

Frequency and severity of low back pain in nurses working in intensive care units and influential factors

Ozlem Ovayolu¹, Nimet Ovayolu², Mehtap Genc³, Nilgun Col-Araz⁴

ABSTRACT

Objective: The purpose of this research was to determine the frequency and severity of low back pain and influencing factors in nurses working in intensive care units.

Methods: This research was conducted as a cross-sectional study with 114 nurses working in the intensive care units in the province of Gaziantep, Turkey. Study data were collected using a questionnaire form and visual analogue scale.

Results: It was found that 84.2% of the nurses experienced low back pain, and 66.7% of the nurses evaluated this pain as “a pain with moderate severity”. It was determined that nurses who had not received any education on low back pain, who remained standing for long periods of time, who performed interventions that required bending forward, who lifted and repositioned patients, and who did not use any aiding equipment during interventions, experienced more pain and had higher average pain scores. In addition, average pain scores were higher among nurses with master’s and doctorate degrees, and those working in internal medicine and pediatric intensive care units and working in shifts.

Conclusion: It was observed that many of the nurses working in intensive care units experienced low back pain, and especially those working in internal medicine and pediatric intensive care units and working in shifts had higher average pain scores.

KEY WORDS: Low back pain, Nurse, Influencing factors, Intensive care units.

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INTRODUCTION

Nurses are among the professionals with the highest incidence rates of work-related low back problems.¹ Because nursing interventions include

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physical, personal and ergonomic risk factors for low back pain.^{2,3} Due to the low back pain caused by these risk factors, every year thousands of nurses in the world work with less efficiency, receive medical reports and/or retire early. Especially the nurses working in intensive care units experience low back pain more frequently due to reasons such as providing patient care by bending forward for long durations, over-forcing/over-loading some body parts while repositioning patients, and sparing more time for patient care. In addition, over-workload in intensive care units, and frequent repetition of body movements and functions such as reaching up-forward, holding, clasping-hugging, lifting and turning prepare the ground for the emergence of this problem.⁴

Despite this fact, there is very limited number of studies on the assessment of low back pain in nurses who work in intensive care units.⁴ Studies conducted on this subject in our country are also not

very common. Thus, this study aimed to determine the frequency and severity of low back pain and influencing factors in nurses working especially in intensive care units that include many of the risk factors for low back pain. In addition, it was considered important to provide suggestions at the end of this study for taking necessary precautions to reduce low back pain in nurses who work in intensive care units.

METHODS

Design and sample: A cross-sectional and descriptive design was used in this study that was conducted with a total of 114 of 188 nurses working in the intensive care units of 3 private and 3 public hospitals in the province of Gaziantep in the Southeastern Anatolian Region of Turkey. Seventy four nurses were excluded from the study because they did not accept to participate in the research and did not meet the study criteria. Exclusion criteria included nurses working in the intensive care units for less than a year,⁵ pregnant nurses,^{2,6,7} and those with a metastatic disease⁶ and health problems that may cause low back pain. At all times, we made it clear that participation was voluntary.

Definition of low back pain: Low back pain was defined as discomfort in the spinal area (between the lower costal margins and gluteal folds) experienced at least once a month³, with or without radiation into the leg to below the knee.²

Questionnaire: The study data were collected using a questionnaire prepared by the investigators with support from the literature.^{1,3,8} The questionnaire validation and translation did not made. Only received the opinion of an expert for questionnaire. A pilot study was conducted with 18 nurses in a hospital not included in the research. It was tested there whether the survey questions were comprehensible and those that were not comprehensible were either excluded or revised. Filling out the questionnaire took about 15-20 minutes. The questionnaire included some descriptive characteristics of nurses, characteristics about low back pain, factors that may affect low back pain. Working hours were classified as day-time, watch system and shift. Watch system is defined as working at times outside official days and hours; shift is defined as working by turns outside normal day-time hours, during the day, in the evening or at night.⁹ In addition, low back pain was assessed by visual analogue scale (VAS; 0-10). In this scale, "0" indicated no pain and "10" indicated very severe pain.¹⁰

Body mass index: Information on body weight and height were obtained from self-reports of nurses. Body Mass Index (BMI) was calculated as weight (kilograms) divided by square of height (meters); and values of 18.5 and lower were classified as "underweight", 18.5 to <25 as "normal weight", >25 as "overweight", >30 as "obese".¹¹

Ethical considerations: Consent was received from the nurses who were included in the study after they were provided with necessary explanation about the study's objectives. Permission was received from the institutions where the research was conducted and approval was obtained from the Ethics Committee.

