





Noncommunicable diseases among nursing professionals at a charitable hospital in Southern Brazil*

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Abstract

Objective: to describe the prevalence of noncommunicable diseases (NCDs), long term (current) drug therapy, blood pressure levels and capillary glycemia among a nursing team at a charitable hospital in Pelotas/RS. **Methods:** This was a cross-sectional study. The questions were adapted from the Vigitel system questionnaire (Telephone Surveillance of Chronic Disease Risk and Protection Factors). All participants had their blood pressure and blood glucose measured. **Results:** Of the 272 staff assessed, 29.4% reported having NCDs, 48.9% were on long term (current) drug therapy and 73.9% reported a family history of NCDs. Among those interviewed, 20.6% reported using antihypertensive drugs, of these 27.7% had high blood pressure levels, and 2.6% reported using antihypoglycemic agents, 42.9% of whom had high blood glucose. **Conclusion:** Among those professionals who stated they had high blood pressure and diabetes, those who were on medication had higher blood pressure and glucose levels than those who were not on medication.

Keywords: Nursing; Team; Hypertension; Diabetes Mellitus; Occupational Health.

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Introduction

Nursing is recognized as a work-intensive humanitarian activity, assisting with the process of care and living with situations of suffering, pain and death at different moments during nursing professionals' daily work.¹ As such, factors favorable to the unfolding of diseases among nursing professionals can be identified, such as excessive workload, difficulty in drawing a line between different roles and functions, problems in interpersonal relationships, emotional burden, inadequate resources, lack of decision-making authority and even lack of recognition of performance at work.²

NCDs are considered to be a serious Public Health problem. Developing during the course of life, they produce serious complications that have a heavy impact on morbidity and mortality and quality of life of affected individuals, greater risk of premature death and adverse economic effects on families, communities and society at large.

Added to this, lifestyle habits, nursing team stress caused by everyday work activities, shift work and working at night, are factors that influence the development and worsening of noncommunicable diseases (NCDs), including systemic arterial hypertension (SAH) and diabetes *mellitus* (DM).¹ High prevalence rates of these diseases owing to the reasons mentioned above have been described, in particular long and exhausting working hours, resulting in nursing professionals not being able to enjoy leisure activities, physical exercise and adequate rest as well as healthy eating habits.³

NCDs are considered to be a serious Public Health problem. Developing during the course of life, they produce serious complications that have a heavy impact on morbidity and mortality and quality of life of affected individuals, greater risk of premature death and adverse economic effects on families, communities and society at large.⁴ According to World Health Organization (WHO) data, this group of diseases accounted for 74.0% of deaths in Brazil⁴ in 2016.

The objective of this study was to describe NCD prevalence, use of medication, blood pressure levels and

capillary glycemia among a nursing team at a charitable hospital in Pelotas, Rio Grande do Sul state, Brazil.

Methods

This was a cross-sectional study of nursing team professionals employed at a charitable hospital in Pelotas, RS. It is the region's largest general hospital and provides services not only to the city of Pelotas but also to the southern region of Rio Grande do Sul (RS) state, since Pelotas is home to the patient referral services for that region. The hospital carries out around 13,000 consultations a year, over 60% of which are Brazilian National Health System (SUS) consultations. At the time this study was conducted, the hospital had 1,108 employees, 442 of whom were part of the nursing team. We estimated that we would need to study 241 of them. To arrive at this number we took estimated DM prevalence of 6%,⁵ with an acceptable margin of error of 3 percentage points and a 95% confidence interval (95%CI).

Data collection took place during March and April 2017 by trained interviews using questions adapted from the Vigitel system questionnaire (Telephone Surveillance of Chronic Disease Risk and Protection Factors).⁶ The questions had been tested beforehand.

First of all the nursing professionals were identified by work area and invited to take part in the study. Losses were considered to be those who were not found or who were not available to answer the questionnaire after three attempts to contact them on different days and at different times, as well as staff on sick leave or on annual leave. Refusals were considered to be nursing professionals who preferred not to take part in the study even after being fully informed about it. Pregnant staff were excluded from the study since pregnancy interferes with the variables measured in this study.

The outcomes of this study were self-reported SAH and DM. All respondents underwent blood pressure measurement and glycemia analysis using a blood glucose test. They were also asked about long term (current) drug therapy, especially drugs used to control SAH and DM, and also about family history of NCDs.

