Original Paper

Prevalence of Neck Pain and its Related Factors in Nurses Working in Intensive Care Units of Hospitals in Northern Iran

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ABSTRACT

Introduction: Nursing is a job with high physical activity; therefore nursed are at high risk of work-related musculoskeletal disorders, including neck pain.

Objective: This study aims to investigate the prevalence and risk factors of neck pain in nurses working in intensive care units (ICUs) of teaching hospitals in Rasht, north of Iran.

Materials and Methods: In this cross-sectional study, 120 nurses working in the ICUs of seven educational therapeutic hospitals in Rasht in 2019 participated. Required data were collected using a two-part questionnaire. The first part surveyed sociodemographic information. The second part was the Persian version of the neck disability index. For statistical analysis, chi-square test, Fisher's test, and logistic regression analyses were used.

Results: The mean age of nurses was 35.7±5.8 years, and 97.5% of them were female. Their mean work experience was 11.1±5.6 years. The overall prevalence of neck pain was 82.5% (n=99). The frequency of neck pain among nurses with more than 15 years of work experience (P=0.019), age 30-39 years (P=0.031) and no sports activity (P=0.031) was more. The risk of neck pain in nurses who had a history of exercise was 3.277 times higher (95% CI; 1.030%, 10.43%, P=0.045) and in married nurses was 2.92 (95% CI; 0.920%, 9.274%, P=0.069) that was borderline significant.

Conclusion: There is a high prevalence of neck pain among nurses working in the ICUs of educational therapeutic hospitals in Rasht. Hence, it is necessary for hospital managers to take the necessary measures to reduce these complications in order to protect the health of nurses and improve the quality of patient care.

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Highlights

● Nurses working in the intensive care units (ICUs) are at high risk of work-related musculoskeletal disorders including neck pain.

● Prevalence of neck pain among ICU nurses in Rasht city is different based on work experience, age, and history of exercise.

● The exercise can help reduce the incidence of neck pain in ICU nurses.

Plain Language Summary

Due to high physical activity, nurses are at risk of work-related musculoskeletal disorders. The prevalence of neck pain among nurses in ICUs is higher than among nurses in other wards due to high work pressure and sensitivity associated with caring for sick patients Results of this study showed that the prevalence of neck pain among ICU nurses from northern Iran was 82.5%. This prevalence was significantly different among nurses with different work experiences and ages, and between those with and without a history of exercise. The nurses with no history of exercise are more likely to have neck pain.

Introduction

I n the past decade, occupational diseases have been prevalent in 40-60% of the workers, most of which is musculoskeletal disorders [1, 2]. Work-related musculoskeletal disorders are associated with discomfort, weakness, inability, or persistent pain in the neck, back, or upper limbs [2, 3]. The prevalence of musculoskeletal injuries is estimated to be 40% and 84% in developed and developing countries, respectively [4, 5]. Nurses, due to having repeated movements such as pushing, pulling, lifting, and bending in the workplace, are prone to a variety of musculoskeletal disorders [6]. The most common musculoskeletal disorder among nurses is low back pain with a prevalence of 32-90%, followed by neck pain, shoulder pain, and knee pain with prevalence rates of 12-52%, 17-48%, and 7-68%, respectively [7]. Musculoskeletal disorders seem to be multifactorial and has several risk factors, including physical, psychosocial, organizational and individual factors. Risk factors associated with musculoskeletal pain among nurses include high physical activity, poor posture at work, moving patients, and lifting heavy loads. Neck pain has a multifactorial etiology. Nonmodifiable risk factors of neck pain are age, gender, and genetics, while modifiable risk factors are smoking, exposure to tobacco smoke, physical inactivity, and mental health problems [8]. Due to anthropometrical and physiological sex differences, women are more prone to neck pain [9]. Genetics seem to have a role in neck pain, although its influence gradually decreases by aging and environmental factors become

