



## Review Paper

# A systematic review for musculoskeletal disorders (MSDs) among school teachers in Malaysia

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## Abstract

*Musculoskeletal issues for the adult population have been a quickly growing problem. School teacher is one occupation that has been shown to suffer from Musculoskeletal Disorders (MSDs). Although much study has been done on MSDs among occupational groups in other nations, established data on this health issue is still minimal in Malaysia, especially in the teaching profession. The demand of this profession, which is performed daily with continuous stress on the musculoskeletal systems as well as the body for prolonged hours in a year or more, can lead to work associated with MSDs. This review can therefore only able to identify 5 MSDs studies investigated among school teachers in Malaysia, focusing on Low Back Pain (LBP), Neck-Shoulder Pain (NSP) and other body parts. In this manner, this review's goal will likely fundamentally investigate the literature and report on the prevalence of MSDs just as the related risk factors in the teaching profession.*

**Keywords:** Musculoskeletal disorders (MSDs), school teachers, prevalence of MSDs, risk factors of MSDs.

## Introduction

Briefly known as MSDs, musculoskeletal disorders have been gave off an impression of being one of the most pervasive and critical health issues among working people, affecting social and financial consequences<sup>1</sup>. The World Health Organization (WHO) interpreted MSDs as a muscle, tendons, joints, and intervertebral disks, peripheral nerves, and vascular system, progressing and chronically impacted by an acute or immediate cause<sup>2</sup>. MSDs are related to musculoskeletal pain or dysfunction, which includes bones and connective tissues, mostly protecting and supporting the body<sup>3</sup>. The circumstance appears mostly as the result of progressive trauma and is likely to impact the bones, muscles, nerves and blood supply<sup>4</sup>. Injuries can also happen in any acute and chronic soreness or pain within the body's support frame, such as sprains, tears and strains. These illnesses are usually degenerative, becoming worse over time with the loss of function for impacted areas of the body if the conditions leading to them are not correctly addressed<sup>5</sup>.

Professional teachers have an essential social value because education in any community can affect on economic growth, technical and science development<sup>6</sup>. In a learning-friendly setting, a teacher will plan, organize and implement an instructional program that monitors and guides students to enhance and meet their academic potential<sup>7</sup>. Besides, teachers are also required to participate in various school events and appointed as a commission for various school activities.

As a result, teachers may have the opportunity to suffer from physical health issues because of the wide-ranging work tasks and role provided to them<sup>8</sup>.

The requirements of this profession being conducted daily for extended hours in a year or more with consistent stress on the musculoskeletal systems that linked to MSDs with additional bad body mechanics, positioning and posture<sup>7</sup>. MSDs happened among school teachers due to lifting heavy loads, prolonged sitting and standing, inappropriate posture, ascending and down the stair, writing on board and prolonging computer use<sup>9-11</sup>. Other associated variables included gender, teachers' psychological structure including anxiety and low job satisfaction, absence of social support and strong demand for psychological work<sup>9-13</sup>. Besides that, MSDs has been reported as one of the primary causes of poor health among retired school teachers<sup>4</sup>.

Nevertheless, the aftereffect of MSD specifically for the teaching profession, there is no sufficient worldwide recognition among researchers either in studies or publications. Based on a recent systematic review, there is still a lack of research of MSDs among school teachers, which in Malaysia is truer<sup>14</sup>. Although there has been a big amount of research on occupational groups for MSDs in other nations, information on these ergonomic health problems are still minimal in Malaysia, particularly in the teaching profession<sup>15</sup>. Thus, this review only able to identify 5 studies of MSDs investigated among school teachers in Malaysia, concentrating on low back pain (LBP),

neck-shoulder pain (NSP) and other parts of the body. Consequently, this review's goal will likely fundamentally investigate the literature and report on the prevalence of MSDs just as the related risk factors in the teaching profession.

## Methodology

Specific keywords were recognized to discover the appropriate studies and information in a systematic search. Electronic database including ELCOSH, PubMed, Science Direct, Google Scholar, SAGE Publications and Springer has been used to recognize and classify MSD studies and publications in Malaysia. A broad search strategy was implemented to cover years of publications between 2000 until 2019. A larger years would maximize the articles and studies related to this review especially related to the teaching profession. Following keywords and combination of these words were searched: musculoskeletal disorders, musculoskeletal disease, musculoskeletal pain, school teachers, prevalence, risk factors of MSDs.

