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Assessment of Risk Factors for Occupational Neck Pain among Teachers: Application of Health Belief Model

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Authors
Zohre Moradi [1] *MSc candidate*
Sedigheh Sadat Tavafian[1*] *PhD*
Seyedeh Somayeh Kazemi [2] *PhD*

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[1] Department of Health Education and Health Promotion, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran
[2] Health Network, Mazandaran University of Medical sciences, Chaloos , Iran

** Correspondence*
Address: No 212, Department of Health Education and Health Promotion, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran.
P.O. BOX: 14115-111.
Tel +98 21 82884547
Fax +98 21 82884555
Email: tavafian@modares.ac.ir

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ABSTRACT

Aim: Neck pain (NP) is one of the most common MusculoSkeletal Disorders (MSDs) that leading to occupational health problems and complaints among different professions. As many studies indicated that NP is common among teachers, this study aimed to assess the risk factors of occupational neck pain in among teachers based on Health Belief Model (HBM).
Method and Materials: In this descriptive-analytical study, 224 teachers from 26 schools were selected randomly. Based on inclusion criteria, 144 participants were eligible and included in the study. A self-designed questionnaire was applied to collect data. The obtained data were analyzed through Pearson correlation test by using SPSS version 24 and.
Findings: This study showed there is a significant relationship between teachers' occupational neck pain and various factors such as age, gender, work experience, doing exercise, awareness, perceived sensitivity, perceived severity, perceived benefits, perceived barriers, cues to action, self-efficacy, and prevent behavior (P <0.05 in all instances).
Conclusion: As this study indicated the majority of the risk factors associated with neck pain can be controlled, providing educational - training program for teachers to reduce occupational neck pain is strongly recommended.

Keywords: Occupational Neck Pain, Teachers, Health Belief Model.

Introduction

Globally, MusculoSkeletal Disorders (MSDs) are one of the most common occupational diseases and injuries that leading to disability and cause the highest number of work-related complaints[1]. It has been shown that MSDs have a significant influence on Health-Related Quality of Life (HRQOL) in industrialized and developing countries [2].

Neck pain is one of the most common Work-Related MusculoSkeletal Disorders (WMSDs) [3]. According to the Centers for Disease Control and Prevention (CDC) survey, neck pain affects 48 % to 62 % of the population[4]. Globally, neck pain ranks fourth for disability and twenty-first in the overall global burden of pain[5]. It has been estimated that about 9 to 18% of general population suffer from neck pain in the world. In other word, it has been discussed that 1 out of every 3 people experiences this pain during their lifetime [6,7]. The prevalence of neck pain is the fourth health problem among teachers, which accounts for 44 to 61% of injuries[8]. The prevalence of neck pain in Iranian teachers is reported to be about 57.8%[9]. It appears that school teachers are at considerable risk of developing MSDs especially for neck pain[10]. Several studies indicated that neck pain (NP) is one of the common MSDs among teachers when compared with other working populations[11,12]. . Studies show various factors including demographic and individual factors, physical, and psychological factors are involved in neck pain. Individual factors included age, sex, Body Mass Index (BMI) and vitamin D deficiency [13,14], also physical factors included duration of employment, length of stay in class, length of

checking homework and preparing lessons, excessive computer use, and prolonged continues sitting and standing, excessive flexion of the torso, squatting, excessive bending of the neck forward or backward, keeping the hands above shoulder level for a long time, lack of adequate rest time during working hours[15-18]. Moreover, psychological factors can be mentioned as high anxiety levels, high work load, poor mental status, lack of attention and support from colleagues, marital and family relationships, job dissatisfaction, weak interpersonal relationships, monotonous and repetitive work, organizational characteristics, financial and social aspects which are involved in occurrence of neck pain [19-23].

