activity practice, such as an inadequate sleep hygiene routine, promote sleep disorders, apathy, physical tiredness, fatigue and mental confusion, metabolic disorder, as obesity, diabetes, hypertension, among others, in this sense, enlarging, increasingly, the health risks (Bahia, Soares and Winck, 2006).

Complementing this, we have the World Health Organization (2015), presenting that mental health can be conceived as a welfare state, where the subject is able to use his own abilities, recover from daily stress and be active and contributor in his environment.

In this way, in the education context, the schoolchildren correspond to all school-age children and adolescents, who attend an educational institution. And these are exposed daily to stress arising from school dynamics, parents pressure/charge, society stereotypes, conflicting relationships, etc, that in one way or another, directly affect their social psychic development and their wellbeing.

In this sense, according to Ropke and collaborators (2017), studies have shown that physical exercise positively promotes a more adequate quality of life such in schoolchildren individuals, as in health populations.

Due to that, the regular practice of physical activity positively influences several variables in schoolchildren's lives, such as, energy to go to the school, memory development, better nights of sleep, disposition to do homework, diseases prevention, in the end collaborate to a good mental health.

Thus, this study is justified, because it aims to verify in scientific literature, the studies

about the effects/relations among physical activity, quantity and quality of sleep and problems related to schoolchildren mental health.

Therefore the aim was review in scientific literature about the effects/relations of physical activity, sleep and mental health in schoolchildren. And as an affirmative hypothesis (H_1) it will be shown, by literature, that there are beneficial effects/relations among physical activity, quality of sleep and mental health in schoolchildren.

MATERIALS AND METHODS

Kind of study

Systematic Review of literature about scientific articles in scientific journals placed in the following databases: Scientific Electronic Library Online - Sicelo.Org; Latino-Americana Literature and from Caribe in Health Science - Lilacs; Dialnet; Red Iberoamericana de Innovación e Conocimiento Científico - Redib; Web of Science; Medline/Pubmed.

Systematic Review studies, according to Gomes and Caminha (2014), allow the development of guidelines to professional acting and make possible the investigation of procedures of new interventions.

Conceptualization

To this study it is used the concepts of review proposed by Thomas, Nelson and Silverman (2012) and the search will follow the procedures proposed by Navarro and Navarro, (2012) and as evaluation criteria of technical quality and scientific of texts will be the use of the scale proposed by Galna and collaborators, (2009).

Experimental Procedures

This review was based in constant publications in the follow data bases and we present its respective electronics addresses: Scielo (scielo.org); Lilacs (lilacs.bvsalud.org); Dialnet (dialnet.unirioja.es); Redib (redib.org); Web of Science (periodicos.capes.gov.br); Medline/Pubmed (pubmed.ncbi.nlm.nih.gov).

To initiate the study, it was verified the adequacy of the Search terms at Health Sciences Descriptors (DeCS) from Virtual Health Library (VHL).

Then, it was quantified in the wingspan/quantity, table 1, these predetermined terms in each database, the possible studies eligible to the realization of this systematic review.

Table 1 - Search result with one term.

Terms	Scielo.org	Lilacs	Dialnet	Redib	Web of Science	Pubmed/ Medline
Physical Activity	4.152	2.982	2.058	4.729	59.420	557.442
Sleep	1.953	4.306	23.319	781	133.357	223.345
Mental Health	6.506	5.913	1.181	2.586	71.983	368.573
Schoolchildren	8.488	43.833	22.219	33.270	7.983	14.431

In view of the expressive result of publications, a refinement was then carried out in the search with the combination of 3 terms, as shown in Table 2.

Table 2 - Search result with 3 terms.

