ASSOCIATION BETWEEN BLOOD PRESSURE AND INDICATORS OF OBESITY GENERAL AND CENTRAL IN STUDENTS: FORMS FOR CARE AND EDUCATION AT CHILDRENS IN SCHOOLS

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ABSTRACT
Nowadays children are living with several risk factors to health, being prone to develop since the childhood cardiovascular diseases as, for example, hypertension. Therefore, the aim of this study was to analyze the association between blood pressure, obesity general and central in schoolchildren of the lower grades of elementary school in Paranavaí - Paraná. The study is characterized as descriptive and correlational. The sample was composed by 745 schoolchildren. The data analysis was done using the Microsoft Excel 2007 and SPSS v.13 software. The results showed that compared to general obesity (GO), assessed using the body mass index (BMI), 25.23% are overweight. Analyzing central obesity (CO) by waist circumference (WC) 21.07% had alterations. Undesirable levels of blood pressure (BP) were diagnosed in 15.17% of the students. The diastolic blood pressure (DBP) and GO were statistically significantly increased in relation to increasing age. Was identified strong relationship positive between GO and CO (r = 0.87). BP levels were associated with CO and GO (p = 0.000). The results point indexes worrisome in the risk factors related to obesity, and are also associated with changes in BP.

Keywords: Risk Factor. Obesity. Hypertension. Child Health.

INTRODUCTION

Among the major risk factors to health can highlight arterial hypertension (AH) and obesity. These practices have negative stimuli as industrialization, urbanization, economic development and industries. The population is increasingly inactive and consuming foods of low nutritional value and high in calories, acquiring thereby increasing chronic diseases, with emphasis on metabolic and cardiovascular diseases [(1)]. Although it is estimated that there is at least one billion hypertensives in the world [(2)], and this disease causes the death of 7.1 million people per year, equivalent to 13% of all deaths [(1)].

A recent study showed that health risk behaviors such as physical inactivity, stimulated by watching television, represents a major form of hobby of children, and long before her may contribute to the genesis of obesity [(3)].

You accept the fact that with increasing age being overweight (EP) is a factor that raises blood pressure, but it occurs in young populations, remaining such a relationship [(4)]. Estimates show that the incidence of hypertension is rising and its impact will be even more damaging in future populations, thus making such alarming facts so that there is a better prevention at younger ages, giving the school a big role in the early diagnosis and prevention[(5)].

In a study of 3,169 children was diagnosed with HA 5.0% and 6.2% in high-normal pressure. In relation to body mass index (BMI) identified 16.0% with PE, of which 4.9% were obese already, having significant relationship between HA and nutritional status was considered excessive. Being suggested to propose measures of interference with the focus on the school as an element able to disseminate information to family units. Thus the possibility of an action plan mobilizes schools as partners in health promotion [(6)].

The school is considered one of the most conducive environments for student learning, which can also be identified risk factors to

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health, because the sooner they are diagnosed, may be the best preventive response to the development of chronic diseases in the medium and long term. Therefore, the aim of this study was to analyze the association between the extent of blood pressure (BP), general obesity (GO) and central (CO) of students of the lower grades of elementary school from Paranavaí – Paraná.

MATERIALS AND METHODS

In Paranavaí PR in 2010 there were 17 elementary schools (5 private and 12 municipal). This field study cross-sectional, correlational study was conducted in the 2nd semester of 2010 and surveyed pupils aged between five and seven years. Therefore we selected a sample of 745 students who attended 1st and 2nd grade level of 8 schools, 2 private and 6 public.

Initially the municipal education was contacted so that they were explained the objectives of their work, researching at that time the number of students in the institutions. After the researchers drove to the institutions chosen by simple random sampling, and so was the opinion of the direction, and the same signed the authorization letter was sent to the guardians of all students in the age group studied the Informed Consent Informed Consent Form (ICF), where the response of these existed, began collecting data for schoolchildren.

