Revista O Mundo da Saúde

Lower back pain profile in restaurant workers at a public university in southern Brazil

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Abstract

The tasks that workers in university restaurants (URs) perform involves repetitive movements of the back, lifting excessive weight, remaining in a standing posture for prolonged periods of time, and, thus, an evaluation of the lumbar region of these workers is indicated. Therefore, the objective of this study was to outline the profile of lower back pain in workers from the URs of a Public University in the South of Brazil. This is a cross-sectional, observational, quantitative study, in which participants aged 18 to 59 years, of both sexes, who performed some function within the restaurants of a university in southern Brazil and who reported the presence of lower back pain were selected. Participants were evaluated by a sociodemographic questionnaire, a visual analogue scale (VAS) for pain, a range of motion (ROM) of the lumbar spine evaluation, and the Brazilian Start Back Screening Tool (SBST) questionnaire. Results are presented as absolute and relative frequencies, with a Spearman correlation, and numerical variables as mean and standard deviation or median, minimum, and maximum. Twenty-eight participants were included in the study, 71.4% of whom were women, with a mean age of 36.3 (±10.8) years old. The report of pain above 4 in the VAS was 71.4% of the participants and all had a decrease in ROM in all movements evaluated in the lumbar spine. Most (71.4%) had low risk for psychosocial factors by SBST. The profile of restaurant workers at the evaluated university is characterized by being primarily performed by women, and these workers presented severe pain and limited joint movements in their lumbar region.

Keywords: Lower back pain. Pain Measurement. Worker's health. Range of Joint Motion.

INTRODUCTION

Technological modernization has been triggering organizational and operational changes that alter working relationships, increasing the prevalence of musculoskeletal diseases, and affecting the physical-functional capacity of workers. These diseases represent one of the major causes of work-related pain[1,2].

The prevalence of lower back pain is increasing, especially in countries with low and medium socioeconomic status, and it is commonly found in the working population[3]. Although there are several global initiatives to address the global burden of lower back pain as a public health problem, it is necessary to determine the specific history and

DOI: 10.15343/0104-7809.202246483492I

strategies of lower back pain management to reduce current lower back pain as well as future pain that is expected in this population[3].

The main risk factors for lower back pain (LD) are individual and related to work and leisure activities[4]. The individual factors may include, but are not limited to, demographic, anthropometric, physical, and psychosocial factors. The LD guidelines[5] demonstrate that psychosocial factors have a greater prognostic role than physical factors.

University restaurants (URs) are presented as one of the main policies to sustain enrollment at universities, making higher education for many students possible, since they offer quality meals at an affordable price, which contribute to the improvement of academic performance, and reduction of educational evasion resulting from insufficient financial conditions[6]. In other words, they are not just an establishment for the preparation and distribution of meals, but rather a complex socio-technical system, characterized by formal and informal interactions between the different actors involved in the production process. Problems such as a high turnover of outsourced servers, workers' complaints due to precarious working conditions, and the need for heavy physical effort[6].

The occurrence of nonspecific lower back pain is higher in workers who are subjected to heavy physical efforts, such as weightlifting, repetitive movement, and constant static postures[5]. It is relevant to analyze the working conditions within this work environment, especially the body posture and routine of workers[7]. The activities carried out in industrial kitchens are characterized by intense manual demand in preparation, the process of serving food, and in cleaning the workplace. The performance of these tasks is accompanied by repetitive movements of the upper limbs and back, lifting excessive weight, and remaining in the standing posture for prolonged periods of time[8]. Therefore, the evaluation of the lumbar region of these workers is paramount to outline strategies that minimize the involvement of musculoskeletal disorders in this population.

This study aimed to outline the profile of lower back pain in restaurant workers at a public university in southern Brazil, and to analyze whether physical and psychosocial factors influence lower back pain.

METHODS

The present study was an observational and cross-sectional quantitative survey, carried out after approval by the Research Ethics Committee through opinion No. 2.327.563. Initially, for the dissemination of the study, a formal invitation was made to workers during their work break, orally, explaining the objectives and expected time for data collection.

The research was carried out in the physical spaces of University Restaurants (URs) of a public university in southern Brazil, with the proper authorization of the person responsible for them as well as the team of workers, which are from an outsourced company. It is noteworthy that the aforementioned public university has 4 university restaurants, which serve 3 meals a day (breakfast, lunch, and dinner) with approximately 14 thousand meals per day. The research team's visits to apply the assessment instruments took place once a week, at a time that best adapted to the workers' routine, without interfering with the work dynamics, and the participants

were approached only once. The data collection for each participant was approximately 20 minutes.