Terms	Scielo.org	Lilacs	Dialnet	Redib	Web of Science	Pubmed/ Medline
Physical Activity + Sleep + Schoolchildren	7	1	1	3	3	64
Physical Activity + Mental Health + Schoolchildren	7	1	1	9	2	29
Sleep + Mental Health + Schoolchildren	0	3	0	0	0	13
Total	14	5	2	12	5	106
Excluded	9	4	2	10	2	96
Included	5	1	0	2	3	10

And after the search with the combined 3 terms, on the data bases, proceeded to digital files transfer, and after that based in the described inclusion and exclusion criteria, after that, it was evaluated the quality of the scientific texts in function of Galna scale (reference) to posterior observations of the variables to be considered in the scientific publications according to the review aim.

In figure 1, it is shown the fluxogram with the search terms from this systematic review, the quantity of articles selected in the databases, and the result of the application of selection/eligibility (exclusion/inclusion) criteria for articles.

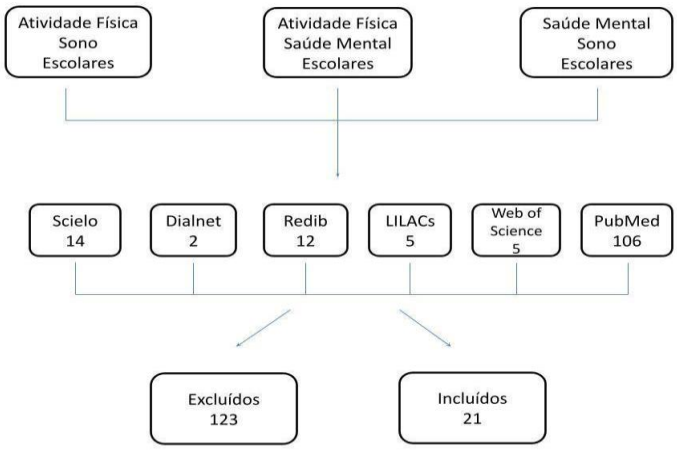

Figure 1 - Search Fluxogram.

Inclusion and Exclusion Criteria

The inclusion criteria determined to this systematic review are the following: electronic access, free access, complete and available text, written in Portuguese and/or Spanish and/or English, and that has been evaluated by Galna scale had equal or superior to 8.0 punctuation.

The Galna scale evaluation items are the following: 1) Clarity of the study aim; 2) Participants detainment; 3) Description of sample selection; 4) Detailing the inclusion and exclusion criteria; 5) Control of Covariates; 6) Clarity in the description of the main results; 7) Adequacy of the methodology for the reproduction of the study; 8) Ability of the methodology to answer the study questions; 9) Methodology reliability; 10) Internal validity of the methodology; 11) Answering the research questions in the discussion; 12) Key findings supported by the results; 13) Logical interpretation of results supported by scientific literature.

Were excluded from this systematic review, thesis texts, dissertations, editorials, texts from journals and repeated articles found in different databases, systematic reviews that showed equal index or inferior to 7.9 on the Galna scale.

All the terms and criteria of the articles search procedures, reading and analyzing variables in articles, assignment of the Galna scale index for articles and writing the text presented are agreed among the researchers of this review study.

Then we present the description/text writing, referring to the qualified articles to this review, obeying to the following descriptive procedures: author and date, aim of the study, sample size and their characteristics, kind of study, experimental procedures, instruments used, and then the results and the conclusion of the study.

Statistic

Will be used the descriptive statistic as absolute value and percentage value, and the mean.

RESULTS

From the total of the initial search on the databases with the combination of the search terms it was found 144 eligible articles, however, were selected 21 articles and these are presented in topics, being the physical activity, the quality of sleep, and mental health, and in ascending chronological order, next.

Physical Activity

According to Giugliano and Carneiro (2004), with the aim of analyzing the relationship among obesity in schoolchildren, physical activity, hours of sleep from children, schooling and parents obesity, in a school-based cross-sectional study with 452 schoolchildren participants, from both sexes, on the age group of 6 to 10, using a wall metal tape measure (2m), brand Sanny with accuracy 0.1cm for height measurement; Using digital scale from brand Filizola, with capacity from 0 to 150kg/100g to weight measurement; and an adipometer brand Lange with precision of 0.5mm for skinfold measurements (All the anthropometric measurements were made according to the Anthropometric Standardization Reference Manual, it was found the following results: The prevalence of overweight and obesity were from 21.1% on the boys and 22.9% on the girls; The adiposity was correlated directly with the sitting time and inversely with the hours of sleep, with the following conclusion: The study highlights the children inactivity as one of the factors to obesity. The hours of sleep presented themselves as a positive factor in the maintenance of weight-height balance.

