20 - PREVALENCE OF HYPERTENSION AND WAIST/HIP RATIO (WHR) AND BODY MASS INDEX (BMI) IN STUDENTS

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1.INTRODUCTION

Hypertension is a clinical syndrome characterized by the elevation of arterial pressure at levels arbitrarily fixed at 140mmHg for systolic and 90mmHg diastolic, measuredatrest in quiet environment without any kind of stress. This has been found to accompany the progressive damage of target organs (brain, heart, kidneys, retina and blood vessels), and deafness. In the majority cases the symptoms have already triggered complications. Its physiopathological origin is multifactorial (BARNETT, 2000).

The relationship between excess weight and diseases hasbeen recognized over time (VISSCHER and SEIDELL, 2001;CAMERON et al, 2003apudSANYAet al. 2009). Obesity has been particularlyrecognized as a major independent risk factor forcardiovascular diseases (DESPRES, 2001apudSANYA et al. 2009). This is becauseincreased body fat is accompanied by profound changes inthe physiological and metabolic functions of the body,which are directly dependent on the degree of excessweight and on its distribution around the body.

The prevalence of obesity is rising in developed anddeveloping nations, and it is cited as an important risk factor for early mortality (WHO, 1998). Body mass index has been identified by the WorldHealth Organization as the most useful epidemiologicalmeasure of obesity. It is nevertheless a crude index thatdoes not take into account the distribution of body fat,resulting in variability in different individuals andpopulations (WHO, 2000).

In the assessment of obesity,the central distribution of body fat cannot be overlooked,hence, the use of other anthropometric indices such as WCand WHR, as measures of adiposity (WELBORN et al, 2003apudSANYA et al. 2009).Waist circumference has been recommended as a simpleand practical measure for identifying overweight and obesepatients. It is particularly useful for individuals andpopulation groups with different body builds (Larson et al,1984; LAPIDUS et al, 1984; WELBORN et al, 2003apudSANYA et al. 2009).

BMI is more accurate in assessing excessweight than the measurement of weight alone, due to itsaccessibility and reproducibility (WHO, 2000). BMI iscomputed by dividing weight (in kilograms) by squareheight (in metres). Waist-hip ratio has been shown to be abetter and simpler indicator of both intra-abdominal fat(LEMIEUX et al, 1996) and coronary artery disease, than BMI.

2.METHODOLOGY

This isa descriptive studywas undertaken within four educational institutions in the city of Palmas-PR. Were evaluated117studentsof both genders, aged between 14 and 18 years.

For determination of anthropometric variables, a teacher Physical Education classes used a tape measure and a scale.

Blood pressure levels were measured with a sphygmomanometer and stethoscope both of the BD-ultralab brand, and were verified by two nurses.

The data was tabulated and descriptive statistics for the study sample were produced using the statistical program SPSS version 12.0, showing the mean values and standard deviations, by gender and age groups. The results are presented in the form of tables and charts.This study was approvedbythe ethics committeeon research andwas conductedin accordancewith current legislationforresearch involving human subjects.