It has been revealed that understanding teachers' experience of the causes and factors affecting occupation neck pain and its impact on life can be effective in reducing and preventing occupation neck pain[24]. Because one of the main factors in causing occupational neck pain is inappropriate health behaviors. The use of behavioral science theories can play an effective role in identifying and correcting these behaviors[25]. One of the best effective models in health education in promoting preventive behaviors is the Health Belief Model (HBM). The HBM considers behavior as a function of one's knowledge and attitude. This model is based on people's perception of a health threat and thus leads people's behaviors towards health. There are various reasons for not performing preventive behaviors for neck pain. The main reason is including the lack of belief in the extent of the disease and the severity of the damage caused by the disease (perceived sensitivity and severity) and also, the lack of evaluation of the benefits people change their behavior when they understand the severity of the danger that threatens them and also have a proper assessment of the barriers and benefits of health behaviors[25,26]. The HBM has six contrasts regarding different perception of people due to doing healthy behaviors that have been defined in the existed evidences [27,28]. Up to on our knowledge, there are limited published study which investigate the risk factors for neck pain based on the HBM among Iranian teachers, so this study was designed to explore this issue.

Method and Materials

This descriptive-analytical study adopted from the declaration of Helsinki and received ethical approval from the Human Ethics Committee at the University of Tarbiat Modares, Tehran, Iran (IR.MODARES.REC.1399.163). It was conducted from January 2020 to July 2020 in 26 public junior high school in Tehran's 19th district which was randomly selected with a sequence of randomly generated numbers through computer. In accordance with previous studies, the sample size was calculated and random selection procedures was done [24-26]. Therefore, 224 teachers were randomly chosen from selected schools and invited to participate in the study. They were excluded from the study if they had neurological disease (nerve root pain, multiple sclerosis, Parkinson's), neck fracture, trauma, or head/neck disorder. Furthermore, any severe spinal abnormalities, malignancies, and any inflammatory diseases or tumors, as well as patients with a history of NP and those with impaired exercise, were excluded from the study. Finally, 144 teachers were included in the study. This sample size allowed the detection of the rate and risk factors for NP among school teachers (power of 85%) with 95% Confidence Interval (CI).

To do this study, firstly the purpose and procedure of the study were fully explained to the participants. All participants completed the informed consent form and were confirmed that they could be excluded from the study whenever they refused to continue the study. Some demographic characteristics including; age, sex, height, weight, BMI, marital status,

pain experience , work experience, income level, number of children, housing status, level of education were collected and recorded through distributed questionnaires.

To obtain the level of: awareness, perceived sensitivity, perceived severity, perceived benefits, perceived benefits, perceived barriers, cues to action, self-efficacy and recommended health behaviors regarding work-related neck pain and its impact on teachers' lives, a self-design questionnaire based on HBM was used. This questionnaire had 8 areas including awareness, perceived sensitivity, perceived severity, perceived benefits, perceived benefits, perceived barriers, cues to action, self-efficacy and behavior with 43 questions. In the field of awareness, 5 questions were asked, which were three-choice (it is correct, I do not know , it is wrong). Higher scores indicated higher levels of awareness. In the areas of perceived sensitivity (6 questions), perceived severity (5 questions), perceived barriers (4 questions), perceived benefits (5 questions), self-efficacy (6 questions) and cues to action (3 questions) were asked. These questions were designed as a five-part Likert scale (completely agree with score 5), (agree with score 4), (no idea with score 3), (disagree with score 2) and (completely disagree with score 1). In the area of behavior 9 questions were asked which these question were measured based on a five-part Likert scale as (always with score 5), (often with score 4), (sometimes with score 3), (rarely with score 2) and (never with score 1). In this section, the maximum score was 45 and the minimum score was 1. In each area of the questionnaire, the person who scored higher had better beliefs and healthier recommended behaviors in adopting neck pain prevention behaviors. This questionnaire reached an acceptable level of validity after validating its questions so that the ability of the questionnaire to assess various areas and also being used in similar research were verified.

