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Rate of Occurrence and Risk Factors of Low Back Pain Among the Allied Health Care Professionals Working in Different Departments of Bangabandhu Sheikh Mujib Medical University

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ABSTRACT

Objective*:* To determine the prevalence and risk factors of low back pain (LBP) among allied healthcare professionals working in various departments at Bangabandhu Sheikh Mujib Medical University (BSMMU). ***Methods****:* A cross-sectional study was conducted from January 1, 2017, to February 28, 2018, involving 90 medical technologists and physiotherapists. Participants were selected through purposive sampling. Data were collected using a structured questionnaire covering personal data and work-related risk factors. Statistical analyses were performed using SPSS version 21, including bivariate analysis and binary logistic regression to identify significant risk factors. ***Results****:* The prevalence of LBP in the past year was 52.22%, with 57.78% experiencing LBP at the time of the study. No significant associations were found between LBP and age, sex, or BMI. Significant risk factors for LBP identified were perceived work stress (OR=7.378, p=0.023), lifting heavy objects (OR=17.14, p=0.001), and sitting for more than 4 hours daily (OR=14.41, p=0.001). Regular exercise was found to be a protective factor (OR=0.021, p<0.001). The study highlighted the high prevalence of LBP and its association with occupational and lifestyle factors among healthcare professionals. ***Conclusion****:* LBP is highly prevalent among allied healthcare professionals at BSMMU. Significant risk factors include work-related stress, heavy lifting, and prolonged sitting, while regular exercise serves as a protective factor. Interventions focusing on ergonomic practices, promoting physical activity, and managing work-related stress are essential to reduce the burden of LBP in this population. Further research should explore longitudinal impacts and intervention effectiveness to enhance healthcare workers' well-being and productivity

Keywords: Low back pain, healthcare professionals, occupational health, ergonomic practices, physical activity.

INTRODUCTION

Low back pain (LBP) is a pervasive global issue, with a lifetime prevalence estimated at 84% [1]. LBP, originating from muscles, nerves, bones, or joints in the spine, is often referred to as lumbago or lumbosacral pain, occurring below the 12th rib and above the gluteal fold [2]. It is a significant concern in the industrial world, affecting nearly 80% of the active population at some point in their lives, thereby greatly impacting their quality of life and physical

activities [3, 4]. LBP predominantly affects individuals aged 25 to 50 [5]. The financial burden of LBP is substantial, encompassing direct healthcare costs, productivity losses, and administrative expenses. For instance, in 1998, the direct healthcare cost for back pain in the USA was estimated at $90.7 billion [6], while in the UK, LBP accounted for £11 billion in direct and indirect costs in 2000 [7]. In Australia, the combined direct and indirect costs were $9.17 billion in 2001 [8], and in the Netherlands, the cost was 1.7% of the gross national product [9]. Thus, LBP imposes a heavy burden on health systems worldwide, affecting both developed and developing countries [10]. In Bangladesh, the Community Oriented Program for the Control of Rheumatic Disease (COPCORD) study highlights a higher prevalence of LBP among all musculoskeletal problems, with rates of 20.1% in rural areas, 18.1% in urban slums, and 18.4% in urban affluent areas [11].

LBP is particularly disabling in the workplace, with various studies indicating differing prevalence rates among hospital staff [12]. For example, a study in Bangladesh among dentists found a prevalence of LBP at 37.5% [13]. Nurses in Hong Kong report a lifetime prevalence of 80.9% [14]. Physiotherapists show a prevalence of 72.7%, technicians 69.6%, and other healthcare aides 53.5% [15]. Several occupational factors contribute to LBP, including prolonged sitting or standing, heavy lifting, and poor ergonomics. Personal factors like age, obesity, smoking, and stress also significantly influence the prevalence of LBP [16-18]. The increase in healthcare professionals in Bangladesh underscores the importance of identifying LBP risk factors among them. This study aims to determine the rate of occurrence and risk factors of LBP among allied healthcare professionals, such as medical technologists and physiotherapists, at Bangabandhu Sheikh Mujib Medical University (BSMMU). The findings will aid in formulating preventive measures and lifestyle modifications, ultimately benefiting the community and the country. Identifying these factors will help reduce LBP incidence, treatment costs, absenteeism, and associated physical and psychological stress, thus enhancing productivity and quality of care.

This study will provide valuable insights into the prevalence and risk factors of LBP among AHCPs at BSMMU, helping to mitigate this prevalent issue and improve overall healthcare productivity and quality.

OBJECTIVE

The objective of this study was to determine the prevalence and risk factors of low back pain (LBP) among allied healthcare professionals working in various departments at Bangabandhu Sheikh Mujib Medical University (BSMMU).

