PREVALENCE OF DIABETES *MELLITUS* AND RISK FACTORS IN RESIDENTS OF "TAÚBAS" NEIGHBORHOOD IN IPATINGA MUNICIPALITY, STATE OF MINAS GERAIS, BRAZIL, IN 2014

GILCINÉIA FERNANDES **OLIVEIRA**[1], JANNEFER FRANCIELEN **PATROCÍNIO**[1], MARIA ALICE FARIA **REIS**[1], ARILTON JANUÁRIO BACELAR **JUNIOR**[2]

1. Graduate Student of Biomedicine course at the Faculty President Antonio Carlos, Ipatinga; **2.** Pharmacy Course Coordinator of the Faculty President Antonio Carlos, Ipatinga; Member of the CRF-MG Education Commission; University Professor Undergraduate and Postgraduate Studies; Bachelor of Pharmacy-Biochemistry; Bachelor of Law; Specialist in Clinical Analysis and Specialist in infectious and parasitic diseases; MBA in Educational Management; Specialist Waste Management in Health Services; Specialist in Educational Law; Specialist in Public Law; PhD student in legal and Social Sciences.

* Faculty President Antônio Carlos, Ipatinga - Marquês de Caravelas Street, 148, Cidade Nobre, Ipatinga, Minas Gerais, Brazil. CEP 35162-148
dr.arilton@gmail.com

ABSTRACT

Diabetes *mellitus* is characterized as a metabolic disorder caused by the buildup of glucose in the bloodstream, caused by defects and / or action of the hormone insulin. To determine the prevalence of diabetes *mellitus* and risk factors in more than 18 residents in the neighborhood Taúbas - Ipatinga MG. We analyzed data from health unit to calculate the prevalence of the disease in the neighborhood, and home visits for application forms for identification of risk factors. 120 individuals were analyzed in the study. The prevalence of the disease was in the neighborhood of four diabetics for every 100 residents. The sample corresponds to 94 (78.3%) persons of the female gender and 26 (21.7%) were male. The most affected age group was 50-70 years. Obtain statistical association (p≤0.05) factors: genetic predisposition, with 63 (52.5%) individuals with dyslipidemia 21 (17.5%) and hypertension 51 (42.5%). No statistical association (p>0.05) factors: smoking 13 (10.8%) individuals, sedentary 89 (74.2%), eating habits 50 (41.7%), coronary heart disease 15 (12.5 %), and BMI ≥25 85 (70.8%). Genetic predisposition has 3.5 times more likely to develop diabetes *mellitus*, dyslipidemia and hypertension has 7.3 times to 3.4 times. The prevalence was demonstrated lower than expected despite the majority of respondents presenting risk factors. Based on these results, it is suggested that new studies with larger populations to be made in order to accurately determine the prevalence of diabetes *mellitus* and risk factors.

KEYWORDS: Diabetes *mellitus*, prevalence, risk factors.

1. INTRODUCTION

Diabetes *mellitus* is a metabolic disorder of chronic disease, characterized by the accumulation of glucose in the bloodstream due to defects in the secretion and action of the hormone insulin. Currently this disease has emerged as a major public health problem because of its increasing prevalence in recent years, thus increasing its morbidity and mortality rates[1,2]. Studies show that the increasing prevalence of the disease is due to the rapid population aging and the industrialization and urbanization processes[3,4].

The Diabetes *mellitus,* which can be acquired or genetic cause is divided into four groups: Type 1, Type 2, gestational diabetes, among others. This classification was created by the American Diabetes Association and adopted by WHO and the Brazilian Society of Diabetes[2,5].

In type 1 diabetes is the destruction of pancreatic β cells, by some autoimmune process or unknown causes, the destruction of β cells will result in the total insulin deficiency in the individual, this type of diabetes is more commonly found in children, adolescents and adults young people. Diabetes type 2 is due to the default functionality and secretion of insulin, with a higher frequency in individuals over 40 years[1].

The development of gestational diabetes is characterized by hyperglycemia diagnosed during pregnancy. Other specific types of diabetes include the defects of genetic nature in the action of insulin and β cells, endocrine diseases, diabetes induced by drugs and other genetic syndromes related to Diabetes *mellitus*[1,5].