Initially, the sociodemographic questionnaire was applied, containing questions such as age, sex, marital status, level of education, current occupation, life habits, time of occupation, working hours, hours worked, use of medication, consumption of alcoholic beverages, practice of activities physical activities, domestic activities, and information on vitality, as found in studies[9,10,11].

Participants and selection criteria

The population studied consisted of servers who had worked in the kitchens of the URs for at least 12 months, during the period of data collection, and who were performing their duties during the study (not on leave, vacation, or away). Participants of both sexes, aged between 18 and 59 years, who indicated the presence of lower back pain in the Nordic Musculoskeletal Symptom Questionnaire were included in the study, and this questionnaire was used as a criterion for screening participants[12]. Participants who had autoimmune diseases, pregnant women, and those who did not complete the questionnaires were excluded.

Evaluation

For evaluation, the researchers initially applied the Nordic Musculoskeletal Symptom Questionnaire[13] to screen the participants. Subsequently, participants who reported lower back pain were evaluated using the Visual Analogue Scale (VAS) for pain[14]. Shortly thereafter, in the restaurant spaces and with work clothes, the range of motion (ROM) was measured using goniometry[15]. Finally, the Brazilian Start Back Screening Tool (SBST)[16] questionnaire was applied.

The Nordic Musculoskeletal Symptoms questionnaire[13] for reporting musculoskeletal symptoms is divided into nine anatomical areas: cervical region, shoulders, dorsal region, elbows, wrists/hands, lumbar region, hips/thighs, knees, and ankles/feet. Its purpose was to screen the participants who answered that they have had pain in the lumbar region within the last 12 months for inclusion in the present study.

The Visual Numerical Scale (VAS) assesses the perception of pain intensity and is presented as a line divided into 11 equal parts, graded from 0 to 10, where 0 characterizes no pain and 10 the worst imaginable pain[14].

The evaluation of the joint angles used in the present study were those referring to the lumbar spine, with the following active movements being performed: flexion, extension, lateral flexion, and rotation, the last two being evaluated on both sides, with the reference values for flexion being 95°, 35° extension, 40° lateral flexion, and 35° rotation[15].

The Intraclass Correlation Coefficient (ICC) was performed by interrater and intrarater of 10 subjects at a 1-week interval between assessments, in order to measure the assessment of range of motion, and the inter-rater ICC was 0.895.

Pain has emotional and behavioral impacts that favor the development of chronic conditions[16]. The participant's perception of the resolution of lower back pain symptoms, their relationship with other diseases, the difficulty in coping with the disease, lack of self-confidence, catastrophizing, and depressive symptoms are predictors of dysfunction and interfere with lumbar pain prognosis[16]; thus, the Start Back Screening Tool (SBST) questionnaire, Brazilian version, was applied in order to analyze the psychosocial factors that influence lower back pain.

The SBST questionnaire is composed of 9 items, 4 related to referred pain, dysfunction, and comorbidities, and 5 constituted a psychosocial subscale related to discomfort, catastrophizing, fear, anxiety, and depression. Individuals are classified into low, medium,

and high risk of poor prognosis, with the score being performed by the sum of their responses. If the total score on the questionnaire is from 0 to 3, the individual is classified as low risk. With values greater than 3, the psychosocial subscale score is used. If the subscale score is from 0 to 3, the individual is classified as medium risk, with a score greater than 3 being classified as high risk[16].

Data analysis

The results were evaluated by descriptive analysis, using tables and graphs, and by applying the Levene and Shapiro-Wilk tests, respectively, to verify homogeneity and normality. When parametric, the results were described as the mean ± standard deviation and when non-parametric, as the median (minimum and maximum). Spearman's correlation was performed for variables with non-parametric distribution, of ROM, VAS, and SBST, using the SPSS 20.0 program. For statistical analysis, participants were stratified according to sex and hours of daily work.

RESULTS

Of the 81 participants eligible for the study, 28 workers with nonspecific lower back pain were included in the study, and 71.4% (n=20) were women, with a mean age of 36.3 ± 10.8 years.

The power of the sample was calculated using the G*Power 3.1.3 program, considering the following criteria: effect size: 0.50; α error: 0.05, sample size 28, resulting in a (1-β) power of 0.82.

With regards to the occupations found within the university restaurants in which the participants were evaluated: 36% were kitchen assistants, 21% nutritionists, 7% in the roles of administrative assistant, general services, butcher, cook, and nutrition assistant, and 4% were an administrator and a janitor. Furthermore, the participants had a BMI classified as overweight. Table 1 demonstrates the characteristics of the study participants.

