

## Self-perceived health among workers at a University Hospital and associations with indicators of adiposity, arterial blood pressure and physical activity habits

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**Abstract** *It has been shown that self-perceived health has a close relationship with indicators of morbidity and mortality. Since there is a lack of information on the self-perceived health status of hospital workers, the objective of this study was to determine the prevalence of satisfaction with health among people working at a University Hospital (UH) and its associations with indicators of adiposity, arterial blood pressure (BP) and physical activity (PA). A total of 380 adults took part in the study, with ages ranging from 20 to 59 and a mean age of 43.92 (SD = 8.46) years. Self-perceived health was assessed using a question from the “WHOQOL-bref” questionnaire. Overall satisfaction with health was 60.8%, and women reported lower satisfaction than men. An analysis adjusted for sex showed that having a healthy BMI was associated with the highest rate of satisfaction with health (PR = 1.478 [95%CI: 1.272 – 1.717]), followed by WC (PR = 1.323 [95%CI: 1.135 – 1.541]). Neither BP nor PA were associated with self-perceived health. It was concluded that the UH workers are aware of risks to their health, but that they do not recognize the importance of maintaining healthy blood pressure or of engaging in regular PA in order to delay onset of chronic conditions that could be harmful to them.*

**Keywords** *Self-perceived health, Risk factors, Abdominal obesity, Physical activity*

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## Introduction

During their daily routines, the nature of health-care professionals' work means that they witness at first hand the rapid progression of non-transmissible chronic diseases (NTCD), since they deal with patients with a wide spectrum of physical impairment. As such, their perceptions of the health-disease process are formed as a function of the experience they accumulate, as mediated by the social, cultural and historical context in which they live, with the result that healthcare professionals make judgments and arrive at interpretations about their own physical and emotional wellbeing<sup>1</sup>.

With relation to this experience, the Brazilian Ministry of Health conducted an important survey in 2006 in all 26 of Brazil's state capitals plus the Distrito Federal and found that the proportion of people who self-rate their health as poor is five times larger in the presence of one NTCD and that the odds ratio for people who reported having two or more NTCDs showed that self-rated poor health was 28 times more common in this case<sup>2</sup>. Notwithstanding, these results must be interpreted in the light of the factors that intervene in self-perceived health. This is because differences in economic, social and behavioral factors and, more than anything, differences in educational level appear to interfere with patterns of self-perceived health<sup>3-5</sup>.

More specifically, a positive and significant association has been described between low levels of education and increased prevalence of self-perceived poor health and with an increased propensity to morbidity and mortality<sup>2,6</sup>.

It is therefore to be presumed that these outcomes would be less accentuated among professionals who work in healthcare, since such people normally have greater knowledge about NTCD and are more sensitive to the physical changes that they trigger, taking action to prevent the emergence/progression of these diseases, particularly when it is considered that these diseases manifest asymptotically.

It is important to point out that people who are not satisfied with their health may use health-care services with greater frequency and be absent from work more often<sup>7</sup>, may exhibit larger numbers of chronic diseases<sup>2,3</sup>, and be at a greater risk of mortality<sup>8,9</sup>, compared with those who report satisfactory self-perceived health status<sup>2,7-9</sup>.

In view of the above, collecting data on the self-perceived health of workers at a hospital could be of help for planning adoption of pre-

ventative measures, avoiding exacerbation of certain diseases, particularly those of a chronic degenerative character. The objective of this scientific investigation was therefore to determine the prevalence of satisfaction with health among workers at a University Hospital (UH) and its association with indicators of adiposity, arterial blood pressure (BP) and physical activity habits (PA).

## Materials and methods

### Sample

This study was conducted at the UH in Londrina, PR, Brazil, which is an institution belonging to the Universidade Estadual de Londrina (UEL). It is a descriptive study with a cross-sectional design investigating a population comprising permanent staff, performing a variety of jobs, who were assigned to the UH at the time the study was conducted.