The Diabetes *mellitus* presented an increasing occurrence, studies show that the disease reached in 1995 about 4% of adults worldwide, and will focus in 2025 about 5.4% of the population. Studies also show that 50% of the diabetic population is unaware of the presence of the disease and the correct diagnosis is made only after the manifestations of signs and symptoms. Therefore the completion of the screening test in asymptomatic patients who have risk for developing the disease is of paramount importance[1,6,7].

The risk factors for the development of disease are: genetic predisposition, age over 50 years, gender, BMI or equal to 25, dyslipidemia, smoking, alcoholism, hypertension, physical inactivity, coronary heart disease and eating habits. Statistics data about the Diabetes *mellitus* is essential to develop health programs aimed at

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prevention, counseling, diagnosis and treatment of affected[2,8,9].

The city of Ipatinga is located to the east of Minas Gerais State, in the metropolitan region of the Steel Valley, the Doce River Basin. Located about 235 km away from Belo Horizonte, the principal city[10]. Its population according to the last IBGE census in 2010 comprises of 239,468 inhabitants, has as estimated population for the year 2014 of 255,266 inhabitants. With the land area of 164,884 km² its population density covers about 1452.34 inhab./ Km², and has 35 neighborhoods. Among them, the Taúbas neighborhood used in the research, located in regional VI, composed of about 467 individuals living on site[11]. Given the increasing public health problem that Diabetes *mellitus* presents the population, this study aims to determine the prevalence of diabetes *mellitus* and its risk factors in residents aged over 18 years Taúbas neighborhood in Ipatinga - MG, registered in the Program "Family Health" in 2014.

2. MATERIAL AND METHODS

The research it is a cross-sectional descriptive observational study of quantitative nature, conducted from September 9 to October 24.

This research project was submitted to the Ethics Committee of the Hospital of the Whale/ Benjamin Guimarães Foundation, voucher number: 087176/2014, CAAE: 36874414.9.0000.5123, ethical standards with regard to research involving human beings in Resolution 196/96 of the National Health Council, especially with regard to the implementation of the Consent and Informed participants, as well as, the secrecy and confidentiality data were followed.

The data to determine the prevalence of diabetes *mellitus* were provided by the local health unit, this unit serving other two neighborhoods beyond Taúbas. To determine the prevalence of risk factors, home visits were carried out by the health care provider for the implementation of the forms in which information was obtained on the number of risk factors are: gender, age, dyslipidemia, BMI or equal to 25, genetic predisposition, smoking, alcohol consumption, hypertension, physical inactivity, coronary heart disease and eating habits[2,8,9]. To help BMI calculation was used portable weighing up to 120 pounds to investigate the weight of research and tape measure participants to determine the height.

The applied forms had nine closed questions and organized in thematic groups in order, namely on: name, gender, age, weight and height, eating habits, physical activity, dyslipidemia, coronary heart disease, smoking, alcohol consumption and genetic predisposition. The names of the patients were coded to avoid the subject's exposure and facilitate the handling of the data obtained with these reviewed by each researcher. All data and

results obtained in this work will be used only for research purposes as well as to achieve their goals.

Only individuals participated in the survey residents Taúbas neighborhood in Ipatinga - MG registered in the Program "Family Health", 18 years and signed the Informed Consent Statement. Smaller inhabitants of 18, missing from home individuals at the time of the visit and individuals who refused to participate in the study, were excluded with respect to the prevalence of risk factors.

The total sample for estimating the prevalence of the disease consists of 574 individuals from 170 families; the data for the total sample was provided by the health department and comprises all individuals living in the neighborhood of registered PSF. In all the forms were applied to 120 people from 89 households, (56%) residents of the neighborhood of 71 households (44%) had no residents on the fly. In 10 households, there were no residents.

Data analysis was performed using statistical calculations where the prevalence of the total population was calculated registered in the program "Family Health" and the average was calculated using data obtained during home visits. To investigate the association statistics of the risk factors we used chi-square test with 95% confidence interval, assuming thereby a significance level of 5% ($p \leq 0.05$). The strength of association was measured by Relative Odds (RO), due to the small number of affected in the sample.