**Selections of relevant studies:** As a whole, 42 search titles were found, and the search was narrowed to 32 studies which

contained relevant hits for this review. After carefully highlighting the related criteria, the duplicates were abolished. Finally, only 5 studies that were related to musculoskeletal disorders (MSDs) among school teachers in Malaysia and met selection criteria as well (Figure-1). The chance-adjusted between-reviewer agreement on the included studies was good ( $\kappa=0.83$ )<sup>16</sup>.

## Results and discussion

A total of 5 research has been recognized and can be reviewed in terms of study population, study location, the design, measurements, prevalence and risk factors provided, and the outcome as well (Table-1).

**Description of Studies:** Table-1 showed the summary of 5 studies that related to musculoskeletal disorders (MSDs) among school teacher with total of 24 primary schools and 66 secondary schools involved. These cross-sectional studies were initiated and conducted in different places in Malaysia (Kuala Lumpur, Pulau Pinang, Pahang, Putrajaya and Klang Valley as well).



**Figure-1:** Overview of literature search and review<sup>17,18</sup>.

**Table-1:** Studies of Musculoskeletal Disorders (MSDs) Prevalence among School Teachers in Malaysia.

Location	Sample	Design	Measurement	Prevalence and Risk Factors	Outcome	Ref
Kuala Lumpur	367 primary school teachers comprised of 49 (13.4%) males and 318 (86.6%) females from 15 schools	Cross-sectional study	a) Work Organization Assessment Questionnaire (WOAQ) b) Beck Depression Inventory for Malays (BDI-M) c) Cornell Musculoskeletal Disorder Questionnaire (CMSD)	Prevalence of MSD was 80.1% with 80.5% of female and 77.5% of male teachers reporting discomfort in 6 months. The most experience MSD was wrist (93.2%), followed by thigh (91.8%), upper arm (91.3%) and lower leg (90.5%). Psychosocial factor and depression were statistically significant to MSD ( $p < .01$ ). Depression partially mediating effect on relationship between psychosocial factors and MSD.	Psychosocial factors and depression are significant predictors of MSD among teachers. Teachers were reporting discomfort in every parts of body with range of prevalence between 93.2% and 40.9%.	10
Penang	1,482 secondary school teachers comprised of 295 (18.3%) males and 1,187 (81.7%) females from 57 schools	Cross-sectional study	a) Nordic Musculoskeletal Questionnaire (NMQ) b) Depression Anxiety Stress Scale (DASS21) c) Mental Component Summary Scale (SF-12 MCS) d) Job Content Questionnaire (JCQ) e) Physical Activity Questionnaire (IPAQ)	12-months prevalence for self-reported low back pain (LBP) was 48% and neck/shoulder pain was 60.1%. LBP and NSP were associated with psychological distress (depression, anxiety, stress) among teachers. LBP was also associated with high job demand, low job resources, low skill discretion, teachers with less than 15 years teaching experience and diabetes mellitus. NSP was also associated with smoking status and low supervisory support.	Self-reported LBP and NSP were common among secondary school teachers.  Psychological distress and work-related psychosocial factors were both associated with self-reported LBP and NSP. Different sites of MSP had different sets of associated factors.	14
Pahang	253 secondary school teachers comprised of 108 (42.6%) males and 145 (57.4%) females from 5 schools.	Cross-sectional study	a) Nordic Musculoskeletal Questionnaire b) General health questionnaire	Prevalence of low back pain (LBP) is high among secondary school teachers (62.5%) with female having higher complaint compare to male (78.8% vs. 40.7%). The highest risk factor for LBP is prolonged standing (23.4%), followed by prolonged sitting (19.0%) and working with computer (16.5%).	High prevalence of LBP among school teachers with most females and middle age group people affected and they are related with highest risk factor which is prolonged standing (23.4%).	20
Putrajaya	120 secondary school teachers comprised of 12	Cross-sectional study	a) Nordic Musculoskeletal Questionnaire b) Teachers' Satisfaction Scale	The prevalence of low back pain (LBP) among secondary school teachers was 72.9%. Gender ( $P=0.016$ ), prolonged sitting (0.015), walking up and down stairs (0.012), and lifting	The prevalence of LBP among secondary school teachers was considered high with significant factors such as gender, prolonged sitting, walking	15

