

Association between risk factors for hypertension and the Nursing Diagnosis overweight in adolescents

Caroline Evelin Nascimento Kluczynik Vieira¹

Larissa Soares Mariz²

Dândara Nayara Azevêdo Dantas³

Dayane Jéssyca Cunha de Menezes⁴

Márcia Camila Dantas Rêgo⁵

Bertha Cruz Enders⁶

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Objective. To identify associations between the risk factors for hypertension and the nursing diagnosis of overweight in adolescents. **Methods.** Cross-sectional study conducted in 2013 with 347 teenagers attending schools in Natal, Rio Grande do Norte, Brazil, who answered a form about the socioeconomic profile, physical activity, eating habits and family history of disease and who underwent physical examination. For

analytical analysis, two groups were formed: students with the Nursing Diagnosis overweight ($n=100$) and students without this diagnosis ($n=247$). **Results.** the risk factors for hypertension associated with the Nursing Diagnosis were: abdominal obesity ($OR=40.0$), food intake rich in sugar and fat ($OR=40.0$), family history of hypertension ($OR=6.9$), obesity and diabetes ($OR=2.0$), abnormal systolic and diastolic blood pressure ($OR=5.5$). **Conclusion.** the risk factors for hypertension that presented association with the Nursing Diagnosis overweight were abdominal obesity, eating habits, family history of diseases

1 Nurse, Ph.D. Student. Federal University of Rio Grande do Norte, Brazil. email: carolinekluczynik@gmail.co

2 Nurse, Ph.D. Student. Federal University of Rio Grande do Norte, Brazil. email: larissamariz@gmail.com

3 Nurse, Ph.D. Student. Federal University of Rio Grande do Norte, Brazil. email: dandara_dantas@hotmail.com

4 Nurse. Federal University of Rio Grande do Norte, Brazil. email: dayanemenezes.enf@gmail.com

5 Nurse. Federal University of Rio Grande do Norte, Brazil. email: marcadr_enfufnrn@hotmail.com

6 Nurse, Ph.D. Federal University of Rio Grande do Norte, Brazil. email: bertha@ufrnet.br

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and abnormal blood pressure. These findings may contribute to prevent hypertension in adolescents, in that it directs the gaze of nurses to develop effective measures to address these risk factors.

Key words: nursing; overweight ; adolescent; risk factors; hypertension.

Asociación entre los factores de riesgo para la hipertensión y Diagnóstico de Enfermería sobrepeso en adolescentes

Objetivo. Explorar las asociaciones entre los factores de riesgo para la hipertensión y el Diagnóstico de Enfermería (DE) de sobrepeso en adolescentes. **Metodología.** Estudio transversal realizado con 347 adolescentes de escuelas de Natal, Rio Grande do Norte, Brasil, quienes respondieron un cuestionario con información acerca de perfil socioeconómico, actividad física, hábitos alimentarios y antecedentes familiares de la enfermedad. A su vez, se sometieron a un examen físico. Para el análisis se formaron dos grupos: los estudiantes con el DE de sobrepeso ($n=100$) y los estudiantes sin este diagnóstico ($n=247$). **Resultados.** Los factores de riesgo para la hipertensión que se asociaron con diagnóstico de enfermería fueron: obesidad abdominal ($OR=40.0$), la ingesta de alimentos ricos en azúcar ($OR=3.5$) y en grasa (4.4); antecedentes familiares de hipertensión ($OR=6.9$), obesidad ($OR=2.0$) y diabetes ($OR=5.5$). El grupo con DE de sobrepeso también tuvo cifras promedio mayores de presión arterial sistólica y diastólica que el grupo sin el diagnóstico. **Conclusión.** Los factores de riesgo para la hipertensión que se asociaron con el DE exceso de peso fueron la obesidad abdominal, los hábitos de alimentación, los antecedentes familiares de enfermedades y la presión arterial anormal. Estos hallazgos pueden contribuir a la prevención de la hipertensión en los adolescentes, ya que dirige la mirada de los enfermeros hacia el desarrollo medidas educativas

eficaces para hacer frente a estos factores de riesgo para sobrepeso en adolescentes.

