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Prevalence of Work-Related Neck and Shoulder Disorders with Associated Risk Factors and Disability among Primary School Teachers in Nilai, Negeri Sembilan, Malaysia

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Abstract

Work-related neck and shoulder disorders (WRNSDs) have been reported among school teachers due to high demands of tasks involved with the job. This study aims to determine the prevalence of WRNSDs and its associated risk factors among primary school teachers in Nilai, Negeri Sembilan. A cross-sectional study was used to collect demographic and lifestyle factors using a validated self-administered questionnaire while the prevalence of neck and shoulder disorders were determined using Standard Nordic Questionnaire (SNQ) and Neck Disability Index (NDI) respectively. Moderate level of disability with high prevalence of neck pain (52.2%) and shoulder pain (39.1%) were reported in the past year. Age, years of experience, duration of working hours, and occupational factors show significant association to neck and shoulder pain. Results imply that WRNSDs are common among primary school teachers which are strongly associated with personal, task, and occupational factors. Education on posture and ergonomic features are recommended to address these problems and potentially improve their quality of life.

Keywords

Neck Pain, Shoulder Pain, Risk Factors, Primary School Teachers

Introduction

Work-related musculoskeletal disorders (WRMSD) consist of an extensive range of both acute and chronic, degenerative and inflammatory conditions that affect different tissues in the body causing discomfort, ache or pain assiociated with a work-related event (Tinubu, Mbada, Oyeyemi, & Fabunmi, 2010). Work-related neck and shoulder disorders (WRNSDs) which involve the neck and shoulder regions are highly related to occupational injuries such as low static load, repetitive injuries and awkward postures (Ming, Närhi, & Siivola, 2004). WRNSDs indirectly reduce quality of life and incur major economic burden in compensation costs and lost wages (Erick & Smith, 2011). In addition, it significantly lowers work productivity due to sick leave, absenteeism as well

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as early retirement (Maguire & O'Connell, 2007). Moreover, WRNSDs in the long term has also been identified as one of the common health-related reason for resigning work and for seeking health care (Erick & Smith, 2011).

Many studies have reported a high prevalence rate of neck and shoulder pain. Neck pain was the most prevalent (53.5%) musculoskeletal complaint among school teachers in Eastern and North Eastern part of India (Damayanti, Zorem, & Pankaj, 2017). Similarly, a higher prevalence of neck and shoulder pain (80.4%) compared to low back pain (68.0%) were reported among the primary school teacher in the Central Durban area (L. Eggers, 2016). This rate is alarming as WRMSDs have been reported to be the major cause of ill retirement among the school teachers (Maguire & O'Connell, 2007). It is more worrisome as WRNSDs among the teachers especially below the age of 45 years has been exposed to physical, mental and psychological impairment (Arbab Zaheer, 2015).

Individual factors such as age, gender, body mass index (BMI), and length of employment are highly associated with higher WRNSDs rate among teachers (Yue, Liu, & Li, 2012). Female teachers experienced neck pain more frequently than their male colleagues (Thomas T. W. Chiu & Lam, 2007b). Teachers in Thailand have high incidence of WRNSDs due to prolonged sedentary position, awkward posture during job task, static works and repetition (Chaiklieng & Suggaravetsiri, 2012). As school teachers spend a lot of time to correct student's work and prepare for lessons, they tend to maintain in a frequent head down posture which eventually increases the risk of developing neck pain and shoulder pain (Chaiklieng & Suggaravetsiri, 2012). In addition, with the increase of computer usage in daily work among school teachers, forward head posture has been hypothesized to increase the considerable load on the non-contractile structures and posterior cervical structures, eventually resulting in neck and shoulder pain. Moreover, tasks of reaching/stretching with arms above chest height, it has been noted that this activity increases the chance of neck and shoulder pain (L. S. Eggers, Pillay, & Govender, 2018). It is possible that marking assessments (when the head in forward-bent posture), and writing on a blackboard (when the head is in backward-bent posture and the arms are stretched forward above chest height) might be activities that aggravate the frequency and onset of neck or shoulder pain. (L. S. Eggers et al., 2018)

In spite of numerous studies conducted among school teachers in Malaysia there is limited information on the prevalence of WRNSDs and the associated risk factors among the primary school teachers in Malaysia. Thus, the purpose of the current study is to determine the prevalence and associated risk factors of work-related neck and shoulder disorder among primary school teachers in Nilai, Negeri Sembilan, Malaysia. By addressing the prevalence and associated risk factors, early intervention and measures such awareness and education on important posture and working ergonomics can be implanted among the school teachers.

