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ACTIVE RESEARCH OF NEW CASES OF DIABETES AND HYPERTENSION IN THE CITY OF FLORIANO, PIAUI

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ABSTRACT

Diabetes mellitus (DM) and hypertension (HA) are common diseases and increasing incidence every year, causing severe complications to the individual. Diabetes mellitus occurs when the production of the hormone insulin by the pancreas is insufficient or when the body does not efficiently use the insulin it produces, leading to an increase in the concentration of glucose in the blood. And hypertension is characterized by increased blood pressure level. The objective of this work was the active search for new cases of diabetes and hypertension in the city of Floriano, Piauí. We evaluated 352 individuals of both sexes aged 18 to 87 years. Questionnaires were applied on the diabetes disease and hypertension, and made the blood glucose test and blood pressure measurement. The results showed that 11.4% of subjects had postprandial blood glucose greater than 140 mg/dL, and 45.7% had some stage of hypertension. The increase in cases of both diseases are consequences of the bad habits of life of individuals. The guidance to the general public on a healthy lifestyle, including physical activity and a balanced diet is an essential attitude in the prevention and control of both diabetes and hypertension, reducing complications and mortality of individuals by diseases simple prevention.

INTRODUCTION

Type 2 diabetes mellitus (DM2) is a disease of increasing incidence each year. According to the Ministry of Health (2007) DM2 already affects 246 million people worldwide, thus becoming the epidemic of the century. It is predicted that this number will reach 380 million individuals with DM2 in the world by 2025. In Brazil, in 2013, the percentage of adults aged over 18 years for the diagnosis of diabetes was 6.9% (52,929 individuals were interviewed in the capitals of the 26 Brazilian states and the Federal District). The prevalence of the disease increases with age, representing 22.1% of individuals over 65 years of age (MINISTÉRIO DA SAÚDE, 2014). Almost 50% of the population with DM do not know that they are carriers of the disease, remaining without diagnosis for a long time until symptoms of complications appear (ORGANIZAÇÃO PAN-AMERICANA DE SAÚDE, 2010). The effective prevention of this disease can reduce its consequences. Healthy living habits, including a balanced diet and regular physical exercise, are measures that favor the non-appearance of DM. Reducing the incidence of the disease, with effective preventive measures, means reducing the impacts that DM causes for individuals and the health system. However, there is little information on the health of Brazilians in medium and small cities (CAROLINO *et al.*, 2008). Like DM2, arterial hypertension (HA) is also a common chronic problem among adults. It has a high prevalence mainly in high age groups. The disease is characterized as asymptomatic and is responsible for

several cardiovascular, encephalic and renal complications (TOSCANO, 2004). A disease of increasing numbers and early manifestation, arterial hypertension is a serious public health problem in Brazil and the world, with high morbidity and mortality rates. In Brazil, its prevalence varies between 22% and 44% for adults (32% on average), reaching more than 50% for individuals aged 60-69 years and 75% among individuals over 70 years of age (MINISTÉRIO DA SAÚDE, 2013). Hypertension is a very common disease in diabetics, thus representing an additional risk for the development of macrovascular complications (TOSCANO, 2004). In subjects with diabetes, hypertension is twice as common as in non-diabetic subjects. Diabetics have a high incidence of coronary disease, arterial disease and cerebral vascular disease (SILVA *et al.*, 2006). Early diagnosis by primary care is extremely important to prevent the complications of this disease, and blood pressure (BP) control reduces cardiovascular complications such as acute myocardial infarction (AMI), stroke, kidney problems, among others (MINISTÉRIO DA SAÚDE, 2013). Preventing and treating both hypertension and type 2 diabetes mellitus involves information about the diseases, their interrelationships and complications, and most of the time, the need to introduce changes in lifestyle habits (SOCIEDADE BRASILEIRA DE CARDIOLOGIA, 2006). The efficient and effective attendance of the health agencies in order to contribute to the reduction of the morbidity and mortality associated with HA and DM in the country depends, above all, on the establishment of bases built from the joint action between the Union, states and municipalities, counting on the support and participation of scientific societies and entities of people with these diseases (MINISTÉRIO DA SAÚDE, 2001). The importance of informing the population about these issues is indispensable. The objective of this study was the active search for DM2 and HA in the municipality of Floriano, State of Piauí.

