Iran J Public Health, Vol. 45, Suppl. Issue No. 1, Feb 2016, pp.85-92

Original Article

Work Task and Job Satisfaction Predicting Low Back Pain among Secondary School Teachers in Putrajaya

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(Received 20 Nov 2015; accepted 16 Jan 2016)

Abstract

Background: : This study aimed to quantify the prevalence of low back pain (LBP), analyze its associated risk factors and explore on how LBP affects job satisfaction among 120 school teachers in Malaysia.

Method: A cross-sectional study was conducted among randomly selected teachers from four secondary schools in Putrajaya from February to March 2015. The level of LBP was assessed using a standardized Nordic Questionnaire, while Teachers' Satisfaction Scale was used to determine teacher satisfaction level. The response rate for this study was 100% (120/120).

Results: The prevalence of LBP among respondents was 72.9%. Gender (*P*=0.016), prolonged sitting (0.015), walking up and down stairs (0.012), and lifting loads with hands (0.030) were significantly associated with LBP among respondents after controlling for other factors including age, marital status and other work tasks. The strongest predictor of LBP among teachers was walking up and down stairs (OR = 9.45) indicating that respondents who reported having to walk up and down stairs frequently were 9 times more likely to have low back pain compared to those who did not.

Conclusion: Prioritization of prevention and control measures should focus more on promoting healthier ergonomic movement among teachers rather than providing knowledge and awareness on low back pain and job satisfaction level among teachers.

Keywords: Low back pain, Secondary school teachers, Putrajaya, Occupational health

Introduction

Musculoskeletal Disorders (MSDs) is a global issue and is considered as one of the most common and expensive occupational health problem (1). MSDs can be divided into eight body parts, which are one or both thighs, one or both hands, one or both legs, shoulder, elbow, neck, upper back pain and LBP. Almost half of the adult population suffers from low back pain, which lasts for more than two days in a year (2). Those who have low back pain were observed to develop other psychological, social and physical health problems (3). MSDs among workers increase financial loss due to work absences, medical treatment, early retirement and poor work performances (4-6).

School teachers have been indicated in previous studies to report high prevalence of MSDs (7). This prevalence ranges between 39% and 95% (8). MSDs is also reported as one of the main causes of poor health among retired school teachers (4). Some researchers believed that several work factors were significant in predicting musculoskeletal disorders among school teachers such as lifting of heavy load, prolonged sitting, improper posture, walking up and down stairs, writing on board and

prolonged computer use (9-11). Other significant factors were gender, age, psychological framework of teachers including anxiety and low job satisfaction as well as psychosocial work factors such as lack of social support and high psychologically work demand (9-13).

Teachers form the majority of the government workforce in Malaysia, thus their health and performance are vital for the overall productivity of the Malaysian government education service. Good teachers' performance encourages the production of good students as well as increases the education standard among Malaysian schoolchildren. Although many studies have dealt with MSDs among occupational groups in other countries, data on the exact nature and prevalence of this important health problem is limited in Malaysia especially among teachers. A previous study on low back pain was conducted only among primary school teachers (9). Identifying the potential causes of MSDs among school teachers is therefore important to assist in improving productivity among teachers. Knowledge on the prevalence of LBP and associated risk factors are important basic information that can provide practical guidance for minimizing teachers' exposure and in preventing LBP among them.

This study aims to determine the prevalence of LBP among secondary school teachers in Putrajaya and its potential factors; a) socio-demographic factors b) teachers' work factors c) teachers' satisfaction d) knowledge and awareness on LBP. Findings of this study may help in identifying the main factors for MSDs among school teachers which may enhance the current preventive measures, if available, to be more efficient and cost effective. Prevention strategies against LBP can only be successful if its contributory and associated risk factors are identified and better understood.