more predominant. Studies have shown that exposure to tobacco smoke, obesity, and high physical activity are risk factors for neck pain [9, 10]. The results of a study showed that the highest rate of musculoskeletal injuries in health care providers was due to lifting and moving patients [11]. Intensive care unit (ICU) nurses are at higher risk of developing musculoskeletal disorders than nurses working in other hospital wards [12, 13]. History of sports injury or occupational trauma, has also been reported as a risk factor for chronic neck pain [14]. Mental problems such as anxiety and anger in case of neck pain have been shown to be associated with a weaker prognosis [15]. Musculoskeletal disorders are the second leading cause of occupational disability and absence from work after cold, which can force hospital nurses to change their career and can impose high economic burden on the health care system [16]. Due to the limited research on this issue in developing countries, especially Iran, this study aims to investigate the frequency of neck pain among ICU nurses in north of Iran and its associated factors.

Materials and Methods

This is a descriptive-analytical study with a cross-sectional design. The study population consists of the nurses working in ICUs of seven teaching hospitals in Rasht, Iran, in 2019. The sampling was done by a census method. Thus, the sample size was equal to the study population (n=145). Inclusion criteria were willingness to participate in the study, no cervical trauma or surgery in the neck area, and working in the ICU.

The data collection tool was a two-part questionnaire. The first part surveyed demographic information including age, sex, body mass index (BMI), and information about the number of work shifts per month, type of work shifts, marital status, work experience, family history of neck pain, history of exercise, and history of mental health problems. The second part was the neck disability index (NDI) developed by Vernon et al. [17]. It has 10 items rated on 6-point scale from 0 to 5, and has a total score of 50. A score of 0-4, 5-14, 15-24, 25-34, and above 34 indicate no disability, mild inability, moderate disability, severe disability and complete disability, respectively [17]. The Persian version of this questionnaire has been validated by Mousavi et al [18]. They reported a Cronbach's α value of 0.88 for this questionnaire. The questionnaire was distributed among the participants and collected during one month (from March to April 2019).

The recorded data were statistically analyzed in SPSS software, version 22 (IBM Corp., Armonk, NY). To investigate the difference in the prevalence of neck pain based on the sociodemographic factors, chi-square test and Fisher's exact test were used. To determine the risk factors of neck pain among nurses, logistic regression analysis was used. Significance level was set at 0.05.

Results

Of 145 questionnaires, 120 were completed and returned (response rate: 82.7%). Table 1 presents the characteristics of participants. The mean age of nurses was 35.7±5.8 years and their mean work experience was 11.1±5.6 years. The overall frequency of neck pain among nurses was 82.5% (n=99), and 17.5% of patients had no disability. Among those with neck pain, 51.7% had mild disability, 26.7% had moderate disability, and 4.2% patients had severe disability.

The results in Table 2 showed that the prevalence of neck pain was not significantly different based on sex, BMI, number of work shifts per month, type of work shift, family history of neck pain, or history of mental health problems; however, it was significantly different based on age (P=0.031), marital status (P=0.012), work experience (P=0.019), and history of exercise (P=0.031). The frequency was higher in married nurses than in single ones, and in nurses with more than 15 years of work experience. Moreover, as shown in Table 3, the frequency of neck pain severity were also significantly different based on age (P=0.001), marital status (P=0.042), work experience (P=0.006), and history of exercise (P=0.011).

To determine the risk factors of neck pain among ICU nurses, logistic regression analysis was used. The results are summarized in Table 4. Among the parameters of age, marital status, work experience, and history of exercise, only the history of exercise was significant predictor of neck pain in nurses. In nurses who had no history of exercises, the risk of neck pain was 3.277 times higher than in nurses with a history of exercise (OR=3.277, 95% CI; 1.30%, 10.43%, P=0.045). But at a significance level of 0.1, marital status and work experience were also independent predictors of neck pain in nurses, so that compared to single nurses, the risk of neck pain in married nurses is 2.92 times higher (OR=2.92, 95% CI; 0.9%, 9.3%, P=0.069) in borderline manner.

