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Factors associated with cardiovascular disease in children and adolescents: a cross-sectional study

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ABSTRACT

Aim: To analyze the relationship between the factors associated with cardiovascular disease (CVD) and socioeconomic and clinical data in children and adolescent students. **Methods**: A cross-sectional study conducted via a form, with 373 students of primary and secondary public schools of the northeastern region in Brazil. Data were organized in spreadsheets and analyzed using descriptive and inferential statistics. **Results**: Modifiable and non-modifiable factors associated with CVD were presented in the sample. Those associated with socioeconomic and clinical features were: alcohol consumption, smoking, physical activity, active recreation and adequate dietary pattern. **Conclusion**: Cardiovascular disease was associated with modifiable and non-modifiable factors presented in relation to the socioeconomic and clinical data. Thus, this highlights the importance of prevention and the promotion of cardiovascular health in students.

Descriptors: Cardiovascular Diseases; Risk Factors; Child; Adolescent; Nursing.

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INTRODUCTION

Cardiovascular diseases (CVD) are a public health problem as they form part of the main causes of mortality in the world. Data released by the World Health Organization (WHO) show that 17 million people died in 2011 due to CVD; it is estimated that by 2030 this will increase to 23.6 million[1].

Recent studies have shown that CVD have a high probability to manifest in the adult individual when they are linked to multiple associated factors, such as inadequate diet and lifestyle that arise in childhood and adolescence, and subsequently advance to adulthood[2, 3].

Among the factors that cause these diseases there are those that increase the likelihood of their occurrence: inappropriate food pattern (diet rich in saturated fat, cholesterol, salt and glucose), sedentary lifestyle, stress, alcoholism, smoking and heredity factors - the latter is the only one which cannot be modified[2].

Modifiable factors such as inadequate dietary pattern and physical inactivity can cause obesity in the individual. This is considered a global problem and can cause other diseases such as hypertension, diabetes and dyslipidemia[3].

Obese children with associated comorbidities (hypertension, hyperlipidemia, metabolic syndrome and stress) are more likely to develop CVD in adulthood[3]. However, it is known that regular physical activity can greatly decrease the risk of developing glucose intolerance, hyperlipidemia, hypertension and stress issues, thus reducing the probability of their occurrence[4].

In addition, the abuse of alcoholic beverages, which have connection with the increase in blood pressure, represents a risk factor for cardiovascular disease. And also for tobacco, which contains substances that can act locally or systemically by releasing elements such as catecholamines which excite the heart, increasing heart rate and blood pressure, and thus cause cardiac and vascular damage[5].

Thus, it is clear that potential associated factors can be instilled at an early age and move gradually into adolescence and adulthood to result in CVD, while only the heredity factor is not subject to change. In this sense, we question the relationship between the factors associated with CVD and the variables in the socioeconomic and clinical context of children and adolescents. Identifying these relationships will allow the establishment of nursing interventions focused on each individual's particularity. This will to contribute to the modification of inappropriate lifestyle habits and health promotion, aimed at the social and clinical situation.

The aim of this study was to analyze the relationship between factors associated with CVD and socioeconomic and clinical data in children and adolescent students.

METHOD

We used a cross-sectional study in a population made up of children and adolescents enrolled within state schools in northeastern Brazil. The study sample was calculated based on the formula for infinite population. The parameters considered were a study confidence level of 95% ($Z\alpha = 1.96$) and a sampling error of 5%; as for the prevalence of the event, we calculated a conservative value of 50%, ending with a sample of 373 students.

The schools' sorting for the research was done through a draw. To do so, a tag with the name and address of all public schools in the capital city was printed. We made four boxes, each one labeled with one of the four county areas: north, south, east and west. Then, we read up the address of each school, and using the neighborhood variable the names of the schools

were deposited in each appropriate box. Finally, two schools were randomly chosen from each box for each of the four areas of the city.