Methods

Study Location and Study Population

The selected locations were secondary schools in Wilayah Persekutuan, Putrajaya. In Putrajaya from February to March 2015, there were 11 secondary schools of which two were boarding and religious schools (14). Four schools in Putrajaya were selected randomly from a list obtained from the Ministry of Education's website. Thirty teachers were selected randomly from the teachers' name list obtained for each selected school. One hundred and twenty secondary school teachers participated in this study with the inclusion criteria of full time/permanent posts and minimum of one-year teaching experience. This study location was chosen because of the school facilities available, proximity to town and their location in an urban area. Urban schools normally have large number of pupils. As a result, there is an increase in job demand with extra responsibility and additional workload among the teachers. The study population was secondary school teachers who have suffered and who have not suffered LBP throughout their job career from four secondary schools in Putrajaya.

Study Instrument and Data Collection Procedure

A combination of self-adapted and modified standardized questionnaires was used for the research. Two versions of the questionnaires in English and Bahasa Malaysia were used. The questionnaires consist of five parts with 39 questions. The questionnaires were collected after one week from the date of the questionnaires given to the respondents.

Part one of the questionnaire was on the respondent's demographic factors, which include age, gender, marital status, height and weight to calculate body mass index (BMI) of the respondents. Part two of the questionnaire assesses teachers' work factors, which were based on the findings from previous studies covering lifting loads, prolonged standing and sitting, walking up and down stairs, writing on white/black boards, and association with the occurrence of low back pain (LBP) (9). Direct observation of the teachers in school was also made as a basis for identifying their work factors in LBPs. The Dutch Musculoskeletal Questionnaire (DMQ) was used for additional items (15). Work tasks of teachers were measured using a dichotomous scale (No/Yes) during an average working day. Work was categorized into tasks including lifting loads with hand, prolonged standing

(≤ 2 hours per day), sitting (≥ 4 hours per day), walking up and down stairs and writing on boards. Additional related questions, such as types of loads they carry, reasons for prolonged standing and sitting, frequency of walking up/ down stairs and writing on boards were also asked. Teacher's experience and job responsibility as were also assessed.

Questions on musculoskeletal pain were constructed according to a modified Nordic questionnaire in part three of the questionnaire (16). Nordic is a group that developed standardized questionnaires for the analysis of musculoskeletal symptoms. Standardized Nordic Questionnaire consists of 2 types of questionnaires which are the General Questionnaire and Specific Questionnaire. The General Questionnaire consists of a diagram in which the human body (viewed from the back) is divided into nine anatomical regions, while the Specific Questionnaire concentrates on anatomical areas in which the muscular-skeletal symptoms are most common (low back, neck and shoulder symptoms).The main advantage in using these questionnaires is that they analyze the severity of the symptoms, their effect on activities at work and during leisure time, total duration of symptoms and sick-leave during the preceding 12 months. In this study, the Specific Questionnaire (Low Back Pain symptoms) was used and was accompanied by analytical diagrams depicting the specific sites. Part four of the questionnaire assesses the respondents' knowledge on LBP as one of the occupational hazards, as well as the sources of information (fellow friends, seminar/trainings and magazine/newspapers or articles). Other related questions asked were knowledge on LBP care such as seeking treatment from specialist.

In the last part of the questionnaire, standardized Teachers' Satisfaction Scale (TSS) was used for the assessment of the teachers' overall satisfaction with their profession (17). The section consists of five items asking the teacher how he/she feels about her/his level of job satisfaction in various ways by changing the wordings to fit the teaching profession (18). For example, an item of the LSS is "In most ways my life is close to my ideal. This item is modified to "In most ways, being a teacher is close to my ideal. For each item, the teachers respond on a 5-point scale with the endpoints 1 = strongly disagree to 5 = strongly agree. This questionnaire was validated and translated previously to Malay Language (17).

Quality Control and Data Analysis

Pre- testing of the questionnaire was conducted on a group of respondents from other secondary schools who are similar in characteristics to the research population to observe their ability in understanding and answering the questionnaire. A reliability test was performed using Statistical Package for Social Sciences (SPSS) and the calculated Cronbach alpha value was 0.75, which was considered acceptable for reliability testing (19). The data analysis was done by using SPSS Version 21.0. Chi-square test and correlation test were used in the statistical analysis.