Palabras clave: enfermería; sobrepeso; adolescente; factores de riesgo; hipertensión

Associação entre os fatores de risco para hipertensão e o Diagnóstico de Enfermagem excesso de peso em adolescentes

Objetivo. Identificar associações entre os fatores de risco para hipertensão e o diagnóstico de enfermagem excesso de peso em adolescentes. **Métodos.** Estudo transversal realizado em 2013 com 347 adolescentes de escolas de Natal, Rio Grande do Norte, Brasil, que responderam um formulário sobre perfil sócio econômico, prática de atividade física, hábitos alimentares e história familiar de doenças e foram submetidos ao exame físico. Para análise analítica formaram-se dois grupos: alunos com o Diagnóstico de Enfermagem excesso de peso ($n=100$) e alunos sem o diagnóstico ($n=247$). **Resultados.** Os fatores de risco para hipertensão que apresentaram associação com o Diagnóstico de Enfermagem excesso de peso foram: obesidade abdominal ($OR=40.0$), consumo alimentar rico em açúcar e gordura ($OR=40.0$); história familiar de hipertensão ($OR=6.9$), obesidade e diabetes ($OR=2.0$); pressão arterial sistólica e diastólica alteradas ($OR=5.5$). **Conclusão.** Os fatores de risco para hipertensão que apresentaram associação com o Diagnóstico de Enfermagem excesso de peso foram a obesidade abdominal, o hábito alimentar, a história familiar de doenças e pressão arterial alterada. Tais achados poderão contribuir para prevenção de hipertensão em adolescentes, na medida em que direciona o olhar dos enfermeiros ao desenvolvimento de medidas eficazes para intervir nesses fatores de risco.

Palavras chave: enfermagem; obesidade; adolescente; fatores de risco; hipertensão.

Introduction

Systemic arterial hypertension (SAH) is a clinical, multifactorial condition, characterized by high and sustained levels of blood pressure (BP). It is frequently associated with functional and / or structural changes in target organs (heart, brain, kidneys and blood vessels) and with metabolic disorders, with consequent increased risk of cardiovascular events.¹ SAH is a Nursing Diagnosis (ND), according to the International Classification of Nursing Practice (ICNP®) code 10009394, whose focus is impaired circulatory process, blood pumping with higher pressure than normal.² Research about the risk factors related to cardiovascular disease have been expanding, even in younger populations, because it is essential to investigate what is expected to be an integral part of the clinical evaluation. The risk factor is a personal or environmental characteristic whose presence is associated with an increased likelihood of having a pathological condition. Through the analysis of risk factors, one can predict the likelihood of an individual to develop cardiovascular disease during life.³

The risk criteria for hypertension are: age greater than 65 years, nonwhite race, overweight; central obesity; diet rich in salt, fat and sugars; alcohol intake; sedentary lifestyle; low education and genetic component.¹ Among these factors, excess weight, poor eating habits and sedentary lifestyle have been increasingly evident in adolescents. For instance, in the United States, the prevalence of overweight in this age group is 34%.⁴ In Brazil, it is the most important nutritional problem, present in approximately 20% of adolescents.⁵ This fact is concerning because of the high likelihood of perpetuation of unhealthy habits for life,⁶ the decrease in life expectancy, due to the higher risk of developing type 2 diabetes, insulin resistance, metabolic syndrome and risk factors for cardiovascular disease such as hypertension.⁷

The nursing practice also encompasses the care of individuals with overweight. This is a ND, according to ICNP®, code 10013899, whose focus is abnormal weight due to high body weight

triggered by the increase in the number and size of fat cells, coupled with excessive nutrient intake and lack of physical exercise.² Therefore, it is important that adolescents with this ND have risk factors for hypertension diagnosed early, and then be directed to the appropriate care. It is expected that health professionals, especially in primary care, are alert and prepared to work in education, prevention and health promotion; and invest in the development of actions at school, because in that space younger people are more receptive to assistance.⁸ As a way to identify the risk factors for hypertension in adolescents with excess weight in order to contribute to the planning, implementation and monitoring of nursing care, this study arises the question: is there an association between the risk factors for hypertension and the ND overweight in adolescents?