Methodology

A cross-sectional study using a validated self-administered questionnaire was used to find out the prevalence of WRNSDs and its associated risk factors and disability among primary school teachers. Teachers from five (5) public schools were selected at random from 18 public primary

schools in Nilai, Negeri Sembilan, Malaysia. Subjects include male and female, between 25 to 60 years of age, who worked full time for at least 1 year as primary school teachers in Nilai, Negeri Sembilan, Malaysia. Subjects who underwent neck and shoulder surgeries, recent neck and shoulder injury or fracture, and pregnant women are excluded from the study.

The study tool was developed by the researchers in English based on the review literature and validated by experts from this field. The questions were adapted from a similar study by Yue, Liu and Li (2012) about prevalence and risk factors of the neck and shoulder pain among school teachers in China, and Zaheer et al (2016) about the level of disability among teachers with neck and/or shoulder pain. The questionnaire includes demographic and lifestyle (individual factor), work characteristics, occupational factor, musculoskeletal symptom assessment, and disability. Neck Disability Index (NDI) was used to examine the disability among primary school teachers in Nilai, Negeri Sembilan. This questionnaire consists of 10 sections including pain intensity, personal care, lifting, reading, headaches, concentration, work, driving, sleeping, and recreation. Modified Neck Standardized Nordic Questionnaire (SNQ) were used to screen the prevalence rate of neck and shoulder pain. SNQ is highly sensitive (range = 0.33-0.38). repeatable (kappa = 0.63-0.90) and it is validated in screening neck and shoulder pain (Palmer, Smith, Kellingray, & Cooper, 1999).

Descriptive statistics such as mean and standard deviation was used to express the level of neck disability while frequency distribution (percentage) was used for all other factors. Chi-Square Test was used to determine the association between risk factors on neck and shoulder pain. Statistical Package for Social Sciences (SPSS) Version 22 was used for quantitative analysis. All informants were asked to sign an Informed Consent Form (ICF) and the study was reviewed and approved by the university's ethics review panel.

Results

A total of 168 questionnaires were distributed among five (5) primary schools in Nilai, Negeri Sembilan, Malaysia. However, only 120 were returned yielding a 68.5% response rate. Five subjects were excluded after failing to meet the sampling criteria. Date from the 115 subjects was sent for final analysis. The general characteristics of the subjects were summarized in Table 1.

Table 1. General Characteristics of Subjects

Variable		Number (n)	Percentage (%)
Gender			
	Male	20	17.4
	Female	95	82.6
Age			
	25-35	60	52.2
	36-45	30	26.1
	46-55	18	15.7
	56-60	7	6.1
BMI			
	<18.5	10	8.7

18.5-22.9	40	34.8
23-24.9	24	20.9
≥25	41	35.7
Neck Disability* (Mean, Standard Deviation)	115	5.82 ± 6.35
Prevalence of Neck Pain** (past 12 months	60	**52.2**
Prevalence of Neck Pain (past 7 days)	20	17.4
Duration of Neck Trouble		
1-7 days	40	34.8
8-30 days	11	9.6
More than 30 days	6	5.2
Every day	3	2.6
Prevalence of Shoulder Pain** (past 12 months)	45	**39.1**
Prevalence of Shoulder Pain (past 7 days)	27	23.4
Duration of Shoulder Trouble		
1-7 days	27	23.5
8-30 days	4	3.5
More than 30 days	11	9.6
Every day	1	0.9

* Based on Neck Disability Index (NDI)
** Based on Standard Nordic Questionnaire (SQC)

Most of the subjects are female (82.6%), aged between 25-35 years (52.2%) having normal weight (34.8%) and obese (35.7%) based on BMI categories. There is prevalence of neck pain of 52.2% and shoulder pain of 39.1%. However, there are more subjects who complain of shoulder pain (23.4%) than neck pain (17.4%) in the last 7 days.

The association between demographic, lifestyle, work-related factors on neck and shoulder pain is shown in Table 2.

Table 2. Association of Demographic, Lifestyle and Work-Related Factors on Neck and Shoulder Pain

Factors	Neck Pain		Shoulder Pain			
	N (%)	p-value	N (%) Right	N (%) Left	N (%) Both	p-value
Gender		0.23				0.18
Male	8 (40.0%)		3 (15.0%)	2 (10.0%)	1 (5.0%)	
Female	52 (54.7%)		13 (13.7%)	4 (4.2%)	22 (23.2%)	
Age		**0.00***				0.20
25-35	41 (68.3%)		13 (21.7%)	4 (6.7%)	12 (20.0%)	
36-45	12 (40.0%)		1 (3.3%)	2 (6.7%)	5 (16.7%)	
46-55	5 (27.8%)		1 (5.6%)	0 (0.0%)	4 (22.2%)	
56-60	2 (28.6%)		1 (14.3%)	0 (0.0%)	2 (28.6%)	
BMI		0.19				0.18
<18.5	3 (30.0%)		1 (10.0%)	0 (0.0%)	0 (0.0%)	
18.5-22.9	25 (62.5%)		9 (22.5%)	3 (7.5%)	7 (17.5%)	