Ethical Consideration

The Ethical Committee for Research involving Human Subjects of Universiti Putra Malaysia approved this study. The respondents were given consent letters and a document describing the procedure of the study and its objectives. All the information and identity of respondents in this study are kept confidential.

Results

The response rate for this study was 100%. Out of 120 sampled, 120 questionnaires and signed consent forms were returned to the researcher. In terms of socio demographic distribution, Table 1 shows that 8 (6.7%) were aged between 19-29 years old, 33 (27.5%) were aged between 30-39 years old, 49 (40.8%) were aged between 40-49 years old, and 30 (25.0%) were aged 50 years old and above. Most of the respondents were females (n = 108 (90%)) among them, 10 (8.30%) were single, 110 (91.70%) were married. The Body Mass Index (BMI) of most of the respondents was in the obese category (n = 40 (33.83%)) which was more than 28.0 kg/m^2, followed by overweight (n = 38 (31.7%)) and normal (n = 42 (35.0%)). In summary, most of the respondents were aged between 40-49 years old, females, married and have normal BMI.

Table 1: Socio-demographic characteristics of respondents (n = 120)

Socio-Demographic Characteristics		Frequency (n)	Percentage (%)	Mean (SD)
Age	19-29 years old	8	6.7	42.32 ± 7.95
	30-39 years old	33	27.5	
	40-49 years old	49	40.8	
	50 years old and above	30	25.0	
Gender	Male	12	10.0	
	Female	108	90.0	
Marital Status	Single	10	8.30	
	Married	110	91.7	
Body Mass Index (kg/m^2) {(BMI)	Normal (≤ 23.9)	42	35.0	26.18 ± 5.42
	Overweight (24.0 -27.9)	38	31.7	
	Obesity (≥ 28.0)	40	33.3	

Prevalence of low back pain

Majority of the respondents (79.2%) experienced low back pain or discomfort throughout their career. Also 68 (56.7%) of the respondents suffered from low back pain in the past 12 months. From 120 respondents, 42 (35.0%) of them suffered from low back pain in the past 7 days. The number of respondents who suffered from low back pain on the day of the study was 26 (21.7%), while 94 (78.3%) of respondents did not have such problem.

Consequences of low back pain

The effects of having low back pain in the past twelve months was asked in the questionnaire. Out of 120 respondents, 6 (5.0%) of the respondents have been admitted to hospital because of their low back pain problems. However, only 1 person (0.8%) had to change jobs or duties due to the problem. In the previous twelve months, 56 (46.7%) of the respondents reduced their daily activities at home or away from home because of the problems they face due to LBP. Twenty-eight respondents (23.3%) took medicine to solve and relieve their low back pain problem. Approximately 19 (15.8%) of respondents took medical leave to rest due to low back pain.

Related Work Tasks among Respondents

Fourty-four percent of the respondents have been teaching for less than 15 years, while 55.8% have been teaching for more than 15 years. Most of the respondents are subject coordinators (92.5%), while 50.8% were classroom teachers, and 45.0% of the respondents were both classroom teacher and subject coordinator. With reference to teachers' work tasks, 70.0% from 120 respondents stated that they lift loads with their hands during work, 37.5% of them claimed to sitting more than 4 hours per day, and 92.5% of respondents stated that they stand for more than 2 hours per day during work. They sit for long duration to mark exam papers, students' exercise and complete their teaching plan. Prolonged standing is involved while writing on white and black board, monitoring students' work and performance at their desks and in teaching activities. Around 93% of respondents claimed that they have to walk up and down stairs at their workplace 2 to 5 times per day and 95.0% of the respondents reported that they always write on white/ black board 2 to 5 times per day.