This research was approved with the opinion No. 0409-10 by the Standing Committee on Ethics in Research Involving Human Subjects of the State University of Maringá (UEM), meeting the requirements of Resolution 196/96 of the National Health Council

To evaluate the anthropometric values of GO used the test of BMI (weight (kg) / height (m2) and CO by measuring in centimeters (cm) of the CC. Was using a digital scale brand with Full Resolution 100g , a tape measure brand Luotulo with 3 m long, 30 cm ruler and a flexible anthropometric tape with 150 cm long [(7)] . Already, BP measurement occurred according to the indications of Mion JR[(8)] getting help from a professional employee of the nursing field, performing two measurements with an interval of two minutes, through a brand aneroid sphygmomanometer with cuff Missouri child, calibrated and a stethoscope brand Missouri.

For BMI classification were used cutoff points of Cole et al.[(9)] so that a line was drawn between age (half-yearly) and gender, classifying them in Eutrophic (normal), Overweight (SP) and obesity (OB). In the analysis of the CC were used cutoffs in percentiles Fernández et al.[(10)] being regarded as high risk to develop metabolic diseases in the value of CC percentile greater than or equal to P90. The the The Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents (8) brought normative tables to assess PA in children and adolescents over the age of one year, until seventeen, where PA is defined through the mean systolic BP (SBP) and diastolic BP (DBP), and considered normal, below the 90th percentile for age and sex, according to the height percentile according to the National Center for Health Statistics in collaboration with National Center for Chronic Prevention and Health Promotion (8) , since the borderline or high normal BP is established when the average is between the 90th and 95th percentiles and hypertension is defined when the value is equal to or greater than 95.

Data were initially analyzed using the software Microsoft Excel 2007 and presented in tables and graphs, using simple descriptive statistics with frequency (n), percentage (%), mean and standard deviation(s). And for comparisons between groups was significant using the Statistical Package for Social Science (SPSS) v.13. The Student t test was used for comparison between two groups. The analysis of variance (ANOVA) one way was adopted for comparison between the three groups. In the investigation of the correlation between BMI and WC used the Pearson test. Already, to determine the association between PA, BMI and WC was employed the chi-square 2x2. The level of significance set for analysis consisted of $p < 0.05$.

RESULTS AND DISCUSSION

Are contained in Table 1 the characteristics of the students in relation to age, anthropometric variables (weight, height, waist circumference

and BMI) and hemodynamic (SBP and DBP), being expressed by quantitative values as mean and standard deviation(s). It also shows the anthropometric characteristics and BP of school, according to the genre. It can be observed that the sample was composed of 363 male and female persons per 382 near checking values, comparing boys and girls. In addition to the estimates of PA, were also observed similarities in all other variables, no statistically significant differences observed in any of them.

Table 1 - Anthropometric characteristics and blood pressure in primary schools, both public and private schools from Paraná / Paraná, 2010. (n = 745)

Age (years)	TOTAL AVERAGE	s	GENUS	AVERAGE BY GENDER	s	p
	6,66	0,74	M	6,63	0,76	0,295
			F	6,69	0,71	
Weight (kg)	25,11	5,19	M	25,26	5,19	0,450
			F	24,97	5,18	
Stature (cm)	122,97	6,20	M	123,20	6,21	0,322
			F	122,75	6,20	
WC (cm)	58,18	6,30	M	58,42	6,39	0,312
			F	57,95	6,21	
BMI (kg/m2)	16,51	2,42	M	16,54	2,41	0,716
			F	16,47	2,44	
SBP (mmHg)	103,94	10,40	M	103,90	10,39	0,918
			F	103,98	10,43	
DBP (mmHg)	67,66	8,51	M	67,51	8,81	0,640
			F	67,80	8,22	

Student's t test $p < 0.05$. s = standard deviation. M = Male. F = Female. WC = waist circumference. BMI = body mass index. SBP = systolic blood pressure. DBP = diastolic blood pressure.

A recent study of 619 schoolchildren from Fortaleza, presents data close to the results of this survey: age, body weight, height and BMI of 6.91 years, 23.87 kg, 122.1 cm and 15.88 kg/m2 , respectively [11].

At this age the differences between body weight and height, are usually minimal (12). Research evaluating 2,598 schoolchildren from Maringá-PR, also found no significant differences between genders in the variables: age, height, WC, SBP and DBP, confirming the findings of this study [13].

Analyzing the anthropometric characteristics and hemodynamic of students divided into age groups (Table 2), we observed the largest group 6-7 years (n = 352) corresponding to 47.25% of the sample. We observe an increase in the average over age for all variables, especially between the first and last age group, however, only statistically significant differences in BMI and DBP.