MATERIAL AND METHODS

The research was conducted as part of the project "Detection of suspects and prevention of type 2 diabetes mellitus: an evaluation of the incidence of cases in Floriano-PI." A total of 352 adult volunteers of both sexes, randomly selected, ranging in age from 18 to 87 years, were evaluated. Data collection took place within the Banco do Brasil branch of the center of Floriano city. Data were collected between August and December 2014. The questionnaire used included questions about age, gender, family history, identification of lifestyle habits, diabetes symptoms, and risk factors for individuals. After the questionnaire and with the consent of the interviewed, the capillary glycemia test was performed using a previously calibrated Accu-Check Performa glycosimeter (Roche Diagnostics, Germany) to verify postprandial blood glucose levels. The blood pressure (systolic and diastolic) was measured using a digital pulse pressure gauge (Geratherm, Germany, INMETRO certified). The pressure measurement was performed with the individual sitting after rest for at least five minutes, with the pulse at the heart level. All participants were guided on healthy lifestyle habits and received a leaflet that was developed with information for the prevention of diabetes and hypertension, based on data from the Ministry of Health. Individuals who had glycemia (> 140 mg/ dL) or arterial hypertension (with SBP ≥ 140 mmHg and / or DBP ≥ 90 mmHg) were instructed to check the nearest health service. The present study was based on the classification values of the National Campaign for Detection of Suspected Diabetes

Mellitus conducted by the Ministry of Health in 2001 and in the VI Brazilian Guidelines for Hypertension in the year 2010. The research protocol was submitted to the Research Ethics Committee of the UFPI, before starting the research, and approved with CAAE 18538313.0.0000.5214. The data processing was performed using the statistical program SPSS Statistics, version 10.0, and the parameters presented were absolute, relative, mean and standard deviation.

RESULTS AND DISCUSSION

A total of 352 individuals were evaluated, 49.4% were male and 50.6% female. Among the 352 individuals, 321 (88.60%) had postprandial blood glucose ≤140 mg/dL (normal) and 40 individuals (11.40%) had blood glucose >140 mg/dL, being considered suspected cases of T2DM, as shown in Table 1. Our data for Floriano-PI in 2015 indicated 11.40% of individuals with suspected cases of DM, a significant value for the total sample (n=352). Among these cases of DM, 57.5% were male and 42.5% female, thus having a predominance of males. The data from our study are of the same order of magnitude when compared to those found by the Ministry of Health in 2001, with 11.40% of suspected DM cases in Floriano versus 13.97% of DM suspects in the capital (Teresina) and 14.66% of DM suspects in the national average (MINISTÉRIO DA SAÚDE, 2001).

Table 1. Postprandial capillary blood glucose test

Blood glucose (mg/dL)	n*	Frequency	M ± DP
≤ 140	321	88,60%	100,32 ± 16,65
>140	40	11,40%	219,40 ± 92,15
TOTAL	352	100%	113,85 ± 51,20

n*= number of individuals evaluated. M = (Mean) ± SD = (Standard Deviation)

In a 2013 study in 26 capitals of Brazil and the Federal District through telephone survey (MINISTÉRIO DA SAÚDE, 2013), pointed percentages of individuals over 18 years who had a diagnosis referred for diabetes. 6.9% of all individuals were diagnosed with the disease, where 6.5% were male and 7.2% female (MINISTÉRIO DA SAÚDE, 2014). These data are well below the values we found, but it should be remembered that this study did not perform a capillary glucose test, only questions through the phone. Moreover, it contradicts the data of the present study, since the highest number of suspected DM2 were female subjects. Regarding glycemic control, 48.1% of individuals with normal postprandial glycemia (≤ 140 mg/dL) have some glycemic control or had recently consulted with their doctor to find out their blood glucose level, while 51.9% did not perform any of these procedures, as shown in Figure 1.
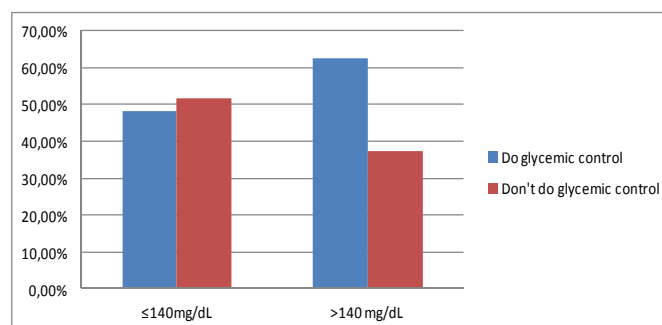