We used a Tycos sphygmomanometer and a Litmann stethoscope to measure blood pressure. The mean blood pressure levels given by two systolic artery pressure measurements equal to or greater than 140mmHg and two diastolic artery pressure measurements equal to or greater than 90mmHg were considered to be indicative

of SAH.⁷ Capillary blood glucose was measured using a Performa glucometer and calibrated test strips. Results equal to or greater than 200mg/dL, based on random measurement, were considered to be indicative of DM.⁸

The other variables collected to characterize the sample were:

- a) sex;
- b) age (collected as a discrete numerical variable, later categorized into age groups: 20-29; 30-39, 40-49, 50 years or more);
- c) self-reported race/skin color (white, black, yellow, indigenous or brown);
- d) marital status (has a partner/does not have a partner);
- e) current alcohol consumption; current tobacco smoking; physical exercise in the three months prior to the interview (yes; no);
- f) profession (nurse, nurse technician, nursing auxiliary);
- g) work shift (morning, afternoon, morning and afternoon, night); and
- h) other paid Health service activity (yes; no).

With regard to long term (current) drug therapy, respondents who reported using them were encouraged by means of an open-ended question to name all medication used. Medication was classified according to the disease categories described in the International Statistical Classification of Diseases and Related Health Problems – Tenth Edition (ICD-10).⁹

All interviews conducted were transferred to a database built using Stata 12.1 (StataCorp, Texas, EUA). Once inconsistencies had been analyzed, we characterized the population studied: we calculated the prevalence rates of self-reported NCDs, including SAH and DM, long term (current) drug therapy, as well as family history of these health conditions; and mean values and standard deviations for systolic and diastolic pressure and glycemia, stratified according to individuals who did or did not report treatment using medication.

The protocol for this research was approved by the Catholic University of Pelotas (UCPel) Research Ethics Committee: Opinion No. 1.954.158. All professions who agreed to take part in the study signed a Free and Informed Consent form.

Results

The 442 staff of the nursing team studied here were divided into three categories: nurses (61),

nurse technicians (314) and nursing auxiliaries (67), of whom 403 were female (91.0%) and 39 were male (9.0%). After successive attempts to make contact, there were 61 refusals (13.8%) and 105 losses (23.8%). Reasons for losses included annual leave (34.3%), sick leave (13.3%) or maternity leave (3.7%), apart from, above all, difficulty in staff being allowed to take time off to answer the questionnaire owing to workflow (48.7%), for example, operating theater instrument technicians and staff working in child delivery rooms.

The study's final sample was comprised of 272 staff, of whom 246 were female (90.4%) and 26 were male (9.6%) (Table 1). With regard to age, 36.0% were between 30 and 39 years old, 76.5% reported their race/skin color to be White and 61.0% lived with a partner. The majority stated that they did not smoke (90.8%) and did not consume alcoholic drink (55.1%), while the majority had also not practiced physical exercise in the three months prior to the interview (61.4%). Some 82.0% were nurse technicians, 32.0% worked on the morning shift and almost the same proportion worked on the afternoon shift. The majority had no other paid Health service activity (75.4%).

Approximately 30.0% reported having an NCD, 48.9% were on long term (current) drug therapy and 73.9% reported family history of NCD. Table 2 shows that the most common NCDs were SAH (20.6%), chronic respiratory disease (6.3%) and DM (5.5%). With regard to long term (current) drug therapy, 20.6% reported using antihypertensive drugs, while 2.6% reported using antihypoglycemic agents.

A total of 56 individuals (20.6%) self-reported hypertension. Of these, 47 reported use of antihypertensive drugs while nine stated not using this medication (Table 3). Among the 216 individuals who reported not having hypertension, at the time of the interview 12 had blood pressure levels above 140/90mmHg. Of the 47 who were taking treatment for SAH, 13 had high blood pressure levels. One of the nine people who were not taking medication had high blood pressure. Around 50.0% of those who did not have hypertension reported family history of SAH, while among those who did have hypertension, this proportion was 78.7% for those on treatment and 77.8% for those not on treatment.