3.RESULTS AND DISCUSSION

The table 1 shows the results of the statistical analysis, with average values, maximum and minimum values, and standard deviation of each variable analysed.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Desviopadrão
BMI MASC 14 years	4	13.29	29.12	21.7775	7.50390
BMI FEM 14 years	2	20.00	21.42	20.7100	1.00409
BMI MAS 15 years	12	18.83	35.16	22.9733	5.43100
BMI FEM 15 years	11	18.49	29.13	22.2591	2.78812
BMI MASC 16 years	13	18.30	29.96	23.0985	4.11328
BMI FEM 16 years	9	17.88	23.93	20.6367	1.96113
BMI MASC 17 years	18	18.08	30.42	23.0622	3.21981
BMI FEM 17 years	16	15.36	25.00	20.9831	2.57999
WHR MASC 14 years	4	0.88	0.95	0.9200	0.2944
WHR FEM 14 years	2	0.90	0.95	0.9250	0.3536
WHR MASC 15 years	12	0.88	0.98	0.9275	0.3049
WHR FEM 15 years	11	0.87	0.95	0.9145	0.2583
WHR MASC 16 years	12	0.85	1.00	0.9375	0.4003
WHR FEM 16 years	8	0.86	0.96	0.9150	0.3505
WHR MASC 17 years	8	0.86	0.95	0.9075	0.3205
WHR FEM 17 years	6	0.85	0.92	0.8917	0.2787
MAP MASC 14 years	4	73.20	99.70	88.9750	11.29022
MAP FEM 14 years	2	89.90	96.50	93.2000	4.66690
MAP MASC 15 years	12	76.50	116.50	88.4333	10.49791
MAP FEM 15 years	11	73.10	96.50	84.6727	8.37832
MAP MASC 15 years	12	63.20	93.20	76.2667	8.14609
MAP FEM 16 years	8	69.80	83.20	78.1625	3.99819
MAP MASC 17 years	8	79.80	93.20	89.8625	4.73767
MAP FEM 17 years	6	69.80	83.10	77.0167	4.90282

Source: The author.

Male and female BMI results are displayed in tables 2 and 3, respectively.
Table 2: Male BMI Results

BMI Classification	14 years	15 years	16 years	17 years
Chronically Malnourished	0%	0%	0%	0%
Malnourished	50%	0%	8%	6%
Underweight	0%	42%	17%	11%
Normal	0%	33%	41%	55%
Overweight	25%	8%	17%	11%
Obese	0%	0%	0%	0%
Obese grade I	25%	0%	17%	11%
Obese grade II	0%	17%	0%	6%
Obesograu III	0%	0%	0%	0%
TOTAL	N=4	N=12	N=12	N=18

Source: The author.

Table 3: Female BMI Results

BMI Classification	14 years	15 years	16 years	17years
Chronically Malnourished	0%	0%	0%	0%
Malnourished	0%	9%	25%	12%
Underweight	50%	9%	13%	25%
Normal	50%	73%	62%	63%
Overweight	0%	0%	0%	0%
Obese	0%	0%	0%	0%
Obese grade I	0%	9%	0%	0%
Obese grade II	0%	0%	0%	0%
Obese grade III	0%	0%	0%	0%
TOTAL	N=2	N=11	N=8	N=16

Source: The author.

Classifications were based on the table from Fernandes Filho (1999), which adopts the 9 levels of BMI classification as shown in these tables. It was observed that 50% of the 14-year old male students exhibited some level of malnutrition; with 25% overweight and 25% grade I obese I. Among 15-year old students, 42% were underweight; 33% normal weight; 17% grade II obese and 8% overweight

For 16-year olds, results were 41% normal weight; 17% underweight; 17% overweight; 17% grade I obese, and 8% malnourished

For 17-year old males, results were 55% normal weight; 15% underweight; 11% overweight; 11% grade I obese; 6% malnourished, and 6% grade II obese.

Among female students, as noted in table 8, 50% were normal weight and 50% underweight for 14-year olds. For 15-year olds 73% had normal weight; 9% malnourished; 9% underweight and 9% grade I obese. Among 16-year old girls it was observed that 62% had normal weight; 25% were malnourished, and 13% underweight. For 17-year olds the results were 63% normal weight; 25% underweight and 12% malnourished

When applying statistical tests to verify that differences between genders within the same age group were statistically significant ($p \leq 0.05$), only the results for the 17-year olds exhibited this difference. It was obtained from the single-factor ANOVA test, with $p = 0.04$, as shown in table 6.

Table 4 illustrates comparative results for male and female waist/hip ratios (WHR) male and female.

Table 4: Mean WHR results

Gender	14 years	15 years	16 years	17 years
Masculine	0.92	0.92	0.93	0.90
Feminine	0.92	0.91	0.91	0.89

All evaluated maleshad results of less than 0.95, which indicates that they don't present a risk of developing diseases like hypertension, coronary heart disease, diabetes and other illnesses (FERNANDES FILHO, 1999). Among the evaluated females, 100% showed WHR values of more than 0.80 which indicates risk for development of the diseases mentioned. There weren't significant differences between genders or between different age groups, according to table 7.

