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Prevalence and Factors Associated with Low Back Pain among Healthcare Workers in Two Hospitals in Yaoundé-Cameroon: A Cross-Sectional Study

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Abstract

Background: Low back pain (LBP) is a very common health problem amongst the general population and a major cause of disability that affects work performance and well-being. Healthcare workers (HCWs) are especially at risk of developing LBP because of physical and emotional factors. Little is known about the burden of LBP in Cameroon. **Objective**: To determine the prevalence of low back pain and identify its associated factors among healthcare workers. **Methods**: A cross-sectional study using a self-administered questionnaire was conducted among healthcare workers in the Yaoundé Central Hospital and the Yaoundé University Teaching Hospital. The questionnaire collected data regarding recent, past year and lifetime occurrences of LBP, socio-demographics and work conditions. Data were analysed using IBM Statistical Package for Social Sciences (SPSS) version 26. **Results:** A total number of 268 HCWs participated in the study, including 197 (73.5%) females and 71 (26.5%) males. The mean age of the study participants was 40.60 ± 8.38 years (extremes of 20 and 65 years). The lifetime, annual, and point prevalences of LBP among the participants were 67.5% (CI: 61.6 - 73.1), 61.5% (CI: 55.6 - 67.1) and 35.7% (CI: 29.7 - 41.5) respectively. Multivariate analysis confirmed a moderate stress level, a sedentary lifestyle, working in the medicine and specialities department, lifting heavy objects and bending to work as associated factors to LBP. Most sufferers had a minimal functional disability (65.7%) while 34.3% had a moderate to severe disability. **Conclusions:** Healthcare providers have a considerably high prevalence of low back pain.

Factors associated with LBP found in this study were similar to those widely recognized in the literature. A substantial proportion of healthcare providers are suffering from functional disability associated with low back pain, affecting their social and work lives. There is a need for multilevel interventions to prevent and control low back pain in this highly vulnerable occupational group.

Keywords

Prevalence, Associated Factors, Low Back Pain, Healthcare Workers, Yaoundé

1. Background

Low back pain (LBP) is a very common symptom and health problem and affects all ranges of the population [1], however, its burden is often considered trivial [2]. In 2015, the global point prevalence of activity-limiting LBP was 7.3%, implying that 540 million people were affected at any one time [3]. Low back pain was asserted in 2017 as the number one cause of disability globally, measured in Year-lived disabilities (YLDs), by the Global Burden of Disease [4].

Until 10 years ago, LBP was largely thought of as a problem confined to Western countries. However, since that time an increasing amount of research has demonstrated that low back pain is also a major problem in low and middle-income countries [5]. A systemic review of 27 epidemiological studies across Africa showed that there is little difference in the prevalence of LBP among Africans as compared to developed countries, with a prevalence ranging from 28% - 74% [6]. The largest increases in disability caused by low back pain in the past few decades have occurred in these countries, including in Asia, Africa, and the Middle East [7], where health and social systems are poorly equipped to deal with this growing burden in addition to other priorities such as infectious diseases [8]. The effects of low back pain in terms of quality of life, productivity and workers' absenteeism are enormous [9]. LBP causes losses in the number of workdays which causes a significant economic burden to the individuals, their families and society [8]. It is demonstrated that various risk factors are affecting the incidence and prevalence of LBP in the epidemiological studies performed. These risk factors are divided into 3; personal, occupational and psychosocial [10]. Most authors agree that advancement in age and female gender are associated with a higher prevalence of LBP [1] [9] [10]. There are however conflicting opinions on the effect of psychosocial factors like alcohol consumption, physical exercise and depression on LBP. These conflicting opinions discourage preventive efforts that should have been directed toward such risk factors. HCWs are at risk of having LBP because of the physical and emotional factors associated with their profession [11]. Healthcare workers often experience low back pain at a rate exceeding that of workers in construction, mining, and manufacturing [12]. These injuries are due in large part to repeated manual patient handling activi-

ties, often involving heavy manual lifting associated with transferring, repositioning patients and working in extremely awkward postures [13] [14]. Studies in Africa, notably in Nigeria raise the concern of the very high prevalence of LBP reported both among healthcare workers (73.53%) [15] and other occupational groups. The risk groups of low back pain among healthcare professionals are physicians, dentists, nurses, physiotherapists, laboratory workers and caregivers, a study reported [16]. The prevalence of LBP reported in different studies among different occupational groups in the hospital ranges from 20% - 70.8% [17] [18].