As stated by Boscolo and collaborators (2007), with the aim of investigate the parameters related to quality of sleep, physical activity levels, usual physical activity level (UPAL) and cognitive function of teenagers in a school-based cross-sectional study with 45 schoolchildren participants, Brazilians, from one public school (A) and two private schools (B and C); using the Sleep Questionnaire (Rombaldi and Soares, 2015 apud Braz, Neumann and Tufik, 1987), the Habitual Physical Activity Level Questionnaire - HPAL, and the Memory Evaluation - Wechsler Memory Scale Revised (WMS-R) it was found the following results: significant differences ($p \geq 5$) among the students from schools A and B as for the index of physical activity at leisure, 73.3% of the students from school A reported desire for change on sleep habit and 40% reported panic episodes upon waking, with the following conclusion: the data found show that the period of study and the sleep habits are interconnected and they can influence school performance of school adolescentes.;

In accordance with Rombaldi and Soares (2016), with the aim of investigate indicators of regular practice of physical activity and of sleep quality in school adolescents in Pelotas-RS, in a school-based cross-sectional study with 85 students/adolescents, participants, from both sexes, among 14 and 18 years old, who attended high school; using the Socioeconomic Questionnaire (ABEP, 2009), the Physical Activity Questionnaire (elaborate by Bastos and contributors) and the Braz, Neumann and Tufik's Sleep Questionnaire (1987) were found the following results: the male adolescents were more active and their average sleep time varied around 7h30m from Monday to Thursday, 5h30m on Fridays and more than 10h on weekends and holidays independently of physical activity quantity, with the following conclusion: the habits and sleep of the adolescents were disorderly and out of norm.

In accordance to Manholer, Legnani and Legnani (2016) with the aim of describe and identify the possible associations among the Physical activity quantity, body weight and hours of sleep in schoolchildren from high school of a Curitiba federal public school, in a school-based cross-sectional study with 139 schoolchildren participants, 42 female and 97 male, with average age of 15.4 ±0,74; using the Webcas electronic Questionnaire, suggested by Legnani (2015) it was found the following results: 78.4% were classified as having normal weight, 3.6% obese and 16.5% with overweight, also 74.1% were classified as sedentary, 6.5% little active and 62.6% were classified as having a adequate sleep, with the following conclusion: the schoolchildren proportion classified as sedentary was elevated, as for the body weight, most were classified as having low weight and normal weight. Most of the schoolchildren were classified with normal sleep. The amount of physical activity did not show significant association with none of the analyzed variables.

According to Christoph and collaborators (2017), with the aim of doing a pilot test from a research that measures the related factors to the weight in rural and urban schoolchildren from Uganda, in a cross-sectional study with 148 rural and urban schoolchildren with age among 11 and 16 in the center of Uganda; using questionnaires to make the correlation and the test t, it was found the following results: Young people had on average 12.1 years old; underweight (10%) it was more common than overweight (1.4%).

The self-reported sleep duration and subjective sleep quality did not differ between rural/urban and residence. Altogether, the rural children had a highest BMI percentile and the prevalence of dwarfism marginally higher. In the adjusted analyses on complete and non-stunted samples, the highest BMI percentual was related to life in the countryside, higher physical activity frequency and higher subjective sleep quality, it was negatively related to being active on the weekends. In the complete sample from this study, the highest BMI percentile was also related to the female sex, with the following conclusion: the BMI percentile was related with various sociodemographic factors, of sleep and physical activity among school children, mainly with normal weight in Uganda, providing a basis for understanding body weight in the context of nutritional transition.