Knowledge and Awareness on Low Back Pain

Findings of this study indicated that 44 (36.7%) of the respondents did not received any information that LBP is one of the occupational hazards. Hence, 108 (90.0%) respondents suggest that in-

formation about LBP as one of occupational hazards should be disseminated among teachers. Among them, 48 (40.0%) would like the information on LBP to be made available in the mass media like television or radio. Thirty-six (30.0%) respondents want the information to be disseminated in seminars or extra training conducted for teachers. While, 23 (19.2%) want it in the form of brochures or pamphlet. However, only 33 (27.5%) of them have received information about proper LBP care and 106 (88.3%) of respondents think that information about LBP care should be distributed among school teachers. 38 (31.7%) of the respondents want the information about proper LBP to be taught in the form of seminars for teachers, 37 (30.8%) in the media such as television and radio, and 36 (30.0) of the respondents want the information distributed in the form of pamphlets.

Teacher Satisfaction Level

The mean score of the teachers' satisfaction scale (TSS) among the respondents is 22.13 with a standard deviation of 2.5. Maximum and minimum values of teacher satisfaction scale were 25 and 13. The scale consists of five items asking the teachers how he/she feels about job satisfaction in various ways. Results of this study indicate that most of those respondents achieved high maximum score of teachers' satisfaction with the range from 22 to 25, thus indicating that they were highly satisfied with their profession.

Bivariate Relationship between Independent Variables and Low Back Pain (LBP) among Secondary School Teachers in Putrajaya

Bivariate analyses were conducted between all independent variables and low back pain. Results on significant relationships are shown in Table 2. Findings indicated that the socio-demographic variables on marital status and gender were significantly associated with low back pain among respondents. Four work tasks; namely lifting loads with hands, prolonged sitting, prolonged standing and walking up and down stairs were found to be significantly associated with low back pain (χ^2 = 4.87 to 9.02)

Table 2: Bivariate analyses between dependent variables and low-back pain among respondents (N = *P-value <0.05)

Variables	Yes n (%)	No n (%)	χ^2	*P*- value	OR (95% CI)
Marital Status					
Single	7 (70.0)	3 (30.0)	0.556	**0.456***	1.714 (0.410-7.170)
Married	88 (80.0)	22 (20.0)			
Gender					
Male	6 (50.0)	6 (50.0)	6.877	**0.009***	4.684 (1.362-16.110)
Female	89 (82.4)	19 (17.6)			
Lifting loads with Hands					
Yes	71 (84.5)	13 (15.5)	4.872	**0.027***	2.731 (1.098-6.790)
No	24 (66.7)	12 (33.3)			
Prolonged Sitting (> 4 hours)					
Yes	42 (93.3)	0 (6.7)	8.761	**0.003***	5.811 (1.628-20.743)
No	53 (70.7)	22 (29.3)			
Prolonged Standing (>2 hours)					
Yes	91 (82.0)	20 (18.0)	7.112	**0.008***	5.688 (1.401-23.088)
No	4(44.4)	5(55.6)			
Walking up and down stairs					
Yes	92 (82.1)	20 (17.9)	9.023	**0.003***	7.667 (1.692-34.734)
No	3 (37.5)	5 (62.5)			

Multivariate Analysis between Independent Variables and Low Back Pain among Respondents

Direct logistic regression was performed to assess the impact of selected independent variables on low back pain among respondents. The model contains seven independent variables; age, gender, marital status and the four types of teaching work tasks (lifting loads with hands, prolonged sitting, prolonged standing and walking up and down stairs). The full model containing all predictors were statistically significant, χ^2 (7, N = 120) = 30.07, $P < 0.001$, indicating that the model was able to distinguish between respondents who have and did not have low back pain. The model as a whole explained 22.2 – 34.6% of the variance in low back pain and correctly classified 95.8% of cases. Findings indicate that the significant predictors of low back pain were gender, prolonged sitting, walking up and down stairs and lofting loads with hand. The strongest predictor for low back pain was walking up and down stairs (OR = 9.45) indicating that respondents who reported having to walk-up and down stairs frequently were 9 times more likely to have low back pain compared to those who did not have to, controlling for all other factors in the model. See Table 3.