Research regarding LBP prevalence, associated factors and consequences among health service workers has, however, tended to focus on single occupational groups only and studies have largely concentrated on the nursing profession [19]. Some studies compared nursing with the general population [20], while others grouped all health service workers for comparison with non-health sector workers [21]. Few studies group health service workers. Thus it is difficult to identify whether certain health sector occupations are associated with a higher risk of LBP. Also, within the few reports that addressed the prevalence of LBP among HCWs in Africa, the assessments were incomplete in terms of details of pain and associated factors.

The burden of LBP, particularly among healthcare workers and other "at-risk groups" in Cameroon is largely unknown. Research to estimate the burden and identify the risk factors associated with LBP in our environment is needed to guide policymakers and human resource managers in designing preventive strategies. Therefore this study was conducted to assess the prevalence and factors associated with low back pain among healthcare workers in two health institutions in Yaoundé, Cameroon.

2. Materials and Methods

2.1. Study Design and Setting

The present study was a cross-sectional descriptive study based on a self-administered questionnaire. The study was carried out over four months from February to May 2020 in the Yaoundé Central Hospital and the Yaoundé University Teaching Hospital. Yaoundé is the administrative capital of Cameroon. Its population is heterogeneous and therefore quite representative of the country's diversity.

2.2. Sample Size

Using the statistical formula of Fisher for calculating sample size, with an 84% prevalence of LBP among HCWs in a previous study, a precision of 5%, 95% confidence interval, the calculated minimum sample size was 226 HCWs.

2.3. Participants

A list of the healthcare workers of each hospital was obtained from the respective human resource services. The sample was selected using a one-stage stratified sampling technique. Practitioners were stratified according to their job using the

Australian and New Zealand Occupation classification system [22], and then from each stratum, the number of healthcare workers to be selected was determined by proportionate allocation.

HCWs having worked for at least 12 months in the health facility and who gave their consent were included in the study. While practitioners with a history of trauma to the back or surgery performed on the back in the last 12 weeks, pregnancy or childbirth in the last 3 months, reported specific causes of LBP (infection, tumour or metastasis, vertebral fracture, spinal stenosis, visceral disease, inflammatory disorders, spinal deformity, cauda equina syndrome) were excluded.

2.4. Data Collection

A self-administered questionnaire was applied for data collection. The questionnaire was first piloted to test for the validity and reliability among 15 HCWs randomly selected from the same sample and needed modifications were applied. It included information on socio-demographic factors: age, gender, marital status, height, weight, smoking, alcohol and coffee consumption. There was a section on the occupational profile and activities like standing, bending, transferring and ambulating patients, lifting heavy objects, and a section on LBP history which helped reveal its prevalence and frequency. It also included the short last 7 days self-administered format of the International Physical Activity Questionnaire (IPAQ), used to assess the level of physical activity and sedentary behaviour. It consists of open-ended questions surrounding individuals' last 7-day recall of physical activity [23]. The Perceived Stress Scale (PSS) questionnaire was used for the assessment of psychosocial risk factors. It includes 10 questions about feelings and thoughts during the last month [24]. The Oswetry Disability Index (ODI) was used for the evaluation of disability. It has been widely recognized by researchers for its good internal consistency and test-retest reliability (kappa = 0.9) for the measurement of functional disability [25]. The ODI tool includes 10 questions about everyday activities such as pain severity, self-care, ability to lift weights, walking, sitting, standing, sleeping, social life, travelling, and professional work [25]. This study used a modified version of ODI in which an item related to sex life is replaced by questions on pain intensity. The internal consistency and reliability of this modified version of ODI are well supported by previous researchers [26]. We considered reported weights and heights for the determination of the BMI.