As stated by Riso and collaborators (2018), with the aim of evaluate the association of objectively determined daily physical activity, sedentary time sleep duration and body composition in 10 to 12 years old children, in a cross-sectional study with 211 schoolchildren participants, 96 boys and 115 girls with average age in Years of 10.9 ±0,7, using accelerometer and anthropometric parameters, it was found the following results: the boys outperformed the girls in time spent in moderate to vigorous physical activity and vigorous physical activity. Only 4.3% of the children answered the current daily recommendation of at least 60min of moderate to vigorous physical activity per day. Sleep duration, moderate to vigorous physical activity and vigorous physical activity had negative association with body fat percentage and the waist/height ratio. The vigorous physical activity had a positive association with lean body mass.

The sedentary time had a positive association with body fat percentage and negative association with fat free mass, with the following conclusion: the sleep duration and moderate to vigorous physical activity are associated with body composition parameters. higher amounts of moderate to vigorous physical activity are associated with the lowest percentage of fat and waist-to-height ratio, independently of sleep duration. The sedentary time is associated with higher values of body fat percentage and lower fat free mass independently of sleep duration.

Sleep Quality

According to O'Dea and collaborators (2012), with the aim of examine the longitudinal relationships among body mass index (BMI), sleep duration and socioeconomic stratification in a 4 year cohort with Australian children, in a longitudinal study with 939 schoolchildren aged between 7 and 12 years old, using a maternal questionnaire: each mother participated in a telephone interview to provide children's demographic information and answered a self-report questionnaire with closed questions, measurement of parental education and school status, it was found the following results: the body mass index increased with the decrease of amount of sleep; at 4 years, after the baseline control, a low socioeconomic stratification was a predictor to a higher body mass index; those with lower BMI were the children with higher socioeconomic stratification, and higher sleep duration, with the following conclusion: low socioeconomic stratification and low sleep

duration predict obesity risks in children and that becomes stronger in children in Early adolescence.

In concordance with Gustafsson and collaborators (2015), with the aim of comparing the blood pressure values and cardiometabolic risk factors in relation to different times of sleep in Machupe Amerindians schoolchildren (teenagers) or of European ancestry, in a longitudinal study with 568 finish students aged between 10 and 15. Using hierarchical linear mixed models of questionnaires, it was found the following results: the more daytime sleepiness occurred, less the health state and life quality, the similar linear association was observed in every age group; the amount of sleep was significantly associated to the positive linear form with health and quality of life, but not persistent in every age group. The positive association was significant to the schoolchildren aged 15 years, but not for other age group. Similar linear association between daytime sleepiness and school-related sub scores also were found, with the following conclusion: enough sleep is essential for quality of life related to health and should be protected and measured in the school health service.

According to Aguero and Rivera (2016) with the aim of determining whether there is an association among night sleep deprivation during the week and on the weekends, eating habits, physical activity and nutritional state among Chilean schoolchildren, in a cross-sectional study with 1810 schoolchildren, Chileans, from both sexes, aged between 6 and 11 years. Using the Pittsburgh Sleep Quality Index (PSQI), it was found the following results: of these students, 49.9% slept fewer hours per night than recommended.

An association in the raw model, in the number 2 model adjust for cola drinks and in number 3 model adjust for dinner, consumption of soft drinks and caffeinated beverages. It was also noted that exercise was a protection factor Against overweight and obesity, nevertheless, periodic limb movements during sleep was a risk factor, with the following conclusion: this study showed an association between less hours of sleep and an increased risk of overweight/obesity.

In agreement with Warren and collaborators (2016), with the aim of testing the hypothesis that reduce the sleep duration could negatively impact the executive function (EF) and lead to an increase in sedentary behavior in childhood, in a longitudinal study of 3 years, with 709 students from South California that participated the Pathways to Health school health promotion program. It was found the following results: the 4th and 6th grades sedentary behavior were predicted by weekly sleep duration and heart rate (HR), both had a direct path and an indirect path through executive function changes, the 5th grade were significant, as were the total effects.