Data analysis: Descriptive statistics were reported as frequencies, means and standard deviations, medians, and ranges. Chi-square was used to determine the relationship between characteristics of nurses, their low back pain status and factors that may influence having low back pain. Student t, ANOVA, Mann Whitney U and Kruskal-Wallis tests were used to determine the relationship between characteristics of nurses, factors that may influence their status of experiencing low back pain, and low back pain average scores. Correlation analysis was used to determine the relationship between the number of employment years, daily and weekly working hours, standing during working hours, and low back pain average scores. Statistically significant levels were set at $p < 0.05$.

RESULTS

The relationship between specific characteristics of nurses and their status of experiencing low back pain is shown in Table-I. Although 84.2% of the nurses experienced low back pain and 66.7% of the nurses evaluated this pain as "moderately severe", measurements performed by VAS revealed that the mean duration of low back pain was 1.5 ± 0.8 years, and that 53.1% of the nurses experienced low back pain for 0-3 years and 39.6% had pain attacks once a week. It was determined that 37.5% of the nurses who experienced low back pain did not make any attempts to relieve the pain, 49.0% experienced an increase in low back pain, 71.9% did not see a doctor, and 79.2% did not receive any treatment for their low back pain (Table-II).

It was also determined that nurses who did not receive education on low back pain (86.5%), who stated that they sometimes complied with body mechanics during interventions to patients (56.3%), who remained standing for a long time (97.9%), who performed interventions that require bending

Table-I: The relationship between specific characteristics of nurses and their status of experiencing low back pain.

Parameters	Those who experience low back pain n (%)	Those who do not experience low back pain n (%)	Significance
Gender			
Male	7(7.3)	5(27.8)	p=0.022
Female	89(92.7)	13(72.2)	
Age			
18-25	27(28.1)	3(16.7)	p=0.095
26-33	56(58.3)	15(83.3)	
34 years and more	13(13.5)	-	
Marital status			
Married	52(54.2)	10(55.6)	p=0.561
Single	44(45.8)	8(44.4)	
Children			
Yes	57(59.4)	11(61.1)	p=0.554
No	39(40.6)	7(38.9)	
Education			
High school	21(21.9)	2(11.1)	p=0.762
Two-year university degree	39(40.6)	16(16.7)	
Bachelor's degree	55(57.3)	12(66.7)	
Master's/ doctorate	4(4.2)	1(5.6)	
Smoking			
Yes	22(22.9)	4(22.2)	p=0.609
No	74(77.1)	14(77.8)	
Wearing high-heeled shoes			
Yes	39(40.6)	7(38.9)	p=0.554
No	57(59.4)	11(61.1)	
Regular exercise			
Yes	8(8.3)	2(11.1)	p=0.491
No	88(91.7)	16(88.9)	
Body mass index			
Poor	2(2.1)	1(5.6)	p=0.024
Normal	77(80.2)	9(50.0)	
Overweight	17(17.7)	8(44.4)	
Evaluation of health condition			
Very good	13(13.5)	3(16.7)	p=0.934
Good	54(56.3)	10(55.6)	
Moderate	29(30.2)	5(27.8)	
Working status			
Head nurse	10(10.4)	1(5.6)	p=0.453
Nurse	86(89.6)	17(94.4)	
Clinic of employment			
Surgery intensive care		38(39.6)	p=0.269
Internal medicine, intensive care	23(24.0)	1(5.6)	
Coronary intensive care	14(14.6)	3(16.7)	
Pediatric intensive care	17(17.7)	2(11.1)	
Reanimation	4(4.2)	2(11.1)	
Working status			
Day-time	35(36.5)	6(33.3)	p=0.137
Shift	34(35.4)	3(16.7)	
Watch	27(28.1)	9(50.0)	
Night work in the last one year			
Yes	70(72.9)	14(77.8)	p=0.458
No	26(27.1)	4(22.2)	
Duration of employment (year)			
Walking-bicycle	6.7±4.4	5.8±2.9	p=0.563
Public transportation	27(28.1)	5(27.8)	
Private car	47(49.0)	9(50.0)	p=0.996
	22(22.9)	4(22.2)	
Total	96(100.0)	18(100.0)	