2.5. Data Management and Analysis

The dependent variable was lifetime occurrence of LBP. The independent variables (factors associated with LBP) were: gender, age, marital status, tobacco consumption, presence of chronic disease, family history of LBP, BMI, stress level, sedentary behaviour, job category, department, number of working years, number of daily working hours, number of standing working hours, number of

seating working hours, number of monthly calls, lifting of heavy objects, bending to work, transferring/ambulating of patients. The body mass index (BMI) is calculated as weight in kilograms divided by the square of the height in meters. Continuous variables were presented as means, medians and standard deviations. Categorical variables were expressed as frequencies, proportions and percentages using charts. Chi-square and Fisher's exact tests were used to examine bivariate associations between each factor and back pain. A multivariate logistic regression model was then constructed including factors showing an association with back pain in the bivariate analyses. A p-value of <0.05 was used to define statistical significance. Data were analysed using IBM Statistical Package for Social Sciences (SPSS) Version 26.

2.6. Operational Definition of Terms

Low Back Pain was defined as "pain, muscle tension, or stiffness localized below the costal margin and above the inferior gluteal folds, with or without leg pain (sciatica)" [27]. **Sedentary behaviour**; was considered sedentary in the subjects with a low level of physical activity as determined from the IPAQ. **Lifetime occurrence** was considered as any reported episode of LBP. **The annual occurrence** was considered as any reported episode of LBP over the past 12 months. **Point occurrence** was considered as LBP present at the time of the survey.

3. Results

Participants

Out of the 340 questionnaires distributed, 278 could be retrieved and were properly filled, giving a response rate of 81%. Ten questionnaires were excluded and 268 questionnaires were retained.

Description of the study population

The socio-demographic and work-related data are summarized in Table 1 and Table 2 respectively. The mean age was 40.6 ± 8.4 years and 73.1% (n = 196) of the respondents were females. The largest proportion–39.6% (n = 106), were found in the 40 to 49 years age group. The majority of the participants (158, 59%), were married. Nurses were the most represented professional group with 135 (50.4%) workers, followed by physicians with 46 (17.2%) workers. Seventy-nine workers (29.5%) presented obesity and 118 (44%) were overweight. Most of the study participants (70.9%) had a moderate perceived stress level. The majority–169 (63.1%), of the workers presented a low physical activity level. The medicine and specialities department was the most represented with 80 (29.9%) workers, followed by the surgery department with 40 (14.9%) workers. The mean working experience was 12 years. Most participants were working for more than 8 hours (n = 162; 60.1%), standing for less than 5 hours (n = 152; 56.7%), and seated for less than 5 hours in a day (n = 190; 70.9%). Among the respondents, 84 (31.3%) recognized lifting heavy objects, 188 (70.1%) bending to work, and 85 (31.7%) transferring/ambulating patients.

Table 1. Sociodemographic and lifestyle characteristics of the study population.

Characteristic	Frequency (n)	Percentage (%)
Age range (years)		
20 - 29	26	9.7
30 - 39	93	34.7
40 - 49	106	39.6
50 - 59	41	15.3
60 - 69	2	0.7
Gender		
Male	72	26.9
Female	196	73.1
Marital status		
Single	99	36.9
Married	158	59
Divorced	5	1.9
Widow	6	2.2
Job category		
Physician	46	17.2
Nursing prof.	135	50.4
Dental practitioner	8	3
Pharmacy prof.	9	3.4
Medical imaging prof.	14	5.2
Laboratory prof.	33	12.3
Physiotherapist	5	1.9
Others*	18	6.7
Tobacco		
Yes	2	0.7
No	266	99.3
Chronic disease		
Yes	35	13.1
No	233	86.9
Family history		
Yes	125	46.6
No	143	53.4
BMI		
Underweight	2	0.7
Normal weight	69	25.7
Overweight	118	44

Continued

Obese	79	29.5
Stress level		
Low	51	19
Moderate	190	70.9
High	27	10.1
Physical activity		
Low	169	63
Moderate	69	25.8
High	30	11.2

*Others: Ophthalmology technicians, audiologists, social workers, and clinical psychologists.