METHODOLOGY & MATERIALS

This cross-sectional study was conducted at Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from 01 January 2017 to 28 February 2018, across several departments, including Biochemistry, Cardiology, Dentistry, Hematology, Microbiology, Pathology, Physical Medicine and Rehabilitation, Radiology and Imaging, Transfusion Medicine, and Virology. The study targeted medical technologists and physiotherapists working in these departments. Participants were selected through purposive sampling, meeting inclusion criteria of being aged 25-59 years, having LBP, and being able to participate.

Data collection

Data were collected using a structured, interviewer-administered questionnaire, covering personal data and work-related risk factors. Measurements of weight and height were taken using a weighing scale and measuring tape. Key variables included age, gender, BMI, smoking status, exercise habits, presence of LBP, hours spent sitting and standing, heavy weight lifting, sick leave, and LBP management. The questionnaire was validated for reliability. Data entry was performed using Epi Info 2000, with logical and random checks for accuracy.

Ethical consideration

Ethical considerations involved obtaining informed, voluntary written consent in the local language, ensuring privacy, anonymity, and confidentiality. Participants were informed of their right to withdraw at any time. The study adhered to the Helsinki Declaration, with ethical clearance from the IRB of BSMMU. The protocol was reviewed and approved by the Department of Physical Medicine and Rehabilitation's academic committee. LBP was defined as pain between the inferior margin of the 12th rib and the inferior gluteal folds [19]. Allied health professionals included those in various health-related services such as diagnostics, rehabilitation, and system management, encompassing dental hygienists, medical technologists, occupational and physical therapists, x-ray technologists, and others.

Statistical analysis of data

Statistical analysis was conducted using SPSS version 21. Descriptive statistics summarized numerical variables as means and standard deviations, and categorical variables as percentages. Bivariate analysis employed chi-

square tests, and multivariate analysis used a binary logistic regression model to calculate odds ratios (ORs) for association strength.

RESULTS

Table 1: Distribution of baseline characteristics among participants (N=90)

Baseline characteristics		Respondents	Percentage (%)
Age (years)	<30	35	38.89
	31-40	44	48.89
	41-50	4	4.44
	51-59	7	7.78
Mean (±SD)		34.68±8.17)	
Sex	Male	58	64.44
	Female	32	35.56
BMI (kg/m2)	Underweight (<18.4 kg/m2)	2	2.22
	Normal weight (18.5-22.9kg/m2)	29	32.22
	Overweight (23.0-27.4kg/m2)	35	38.89
	Obese (> 27.5kg/m2)	24	26.67
Mean(±SD)		25.8±4.77	
Type of Occupation	Physiotherapist	10	11.11
	Medical technologist	80	88.89
Working hours	6-8 hours	80	88.89
	8 -10hours	10	11.11
Employment duration (in years)	≤10	60	66.67
	20-Nov	27	30
	>20	3	3.33
Features of Low back pain	Experience low back pain in past year	47	52.22
	Consult with doctors for low back pain	26	28.89
	Sick leave due to low back pain	45	50

The study included 90 participants with a mean age of 34.68±8.17 years. The age distribution showed that 38.89% were under 30 years, 48.89% were between 31-40 years, 4.44% were between 41-50 years, and 7.78% were between 51-59 years. Males comprised 64.44% of the participants, while females made up 35.56%. Regarding BMI, 2.22% were underweight, 32.22% had normal weight, 38.89% were overweight, and 26.67% were obese, with a mean BMI of 25.8±4.77 kg/m². Occupation-wise, 11.11% were physiotherapists, and 88.89% were medical technologists. Most participants (88.89%) worked 6-8 hours daily, while 11.11% worked 8-10 hours. The majority (66.67%) had an employment duration of ≤10 years, 30.00% had 11-20 years, and 3.33% had over 20 years (Table 1).