Through the draw made in each of the eight schools, a group from an elementary school and another from a high school were selected to the sample. When the number of participants did not match the expected area covered, a new random selection was done and a new group of children from the elementary high and schools was inserted into the collection, respecting the number of participants previously set: 160 students from the north; 45 students from the south; 45 students from the East Zone and 123 students from the West Zone. When a selected group exceeded the number of participants indicated to a school, only the equivalent calculated in the sample was admitted in the study.

The following were adopted as inclusion criteria: being a child or adolescent aged between seven and 17 years and being enrolled in one of the schools selected for the study. And as exclusion criteria: being on sick leave at the time of data collection or absent from school for some other reason.

Data collection was performed by nursing students in their final year at a federal nursing school, from August 2013 to May 2014, using a structured assessment form for:

- Socio-demographic data (gender, age, family income and education) and family history of disease (obesity, hypertension, diabetes, heart disease and dyslipidemia). These variables were measured by directly questioning the children and adolescents in the study;
- Anthropometric measurements: body mass index, calculated by dividing weight by height squared. These values were measured with a height scale. We also measured waist circumference using an anthropometric tape around the umbilical scar line;
- Diet pattern;
- Physical activity, leisure, smoking and alcohol drinking habits;
- Blood pressure and heart rate.

The dietary pattern was evaluated through the presence or absence of an appropriate diet, which is configured as five to six meals per day with varied distribution of food and does not include an excess of soft drinks, artificial and soy-based beverages, foods high in fat, salt and sugar - such as fast food, chips, crackers, baked goods containing trans and saturated fats, canned foods, sausages and processed spices, according to the Brazilian Society of Pediatrics[6].

The physical activity habit was verified by the presence or absence of sports activities or those involving physical exercise for at least three times per week, since physical activity can be defined as any form of movement involving the body that can lead to energy consumption and increased metabolic rate[1]. The leisure habit was verified as the presence or absence of physical leisure activities according to the Brazilian Society of Pediatrics[6].

The habit of drinking alcohol and smoking was considered present for those students who said they drank alcohol and/or smoked sporadically, daily or weekly, until the day of data collection. Those who reported having experienced alcohol or tobacco only once, and deemed these were not part of their daily habit, were not considered.

Evaluation of blood pressure was performed as recommended by the VI Brazilian Guidelines on Hypertension and the Brazilian Society of Hypertension, using palpation and auscultation with aneroid devices calibrated at the beginning of data collection by trained personnel, finding the systolic and diastolic blood pressure rates. Then, with the two measures the mean arterial pressure (MAP) was calculated[7]. The heart rate was measured by applying the index and middle

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fingers of the evaluators over the radial artery of the subjects.

After the collection of data, a database for analysis was created using *IBM SPSS version 19.0 for Windows* statistics software, generating descriptive data and p-value for the Kolmogorov-Smirnov (to check the distribution of normality), chi-square and Mann-Whitney tests (to check for associations between the variables proposed by the study). The significance level was 5% ($p < 0.05$).

It is important to register that the project was approved by the Research Ethics Committee of the institution responsible for the research, with protocol number 347 902 and CAAE 18703213.7.0000.5537. The participation of children and adolescents in this study was done with parental consent, by signing the Informed Consent Term, according to the standard that regulates research involving human subjects.

RESULTS

Most of the 374 students interviewed in this study were female (61.2%), had family income of 0 to 5 minimum wages (95.7%), claimed not to be alcoholic (89.3%), were not in the habit of smoking (96.3%), practiced physical activity (55.1%), had no physical leisure activity (87.7%) and had inadequate dietary pattern (73.5%). With regard to family history, 26.5% of parents in this sample had hypertension, 14.2% presented obesity, 9.9% had Low Density Lipoprotein (LDL) cholesterol-type high levels, 8.6% had diabetes and 4.5% had a history of heart disease.