In the early infancy phase was initially about 4 years, there is an increased stabilization of body weight and height, when grows approximately 5.1 cm and 2.3 kg per year. Between 6 and 10 years of age, characterized in that the end of childhood, occurring slow increases in height and weight, but stable [12].

BMI and WC are some indicators that serve to assess obesity and can present in the general population, the risk of developing co-morbidities [11]. The stage from 5 to 7 years of age presents itself as a critical period for development adiposity, it is expected that the BMI increases

during the first year of life and declines in the next 5 years when growth resumes again in accordance with age [12].

The PA in children tends to increase with the age, regardless of sex, but dependent on the height [8]. This information helps us found where SBP and DBP increased with advancing age.

Table 2 - Anthropometric characteristics and blood pressure, according to the age group between primary schools from public and private schools from Paraná / Paraná, 2010.

	AGE GROUP	n	AVERAGE	s	p
Weight (kg)	5 – 6	147	23,49	4,34	-
	6,1 – 7	352	24,40	4,61	
	+ de 7	246	27,10	5,80	
Stature (cm)	5 – 6	147	118,65	5,27	-
	6,1 – 7	352	122,13	5,23	
	+ de 7	246	126,73	5,89	
WC (cm)	5 – 6	147	57,59	5,68	-
	6,1 – 7	352	57,49	5,89	
	+ de 7	246	59,51	6,99	
BMI (kg/m2)	5 – 6	147	16,59	2,37	0,021[2]
	6,1 – 7	352	16,28	2,26	
	+ de 7	246	16,77	2,65	
SBP (mmHg)	5 – 6	147	103,35	9,48	-
	6,1 – 7	352	102,88	10,59	
	+ de 7	246	105,81	10,45	
DBP (mmHg)	5 – 6	147	67,64	8,20	0,007[2] 0,001[3]
	6,1 – 7	352	66,84	7,92	
	+ de 7	246	68,83	9,35	

One-way ANOVA test for post-hoc Bonferroni or Games-Howell: 1 Significant difference (p <0.05) between groups "5-6 years" and "6-7 years", 2 Significant difference (p <0 , 05) between the "5-6 years" and "more 7yr"; 3 significant difference (p <0.05) between groups "6-7 years" and "+ for 7years." n = sample size. s = standard deviation. WC = waist circumference. BMI = body mass index. SBP = systolic blood pressure. DBP = diastolic blood pressure.

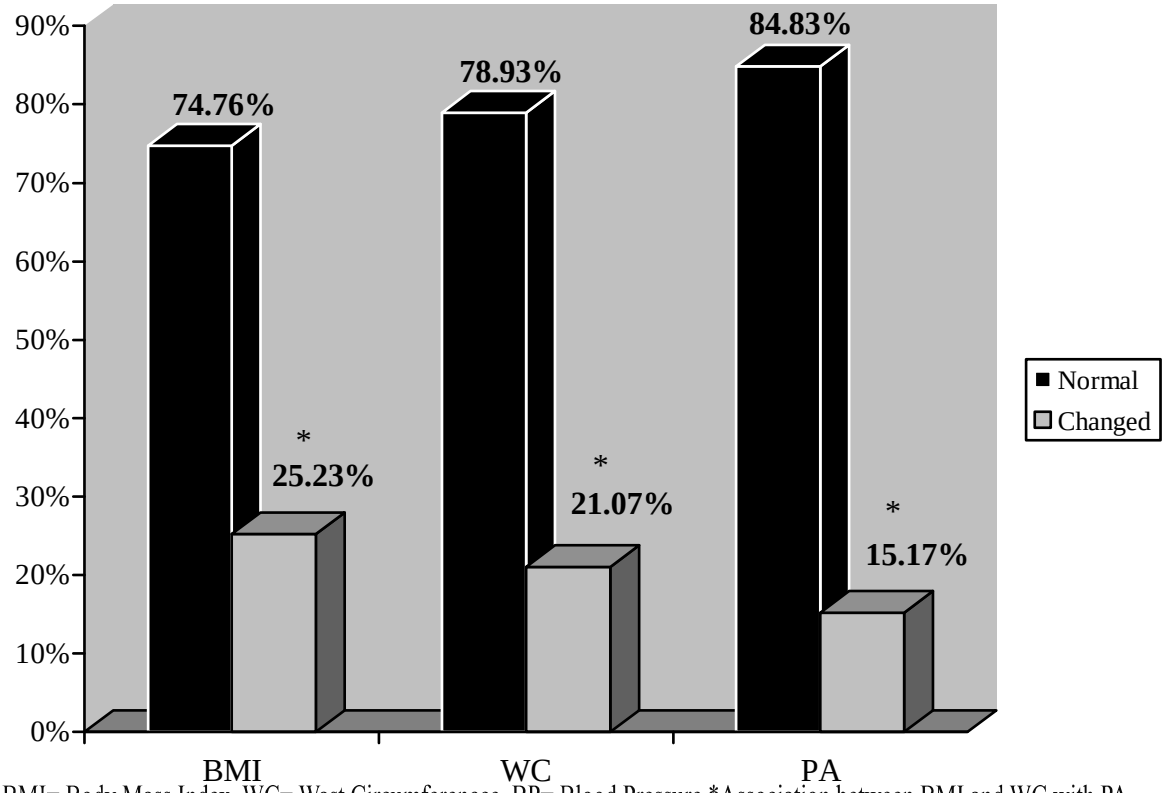
Some studies have also found an increase in SBP and DBP in accordance with advancing age, as can be seen in Maceió-AL [14], which was surveyed a sample of 1,256 schoolchildren, PA assessed at two times with intervals of at least 2 minutes, similar to the way that occurred in this study, and found an increase of hemodynamic measurements with advancing age, with the most significance.