The 5th grade executive function (EF) was significantly associated with 6th grade sedentary behavior. The parental rules that control screen time and the white ethnicity families were significantly associated with 4th grade increased sleep, while, increased physical activity was associated with the decreased sleep in 4th grade and executive function (EF) increased in 5th grade. Male sex and blacks were associated with increase of initial sedentary behavior in 6th grade. With the following conclusion: the study found out that the average nighttime sleep duration was significant and it is associated with the elementary students' sedentary behavior, and that this association was significantly measured by the children's heart rate.

As stated by Aguero, Giraldo and Guerra and Guerra (2017), with the aim of establish the relation among sleep duration, nutritional state and consumption of caffeinated beverages, in a cross-sectional school-based study with 805 schoolchildren from 6 to 20 years old, in 6 neighborhoods from Santiago, Chile. Using questionnaire for the parents and anthropometric evaluation on the children, it was found the following results: 52.6% of schoolchildren were obese and 46.4% slept the recommended amount (>10h). The sleep amount was significantly larger in schoolchildren with normal wight than obese, with the following conclusion: over half of these Chilean children slept less than the recommended amount, the obese schoolchildren slept less than the normal weight children.

In concordance with Ferrari Junior and collaborators (2017), with the aim of analyses the factors associated with short sleep duration in Amazonian teenagers, in a cross-sectional epidemiological study with 2517 teenagers, 1106 male and 1411 female, aged among 14 and 19 years old, enrolled in high schools from public schools in the state of Amazonas. Using the Catarinense Lifestyle questionnaire (COMPAC II); Adapted questions, such as: "On average how many hours you sleep per day in

a typical week?", "During a typical week, in how many days do you engage in moderate to vigorous physical activity?" and "During a week, how long do you engage in moderate to vigorous physical activity?". It was found the following results: There was no difference between the prevalence of short sleep duration between males and females; the teenagers who study in the morning shift were more likely to have short sleep duration, followed by those from the night shift compared to those from the afternoon shift; higher odds of having short sleep duration were observed among the teenagers that worked, as well as among those physically inactive, with the following conclusion: the results showed that biological, behavioral and environmental factors are important to sleep duration in teenagers.

According to Lima and collaboators (2018), with the aim of estimate the joint prevalence of insufficient hours of sleep/day and excess body adiposity in schoolchildren, as well as verify the sociodemographic characteristics, related behavioral, in a school-based cross-sectional study with 975 schoolchildren, aged among 11 and 14 years old from Florianopolis. Using a protocol from the International Society for the Advancement of Kinanthropometry (ISAK), the questionnaire about the sleep habits that was structured by with questions asked by the researchers, the skinfold measurements that were esteemed using the Lohman's predictive equation and the data about socioeconomics identification. It was found the following results:

The joint prevalence of insufficient hours of sleep/day and excess body adiposity was 25.1%, the sociodemographic and behavioral factors predictors of this condition were in the group age of 13 to 14 years old and with monthly income in the middle tertile, with the following conclusion: little more than a quarter of the schoolchildren showed, concurrently, insufficient hours of sleep/day and excess body adiposity. The subgroups belonging to the group age between 13 and 14 years old and to the monthly income in the middle tertile were more likely to simultaneously present insufficient hours of sleep/day and excess body adiposity.

In agreement with Sawa, Hashizume and Abe (2019), with the aim of analyze the effects that the habits from the different lifestyles have on physical/psychosocial health and how different habits influence the health of schoolchildren, in a cross-sectional study, with 576 schoolchildren of a primary school from Toyama, Japan, in 1 to 4 and 5 to 6 grades. Using the Questionnaire of the Ministry of Education, Culture, Sport, Science and Technology (MEXT - 2000), it was found the following results: in the 1 to 4 grades, the age had direct effect in body weight, in the physical/psychosocial health (PPH) total score and in total score from the physical aptitude test, in 5 to 6 grades, the age had direct effect in body weight and in total score from the physical aptitude test, with the following conclusion: this study reveals the relation among physical activity, sleep duration and breakfast consumption with physical/psychosocial health (PPH) of schoolchildren in grades 1-4 and 5-6. These findings could be used to develop interventions tailored to the specific characteristics of the schoolchildren.