The variables age, educational level, heart rate, waist circumference and BMI showed asymmetric distribution (p value <0.05) for the Kolmogorov-Smirnov test, indicating an average of 13 years old, seven years of education, 75.5 heartbeats per minute, 71 cm (waist circumference) and 19.5 kg/m^2 (BMI), respectively. The mean MAP was 146.9 millimeters of mercury (mmHg), the variations of 96.7 mmHg and 183.3 mmHg as minimum and maximum values, respectively.

Regarding the statistical association between socioeconomic variables and clinical factors associated with CVD, significant associations were identified between: gender and physical activity, physical leisure activity and appropriate eating pattern; age and alcohol consumption, smoking, physical activity and leisure activity; education with alcoholism and leisure activity; family income with alcoholism and smoking; heart rate and smoking; BMI and physical activity; MAP and leisure activity; and finally, abdominal circumference with alcohol consumption and physical activity. This is presented in Table 1.

DISCUSSION

CVD develops over decades and is related to modifiable and non-modifiable factors - so they may be preventable; however, this involves society's and, more specifically, an individual's behavioral changes[2].

Heredity is a non-modifiable risk factor for CVD, and was addressed in this study as the presence of hypertension, obesity, Dyslipidemia, diabetes and heart disease in parents of the children and adolescents studied. SAH, present in 26.5% of fathers of this population, is a factor linked to heredity, since blood pressure variability is strongly influenced by genetic factors associated with environmental factors, such as smoking, alcohol consumption and obesity[3, 8].

With regard to heredity, of the students included in the survey, 14.2% said they had parents presenting obesity, 9.9% with dyslipidemic changes (high LDL), 4.5% with heart disease and 8.6% with diabetes. One study[8] included family history as a risk for mortality from cardiovascular

Table 1 - Analysis of statistical association between factors associated with cardiovascular disease and socioeconomic and clinical variables. Natal, 2014

	n(%)	Gende-rA	AgeB	Educa-tionB	Family IncomeA	HRB,1	BMIB,2	MAPB,3	WCB,4
Alcohol Use		0,392	0,000*	0,000*	0,007*	0,22	0,059	0,119	0,007*
Yes	40 (10,7)								
No	334 (89,3)								
Tobacco use		0,15	0,001*	0,186	0,001*	0,030*	0,346	0,884	0,213
Yes	14(3,7)								
No	360 (96,3)								
Physical Activity		0,000*	0,042*	0,405	0,542	0,343	0,027*	0,458	0,012*
Yes	206(55,1)								
No	168(44,9)								
Active recreation		0,021*	0,000*	0,000*	0,98	0,65	0,127	0,011*	0,655
Yes	46(12,3)								
No	328(87,7)								
Appropriate Diet Pattern		0,044*	0,803	0,296	0,307	0,681	0,243	0,333	0,395
Yes	99(26,5)								
No	275(73,5)								
Legend: *									

Tests statistically associated. AChi-square and BMann-Whitney Test. 1Heart rate. 2Body mass index. 3Median Arterial Pressure. 4Waist cisrcumference.

DISCUSIÓN

Las ECV se desarrollan a lo largo de décadas, siendo relacionadas a factores modificables y no modificables – así pueden ser prevenibles, sin embargo eso envuelve el cambio de comportamiento de la sociedad y, más específicamente, de los individuos[2].

Como factor de riesgo no modificable para las ECV, se tiene la herencia, la cual fue abordada en este estudio como la presencia de HAS, Obesidad, Dislipidemias, Diabetes y Enfermedades cardíacas en los padres de los niños y adolescentes estudiados. La HAS presente en 26,5% de los padres de la población estudiada es un factor ligado a la herencia, una vez que la variabilidad de la presión arterial es fuertemente influenciada por factores genéticos asociados a factores ambientales, tales como tabaquismo, consumo de alcohol y obesidad[3;8].