Table 1 – Description of nursing team professionals (N=272) at a charitable hospital, Pelotas, Rio Grande do Sul, 2017

| Variables | N (%) |
|---|------------|
| Sex | |
| Male | 26 (9.6) |
| Female | 246 (90.4) |
| Age (in complete years) | |
| 20-29 | 57 (21.0) |
| 30-39 | 98 (36.0) |
| 40-49 | 74 (27.2) |
| 50 or over | 43 (15.8) |
| Self-reported race/skin color | |
| White | 208 (76.5) |
| Black | 53 (19.5) |
| Brown | 11 (4.0) |
| Marital status | |
| Has a partner | 166 (61.0) |
| Does not have a partner | 106 (39.0) |
| Currently smokes | |
| No | 247 (90.8) |
| Yes | 25 (9.2) |
| Currently consumes alcohol | |
| No | 150 (55.1) |
| Yes | 122 (44.9) |
| Physical exercise in the last three months | |
| No | 167 (61.4) |
| Yes | 105 (38.6) |
| Profession | |
| Nurse | 27 (9.9) |
| Nurse technician | 222 (81.6) |
| Nursing auxiliary | 23 (8.5) |
| Work shift | |
| Morning | 87 (32.0) |
| Afternoon | 88 (32.3) |
| Morning and afternoon | 16 (5.9) |
| Night | 81 (29.8) |
| Other paid activity | |
| No | 205 (75.4) |
| Yes | 67 (24.6) |
| Family history of NCD^a | |
| No | 71 (26.1) |
| Yes | 201 (73.9) |
| Self-reported NCD^a | |
| No | 192 (70.6) |
| Yes | 80 (29.4) |
| Long term (current) drug therapy | |
| No | 139 (51.1) |
| Yes | 133 (48.9) |

a) NCD: noncommunicable disease.

Table 2 – Self-reported noncommunicable diseases and long term (current) drug therapy among nursing team professionals (N=272) at a charitable hospital, Pelotas, Rio Grande do Sul, 2017

| Variables | N | % |
|---|----|------|
| Self-referred NCD^a | | |
| Systemic arterial hypertension | 56 | 20.6 |
| Diabetes <i>mellitus</i> | 15 | 5.5 |
| Cancer | 0 | 0.0 |
| Chronic respiratory disease | 17 | 6.3 |
| Cardiovascular disease | 5 | 1.8 |
| Kidney disease | 1 | 0.4 |
| Musculoskeletal disorders | 4 | 1.5 |
| Other NCD ^a | 3 | 1.1 |
| Long term (current) drug therapy^b | | |
| Antidepressant and mood stabilizer | 14 | 5.1 |
| Antihypertensive | 56 | 20.6 |
| Antisecretory | 6 | 2.2 |
| Antiasthmatic | 4 | 1.5 |
| Acting on the endocrine and reproductive system | 75 | 27.6 |
| Antihypoglycemic | 7 | 2.6 |
| For the circulatory and renal systems | 14 | 5.1 |

a) NCD: noncommunicable disease.

b) According to the International Statistical Classification of Diseases and Related Health Problems – Tenth Revision (ICD-10).

Table 3 – Mean values and standard deviations of systolic and diastolic arterial pressure, suggestive classification for hypertension and family history self-reported by nursing team professionals (N=272) at a charitable hospital, Pelotas, Rio Grande do Sul, 2017

| Variables | Total (N=272) | Without systemic arterial hypertension (N=216) | Systemic arterial hypertension in treatment (N=47) | Systemic arterial hypertension untreated (N=9) |
|--|---------------|--|--|--|
| Systolic blood pressure (mean, standard deviation) ^a | 119.8 (17.2) | 116.5 (15.1) | 133.7 (19.6) | 125.6 (14.5) |
| Diastolic blood pressure (mean, standard deviation) ^a | 73.8 (10.3) | 71.9 (9.3) | 81.9 (11.0) | 77.22 (9.7) |
| Blood pressure $\geq 140/90$ mmHg (N) ^b | 26 | 12 | 13 | 1 |
| Family history of systemic arterial hypertension (N) | 159 | 115 | 37 | 7 |

Legend:

a) Mean in mmHg.

b) Measurement suggestive of systemic arterial hypertension.

Table 4 describes the mean values and standard deviations for random capillary blood glucose testing using a classification suggestive of DM and family history. A total of 94.5% of the sample reported not having DM; among those who did refer having DM (5.5%), seven were on medication and eight were not. Only one participant among the non-diabetic individuals had random capillary blood glucose

≥ 200 mg/dL, while three among those who had diabetes and were on treatment and three who had diabetes but were not on treatment had high blood glucose levels at the time of the interview. Some 58.0% of those who did not have diabetes reported family history of DM, while prevalence of family history varied between 85.7% among diabetics on treatment and 50.0% among diabetics not on treatment.

