



Prevalence of Low Back Pain among Public High School Teachers in the City of Manila

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ABSTRACT

Objectives: To determine the prevalence of low back pain (LBP) among public high school teachers in the City of Manila and contributing factors leading to LBP. **Methodology:** A cross-sectional observational study was conducted at the five largest public high schools in the City of Manila. Five hundred eighteen teachers were given questionnaires on specific working patterns of teachers which include questions on demographics, psychosocial status, job satisfaction, socio-economic status, and working hours per day. Modified Oswestry Disability Questionnaire was also given to determine how LBP affected their ability to manage everyday life. **Results:** Fifty three percent of 379 public high school teachers presented with LBP. Stress level (odds ratio=4.15) & increased working hours (5-6 hours OR=1.9; 7-8 hours OR =2.5) showed significant risks for LBP. Smoking (OR=1.38) and alcohol consumption (OR=1.01) showed weak correlation with LBP. **Discussion:** Level of stress reflects the teachers' increased risk for acquiring LBP secondary to exposure to fatigue, work environment and the satisfaction on their job. Daily working hours also posed greater risk for LBP as teachers are more exposed to prolonged and incorrect postures. **Conclusions:** Stress level and increased worked hours per day are significant risk factors for LBP development among the teachers.

Keywords: Filipino teachers, low back pain (LBP), modified Oswestry LBP disability questionnaire (non-meSH)

INTRODUCTION

Low Back Pain is a widespread disorder in which lifetime prevalence in adults is 50% to 70%.⁶ Teaching is a job which has the potential for high risk for musculoskeletal disorders (MSD). Prolonged standing, sitting, poor ergonomically designed workplace, and stress are just a few factors contributing to such disorders. The Department of Education states that the Philippines have a total of 13,049,134 public school enrollees (SY 2004-2005) with only 340,231 teachers employed. This huge teacher-student ratio may be a sub-factor for having musculoskeletal disease in this population. A large amount of effort is needed to contained a class with more than 45 students compared to a class with less class size. Teachers usually patterned their teaching technique based on the abilities of the student. Having large class size means dealing with different types of students, thus different techniques for teaching. Work-related musculoskeletal disorders (WRMSD) have

the highest incidence rate of all nonfatal occupational injuries.¹ Most journals are focused on the industrial setting because of the impact of WRMSD on the worker's compensation program. However, because such programs do not exist locally, particularly for teachers in public high schools, little interest has been shown in determining the prevalence of musculoskeletal disorders among this population and the factors that lead to their development.

Overexertion, repetitive range of motion and prolonged static positions, particularly long periods of standing, have been suspected as culprits in work-related musculoskeletal pain. The World Health Organization has characterized "work-related diseases" as multi-factorial to indicate that a number of risk factors such as physical, work organizational, psychosocial individual, and socio-cultural contribute to causing these disorders.² Studies have reported that "work organization factors" contribute to these musculoskeletal disorders. These include various aspects of job

content (e.g., workload, repetitiveness, job control, mental demands, job clarity, etc.); organizational characteristics (e.g., tall versus flat organizational structures, communications issues); interpersonal relationships at work (e.g., supervisor-employee relationships, social support); temporal aspects of the work and task (e.g., cycle time and shift work); financial and economic aspects (e.g., pay, benefit, and equity issues); and community aspects (e.g., occupational prestige and status) which pose threat to health.¹ These things usually relate to the conditions of teachers. Teachers are usually given heavy workload due to large number of enrollees. Shifting of class into three sessions is usually seen in public schools. Compensation is also a big issue since public school teachers (elementary and high school teachers) receive low salary compared to college instructors. Teachers are also usually given work outside their job description like supervising elections.

Musculoskeletal disorders (MSD) are common conditions present in many occupations. These conditions affect tendons, nerves, muscles and supporting structures in the body. These have been recognized as having an occupational related etiology as early as the beginning of the 18th century. In 1713, Bernardini Ramazzini, the father of occupational medicine, in his treatise *De Morbis Artificum Diatriba* documented that musculoskeletal disorders were associated with workplace factors. Regarding bakers, Ramazzini noted, "Now and again, I have noticed bakers with swelled hands, and painful too; in fact the hands of all such workers become much thickened by the constant pressure of kneading the dough"³. Of sedentary workers, Ramazzini observed, "men and women who sit while they work at their jobs, become bent, hump-backed and hold their heads like people looking for something on the ground; this is the effect of their sedentary life and the bent posture as they sit ...".³ It was not until the 1970s that occupational factors were examined using epidemiologic methods, and the issue of work-relatedness of these conditions began appearing regularly in the international scientific literature.