The relevance of this study is evident by the possibility of generating knowledge about the main risk factors for the development of hypertension in adolescents with the ND overweight and, thus, by contributing to the direction of resolving nursing actions, in order to reduce such risks and the establishment of the disease. From the assumption that excess weight is related to increased risk of hypertension,⁷ the present study aimed to identify associations between the risk factors for hypertension and the ND overweight in adolescents.

Methods

Cross-sectional study conducted between March and June 2013, with teenagers from state schools located in Natal, Rio Grande do Norte, Brazil. To calculate the sample size, it was considered: the value of 16.5%, which represents the prevalence of adolescent with overweight in Northeast region;⁵ the population of 27,377 adolescents enrolled in state schools of the city;⁹ and the error threshold that satisfied 0.95. The obtained sample was 211, then it was applied the multiplication by the correction constant of 1.5 for sampling with stratification, resulting in $n = 316$. Finally, this value has been fixed at 10% to minimize losses in

the collection. Thus, the sample consisted of 347 adolescents. This total was divided proportionally by district sections of the city, resulting in four sub-samples: 96 from the North, 70 from the West, 104 from the East and 77 from the South section.

To select the participants, two schools per section were randomly selected, the sub-sample number was divided into two schools; in each of them, a class was drawn between the 7th year of elementary school to the 3rd year of high school; all students from selected class were invited to participate, and students received the Informed Consent Form (ICF) to present to their parents. When not reaching the predetermined number in each school, a second class was drawn; when exceeding the number of students, only the equivalent calculated for the sub-sample was admitted to the research. Inclusion criteria were being between 12 and 18 years old and being enrolled in state schools in the city of study. Exclusion criteria were not attending on the day indicated for the collection of data and being underweight or very low weight at the time of collection, as the inclusion of these would hamper comparisons between groups. The following were considered risk criteria for hypertension: male; non-white race; overweight; central obesity; diet rich in salt, fat and sugars; alcohol intake and sedentary lifestyle. The factors: age greater than 65 years and low educational level did not apply in this study due to the characteristic of the studied population. Since the genetic component is a difficult parameter to be assessed, the family history of diseases was used as a reference.¹

The adolescents were subjected to physical examination and answered a form with questions about socioeconomic profile, physical activity, eating habits and family history of disease. The form data were collected by eleven nursing students; and the physical examination was performed by a nurse and two nursing students. All graduate students had been trained to participate in the data collection stage. The content of the form was submitted to five specialists with post-graduation (masters and doctors), researchers

on the theme excess weight in adolescents and scientific production. In anthropometry, it was considered the average of two measurements. For weight, researchers used a digital scale Beurer®, with precision of 10 grams, barefoot teenagers, light clothes and positioned in the center of the platform. Height was measured by stadiometer of WCS® brand, with precision of 0.5 cm, barefoot teenagers in the standing position, arms positioned along the body, feet together, knees straight, head oriented in the Frankfurt horizontal plane, after deep inspiration.¹⁰

Waist circumference (WC) measurement was made with inelastic tape measure Cardiomed®, with precision of 0.1 cm at the midpoint between the top edge of the iliac crest and the last costal margin, with the teenager in the standing position, with naked abdomen, arms positioned along the body and in the expiratory phase of breathing.¹¹ BP was measured in three times, at intervals of two minutes; it was considered the average of the last two measurements.¹ Authors used sphygmomanometer and stethoscope BD®. Participants had the nutritional status classified according to body mass index for age and sex based on Z score: very low birth weight (<-3), low birth weight (≥ -3 and <-2), eutrophic (≥ -2 and $\leq +1$), overweight (> +1 and +2 \leq) and obesity (> + 2).¹²

