

Diabetes mellitus: occurrence of risk factors and care among nursing workers*

Diabetes mellitus: fatores de risco, ocorrência e cuidados entre trabalhadores de enfermagem

Diabetes mellitus: factores de riesgo, ocurrencia y cuidados entre trabajadores de enfermería

Darlene Mara dos Santos Tavares¹, Nayara Araújo Reis², Flavia Aparecida Dias³, Fabiana Augusta Moreira Lopes⁴

ABSTRACT

Objective: To identify the occurrence of Diabetes Mellitus (DM), risk factors, stress and health-care activities performed by diabetic nursing workers. **Methods:** This is a descriptive study with 418 professional nurses, working at a university hospital. Data were collected through a semi-structured instrument and were analyzed using the frequency distribution, the chi-square test ($p < 0.05$) and the odds ratio. **Results:** Most of the professionals were female and had between 20 and 30 years of age. All risk factors for DM were present, including the factors that can be modified. It was found a larger proportion of diabetic workers that had: overweight; arterial hypertension and capillary blood glucose altered, when compared to those without the disease. It was not found an increased likelihood of developing DM among nursing workers who reported stress. The workers with DM did not attend to the monthly follow up (69.2%); they were treated in private services (70%); and, they did not participate in educational activities (92.3%). **Conclusion:** It is necessary to develop health actions aimed to the workers, in order to prevent DM.

Keywords: Diabetes mellitus; Nursing; Disease prevention; Nursing team; Surveillance of the workers health

RESUMO

Objetivo: Identificar a ocorrência de *Diabetes Mellitus* (DM), os fatores de risco, o estresse e o cuidado com a saúde realizado pelos trabalhadores de enfermagem diabéticos. **Métodos:** Estudo descritivo realizado com 418 profissionais de enfermagem de um hospital universitário. Os dados foram coletados por meio de instrumento semiestruturado e analisado, utilizando-se a distribuição de frequência, teste qui-quadrado ($p < 0,05$) e *odds ratio*. **Resultados:** A maioria dos profissionais era do sexo feminino e possuía de 20 a 30 anos de idade. Todos os fatores de risco para DM estavam presentes, inclusive, os passíveis de modificação. Houve maior proporção de trabalhadores diabéticos com: sobrepeso; hipertensão arterial e glicemia capilar alterada, quando comparados aos que não tinham essa doença. Não se observou maior chance de desenvolver DM entre os trabalhadores de enfermagem que referiram estresse. Os trabalhadores com DM não faziam acompanhamento mensal (69,2%); eram atendidos em serviços particulares (70%), e nem participavam de atividades educativas (92,3%). **Conclusão:** Faz-se necessário desenvolver ações em saúde direcionadas aos trabalhadores, visando a prevenção do DM.

Descritores: Diabetes *mellitus*; Enfermagem; Prevenção de doenças; Equipe de Enfermagem; Vigilância em saúde do trabalhador

RESUMEN

Objetivo: Identificar la ocurrencia de *Diabetes Mellitus* (DM), los factores de riesgo, el estrés y el cuidado con la salud realizado por los trabajadores de enfermería que son diabéticos. **Métodos:** Estudio descriptivo realizado con 418 profesionales de enfermería de un hospital universitario. Los datos fueron recolectados - por medio de un instrumento semi-estructurado - y analizados, utilizando la distribución de frecuencias, prueba chi-cuadrado ($p < 0,05$) y *odds ratio*. **Resultados:** La mayoría de los profesionales era del sexo femenino e poseía de 20 a 30 años de edad. Todos los factores de riesgo para DM estaban presentes, inclusive, los pasibles de modificación. Hubo mayor proporción de trabajadores diabéticos con sobre peso, hipertensión arterial, y glucemia capilar alterada, cuando comparados a los que no tenían esa enfermedad. No se observó una mayor probabilidad de desarrollar DM entre los trabajadores de enfermería que relataron estrés. Los trabajadores con DM: no hacían acompañamiento mensual (69,2%); eran atendidos en servicios particulares (70%); y no participaban de actividades educativas (92,3%). **Conclusión:** Es necesario desarrollar acciones de salud dirigidas a los trabajadores, con la finalidad de prevenir la DM.