This study was prompted by the possible risk of low back pain among public high school teachers and the lack of studies investigating this. This study posed the research question: What is the prevalence of low back pain in public high school teachers in Metro Manila?

The aims of the study were to:

- Determine the prevalence of low back pain among public high school teachers in the City of Manila, and
- Investigate contributing factors to low back pain in public high school teachers in the City of Manila.

METHODOLOGY

Research design

This paper describes an observational study using a cross-sectional design. Epidemiological studies are used to describe the health status of a population and investigate the relevant factors that influence health. As there is no information currently available on the musculoskeletal health of Filipino teachers, specifically on low back pain, an epidemiological study is appropriate to investigate this. A cross sectional design was chosen, as it is an efficient and economical first-line method of gathering data on disease prevalence and exposure.

Participants

There are about 3,736 public high school teachers in the City of Manila. Teachers in the five largest high schools in City of Manila were invited to participate in the study. Sampling in this manner was efficient, and provided access to a large number of teachers in a small number of sites. Eligible subjects were full time regular public high school teachers with at least four years of working experience. This criterion was used to ensure teachers had sufficient exposure and are likely to have been affected by the occupational risk factors of teaching. Teachers were excluded from the study if they had significant LBP or other WRMD prior to commencing work as a teacher. Previous LBP was deemed significant if LBP ever prevented them from attending their previous occupation whether that is work, recreation or study. The exclusion criteria potentially identified a sample of subjects that were free of significant LBP or other WRMD prior to commencing work as a teacher. Sample size calculation with 95% confidence interval showed that a sample size of at least 376 must be included in the study.

Procedure

Ethical approval was secured from the Research Center for Health Sciences of the Faculty of Medicine & Surgery, University of Santo Tomas. Permission was also sought from The Department of Education (DepEd) – Manila to conduct the study. A written memo was forwarded to the respective principals stating objectives and relevance of the study. A number of survey questionnaires, pre-determined by the principal, were given to an officer in each school who was tasked to disperse the survey forms to the participating teachers.

Measurement tools

A review of the literature was performed to find valid and reliable questionnaires that were efficient to complete, measured low back pain adequately, and covered a range of possible causes of low back pain.

Low back pain and general causes

Of the various questionnaires available to measure low back pain, the Modified Oswestry Disability Questionnaire (modified ODQ) was chosen for use in this study. According to Fairbanks et al 1980⁵, the purpose of the modified ODQ is to measure the level of disability occurring in people with low back pain. The questionnaire consists of a 10 - part series of questions on the relationship between low back pain & pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, traveling, and employment/ homemaking, each with 6 possible responses. ODQ is one of the widely used outcome measures in determining the functional status of people with low back pain. The modified ODQ used in this study replaced the sex life section with a question related to fluctuations in pain intensity.⁵

Scores obtained with the modified version of the ODQ have high levels of reliability (ICC=.90), construct validity (correlations with global patient ratings and other region-specific disability measures greater than .80), and responsiveness (effect size of 1.8 in 69 patients who were receiving physical therapy interventions for work-related LBP).⁵

Teacher-specific causes of LBP

There was no other survey instrument which covered the potential causes of low back pain in teachers. A purpose-built survey instrument was thus developed, which collected information on previous low back pain, and specific working patterns of teachers. Questions included basic demographic information, psychosocial status, socioeconomic status, working hours per day and exposure to hazards while working. The formulated questionnaire was validated by three physical therapists for its construct and content.

The study therefore consisted of a three part survey administered in the following order: (1) Personal Information Survey; (2) the series of questions on occupational patterns, and (3) the modified Oswestry Disability Questionnaire (ODQ).

Statistics

Appropriate descriptive statistics were calculated for all study measures. Age-related differences between sufferers of LBP and asymptomatic teachers were determined using independent t tests, and gender-related differences were calculated as chisquare statistics. The univariate

associations between low back pain and potential risk factors (stress, working hours, alcohol, smoking, salary etc) were calculated as Odds Ratios (95%CI).