forward (95.8%), who lifted patients (68.8%), who changed sheets while the patient was in the bed (65.6%), who repositioned patients (83.3%) and who did not use any aiding equipment during interventions (60.4%) experienced more low back pain (Table-III) and had higher mean pain scores ($p>0.05$) (Table-IV). Despite these observations, 85.4% of the nurses believed in the benefit of using aiding equipment during interventions. The nurses who were partially satisfied with their institution of employment (41.7%) were found to experience even more pain ($p>0.05$) (Table-III).

When the relationships between some of the characteristics of nurses and their mean pain scores were evaluated, it was found that the mean pain scores were higher in female nurses, those who were in the age group of 34 years and over, those

Table-II: Distribution of low back pain-related characteristics of nurses who experience low back pain.

Parameters	n(%)
Low back pain severity	
Mild	25(26.0)
Moderate	64(66.7)
Severe	7(7.3)
Low back pain duration	
0-3 years	51(53.1)
4-6 years	27(28.1)
7-10 years	13(13.5)
11 years and more	5(5.2)
Low back pain frequency	
All the time	25(26.0)
Once a week	38(39.6)
Once a month	18(18.8)
More than once a month	14(14.6)
After shifts	1(1.0)
Interventions performed to overcome low back pain	
Nothing	36(37.5)
Exercise	14(14.6)
Massage	3(3.1)
Resting	26(27.1)
Medication	8(8.3)
Other	9(9.4)
Experiencing an increase in low back pain	
Yes	47(49.0)
No	49(51.0)
Seeing a doctor for complaints of low back pain	
Yes	27(28.1)
No	69(71.9)
Receiving treatment for low back pain	
Yes	20(20.8)
No	76(79.2)
Total	96(100.0)

Table-III: The relationship between the nurses' status of experiencing low back pain and the influencing factors.

Parameters	Those who experience low back pain n (%)	Those who do not experience low back pain n (%)	Significance
Receiving education on low back pain			
Yes	13(13.5)	5(27.8)	p=0.124
No	83(86.5)	13(72.2)	
Complying with body mechanics during interventions			
Yes	10(10.4)	4(22.2)	p=0.348
No	32(33.3)	6(33.3)	
Sometimes	54(56.3)	8(44.4)	
Standing for a long time			
Yes	94(97.9)	18(100.0)	p=0.708
No	2(2.1)	-	
Doing works that require bending forward			
Yes	92(95.8)	18(100.0)	p=0.498
No	4(4.2)	-	
Lifting patients			
Yes	66(68.8)	14(77.8)	p=0.321
No	30(31.2)	4(22.2)	
Bathing patients			
Yes	34(35.4)	5(27.8)	p=0.368
No	62(64.6)	13(72.2)	
Changing sheets while the patient is in the bed			
Yes	63(65.6)	12(66.7)	p=0.581
No	33(34.4)	6(33.3)	
Changing patients' clothes			
Yes	36(37.5)	7(38.9)	p=0.555
No	60(62.5)	11(61.1)	
Repositioning patients			
Yes	80(83.3)	13(72.2)	p=0.211
No	16(16.7)	5(27.8)	
Pushing-pulling heavy objects			
Yes	48(50.0)	15(83.3)	p=0.008
No	48(50.0)	3(16.7)	
Using aiding equipment during interventions			
Yes	38(39.6)	9(50.0)	p=0.285
No	58(60.4)	9(50.0)	
Benefit of using aiding equipment during interventions			
Yes	82(85.4)	17(94.4)	p=0.269
No	14(14.6)	1(5.6)	
Satisfaction with the institution of Employment			
Yes	38(39.6)	7(38.9)	p=0.227
No	18(18.8)	7(38.9)	
Partially	40(41.7)	4(22.3)	
Total	96(100.0)	18(100.0)	

who had master's and doctorate degree, those with a chronic disease, those with a normal body mass index, those who worked in internal diseases and pediatric intensive care units, and those who worked in shifts (p>0.05) (Table-V).

Table-IV: The relationship between specific parameters that may affect low back pain in nurses and their mean low back pain scores.