For the statistical analysis, stratifications were performed regarding sex and hours of daily work. Therefore, groups of women with daily working hours of 6, 8, and 9 hours and men with daily working hours of 8, 9 and 10 hours were analyzed. It was found that there is a higher frequency of LBP in individuals who work around nine hours a day. There was no comparison of a male participant with a 10-hour workday because he was the only one with this workload.

Table 2 presents the VAS scores obtained by the participants, indicating the percentage in each group after stratification.

Table 3 presents the values referring to the evaluated lower back movements. It was found that both men and women showed a decrease in ROM at all angles evaluated. It was detected that all evaluated individuals showed reduced mobility in all evaluated movements, which may be a physical factor in the onset of LBP. When comparing ROM and pain intensity, we verified that there is a positive correlation (Rho=0.88, p=0.04) between restricted ROM flexion and left-right inclination in women with a VAS pain intensity of 8, who worked for 8 hours (Table 3).

Table 4 shows the scores and percentages for each risk classification obtained by the stratified groups in the assessment by the Brazilian Start Back Screening Tool. Based on the scores presented, 70% of the women evaluated and 75% of the men evaluated showed a low risk of influence of physical and psychosocial factors on LBP, which characterizes a good prognosis.

Table 5 shows the correlation values for ROM, VAS, and the SBST questionnaire according to sex, daily working hours, and the value of VAS for women. Correlations were verified for women with daily working hours of 6.8 and 9 hours with moderate intensity pain.

Table 1 – Characteristics of the study participants.

Sex	Absolute frequency (%)
Male (n.%)	8 (28.5%)
Female(n.%)	20 (71.4%)
Age (years) (mean±SD)	36.3 (±10.8)
BMI (mean±SD)	26.6 (±5.2)
Marital status	
Single (n.%)	8 (28.5%)
Married (n.%)	12 (42.8%)
Stable union (n.%)	7 (25%)
Divorced (n.%)	1 (3.5%)
Widow (n.%)	0
Education	
Did not study (n)	0
From 1st to 4th grade of elementary school (n)	0
From the 5th to the 8th grade of elementary school (n, %)	5 (17.8%)
Incomplete high school (2nd grade) (n, %)	9 (32.1%)
Completed high school (2nd grade) (n, %)	7 (25%)
Incomplete higher education (n)	0
Completed higher education (n, %)	7 (25%)
Has children (n, %)	19 (67.8%)
Working hours	
6 hours (n, %)	5 (17.8%)
8 hours (n, %)	9 (32.1%)
9 hours (n, %)	13 (46.4%)
10 hours (n, %)	1 (3.5%)
Smokes cigarettes (n, %)	3 (10.7%)
Drinks alcoholic beverages (n, %)	13 (46.4%)
Uses medication (n, %)	9 (32.1%)
Performs physical activity (n, %)	13 (46.4%)
Performs domestic activities after working hours (n, %)	19 (67.8%)

Table 2 – Absolute and relative frequencies of the VAS scores of the study participants, stratified by sex and daily working hours.

Daily working hours	n	No Pain (0)	Light Pain (1 a 3)	Moderate Pain (4 a 6)	Strong Pain (7 a 9)	Unbearable pain (10)
Women						
		N (%)	N (%)	N (%)	N (%)	N (%)
6 h	5	1 (20%)	1 (20%)	0	2 (40%)	1 (20%)
8 h	6	0	1 (16,6%)	3 (50%)	2 (33,3%)	0
9 h	9	0	2 (22.2%)	5 (55,5%)	2 (22.2%)	0
Men						
		N (%)	N (%)	N (%)	N (%)	N (%)
8 h	3	1 (33,3%)	0	1 (33,3%)	1(33,3%)	0
9 h	4	0	1 (25%)	2 (50%)	1 (25%)	0
10 h	1	0	1 (100%)	0	0	0

Table 3 – Range of Joint Movement (ROM) of the Lower Back of study participants, stratified by sex and daily working hours in Curitiba, PR (2019).