Each of the exposure variables which demonstrated a significant risk increase for LBP was identified. These were stress, low job satisfaction, smoking, working hours per day and socio-economic status. Alcohol intake was also considered as a potential risk factor for back pain. Each of the significant exposures which were likely to increase the risk of LBP was univariately stratified with each of the other exposure variables that were thought to have a plausible biological relationship. For example, teachers who are stressed may be those working longer hours per week. Stratum specific odds ratios are used to determine significant combinations of risk factors for LBP. The prevalence of LBP in teachers who are stressed and work long hours is compared to the prevalence in teachers who are not stressed and teach long hours to test if stress is truly a risk factor for LBP independent of working long hours. Although calculations were made comparing the effect of the significant variables for every other risk factor only — ~~the significant findings are reported (i.e. odds ratios with a lower confidence limit greater than one).~~

RESULTS

Sample: To obtain the required minimum sample size, all teachers (992) in the participating high schools were invited to participate (Table 1). Five hundred eighteen (518) agreed to participate and were consequently surveyed. Sixteen (16) teachers' responses were not included due to incomplete answers in the survey, and 123 were excluded for reporting low back pain prior to working as a teacher. A total of 139 responses were excluded from the study. Figure 1 provides the reasons for exclusion.

The eligible sample was 379 (76 male, 303 female), mean age 45.2 years, which satisfied the sample size calculation with 95% confidence interval. The gender proportions in the sample reflected the general gender bias of secondary teachers in Manila (20% males, 80% females).. The low number of male participants in this sample is representative of the secondary teachers population, therefore the prevalence of LBP is reported for the entire sample (n=379).

Table 1: Participating Schools with data on number of teachers and students			
Name of School	No. of students	No of Teachers	Student to teacher ratio
Torres HS	5974	227	26:1
Tondo HS	5915	157	38:1
Lakandula HS	5474	160	34:1
Jose Abad Santos HS	5230	248	21:1
Araullo HS	5096	200	25:1
Total	27, 689 students	992 teachers	