By Figure 1, using cutoffs [9], can be identified by GO BMI of schoolchildren in this study, where 74.76% (n = 557) were considered eutrophic, 15.84% (n = 118) with SP and 9.39% (n = 70) ob, characterized 25.23% (n = 188) presented some overweight (EP).

The SP is displayed as the excessive increase of total body weight, which may occur in any constituent by altering body composition (fat, muscle, bone and water) together or, it still presents a risk to develop OB, which refers to the increase in a generalized or localized fat in relation to body weight, being related to many health risks. The excess weight may occur through the influence of some factors, including physical inactivity, physical activity, poor nutrition, lifestyle adopted similar to major

cities, some aspect of the local culture (excess of certain food or feeding behavior), among others [15].

About physical activity, all students are encouraged by such knowledge, given that all institutions work such content in an interdisciplinary way, and there are 2 physical education classes per week, regardless of whether the school is public or private, and this discipline has as an objective to encourage the practice and enjoyment of healthy activities. Currently being installed malls and large marketing networks of food ready, or that facilitate their use, something culturally large cities besides children having early contact with social networks and television commercials that encourage excessive consumption of some products nutritious and calorie-dense, and that these factors may contribute to increased body weight and associated risks.



BMI= Body Mass Index. WC= Wast Circumferencce. BP= Blood Pressure.*Association between BMI and WC with PA

Figure 1 - Prevalence of general and central obesity and high blood pressure in primary schools, both public and private schools from Paraná / Paraná, 2010. (n = 745)

Some studies present values close to those found in this research, such as the State of Santa Catarina, with 4,964 children being identified with 15.4% and 6.0% respectively and SP B [16].

In Natal-RN were evaluated 3,721 children, which were 26.1% with PE [17]. The value found in this study is similar to this, being such a city of a much larger business, but also a geographical region culturally different, then understanding the factors that led to such a feat may be related to education for children has received through family, school and media, affecting their quality of life and respectively the practice of risk factors to health, since they are still dependent adult.

To prevent the evils arising from the EP in childhood, there are some areas that need attention. Education, the food industry and the media are considered the main vehicle of action, steps are needed to be educational and informative, alongside the school curriculum and the media of mass communication. Thus, control of advertising of unhealthy foods, mainly aimed at children and include a minimum percentage of natural foods in the national school feeding, are actions that need to be reversed. About the

industrialization of nutrients, you should seek the support of the manufacture and marketing of healthy groceries [4].