3. RESULTS

The prevalence found in the study was four for each top 100 inhabitants of 18 years. Of the total sample females corresponds to 94 women (78.3%) and males to 26 men (21.7%). The most affected age group is 50-70 years, mean 52 years old. The prevalence of risk factors, presence and absence of statistical association are shown in (Table 1).

Table 1. Prevalence of risk factors and analysis of statistical association of variables.

Analysis of risk factors studied							
Variables	Diabetic		Non-diabetic		Total		Chi-square x^2
	n	%	n	%	n	%	
Genetic Predisposition							
Yes	16	13.3	47	39.2	63	52.5	≤0.05
No	5	4.2	52	43.3	57	47.5	
Age							
> 50 years	14	11.7	50	41.7	64	53.3	≥0.05
≤ 50 years	7	5.8	49	40.8	56	46.7	
Gender							
Female	14	11.7	80	66.7	94	78.3	≥0.05
Male	7	5.8	19	15.8	26	21.7	
BMI							
< 25	4	3.3	31	25.8	35	29.2	≥0.05

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≥ 25	17	14.2	68	56.7	85	70.8	
Dyslipidemia							
Yes	10	8.3	11	9.2	21	17.5	≤0.05
No	11	9.2	88	73.3	99	82.5	
Smoking							
Yes	3	2.5	10	8.3	13	10.8	≥0.05
No	18	15.0	89	74.2	107	89.2	
Alcoholism							
Yes	0	0.0	15	12.5	15	12.5	*
No	21	17.5	84	70.0	105	87.5	
Hypertension							
Has SAH	14	11.7	37	30.8	51	42.5	≤0.05
Has no SAH	7	5,8	62	51,7	69	57,5	
Sedentarism							
Sedentary	15	12.5	74	61.7	89	74.2	≥0.05
Non-Sedentary	6	5.0	25	20.8	31	25.8	
Coronary Artery Disease							
Yes	4	3.3	11	9.2	15	12.5	≥0.05
No	17	14,2	88	73,3	105	87,5	
Food habits							
Healthy	12	10.0	38	31.7	50	41.7	≥0.05
Non-Healthy	9	7.5	61	50.8	70	58.3	

* Could not calculate the chi-square, as the number of affected by the variable is 0.

Note that the risk factors analyzed was obtained statistical association (p = 0.05) only the genetic predisposition factors, dyslipidemia and hypertension. The genetic risk factor predisposing corresponds to 63 (52.5%) of the total population studied subjects, 16 (13.3%) diabetic patients and 47 (39.2%) non-diabetic patients, 21 (17.5%) individuals the studied population has some type of dyslipidemia which 10 (8.3%) are diabetic and 11 (9.2%) non-diabetics. Hypertension affects 51 (42.5%) individuals in the population; these figure, 14 (11.7%) individuals are diabetic and 37 (30.8%) non-diabetics.

The risk factors that showed no statistical association (p≥0,05) were smoking, sedentary lifestyle, eating habits, coronary heart disease, BMI greater than or equal 25, the age of 50 years and gender. Smoking acomete13 individuals (10.8%) of the total population studied, where three (2.5%) are diabetic and 10 (8.3%) non-diabetics. Individuals over age 50 account for 64 (53.3%) patients of the total research participant population of the value of 14 (11.7%) are diabetic and 50 (41.7%) of non-diabetics. Regarding the variable alcohol consumption, could not be verified association due to the fact the number of affected by diabetes *mellitus* be null.

It was observed that 15 patients (12.5%) of the population has some type of coronary disease, this total four (3.3%) are diabetic and 11 (9.2%) are not diabetic. In eating habits it was noted that 12 individuals (10%) of diabetic and 38 (31.7%) of the non-diabetic population. The population have healthy eating habits, while nine patients (7.5%) who have diabetes and 61 (50.8%) of those who do not have diabetes do not have healthy eating habits.