Aún sobre la herencia, de los alumnos incluidos en la investigación, 14,2% afirmaron tener padres obesos, 9,9% con alteraciones dislipidémicas (LDL alto), 4,5% con cardiopatías y 8,6% con diabetes. Un estudio[8] incluyó la historia familiar como un riesgo para mortalidad por enfermedades cardiovasculares. En ese mismo estudio, se observa que la presencia de los factores asociados aumenta la probabilidad de muerte por ECV cuando comparados con los que no presentaban histórico familiar para comorbidades relacionadas a las ECV[8].

El conocimiento de comorbidades familiares pode reducir la gravedad con que esas enfermedades puedan venir a afectar esos jóvenes en la vida adulta. En ese contexto, son importantes acciones de prevención para las mismas. Obesidad, alteraciones dislipidémicas, cardiopatías y diabetes son enfermedades directamente relacionadas a las ECV, lo que las vuelve factores importantes para la prevención y control[2;3].

En relación a los factores asociados modificables, el presente estudio abordó la presencia del alcoholismo, tabaquismo, actividad física, ocio y estándar alimentar. Se identificaron algunas asociaciones al cruzar estadísticamente los

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disease. In the same study it was observed that the presence of associated factors increase the likelihood of death from CVD compared to those without a family history of comorbidities related to CVDs[8].

Knowledge about family comorbidities can reduce the severity of these diseases that may affect young people in adulthood. In this context, preventive measures are important. Obesity, dyslipidemic changes, heart disease and diabetes are diseases directly related to CVD, making them important factors in its prevention and monitoring[2, 3].

Regarding modifiable associated factors, this study verified the presence of alcohol consumption, smoking, physical activity, leisure and eating habits. Some associations were identified statistically, crossing cardiovascular modifiable factors with socioeconomic and clinical variables.

The alcoholism factor had statistical association with the variables age ($p < 0.000$), education ($p < 0.000$), family income ($p < 0.007$) and AC ($p < 0.007$). The use of alcohol by young people is increasingly frequent, leading to severe consequences such as liver and kidney damage, certain types of cancer, heart disease and hypertension, all of which can be aggravated by their low age[5].

The free marketing of illicit drugs, such as alcohol, may be related to their easy use by adolescents. In addition to easy access, young people can often be influenced by the media and culture, thus encouraging excessive consumption[9].

According to a study[9] that investigated the consumption of alcohol and its association with education, income and excess weight in a sample of women, alcohol consumption can be influenced by income, age and education level. Older people, with a higher education level and economic status tend to consume greater amounts of alcohol.

Usually, teenagers have a more active social life due to parties and celebrations that promote the use of this substance. Older people with better financial resources can acquire the product more easily, and therefore have easier access[9]. This finding corroborates the study of risk and protective factors for chronic diseases[10], which shows a positive relationship between higher education and the greater consumption of alcoholic beverages.

A study[9] about the association of alcohol consumption and socioeconomic and clinical variables shows that an increase in body and abdominal fat is related to moderate and frequent consumption of alcoholic beverages. This fact was also identified as statistically significant in this study when we associated the value of WC (Waist Circumference) and the consumption of alcoholic drinks.

The smoking variable was statistically associated with age ($p < 0.001$), family income ($p < 0.001$) and heart rate ($p < 0.030$). Tobacco use, especially when started early, can have serious implications on social level and health. A study in the Port district of Portugal showed that tobacco use usually begins during early adolescence[11].

The survey of Students' National Health Research (PENSE)[12], held in Brazil in 2009, investigated the smoking habits of the students in the country, revealing that students with lower incomes had a greater prevalence for tobacco consumption. There is also the fact that this low-income population often does not have access to information, education and health, resulting in higher consumption of those substances[13].

Smoking is related to several diseases, especially cardiovascular conditions among others, because it causes widespread stimulation of receptors located in the heart, generating excitatory cardiovascular effects, and a consequent increase in HR[14]. Furthermore, it generates atherosclerotic plaques in veins near

to the heart and thus increases blood pressure. These diseases associated with the prolonged use of tobacco can bring irreversible damage to its user's health[5].