Discussion

In the present study, most of ICU nurses suffered from some degree of neck pain and the majority of them had moderate or severe neck pain. We used the standard NDI questionnaire. The related studies have mostly used a researcher-made questionnaires and have reported different rate and severity of pain in nurses [19]. Our findings showed that the frequency of neck pain among ICU nurses in Rasht was significantly higher than

Table 1. Characteristics of participants

Variables	No.	Mean±SD	Minimum	Maximum
Age (y)	120	35.7±5.8	23	47
BMI (Kg/m^2)	120	24.4±3.0	18.5	35.5
Work experience (y)	120	11.1±5.6	1	23
Morning shifts per month	106	10.0±7.1	2	26
Evening shifts per month	96	6.8±2.9	2	20
Night shifts per month	92	7.7±2.9	1	14

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Table 2. Frequency of neck pain among ICU nurses based on sociodemographic variables

Variables		No. (%)	No. (%)		P
			Neck Pain		
			No	Yes	
Sex	Male	3(2.5)	19(16.2)	98(83.8)	0.079*
	Female	117(97.5)	2(66.7)	1(33.3)	
Age (y)	20-29	23(19.2)	6(26.1)	17(73.9)	0.031**
	30-39	66(55)	14(21.2)	52(78.8)	
	40-49	31(25.8)	1(3.2)	30(96.8)	
BMI	Normal	76(63.3)	14(18.4)	62(81.6)	0.836**
	Overweight	39(32.5)	7(17.9)	32(82.1)	
	Obese	5(4.2)	0(0)	5(100)	
Marital status	Singe	31(25.8)	10(32.3)	21(67.7)	0.012**
	Married	89(74.2)	11(12.4)	78(87.6)	
Work experience	<15 years	76(36.3)	18(23.7)	85(76.3)	0.019**
	15 years or more	44(36.7)	58(76.3)	41(93.2)	
Number of work shifts per month	<10	14(11.7)	5(35.7)	9(64.3)	0.069*
	≤10	106(88.3)	16(15.1)	90(84.9)	
Type of work shift	Morning	22(18.3)	1(4.5)	21(95.5)	0.224**
	Morning+evening	5(4.2)	0(0)	5(100)	
	Evening+night	14(11.7)	3(21.4)	11(78.6)	
	Morning+evening+night	79(65.8)	17(21.5)	62(78.5)	
Family history of neck pain	Yes	28(23.3)	4(14.3)	24(85.7)	0.779*
	No	92(76.7)	17(18.5)	75(81.5)	
History of mental health problems	Yes	14(11.7)	1(7.1)	13(92.9)	0.460*
	No	106(88.3)	20(18.9)	86(81.1)	
History of exercise	Yes	66(55)	16(24.3)	50(75.8)	0.031**
	No	54(45)	5(9.3)	49(90.7)	

*Fisher exact test, **Chi-square test.

Table 3. Frequency of neck pain severity among ICU nurses based on sociodemographic variables

Variables		No. (%)				P*
		Neck Pain Severity				
		No Disability	Mild	Moderate	Severe	
Sex	Female	19(16.2)	62(53)	31(26.5)	5(4.3)	0.098
	Male	2(66.7)	0(0)	1(33.3)	0(0)	
Age (y)	20-29	5(21.7)	15(65.2)	3(13)	0(0)	0.001
	30-39	14(21.2)	28(42.4)	24(36.4)	0	
	40-49	2(6.5)	19(61.3)	5(16.1)	5(16.1)	
BMI	Normal	14(18.4)	41(53.9)	19(25)	2(2.6)	0.302
	Overweight	7(17.9)	16(41)	13(33.3)	3(7.7)	
	Obese	0	5(100)	0	0	
Marital status	Married	11(12.4)	46(51.7)	27(30.3)	5(5.6)	0.042
	Single	10(32.3)	16(51.6)	5(16.1)	0	
Work experience (y)	<15	17(22.4)	41(53.9)	18(23.7)	0	0.006
	≤15	4(9.1)	21(47.7)	14(31.8)	5(11.4)	
Number of work shifts per month	<10	5(35.7)	7(50)	2(14.3)	0	0.296
	≤10	16(15.1)	55(51.9)	30(28.3)	5(4.7)	
Type of work shift	Morning	1(4.5)	12(54.5)	6(27.3)	3(13.6)	0.183
	Morning+evening	0	5(100)	0	0	
	Evening+night	3(21.4)	8(57.1)	3(21.4)	0	
	Morning+evening+night	17(21.5)	37(46.8)	23(29.1)	2(2.5)	
Family history of neck pain	Yes	4(14.3)	13(46.4)	11(39.3)	0	0.315
	No	17(18.5)	49(53.3)	21(22.8)	5(5.4)	
History of mental health problems	Yes	1(7.1)	8(57.1)	5(35.7)	0	0.661
	No	20(18.9)	54(50.9)	27(25.5)	5(4.7)	
History of exercise	Yes	16(24.2)	37(56.1)	12(18.2)	1(1.5)	0.011
	No	5(9.3)	25(46.3)	20(37)	7(7.4)	