The ND under analysis was determined by the presence of the defining characteristic excess weight: overweight or obesity.² From this, the sample was divided in two groups, with and without excess weight, and risk factors for hypertension were studied in these groups. It was considered loss being underweight or very low birth weight, not to impair the comparison between the groups of interest, which totaled 25 teenagers. Abdominal obesity was considered present in values for increased WC, above the percentile 90, with a limit of 88 cm for girls and 102 cm for boys.¹³ It was considered the criterion for physical activity used by the National Research for Students' Health (PENSE in Portuguese), in order to compare the findings of this study, since participants of the PENSE were teenagers

attending the 9th grade of elementary school of public and private schools of Brazilian capitals and the Federal District.¹⁴ Then, adolescents were classified as for physical activity into two groups: active (students that accumulated value ≥ 300 minutes of physical activity per week) and insufficiently active (students who reported having practiced <300 minutes of physical activity per week). It was used the accumulated physical activity indicator in the last seven days, with respect to three different areas: commuting to school, physical education classes and other extracurricular physical activities.

To measure the food habits, students received a list of unhealthy food,¹⁴ rich in salts, sugars and fats, and adolescents answered how often they had consumed them in the last seven days. It was considered as a "yes" the consumption of five or more times per week. On the history of family illness, with reference to the first-degree relatives (parents, siblings, uncles and grandfathers), adolescents responded whether their family had history in the following diseases: diabetes, hypertension and obesity.¹ For classification of BP values in adolescents, it is considered the age, sex and height. Therefore, it was considered 'normal' BP that below the percentile 90; and 'altered' the borderline BP (percentile ≥ 90 and <95), stage 1 (percentile ≥ 95 and <99) or stage 2 (percentile ≥ 99).¹ The data were tabulated and analyzed in SPSS 19.0 using the chi-square test and odds ratio, considering: a significance level of 5% ($p < 0.05$) to determine the factors related to overweight. The project was approved by the Ethics Committee of the Federal University of Rio Grande do Norte, Certificate of Presentation for Ethical Consideration (CAAE) No. 10200812.0.0000.5537. The participation of adolescents occurred after the presentation of the research in classrooms of schools, and

adolescents interested in participating needed parents' consent and signature of the ICF.

Results

Among the 347 students participating, there was prevalence of women (72%), non-white (brown and black) (73.6%), with a family income of up to two minimum wages (it was considered the benchmark for minimum wage in March 2013, of R\$ 678) (76.8%), living with four or more people (69.1%) and with maternal education of up to nine years (32.5%). In the formation of interest groups, 100 (26.9%) were part of the group of adolescents with the ND excess weight, since these were classified as overweight or obese. The remaining 66.4% ($n = 247$) formed the comparison group, or adolescents without the ND, for they presented no nutritional changes.

As regards the analysis of association between the risk factors for hypertension and the ND overweight, as shown in Table 1, it was observed that there was an association between the groups for: WC; consumption of foods rich in sugar and fat; family history of hypertension, obesity and diabetes; and altered systolic and diastolic body pressure. The group with the ND overweight showed higher frequencies for these risk factors. It was found also that adolescents with the ND overweight were 40.04 times more likely to have high WC; 3.5 to consume foods high in sugar and 4.7 high in fat; 6.9 of having family history of hypertension, 1.96 for obesity, 5.52 for diabetes; and 5.43 times more likely to have altered systolic BP, and 8.57 in diastolic BP.

When analyzing the association of mean values of systolic and diastolic BP with the ND overweight, according to Table 2, there were associations, since the averages were significantly higher in adolescents with the ND.