Parameters	Pain Mean±SD	Significance
Complying with body mechanics during interventions		
Yes	1.3±1.0	p=0.757
No	1.4±0.7	
Sometimes	1.5±0.8	
Receiving education on low back pain		
Yes	1.2±0.8	p=0.228
No	1.5±0.8	
Duration of low back pain		
0-3 years	1.3±0.9	p=0.164
4-6 years	1.7±0.5	
7-10 years	1.8±0.5	
10 years and over ↑	1.8±0.4	
Lifting patients		
Yes	1.5±0.8	p=0.074
No	1.5±0.7	
Standing for a long time		
Yes	1.5±0.8	p=0.074
No	1.1±0.8	
Bathing patients		
Yes	1.5±0.8	p=0.729
No	1.5±0.8	
Changing sheets while the patient is in the bed		
Yes	1.5±0.8	p=0.552
No	1.4±0.7	
Changing patients' clothes		
Yes	1.5±0.9	p=0.932
No	1.5±0.7	
Pushing-pulling heavy objects		
Yes	1.4±0.9	p=0.478
No	1.5±0.6	
Repositioning patients		
Yes	1.5±0.8	p=0.242
No	1.3±0.8	
Using aiding equipment during interventions		
Yes	1.4±0.8	p=0.396
No	1.5±0.8	
Total	1.5±0.8	

In addition, correlation analysis revealed that low back pain score increased with the increase in years of employment, daily and weekly working hours, and duration of standing during working hours; but this result was not observed to be statistically significant (p>0.05).

DISCUSSION

The studies evaluating low back pain in nurses showed that low back pain rates were higher ^{2,7,12-16}

Table-V: The relationship between specific characteristics of nurses and their mean low back pain scores.

<i>Parameters</i>	<i>Pain Mean±SD</i>	<i>Significance</i>	
<i>Gender</i>			
Male	1.0±0.9	p=0.104	
Female	1.5±0.8		
<i>Age</i>			
18-25	1.5±0.6	p=0.083	
26-33	1.4±0.9		
34 and more	2.0±0.4		
<i>Education</i>			
High school	1.7±0.6	p=0.256	
Two-year university degree	1.5±0.8		
Bachelor's degree	1.4±0.8		
Master's/ doctorate	1.8±1.3		
<i>Wearing high-heeled shoes</i>			
Yes	1.4±0.8	p=0.464	
No	1.5±0.8		
<i>Regular exercise</i>			
Yes	1.5±0.9	p=0.951	
No	1.5±0.8		
<i>Chronic disease</i>			
Yes	2.0±0.0	p=0.098	
No	1.4±0.8		
<i>Body mass index</i>			
Poor	1.0±1.0	p=0.359	
Normal	1.5±0.7		
Overweight	1.3±1.0		
<i>Health condition</i>			
Very good	1.4±0.8	p=0.741	
Good	1.5±0.8		
Moderate	1.5±0.8		
<i>Clinic of employment</i>			
Surgery intensive care	1.5±0.9	p=0.980	
Internal diseases intensive care	1.6±0.6		
Coronary intensive care	1.5±0.7		
Pediatric intensive care	1.6±0.8		
Reanimation	1.0±0.8		
<i>Working condition</i>			
Day-time	1.5±0.8		p=0.226
Shift	1.7±0.7		
Watch	1.3±0.8		
Total	1.5±0.8		

among nurses compared to other musculoskeletal system problems.^{5,17} In our study, it was observed that most of the nurses experienced low back pain, and this result was found to be similar to the findings of previously conducted studies. Therefore, it is important to define the risk factors that may lead to low back pain in nurses and to take

the necessary protective measures. Nurses, who play an important role in protecting, maintaining and improving individuals' health, should attach importance to applying protective and improving actions for their own health, so that they can provide nursing care quality, be productive, and administer patient care without interruption.¹⁸

In our study, most of the nurses worked in standing position for long durations, performed interventions that required bending forward, lifted and repositioned patients, and these nurses had higher average low back pain scores. Moreover, it was observed that the nurses who did not use any aiding equipment during interventions yet believed in the benefit of using it constituted the majority. It is a striking result that although nurses frequently performed interventions that may create risk factors for low back pain, such as standing for long durations, performing interventions that require bending forward and lifting and repositioning patients, and although they knew the proper application in using aiding equipments; they did not reflect this knowledge in their interventions. This result may be explained by the lack of sufficient education given to nurses about the risks that may cause low back pain and the lack of sufficient time during interventions for using aiding equipment.