Table 2. Work-related characteristics of study population.

Characteristic	Frequency (n)	Percentage (%)
Department*		
Medicine & specialities	80	29.9
Surgery	40	14.9
Laboratory	38	14.2
Maternity	22	8.2
Paediatric	18	6.7
Radiology	16	6
Emergencies	15	5.6
ICU	10	3.7
Pharmacy	9	3.4
Theatre	7	2.6
Working years		
1-12	151	56.3
≥12	117	43.7
Working hours		
≤8	106	39.5
>8	162	60.5
Standing hours		
≤5	152	56.7
>5	116	43.3
Seated hours		
≤5	190	70.9
>5	78	29.1
Monthly calls		
≤4	177	66

Continued

>4	91	34
Lifting		
Yes	84	31.3
No	184	68.7
Bending		
Yes	188	70.1
No	80	29.9
Transferring/ambulating patients		
Yes	85	31.7
No	183	68.3

*n=255; some HCWs didn't belong to any of the studied departments.

Prevalence of low back pain

The prevalences of LBP are summarized in Table 3. One hundred and eighty-one [67.5%; (CI: 61.6 - 73.1)] of the 268 participants have once experienced LBP in their lifetime, 164 [61.2%; (CI: 55.6 - 67.1)] had experienced it in the last 12 months, while 95 [35.7%; (CI: 29.7 - 41.5)] had LBP at the time of the survey. Compared to males, females had higher lifetime prevalence (males 52.8%, females 73%), 12-month prevalence (males 44.4%, females 67.3%) and point prevalence (males 16.7%, females 42.3%) of LBP. The highest lifetime prevalence was among physicians (77.3%), followed by nursing professionals (77.2%), laboratory officers (45.4%), pharmacy professionals (44.4%), physiotherapists (40%) and medical imagery professionals (35.7%). ICU workers had the highest prevalence of LBP (80%), followed by medicine and specialities (78.7%), maternity (77.2%), paediatrics (72%), theatre (71.4%), emergency unit (60%), laboratory (50%) and pharmacy (44.4%).

Factors associated with low back pain

Table 4 and Table 5 present the univariate and Table 6 multivariate analyses for the potential personal and work-related factors of LBP over the lifetime. Participants suffering from the low back pain were more likely to be older (p = 0.009) with the highest percentage of low back pain among the 50 to 59 years age category. Gender was significantly (p = 0.002) associated with the occurrence of low back pain in our study population. Females were more likely to report LBP than males with a proportion of 73%. Marital status showed a significant relationship with low back pain (p = 0.015) with the highest proportion among divorced workers (100%). However, the number of divorced workers was very small (n = 5). A family history of LBP also showed a significant association with LBP (p = 0.006). The stress level was significantly associated with LBP (p = 0.019), with participants presenting moderate to severe stress levels showing the highest proportions of LBP (81.2% and 63.3% respectively). There was a significant association (p = 0.020) between the physical activity level and presence of

Table 3. Lifetime, annual, and point prevalences of low back pain among healthcare workers in the study population.

Low back pain occurrence	Frequency (n)	Percentage (%)	95% CI
Lifetime	181	67.5	61.6 - 73.1
Last 12 months	164	61.2	55.6 - 67.1
Current	95	35.7	29.7 - 41.5

Table 4. Individual factors associated with low back pain.