23-24.9	10 (41.7%)		2 (8.3%)	1 (4.2%)	4 (16.7%)	
≥25	22 (53.7%)		4 (9.8%)	2 (4.9%)	12 (29.3%)	
Hour of exercise per week		0.37				0.40
<7	50 (50.5%)		13 (13.1%)	4(4.0%)	19 (19.2%)	
≥7	10 (62.5%)		3 (18.8%)	2 (12.5%)	4 (25.0%)	
Hour of housework per week		0.36				0.08
<20	42 (55.3%)		9 (11.8%)	6 (7.9%)	13 (17.1%)	
≥20	18 (46.2%)		7 (17.9%)	0 (0.0%)	10 (25.6%)	
Years of experience		**0.03***				**0.045***
1-9	36 (66.7%)		13 (24.1%)	5 (9.3%)	9 (16.7%)	
10-19	17 (42.5%)		2 (5.0%)	1 (2.5%)	7 (17.5%)	
20-29	5 (31.3%)		1 (6.3%)	0 (0.0%)	5 (31.3%)	
Working hours per week		0.07				0.12
<10	7 (36.8%)		6 (31.6%)	0 (0.0%)	1 (5.3%)	
10-20	15 (75.0%)		0 (0.0%)	0 (0.0%)	4 (20.0%)	
21-30	2 (28.6%)		0 (0.0%)	0 (0.0%)	1 (14.3%)	
31-40	19 (50.4%)		6 (18.8%)	4 (12.5%)	8 (25.0%)	
Hours of working with a computer per day		**0.00***				0.36
<4	23 (38.3%)		7 (11.7%)	3 (5.0%)	9 (15.0%)	
≥4	37 (67.3%)		9 (16.4%)	3 (5.5%)	14 (25.5%)	

*significant at a p-value of less than 0.05

Result of the study showed that there was no statistically significant assocation between gender, BMI, number of hours of exercise, number of hours of housework, and nuber of working hours per week on neck and shoulder pain. However, there was a statistically significant association is noted between age (p=0.00) and hours working on a computer (p=0.00) and neck pain, as well as years of teaching experience on neck (p=0.03) and shoulder pain (p=0.045).

The association between occupational risk factors on neck and shoulder pain in the last 12 months is shown in Table 3.

Table 3. Association of Occupational Risk Factors on Neck and Shoulder Pain

Factors	Neck Pain		Shoulder Pain			
	N (%)	p-value	N (%)			p-value
			Right	Left	Both	
Lift heavy load >5kg	17 (56.7%)	0.57	6 (20.0%)	1 (3.3%)	7 (23.3%)	0.59

Push or pull heavy loads >5kg	11 (47.8%)	0.64	1 (4.3%)	2 (8.7%)	6 (26.1%)	0.32
Carry heavy loads >5kg	20 (62.5%)	0.17	5 (15.6%)	2 (6.3%)	9 (28.1%)	0.49
Lift in an awkward position	14 (70.0%)	0.08	2 (10.0%)	1 (5.0%)	8 (40.0%)	0.15
Lift with the load far away from body	8 (50.0%)	0.85	3 (18.8%)	1 (6.3%)	4 (25.0%)	0.82
Lift with twisted trunk	6 (50.0%)	0.87	2 (16.7%)	1 (8.3%)	2 (16.7%)	0.95
Neck in a forward posture for long periods	35 (68.6%)	**0.00***	6 (11.8%)	2 (3.9%)	16 (31.4%)	0.06
Neck in a backward posture for long periods	19 (70.4%)	**0.03***	10 (37.0%)	1 (3.7%)	6 (22.2%)	**0.00***
Make repetitive movement with arms or hands	42 (62.7%)	**0.00***	9 (13.4%)	6 (9.0%)	20 (29.9%)	**0.00***
Reach with arms or hands	34 (65.4%)	**0.01***	11 (21.2%)	4 (7.7%)	16 (30.8%)	**0.00***
Hold hands above shoulder level	29 (72.5%)	**0.00***	5 (12.5%)	3 (7.5%)	19 (47.5%)	**0.00***
Prolonged standing	54 (59.3%)	**0.00***	12 (13.2%)	6 (6.6%)	21 (23.1%)	0.09
Prolonged sitting	29 (65.9%)	**0.02***	9 (20.5%)	4 (9.1%)	11 (25.0%)	**0.04***
Prolonged static posture	35 (67.3%)	**0.03***	5 (9.6%)	4 (7.7%)	14 (26.9%)	0.17
Perform jobs which require exertion of arms or hands	25 (67.6%)	**0.02***	5 (13.5%)	5 (13.5%)	12 (32.4%)	**0.00***

*significant at a p-value of less than 0.05

Significant associations ($p<0.05$) were noted between neck pain and prolonged neck forward posture prolonged standing and prolonged static posture. In addition, prolonged neck backward posture, repetitive movement of arms or hands, holding hands above shoulder level, prolonged sitting, and jobs requiring exertion of arms or hands were found to be significantly associated with both neck and shoulder pain.