Descriptores: Diabetes *mellitus*; Enfermería; Prevención de enfermedades; Grupo de enfermería; Vigilancia de la salud del trabajador

* Work carried out in the Clinical Hospital of the Federal University of Triângulo Mineiro – FUTM – Uberaba (MG), Brazil.

¹ Doctorate in Nursing. Associate Professor of the Department of Education and Community Health Nursing (DEESC) of the Graduation in Nursing (CGE) course of the Federal University of Triângulo Mineiro – FUTM – Uberaba (MG), Brazil.

² Undergraduate Nursing Student of CGE of FUTM. Scientific Initiation Scholarship of CNPq

³ Registered Nurse. Masters student of the Post-Graduate Program in Health Care of the Federal University of Triângulo Mineiro – FUTM – Uberaba (MG), Brazil. Masters scholarship financed by Capes

⁴ Registered Nurse. Specialist in Collective Health Masters student of the Post-Graduate Program in Health Care of the Federal University of Triângulo Mineiro – FUTM – Uberaba (MG), Brazil.

INTRODUCTION

Stress can be triggered by various situations, among them, the work that is essential to human life. Thus, subjects who carry out risky work activity should undergo health actions in order to prevent unpleasant symptoms that can bring harm to their health⁽¹⁾. In recent decades, studies have been developed, addressing the risk factors for stress, present in nursing work, with emphasis on hospital performance⁽²⁻⁸⁾. However, fewer have addressed the consequences of stress on the health of workers in general⁽⁹⁾ and on that of nursing workers^(1,10-11).

For health, the repercussions of stress, generated by nursing work, have been described as migraine headache episodes, irritability, physical fatigue, depression, leg pain, varicose veins and high blood pressure⁽¹⁰⁾ with the addition of psychosomatic symptoms such as fatigue, muscle tension, nervousness, back pain, anxiety, premenstrual syndrome, cephalgia and memory problems⁽¹⁾ plus the occurrence of work accidents from perforating-cutting material, falls, exposure to biological fluids and contusions⁽⁸⁾.

In a study carried out with nurses, employees of the institution in which this research was conducted, it was found that 87.5% of the population were female, 33.4% had worked there from 10 to 15 years, 50% were in the age group of 35 to 60 years, 45.8% had two employment contracts and 52% were classified as stressed⁽⁷⁾.

Given the necessity of furthering knowledge regarding the repercussions of stress on the health of nursing staff and the characteristics of the professionals described above, it was chosen to conduct this study with a view to identifying risk factors and the incidence of diabetes mellitus type 2 (DM), as well as the health care carried out.

The choice of DM was made due to the growing increase in its incidence, especially among those above 40 years of age. It is estimated that today it affects 11% of the population with an upward trend as age increases. It is a disease that presents high rates of morbidity and mortality; leads to chronic complications; it is one of the leading risk factors, with arterial hypertension, for cardiovascular diseases; it compromises the quality of life and social inclusion as a result of the loss of productivity in work, early retirement and premature mortality. Worldwide, the direct costs for the care of diabetic patients represent 2.5% to 15% of health spending⁽¹²⁾. Moreover, at the time of the multicentric study conducted in Brazil, it was found that in approximately 50% of people with DM the condition was unknown and that 20% of those who had a previous diagnosis of the disease were not undergoing treatment⁽¹³⁾. The Ministry of Health indicates the screening of asymptomatic subjects, since ignorance of the disease leads to the diagnosis occurring

when complications already exist⁽¹²⁾.

Risk factors for DM are: over 45 years of age; overweight (body mass index >25); central obesity (waist circumference >102 cm for men and >88 cm for women, measured at the height of the iliac crests); family history (mother or father) of diabetes, arterial hypertension (>140/90 mmHg), HDL cholesterol >35 mg/dL and triglycerides <150 mg/dL; history of macrosomia or gestational diabetes; previous diagnosis of polycystic ovary syndrome and cardiovascular, cerebrovascular or peripheral vascular disease⁽¹²⁾.