Independent variable		Back pain lifetime				p-value
		No		Yes		
		n	%	n	%	
Gender	Female	53	27	143	73	**0.002**
	Male	34	47.2	38	52.8	
Age (years)	20 - 29	13	50	13	50	**0.009**
	30 - 39	39	41.9	54	58.1	
	40 - 49	25	23.6	81	76.4	
	50 - 59	9	22	32	78	
	60 - 69	1	50	1	50	
Marital status	Married	43	27.2	115	72.8	**0.015**
	Single	43	43.4	56	56.6	
	Divorced	0	0	5	100	
	Widow	1	16.7	5	83.3	
Tobacco c.	Yes	1	50	1	50	**0.595**
	No	86	32.3	180	67.7	
Chronic disease	Yes	7	20	28	80	**0.091**
	No	80	34.3	153	65.7	
Family history	Yes	30	24	76	95	**0.006**
	No	57	39.9	86	60.1	
BMI	Underweight	0	0	2	100	**0.230**
	Normal weight	27	39.1	42	60.9	
	Overweight	40	33.9	78	66.1	
	Obese	20	25.3	59	74.7	
Stress level	Low	25	49	26	51	**0.019**
	Moderate	55	28.9	135	71.1	
	High	7	25.9	20	74.1	
Physical activity	Low	63	37.3	106	62.7	**0.020**
	Moderate	13	18.8	56	81.2	
	High	11	36.7	19	63.3	

Table 5. Professional factors associated with low back pain.

Independent variable		Back pain lifetime				*p*-value
		No		Yes		
		n	%	n	%	
Category	Physician	10	21.7	36	78.3	**<0.001**
	Nursing prof.	30	22.2	105	77.8	
	Dental practitioner	4	50	4	50	
	Pharmacy prof.	4	44.4	5	55.6	
	Medical imaging prof.	9	64.3	5	35.7	
	Laboratory prof.	18	54.5	15	45.5	
	Physiotherapist	3	60	2	40	
	Others	9	50	9	50	
Department	Medicine & specialities	17	21.3	63	78.8	**0.014**
	Surgery	10	25	30	75	
	Maternity	5	22.7	17	77.3	
	Paediatric	5	27.8	13	72.2	
	Emergency	6	40	9	60	
	ICU	2	20	8	80	
	Theatre	2	28.6	5	71.4	
	Laboratory	19	50	19	50	
	Radiology	5	55.6	5	44.4	
	Pharmacy					
Working years	1~12	59	39.1	92	60.9	**0.009**
	≥12	28	23.9	89	76.1	
Working hours	≤8	48	45.3	58	54.7	**<0.001**
	>8	38	23.6	123	76.4	
Standing working hours	≤5	62	40.8	90	59.2	**0.001**
	>5	24	20.9	91	79.1	
Seated working hours	≤5	61	32.1	129	67.9	0.351
	>5	25	32.5	52	67.5	
Monthly calls	≤4	60	35.5	109	64.5	0.165
	>4	27	27.3	72	72.7	
Lifting heavy objects	Yes	16	19	68	81	**0.002**
	No	71	38.6	113	61.4	
Bending to work	Yes	52	27.7	136	72.3	**0.010**
	No	35	43.8	45	56.3	
Transferring/ambulating patients	Yes	21	24.7	64	75.3	0.065
	No	66	36.1	117	63.9	

Table 6. Regression analysis of predictor variables of reported low back pain.

Variable		OR	95% CI	*p-value*
Age	20 - 29*	Ref		
	30 - 39	1.655	0.50 - 65.411	0.405
	40 - 49	2.303	0.546 - 9.706	0.256
	50 - 59	3.613	0.672 - 19.416	0.134
	60 - 69	0.505	0.018 - 13.854	0.686
Gender	Male*	Ref		
	Female	2.041	0.949 - 4.390	0.068
Marital status	Single*	Ref		
	Married	0.716	0.332 - 1.544	0.394
	Divorced			0.999
	Widow	1.383	0.102 - 18.803	0.808
Family history	No*	Ref		
	Yes	0.703	0.362 - 1.366	0.299
Stress level	Low*	Ref		
	Moderate	**2.091**	1.012 - 4.319	**0.046**
	High	1.000		1.000
Physical activity	Yes*	Ref		
	No	**2.407**	1.200 - 4.830	**0.013**
Category	Others*	Ref		
	Physician	4.791	0.991 - 23.150	2.407
	Nursing prof.	2.623	0.659 - 10.431	0.171
	Dental practitioner	1.869	0.207 - 16.906	0.578
	Pharmacy prof.	3.103	0.207 - 16.906	0.299
	Medical imaging prof.	0.000		0.999
	Laboratory prof.	1.428	0.171 - 11.906	0.742
	Physiotherapist	0.722	0.043 - 2.186	0.821
Department	Pharmacy*	Ref		
	Medicine & specialities	**3.855**	1.035 - 14.359	**0.044**
	Surgery	2.663	0.615 - 11.536	0.190
	Maternity	2.292	0.494 - 10.638	0.289
	Paediatrics			0.999
	Emergency	1.813	0.2440 - 13.446	0.561
	ICU	1.473	0.281 - 7.715	0.647
	Theatre	0.794	0.094 - 6.740	0.833
	Laboratory	2.250	0.289 - 17.517	0.439