Physical activity was associated statistically with gender (p<0.000), age (p<0.042), BMI (p<0.027) and WC (p<0.012). In this study, it was observed that most (56.3%) of the respondents who did not exercise were women. The difference between genders can also be seen in another study[15], which demonstrates that men are more active than women.

Regular physical activity is one of the measures to decrease weight, but is a practice barely evidenced in the school environment, especially among women[16;17]. A study[17] explains the difference between gender and activity with energy expenditure through socio-cultural aspects. Early in life, boys were conditioned to physical activities with higher energy expenditure, while girls were directed to family care. Furthermore, it is known that men and women used to be treated differently in society, in a way that there is little stimulation for women to be physically active This fact is still identified today, as we perceive a higher prevalence of active habits such as leisure with energy expenditure and physical activity in men.

Confirming the benefits of physical exercise, one study[16] states that regular physical activity protects against excessive weight gain, while sedentary habits, especially sedentary occupations and recreations, promote greater weight gain, resulting in a high BMI and high values of WC.

Obesity, identified through BMI and WC, can be a trigger for major coronary risk[3,4] in a patient. Therefore, the practice of physical activity can prevent obesity as it produces attenuating effects on cholesterol, insulin resistance, decreased of levels blood pressure and well-being[5,16]. This highlights the importance of physical activity as a means to achieve good health. In early life children and adolescents must understand the benefits of regular physical activity and its contribution to a healthy adulthood.

Active recreation achieves a statistical association with gender (p <0.021), age (p <0.000), education (p <0.000) and MAP (p <0.011). According to VIGITEL[10] data, the average prevalence of sufficient leisure time for physical activity was 30.3% among schoolchildren. These data corroborate a sedentary profile in the population, which can be attributed to lifestyle modifications arising from urban and technological developments[18].

We can observe that, overall, the average time spent in not-active leisure is significantly higher for boys. A plausible explanation for these results is that the access and use of computer applications and video games, which are sedentary activities, is higher for boys than for girls[15].

When observing the time spent by children and adolescents in activities that constrain energy expenditure (active leisure), we see a low ratio; i.e. we realize the public is devoting less time to active leisure activities. As a result, we see children and adolescents with sedentary behavior; i.e. in activities that do not increase energy expenditure substantially above a resting level, such as watching television or playing computer and video games[15].

A significant proportion of older teens do not like physical activity compared to younger teens[19]. Adolescense is the period of life in which our body and lifestyle evolve to create our adulthood. Habits acquired during this period will be carried into adulthood. Individuals who are physically active, or even those with bad eating habits and addictions like alcohol consumption and smoking, will present worrying health outcomes in adulthood[15].

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Exercise is an important tool for maintaining quality of life and the prevention of cardiovascular disease, as well as being a strong ally in controlling blood pressure. Children who practice physical activity have lower levels of blood pressure, which corroborates the study of Bundchen et al.[8], that demonstrates that individuals who practice some form of physical activity present healthier levels of blood pressure, in addition to acquiring a better quality of life. This reveals the importance of physical activity on maintaining health.

Finally, dietary pattern obtained a statistical association with the age variable ($p<0.044$). In general, along with the sedentary profile of this sample, we can perceive a low-quality dietary pattern in young people. A study conducted in São Paulo showed that young people have been adopting a diet that shows a decline in the intake of vegetables and an increase in the consumption of foods high in salt, glucose and fat, favoring the development of disease[20].

Excess fatty foods, besides promoting weight gain, also cause changes in the arterial wall and consequent formation of atheromatous plaques, reducing the passage of blood. This demonstrates that diet is an important factor in the context of CVD[20].

A research study of children indicates that the process of atherosclerosis begins at an early age, is related to obesity, and is also directly linked to cardiovascular risk factors[3], In addition, excess weight in this age group is related to the development of hypertension in children. Another study shows that a third of obese children may have high blood pressure[20], although no hypertensive children were found in this sample.