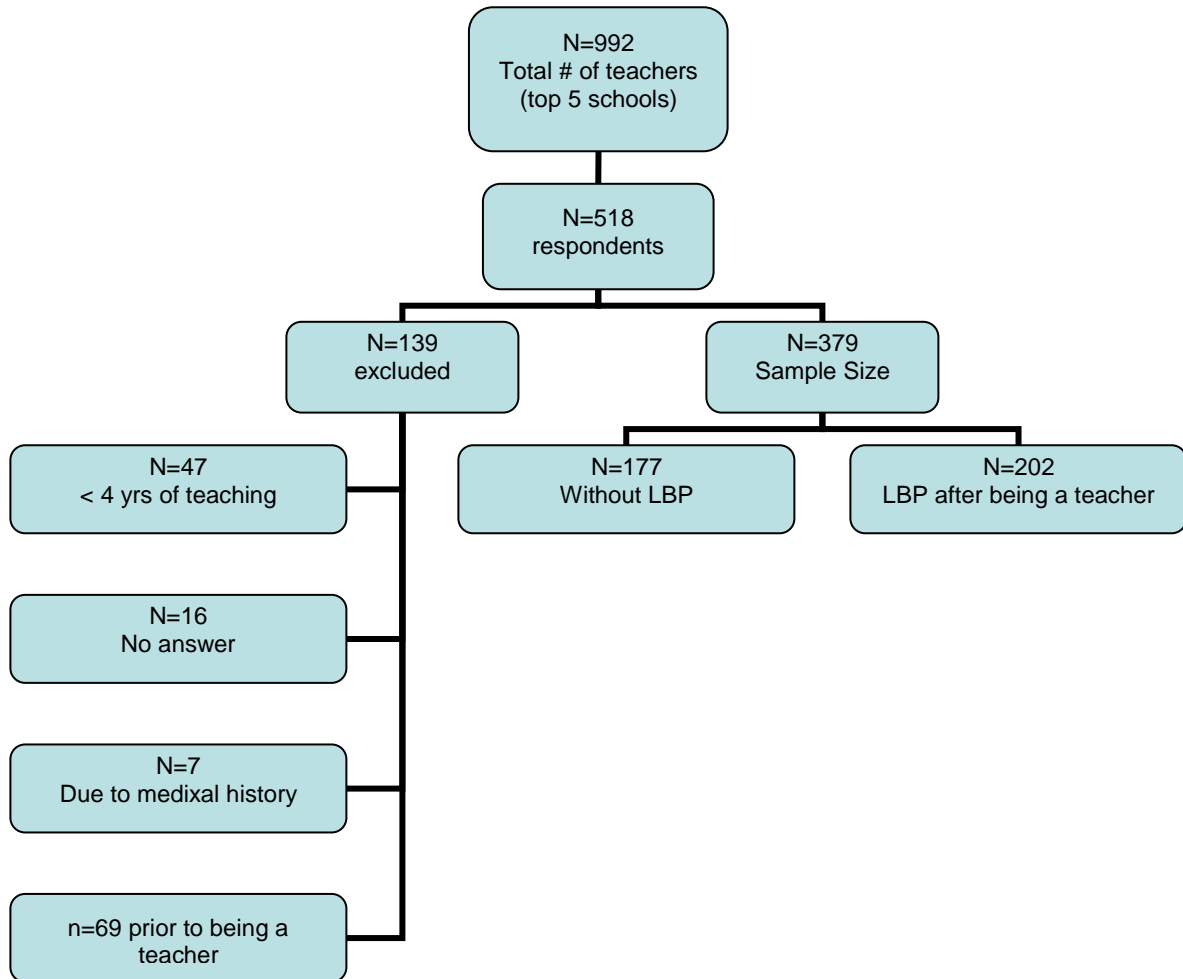


Figure 1 – Reasons for Exclusion

Prevalence of back pain: Of those teachers reporting back pain on the Modified Oswestry Low Back Pain Disability Questionnaire, 14. 5% reported minimal disability, 49.4% reported moderate disability, 25% reported severe disability, 6% reported being crippled and 5% reported being bed bound. Results of the questionnaire showed that around 11% may have exaggerated their pain level.

The Influence of Anthropometric and Occupational Variables

Age and gender: There was no significant difference in age and gender between the group with LBP and the group without LBP ($p>0.05$).

Smoking: The prevalence of back pain among those teachers who smoked was 72%, and the prevalence of back pain among those who do not

smoke was 65%. This supported a weak direct association between smoking and back pain (OR 1.4)

Alcohol: The prevalence back pain among those who drank alcoholic beverages was 66% and the prevalence of back pain among those who do not drink alcohol was 65%. Thus there was no direct association between low back pain and alcohol consumption (OR 1.01)

Working hours per day: The prevalence of back pain among those who worked 5 – 6 hours per day was 69.8%, while the prevalence of back pain among those who worked fewer hours was 55%. The odds of back pain being associated with long working hours was significant (OR 1.88)

This association was strengthened when examining the prevalence of back pain among those who worked even longer hours per day (7 - 8 hours) (77.9%). The prevalence of back pain among those who worked fewer hours per day was 58.3%. These prevalence figures related to significantly predictive odds ratio between hours of work and back pain equivalent to 2.5

Stress level: Based on the stress level, the odds of stress occurring among teachers with back pain was 4.15 times higher than low stress. This means that high stress levels are significant contributors to back pain occurrence.

DISCUSSION

This study reported high prevalence of back pain in Filipino metropolitan secondary teachers, and establishes the first known epidemiological information in this area. The sample was appropriately powered for believable findings, and suggests that a better understanding of causal factors is required, as is a better understanding of preventative measures.

From the Modified Oswestry Low Back Pain Disability Questionnaire, 49.4% respondents reported moderate disability. This may imply that majority of teachers experience pain at a barely tolerable level. This is supported by comments from teachers on the questionnaire, *Pain medications provide me with complete relief from pain.* Moderate disability encompasses a description of taking medications for complete pain relief. The subjective pain intensity perceived by the patient can largely support the development of an LBP that is behaving to be chronic. Rucker et al recommended that 75% or greater of the maximum intensity on pain scale

should be used as the threshold to delineate pain intensity as an important factor affecting a developing chronic LBP.¹⁸

Pain prevents me from lifting heavy weights off the floor, but I can manage if the weights are conveniently positioned (e.g., on a table). Troup in 1965 found that trunk flexion combined with rotation when lifting compounded the most common cause of back pain at work.¹⁹ The teacher's back pain may become exaggerated when lifting especially when the load to be lifted is too heavy for one's own capacity, the method used for lifting is incorrect and the duration of lifting is prolonged. These were the factors that they should be educated on for them to become aware of the potential hazards that will predispose them to developing or preventing further occurrence of LBP.