The EP is a serious health disorder that reduces life expectancy and threatens their quality. There is evidence to claim that fat accumulation and body weight acquires a large role in the variation of the human body functions, assuming then important role in changing the performance of the body, thus becoming one of the leading and most significant risk factors morbidities associated with specific as diabetes and hypertension, and also in mortality [15].

Observed in the present study 78.93% (n = 588) of the surveyed sample without CO (<P90) and 21.07% (n = 157) showing any changes in the measurement of DC (> P90) (Figure 1) . The CC is the measurement used to identify regional fat accumulation, in which case, abdominal obesity or CO (android). Still existing, close relationship with cardiovascular disease (CVD), adverse lipid levels, diabetes mellitus type 2 [18].

Few studies bring the prevalence of CC undesirable in percentage (%) in school. But in contributing to the results of this study, was identified in Maringá-PR [13] a prevalence of 92.2% and 7.8% for CC desirable and concomitantly altered, noting that the city is near the location of the study. Each region has its specificities are cultural, social, economic, industrial, among others, they can determine the profile of the local population, however, it appears that this result demonstrates great conflict between surveys, where the values show difference nearly three times higher for this analysis, making such troubling risk factor.

The Pearson correlation test also found strong positive relationship between CO and GO (r = .87). Highlighting, so that the higher the DC is also rising BMI, or the inverse Similarly, although the identifying methods to assess obesity are effective for the population.

The use of CC as an assessment tool for children by health professionals can serve as a prevention strategy against OB and development of co-morbidities [10].

Also in Figure 1 shows the prevalence of PA changed in school, where 84.83% (n = 632) were presented as normotensive or borderline BP and 15.17% (n = 113), then being considered with the PA high. In general it is asymptomatic, high levels of it cause damage to the arteries supplying blood to the heart, brain, kidneys and other organs, causing a series of structural changes in organic [2].

From the age of three is recommended to make the verification of AP for the early detection of hypertension and instigate both primary prevention, since there is a pressure increase with age, as well as the acquisition of blood pressure goals related to lower cardiovascular risk in hypertensive patients, after being diagnosed necessary changes, monitoring the PA to prevent future HA [2,5].

Are present in Brazilian literature some results that corroborate our understanding of the findings. However, they have differences among them, since various forms have been identified by the various methodological authors.

Research has characterized in this study, which was performed in Maringa-PR, 9.2% were found with elevated BP (13). In São Paulo-SP, and PA analyzed the lipid profile among offspring of hypertensive and normotensive, and concluded that the highest levels were more unfavorable among children of parents with hypertension, where the states of low HDL-c was the major finding relevant independent variables and anthropometric or nutritional. This study shows heredity as a factor for developing hypertension [19].

There is a strong relationship between BP and cardiovascular risk, so that the greater the pressure will be too great a propensity to occur cardiovascular events. Regardless of the assistance of other factors, the prevalence of PA is increasing worldwide as a result of the epidemiological transition that currently lives [2].

Associations were observed between BP (SBP and DBP), as in the GO and CO (BMI and WC). As noted the relationship between all variables (p = 0.000), thus are related to PA both desirable outcomes such as altered WC and BMI (Figure 1).

Despite the association between OB and PA is well known, the mechanisms involved in this process remain poorly understood. However, it is found that obese individuals have a predisposition to hiperinsulemia and insulin resistance, due to excessive exposure and increased concentrations of free fatty acids,

increasing vascular sensitivity, identified the main factor for increased BP [5].

In most studies that seek to evaluate the association between PA, GO and CO, such a relationship is found, regardless of age or locality studied. These results corroborate those found in this study, which was also detected this finding [6,13,14].

The OB in childhood and adolescence is an important risk factor for the development of CVD (including HA) in the afterlife. Among the main policy components of a healthy lifestyle include: the promotion of increased physical activity, the implementation of exercise programs and encouraging the acquisition of healthy, should it occur while there is still time to reverse unfavorable frames relation to health[4].

The physical activity at school is an option for educational training, being conducted physical assessments periodically, can help detect possible risk factors to health, and if treated early still provide a better quality of life in adulthood, along with a healthier lifestyle. Besides the students perform at least one meal during the class period, there is also the opportunity to discuss concepts associated to adequate food. During class, the students have opportunities to participate in recreational activities, sports and recreational, constituting attitudes favorable to the awareness of the benefits of physical activity in general [4,5]. Therefore, there should be reformulations of structural and functional way, and professionals involved in the educational context [20].