The obtained data were statistically analyzed using SPSS 24. To evaluate the normality of distribution for tested variables, the Kolmogorov–Smirnov test was conducted. Chi-square ($\chi 2$) test or Fisher's exact test and t-test were used. The Pearson correlation coefficient (r) was applied to assess the existence of the linear relationship between variables. The sample was analyzed with calculation of odds ratios (ORs) and their 95% confidence intervals (CIs) by logistic regression for NP in teachers in relation to different variables. In this study, the P-value less than 0.05 was considered statistically significant.

Findings

In this study, 146 teachers with mean age of 38.5 ± 6.5 were examined. Of all participants 119 individuals (81.5%) were female, 27 individuals (18.5%) were male, 89 individuals (61.00%) experienced neck pain and 57 individuals (39.00%) did not experience neck pain. Table 1 shows the rest demographic characteristics of the studied participants.

Table 1) The characteristics of participants (N=146)

Variable	**No (%)**
Gender	
Female	119 (82.5)
Male	27 (18.5)
Marital status	
Single	36 (25.00)
Married	110 (75.00)
BMI	
Normal weight (18.5–24.9)	63 (44.00)
Overweight (25–29.9)	59 (40.00)
Obese (≥ 30)	24 (16.00)
Experience of pain	
Yes	89 (61.00)
No	57 (39.00)

Findings from the study show that among the studied risk factors, gender, age, marital status, body mass index, work experience, sports activity, housing status, ,perceived sensitivity, perceived severity, self-efficacy, perceived benefits, barriers to understanding, behavior was most associated with occupational neck pain (Table 2,3).

Based on the findings of the study there is a significant relationship between factors gender, age, BMI, marital status, perceived sensitivity, perceived severity, perceived benefits, perceived barriers, self-efficacy and behavior with neck pain in teachers. Based on the results of the study It was found that there is a significant relationship between occupational neck pain in both men and women, The results also showed that female teachers were more at risk for developing NP than males ($p<0.05$). Older teachers were more likely to suffer NP than younger teachers. Results demonstrated that there was a significant association between BMI and the prevalence of NP. In addition, years of teaching were associated with the prevalence of NP: teachers who had work experience of longer than 10 years were more prone to occupational neck pain. The results demonstrated that performing regular daily exercises was a significant factor associated with a lower prevalence of NP. Analysis of data did not show a significant relationship between knowledge and cues to action with occupational neck pain. But these findings show that among the perceived sensitivity factors, perceived severity, perceived benefits, perceived barriers, self-efficacy and performing behaviors such as long-term computer use, prolonged sitting and standing, use of inappropriate body postures at work, there is a significant relationship with occupational neck pain among teachers ($p<0.05$).

Discussion

The present study investigated the prevalence and risk factors for NP in a sample of teachers in Iran. Occupational neck pain is a multifactorial disease and the risk factors of various physical, psychological, social and personal factors as well as perceived sensitivity, perceived severity, perceived benefits and barriers, self-efficacy and behaviors play a role in its development[14,29-32]. The prevalence of neck pain among Iranian teachers is increasing and several factors are involved in causing occupational neck pain[13] .According to a previous study which conducted on 400 teachers, there was a significant relationship between inappropriate working conditions and inappropriate workstations with the prevalence of musculoskeletal disorders in the neck[33]. The present study showed that women compared with men were more high risk regarding neck pain. A study by Makela et al., conducted on 8,000 people in the general population, found that women were more likely than men to have neck pain[34]. In the line of the findings of our study, several existed studies showed significant relationship between working hours in a sitting position and neck pain, and the theory has been proven that bending the neck forward is a strong risk factor in causing neck pain at work in teachers [2,13,30,35]. In present study there was relationship between exercising and neck apin that is in the line of a previous study that revealed regular exercise and adequate rest during work were factors in reducing neck pain in teachers[36]. Association between BMI and the prevalence of NP in school teachers and reported positive results[12,15] which is consistent with findings of our study. Furthermore evidences showed relationship between age and neck pain[10,22,24,37]. However, other study showed younger people might be suffered from neck pain more[38].In present study the participants who were older were more lokely to suffer from neck