As stated by Álvarez and collaborators (2019), with the aim of compare the values of blood pressure and cardiometabolic risk factors in relation to the different times of sleep in Amerindians Machupe or European ancestry schoolchildren, in a cross-sectional study with 540 Chileans schoolchildren aged among 6 and 13 years old. Using systolic blood pressure and diastolic blood pressure, body mass, body mass index (BMI), waist circumference, fat mass, lean mass, resting heart rate, oxygen saturation; hand grip of the dominant and non-dominant arm as parameters, it was found the following results: From Q1 and between Q2, Q3 and Q4, there was an increase in mean delta systolic blood pressure in schoolchildren, from a 30 to 90-minute decrease in sleep time. The worsening trend of other cardiometabolic risk factors was maintained for mean delta BMI (Δ +2.6 kg/m2), waist circumference, and fat mass in Mapuches, meanwhile the European pairs showed indicators of reduced waist circumference in Q2, Q3 and Q4 compared to Q1. There was also a higher prevalence of hypertension in Mapuche (31.1%) compared to European schoolchildren (17.6%). With the following conclusion: Machupes and European schoolchildren showed higher values of systolic blood pressure with decreased sleep time of 30 minutes. In addition, there is a higher prevalence of hypertension and obesity in Mapuche than in Europeans, indicating that more studies should be applied at early school age to prevent low sleep time and its related cardiometabolic risk factors for the development of hypertension in different groups ethnic.

In concordance with Orden and collaborators (2019), with the aim of identify individual and family factors related with obesity in children, in a cross-sectional study with 1366 schoolchildren, aged among 6 to 13 years old. Using the International Task Force (IOTF), it was found the following results: 20% of the children were categorized woth overweight (OW) and 12.2% obese (OB). The parents' score of the International Task Force (IOTF) was positively associated with overweight/obesity, the Other variables were negatively associated with overweight and obesity: hours of sleep, physical activity and daily milk intake. The International Task Force (IOTF) predicted overweight and obesity, while hours of sleep predicted overweight and the physical activity predicted obesity. With the following conclusion: the family should be considered the initial target for effective strategies to reduce obesity, with the introduction of physical activity, promotion of milk and dairy intake, as well as sleep hygiene, can play an important role in reducing obesity because of its protection and positive effects.

Mental Health

According to Lopez Sanchez, Lopez Sanchez and Suerez (2015), with the aim of study the effects of a physical activity program in sleep quality in a schoolchildren group with Attention Deficit Hyperactivity Disorder (ADHD), in a cross-sectional study, with 12 participants students, 12 boys aged among 7 to 12 years old. Using pre-test, intervention and post-test and the sleep quality index, it was found the following results: 16.6% of the schoolchildren increase sleep quality.

In agreement to Gerber and collaborators (2016), with the aim of explore if the physical aptitude is capable of dampen the negative effects from psychosocial stress on retinal vessel diameters and blood pressure in young children, in a cross-sectional study, with 325 participants students from elementary school (51% girls, with an average age of 7.28 years old). Using Static Retinal Vessel Analyzer (SVA-T, Impedos Systems UG, Jena, Germany); Blood pressure; 20m running test; Wall-mounted stadiometer and electronic scale and Questionnaires for parents and guardians, it was found the following results: critic events of life and stress associated with Family, colleagues and school were just weakly associated with retinal vessel diameters and blood pressure. No support was found for a stress-buffering effect of physical fitness, with the following conclusion: more research is necessary with different groups of school age to discover from what physical aptitude can protect against narrowing of the vessels and the occurrence of other risk factors for cardiovascular diseases.