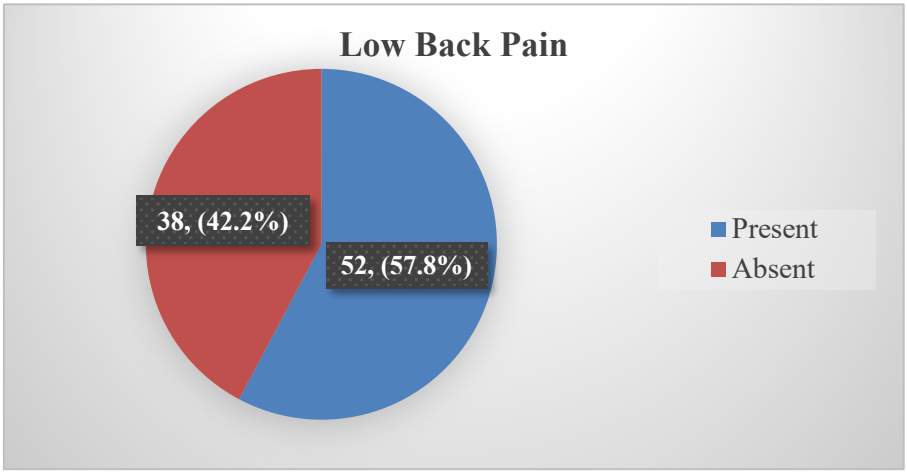

Figure 1: Distribution of participants by presence of low back pain at time of study (N=90)

In terms of low back pain (LBP), 52.22% experienced LBP in the past year, 28.89% consulted doctors for LBP, and 50.00% took sick leave due to LBP. At the time of the study, 57.78% of participants had LBP, while 42.22% did not (Figure 1).

Table 2: Distribution of study participants by lifestyle habits and factors (N=90)

Variables		Respondents	Percentage (%)
Smoking status	Never smoked	73	81.11
	Stopped smoking in the past	1	1.11
	Less than 10 PY (pack year)	13	14.44
	10-20 PY (pack year)	3	3.33
Exercise status per week	5 to 6 times	45	50
	3 to 4 times	4	4.44
	1 to 2 times	9	10
	No exercise	32	35.56
Daily time spend standing at work (hour)	0-1	39	43.33
	4-Feb	38	42.22
	6-May	9	10
	>6	4	4.44
Daily time spend sitting (hour)	0-1	1	1.11
	4-Feb	44	48.89
	6-May	37	41.11
	>6	6	6.67
Heavy weight lifting (Patients/Equipment)	Yes	36	40
	No	54	60

Regarding lifestyle habits, 81.11% never smoked, 1.11% had stopped smoking, 14.44% smoked less than 10 pack years (PY), and 3.33% smoked 10-20 PY. Exercise habits varied, with 50.00% exercising 5-6 times per week, 4.44% 3-4 times, 10.00% 1-2 times, and 35.56% not exercising at all. Daily time spent standing at work was 0-1 hour for 43.33%, 2-4 hours for 42.22%, 5-6 hours for 10.00%, and more than 6 hours for 4.44%. Daily time spent sitting was 0-1 hour for 1.11%, 2-4 hours for 48.89%, 5-6 hours for 41.11%, and more than 6 hours for 6.67%. Additionally, 40.00% reported lifting heavy weights (patients/equipment), while 60.00% did not (Table 2).

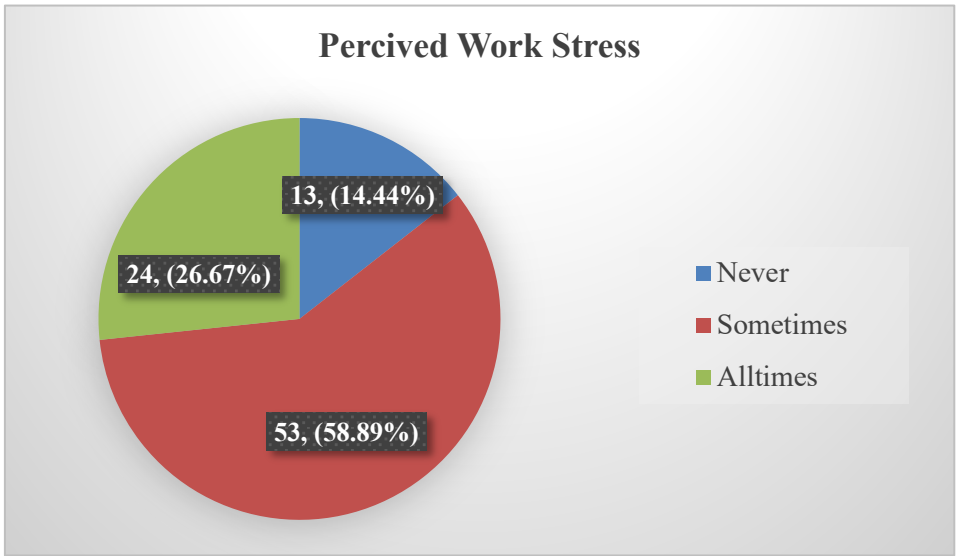

Figure 2: Distribution of perceived work stress among the participants (N=90)

Perceived work stress among participants showed that 14.44% never felt stressed, 58.89% sometimes felt stressed, and 26.67% felt stressed all the time (Figure 2).

