

Original Article

Low back pain in medical workers and its influencing factors

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Abstract: Purpose: To investigate the prevalence of occupational lower back pain (OLBP) among medical workers and identify the contributing factors. Methods: An electronic questionnaire was distributed to medical workers at Yuebei People's Hospital to gather information on various factors, including gender, age, body mass index (BMI), length of employment, job role, education level, professional title, marital status, fertility status, frequency of night shift, weight lifting daily, duration of daily standing at work, frequency of bending, work-related stress, experience with low back protection training, and frequency of waist exercises. Univariate and multivariate logistic regression analyses were conducted to identify the factors associated with OLBP in medical workers. Results: Out of the 98 medical workers surveyed, 67 experienced OLBP (68.37%). The results of multivariate logistic regression analysis revealed that working for more than 5 years, holding a nursing position, and lacking training in low back protection were significant risk factors for developing OLBP in medical workers (all $P < 0.05$). Conclusion: OLBP is a prevalent issue among medical workers, and various factors such as length of employment, job role, and training in low back protection can influence its occurrence.

Keywords: Medical workers, low back pain, investigation of the current status, multi-factor analysis

Introduction

In this fast-paced and ever-evolving society, low back pain (LBP) has emerged as a prevalent ailment that greatly affects individuals' work and personal lives [1, 2]. The World Health Organization recognizes LBP as a collection of syndromes wherein low back pain or sciatica are primary clinical manifestations. Research indicates that individuals have an 84% likelihood of experiencing LBP at some point in their lives, with the highest prevalence observed at ages of 40-69 years [3, 4]. However, recent epidemiological studies suggest a growing trend of LBP among younger people [5, 6]. Occupational low back pain (OLBP) characterized by pain between the 11th and 12th thoracic vertebrae and buttocks, as well as limited mobility resulting from work-related factors, significantly impacts an individual's work performance and can even lead to work incapacity in severe cases. OLBP is particularly prevalent among medical professionals, office workers, farmers, and individuals engaged in occupa-

tions that entail prolonged periods of sitting, standing, or heavy lifting [7-9].

In recent years, there has been a surge in hospital visits due to improvement in medical services, patients' self-care awareness and living standards. Amidst this influx, medical workers find themselves consistently occupied and under significant pressure, evident in the demanding nature of their responsibilities such as prolonged surgeries, patient transfers, and instrument lifting [10]. All these undoubtedly contribute to the occurrence of OLBP among medical staff to some extent. The impact of OLBP on the quality of life and work of medical professionals is profound, with far-reaching consequences extending to societal burdens [11, 12]. Thus, it is imperative for both medical workers and healthcare institutions to prioritize addressing OLBP. It is crucial to investigate the current status of OLBP among medical workers and analyze the factors that influence its occurrence.

Low back pain in medical workers

While there exist studies on OLBP among medical workers, previous studies have only focused on nursing workers, and few have included doctors, pharmacists, or other technicians [13]. Therefore, conducting a more comprehensive analysis of the current status of OLBP and its related influencing factors among medical workers would have theoretical value and significance. This study aims to address this gap by delving into the actual working conditions of medical workers affected by OLBP and by exploring strategies to mitigate its impact through an in-depth analysis of contributing factors.

Subjects and methods of research

Research subjects

This study collected data from medical staff at Yuebei People's Hospital during September 2022 to September 2023 for the analysis. Inclusion criteria for research subjects were as follows: (1) Holding vocational qualification and being registered for practice; (2) Doctors, care workers, medical technicians, or pharmacists at the hospital; (3) No history of low back traumas. The exclusion criteria were as follows: (1) Experiencing low back pain due to menstruation or pregnancy; (2) Having low back pain caused by tumors, tuberculosis, or ankylosing spondylitis; (3) Being absent for study or vacation during the data collection period; (4) Being retired or re-employed after retirement. This study was approved by the Ethics Committee of Yuebei People's Hospital.

Data collection

We utilized an electronic questionnaire for information surveying, comprising two parts: assessment of OLBP prevalence, and collection of general information. For the assessment of OLBP prevalence among medical workers, we employed the Oswestry Disability Index (ODI) questionnaire [14]. The ODI questionnaire evaluated various aspects of low back pain, including pain level, ability to perform daily activities, mobility, and engagement in social and sexual activities. Each dimension of the ODI questionnaire was scored on a 6-point scale, ranging from 0 (no pain) to 5 (extremely painful). The score was calculated as (actual

score/50) × 100%. In this study, a score greater than 60 indicated the presence of OLBP, with higher scores indicating more severe low back pain. The Cronbach's α of ODI was 0.78.