Continued

Working years	1 - 12*	Ref		
	≥12	0.940	0.329 - 2.685	0.909
Daily working hours	≤8*	Ref		
	>8	1.437	0.726 - 2.847	0.298
Lifting heavy obj.	No *	Ref		
	Yes	**2.280**	1.051 - 4.947	**0.037**
Bending to work	No*	Ref		
	Yes	**2.233**	1.094 - 4.556	**0.027**

*Reference group, OR: odds ratio, CI: confidence interval.

LBP with the highest prevalence among workers with a moderate physical activity level (81.2%). The professional category demonstrated a significant association with LBP, with working as a physician showing the highest prevalence of low back pain (78.3%) among occupational groups. The department was significantly associated with LBP (p = 0.014), with the highest prevalence among workers of the ICU. The work duration was significantly associated with LBP (p = 0.009) with the highest prevalence among those working for more than 12 years (76.1%). Working more than 8 hours a day ($p < 0.001$) and prolong standing (p = 0.001) were significantly associated with LBP. Bending to work (p = 0.010), lifting heavy objects (p = 0.002), were also significantly associated with LBP. In the multivariate analyses, the stress level was significantly associated with reported LBP, with participants presenting a moderate stress level having more risk of back pain (OR = 2.1; 95% CI: 1.01 - 4.3). Sedentary participants (low level of physical activity) were significantly more at risk of having LBP than physically active workers (OR = 2.4; 95% CI: 1.2 - 4.8). Workers in the medicine and specialities department were at increased risk of reporting LBP (OR = 3.9; 95% CI: 1.04 - 14.4). The multivariate logistic regression model also confirms the risky effect of handling heavy objects (OR = 2.3; 95% CI: 1.1 - 5) and bending to work (OR = 2.2; 95% CI: 1.1 - 4.6) for having LBP.

Functional disability

Out of the 181 participants who had ever suffered from LBP, 119 (65.7%) had a minimal functional disability, 58 (32%) had a moderate disability, and 4 (2.2%) had a severe disability (Table 6). Nursing professionals accounted for the highest proportion of moderate and severe disability with 78.3% and 75% respectively.

4. Discussion

This study is a unique effort in Cameroon and sub-Saharan Africa while focusing on a common but neglected occupational health problem among healthcare providers in a developing country.

Participants

The mean age of our population was 40.4 years ± 8.52. This finding falls in between the observations of Awosan *et al.* [28] and Omokhodion *et al.* [17] both in Nigeria, who had mean ages of 36.99 ± 8.23 and 43.8 ± 7.8 respectively. Citko *et al.* in Poland had a similar mean age of 40.99 ± 6.6 years [29]. The female preponderance (73.1%) in our study agrees with most previous studies [17] [28] [30].