Table 3: Association between socio-demographic characteristics and rate of low back pain (N=90)

Sociodemographic characteristics		Low Back pain (n=52)		No low Back pain (n=38)		p-value
		n	%	n	%	
Age (years)	<30	24	46.15	11	28.95	0.984
	31-40	20	38.46	24	63.16	
	41-50	3	5.77	1	2.63	
	51-59	5	9.62	2	5.26	
Mean (±SD)		34.69±9.04		34.66±6.63		
Sex	Male	33	63.46	25	65.79	0.82
	Female	19	36.54	13	34.21	
BMI (kg/m2)	Underweight (<18.4 kg/m2)	1	1.92	1	2.63	0.566
	Normal weight (18.5-22.9kg/m2)	14	26.92	15	39.47	
	Overweight (23.0-27.4kg/m2)	23	44.23	12	31.58	
	Obese (> 27.5kg/m2)	14	26.92	10	26.32	
Type of Occupation	Physiotherapist	5	9.62	5	13.16	0.597
	Medical technologist	51	98.08	29	76.32	

The association between socio-demographic characteristics and the rate of LBP was analyzed. Among participants aged less than 30 years, 46.15% experienced LBP compared to 28.95% who did not, but the difference was not statistically significant (p=0.984). Similarly, no significant association was found with age, sex, or BMI. For BMI, 44.23% of overweight participants experienced LBP, compared to 31.58% who did not (p=0.566). Regarding occupation, 9.62% of physiotherapists and 98.08% of medical technologists experienced LBP, compared to 13.16% and 76.32% respectively, who did not (p=0.597) (Table 3).

Table 4: Association between lifestyle habits and factors and rate of low back pain (N=90)

Variables		Low Back pain (n=52)		No low Back pain (n=38)		p-value
		n	%	n	%	
Smoking status	Never smoked	44	84.62	29	76.32	0.391
	Stopped smoking in the past	1	1.92	0	0	
	Less than 10 PY (pack year)	5	9.62	8	21.05	
	10-20 PY (pack year)	2	3.85	1	2.63	
Exercising Habit	Yes	23	44.23	35	92.11	<0.001
	No	29	55.77	3	7.89	
Daily time spend standing at work (hour)	0-1	20	38.46	19	50	0.679
	4-Feb	24	46.15	14	36.84	
	6-May	6	11.54	3	7.89	
	>6	2	3.85	2	5.26	
Daily time spend sitting (hour)	0-1	0	0	1	2.63	<0.001
	4-Feb	15	28.85	29	76.32	
	6-May	30	57.69	7	18.42	
	>6	7	13.46	1	2.63	
Heavy weight lifting (Patients/Equipment)	Yes	31	59.62	5	13.16	<0.001
	No	21	40.38	33	86.84	
Perceived Work Stress	Never	1	1.92	12	31.58	<0.001
	Sometimes	31	59.62	22	57.89	
	All the time	20	38.46	4	10.53	

Lifestyle habits and factors showed significant associations with the rate of LBP. Participants who exercised regularly had a lower prevalence of LBP (44.23%) compared to those who did not exercise (55.77%), with a p-

value of <0.001. Smoking status was not significantly associated with LBP (p=0.391). Daily time spent standing and sitting were significantly associated with LBP. Those who spent 5-6 hours sitting had a higher prevalence of LBP (57.69%) compared to those who sat 2-4 hours (28.85%) or more than 6 hours (13.46%), with a p-value of <0.001. Additionally, lifting heavy weights was significantly associated with a higher prevalence of LBP (59.62%) compared to those who did not lift heavy weights (13.16%), with a p-value of <0.001. Perceived work stress also showed a significant association, with participants who felt stressed all the time having a higher prevalence of LBP (38.46%) compared to those who never felt stressed (1.92%) or sometimes felt stressed (59.62%), with a p-value of <0.001 (Table 4).

Table 5: Risk assessment of low back pain by using binary logistic regression (N=90)

Covariates	OR	p value	95% C.I. for EXP (B)	
			Lower	Upper
Perceived work stress	7.378	0.023	1.323	45.24
Lift heavy object	17.14	0.001	3.389	86.745
Doing exercise	0.021	<.001	0.003	0.135
Sitting >4 hour	14.41	0.001	3.04	68.39

Risk assessment using binary logistic regression identified several significant factors associated with LBP. Perceived work stress had an odds ratio (OR) of 7.378 (p=0.023), indicating a strong association with LBP. Lifting heavy objects had an OR of 17.14 (p=0.001), showing a significant risk factor. Conversely, regular exercise was protective against LBP, with an OR of 0.021 (p<0.001). Sitting for more than 4 hours daily was also a significant risk factor, with an OR of 14.41 (p=0.001) (Table 5).