For the collection of general information, the following aspects were collected: gender, age, body mass index (BMI), years of employment, positions, education, title, marital status, fertility status, frequency of night shift, weight lifted per instance (>10 kg), daily standing hours at work (>5 h), frequency of bending (>10 times), working pressure, experience with low back protection training, and frequency of waist exercise.

Survey methods

Using our hospital's staff information inquiry system, three trained investigators initially screened the research subjects who met the inclusion and exclusion criteria. They then contacted these individuals by telephone to inform them about the purpose and process of the study. Finally, an electronic questionnaire was distributed through WeChat to the medical workers who voluntarily participated in the study. A total of 120 questionnaires were distributed, out of which 111 were collected. Thirteen questionnaires were deemed invalid due to incomplete information or identical options and were excluded through manual screening. Ultimately, 98 valid questionnaires were obtained, resulting in a questionnaire recovery rate of 92.50% and an effective questionnaire rate of 88.29%.

Statistical analysis

The SPSS 25.0 statistics software was used for data analysis. The measured data were analyzed for normality. Those showing a normal distribution were expressed as mean \pm standard deviation, and the t-test was used for group comparisons. Data not conforming to a normal distribution were expressed as median and interquartile range, and the rank sum test was used for group comparisons. Categorical data were expressed as frequency and percentage, and the comparison of groups was analyzed by chi-square test. Multivariate logistic regression analysis was used to explore the factors affecting the occurrence of OLBP in medical workers, and the specific influence of

Low back pain in medical workers

Table 1. General characteristics of respondents

Characteristic	Number	Percentage (%)
Gender		
Male	59	60.20
Female	39	39.80
Years of employment		
>5	74	75.51
≤5	24	24.49
Job role		
Medical	31	31.63
Medical technology	16	16.33
Nursing	51	52.04
Education background		
Bachelor's degree or higher	76	77.55
Associate degree	22	22.45
Profession title		
Intermediate or senior	61	62.24
Junior	37	37.76
Marital status		
Married	46	46.94
Unmarried	52	53.06
Fertility status		
Already had children	36	36.73
Haven't had children	62	63.27
Frequency of night shifts (times/month)		
>4	29	29.59
≤4	69	70.41
Weight lifted daily >10 kg		
Yes	57	58.16
No	41	41.84
Daily standing hours at work >5 h		
Yes	71	72.45
No	27	27.55
Daily frequency of bending >10		
Yes	86	87.76
No	12	12.24
Working pressure		
Very stressful	63	64.29
Moderately stressful or less stressful	35	35.71
Training in lower back protection		
No	44	44.90
Yes	54	55.10
Frequency of waist exercises (times/month)		
≤4	23	23.47
>4	75	76.53

$P < 0.05$ was considered a statistical difference.

Result

Status of low back pain in medical workers

In this study, there were 59 male respondents and 39 female respondents, accounting for 60.2% and 39.8% respectively. In terms of job role, there were 31 medical workers (31.63%), 16 medico-technical workers (16.33%), and 51 nursing workers (52.04%). As for their professional titles, 37 held junior titles (37.76%), while 61 held intermediate or senior titles (62.24%). The details are listed in **Table 1**. Additionally, the ages of the respondents ranged from 20 to 42 years old, and the specific distribution is shown in **Figure 1**. BMI ranged from 22.32 to 26.87 kg/m² (**Figure 2**). Among the 98 medical workers, 68.37% of them were experiencing OLBP (**Figure 3**).

Univariate analysis of the occurrence of OLBP in medical workers

Results from univariate analysis showed that factors such as BMI, years of employment, job role, frequency of night shift, daily standing hours at work, and training in low back protection were significantly different between medical workers with and without OLBP (**Table 2**).

Multivariate analysis

The indicators with significant differences in the univariate analysis were used as independent variables, while the occurrence of OLBP among medical workers was used as the dependent variable. A multivariate logistic regression analysis was conducted, with the assignment of each variable shown in **Table 3**.

each factor on the occurrence of OLBP was determined according to the odds ratio (OR).

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Low back pain in medical workers