*Chi-square test.

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Table 4. Results of logistic regression analysis

Variables	B	SE	OR	95% CI		P
				Lower Band	**Upper Band**	
Age (y)	-0.04	0.06	0.962	0.847	1.093	0.556
Marital status (married)	1.07	0.59	2.92	0.920	9.274	0.069
Work experience (≥15 y)	1.47	0.85	4.363	0.821	23.173	0.084
History of exercise (No)	1.19	0.59	3.277	1.030	10.432	0.045

OR: Odds ratio.

reported rates of neck pain in the general population [9-11, 20, 21]. Joslin et al. reported that 76% of nurses had neck pain [12]. In the study by Sheikhzadeh et al., the prevalence of neck pain among surgical nurses was 71% [13]. The results of a study in Brazil showed that neck pain with a prevalence of 68% was the second most common musculoskeletal pain among nurses [22]. Habibzade et al. reported the prevalence of low back pain among Iranian nurses was 56% [23]. Kheiry et al. reported that 16.7% of nurses in Bandar Abbas had chronic neck pain [15].

In the present study, frequency of neck pain was not significantly different between males and females. It can be because of small number of male nurses in our study. Côté et al. reported that female gender was an independent risk factor for neck pain [24]. Our study showed that the frequency and severity of neck pain was significantly different based on age; it was higher in the age group of 40-49 years than in younger nurses. In our study, prevalence of neck pain was higher in obese nurses than in overweight or normal weight nurses, but the difference was not statistically significant. Frequency of severe neck pain in married nurses was significantly higher than single nurses, consistent with Afshar et al.'s study [25]. This can due to pregnancy, hormonal changes, or child care tasks added to the responsibilities of nurses. Furthermore, the overall prevalence of neck pain and severe neck pain were significantly higher among nurses with more than 15 years of work experience than in nurses with less work experience.

In the present study, although the prevalence of neck pain was higher among nurses with higher number of work shifts per month, but the difference was not statistically significant. Also, there was no significant difference between nurses with morning, evening or night shifts. An interesting finding of the present study was the difference in the prevalence of neck pain among nurses based on the history of exercise; the prevalence in nurses who had no sport activity and exercise was significantly higher. Exercise has been shown to be an effective preventive intervention in reducing musculoskeletal pain, especially in the neck and back [21, 26]. In a recent study, the results indicated high prevalence of musculoskeletal complaints in nurses working in hospitals. The posture and movements as well as the type of work can affect the prevalence in nurses [27].

Conclusion

This study showed a high frequency of neck pain among ICU nurses in Rasht, north of Iran. The risk factors were work experience >15 years, age >40 years and lack of sports activity. Therefore, it is necessary for policy makers to take the necessary measures to prevent or reduce these complications in nurses in order to protect the health of nurses and the quality of patient care. One of the limitations of this study was that the nurses answered the questions in their work environment; the workplace-related stress and pressure can affect their answers to the questions. Another limitation was the small number of male nurses. Thus, more studies in the future is needed to accurately determine the prevalence of neck pain and related factors among male nurses. Moreover, further studies with larger sample sizes and considering the ergonomic characteristics of the workplaces, postures and movements are recommended.

Ethical Considerations

Compliance with ethical guidelines

The study was approved by the Ethics Committee of Guilan University of Medical Sciences (Code: IR.GUMS. REC.1398.014). Informed consent was obtained from all participants, and they were assured of the confidentiality of their information.

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