The total number of workers was obtained by requesting the Human Resources Department to provide a list of all employees, plus a breakdown by department of the numbers of workers at the hospital. This list showed that the UH had a total of 1,460 workers, broken down as follows: Nursing Department-ND ( $n = 695$ ); Clinical Department-CD ( $n = 384$ ); Administrative Department-AD ( $n = 320$ ) and Management Department-MD ( $n = 61$ ). These totals do not include employees assigned to the outpatients specialties clinics at the UEL Hospital de Clínicas, since the decision had been taken to only study the UH.

A minimum sample of interviewees was estimated based on the assumption of a 25% prevalence of dissatisfaction with health<sup>10</sup> and 4% sampling error, with a 95% confidence level, which resulted in a sample size of 344 workers, but this figure was increased by 10% to account for possible losses. This calculation resulted in a minimum of 378 study participants, but data collection was actually terminated after 380 men and women had taken part, selected at random from all of the hospital's sectors.

Workers were recruited for voluntary participation, taking into account the number of workers in each department, and interviews were conducted during all three shifts (morning, afternoon and night) at each worker's place of work.

In order to help publicize the study, space was allocated on the hospital's home page, where workers were invited to take part in the investiga-

tion. Workers were considered ineligible if they were on temporary assignments at other institutions or were taking advantage of temporary leave benefits for training or ongoing education, or were on any other type of leave, including unpaid leave.

The study was conducted in accordance with the standards required by the Helsinki Declaration and was approved by the Research Ethics Committee at the UEL. Before being interviewed, all workers who had agreed to participate read and signed a free and informed consent form.

#### **Educational and Economic Factors**

Data on educational attainment and ownership of consumer goods were acquired by administering a questionnaire developed by the Brazilian Association of Market Research Companies (ABEP - Associação Brasileira de Empresas de Pesquisa, 2008) and the resulting scores were used to assign interviewees to economic classes according to the questionnaire's scale<sup>11</sup>.

#### **Self-perceived health**

The question, "How satisfied are you with your health?" was used to collect participants' self-perceived health status. This question was extracted from the "WHOQOL-bref" quality of life assessment questionnaire, which was developed internationally in 1998 and was field-tested in Brazil by Fleck et al.<sup>12</sup> There are five response options, but for the purposes of this study they were dichotomized as follows: i) satisfied (satisfied and very satisfied); and ii) not satisfied (very dissatisfied, dissatisfied, and neither satisfied nor dissatisfied) because none of these report a positive perception of health status.

#### **Adiposity Indicators and Arterial Blood Pressure**

Data on the anthropometric variables body mass, height, waist circumference and hip circumference were collected and systolic and diastolic arterial blood pressures were measured.

#### **Body mass**

Body mass was measured using a lithium battery-powered Plenna brand digital balance with a liquid crystal display (5 x 2.5cm), precision of 100g and capacity of up to 150kg. All participants were requested to wear light clothing, remove

their shoes and stand upright with feet together and arms at their sides.

#### **Height**

Height data were obtained by self-report, because the questionnaires were administered at the employees' workplaces. It has been found that this method provides reliable information in epidemiological studies conducted to monitor the prevalence of excess weight in populations<sup>13</sup>.

These measures were then used to calculate body mass index (BMI), by dividing weight (kg) by the square of height (m). The results were classified according to cutoff points recommended by the World Health Organization, so that people whose BMI was from 18.5 to 24.9 kg/m<sup>2</sup> were classified as healthy weight, those with BMI from 25.0 to 29.9 kg/m<sup>2</sup> were classified as overweight and those with BMI  $\geq$  30.0 kg/m<sup>2</sup> were classified as obese.<sup>14</sup> In common with other independent variables investigated in this study, BMI was also dichotomized, i.e. reclassified as healthy weight or overweight/obesity.