There is a premise that stress is present, to a greater or lesser extent, in nursing work, when viewing the hospital space. Thus, the specifics of nursing work can generate stress, which in turn is a risk factor for several chronic diseases. It is questioned whether stress resulting from nursing work in the hospital can be a risk factor for the occurrence of DM. Another issue that brings concern is the care the nursing staff dispense to themselves. Do they take care of themselves?

There is evidence that modifiable risk factors for DM type 2 may contribute to postpone and prevent the disease, through changes in lifestyle, especially weight loss and regular physical activity⁽¹⁴⁾. Such changes in lifestyle are considered almost twice as effective as the use of medication, and also reduce cardiovascular risk⁽¹⁴⁾. Aiming to contribute with the expansion of knowledge of the area, with the prevention of illness among nursing staff and with the planning of health promotional activities within the hospital space of the institution where the researchers work and study, were outlined as the aims of this study.

- To describe the demographic characteristics and those related to the work of nursing professionals from the Clinical Hospital (CH) of the Federal University of Triângulo Mineiro (FUTM);
- To identify the occurrence of Diabetes *mellitus* and its risk factors among these workers;
- To verify the relationship between stress, self-reported, related to nursing work and the occurrence of Diabetes *mellitus*;
- To describe the care of health performed by nursing staff with Diabetes *mellitus*.

METHODS

This was a descriptive, observational, cross-sectional study carried out in the Clinical Hospital of the FUTM.

The site has 618 nursing staff, of whom 84 are registered nurses, 330 nursing technicians and 204 auxiliary nurses. To constitute the study population the following inclusion criteria were used: being part of the body of nursing staff of the referred hospital, of either gender and to accept to participate. The exclusion criteria were:

carrying out an alternative function; being on sick leave or sabbatical; being off work for electoral matters or for representing professional organs, being on vacation, and not attending to collect data three times, after the previously scheduled date and time.

From the population, 418 (67.6%) workers met the discussed criteria, with a higher participation of nursing technicians (87%), followed by registered nurses (54.8%) and auxiliary nurses (41.7%). The non-participation in the study (32.3%) was related to non-attendance to collect data on three occasions after the previously scheduled date and time (16.4%) non-acceptance to participate in the survey (8.3%) ; sick leave (3.9%), holidays (2.3%) and alternative functions (1.4%).

To collect data a semistructured instrument was used, which was previously tested by means of a pilot study. The variables studied were: gender; age group; marital status; professional category; function performed by the nurse; the number of employment contracts; work sector; length of employment at the institution; risk factors for DM; physical activity; work-related stress; capillary blood glucose level; duration since DM diagnosis; number of comorbidities; presence of complications; type of treatment for DM; monthly consultation; registered with Hiperdia, participation in educational groups and adherence to the recommended treatment. The electronic database was constructed using EpiInfo 3.2™ and for data analysis, a simple frequency distribution, chi-square test ($p < 0.05$) and odds ratio were used. To compare the presence of risk factors for DM among workers, there were two groups, named Group 1 (workers with a DM diagnosis) and Group 2 (workers without a DM diagnosis).

This project was approved by the Human Research Ethics Committee of FUTM, Protocol N° 1059. The subjects of the research were contacted at their places of work, and were presented with the aims, the Free Prior Informed Consent form and were offered relevant information. The interview was conducted after the interviewee's consent and signature of the FPIC form.

RESULTS

The predominant professional category was nursing technicians (68.7%) followed by auxiliary nurses (20.3%) and registered nurses (11%). Among the nurses interviewed, 89.1% had the function of ward nurse and 10.9% were nursing coordinators.

Data regarding the distribution of demographic variables and the work of nursing professionals of a university hospital are presented in Table 1.