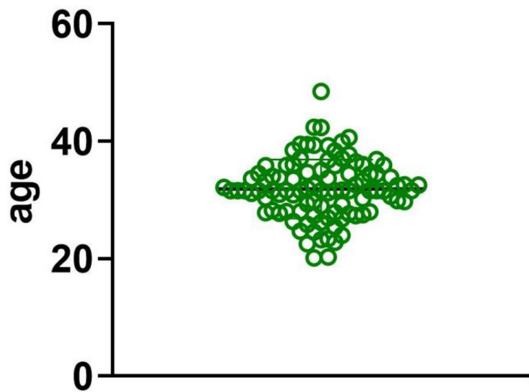
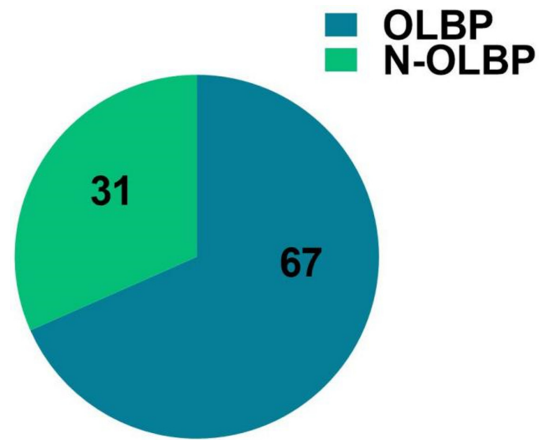


Figure 1. Age distribution of respondents.



Total = 98

Figure 3. Prevalence of OLBP in respondents.

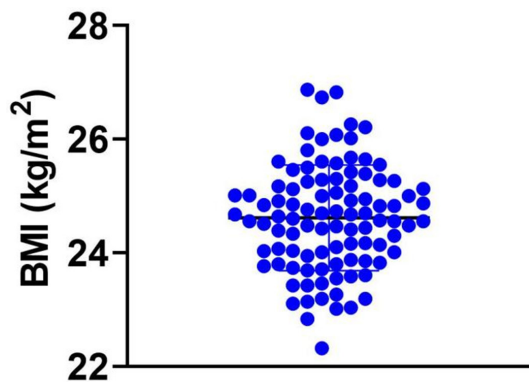


Figure 2. BMI distribution of respondents.

The Results indicated that employment for over 5 years, holding a nursing position and lack of training in low back protection were risk factors for OLBP in medical workers (all $P < 0.05$, see Table 4).

Discussion

Occupational low back pain (OLBP) is a significant health concern for medical workers. In a specialized survey conducted by Alshahrani [15], it was shown that over 74% of nursing workers experienced some level of low back pain (LBP). Alshahrani called for relevant departments to develop policies for intervention. Yokota [16] conducted a large sample study and found that the prevalence of OLBP among nursing workers was 64.6%, with most cases being acute OLBP, significantly affecting their work quality. Gilchrist [17] investigated the prevalence of LBP among 569 nursing workers and found that 84.7% of respondents experienced LBP. In our study, 98 medical workers

from our hospital participated in the questionnaire, revealing that 68.37% of medical workers reported experiencing OLBP. This percentage was slightly higher than Yokota's survey results but lower than the results of Alshahrani and Gilchrist. Despite variations in results, our study underscores the persistent high prevalence of OLBP among medical workers. This suggests that both medical workers and hospital administrators should pay more attention to this issue. Discrepancies in findings may be attributed to factors such as the grade and type of hospital, as well as racial differences among the study subjects.

Following multivariate analysis, this study concluded that the occurrence of OLBP among medical workers is influenced by their job role, years of employment and participation in training. Nursing workers were found to have the highest risk of OLBP, followed by medico-technical workers. Nursing roles entail a wide range of duties, including manual patient handling, assisting with daily patient care, performing medical procedures like venous transfusion, collecting arteriovenous blood samples, suctioning sputum, and other activities that involve frequent bending, which increases the risk of OLBP in nursing staffs compared to workers in other positions [18-20]. Medical workers with more than 5 years of experience are four times more likely to develop OLBP than those with less than five years of experience. Long-term and repetitive lifting of heavy objects can lead