Figure 1. Glycemic control X Postprandial capillary blood glucose

Among the group that presented altered postprandial blood glucose >140 mg/dL (suspected DM2), 62.5% did some glycemic control and 37.5% did not perform any control procedure, shown in Figure 1. The usual glycemic monitoring is extremely important both for those diagnosed with diabetes, for glycemic control, and for those who do not have the disease, as it is silent, only showing signs of complications in very advanced stages. However, this practice of glycemic control is performed mainly in the doctor's office or in cases of extreme malaise of the individual (SOUSA & MCINTYRE, 2008). Among the 40 individuals suspected of DM2, we found that the majority (58.53%) already had symptoms of diabetes, while the others (41.47%) had no symptoms, as shown in Table 2. DM2 suspects who reported no symptoms (41.47%), shown in Table 2, may still be in the early stages of the disease, and are therefore asymptomatic. DM is known to cause severe health complications if proper prevention procedures are not performed. Through early detection, proper treatment, a healthy eating program and exercise specific to the needs of diabetics, complications of the disease can be avoided (GIACOMINI *et al.*, 2009).

Table 2. Percentage of individuals with suspected DM who had symptoms

	Frequency
Had symptoms	58,53%
Had no symptoms	41,47%
TOTAL	100%
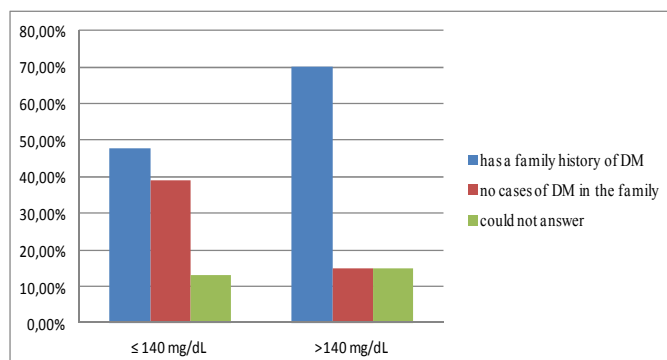
Figure 2. DM family history X Postprandial capillary blood glucose

One of the unmodifiable factors of DM2 is the family history of the disease. Among of the subjects participating in the study who had normal blood glucose (≤140 mg/dL, 312 individuals), 47.8% reported having family diabetes, 39.1% had no family history of the disease and 13.1% could not answer, as shown in Figure 2. Among the diabetes suspects (glycemia >140 mg/dL, 40 individuals), 70% reported having family diabetes, 15% had no family history of the disease and 15% could not respond, observed in Figure 2. We found that most of the individuals evaluated had a family history of DM, both among those with normal and high blood glucose. Normal individuals with a family history of diabetes are very likely to develop the disease, especially those who have not adopted healthy daily habits (weight control, exercise and regular preventive blood glucose control). Family history plays a fundamental role in the onset of diabetes. Diabetics have at least one close relative affected with the disease (DIRETRIZES DA SOCIEDADE BRASILEIRA DE DIABETES, 2007). The research volunteers were evaluated regarding their resting blood pressure (BP), as shown in Table 3. It can be seen that although 191 individuals (54.3%) had normal BP, a large number of participants (45.7%) had some stage of arterial hypertension. Among those who did not have normal BP, 15% were considered prehypertensive, 14.8% had the early stage of hypertension (hypertension 1), 6.8% were in stage 2 of hypertension, 2.3% were in the stage 3 of hypertension and finally 6.8% of respondents had isolated systolic hypertension. Males presented a higher percentage in all stages of arterial hypertension, as shown in Table 3. The borderline blood pressure is occasional, and risk factors, target organ damage and associated diseases should be considered. The accurate diagnosis depends considerably on BP measurements, thus minimizing the risks to misdiagnosis for both hypertensive and normotensive patients.