Table 3: Logistic Regression predicting low back pain among respondents (N = 120)

	B	S.E.	Wald	df	*P*	Odds Ratio	95% C.I. for EXP(B)	
							Lower	Upper
Age (yr)	-0.045	0.038	1.385	1	0.239	0.956	0.887	1.030
Marital status	1.090	0.911	1.432	1	0.231	2.974	0.499	17.722
Gender	1.805	0.750	5.799	1	0.016*	6.080	1.399	26.419
Prolonged Sitting (> 4 hours)	1.737	0.712	5.950	1	0.015*	5.679	1.407	22.925
Prolonged Standing (> 2 hours)	0.794	0.897	0.784	1	0.376	2.213	0.381	12.840
Walking Up and Down Stairs	2.247	0.899	6.249	1	0.012*	9.459	1.625	55.072
Lifting Loads With Hand	1.231	0.566	4.728	1	0.030*	3.424	1.129	10.386
Constant	-3.237	1.922	2.837	1	0.092	0.039		

*$P < 0.05$

Discussion

The first aim of this study was to determine the prevalence of low back pain among secondary school teachers in Putrajaya. The prevalence of low back pain in this study was 79.2%. The prevalence of self-reported LBP among teachers found in countries such as Saudi Arabia, Hong Kong and Brazil ranged between 39% and 95% (1). Based on the findings in this study, it was found that the prevalence of low back pain among secondary school teachers in Putrajaya could be considered as particularly high. This study also showed a higher prevalence of low-back pain compared to the study conducted in Ethiopia (53.8) (20), Botswana (55.7%) (1) and China (45.6%) (8). One of the possible reasons causing the difference in the prevalence could be the facility provided for the teachers at their institution or social and economic differences between Malaysia and the countries mentioned, the way in which work was organized may contribute to the differences observed in comparison to this study.

Findings of this study showed that four independent variables were significantly associated with the prevalence of low back pain among respondents, which were gender, prolonged sitting, walking up and down stairs, and lifting loads with hands. Data from the Ministry of Education stated that female teachers constitute the majority of school teachers in Malaysia (69.1%) and their participation in this study (90.0%) is in agreement with the provided statistics (9). In this study, female teachers showed a significantly higher prevalence of low back pain (82.4%) than men (50.0%). Female teachers were four times more likely to experience low back pain

(OR 95% CI = 4.684 (1.362-16.110). A study on low back pain among secondary school teachers in Klang Valley, Malaysia also showed similar result (48.1%) of a higher prevalence among women (9) Work activities, which involve heavy lifting, prolonged sitting, and prolonged standing, contribute to the development of musculoskeletal disorders (21, 22). Activities of sustained sitting of frequent reading, marking assignment, and standing up teaching in class are unsafe acts and favour the development of neck/shoulder pain, low back pain and upper limb pain found in teachers (9, 5, 21). Studies have also confirmed that sitting for more than 3 hours daily could be a risk factor for low back pain (23-25).

Conclusion

The prevalence of LBP among respondents was considered high and a few factors such as gender, prolonged sitting, walking up and down stairs and lifting loads with hands were identified as the significant factors predicting low back pain among respondents. Other independent variables including job satisfaction, and knowledge and awareness about low back pain were not found to be significant. Therefore, findings of this study suggest that prioritization of prevention and control measures should focus more on promoting healthier ergonomic movement among teachers. Currently, procedures and guidelines on good ergonomic movements for industrial workers involved with manual handlings are readily available but not for teachers. Detailed and specific guidelines on good ergonomic movement for teachers are worth developing to minimize the prevalence and effects of low back pain among them. Future intervention studies on how to reduce back pain among teachers is therefore warranted. Future studies investigating the prevalence of low back pain among teachers need to consider a larger sample of randomly select subjects to increase the power of the study. In addition, inclusion of more instrumental measurements will provide a more convincing result to strengthen further the argument that low back pain is of great concern among the teaching population.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Acknowledgements

The authors declare that there is no conflict of interests.

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