As stated by Gerber and collaborators (2017), with the aim of examine for the first time in students from first grade if the physical activity and the physical preparation can moderate the relation between the psychosocial stress and obesity-related measures, in a cross-sectional study with 325 schoolchildren from elementary school (51% girls). Using a report that parents responded to, and a 20m running test it was found the following results: children experiencing increased school-related stress had lower body mass index, body fat and waist circumference. With the following conclusion: this study shows that a good aptitude is associated to a better body composition of children with high school related stress. The results indicate that policies aimed at reducing overweight and obesity should include the promotion of physical activity in and out of school context.

In concordance with Bruusgaard, Smedbraêten and Natvig (2000), with the aim of examinate the associations among self-report of body pain, mental suffering and sleep problems in children in school age to test some hypotheses, in a cross-sections study, with 569 schoolchildren from 4th grade (average age of 10.5 years old), 7th grade (average age of 13.5 years old) and 9th grade (average age of 15.5 years old) from all schools in a local community. Using the Self-esteem, body image, physical activity and pain Questionnaire, the following results were found: we found a strong association between reporting pain, mental distress and sleep problems. Knee pain was the Only reported problem more frequently by boys than girls, and knee pain did not show the same association with mental suffering and sleep problems as the pain in other body parts, with the following conclusion: a possible cause/effect relationship between pain, mental distress and sleep problems, and the possibility that all complaints are simultaneous signs of a multi-symptom.

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DISCUSSÃO

In the studies presented in this systematic review, a total of 13.150 schoolchildren were sampled comprising an age range of a minimum of 6 years old and a maximum of 19 years old, therefore, children and adolescents. Being used a a variety of instruments, such as questionnaires, where were found the following to evaluate the sleep of schoolchildren: Cleveland Adolescent Sleepiness Questionnaire (Vilela and collaborators, 2016); Sleep Disturbance Scale for Children (Vilela and collaborators, 2016); Sleep Questionnaire (Rombaldi and Soares, 205 apud Braz, Neumann and Tufik, 1987), Pittsburgh Sleep Quality Index (PSQI) (Aguero and Rivera, 2016). To evaluate the quantity of physical activity, socioeconomic level and lifestyle were used the following questionnaire: Socioeconomic Questionnaire, determined according to Abep in 2009 (Rombaldi and Soares, 2016).

Questionnaire about Physical Activity (elaborated by Bastos et al., 2008) (Rombaldi and Soares, 205); General Health and Sexual Maturation Questionnaire (Vilela and collaborators, 2016); Electronic Questionnaire Webccas (Manholer, Legani and Legani, 206); Habitual Physical Activity Level Questionnaire - HPALQ (Boscolo and collaborators, 2007); COMPAC II Questionnaire (Catarinense Lifestylee) (Junior, Pinto and collaborators, 2017); Questionnaire of the Ministry of Education, Culture, Sport, Science and Technology (MEXT - 2000) (Sawa and collaborators, 2019). Directing the data collect about mental health, quality of life, wellbeing and stress were found the following instruments: Self-Esteem, Body Image, Physical Activity and pain Questionnaire (Bruusgaard e Natvig, 2000); Memory Evaluation - Wechsler Memory Scale Revised (WMS-R) (Boscolo and collaborators, 2007).

In relation to the anthropometric parameters were presented the following instruments: International Society for the Advancement of Kinanthropometry Protocol (ISAK) (Lima and collaborators, 2018); Body Mass Index; Skin Folds; Blood Preasure; Waist Circumference; Resting Heart Race; Oxygen Saturation; Hand Grip Strength; 20m Race; Accelerometry; Anthropometry.

Eighteen (18) studies were cross-sectional and three (3) longitudinal. In cross-sectional studies presented, male school children were more physically active and the amount of sleep increased on the weekends and holidays regardless of the amount of physical activity. In the context of the culture that involves Brazilian schoolchildren (children and adolescents), since childhood, boys are influenced to be more physically active, and this continues during adulthood, can be, one of the reasons for what the male adolescents are more actives, next to that, the adolescents' sleeping habits were unruly and out of the ordinary, even with the amount of sleep increasing on weekends because they don't have to go to school or fulfill obligations they would have during the week. Therefore, the overweight and obesity prevalence was bigger in female school children adolescents, who always are influenced to do statics activities.