Table 5 displays the results of mean arterial pressure (MAP) of both sexes.

Table 5: Mean MAP results

Gender	14 years	15 years	16 years	17 years
Masculine	88.97	88.43	76.26	89.86
Feminine	93.20	84.67	78.16	77.01

Source: The author.

It can observed that pressure levels encountered were within the normal range for both genders and all age groups examined, with slightly higher values among girls of 14 years. However, statistically, when comparing results between genders and respective age groups, described in table 8, the significant difference was for the 17-year olds, with girls showing lower values than boys ($p = 0.00$).

Table 6: ANOVA BMI Results

	BMI 14 years	BMI 15 years	BMI 16 years	BMI 17 years
Value – P	0.86	0.70	0.11	0.04*

Source: The author.

Table 7: ANOVA WHR Results

	WHR 14 years	WHR 15 years	WHR 16 years	WHR 17 years
Value – P	0.86	0.28	0.21	0.35

Source: The author

Table 8: ANOVA MAP Results

	MAP 14 years	MAP 15 years	MAP 16 years	MAP 17 years
Valor – P	0.65	0.35	0.72	0.00*

Source: The author

These results agree withGuedes and Guedes (1998), stating that excess fat constitutes one of the most significant risk factors associated with specific morbidities and the mortality index. Excess fat and body weight isn't only an aesthetic problem, but is a serious health disorder that reduces life expectancy and threatens its quality.

Risk factors for heart disease, which were previously only evident in adults, are already today present in obese children and adolescents, emphasizing the importance of the problem of childhood obesity and the implementation of preventive measures to combat this nutritional disorder in younger age groups. Promoting increased physical activity, encouraging the adoption of healthy eating habits, and creating objective conditions for its implementation, would be the first steps towards reducing the incidence of cardiovascular diseases.

4.CONCLUSION

From this study, whichaimed to verify the prevalence of hypertension and track waist/hip ratio (WHR) and body mass index (BMI) among high school students in the municipality of Palmas-PR, we concluded that 50% of male school children aged 14 years exhibit some level of malnutrition; 25% are overweight, and 25% grade I obese. Among 15-year olds 42% areunderweight; 33% normal weight; 17% grade II obese and 8% overweight. For 16-year olds, 41% presented results of normal weight, 17% underweight; 17% overweight; 17% grade I obese and 8% malnourished. For 17-year olds, results for males were 55% normal weight; 15% underweight; 11% overweight; 11% grade I obese; 6% malnourished and 6% grade II obese.

Among the female students, 50% have normal weight and 50% underweightfor 14-year olds. For 15-year olds, 73% had normal weight; 9% malnourished; 9% underweight and 9% grade I obese. Among 16-year old girls, it was observed that 62% had normal weight; 25% malnourished, and 13% underweight. For 17-year olds, the results were 63% normal weight; 25% underweight and 12% malnourished. When applying statistical tests to verify that differences between genders within the same age group were statistically significant ($p \leq 0.05$), only the results for the 17-year olds exhibited this difference

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Blood pressure encountered werewithin the normal range for both genders and all age groups examined, with slightly higher values among 14-year old girls. However, statistically, when comparing results between genders and respective age groups, described in table 11, the significant difference was for the 17-year olds, with girls showing lower values than boys ($p = 0.00$).

Adolescence is a time of growth and human development, in which the nutritional needs of the subject increase. Health care professional should be aware of bodily changeswhich occur in pubescent growth spurts and adolescent nutrition since this could be the last opportunityappropriate for intervention in the growth process.

It is suggested that these results are disseminated to promote good quality of life. Moreover, it highlights appropriate eating habits and physical activity as a means of maintainingweight through adulthood and as a way to prevent obesity.