Table 1 shows that the majority were female (85.9%), with the predominant age groups of 20 to 30 years (29.4%) and 40 to 50 years (27.8%). Regarding marital

status, 45% were married or cohabiting with a partner and 38.3% single

Table 1 - Demographic variables and the work of nursing professionals of a university hospital, Uberaba, 2009.

| Variables | n° | % |
|--------------------------------------|-----|------|
| Gender | | |
| Female | 359 | 85.9 |
| Male | 59 | 14.1 |
| Age group (in years) | | |
| 20 -30 | 123 | 29.4 |
| 30 -40 | 98 | 23.4 |
| 40 -50 | 116 | 27.8 |
| 50 -60 | 72 | 17.2 |
| 60 or more | 9 | 2.2 |
| Marital status | | |
| Married or cohabiting with a partner | 188 | 45.0 |
| Separated | 9 | 2.2 |
| Legally separated/Divorced/Widowed | 61 | 14.6 |
| Single | 160 | 38.3 |
| Employment contracts | | |
| One | 289 | 69.1 |
| Two | 112 | 26.8 |
| Three | 17 | 4.1 |
| Work sector | | |
| Intensive care | 152 | 36.4 |
| Semi-intensive care | 72 | 17.2 |
| Intermediate care | 141 | 33.7 |
| Administrative | 7 | 1.7 |
| Materials and equipment Center | 31 | 7.4 |
| Renal Therapy Unit | 13 | 3.1 |
| Hemodynamic | 2 | 0.5 |
| Length of employment | | |
| Less than 1 year | 61 | 14.6 |
| 1 -5 years | 118 | 28.2 |
| 5 -10 years | 73 | 17.5 |
| 10 -15 years | 63 | 15.1 |
| 15 -20 years | 44 | 10.5 |
| 20 -25 years | 59 | 14.1 |

Concerning employment contracts, 69.1% possessed one, followed by those working in two places (26.8%). Most interviewees worked in the intensive care (36.4%) or intermediate care (33.7%) sectors. The intensive care sector grouped the pediatric and adult ICU units and the intermediate care sector was composed of coronary IMCU, adult and infant ERs. Regarding the length of employment, 1 to 5 years (28.2%) and 5 to 10 years (17.5%) prevailed.

Table 2 shows that all risk factors for DM were present among the nursing staff, the highest percentages being for a sedentary lifestyle (60.8%), overweight (45.3%), central obesity (32.9%) and aged over 45 years (31.5%).

Comparing risk factors (Table 2) between workers with diagnosed diabetes, and those without the disease, statistically significant differences were obtained between

the groups for the following factors: overweight ($\pm 2=8.09$, $p=0.004$), family history of DM ($\pm 2=11.81$, $p=0.0005$), systemic arterial hypertension ($\pm 2=4.65$, $p=0.031$), history of macrosomia ($\pm 2=6.67$, $p=0.017$) and capillary blood glucose above levels considered normal ($\pm 2=19.11$, $p=0.00001$). It was verified that a higher proportion of workers with DM presented these risk factors when compared to those without DM.

It is noteworthy that, although not statistically significant, cardiovascular, cerebrovascular or peripheral vascular disease (16.3%) and polycystic ovary syndrome (11.1%) presented higher percentages among workers who were not diagnosed with DM compared to workers with DM. Referring to capillary blood glucose, it was observed that 4.4% of workers who did not have DM, presented values above the standard set by the Ministry of Health, as well as central obesity (31.6%) and sedentary life style (60%). Among the interviewees, stress was self-reported by 53.3%, however, there was no greater chance of developing diabetes among nursing workers who reported work stress when compared to those that did not report it (OR = 1.41, 95% = 0.41 to 5.6). In the study population, the occurrence of DM was 3.1%. Of these the majority had a length of time since diagnosis of less than 10 years (84.6%), presented one comorbidity (75%) and 15.4% reported complications arising from DM, the most common being diabetic neuropathy.

Regarding treatment, it was verified that the majority used oral hypoglycemic agents (53.8%), followed by non-drug treatment (38.5%) and oral hypoglycemic agents and insulin (7.7%). Adherence to the recommended treatment was reported by 61.5% of the workers. Monthly monitoring was not performed by 69.2%, among those that did, the sites were private services (70%) and the specialty outpatient clinic of the FUTM (30%). It is

noteworthy that 76.9% were not enrolled in the Hypertension and Diabetes Mellitus Care Reorganization Program (Hiperdia) and most did not participate in educational activities (92.3%).