Low back pain in medical workers

Table 2. Univariate analysis of the occurrence of OLBP in medical workers

Factor	OLBP Group (n = 67)	N-OLBP Group (n = 31)	χ^2/t	P
Gender			3.016	0.082
Male	38 (64.41)	21 (35.59)		
Female	29 (74.36)	10 (25.64)		
Age (years old)	31.56±5.16	32.17±5.73	0.460	0.646
BMI (kg/m ²)	24.83±0.97	24.16±0.63	2.969	0.004
Years of employment			10.478	0.001
>5	57 (77.03)	17 (22.97)		
≤5	10 (41.46)	14 (58.33)		
Job role			10.590	0.005
Medical	15 (48.39)	16 (51.61)		
Medical technology	10 (62.50)	6 (37.50)		
Nursing	42 (82.35)	9 (17.65)		
Education background			1.040	0.308
Bachelor's degree or higher level	50 (65.79)	26 (34.21)		
Associate degree	17 (77.27)	5 (22.73)		
Profession title			2.181	0.140
Intermediate or senior	45 (73.77)	16 (26.23)		
Junior	22 (59.46)	15 (40.54)		
Marital status			0.456	0.500
Married	33 (71.74)	13 (28.26)		
Unmarried	34 (65.38)	18 (34.62)		
Fertility status			2.330	0.127
Already had children	28 (77.78)	8 (22.22)		
Haven't had children	39 (62.90)	23 (37.10)		
Frequency of night shift (times/month)			3.944	0.047
>4	24 (82.76)	5 (17.24)		
≤4	43 (62.32)	26 (37.68)		
Weight lifted daily >10 kg			1.064	0.302
Yes	41 (71.93)	16 (28.07)		
No	26 (63.41)	15 (36.59)		
Daily standing hours at work >5 h			4.700	0.030
Yes	53 (74.65)	18 (25.35)		
No	14 (51.85)	13 (48.15)		
Daily frequency of bending >10			0.637	0.425
Yes	60 (69.77)	26 (30.23)		
No	7 (58.33)	5 (41.67)		
Working pressure			0.764	0.382
Very stressful	45 (71.43)	18 (28.57)		
Moderately stressful or less stressful	22 (62.86)	13 (37.14)		
Training in lower back protection			4.614	0.032
No	35 (79.55)	9 (20.45)		
Yes	32 (59.26)	22 (40.74)		
Frequency of waist exercises (times/month)			1.360	0.243
≤4	18 (78.26)	5 (21.74)		
>4	49 (65.33)	26 (34.67)		

Low back pain in medical workers

Table 3. Assignment of each variable

Variable	Assignment
Dependent variables	
Occurrence of OLBP	1 = "OLBP", 0 = "No OLBP"
Independent variables	
BMI	Actual value entered
Years of employment	1 = ">5 years", 0 = "≤5 years"
Position	1 = "nursing", 0 = "medical or medical technology"
Frequency of night shift	1 = ">4 times/month", 0 = "≤4 times/month"
Standing hours at work	1 = ">5 h/d", 0 = "≤5 h/d"
Training in low back protection	1 = "No", 0 = "Yes"

Table 4. Multivariate analysis

Variable	B	SE	Wald χ^2	P	OR	95% CI
BMI	0.050	0.026	3.648	0.056	1.051	0.999-1.106
Years of employment >5	0.118	0.021	32.893	0.000	1.125	1.081-1.171
Nursing position	1.387	0.460	9.090	0.003	4.001	1.625-9.855
Frequency of night shift >4 times/month	0.280	0.474	0.350	0.554	1.324	0.523-3.352
Standing hours at work >5 h/d	0.530	0.469	1.277	0.258	1.699	0.678-4.258
Without training in low back protection	1.687	0.499	11.448	0.001	5.404	2.034-14.358
Constant	-30.457	4.731	41.446	0.000	-	-

to chronic musculoskeletal injuries. The risk of OLBP in medical workers increases with the number of years of employment [21, 22]. Lack of training and experience in dealing with low back pain is a risk factor for the development of OLBP in medical workers. Due to their heavy workload, most medical workers experience varying degrees of low back pain. Without appropriate intervention, this pain is likely to progress to OLBP. Adequate training enables medical workers to effectively address muscle spasms and improve low back muscle function, thus reducing the prevalence of OLBP [23-26]. To enhance the awareness of self-protection against OLBP among medical workers, relevant management departments should implement standardized, systematic, and targeted OLBP protection courses as part of school education, pre-job training and continuing education.

Limitations and prospects

It is important to note that the duration of OLBP was not analyzed in this study, which is a limitation of retrospective studies. The duration of OLBP may have an impact on pain severity, dysfunction, treatment outcome, and its effect on work. Future studies should consider including the duration of OLBP as a variable to compre-

hensively assess contributing factors and offer more precise recommendations for prevention and treatment in clinical settings.

The sample size of this study was small, and it was conducted at a single center. Future research endeavors should aim to collaborate with multiple institutions to conduct large-sample, multi-center randomized studies. This will help identify more relevant factors that influence the occurrence of OLBP among medical workers. Additionally, some of the observation indicators in this study were subjective, suggesting the need for introducing diagnostic and treatment equipment to provide more scientific and objective observation indicators. Furthermore, relevant follow-up should be conducted based on evidence-based medicine, in subsequent studies.

Conclusion

We investigated the current status of OLBP among medical workers in our hospital. We found that the prevalence of OLBP among medical workers in our hospital is relatively high, underscoring the importance for both medical staff and hospital administrators to recognize and address this issue. After further analysis of

the factors that contribute to OLBP in medical workers, we concluded that the occurrence of OLBP is influenced by various factors, including years of employment, job role, and relevant training. Therefore, there is a pressing need for comprehensive preventive measures targeting individual characteristics, job role, occupational exposure, and environmental management within hospitals.

Disclosure of conflict of interest

None.

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Low back pain in medical workers

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