Subjects with a BMI greater than or equal to 25 account for 17 subjects, which (14.2%) were diabetic and 68 (56.7%) were non-diabetic patients. Its results show that 4 (3.3%) diabetics subjects and 31 (25.8%) non-diabetics subjects have a BMI less than 25. In the group, 94 subjects (78.3%) of the interviewed population are females where 14 (11.7%) had diabetes *mellitus* and 80 (66.7%) did not have the disease, the male corresponds to 26 individuals (21.7%) of the total population interviewed, this value seven (5.8%) are diabetic and 19 (15.8%) non-diabetic subjects.

Through calculations to investigate the strength of association was observed that individuals with dyslipidemia show 7.3 times more likely to develop diabetes of which do not have dyslipidemia. It comes to genetic predisposition, individuals who have a family member with diabetes have 3.5 times more likely to develop the disease than those who have no family with the disease. The presence of hypertension increases 3.4 times more likely to develop diabetes than individuals who do not have hypertension (Figure 1).
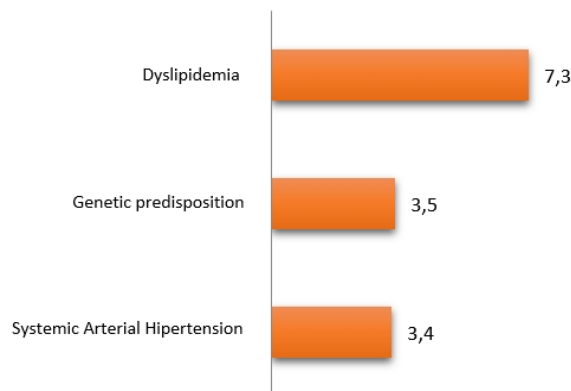

Figure 1. Strength of association between the risk factors for developing diabetes *mellitus*.

4. DISCUSSION

The results of the survey enabled us to identify a prevalence lower than expected, with 4% of value. Freitas & Garcia (2012)[12] has identified an approximate prevalence of 5% of the Brazilian population po-demonstrating consistency with the data obtained in the study performed. However Days & Campos (2012)[13] argue that the prevalence of diabetes *mellitus* in Brazil there was a sharp increase, with over 10% in most of the bra-ian states in the 2002-2007 period.

In the survey the genetic predisposition factor is present in 13.3% of diabetic patients in the survey, the result is proven by Souza *et al.* (2003)[14], wherein the factor affects 10% of the diabetic population studied. Medeiros *et al.* (2012)[9] stated that individuals who have first-degree relatives is two to six times more likely to develop diabetes. In research conducted in Taúbas

neighborhood was observed using statistical calculations that individuals who have a family member with the disease are 3.5 times more likely to develop diabetes with respect to those who have no family with that disease.

Though it lacks statistical association study conducted in individuals aged over 50 years are more affected by the disease since the study population 11.7% of diabetics have the age of 50 years and only 5.8% have the age of 50 years. Freitas & Garcia (2012)[12] observed in their study that the age group most affected by the disease was 70-79 years old. The authors also state that the prevalence rate has greater significance in people aged 40-79 years with no differences regarding gender.

Although other studies have shown a higher frequency of diabetes in female subjects[14,15], conducted the study had a higher prevalence of diabetes in male persons. In research conducted by Pinto & Moretto (2004)[16] in outpatients, the prevalence of diabetes *mellitus* was higher in males. However, after 50 years of age, the prevalence found himself pronounced in females, the authors claim that the fact that the prevalence is more pronounced in individuals older than 50 years hence increases the risk of morbidity and mortality in this group age. Ortiz & Zanetti (2001)[15] point out that the prevalence of the disease in women has no great significance, as the prevalence of diabetes *mellitus* is 1.4 to 1.8 times more frequent in females than in males.

Despite the BMI variable has no statistical association in our study we found 14.2% of diabetic patients with BMI 25 and above in while only 3.3% of diabetics have lower BMI than 25. In research conducted by Ortiz & Zanetti (2001)[15], 51.5% of study participants is in a frame overweight or obese. In Souza *et al.* (2003)[14] is also depicted that obesity is a factor in the development of diabetes *mellitus*.