The studies conducted on low back pain have demonstrated that there is a relationship between smoking and low back pain,¹⁹ and that smoking impairs nutrition in the disk, making it more vulnerable against outside influences and disturbing blood flow.^{18,20} However, as in our study, there are also study that found no relationship between smoking and low back pain.⁶ Our findings may be explained by the low number of non-smoker nurses included in the research.

In previously conducted study, a relationship was found between gender and low back pain, and women were shown to experience more low back pain.⁸ This result may be associated with the anatomic, physiologic and structural difference between the sexes, and the low number of male nurses included in our study. Our study also revealed a statistically significant relationship between low back pain and education status among other socio-demographic variables, and showed that nurses with master's and doctorate degrees had higher low back pain average scores compared to others. A similar result was obtained in another study. in our country, and this result was associated with the fact that those with higher education level spared more time for patient care and gave more

prominence to their professional roles.¹⁹ On the other hand, in another study conducted in our country, no significant relationship was found between education level and low back pain.¹⁸

In our study, work conditions such as working hours and institution of employment were determined to be effective on low back pain. It was reported that low back pain increased in parallel with the increase in working hours and this result was associated with sparing less time for resting.¹⁵ In another study it was assessed that relationship between the clinic of employment and low back pain. It was observed that the orthopaedic and ICU departments have heavy workloads that are likely to cause low back pain. Therefore it was suggested, the clinics in which nurses work and the risks posed by these clinics should be evaluated.¹ In our study, it was observed that especially the nurses who worked in internal diseases and pediatric intensive care units had higher low back pain average scores. Similarly, a higher prevalence of low back pain was also reported among nurses working in these clinics by other researchers.³ Higher low back pain average scores observed in nurses working in internal diseases and pediatric intensive care units may be associated with the fact that interventions that are more likely to cause low back pain are applied more in patients hospitalized in these units since these patients need different nursing cares, and that these clinics provide service under different conditions.

In addition, it was also found that working conditions and satisfaction with the place of employment affected low back pain; nurses who worked in shifts had higher low back pain average scores; and nurses who were partially satisfied with their place of employment experienced more low back pain. Working with fewer personnel during shifts, having to perform patient transfers on one's own without help, lack of sleep, and decrease in the quality of sleep may be associated with low back pain. Moreover, it is thought that the employees feel better and experience less anxiety as their satisfaction with the institution of employment increase, and that these factors have a positive effect on low back health. There are studies that determined a relationship between low back pain and working conditions and satisfaction with the place of employment;²¹ whereas, no relationship was found in some studies between these factors and low back pain.¹⁸ Furthermore, in our study, it was found that nurses who evaluated their health condition as "very good" experienced less low

back pain problems and had lower low back pain average scores. This result may indicate that nurses who define their health status as "very good" feel much better, as observed in the satisfaction with the institution of employment, and this situation increases their performance and therefore decreases their low back pain related problems. This observation is also supported by the study conducted by Alexopoulos et al., which revealed that those with worse self-perceived health condition experienced more low back pain.¹⁶

In line with these results; it may be suggested that regular education programs should be initiated in intensive care units in order to control risk factors that may cause low back pain; nurses should be provided with guidance on using aiding equipment that would reduce physical load; and necessary protocols should be established to control compliance to these rules by close monitoring. In addition, it is considered highly important that necessary attention is paid to complying with body mechanics during all kinds of nursing interventions in patient care, and the differences between clinics in terms of the risk factors for low back pain are taken into consideration.

Limitations of the study: This study has several limitations. First, our study was cross-sectional in design; the sample size was small; and this study was conducted only in the institutions in Gaziantep province located in the Southeastern Anatolia Region of Turkey. Thus, the results and conclusions should not be generalized for nurses in all intensive care units in Turkey. Secondly, study data were collected by using questionnaires, without observation.

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Conflict of interest: The authors declare that they have no conflict of interest.

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Authors Contribution:

OO, NO, MG: Study design. **MG:** Data collection. **OO:** Data analysis. **OO, NO, NCA:** Manuscript preparation.