Table 2) Relationship between different risk factors and neck pain

Risk factors	People with pain	People without pain	P Value: Chi-square (χ2)
	(N%)	(N%)	
Gender			
Female	73 (50.00)	46 (31.5)	< 0.05
Male	16 (11.00)	11 (7.5)	
Marital status			
Single	15 (10.3)	21 (14.4)	< 0.05
Married	74 (50.6)	36 (24.7)	
Sports activities			
No sports activities	67 (46.5)	19 (13.2)	< 0.05
Less than 3 days a week	18 (12.5)	15 (10.4)	
≥3 days a week	4 (2.8)	21 (14.6)	

Table 3) Relationship between different risk factors and neck pain

Risk factors	People with pain	People without pain	P Value(t-test)
	Mean±SD	Mean±SD	Mean±SD
Age(year)			
≤35	9.6 2 ± 4.5	27.4 ± 5.7	0.061
>35	37.4 ± 4.31	36.9 ± 3.8	0.039
Body mass index(BMI)			
Normal weight (18.5–24.9)	58.26 ±22.3	57.6 ± 19.58	0.073
Overweight (25–29.9)	57.45 ± 21.8	59 ± 18.91	0.043
Obese (≥ 30)	62.3 ± 23.36	60.9 ± 19.58	0.032
Work experience(year)			
≤15	9.5 ± 4.36	8.9 ± 5.2	0.058
>15	19.3 ± 5.2	17.6 ± 4.8	0.039
Knowledge	8.6 ±5.3	7.59 ± 6.1	0.061
Perceived sensitivity	24.3 ± 8.9	21.9 ± 6.5	0.043
Severely perceived	19.2 ± 5.2	18.5 ± 4.7	0.037
Perceived benefits	19.9 ± 4.3	17.5 ± 3.6	0.024
Perceived obstacles	17.6 ± 3.6	16.9 ± 4.3	0.049
Cues to action	12.6 ± 3.6	11.59 ± 3.9	0.073
Efficacy	24.8± 6.3	21.3 ± 4.8	0.036
Behavior	39.7 ± 7.3	37.3 ± 6.7	0.021

pain. In present study self-efficacy were associated with neck pain. In this regard, numerous studies, have shown that having self-efficacy and performing proper health behaviors can be effective in reducing neck pain[39]. Furthermore, numerous studies have shown the effect of self-efficacy and perceived sensitivity and severity in reducing musculoskeletal disorders which support the findings of present study. These studies have shown that self-efficacy is an important protective factor against negative

behaviors in the workplace and also an important factor in creating and adopting health-promoting health behaviors in the prevention of musculoskeletal disorders [31,40-42]. Findings of present study showed that if teachers were aware of the causes of occupational neck pain, this awareness would not lead to preventive behavior of neck pain. This finding is confirmed by a previous study [43]. In consistent with the findings of present study numerous existed studies show that proper health behaviors can be effective in preventing and reducing musculoskeletal disorders[44-48].

One of the innovations of the present study was the lack of similar studies based on the health belief model. One of the limitations of the present study was the prevalence of NP in elementary and high school teachers. It seems that teachers at different levels of teaching may have different demands and working conditions, which in turn may be the source of bias.

Conclusion

According the behaviour - based risk factors of neck pain among school teachers, training these people regarding healthy posture behavior of neck are strongly recommended.

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Authors' Contribution: ZM was the main investigator. SST supervised the study. SSK was the study advisor. All authors read and approved the final manuscript.

Conflicts of Interest: There is no conflict of interest for this study.

Ethical Permission: This study received ethical code of TUM. The ethical code is (IR.MODARES.REC.1399.163).

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