Table 1. Association between risk factors for hypertension and the Nursing Diagnosis overweight, 2013 Natal / RN, Brazil

Variable	Groups				Chi-square <i>p</i>	OR (CI95% OR)
	Without Diagnosis		With Diagnosis			
	n	%	n	%		
Gender						
Female	179	72.5	71	71.0	0.076	1.07 (0.64-1.79)
Male	68	27.5	29	29.0		
Race						
White	65	26.3	25	25.0	0.064	1.07 (0.62-1.82)
Non-white	182	73.7	75	75.0		
Abdominal circumference						
Normal	246	99.6	86	86.0	<0.001	40.04 (5.18-309.08)
Altered	1	0.4	14	14.0		
Consumption of foods rich in salt						
Yes	92	37.2	43	43.0	0.319	0.78 (0.49-1.26)
No	155	62.8	57	57.0		
Consumption of foods rich in sugar						
Yes	55	22.3	76	76.0	<0.001	3.50 (3.06-4.70)
No	192	77.7	24	24.0		
Consumption of foods rich in fat						
Yes	39	15.8	80	80.0	<0.001	4.70
No	208	84.2	20	20.0		(2.60-8.50)
Alcohol consumption						
Yes	231	93.5	93	93.0	0.859	1.08 (0.43-2.72)
No	16	6.5	7	7.0		
Physical activity						
Active	116	46.9	50	50.0	0.347	0.68 (0.28-1.41)
Insufficiently active	131	53.1	50	50.0		
Family history of hypertension						
Yes	56	22.7	76	76.0	<0.001	6.90 (3.80-12.6)
No	191	77.3	18	18.0		
Family history of obesity						
Yes	75	30.4	69	69.0	<0.001	1.96
No	172	69.6	31	31.0		(1.18-3.24)
Family history of diabetes						
Yes	139	56.3	70	70.0	0.018	5.52 (3.36-9.06)
No	108	43.7	30	30.0		
Systolic blood pressure						
Normal	232	93.9	74	74.0	<0.001	5.43 (2.73-10.80)
Altered	15	6.1	26	26.0		
Diastolic blood pressure						
Normal	240	97.2	80	80.0	<0.001	8.57 (3.49-21.02)
Altered	7	2.8	20	20.0		

Table 2. Association between the averages of blood pressure and the Nursing Diagnosis overweight in adolescents, 2013 Natal / RN, Brazil.

Variable	Groups		p*
	Without the Diagnosis Mean ± Standard deviation	With the Diagnosis Mean ± Standard deviation	
Systolic blood pressure (mmHg)	105.17 ± 11.08	115.19 ± 13.55	0.046
Diastolic blood pressure (mm/Hg)	65.36 ± 8.47	69.31 ± 11.49	0.008

(*) Unpaired t test

Discussion

This study allowed exploring risk factors for the development of hypertension in the population of adolescents with the ND overweight. It was found that the adolescents were predominantly of low-income and had maternal education. Studies show that one of the factors that can influence the development of chronic diseases, namely obesity and hypertension, is the social and economic context.^{1,3,8} This is because the “physical environments and social standards” make difficult the access to health facilities and the purchase of food and healthy lifestyle, which leads to poor diet, physical inactivity and consequently overweight.¹⁵ The ND overweight was presented in this study as a risk factor for the development of hypertension, with risk for students with abdominal obesity, bad eating habits, family history of this disease and altered BP.

The relationship between overweight, hypertension and altered WC measures is a factor that has raised concern among health professionals, as visceral fat differs from the fat from other parts of the body due to their metabolic and functional characteristics that lead to insulin resistance and the development of hypertension and dyslipidemias.¹⁶ The percentage of adolescents with altered SBP and DBP is significantly higher among those with increased WC. In a survey with adolescents to assess the presence of high BP by simple linear regression analysis, it was revealed that for every increase of 1 cm in WC, the SBP tends to increase from 0.622 mmHg.¹⁷

The consumption of foods rich in fat and sugar is a frequent eating habit in this age group. This has raised the overweight rates among adolescents worldwide, since the consumption of foods with high energy content coupled with physical inactivity increase the body mass index. Given this, a study corroborated the data from this research and identified the positive influence between the values of body mass index and BP among adolescents,¹⁸ demonstrating that increased BMI and WC are risk predictors for hypertension in adolescents. It is noteworthy that adolescents with overweight have the highest frequencies for cardiovascular risk factors, when compared to the eutrophic group.¹⁹ An investigation found that obesity is positively associated with hypertension, independent of other factors and confirmed obesity as a risk factor for hypertension among adolescents. It stated, too, the need for public health interventions for the prevention, control and treatment of hypertension and obesity in adolescence, in order to reduce the damage to health in the short and long terms.¹⁹