It was noted in this study the presence of statistical association regarding the variable dyslipidemia and hypertension, showing that such variables are risk factors for developing diabetes *mellitus*. Souza *et al.* (2003)[14] confirm this association through a study conducted in Rio de Janeiro, in which state that high blood pressure and dyslipidemia are in fact risk factors for developing the disease, and the prevalence of diabetes *mellitus* in more expressive individuals which has some of these factors. Lyra *et al.* (2010)[17] that 20% to 60% of diabetic patients have hypertension, pre-valence was found by the authors one to three times higher in people who have diabetes *mellitus* in relation to those who do not have the disease.

Francis *et al.* (2010) 8 say that the significant prevalence of hypertension in diabetic patients due to the fact thereof is connected to the increasing degree of insulin resistance in addition to the worse hypertensive medications used by this resistance framework, making the car-

rier more prone hypertension developing Diabetes *mellitus*.

Sedentary lifestyle no significant statistical association in going from line study to research conducted by Medeiros *et al.* (2012)[9]. Lyra *et al.* (2010)[17] argue that physical inactivity is related to insulin resistance in people without diabetes *mellitus*, in the study conducted by the authors said variable was not related, stating that physical exercise increases the amount of muscle fibers and capillaries, assisting the functionality of the insulin-mediated glucose on the abovementioned cells.

Thus, it is observed that the variable sedentary lifestyle despite having no statistical association is considered a risk factor for the development of diabetes *mellitus*. For the physical activity is beneficial to health it must be carried out continuously with a suitable degree of intensity to each individual[18].

Regarding smoking, the variable showed no statistical significance. These results are in agreement with the findings by Moraes *et al.* (2010)[7], the study in São Paulo in which he states that the association of this variable with diabetes *mellitus* presented with conflicting results in the literature making this little fact clear. Smoking adds the chronic complications of diabetes *mellitus*, thus bringing health hazards both independently as associated with other factors[16]. Another variable that was not statistically significant was the presence of coronary heart disease, the result is contradictory in the study of Francis *et al.* (2010)[8], where it was found statistically significant factor that affects 21% to 15% of the study population.

In the data analysis showed that the variable diet was not statistically significant, one reason for the data found is that the diabetic population already have a balanced diet due to illness, it was observed that most of the non-diabetic patients have had a healthy diet. Brito *et al.* (2009)[19], shown in his research that 73.49 % of diabetic respondents in the study do not have healthy eating habits, the authors also stress the importance of having a balanced diabetic individuals and fractional power.

5. CONCLUSION

In conclusion, this study showed a prevalence rate lower than expected, this shows that much of the population studied, despite not having healthy eating habits and be mostly sedentary, do not have diabetes *mellitus*.

Most of the participants of the study population had at least two risk factors for the development of diabetes *mellitus*. We suggest the implementation of awareness campaigns with regard to the practice of promoting healthy habits, such as the practice of physical activity and eating habits appropriate to the needs of each individual, because much of this population still unaware the importance of prevention, monitoring and control of the disease.

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The monitoring of the health status of the population studied is extremely necessary for there to be an early and accurate diagnosis of the disease in order to reduce morbidity and mortality caused by the disease. Given, these results suggest the new studies with populations of more individuals and covering not only individuals older than 18 years in order to accurately determine the prevalence of diabetes *mellitus* and its risk factors.

REFERENCES

[01] Shwetz, Cobas RA, Gomes MB de. Diabetes *Mellitus*. Rev do Hospital Universitário Pedro Ernesto**.** 2010; 9 (1):69-75.

[02] Brasil. Ministério da saúde (MS). Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Estratégias para o cuidado da pessoa com doença crônica: diabetes *mellitus*. Brasília: Ministério da saúde (MS); 2013.

[03] Sociedade Brasileira de Diabetes. Diretrizes da Sociedade Brasileira de Diabetes:2013-2014. São Paulo: AC Farmacêutica; 2014.