It is painful to take care of myself, and I am slow and careful; Pain prevents me from walking more than 1/2 mile; Pain prevents me from sitting for more than 1 hour; Pain prevents me from standing for more than 1 hour. Pain prevents me from participating in more energetic activities (e.g., sports, dancing). My pain restricts my travel over 2 hours. I can perform most of my homemaking / job duties, but pain prevents me from performing more physically stressful activities (e.g., lifting, vacuuming). Pain is present usually with physical activity, especially lifting, bending, sitting and exercises that increase intra-abdominal pressure. Strengthening the abdominal and back muscles is recommended as these are often weak in individuals with sedentary occupations such as teachers. Deep stabilizing muscles of the spine during active movement in individuals with low back pain has an altered or delayed recruitment therefore it is a primary goal to increase core stability to adapt to various forces and demands imposed on the spine.²⁰

Even when I take medication, I sleep less than 6 hours. Studies by Smith et al, Arikan et al, McCracken et al, & Menefee et al (as cited in Marin et al) state that it is generally an accepted fact that people with low back pain may be experiencing sleep disturbance at some point in their lives. In research findings, they suggest that sleep disturbance is a result of pain in view of sleep deterioration claimed after the onset of back pain. Since pain in turn seems to worsen when patient is sleep-deprived, this cycle continues to happen. Also, the mattress type used on their beds may be a factor in disturbance of sleep.²¹

Associates of back pain: This study found that long hours of work, and high stress, were the strongest associates of back pain. Psychosocial issues have been reported as important factors in workplace injury in other studies. Psychosocial factors such

as stress and job dissatisfaction have been associated with increased reports of LBP hence they are recorded in the study of Bigos et al. The researchers stated that workers who “hardly ever” enjoyed their jobs were 2.5 times more likely to acquire a back injury than those who reports “almost always” enjoyed their work. This would reflect the psychological aspect involved in teaching when one is dissatisfied with her work probably due to the work environment, co-workers surrounding her, fatigue at the end of the day and a larger degree of stress associated when worrying about a students’ performance in computing their grades even after work. In this study, stress significantly increased the risk of back pain among teachers by approximately four times. Stress process as is also described in a term “psychosocial” also constitutes the interactions with factors associated with the job and work environment which may impact the person’s performance of work and to the development of back pain. Job satisfaction was included as this is also one of the contributing factors included in the stress process confounding an individual’s exposure to back pain. Persons who view their occupations as boring, repetitious or dissatisfying might also report a higher rate of LBP.⁷

Longer working hours expose teachers more to factors that are associated with LBP such as prolonged standing, prolonged sitting, and awkward posture at work. Prolonged sitting for more than 4 hours showed an increased risk for developing LBP compared to prolonged sitting for just an hour, which did not show any increase risk for LBP.⁸ Increased intradiscal pressure account to the development of low back pain in prolonged sitting which is greater than in prolonged standing.⁹ Standing was reported to have a positive relationship with low back pain but was not shown to increased intradiscal pressure unless it is accompanied by twisting or side bending motion.¹⁰

Smoking, alcohol consumption and salary were not associated with LBP. The smoking finding concurs with a four year perspective study by Eriksen et al which tested the hypothesis that heavy physical work is a stronger predictor of low back pain in smokers than in non-smokers. It showed no association between smoking in 1990 and low back pain in 1994.¹¹ Still, some studies show strong correlation of smoking to LBP as opposed to the results gathered in this study^{11,12}. More research is required to determine whether smoking alone is a risk factor, or whether smoking is a covariant of factors such as stress, long work hours, or poor postures.

CONCLUSIONS

There is high prevalence of low back pain among public high school teachers in the City of Manila. The large sample and the consistency of the findings suggest that back pain could be a considerable problem for Filipino teachers. Stress level and high working hours were significant contributors for low back pain. A limitation of the study is its cross-sectional nature, wherein exposure and outcome are studied at same point in time. To better determine the associates of low back pain for teachers, a prospective cohort study is required. Other information should be collected in such a study, such as work station set up, ergonomics and more information about stress, which might contribute to the occurrence of LBP.

Future studies should investigate subgroups of teachers, for instance the subjects being taught, the number of students in the class and year level. More information is also required on workload and key duties (administrative or classroom teaching) area to generalize the results.

Given the strong findings from this study regarding workplace factors contributing to low back pain in teachers, preventative measures could be implemented now, such as workload and work hours minimization, and stress reduction programs.

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