Discussion

This study has shown that 52.2% of respondents experienced neck pain in the last 12 months, this is similar among teachers India with a prevalence of 53.53% and among teachers in Hong Kong with a prevalence of 69.3% (Damayanti et al., 2017)(Thomas T. W. Chiu & Lam, 2007a). In addition, there is 39.1% prevalence of shoulder pain which is lower compared among Turkish

teachers of 55.9% (Durmus & Ilhanli, 2012). In this study, our result shows that age was associated with neck pain. Similarly, a previous study stated that different age was associated with neck and shoulder pain, especially among younger teacher (Thomas T. W. Chiu & Lam, 2007a). This may due to the use of the technology device is rapidly increasing among young adult compared to the older generation which more likely leads to the development of neck pain (Yeun & Han, 2017). However, a number of other studies demonstrated that older teacher (more than 40 years) were more likely to have neck and shoulder pain (Ehsani, Mohseni-bandpei, Fernández-de-las-peñas, & Javanshir, 2017; Korkmaz, Cavlak, & Telci, 2011; Yue et al., 2012). The reason for increasing the risk of neck and shoulder pain in older teachers includes age-related physical degeneration, declining tissue healing and thinning of the joint cartilage. (Korkmaz et al., 2011).

Our study shows that years of experience was associated with both neck pain and shoulder pain. Teacher with experiences of 1-9 years has a high prevalence of neck pain and shoulder pain. In a study conducted among school teachers in Hong Kong, teachers with lesser teaching experiences higher prevalence of neck pain and shoulder pain. This could be due to new teachers still adapting to a new working environment and influenced by the psychological and physical stress affecting the wellness of their musculoskeletal condition (Thomas T. W. Chiu & Lam, 2007a).

Prolonged working hours with the computer is also associated with neck pain. Previous studies stated that this maybe due to computer use with a forward head posture which would induce a considerable load on posterior neck muscle and led to muscle fatigue (Ehsani et al., 2017) (Korkmaz et al., 2011)(Thomas T. W. Chiu & Lam, 2007a). This would further increase loading on non-contractile structures and posterior cervical structures causing neck pain (T. T.W. Chiu et al., 2002).

Prolonged forward neck in posture was associated with neck painsimilar to previous studies (Thomas T. W. Chiu & Lam, 2007a), (Ehsani et al., 2017) and (L. S. Eggers et al., 2018). Many school teachers reported that teaching required them to keep their heads in a prolonged forward bent posture, which can be expected due to the hours spent reading, marking, reviewing of examination scripts, writing as well as computer usage. Those occupational activities increased vulnerability to neck and shoulder pain (Ehsani et al., 2017) (L. S. Eggers et al., 2018).

Our study showed mild neck disability among the primary school teacher in Nilai, Negeri Sembilan, Malaysia. In contrast, a study showed a moderate level of disability of neck pain among school teachers in Lahore possibly due to the larger sample size in the latter. Our study result found that 3.5% of neck pain and 4.3% of shoulder pain participants also changed their jobs due to this trouble. Karakkaya et al, 2015, have shown a similar trend as the number of teachers who had to change jobs or duties (even temporarily) because of the musculoskeletal trouble was 4%. (Karakaya, Karakaya, Tunç, & Kıhtır, 2015).

Conclusions and Recommendation

This study demonstrated a high prevalence rate of work-related neck and shoulder disorders among primary school teacher in Nilai, Negeri Sembilan. Different individual, work-characteristics and

occupational factors were important risk factors of work-related neck and shoulder disorders. Besides, this study concludes that primary school teacher in Nilai, Negeri Sembilan, Malaysia experienced a mild level of disability of neck. Therefore, effective preventive strategies have to be addressed in this area to prevent further disability and improve the quality of life of primary school teachers in Nilai, Negeri Sembilan, Malaysia. Further research is suggested to explore any existing intervention or strategies for the work-related musculoskeletal disorder of neck in a school setting for preventative intervention.

Conflict of Interest

The authors declare no conflict of interest at any point during the conduct of this research.

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