DISCUSSION

The scientific literature provides evidence that the majority of nursing staff are female. This fact is corroborated by another study performed in a Teaching Health Center with 184 nursing staff, where 62.5% of them were female⁽¹⁵⁾; as well as another performed with nurses in a Clinical Hospital in the State of Minas Gerais (87.5%)⁽⁷⁾. Ages from 25 to 30 years (3.6%) and married or cohabiting with a partner (45.0%) were also found in research conducted in Botucatu - SP⁽¹⁶⁾. Double employment was reported in a survey previously conducted with nurses who worked at the same site as this study (45.8%)⁽⁷⁾. This work situation may cause interference in personal and families relationships, followed by restriction of social activities⁽¹⁶⁾. The study showed that risk factors for DM were present, among all workers, particularly the modifiable factors. It is estimated that about 80% of recently diagnosed diabetics are obese and that 50% of new cases could have been prevented by avoiding excess weight, and 30% with physical inactivity control⁽¹⁷⁾. Regarding the presence of arterial hypertension, which has been associated with DM, this constitutes the main cause of mortality, hospitalizations and amputations of lower limbs and represents 62.1% of the primary diagnoses in patients with chronic renal failure undergoing dialysis in Brazil⁽¹²⁾.

Primary prevention, by screening individuals with risk factors, increases the diagnosis of previously established DM⁽¹⁴⁾. In this study, the occurrence of risk factors among

Table 2 - Risk factors for DM among the nursing staff of a university hospital, Uberaba, 2009.

| Risk factors | Diabetic | | Non-diabetic | | χ^2 | Value P | Total | |
|--|----------|------|--------------|------|----------|---------|-------|------|
| | n | % | n | % | | | n | % |
| Age > 45 years | 7 | 53.8 | 123 | 30.4 | 2.24 | 0.134 | 130 | 31.5 |
| BMI > 25/Overweight* | 11 | 84.6 | 176 | 43.5 | 8.09 | 0.004 | 187 | 45.3 |
| Central obesity** | 8 | 61.5 | 128 | 31.6 | 3.59 | 0.05 | 136 | 32.9 |
| Family history of DM | 8 | 61.5 | 76 | 18.8 | 11.81 | 0.0005 | 84 | 20.3 |
| Arterial Hypertension | 6 | 46.2 | 74 | 18.3 | 4.65 | 0.031 | 80 | 19.4 |
| History of macrosomia | 3 | 23.1 | 16 | 3.9 | 6.67 | 0.017 | 19 | 4.6 |
| History of gestational diabetes | 1 | 7.7 | 2 | 0.5 | 1.84 | 0.091 | 3 | 0.7 |
| Polycystic ovary syndrome | 1 | 7.7 | 45 | 11.1 | 0.00 | 1.0 | 46 | 11.1 |
| Cardiovascular, cerebrovascular or peripheral vascular disease | 2 | 15.4 | 66 | 16.3 | 0.09 | 1.0 | 68 | 16.5 |
| Sedentary lifestyle | 8 | 61.5 | 243 | 60.0 | 0.04 | 0.98 | 251 | 60.8 |
| Altered capillary blood glucose levels | 5 | 38.5 | 18 | 4.4 | 19.11 | 0.00001 | 23 | 5.6 |

* Weighing not performed with 2.7% of interviewees

** Abdominal circumference measurement not performed with 2.4% (pregnant women)

*** Blood glucose measurement not performed with 9.8% of the interviewees

workers who had no diagnosis of DM, suggests that they should be investigated for the presence of the disease, considering the benefits of early diagnosis and that encouraging changes in lifestyle promotes adherence to treatment and disease control. Regarding the control of blood glucose levels, it is the responsibility of the nursing team to develop educational activities with clients related to self-monitoring of capillary blood glucose and the insulin delivery technique⁽¹²⁾. However, the maintenance of metabolic control of blood glucose is a challenge for people with DM. Given the significant percentage of workers with blood glucose levels above normal values, it is suggested that the difficulties in blood glucose control and the possible relationship with the specificities of nursing work are investigated in order to establish health planning, aimed at delaying the micro and macro-vascular complications resulting from this disease.