CONCLUSION

Data from this study demonstrated a high prevalence of high blood pressure, especially among children who were overweight and obese. The association between excess body weight with changes in blood pressure observed in this study emphasizes the importance of developing preventive measures in the school environment in relation to excess body fat to prevent the elevation of blood pressure in childhood and the consequent increased risk cardiovascular disease in adulthood.

It should be noted that the levels which define the measure of high blood pressure in children, based on statistical limits therefore arbitrary. Thus, a limitation of this study was the single measure of PA, which is used only for assessment at specific times. However, we suggest that further studies to assess the blood pressure during the growth of the child, to establish a more reliable diagnosis.

ASSOCIAÇÃO ENTRE PRESSÃO ARTERIAL E INDICADORES DE OBESIDADE GERAL E CENTRAL EM ESCOLARES: PISTAS PARA CUIDAR-EDUCAR DA CRIANÇA NA ESCOLA

RESUMO

Na atualidade as crianças estão convivendo com vários fatores de risco à saúde, estando propensas a desenvolver desde a infância doenças cardiovasculares como, por exemplo, a hipertensão arterial. Logo, o objetivo deste estudo foi analisar a associação entre a medida da pressão arterial, obesidade geral e central de escolares das séries iniciais do ensino fundamental de Paranavaí – Paraná. O estudo caracteriza-se como transversal, descritivo, do tipo correlacional. A amostra foi composta por 745 escolares. Para a análise dos dados foram utilizados os softwares Microsoft Excel 2007 e SPSS v.13. Os resultados mostraram que em relação à obesidade geral (OG), avaliada por meio do índice de massa corporal (IMC), 25,23% apresentam excesso de peso. Analisando a obesidade central (OC) por meio da circunferência da cintura (CC) 21,07% demonstraram alteração. Níveis indesejáveis da pressão arterial (PA) foram diagnosticados em 15,17% dos escolares. A OG e a pressão arterial diastólica (PAD) aumentaram estatisticamente em relação ao avanço da idade. Foi identificada forte relação positiva entre OG e OC (r= 0,87). Os níveis pressóricos mostraram-se associados com a OC e OG (p= 0,000). Os resultados apontam índices preocupantes nos fatores de risco correspondentes à obesidade, e também estão associados à alteração da PA.

Palavras-chave: Fatores de Risco. Obesidade. Hipertensão. Saúde da Criança.

ASOCIACIÓN ENTRE LA OBESIDAD CENTRAL Y GENERAL Y LA PRESIÓN ARTERIAL EN LOS ESTUDIANTES: CÓMO CUIDAR Y ENSEÑAR A LOS NIÑOS EN LA ESCUELA

RESUMEN

Hoy en día los niños están viviendo con múltiples factores de riesgo para la salud, siendo propensos a desarrollar enfermedad cardiovascular desde la infancia, por ejemplo la hipertensión. Por lo tanto, el objetivo de este estudio

fue analizar la asociación entre la presión arterial, obesidad central y obesidad general, para los estudiantes en los primeros grados de la escuela primaria en Paranavaí - Paraná. El estudio se caracteriza por ser un estudio transversal descriptivo y correlacional. La muestra consistió en 745 estudiantes. Para tratar de los datos se utilizó el software Microsoft Excel 2007 y SPSS v.13. Los resultados mostraron que en comparación con la obesidad general (OG), evaluada mediante el índice de masa corporal (IMC), 25,23% tienen sobrepeso. Analizando la obesidad central (OC) en la circunferencia de la cintura, (CC) 21,07% tuvieron alteraciones. Los niveles indeseados de presión arterial (PA) se diagnosticaron en 15,17% de los alumnos. En la la presión arterial diastólica (PAD) y OG eran estadística y significativamente mayor en relación con el aumento de edad. Una fuerte relación positiva se identificó entre OG y OC (r = 0,87). Los niveles de presión se asociaron con OC y OG (p = 0,000). Los resultados muestran factores de riesgo relacionados con la obesidad, algo preocupante, y también están asociados con los cambios en PA.

Palabras clave: Factores de Riesgo. Obesidad. Hipertensión. Salud del Niño.

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