With regard to the eating habits of children and adolescents in their three daily meals (breakfast, lunch and dinner), we could observe a shortfall in the nutrition levels recommended by the literature, demonstrating, from a qualitative point of view, inappropriate eating habits as this study did not refer to the amount consumed from each food group at mealtimes.

In this context we confirm the importance of maintaining a healthy lifestyle with better quality of life. Therefore, at an early age sedentary habits should be reduced and new activities and recreation incorporated into daily life. This requires political decisions on the social and physical environment that promote changes in the urban infrastructure, in school or at work.

With regard to policies designed by the Ministry of Health on comprehensive healthcare, there is the monitoring of growth and development of children and adolescents. It aims to extend habits of a healthy life through strategies that provide improvements in the health promotion of healthy lifestyles, prevention of health problems, as well as providing care measures in a timely manner[21].

To think of actions that enable such assistance from nursing and correlate them with education, we imagine schools as a starting point, as this population spends much of its time in this environment. The meeting of knowledge from education and areas of healthcare enhances the development of actions that favor the educational dimension of health and self-care[22]. As professionals in health and education begin to collectively plan, execute and evaluate actions to promote health they may encourage care practices that join school and health promotion and, consequently, lead to an improved quality of life for that population[22].

As limits to the study, we register the lack of a direct investigation regarding the following variables related to family history of the respondents: obesity, diabetes, high LDL, high blood pressure and heart disease. This information was collected only from interviews with the children and teenagers, a fact that does not prove the presence of disease.

CONCLUSION

The children and adolescents studied showed modifiable and non-modifiable factors associated with cardiovascular disease. Among the modifiable, the more frequent were physical inactivity and inadequate dietary pattern. Modifiable factors (alcohol consumption, smoking, physical activity, active recreation and adequate food pattern) presented significant statistical association with socioeconomic and clinical variables (gender, age, education, household income, HR, BMI, MAP and WC).

Thus, we see the importance of carrying out actions to promote awareness in children and adolescents to the severity of heart disease and its consequences. Early teaching about the relevance of habits that help control and prevent CVD is important in reducing mortality from CVD in adults.