Therefore, lifestyle changes are indispensable to prevent and treat hypertension, which involves knowledge of the disease and its complications (SOCIEDADE BRASILEIRA DE CARDIOLOGIA, 2006). The Table 4 shows the classification of blood pressure according to age. Among the 352 individuals evaluated in the age range from 18 to 87 years old, 54.3% had normal blood pressure levels, 15% were classified as prehypertensive, 14.8% had stage 1 hypertension, 6.8% had hypertension stage 2, 2.3% had hypertension stage 3 and 6.8% had isolated systolic hypertension (ISH). From 18 to 27 years old, 8.24% of respondents had normal BP, 0.3% had prehypertension, 0.6% had stage 1 hypertension, 0.6% had stage 2 hypertension, no individual presented stage 3 hypertension and 0.6% had ISH. From 28 to 37 years, 14.5% of the individuals had normal BP, 2.8% had prehypertension, 1.14% had hypertension stage 1, 0.6% had hypertension stage 2, no individual had hypertension. hypertension stage 3 and 1.14% had ISH. From 38 to 47 years, 11.1% had normal BP, 3.7% had prehypertension, 3.7% had stage 1 hypertension, 1.7% had stage 2 hypertension, 0.3% had hypertension stage 3 and 0.85% had ISH. From 48 to 57 years old, 11.4% had normal BP, 4.3% had prehypertension, 4.3% had hypertension stage 1, 1.14% had hypertension stage 2, 0.85% had hypertension hypertension stage 3 and 2.3% have ISH. From 58 to 67 years old, 5.11% had normal BP, 2.5% had prehypertension, 2.5% had hypertension stage 1, 1.14% had hypertension stage 2, 0.85% had hypertension hypertension stage 3 and 0.85% had ISH. From 68 to 77 years old, 3.12% had normal BP, 1.4% had prehypertension, 2.3% had hypertension stage 1, 1.4% had hypertension stage 2, no individual had stage hypertension 3 of hypertension and 0.85% had ISH. From 78 to 87 years old, 0.85% had normal BP, no individual had prehypertension, 0.3% had hypertension stage 1, 0.3% had hypertension stage 2, 0.3% had stage3 hypertension and 0.3% had ISH.

The research reported that individuals aged 28 to 47 years had a significant increase in prehypertension and stage 1 of hypertension. In addition to having high levels of prehypertension and stage 1 hypertension, individuals aged 48 to 57 years had an increase in isolated systolic hypertension compared to other individuals in the study. The largest number of individuals in stage 1 of hypertension were found in the age group 48 to 77 years, as shown in Table 4. Participants 48 to 57 years old confirmed that age above 45 years is a risk factor for the disease. According to the Brazilian Society of Cardiology (2006) the Brazilian Society of Cardiology (2010) and the Pan American Health Organization (2010), age over 45 years is one of the main risk factors for developing hypertension.

Table 3. Blood pressure classification by gender

	Male			Female		
	Freq. (n)	SBP ± DP	DBP ± DP	Freq. (n)	SBP ± DP	DBP ± DP
NM	23,01% (81)	117,81 ± 9,19	75,12 ± 7,49	31,25% (110)	113,20 ± 9,86	72,88 ± 7,0
PH	08,24% (29)	133,82 ± 2,96	85,17% ± 6,34	6,81% (24)	134,50 ± 6,48	80,87 ± 6,06
H1	8,52% (30)	147,46 ± 6,92	94,23 ± 6,77	6,25% (22)	153,00 ± 4,73	89,09 ± 7,24
H2	3,69% (13)	166,69 ± 5,89	97,07 ± 12,25	3,12% (11)	166,09 ± 4,92	96,09 ± 7,44
H3	1,42% (5)	203,80 ± 14,37	115, 80 ± 7,69	0,85% (3)	200,33 ± 7,57	102,66 ± 16,65
ISH	4,54% (16)	143,43 ± 2,50	82,50 ± 5,77	2,30% (8)	142,87 ± 2,69	81,12 ± 5,48
T	49,43% (174)	134,07 ± 20,97	83,58 ± 12,33	50,57% (178)	127,06 ± 21,86	78,26 ± 10,60

Freq.= frequency; n = number of individuals evaluated. NM = normal, PH = prehypertension, H1 = hypertension 1, H2 = Hypertension 2, H3 = Hypertension 3, ISH = Isolated Systolic Hypertension, T = Total. SBP ± SD (Mean Systolic Blood Pressure ± Standard Deviation); DBP ± SD (Mean Diastolic Blood Pressure ± Standard Deviation).