[04] Schmidt MI, Duncan BB, Hoffmann JF, Moura L, Malta DC, Carvalho RMSV de. Prevalência de diabetes e hipertensão no Brasil baseada em inquérito de morbidadeauto-referida, Brasil, 2006. Rev. Saúde Pública. 2009; 43(2):74-82

[05] Smeltzer SC, Bare BG, Hinkle JL, Cheever KH. Tratado de Enfermagem Médico-Cirúrgica. 10. Ed. Rio de Janeiro: Guanabara Koogan; 2009. 1158-214.

[06] King H, Aubert RE, Hernan WH. Global burden of diabetes, 1995-2025: prevalence, numerical estimates, and projections. Diabetes Care. 1998; 21(9): 1414-31.

[07] Moraes SA, Freitas ICM de, Gimeno SGA, Mondini L. Prevalência de diabetes *mellitus* e identificação de fatores associados em adultos residentes em área urbana de Ribeirão Preto, São Paulo, Brasil, 2006: Projeto OBEDIARP. Cad Saúde Pública. 2010 maio; 26(5):929-41.

[08] Francisco PMSB, Belon AP, Barros MBA de, Carandina L, Alves MCGP, Goldbaum M, *et al*. Diabetes auto-referido em idosos: prevalência, fatores associados e práticas de controle. Cad Saúde Pública. 2010 jan; 26(1):175-84.

[09] Medeiros CCM, Bessa GC, Coura AS, França ISX de, Sousas FS de. Prevalência dos fatores de risco para diabetes *mellitus* de servidores públicos. Rev Eletrônica de Enfermagem. 2012 jul-set; 14(3):559-69.

[10] Freitas GVR. Entre divisas, divisores e um massacre: A emancipação da não construída cidade de Ipatinga-MG [dissertação de mestrado]. Uberlândia: Universidade Federal de Uberlândia; 2011.

[11] IBGE – Instituto Brasileiro de Geografia e Estatística [homepage na internet]. Rio de Janeiro: Censo demográfico 2010 – Resultados da amostra; c2010 [acesso em 2014 out 25]. Disponível em: http://www.cidades.ibge.gov.br/xtras/perfil.php?lang=&codmun=313130&search=minas-gerais|ipatinga

[12] Freitas LRS de, Garcia LP. Evolução da prevalência do diabetes e deste associado à hipertensão arterial no Brasil: análise da Pesquisa Nacional por Amostra de Domicílios, 1998, 2003 e 2008. EpidemiolServ Saúde. 2012 jan-mar; 21(1):7-19.

[13] Dias JCR, Campos JADB. Diabetes *mellitus*: razão de prevalências nas diferentes regiões geográficas no Brasil, 2002 – 2007.Ciênc. saúde colet. 2012; 17(1):239-44.

[14] Souza LJ de, Chalita FEB, Reis AFF, Teixeira CL, Neto CG, Bastos DA,*et al.* Prevalência de Diabetes *Mellitus* e Fatores de Risco em Campos dos Goytacazes, RJ. ArqBrasEndocrinolMetab. 2003 fev; 47(1):69-74.

[15] Ortiz MCA, Zanetti ML. Levantamento dos fatores de risco para diabetes *mellitus* tipo 2 em uma instituição de ensino superior. Rev Latino-am Enfermagem. 2001 maio; 9(3):58-63.

[16] Pinto AB, Moretto MB. Diabetes *mellitus* e fatores de risco em pacientes ambulatoriais. NewsLab. 2004; 66: 106-118.

[17] Lyra R, Silva RS dos, Montenegro Jr RM, Matos MVC, Cézar NJB, Silva LM da. Prevalência de diabetes melito e fatores associados em população urbana adulta de baixa escolaridade e renda do sertão nordestino brasileiro. ArqBrasEndocrinolMetab. 2010; 54(6):560-66.

[18] Almeida VCF de, Zanetti ML, Almeida PC de, Damasceno MMC. Ocupação e fatores de risco para diabetes tipo 2: estudo com trabalhadores de enfermagem. Rev. Latino-Am. Enfermagem. 2011 maio-jun; 19(3):[09 telas].

[19] Brito KM de, Buzo RAC, Salado GA. Estilo de vida e hábitos alimentares de pacientes diabéticos. Rev Saúde e Pesquisa. 2009 set-dez; 2(3):357-62.