Table 4 – Mean values and standard deviations of random measurement of capillary glycemia, suggestive classification for diabetes *mellitus* and family history according to diabetes self-referred by nursing team professionals (N=272) at a charitable hospital in Pelotas, Rio Grande do Sul, 2017

| Variables | Total (N=272) | Without diabetes <i>mellitus</i> (N=257) | Diabetes <i>mellitus</i> in treatment (N=7) | Diabetes <i>mellitus</i> untreated (N=8) |
|--|---------------|--|---|--|
| Glycemia (mean, standard deviation) ^a | 112.7 (62.1) | 107.4 (52.9) | 211.7 (125.4) | 197.1 (120.8) |
| Glycemia ≥200 mg/dL (N) ^b | 7 | 1 | 3 | 3 |
| Family history of diabetes <i>mellitus</i> (N) | 159 | 149 | 6 | 4 |

Legend:

a) Mean in mg/dL.

b) Measurement suggestive of diabetes *mellitus*.

Discussion

With the objective of describing the prevalence of NCDs – arterial hypertension and diabetes *mellitus* – and the care taken in relation to these health conditions among nursing professionals at a charitable hospital in Pelotas, this study found that one third of them had an NCD, half of whom were on long term (current) drug therapy and approximately three quarters reported family history of NCDs.

The majority of the nursing professionals assessed were female, a fact also found in other studies.^{10,11} Feminization is a characteristic found among health workers, with more than 80.0% of employees being women.¹²

The majority of respondents reported not consuming alcoholic beverages or using tobacco. A possible justification for this finding would be the fact of them, as health professionals, being aware of the harm caused and consequently avoiding the use of these substances.¹⁰ Health professionals are seen as health educators and habits such as drinking and smoking may not be in keeping with the ethics and public image of these professions.¹³ On the other hand, we found that the majority of professionals who denied having the habit of drinking and smoking did not do physical exercise.

This study found that one third of the sample reported having an NCD. This result is consistent with the literature.^{10,14} High NCD prevalence rates have been described among nursing professionals, arising from long and exhausting working hours, restricting their availability to enjoy leisure time, do physical exercise, get sufficient rest and have a healthy diet.³

Despite a fifth of the sample having hypertension, this proportion is below that found in the literature,^{1,10,15} where it ranged between 26.0¹⁶ and 41.3%.¹ Only the

study conducted by Magalhães et al. (2014)¹⁷ found a lower prevalence rate, 17.5%, in a sample of nurses in Fortaleza, Ceará state. DM prevalence was also lower than that found in the majority of studies undertaken in Brazil (Fortaleza, CE; Porto Alegre, RS; and Alfenas, MG), between 2008 and 2015,^{1,10,17,18} when prevalence was identified as being between 7.9%¹⁷ and 24.6%.¹

Studies with nursing professionals have identified factors favoring the onset of diseases: excess work, difficulty in drawing the line between roles and functions, problems in interpersonal relationships, emotional burden, inadequate resources, lack of decision-making authority and even lack of recognition of performance at work.² Potentiation of factors such as these gives rise to increased possibility of self-care failure. This is a relevant issue, above all because NCDs like HAS¹ and DM begin and develop silently.

With regard to studies conducted with the general population, data from the most recent Vigitel survey, carried out in 2016 in the capital cities of the 26 Brazilian states and in the Federal District, indicate that SAH prevalence is 25.7% for Brazil as a whole, while reaching 28.2% in Porto Alegre.¹⁹ Regarding diabetes, Vigitel found 8.9% prevalence,¹⁹ which was also higher than the rate found in this study. According to the 2013 National Health Survey (PNS), the Brazilian macroregion with the highest self-reported NCD prevalence was the Southern region with 52.1% in the general population.⁵ Also according to the 2013 PNS, SAH prevalence in particular in the Southern region was 21.4% while diabetes prevalence was 6.2%,⁵ these rates being similar to those found in our study. As such, despite the oscillations in the prevalence rates found in the general population, having university qualifications in the area of Health does not represent an effective reduction in the risk of developing these diseases.²⁰