Table 4. Blood pressure classification by age group

	Frequency (n)					
Age (years)	NM	PH	H1	H2	H3	ISH
18-27	8,24% (29)	0,3% (1)	0,6% (2)	0,6% (2)	0% (0)	0,6% (2)
28-37	14,5% (51)	2,8% (10)	1,14% (4)	0,6% (2)	0% (0)	1,14% (4)
38-47	11,1% (39)	3,7% (13)	3,7% (13)	1,7% (6)	0,3% (1)	0,85% (3)
48-57	11,4% (40)	4,3% (15)	4,3% (15)	1,14% (4)	0,85% (3)	2,3% (8)
58-67	5,11% (18)	2,5% (9)	2,5% (9)	1,14% (4)	0,85% (3)	0,85% (3)
68-77	3,12% (11)	1,4% (5)	2,3% (8)	1,4% (5)	0% (0)	0,85% (3)
78-87	0,85% (3)	0% (0)	0,3% (1)	0,3% (1)	0,3% (1)	0,3% (1)
T	54,3% (191)	15% (53)	14,8% (52)	6,8% (24)	2,3% (8)	6,8% (24)

N = number of individuals evaluated. NM = normal, PH = Prehypertension, H1 = Hypertension 1, H2 = Hypertension 2, H3 = Hypertension 3, ISH = Isolated Systolic Hypertension, T = Total.

Chaves *et al.* (2010) stresses that it is of great importance the monitoring of individuals by the health team, to initiate preventive measures at an early stage of adulthood. Understanding the increased prevalence of hypertension in young individuals and their possible implications for adulthood has indispensable allusions to prevent chronic diseases, especially cardiovascular diseases (ARAÚJO *et al.*, 2008). Araújo *et al.* (2008) understands that the results of blood pressure measurements do not indicate that individuals have hypertension, but that the disease may manifest itself in adulthood, if there are risk factors and if they are not followed healthy guidelines. Intervening in the treatment and follow-up process of individuals with high blood pressure and diabetes has relevant importance in the control of these chronic diseases. Through an educational action through a multidisciplinary team, this procedure can be maintained and expanded in public health services (SILVA *et al.*, 2006).

CONCLUSION

Blood glucose and blood pressure levels were investigated in a population sample in the city of Floriano, Piauí. The percentage of suspected individuals referred to a health service for diagnostic confirmation of diabetes mellitus was 11.4% (40 out of a total of 352 individuals) and 45.7%, ie (161 out of a total of 352 individuals) had some stage of hypertension. In the present study, it was confirmed that primary prevention with glycemic control and blood pressure measurement were not performed by most of the individuals evaluated. The results of our study showed that a significant number of individuals with both normal and altered blood glucose had a family history of diabetes mellitus. Age over 45 years old represents a risk factor for hypertension, as a significant 4.3% of individuals aged 48 to 57 years presented altered blood pressure, thus confirming the citations of several articles that showed similar results. Another factor found in our study was young adults aged 28 to 37 years who showed a significant percentage for altered blood pressure.

Regarding healthy lifestyle habits, it was noticed that the vast majority of individuals did not include physical activity in their daily lives. Diabetes mellitus and high blood pressure are common and growing diseases every day, diseases that weaken the individual and cause exorbitant expenses to the health system. Prevention of these conditions includes simple lifestyle habits such as healthy eating and regular physical activity. In this sense, it is clear that the health system should be more active in preventing these diseases, and there is a need for health education multipliers in order to warn about prevention, risk factors, complications and treatment. Health education in schools would be indispensable to warn or even minimize the consequences of type 2 diabetes mellitus and hypertension, as well as several other diseases.

Collective health is a field of knowledge and interdisciplinary intervention, where we work with practices of better living conditions, transforming the way of life, promoting health and preventing diseases (CARVALHO & CECCIM, 2006). The promotion of healthy lifestyle habits would change the health system scenario today, reducing the complications and mortality of individuals due to simple prevention and effective treatment diseases, if followed correctly by educational measures. Understanding the need to guide individuals and guide them towards a healthy lifestyle is a joint task of health and education systems, thus promoting a better quality of life for the population and reducing treatment costs for both individuals and their families, as for our already overburdened health care system.

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