#### **Waist circumference**

Waist circumference (WC) was measured using a Cardiomed, non-stretch, fiberglass tape measure, with a length of 200 cm and precision of 0.1 cm. The measurement was taken at the midpoint between the iliac crest and the last rib and the cutoff points for classification were those recommended by the National Institutes of Health - NHLBI<sup>15</sup>, by which men were considered "low risk" when circumference was  $<$  94.0 cm and "moderate/high risk" when WC was  $\geq$  94.0 cm, while for women  $<$  80.0 cm corresponded to "low risk" and  $\geq$  80.0 cm to "moderate/high risk".

#### **Circumference of hips**

Hip circumference (HC) was measured by running the non-stretch, fiberglass tape measure around the hips at the point of greatest protuberance, without compressing the skin. The results for WC and HC were used to calculate the waist/hips ratio (WHR), for which the cutoff points adopted for "normality" were up to 0.95 cm for men and up to 0.85 cm for women<sup>16</sup>.

#### **Arterial blood pressure**

Blood pressure readings were taken using an automatic blood pressure monitor, OM-

RON brand, model HEM-742INT, with a digital display and a measurement range of 0 to 299 mmHg. The measurement procedures and classification of results were conducted in accordance with American Heart Association recommendations<sup>17</sup>. Blood pressure (BP) readings were classified using the cutoff points: i) systolic blood pressure (SBP)  $\leq$  120 mmHg and diastolic blood pressure (DBP)  $\leq$  80 mmHg for “ideal”; and SBP  $>$  120 mmHg and DBP  $>$  80 mmHg for “not ideal”. Additionally, people who stated that they had hypertension and were regularly taking antihypertensive medication were also classified as having “not ideal” BP. If a participants’ systolic and diastolic were in different categories, they were classified according to the higher of the two (i.e. as “not ideal”).

All anthropometric measurements were taken and all questionnaires administered by two researchers with experience in this type of investigation. Procedures were standardized in the following sequence: (i) contact with heads of departments to obtain permission for data collection; (ii) choice of an appropriate location for administration of the questionnaire and collection of the anthropometric data; (iii) reading and signature of the free and informed consent forms; (iv) collection of all responses to the questionnaire; (v) measurement of variables (body mass, waist circumference, hip circumference and blood pressure).

### Physical Activity Habits

The sample’s physical activity (PA) habits were surveyed using the short form of the International Physical Activity Questionnaire (IPAQ), based on their activity during the previous week<sup>18</sup>. The instrument’s four questions are designed to collect information on the frequency (days/week) and duration (minutes/day) of walking and daily activities that demand physical effort of moderate and vigorous intensity and also on the amount of time (minutes/day) spent on activities that are performed in a sitting position. All categories are analyzed in four dimensions: work-related activity, self-powered transport, leisure time activity and domestic activities.

Physical activity habits were categorized according to the consensus proposed by Matsudo et al.<sup>19</sup>, which uses three strata (very active, active and irregularly active), classified as follows: *Very active*:  $\geq$  5 days/week and  $\geq$  30 minutes/session of vigorous activities; and/or  $\geq$  3 days/week and  $\geq$  20 minutes/session of vigorous activities plus mod-

erate activities and/or walking  $\geq$  5 days/week and 30 minutes/session; *Active*:  $\geq$  3 days/week and  $\geq$  20 minutes/session of vigorous activities; or  $\geq$  5 days/week and  $\geq$  30 minutes/session of moderate activities or walking; or any type of activity which when summed equals  $\geq$  5 days/week and  $\geq$  150 minutes/week (walking + moderate + vigorous); *Irregularly active*: people who do engage in physical activity, but not enough to be classified as active, because they do not meet the criteria for frequency or duration. These strata were then dichotomized as: i)  $\geq$  150 minutes/week (Active) and  $<$  150 minutes/week (Irregularly active).