Prevalence

The lifetime prevalence of LBP in our population was 67.5%. Karahan *et al.* [31] observed a similar proportion with a prevalence of 65.8% in a study in six hospitals in four Turkish cities. Bejia *et al.* in Tunisia [32], Ouedraogo *et al.* in Burkina Faso [33] and Awosan *et al.* [28] in Nigeria had lower prevalences of 57.7%, 56.4%, and 56.2% respectively. This prevalence is far below the values reported by Abdulmujeeb *et al.* [34] in Uganda (84%). These divergences can be explained by the heterogeneity of the studied populations but also by the differences in methodology. Administrative staff included in Bejia *et al.* [32] population was not included in our population. Also, the presence of other health professionals with a relatively lower prevalence of LBP in this study may have accounted for the lower prevalence observed as compared to some high-prevalence studies which tend to focus on single occupational groups as nurses who have been observed to have a higher prevalence of LBP than other medical staff [31]. The annual prevalence of 61.2% in our study population was similar to those reported by Karahan *et al.* [31] (61.3%) in Turkey and Behisi *et al.* [35] (61%) in Saudi Arabia. Our study point prevalence was 35.7%, higher than those reported by Awosan *et al.* [28] (17.2%), Abebe *et al.* [36] (28.9%) in Ethiopia and Simsek *et al.* [16] (29.5%) in Turkey. The fact that many of the study participants were only available to answer the questionnaire at the end of the workday and during the shift might have accounted for this higher point prevalence.

Associated factors

Various factors are associated with the occurrence of LBP. In bivariate analyses, older age was observed to be associated with a higher prevalence of low back pain. Individuals whose ages were between 20 to 29 years had a 50% prevalence of low back pain and this was observed to increase to 78% prevalence for those that were aged between 50 to 59 years. In the study conducted by Cunningham *et al.* [14], multivariate analyses showed older age as an independent risk factor for LBP. The association between age and LBP was not confirmed in multivariate analyses, a finding similar to that observed by Behisi *et al* [35] and Alnaami *et al.* [37].

The result of the current study confirms, rather than only in bivariate analyses, the association of gender with the occurrence of LBP, as recognized in reports from various authors [12] [14] [28] [31] [33].

Participants with a low level of physical activity were significantly at higher risk of reporting LBP in our survey. In a study conducted among medical personnel in North-East Poland, Citko *et al.* demonstrated that a sedentary lifestyle increased the chance for the development of recurrent non-specific by over 3.5

times (OR = 3.58; 95% CI: 2.55 - 5.03, $p < 0.001$) [29]. This can be explained by the fact that lack of physical exercise can lead to weakness of the lumbar muscles and lead to the spiral of physical deconditioning [38]. Rezaei *et al.* mentioned that physical activity strengthens the lumbar muscles, maintaining good alignment of the lumbar arch and therefore better tolerance of the physical stresses applied to it by the trunk, as reported by [39]. While this might suggest a direct benefit of regular exercise on the risk of low back pain supported by some authors [32] [37], Citko *et al.* also showed that a high level of activity significantly increased the chances for the occurrence of recurrent and chronic non-specific LBP. These results confirm the hypothesis that a relationship between the level of activity and LBP can be a U-shaped curve; that is, both inactivity and excessive activity (unhealthy activity) cause an increased risk of back pain [38]. In this study, an increased stress level was associated with the occurrence of LBP. It was well demonstrated that an "unsettled" psychological profile is a risk factor for common LBP, especially chronic LBP [11] [32]. These studies included a wide range of psychosocial factors which was not the case in our study. It has been shown that stress increases cortisol secretion. This excess can lead to oxidative stress and damage, cellular lesions caused by free radicals, which lead to muscle tension and spasms that can cause pain. Also, anxiety increases the release of noradrenaline and adrenaline in the blood, which can cause tension and subsequent muscle spasms, which may lead to lower back pain [40].