Three out of four respondents reported family history of NCD. According to studies conducted in Brazil,^{1,20} family history of NCD, considered to be an unchangeable risk factor, is present among the majority of health professionals who had high blood pressure levels suggestive of SAH, diabetes or obesity. Long term (current) drug therapy was reported by half of the respondents, whereby the most prevalent forms of medication were those that act on the endocrine and reproductive systems, mainly contraceptive pills, followed by antihypertensive drugs. According to other studies, antihypertensive drugs are amongst the medication most taken by nursing professionals.^{10,13}

With regard to non-hypertensive individuals in our study, some had high blood pressure levels. However, two blood pressure measurements taken on the same day with a short interval of time between them, do not characterize diagnosis. According to the parameter set by the Ministry of Health (mean blood pressure greater than or equal to 140/90mmHg suggestive of SAH), new measurements should be taken on three different days with at least one week between each of them.⁶ Regarding those who were taking treatment for SAH, a third of them had high blood pressure levels. Similarly, an adequate assessment of blood pressure levels should be undertaken to identify whether, in fact, the treatment in question is adequate. One of the nine individuals who stated having hypertension but did not take medication had high blood pressure. The question remains whether this individual was indeed hypertensive or if their diagnosis was mistaken.

Studies with nursing professionals and with the general population have also found high blood pressure levels among people with SAH.^{18,21} The literature has described a close relationship between occupation and cardiovascular diseases, or influence of work on raised blood pressure.²² Despite population studies having provided evidence of the importance of SAH control in reducing cardiovascular morbidity and mortality,^{23,24} it is estimated that only one third of the hypertensive population has their blood pressure under control.²³ It is important to emphasize that controlling SAH is not done only through pharmacological treatment, but also through lifestyle changes.²⁵

With regard to those nursing professionals who reported themselves as being diabetic, their blood glucose levels were higher. Among those who were

not diabetic, blood glucose levels were lower; only one had altered capillary glycemia levels. The literature reiterates the need for adherence to what are considered to be the three mainstays of DM treatment – a healthy diet, doing physical exercise and taking medication –, in order to achieve good control of blood glucose²⁶⁻²⁸ and, above all, prevent future complications.²⁹

A limitation of this study was working with SAH and DM estimates rather than definitive diagnoses; blood pressure measurement, as well as glycemia assessment, were not done in accordance with globally recommended standards.^{7,8} Blood pressure was measured twice on the same day; glycemia was assessed without establishing the need for fasting, with or without symptoms. Ministry of Health Care Booklet techniques and recommendations were followed,^{7,8} SAH and DM were always interpreted as being suggestive (or indicative), and never as definitive. With regard to losses and refusals, there are sectors in the hospital where, due to high demand for activities, health professionals end up not being available or not having time or interest in taking part in studies. Moreover, a considerable number of them were on sick leave or annual leave. A further issue is the possibility of healthy worker effect, since those who are working are relatively healthy and/or free from health conditions such as, for instance, NCDs, which may have caused the prevalence rates found to have been underestimated. Another limitation refers to the study's external validity: the sample was taken from just one hospital in a medium-sized city in the state of Rio Grande do Sul, whereby caution is recommended when attempting to generalize these findings to other contexts. It is also possible that health professionals may have underreported behaviors considered to be negative in relation to health, given that the study was conducted in the hospital environment.

Staff with SAH and DM and taking medication had higher blood pressure and glycemia levels than those who reported having NCDs but were not on treatment. A possible justification for this might be the fact that as they are taking medication, they do not take care with other risk factors, such as food, weight control and, as demonstrated here, doing physical exercise. It is also possible that they might not have been taking their medication correctly, without medical appointments for medication control and adjustment.

We conclude that the work routine of nursing professionals can contribute to reduced self-care. Action needs to be taken in this respect. Investing in health promotion and in more accurate assessment by health services may be an alternative response to this issue, given that even with periodical medical appointments, many of the individuals we assessed appear not to have their systemic arterial hypertension and diabetes *mellitus* under adequate control.

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Authors' contributions

Domingues JG and Barros FC contributed to the conception and design of the article, data analysis and interpretation and wrote the first version of the manuscript. Silva BBC and Bierhals IO contributed to data analysis and interpretation and critically revised the manuscript. All the authors approved the final version and are responsible for all aspects thereof, including the guarantee of its accuracy and integrity.

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