DISCUSSION

The prevalence of low back pain (LBP) among allied healthcare professionals at Bangabandhu Sheikh Mujib Medical University (BSMMU) was found to be significant, with 52.22% experiencing LBP in the past year and 57.78% reporting LBP at the time of the study. This aligns with the findings from similar studies, such as those conducted among hospital staff in Turkey, where 65.8% of respondents reported experiencing LBP [20]. In terms of age distribution, the mean age of participants in this study was 34.68 years, which is comparable to the mean age of 36.59 years found in a Nigerian study among healthcare workers [21]. However, unlike some studies that have shown a significant association between age and LBP, our study did not find such an association (p=0.984). This discrepancy could be due to the relatively narrow age range of our study population or other unmeasured confounding factors. Gender distribution in our study showed a predominance of males (64.44%), which contrasts with many studies where females typically report higher prevalence rates of LBP [22]. Despite this, we did not find a significant association between gender and LBP (p=0.82), which is consistent with the findings from a study among Finnish industrial workers that also reported no significant gender difference in LBP prevalence [23]. Body mass index (BMI) was another factor examined, with 38.89% of participants being overweight and 26.67% obese. Similar to our findings, a study conducted in Southern China found a high prevalence of LBP among individuals with higher BMI [24]. However, our study did not find a significant association between BMI and LBP (p=0.566), which may be due to the relatively small sample size or other lifestyle factors that were not controlled for. Occupational roles showed no significant association with LBP in our study (p=0.597), although other studies, such as one among healthcare workers in Malaysia, have found certain occupations to be at higher risk [25]. This suggests that factors other than the type of occupation, such as specific job tasks and individual work practices, might play a more critical role in the development of LBP. Regular exercise was found to be protective against LBP in our study (p<0.001), with those engaging in physical activity reporting lower prevalence rates. This finding is supported by a study conducted among nursing personnel, which also highlighted the protective effect of regular exercise against LBP [26]. Conversely, a lack of physical activity has been consistently identified as a risk factor for LBP in multiple studies [27]. Work posture and duration of sitting were significant predictors of LBP in our study. Sitting for more than 4 hours daily was significantly associated with higher LBP prevalence (p<0.001). This is consistent with findings from a prospective cohort study that identified prolonged sitting as a risk factor for LBP [28]. Similarly, lifting heavy objects was another significant risk factor (p<0.001), which aligns with findings from studies conducted among healthcare workers and other occupational groups [29]. Perceived work stress emerged as a significant predictor of LBP in our study (OR=7.378, p=0.023). This is corroborated by a study among high school teachers in Ethiopia, which found a strong association between psychological job demands and LBP [30]. The impact of work stress on musculoskeletal disorders has been well-documented, emphasizing the need for workplace interventions that address both physical and psychosocial factors [31].

In summary, the findings of our study highlight the multifactorial nature of LBP among allied healthcare professionals. The significant associations with factors such as work posture, heavy lifting, exercise habits, and perceived work stress underscore the importance of comprehensive workplace health programs. These programs

should focus on ergonomic interventions, promoting physical activity, and managing work-related stress to effectively reduce the burden of LBP in this population.

CONCLUSION

The findings of this study underscore the significant prevalence of low back pain (LBP) among allied healthcare professionals at Bangabandhu Sheikh Mujib Medical University (BSMMU). The study revealed that over half of the participants experienced LBP within the past year, with a significant portion reporting ongoing pain at the time of the study. Key risk factors identified through binary logistic regression analysis included perceived work stress, heavy lifting, and prolonged sitting, while regular exercise emerged as a protective factor against LBP. Despite the lack of significant associations between LBP and demographic factors such as age, sex, and BMI, the occupational and lifestyle factors highlighted in this study emphasize the importance of targeted interventions. Implementing ergonomic work practices, promoting regular physical activity, and addressing work-related stress are crucial steps towards mitigating the burden of LBP among healthcare professionals.

Limitations of the study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

Recommendations

Future research should focus on longitudinal studies to better understand the causal relationships and effectiveness of intervention strategies. Additionally, expanding the scope to include other healthcare settings and a broader range of occupations could provide more comprehensive insights into the multifaceted nature of LBP in the healthcare industry. By addressing these risk factors and promoting healthy work environments, healthcare institutions can enhance the well-being of their staff, reduce absenteeism, and ultimately improve the quality of care provided to patients. This study contributes valuable data to the existing literature and highlights the urgent need for preventive measures to combat LBP among healthcare workers.

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