### Statistical analysis

The Kolmogorov-Smirnov test was used to test the normality of data. Descriptive statistics were calculated for data analysis. Frequency distributions were used to classify the hospital workers in terms of information related to place of work, educational level, economic classification and self-perceived health status. Means and standard deviations were used to describe the sample. Student’s *t* test for independent samples was used to compare age and anthropometric characteristics across the sexes. Categorical variables were analyzed with nonparametric statistical methods; the chi-square test ( $\chi^2$ ) was used to test for associations between the dependent variable “self-perceived health” and independent variables. Statistical significance was set in advance as values less than or equal to 5%. Variables that returned *p* values of  $<$  0.20 in the  $\chi^2$  test were entered into adjusted analyses using Poisson regression with robust variance adjustment and the results were expressed as prevalence ratios (PR) with their respective 95% confidence intervals (95% CI). Data were analyzed using the software package Statistical Package for the Social Science (SPSS), version 20.0.

### Results

The study analyzed information from 380 adults aged 20 to 59 years. Mean age was 43.92 (SD = 8.46) years, mean height was 1.64 m (SD = 0.09), mean body mass was 73.27 kg (SD = 13.99), and 65.3% of the sample were women. It should be pointed out that, with the exception of the Clinical Department, a larger number of employees than initially estimated by the sample size calculation were interviewed in all departments.

Interesting findings resulting from this investigation include the high proportion of inter-

viewees who reported that they were satisfied or very satisfied with their health status, accounting for 60.8% of the sample. With regard to indicators of educational attainment, it is of note that the great majority of the interviewees, 91.8%, had completed Secondary or Higher Education. In terms of economic class, it was found that a significant majority of the workers were allocated to socioeconomic class B. Table 1 below lists the general characteristics of the sample.

The results of the analyses of associations between self-perceived health and sex, indicators of adiposity, arterial blood pressure and physical activity habits are shown in Table 2.

It will be observed that associations were detected between self-perceived health and sex and between self-perceived health and the indicators of adiposity, among which BMI exhibited the strongest association according to the Poisson Regression analysis. In contrast, neither BP nor PA habits were significantly associated with self-perceived health.

## Discussion

This study analyzed associations between self-perceived health and sex, indicators of adiposity, arterial blood pressure and PA habits in 380 employees of the University Hospital (UH) in Londrina, PR, Brazil. The principal findings were as follows: i) almost half of the women and one quarter of the men were not satisfied with their health; ii) the highest proportions of dissatisfaction with health coincided with the higher strata of the indicators of adiposity, i.e., in order of significance, BMI, WC, and WHR; iii) self-perceived health was not associated with BP or with PA habits; iv) there was a high prevalence of physical inactivity among these hospital workers.

To our knowledge, this is the first investigation conducted with healthcare workers in the municipal district of Londrina, PR, Brazil, designed to determine the prevalence of satisfaction with health status among employees of a university hospital. It should be emphasized that the study was conducted with a representative sample of the overall population of 1460 workers and none of the people selected refused to take part in the study.

As can be observed in Table 1, there was a very small percentage of workers who had spent eight years or fewer in education, probably because the majority of the job descriptions for university employees demand graduation from

**Table 1.** General characteristics of the sample.

Variables	n	%
Sex		
Men	132	34.7
Women	248	65.3
Self-perceived health		
Satisfied	231	60.8
Not satisfied	149	39.2
Hospital department		
Nursing department	186	48.9
Clinical department	73	19.2
Administration department	102	26.8
Management department	19	5.0
Educational level of interviewee		
≤ 8 years of study	31	8.1
9 to 11 years of study	209	55.0
≥ 12 years of study	140	36.8
Economic classification (ABEP)		
A (greatest spending power)	52	13.7
B	255	67.0
C	72	19.0
D	1	0.3
Body mass index (BMI)		
Healthy weight	137	36.1
Overweight/obese	243	63.9
Waist Circumference (WC)		
Low risk	111	29.2
Moderate/high risk	269	70.8
Waist/Hips Ratio (WHR)		
Normal	214	56.3
Excessive	166	43.7
Arterial blood pressure (BP)		
Ideal	213	56.1
Not ideal	167	43.9
Physical activity habits (IPAQ)		
Active	134	35.3
Irregularly active	246	64.7

Workers at the University Hospital in Londrina, PR, Brazil, 2010.

secondary education as a minimum. With regard to this finding, studies have shown that self-reported dissatisfaction with health status is more common among people who are less well-educated, poorer and older, irrespective of sex<sup>20</sup>. Previous investigations have also detected an inverse relationship between educational level and reported chronic diseases, finding a 62% higher prevalence of NTCd in the least well-educated section of the adult population<sup>2</sup>.