	WOMEN				
Daily working hours	**6h (n=5)**	**8h (n=6)**	**9h (n=9)**		
Joint Movement				**Reference value[15]**	**Conclusion**
Flexion	76±16.7°	77.6±18.2°	63.1±18°	95°	Decreased
Extension	26,6±6.5°	26.4±6.6°	24.4±5.7°	35°	Decreased
Incline D	28±7.3°	30±6.1°	29.1±6.4°	40°	Decreased
Incline E	28±7.5°	30.4±5.3°	28.8±8.3°	40°	Decreased
Rot D	26±5.7°	26.4±6.3°	25.1±4.1°	35°	Decreased
Rot E	26±6.5°	26.8±7.0°	25.5±4.7°	35°	Decreased
	MEN				
Daily working hours	**8h (n=3)**	**9h (n=4)**	**10h (n=1)**		
Joint Movement					
Flexion	71.3± 20.1°	46±20.8°	64°	95°	Decreased
Extension	26±4°	27.5±8.0°	30°	35°	Decreased
Incline D	24±4°	25±7.3°	28°	40°	Decreased
Incline E	25.3±4.6°	25.5±8.3°	28°	40°	Decreased
Rot D	32.6±2.3°	31±7.5°	26°	35°	Decreased
Rot E	32.6±2.3°	28±9.2°	28°	35°	Decreased

Data expressed as mean ± standard deviation

Table 4 – The Brazilian Start Back Screening Tool (SBST) questionnaire scores of survey participants stratified by sex and daily working hours. Curitiba, PR (2019).

Daily working hours	n	Low Risk (n,%)	Medium Risk (n,%)	High Risk (n,%)
Women				
6 h	5	5 (100%)	0	0
8 h	6	3 (50%)	2 (33,3%)	1 (16.6%)
9 h	9	6 (66.6%)	2 (22.2%)	1 (11.1%)
Men				
8 h	3	3 (100%)	0	0
9 h	4	2 (50%)	2 (50%)	0
10 h	1	1 (100%)	0	0

Table 5 – Table of correlations of VAS, Brazilian Start Back Screening Tool, and ADM of study participants, stratified by daily working hours, Curitiba, PR (2019).

WOMEN/6h Daily	Extension ROM	Right Slope ROM	Left Tilt ROM	Right Rotation ROM	Left Rotation ROM
VAS=7	Rho (ρ): 0.889 p: 0.044*	Rho (ρ): 0.000 p: 1.000	Rho (ρ): 0.740 p: 0.152	Rho (ρ): -0.520. p:0.148	Rho (ρ): 0.889 p: 0.044*
WOMEN/8h Daily					
VAS=8	Rho (ρ): -0.315 p: 0.543	Rho (ρ): 0.880 p: 0.021*	Rho (ρ): 0.880 p: 0.021*	Rho (ρ): -0.414 p: 0.414	Rho (ρ): -0.315 p: 0.543
WOMEN/9h Daily					
VAS=4	Rho (ρ): -0,317 p: 0.806	Rho (ρ): -0.470 p: 0.202	Rho (ρ): -0.312 p:0.414	Rho (ρ): -0.652 p: 0.057	Rho (ρ): -0.709 p: 0.032*
VAS=5	Rho (ρ): 0.106 p: 0.789	Rho (ρ): 0.365 p: 0.334	Rho (ρ): 0.468 p: 0.204	Rho (ρ): 0.434 p: 0.243	Rho (ρ): 0.436 p: 0.240

Rho = correlation coefficient
p=value of statistical significance
*significant correlation (p<0.05, Spearman).
Correlations for males did not present significant values.

DISCUSSION

The present study verified the profile of lower back pain (LBP) in servers of university restaurants (URs) of a public university in the south of Brazil through the VAS, ROM of flexion, extension, inclination, and rotation of the lumbar spine evaluations, as well as the physical and psychosocial factors that could influence lower back pain in these participants. LBP was present in this population, especially in women working in the URs.

Although the present study did not aim to assess prevalence, it was demonstrated that

71.4% of the participants who had LBP were women, which were similar to results found in the systematic review by Hoy *et al.*[17]. Since working conditions, sociodemographic factors, work-related and psychological factors are different between men and women, it is suggested that the assessment of the health status of men and women be evaluated separately[18]. A possible cause for this prevalence in women, according to a study by Silva, Fassa, and Valle[19], would be that females have some anatomo-functional characteristics that may contribute to the onset of chronic lower back pain, such as shorter stature, lower muscle mass, lower bone mass, more fragile joints which are less adapted to heavy physical effort, and greater fat weight; however, the focus of the present study was to trace the profile of lower back pain and not verify prevalence.

With regards to body weight, it was identified that the participants of this study had a BMI classified as overweight, a fact that should be monitored, because according to Hoy *et al.*[17], obesity is closely linked to the occurrence of LBP.

A higher frequency of LBP was observed in participants who worked around nine hours a day, which was also demonstrated by Elnaggar *et al.*[20] who showed a relationship between the probability of developing LBP and the number of hours worked per day. The prevalence of LBP was higher in people who worked more than 6 hours a day.