Thus, sleeping habits and amount of physical activity are interconnected and can influence the school performance of children and adolescents (Boscolo and collaborators, 2007). Given that, adiposity was directly correlated with the time spent sitting and studies highlight the children inativity as one of obesity factors, being that it is possible to say that children with a physiccaly active lifestyle tend to live healthier and higher school performance regardless of the sex of the child (Giugliano and Carneiro, 2004).

However, in a study by Manholer, Legnani and Legnani (2016), the amount of physical activity did not present significant association with none of the analyzed variables, those are hours of sleep and body weight, together we have Riso and collaborators (2018), stating that bigger amounts of physical activity, moderate to vigorous, are associated to a lower body fat percentage and waist-to-height ratio, regardless of sleep duration. In Other words, the authors stated that hours of sleep do not have relation with the children and adolescent lifestyle and if they are practicing physical activity or not.

It is also added that the Body Mass Index (BMI) percentile was related to several factors such as sociodemographic, sleep and physical activity among the children in school age, mainly with normal weight. In general, the rural children presented higher BMI percentile, because the highest BMI percentage was related to life in the countryside, higher frequency of physical activity and higher subjective quality of sleep, which was negatively related to being active on the weekends. In the sample of the studies

presented, the higher BMI percentile was also related to females (Giugliano and Carneiro, 2004), one more time the girls being presented with a higher body mass index, due to standardized/established lifestyle in our society.

In one of the four cross-sectional studies about mental health included, 16.6% of the schoolchildren with Attention Deficit Hyperactivity Disorder (ADHD) increased the quality of sleep and focus capacity after 12 weeks of intervention with physical activity and focus exercises (Lopez Sanchez, Lopez Sanchez, Suarez, 2015).

Was also found, in the studies, a strong association among pain report, mental suffering and sleep problems. Mental stress caused at school was pointed as a reason for poor sleep quality in some schoolchildren, they were with mental health at risk due to school demands, which led to poor sleep quality and they were not willing to do any physical activity, which worsened the situation (Bruusgaard and Natvig, 2000).

In addition, schoolchildren in final grades presents a higher mental stress and worst sleep quality, because older adolescents have already experienced the onset of puberty, where, high hormonal loads, mood swings, anxiety, need for acceptance, among others, end up resulting in greater stress, thus altering mental health (Sawa and collaborators, 2019).

Critical life events, such as stress related to the family environment, friendships, and school activities, were related to low physical fitness in schoolchildren. Adolescents are not worried with health, either physical or mental, everything is felt/experienced with maximum intensity, and studies have shown that the practice of physical activity and good sleep hygiene can help, at this stage, experienced by schoolchildren in a school and family environment

In front of the exposed in this study, we present as a limiter, the scarcity of experimental intervention procedures, in view of the possibility of carrying out a meta-analysis to establish/create a possible physical activity protocol aiming in favorable interfering in quantity and quality of sleep, as well as in schoolchildren's mental health.

CONCLUSION

As a conclusion, we have that, the schoolchildren have insufficient hours of sleep per day, with inappropriate sleeping habits what in this way decreases its quality, with the presence of deficits and sleep disorders related to the age, kind of school (public or private), socioeconomic stratum, the amount of physical activity and body mass index.

These findings had better incidence in schoolchildren initiating adolescence and that the less hours of sleep, the larger the risk of obesity or being overweight.

Bigger quantities of physical activity are associated with the smaller percentage of body fat, schoolchildren that present low quantities of physical activity, tend to remain inactive into adulthood with high obesity indexes.

It is inferred that, the greater the amount of physical activity, better the sleep quality, better will be the schoolchildren mental health, although, more studies are required to know until where the school stress can affect the destined time to physical activity and with the presence of sleep disorders, in schoolchildren lives.

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