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PREVALENCE OF HYPERTENSION AND WAIST/HIP RATIO (WHR) AND BODY MASS INDEX (BMI) IN STUDENTS

ABSTRACT

The objective of this study relates to the WHR, BMI, blood pressure and health of students. The research was undertaken with 117 students, both genders, aged between 14 and 17 years. The waist hip ratio (WHR) was measured using a tape measure; the body mass index (BMI) was based on the body mass in Kg and height in cm, and blood pressure measured at rest. Regression analysis was used to verify the correlation between samples, considering r between 1 and -1. It was observed that 50% of the 14-year old male students exhibited some level of malnutrition; with 25% overweight and 25% grade I obese. Among 15-year old students, 42% were underweight; 33% normal weight; 17% grade II obese and 8% overweight. For 16-year olds, results were 41% normal weight; 17% underweight; 17% overweight; 17% grade I obese, and 8% malnourished. For 17-year old males results were 55% normal weight; 15% underweight; 11% overweight; 11% grade I obese; 6% malnourished, and 6% grade II obese. Among female students, 50% were normal weight and 50% underweight for 14-year olds. For 15-year olds 73% had normal weight; 9% malnourished; 9% underweight and 9% grade I obese. Among 16-year old girls it was observed that 62% had normal weight; 25% were malnourished, and 13% underweight. For 17-year olds the results were 63% normal weight; 25% underweight and 12% malnourished. In relation to WHR, all the males evaluated had results less than 0.95, indicating that they don't present risk of developing diseases. Among the evaluated females, 100% had WHR values greater than 0.80 indicating risk for disease development. It can be observed that the blood pressure levels were within the normal range for both genders and all age groups examined, with slightly higher values among 14-year old girls.

KEYWORDS: blood pressure, body mass index, WRH.

PRÉVALENCE DE L'HYPERTENSION ET RATIO TAILLE / HANCHE (RTH) ET L'INDICE DE MASSE CORPORELLE (IMC) DANS LES ETUDIANTS

RÉSUMÉ

Cette étude avait puisque j'ai l'intention de raccorder le WHR et BMC les niveaux de pression avec d'étudiants. Ont été enquêtés 117 étudiants, les deux sexes, avec l'âge entre 14 et 17 ans. Les variables ont été déterminées: WHR, BMI RCQ et de niveaux pressóricos du reste. L'analyse de régression a été utilisée pour vérifier la corrélation entre les échantillons, en réfléchissant r entre 1 et-1. Il est conclu que 50% des éléves de 14 ans, ont un taux de malnutrition ; 25% au dessus du poids et 25% d'obésité de premier degré. Parmi les éléves de 15 ans, 42% sont em dessous du poids ; 33% ont um poids normal ; 17% ont une obésité de segond degré et 8% sont au dessus du poids. Á 16 ans, 41% ont um poids normal, 17% sont em dessous du poids; 17% ont un excès de poids ; 17% ont une obésité de premier degré, et 8% sofre de malnutrition. Á l´âge de 17 ans les résultats de sexe masculin sont passes à 55% au poids normal ; 15% em dessous du poids; 11% au dessus du poids; 11% d´obésité de premier degré; 6% de malnutrition e 6% d´obésité de segond degré. Les résultats de tous les candidats sont restés à moins de 0,95, ce qui indique qu´ils ne présentent aucun risque de développer des maladies comme l'hypertension, les maladies coronariennes, le diabète et autres maladies. La pression artérielle est dans le taux normal chez tous les groupes testés. On peut déduire que la majorité des personnes évaluées ont une tendance à l'obésité et donc susceptibles de développer des maladies cardiovasculaires et les maladies dégénératives chroniques, pourtant pas en conformité avec les normes de santé. Les résultats de l'analyse statistique de regression ont indiqué qu'il existait une relation entre les variables.

MOTS-CLÉS : pression artérielle, RTH, IMC.