REFERENCES

1. Organização Mundial da Saúde. Cardivascular disease. Situation and trend. [Internet] Brasília: OMS; 2012. [Cited 2014 Jul 17] Available from: http://www.paho.org/hq/index.php?option=com_content&view=article&id=6685&Itemid=259&lang=es.
2. Muniz LC, Schneider BC, Silva IC, Matjasevch A, Santos IS. Accumulated behavioral risk factors for cardiovascular diseases in Southern Brazil. Rev. Saúde Pública [online]. 2012, 46(3):534-42.
3. Pizzi J, Silva LR, Moser D, Leite N. Relação entre aterosclerose subclínica, pressão arterial e perfil lipídico em crianças e adolescentes obesos: uma revisão sistemática. Arq Bras Endocrinol Metab [online]. 2013, 57-1.
4. McMurray RG. Insights into physical activity and cardiovascular disease risk in young children: IDEFICS study. BMC Medicine. 2013; 11:173.
5. Silva MS, Silva NB, Alves AGP, Araújo SP, Oliveira AC. Risco de doenças crônicas não transmissíveis na população atendida em Programa de Educação Nutricional em Goiânia (GO), Brasil. Ciênc. saúde coletiva [online]. 2014; 19(5):1409-18.
6. Sociedade Brasileira de Pediatria. Manual de orientação para a alimentação do lactente, do pré-escolar, do escolar, do adolescente e na escola. Departamento de Nutrologia, 3ª. ed. Rio de Janeiro: SBP; 2012.
7. Sociedade Brasileira de Cardiologia. VI Diretrizes Brasileiras de Hipertensão – DBH VI Diagnóstico e classificação. Rev Bras Hipertens [Internet]. 2010, 17(1):11-7. [Cited 2014 Jul 17]. Available from: http://departamentos.cardiol.br/dha/vidiretriz/06-cap02.pdf
8. Bachmann JM, Willis BL, Ayers CR, Khera A, Berry JD. Association Between Family History and Coronary Heart Disease Death Across Long--Term Follow-Up in Men. Circulation. 2012; 125(25):3092–8.
9. Cibeira GH, Muller C, Lazzaretti R, Nader GA, Caleffi M. Consumo de bebida alcoólica, fatores socioeconômicos e excesso de peso: um estudo transversal no sul do Brasil. Ciência & Saúde Coletiva [online]. 2013, 18(12):3577-84.
10. Departamento de Análise de Situação de Saúde, Secretaria de Vigilância em Saúde, Ministério da Saúde (Brasil). Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico, Vigitel 2012. Brasília: Ministério da Saúde; 2012.
11. Ferreira MMSRS, Torgal MCLFPR. Consumo de tabaco e de álcool na adolescência. Rev. Latino--Am. Enfermagem. 2010, 18(2):123-9.
12. Instituto Brasileiro de Geografia e Estatística (Brasil). Pesquisa Nacional de Saúde do Escolar 2009. Rio de Janeiro: IBGE; 2009.
13. Bortoluzzi MC, Kehrig RT, Loguercio AD, Traebert JL. Prevalência e perfil dos usuários de tabaco de população adulta em cidade do Sul do Brasil (Joaçaba, SC). Ciência & Saúde Coletiva [online]. 2011;16(3):1953-9.
14. Amaral MF, Silva ML, Pinto TR, Pessoa BP, Figueiredo PHS, Diniz GCLM. Comparação entre a Variabilidade da Frequência Cardíaca de Jovens Tabagistas e Não Tabagistas. Rev Bras Cardiol. 2013;26(6):450-6.
15. Byun W, Dowda M, Pate RR. Associations Between Screen-Based Sedentary Behavior and Cardio-

Delgado MF, Frazão CMFQ, Fernandes MICD, Medeiros ABA, Lúcio KDB, Lira ALBC. Factors associated with cardiovascular disease in children and adolescents: a cross-sectional study . Online braz j nurs [internet] 2015 Mar [cited year month day]; 14 (2):168-77. Available from: http://www.objnursing.uff.br/index.php/nursing/article/view/5126

vascular Disease Risk Factors in Korean Youth. J Korean Med Sci. 2012;27:388-94.
16. Ribas AS, Silva LCS. Fatores de risco cardiovascular e fatores associados em escolares do Município de Belém, Pará, Brasil. Cad. Saúde Pública. 2014;30(3):577-86.
17. Ribeiro JAB, Cavalli AS, Cavalli MO, Afonso MR. Nível e importância atribuídos à prática de atividade física por estudantes do ensino fundamental de uma escola pública de Pelotas/RS. Revista Mackenzie de Educação Física e Esporte. 2013;12(2):13-25.
18. Barbosa JPAS et. al. Risco cardiovascular e prática de atividade física em adultos de Muzambinho/MG: influência do gênero e da idade. Rev Bras Ativ Fis e Saúde. 2013;18(2):242-52.
19. Garcia LMT, Fisberg M. Atividade física e barreiras referidas por adolescentes atendidos num serviço de saúde. Rev Bras Cineantropom Desempenho Hum. 2011; 13(3):163-9.
20. Kavey RE, Daniels SR, Flynn JT. Management of High Blood Pressure in Children and Adolescents. Cardiol Clin. 2010;28(4):597–607.
21. Ministério da Saúde (Brasil), Secretaria de Atenção à Saúde, Departamento de Atenção Básica. Saúde da Criança: Crescimento e desenvolvimento. Brasília: Ministério da Saúde; 2012.
22. Ministério da Saúde (Brasil), Secretaria de Atenção à Saúde. Manual Instrutivo: Programa Saúde na Escola. Brasília: Ministério da Saúde; 2013.

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