For the purposes of this study, the level of educational attainment of the interviewees was analyzed, rather than the level of the head of



**Table 2.** Associations between self-perceived health status and sex, indicators of adiposity, arterial blood pressure and physical activity habits.

Variables	Autopercepção de Saúde		
	Satisfied (%)	Crude PR (95%CI%)	Adjusted PR (95%CI%)
Sex			
Woman	53.2	Ref.	Ref.*
Men	75.0	1.409 (1.210 – 1.642)	1.461 (1.258 – 1.696)
p <sup>‡</sup>	<0.001		
BMI			
Overweight/obesity	52.7	Ref.	Ref.†
Healthy weight	75.2	1.427 (1.225 – 1.664)	1.478 (1.272 – 1.717)
p <sup>‡</sup>	<0.001		
Waist Circumference			
Moderate/high risk	54.3	Ref.	Ref.†
Low risk	76.6	1.411 (1.214 – 1.640)	1.323 (1.135 – 1.541)
p <sup>‡</sup>	<0.001		
Waist/Hips Ratio			
Excessive	54.2	Ref.	Ref.†
Normal	65.9	1.215 (1.025 – 1.440)	1.190 (1.008 – 1.405)
p <sup>‡</sup>	0.021		
Arterial blood pressure			
Not ideal	59.9	Ref.	-
Ideal	61.5	1.027 (0.872 – 1.209)	-
p <sup>‡</sup>	0.748		
Physical activity habits			
Irregularly active	60.2	Ref.	-
Physically active	61.9	1.030 (0.871 – 1.217)	-
p <sup>‡</sup>	0.735		

Workers at the University Hospital in Londrina, PR, Brazil, 2010. \* Adjusted for BMI category; † Adjusted for sex; ‡ P value according to Pearson's chi-square test; PR: Prevalence ratio.

the family, since the intention was to obtain the characteristics of the sample. The majority of the employees had successfully completed secondary education and a considerable proportion, 36.8%, had at least started higher education.

Body mass index was used as a proxy for nutritional status, showing that approximately 64.0% of the workers interviewed were overweight or obese, which is a higher proportion than that observed among the adult population living in the urban districts of the city of Pelotas, RS, Brazil (53.0%)<sup>21</sup>. Overweight and obesity are associated with greater deposition of abdominal fat, which, in turn, increases the likelihood of onset of a large number of different chronic diseases, such as hypertension, hyperlipidemias, gallstones, type II diabetes and some types of cancer<sup>22</sup>.

In the present study, having a BMI classified within the healthy weight category was signifi-

cantly associated with a higher frequency of satisfaction with health status PR = 1.478 (95% CI: 1.272 – 1.717).

In another study, conducted with 2,022 adults from the Brazilian State of Santa Catarina, it was found that a lower proportion of women reported a positive self-perception of their own health, particularly women who were classified as overweight or obese and/or who had a large waist circumference<sup>20</sup>. Those findings are in agreement with the results of the present study, but it should be noted that the cutoff points for WC adopted in that study were higher than those used in the present investigation, and for this reason these results should be interpreted with care. It is also of note that the women in the present study were more susceptible to exhibiting a higher frequency of metabolic dysfunctions and this may at least in part be because of the greater proportion of

central fat buildup. Furthermore, those workers who had a WC that was classified as conferring low risk were more satisfied with their health PR = 1.323 (95% CI: 1.135 – 1.541).