PREVALENCIA DE HIPERTENSION Y RATIO CINTURA / CADERA (ICC) Y EL ÍNDICE DE MASA CORPORAL (IMC) EN ESTUDIANTES

RESUMEN

El objectivo de este estudio fue relacionar el ICC, IMC y tensión arterial de 117 estudiantes, ambos géneros, edad entre 14 y 17 años. Se observó que el 50 % de los estudiantes de sexo masculino de 14 años expuso algún nivel de la desnutrición; con grado demasiado pesado y del 25 % del 25 % I obeso. Entre estudiantes de 15 años, el 42 % era de peso insuficiente; peso normal del 33 %; grado del 17 % II sobrepeso obeso y del 8 %. Para 16 años, los resultados eran el peso normal del 41 %; el 17 % de peso insuficiente; sobrepeso del 17 %; grado del 17 % I obeso, y el 8 % desnutrido. Para varones de 17 años los resultados eran el peso normal del 55 %; el 15 % de peso insuficiente; sobrepeso del 11 %; grado del 11 % I obeso; Grado desnutrido, y del 6 % del 6 % II obeso. Entre muchachas 50 % era el peso normal y el 50 % de peso insuficiente para 14 años; 15 años el 73 % tenían el peso normal; el 9 % desnutrido; grado de peso insuficiente y del 9 % del 9 % I obeso; 16 años se observó que el 62 % tenía el peso normal; el 25 % era desnutrido, y el 13 % de peso insuficiente. Para 17 años los resultados eran el peso normal del 63 %; el 25 % de peso insuficiente y el 12 % desnutrido. Con relación a RCQ, todos los varones tuvieron resultados menor de 0.95, indicando que no presentan el riesgo de desarrollar enfermedades. Entre las mujeres , el 100 % tenía valores de RCQ mayores que 0.80 riesgo de indicación para el desarrollo de enfermedad.

PALABRAS CLAVE: presión arterial, índice de masa corporal, ratio cintura/cadera.

PREVALÊNCIA DE HIPERTENSÃO ARTERIAL E A RELAÇÃO CINTURA/QUADRIL (RCQ) E ÍNDICE DE MASSA CORPORAL (IMC) EM ESTUDANTES

RESUMO

Este estudo teve como objetivo relacionar o RCQ e o IMC com níveis pressóricos de escolares. Foram pesquisados 117 alunos, ambos os gêneros, com idade entre 14 e 17 anos. Foram determinadas as variáveis: relação cintura quadril (RCQ), índice de massa corporal (IMC) e níveis pressóricos de repouso. Para verificar a correlação entre as amostras utilizou-se análise de regressão, considerando-se r entre 1 e –1. Observou-se que 50% dos escolares de 14 anos, gênero masculino, apresentam nível de desnutrição; 25% sobrepeso e 25% obesidade grau I. Entre os escolares de 15 anos, 42% apresentam baixo peso; 33% peso normal; 17% obesidade grau II e 8% sobrepeso. Aos 16 anos, 41% apresentam resultado de peso normal, 17% baixo peso; 17% sobrepeso; 17% obesidade grau I e 8% desnutrição. Aos 17 anos os resultados de gênero masculino foram 55% peso normal; 15% baixo peso; 11% sobrepeso; 11% obesidade grau I; 6% desnutrição e 6% obesidade grau II. Entre os escolares do

gênero feminino, 50% apresentam peso normal e 50% baixo peso, aos 14 anos. Aos 15 anos 73% tiveram peso normal; 9% desnutrição; 9% baixo peso e 9% obesidade grau I. Entre as meninas de 16 anos observou-se que 62% tinham peso normal; 25% desnutrição e 13% baixo peso. Aos 17 anos os resultados foram 63% peso normal; 25% baixo peso e 12% desnutrição. Todos os avaliados do gênero masculino obtiveram resultados de RCQ inferiores a 0,95, o que indica que não apresentam risco de desenvolvimento de doenças. No gênero feminino, 100% apresentaram valores de RCQ superior a 0,80 o que indica risco para desenvolvimento de enfermidades. Os níveis pressóricos encontram-se dentro da normalidade para ambos os gêneros e todas as faixas etárias analisadas, com valores um pouco mais elevados entre as meninas de 14 anos.

PALAVRAS – CHAVES: pressão arterial, Índice de Massa Corporal, RCQ.