In relation to ROM, it was found that all evaluated individuals showed decreased mobility in all movements evaluated, which may be a physical factor for the onset of LBP. When correlated with ROM and pain intensity, we identified a positive correlation between restriction of flexion ROM and right/left inclination ROM, with VAS pain intensity score of 8 in women who have an 8-hour workday. This finding agrees with the study by Wong and Lee[21], who found that LBP is related to a significant decrease in lumbar spine movements in the three anatomical planes.

In studies carried out by Laird *et al.*[22,23], it was shown that individuals who reported higher intensities of LBP also had a lower range of motion for flexion and extension in their lower back, which indicates that the presence of lower back pain may be related to the reduced mobility at this site. On the other hand, in a study by Garcia *et al.*[24], who analyzed treatment methods for lower back pain, it was found that the improvement in the pain condition of individuals is not linked to the increase in ROM. This finding suggests that pain is not the determining factor for reduced lumbar mobility, thus, requiring the use of other assessment tools.

Therefore, the evaluation of psychosocial factors that may influence LBP is necessary. The results of the SBST questionnaire showed that most of individuals evaluated did not have a significant influence of physical and psychosocial factors on LBP, which represents a good prognosis for symptom resolution. According to Hill *et al.*[25], the stratified approach, through the use of prognostic screening of the SBST, has important implications for the future treatment of LBP in primary care. In the study carried out by de Nicholas and George[26], it was found that psychological factors can influence the characteristics of lower back pain, and when treated, can reduce pain. Similarly, Camacho *et al.*[27] found a relationship between lesser lower back pain intensity and better prognosis in the SBST questionnaire. In the same study, lower ROM was found for lower back movements, associated with higher pain values and lower prognosis in SBST; in other words, the more movement is performed, the lower the psychosocial factor.

Therefore, in our study, no correlation was observed between scores on the SBST questionnaire, lumbar movement, and VAS. Thus, it is a pain that may be related to physical factors and not to psychosocial ones.

Among the limitations of the present study are the limited time allocated to data collection due to the logistics of the service and the low adherence of the participants, as was also found in the study by Meucci *et al.*[27].

Thus, it is suggested that further studies be carried out to further evaluate this population in order to devise strategies for the prevention of lower back pain and promote worker health.

CONCLUSION

The profile of restaurant workers at a public university in the South of Brazil is characterized as primarily women with a daily shift of 6 to 8 hours, and these workers presented intense pain and limited joint movements in the lumbar region. It was also observed that women with a daily workday of 8 hours have a pain score of 8 with a reduced range of motion for flexion and inclination of the spine. Since women with a daily shift of 9 hours have pain scores of 4 and 5 with decreased amplitude for spine flexion. As for psychosocial factors, women with a 6-hour workday showed a correlation between rotation to the right as well as greater risks of a worse prognosis for their lower back pain.

Considering the context presented in the present study, further studies are suggested in this population. Given the high demand for physical effort, which impacts musculoskeletal function, this may, in turn, reflect on the work and personal relationships of these servers.

CRediT author statement

Conceptualization: Lima, FV; Dias, LG; Beth, PAB; from Macedo, ACB; Zotz, TGG. Methodology: Lima, FV; Dias, LG; Beth, PAB; from Macedo, ACB; Zotz, TGG. Statistical analysis: Lima, FV; Dias, LG; Beth, PAB; from Macedo, ACB; Zotz, TGG. Formal analysis: Lima, FV; Dias, LG; Beth, PAB; Motter, AA; from Macedo, ACB; Zotz, TGG. Research: Lima, FV; Dias, LG; Beth, PAB; Motter, AA; from Macedo, ACB; Zotz, TGG. Resources: Lima, FV; Dias, LG; Beth, PAB; Motter, AA; from Macedo, ACB; Zotz, TGG. Elaboration of original writing: Lima, FV; Dias, LG; Beth, PAB; Motter, AA; from Macedo, ACB; Zotz, TGG. Writing-Reviewing and Editing: Motter, AA; from Macedo, ACB; Zotz, TGG. Visualization: Lima, FV; Dias, LG; Beth, PAB; Motter, AA; from Macedo, ACB; Zotz, TGG. Supervision: Motter, AA; from Macedo, ACB; Zotz, TGG. Project management: Motter, AA; from Macedo, ACB; Zotz, TGG.

All authors read and agreed with the published version of the manuscript.

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Submitted: 07 april 2022.
Approved: 21 september 2022.
Published: 01 december 2022.