In this study, stress was not associated with the occurrence of DM. Different data have been found in research conducted with workers of health units in Ribeirão Preto - SP. Stress was reported by 47.3% of workers, and the work environment was considered the most stressful (46.7%), revealing this as one of the important factor in determining health⁽¹⁵⁾. Research previously conducted among nurses of the same hospital showed that 52% were stressed. This condition was related to the managerial function, to the higher age group, to the coping with critical situations, such as crises, and the remuneration⁽⁷⁾.

Nursing professionals, who work in tertiary care, are exposed to several factors that may cause harm to their health. A study conducted with nursing staff at a university hospital highlighted some of the main factors that cause stress as: excessive control by the institution, difficulties in interpersonal relationships, routine and repetitive activities, excessive numbers of patients, an atmosphere of suffering and death, insufficient wages, lack of leisure, support and recognition by the institution⁽¹⁾. These data demonstrate the interference of the working environment with the health conditions of the workers. They also denote the need for joint evaluation between employees and the Nursing Director to identify the stressor agents of working in the institution, aiming to plan actions that contribute to the reduction of work-related stress.

Investing in health promotion in institutions, motivates the staff, reduces absenteeism, personal problems and interpersonal disputes, and promotes greater efficiency and improved performance. These actions must be guided by ethics, assuming political, critical and conscious positioning of how to advocate for the health of the worker in the adoption of specific preventive measures⁽¹⁸⁾. With regard to the treatment performed by people with DM, the World Health Organization states that, in developed countries, adherence to treatment of chronic diseases is, on average, 50%⁽¹⁹⁾. Low adherence constitutes

a public health problem, by reducing the benefits of treatment and leading to unnecessary prescriptions of increasing doses or more potent drugs. Simultaneously, it leads to a decrease in the quality of life of patients, motivated by the failure of the treatments⁽²⁰⁾.

The data described above demonstrate the need to investigate the difficulties of adherence to treatment and monthly monitoring. Thus, it will be possible to develop a plan of care directed toward nursing staff in order to discuss and reflect on the theme and contribute, so that the complications and disabilities originating from this disease are delayed. A study conducted among nursing staff at a Clinical Hospital of the interior of Minas Gerais, verified that the people, even though they knew what they should do to improve the health condition, did not develop actions in this direction. On the other hand, while trying to take care of their health they collided with a system that does not give them many opportunities of efficient care. According to most interviewees, the work was seen as the center of their lives and, paradoxically, was not able to offer them good conditions of life⁽¹⁰⁾.

CONCLUSIONS

In this study, it was found that the majority of the nursing staff were female, they were between 20 and 30 years of age, married or cohabiting with partners, they had one employment contract, with the length of time working at the institution of five years. Regarding risk factors for DM, all were present, especially those subject to modification, i.e. physical inactivity and being overweight. A higher proportion of employees with DM were found with the risk factors: overweight, family history of DM, systemic arterial hypertension, history of macrosomia, and capillary blood glucose above levels considered normal, when compared to those who did not have DM. No increased chance of developing diabetes was observed among the nursing staff who reported stress when compared to those who did not. Among the diabetic employees, the majority used oral hypoglycemic agents, presented adherence to the recommended treatment, did not carry out monthly monitoring, were treated at private services, were not enrolled in Hiperdia, and did not participate in educational activities.

Given these results, the need for the development of health actions directed toward the health of the workers of this institution is highlighted. The presence of risk factors suggests that changes in lifestyle should be encouraged and preventive activities related to health implemented, in order to contribute to self-care. It is necessary to focus on the nursing staff, identifying their problems and necessities, to strengthen educational practices aimed at preventing disease among workers who do not have a diagnosis of DM and improving metabolic control and adherence to treatment among those that have the disease.

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