As regards the association between family history of diseases, the findings of this study indicated association with the ND overweight, not only for family history of hypertension, but also of obesity and diabetes, which are risk factors for the development of hypertension. However, this association was not identified by research that analyzed the same variables in subjects of the same age.¹⁸ As for the increase in systolic and diastolic blood pressure in adolescents with overweight, a study did not identify significant difference between genders: systolic blood

pressure was elevated in 46.4% of boys and 39.3% of girls and diastolic blood pressure in 42.0% and 44.6%, respectively. By means of linear regression analysis of systolic blood pressure values regarding body mass index values, it was demonstrated that, for each increase of one unit in the index, the systolic blood pressure increased by 1.198 mmHg. Thus, even without the increase in WC, high body mass index caused risk of high BP.¹⁸ This indicates the need for greater vigilance as BP and risk for developing hypertension in adolescents.

For these reasons, it is important to identify the risk factors associated with the ND overweight, since the time of exposure to several risk factors at this age to adulthood shows to be directly associated with morbidity from cardiovascular disease. Identifying that cardiovascular diseases may originate in childhood and adolescence leads to the need for extensive research of risk factors, in order to plan early and effective interventions to reduce morbidity and mortality from cardiovascular diseases.³ In this perspective, the Primary Health Care (PHC) nurse is an indispensable actor for this action, since they can work in the home of these individuals and in the school, through the School Health Program, by implementing clinical actions of investigation and detection of adolescents with the ND overweight, with risk factors for hypertension or with the presence of this disease installed and by running effective interventions that provide these clients and their families more knowledge¹⁴ to diminish the risk for developing hypertension.

Among these actions, there was highlight for the short-term interventions, such as nutritional education activities and to encourage physical activity, using interactive, participatory and dynamic methods in the school, which has proven effective in modifying eating habits considered unhealthy among adolescents. However, it is suggested that these activities are carried out in a continuous period, because it is unknown if this healthy eating behavior is maintained in the absence of such educational activities.⁷ Moreover, the practice of nutritional counseling

should be encouraged as it is important to reduce intake of unhealthy foods, and to increase consumption of fruit and vegetables among children and adolescents.⁶ Therefore, it is believed that the nurse can be an active agent of these educational activities and of nutritional monitoring of adolescents. Therefore, before that, the nurses working, especially in PHC, need to be more attentive to the problems of overweight and risk factors for hypertension in adolescents. It is noteworthy that to intervene in a solving way, these professionals need to be willing and qualified to work at schools, by establishing health actions.

Finally, this study shows the limitations of the data collection, that occurred only in state schools, which did not allow to compare variables with a population of adolescents with different socioeconomic status, such as with students from private schools. It is considered also that the study was of cross-sectional design, so it is not possible to establish causal relationships between variables. In this sense, the implications of the observed associations here should be made with caution.

Conclusion

Abdominal obesity, eating habits, family history of disease and altered BP were the risk factors for hypertension that were associated with the ND overweight. However, gender, race, consumption of foods high in salt and physical inactivity showed no significant statistical association between the groups of adolescents. These findings may contribute to the health of adolescents with overweight and for the prevention of chronic diseases in adulthood, especially hypertension, since they direct the gaze of professionals to the main risk factors for increased BP in adolescents and for the importance of developing effective measures in order to intervene on these factors and prevent this injury. In this sense, since nurses working in PHC are closer to adolescents and are able to work in the school and family context of this clientele, they may establish continuous interventions that encourage healthy habits

in younger people, since unhealthy diet was associated with the group of adolescents with the ND overweight and it is an important modifiable risk factor for hypertension, susceptible to easy and low-cost professional interferences.

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