The WC measurement is an indicator of metabolic risk that has been widely publicized by a number of international<sup>15</sup> and Brazilian entities<sup>23</sup>. Presence of excess abdominal fat is an independent predictor of risk factors and morbidity, since it has a positive correlation with abdominal fat content, which in turn can make the emergence of cardiovascular problems more likely<sup>15</sup>.

A study conducted by Mota et al.<sup>24</sup> assessing 273 people of both sexes from the municipal district of Botucatu, SP, Brazil, with a mean age of 53 years, found that WC was the variable that had the greatest influence on the metabolic abnormalities under investigation. People who had excessive or very excessive WC exhibited higher fasting concentrations of glucose ( $p < 0.05$ ), triacylglycerol ( $p < 0.0001$ ), total cholesterol ( $p < 0.05$ ), non-HDL cholesterol ( $p < 0.001$ ) and LDL-c ( $p < 0.05$ ) than those classified with normal WC and had lower HDL-c concentrations ( $p < 0.001$ ).

Overall, 39.2% of the hospital workers were not satisfied with their health. Self-perceived health was associated with sex with PR = 1.461 (95% CI: 1.258 – 1.696), since a significantly higher proportion of women than men reported not being satisfied with their health, which has also been observed by Barros et al.<sup>25</sup> in all Brazilian capitals, in an analysis of the “VIGITEL” telephone survey for surveillance of risk and protection factors for chronic diseases, in studies conducted by Reichert et al.<sup>3</sup> and by Nery Guimarães et al.<sup>9</sup>. This could indicate that women are more aware of their true health status, with the result that their data was more compatible with the indicators of adiposity observed, of which BMI appears to be the most important, since it exhibited the strongest association with self-perceived health.

The percentage of people who self-rate their health as poor or very poor increases considerably as chronological age increases, with lower educational levels and the higher the number of diseases reported, both among men and among women. Although women state that they are less satisfied with their health, in the presence of two or more morbidities, PR values are higher among men<sup>2,25</sup>. It appears that men’s perception of their own health in the presence of an NTCD is worse than women’s.

As the body ages, there is a notable increase in the frequency of people who self-report health as poor or very poor, when compared with younger people. In a study conducted in Poland, just 4% of men and 10% of women aged less than 25 years self-rated their health as poor or very poor, whereas in the 44 to 54 age range this proportion increased to over 40%<sup>26</sup>.

Almost half of the sample studied in this investigation work for the Nursing Department (48.9%) and 86.0% of these were women. The lifestyle of healthcare professionals has been the subject of study for decades<sup>27</sup>, possibly because of the peculiarities of their jobs.

Starting in 1976, a cohort study entitled The Nurse’s Health Study was conducted in the United States in the state of Massachusetts with the objective of constructing a model to provide an understanding of the impact of several different risk factors on given causes of mortality. Every 2 years the nurses were sent questionnaires containing questions on lifestyle and health risk behaviors. Later on questions on dietary and physical activity habits were also added. Complete data on 50,112 participants were computed from 1986 onwards and analyzed up to 2004. During this period there were 4,893 deaths, 1,026 of which were from cardiovascular diseases (heart disease, cerebrovascular disease, etc.). Systolic blood pressure (SBP) was positively associated with increased risk of death from these diseases, raising the incidence (Hazard Ratio-HR) from 1.25 (95% CI = 1.06 - 1.48) when SBP was up to 139 mmHg to 2.58 (95% CI = 1.91 - 3.49) when it was  $\geq 160$  mmHg<sup>27</sup>.

Reinforcing these findings, Nery Guimarães et al.<sup>9</sup> found that diseases of the circulatory system were the main cause of deaths (30%) in a cohort recruited from the employees of a public university in the Brazilian state of Rio de Janeiro and followed for 10 years.

A study conducted by Peres et al.<sup>20</sup> found that when blood pressure readings were high, lower proportions of people self-rated their health positively, but a similar association was not observed in the present study. It is possible that the association was detected in that study<sup>20</sup> because the cutoff points chosen to classify elevated BP were higher than those used in the present study, which could have resulted in symptomatic hemodynamic and vascular abnormalities affecting the way the participants perceived their health.