No significant relationship between BMI and low back pain was identified in this study. Previous studies have suggested that high BMI (>30 BMI) is an independent predictor of the development of low back pain [12] [28] [37]. This quite surprising finding was also reported by Behisi *et al.* [35]. This may be due to relatively equal high prevalences of LBP among underweight/normal weight compared to overweight/obese in our sample. Working in the medicine and specialties department was significantly associated with low back pain in this study. This can be explained by the fact that this was the most represented department in our study, essentially composed of physicians and nurses who showed high frequencies of LBP. Also, in our context, nurses often irrespective of their specialty (e.g. midwives) tend to work over their careers in different hospital departments raising a possible bias. Still, the wide confidence interval requires a cautious interpretation of this result. The present study also revealed significant factors associated with LBP as prolonged standing, daily working hours, bending to work and lifting heavy objects. These findings are supported by Alnaami *et al.* [37] and Omokhodion *et al.* [17] who reported an association between low back pain and prolonged standing. Omokhodion *et al.* and Abebe *et al.* [36] equally described an association with heavy weight lifting. Daily working time was associated with LBP in Aldulmujeeb *et al.* [34] survey. Karahan *et al.* [31] results support bending to lift objects from the floor as a risk factor for LBP in hospital staff. While Abebe *et al.* [36] in Ethiopia found an association between prolonged sitting and LBP, this was not the case in our survey. Only bending to work and the handling of heavy objects were identified as predictors of LBP in

the multivariate analyses. The majority (65.7%) of all healthcare providers who have ever experienced LBP had a minimum functional disability and were able to perform their routine activities as required. However, 34.3% of all healthcare providers were suffering from moderate to severe functional disability which was affecting their day-to-day activities including social as well as work-related activities. The rate of moderate to severe disability in our survey was higher than the rate observed in Karachi tertiary care Public Hospital which was 27.4% [30]. This highlights the actual burden of physical and social suffering among healthcare providers in two hospitals among the biggest and busiest in Yaounde. The LBP-related functional disability might be affecting the service delivery quality and healthcare provider's motivation towards work. The study carried out on rehabilitation professionals in Saudi Arabia repported limitations in 1 or more of the following activities of daily living: sleeping, getting out of bed, standing up, walking, sitting, climbing stairs, travel, employment and personal care [41]. In his article, Minematsu reported the education and training of healthcare staff on using body mechanics, taking proper ways of care, LBP exercise, using LBP supporter, improvement of muscle flexibility and power, taking care in a pair, learning care knowledge and skills as strategies for preventing back pain in carers [42].

5. Limitations

This study has a few limitations. First, this was a cross-sectional survey with an inherent risk of coincidence findings hence results should be interpreted with caution. Causal associations between LBP and individual/lifestyle and professional factors were not guaranteed. Secondly, the study included two hospitals of secondary and tertiary care levels. Our sample was not representative of all healthcare workers in these settings, thus the study might have been subject to selection bias. However, while the numbers are not representative, they provide baseline and important results that show that problems do occur in this population, which warrant further investigation. A larger sample size with the involvement of primary care hospitals may be required to attain more comprehensive and generalizable results. Thirdly, the lifetime occurrence of LBP was the independent variable in this survey. Studies suggest that 1-year prevalence may provide a more precise figure of prevalence, as the recall bias of studied persons is reduced [43]. Moreover, the information regarding complaints of LBP, work-related ergonomic exposures and anthropometrics were self-reported and might be directed by a recall bias as well as a volunteer bias. Furthermore, this study might have underestimated the actual frequency of functional disability due to LBP as those who had a crippling disability and could not continue their job were naturally excluded from the survey.

Declarations

Ethical statement: This work was approved by the ethical committee of the University of Bamenda. Administrative clearance was obtained from the respective

hospital administrations. All participants signed the informed consent form. We carriedout this work in accordance with the declarations of Helsinki. We report this work following the STROBE checklist.

Consent for publication: Not applicable.

Availability of data and material: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interest: None to declare.

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Authors' contribution: Conception and design: MNS, CT, AMJ, GB, FTB. Data collection: GB, AMJ. Data analysis: GB, AMJ. Data interpretation: CT, MNS. Drafting of the manuscript: GB, AMJ, FTB. Review of the manuscript: MNS, CT. All authors approved the final version for publication.

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List of Abbreviations

LBP: Low Back Pain.

HCWs: Health Care Workers.

YLDs: Years-Lived Disabilities.

IPAQ: International Physical Activity Questionnaire.

PSS: Perceived Stress Scale.

ODI: Oswetry Disability Index.

BMI: Body Mass Index.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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