In the present study, an association between self-perceived health and BP was not detected, but 60.8% of the employees investigated report-

ed that they were satisfied with their health, even though many did not have ideal blood pressure.

There was also no association between self-perceived health and PA habits ( $p = 0.735$ ), but it is known that daily engagement in moderate intensity PA is inversely related to risk of death from many different causes, with HR = 0.76 (95% CI = 0.66 - 0.86)<sup>27</sup>, and so it appears salutary to increase the frequency of exercise to increase its protective effect and in turn improve self-rated health status<sup>28</sup>.

Among adults, studies undertaken in other countries<sup>26,28</sup> have demonstrated that there is a direct and independent association between the practice of physical activity and better self-perceived health.

A European study using information provided by the Swedish government from its 1999 census analyzed a sample of 3,756 people aged 25 to 64, finding that just 4.3% of the sample was physically inactive, considering all domains of PA. Physical exercise (PE) and PA were independently associated with reports of good self-perceived health and the likelihood of improving self-perception increased approximately three times OR = 3.04 (95% CI = 2.10 - 4.39) with regular PE and when total PA was  $\geq 6$  hours per week<sup>28</sup>.

In Brazil, in the most recent VIGITEL telephone survey for surveillance of risk and protection factors for chronic diseases, irregular PA is defined as when the sum of the number of minutes spent on physical activities in free time, during active transport to work or school and in occupational activity do not reach the equivalent of 150 minutes per week<sup>29</sup>. The same cutoff point was also adopted for the present investigation, but it should be emphasized that even so the prevalence of irregular PA among the UH employees was still greater than the prevalence observed in the city of João Pessoa (54.4%), which was the Brazilian state capital with the highest prevalence of irregular PA, where rates were 46.1% for men and 61.3% for women. Among the UH employees, prevalence rates were 58.2% for men and 68.0% for women.

It should be remembered that the question used in the present study to collect worker's self-perceived health status was extracted from an instrument recommended by the World Health Organization, which has been administered and validated in Brazil by Fleck et al.<sup>12</sup>, and this con-

tributes to comparability with data observed in other countries.

While self-perceived health status is a simple item of information, it has a well-established association with mortality. People who perceive their health as "poor" exhibit two to three times greater risk of death than those who perceive their health as "excellent"<sup>6,8,9</sup>. In other words, the associations that have been found with health risk factors underscore the utility of this information.

With relation to the interviews, it is of note that all were conducted by just two researchers and that they took place at the interviewees' own workplaces, because the sample included people doing different jobs and on different shifts, but this did not interfere with the analyses.

One limitation of this study is its cross-sectional design, which means that no relationships of causality can be established between the variables analyzed. It therefore appears an appropriate suggestion for future studies to analyze these associations with prospective study designs.

Another point that should be mentioned is that, although every effort was made to ensure that interviews were equally distributed across the three shifts (morning, afternoon and night), the largest number of interviews took place during the day shift. Night shift workers were on a rolling shift system and in some cases appointments were made to conduct the interviews during their next shift on duty, but because of scheduling incompatibilities sometimes this was not possible.

In summary, approximately half of the women and one quarter of the men investigated were not satisfied with their health. In general, the variables associated with self-perception of health were those related to indicators of adiposity, with BMI and then WC having the strongest associations. Other risk factors, such as high BP and irregular PA habits were not associated with self-perceived health, even though prevalence rates were high. These findings suggest that people recognize the risks to their health, in particular those linked to morphological indicators, but they ignore the importance of maintaining good blood pressure and engaging in regular PA in order to delay onset of chronic conditions that are harmful to their bodies, which could impact on their self-perceived health.



## Collaborations

DB Porto and GA de Arruda were responsible for the study objectives and design, collection and analysis of data, statistical treatment, interpretation of data and drafting the article; LR Altinari and CG Cardoso Júnior performed critical review of the article and approved the final version submitted for publication.

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