	(10%) males and 108 (90%) females from 4 schools.			loads with hands (0.030) were significantly associated with LBP after controlling other factors including age, marital status and other work tasks.	up and down stairs and lifting loads with hands. Other independent variables including job satisfaction and knowledge and awareness about LBP were not found significant.	
Klang Valley	272 primary school teachers comprised of 81 (33.5%) males and 191 (66.5%) females from 9 schools.	Cross-sectional study	a) Nordic Musculoskeletal Questionnaire b) General health questionnaire	The prevalence of low back pain (LBP) among primary school teachers was 40.4% with higher among female teachers (48.1%) compare to male teachers (39.6%). Prevalence of LBP was higher in the rural area (47.8%) compare to urban area (46.3%) and industrial area (40.2%). Risk factors contributed to LBP were highest from lifting loads (28.0%), followed by prolonged sitting (25.2%), prolonged standing (23.4%), activities during physical education session and walking up and down stairs (13.5%) and lastly, working with computer (6.3%). Poor mental health also contributes to LBP.	Prevalence of LBP among primary school teachers in Klang Valley was 40.4% with lifting heavy loads was perceived as main activity that resulted to the development of LBP.  Poor mental health status also had significant relationship with LBP among primary school teachers.	9

Study by Samad et al.<sup>9</sup>, chosen schools were Klang Valley Grade A primary schools. Grade A school is classified as schools comprising of more 500 students in urban and industrial fields, while schools comprising of more 200 students are classified for rural areas. Thus, in the urban areas, 4 of the schools are located, 2 are from industrial fields, and 3 are from the rural areas. Together with the research carried out in Putrajaya<sup>15</sup>, 4 schools randomly chosen from the website of the Ministry of Education, also located in an urban area. Nevertheless, other 3 studies that had been conducted in Kuala Lumpur, Penang and Pahang, all the schools were randomly selected after getting the permission from Ministry of Education, Malaysia as well as State Department of Education<sup>14,19,20</sup>.

**Characteristics of study populations:** These studies engaged a total of 2,494 of primary and secondary school teachers. To be exact there were majority of female teachers (78.2%) participated in these studies compared to male teachers (21.8%) with response rate in range between 32.1% to 100%. All reviews included males and females' teachers as respondents and the ages of respondents ranged from 20 to 55 years old. These four studies<sup>9,14,15,20</sup> stated clearly the inclusion and exclusion criteria while study was done by Ng et al.<sup>19</sup> did not state clearly the criteria before selecting the respondents. The inclusion criteria such as fulltime teacher, co-operative teacher, had minimum 1-year teaching experience, not taking medication as prescribed by health practitioners and do not have any health

problems such as any injuries, fractures, past history of LBP and thus who were pregnant were also excluded.

**Prevalence:** These papers engaged both primary and secondary schools situated in Malaysia's various states. Most of these researches used validated methodology to determine the prevalence and risk factors of musculoskeletal disorders (MSDs) among Malaysian school teachers, including Nordic Musculoskeletal Disorder, General Health Questionnaire, Job Content Questionnaire AND Cornell Musculoskeletal Disorder.

Based on review among school teachers for these 5 studies on MSD, higher prevalence of MSD was recorded as shown in the Table-1. Among these studies, Ng et al.<sup>19</sup> recorded the highest prevalence of MSD, with 80.1% of the 6-month MSD prevalence rate. This study revealed prevalence of MSD for whole parts of the body including wrist (93.2%) as the most experienced MSD amongst teachers, followed by thigh (91.8%), upper arm (91.3%), lower leg (90.5%), forearm (89.6%), knee (88%), foot (87.7%), shoulder (80.1%), neck (75.5%), lower back (59.9%), upper back (56.4%) and lastly hip and/or buttocks (40.99%). On the other hand, other studies focused on prevalence rate of MSD for particular part of the body which were Low Back Pain (LBP) that range between 40.4% to 72.9%<sup>9,14,15,20</sup> and Neck-Shoulder Pain (NSP) with 60.1% prevalence rate<sup>14</sup>. In primary school teachers, the prevalence of lower back, neck and shoulder appeared to be particularly higher compared to secondary teachers.

The prevalence of MSD was highly correlated with age, body mass index (BMI), duration of employment, demand for work, and status of mental health among teachers. The trials included in this paper, revealed inconstant sexual distinctions and MSD results. 3 out of 5 studies in this paper by reported that female teachers contributed to high prevalence of LBP compare to male teachers (80.5% vs 77.5%)<sup>19</sup>, (48.1% vs 39.6%)<sup>9</sup> and (74.5% vs. 46.3%)<sup>20</sup>. Along with that, Nur Farawahida et al.<sup>15</sup> reported statistically difference of female and male teachers ( $p < 0.009$ ), whilst study by Zamri et al.<sup>14</sup> showed there was not significant different of MSD prevalence based on gender for LBP ( $p = 0.982$ ) and NSP ( $p = 0.608$ ).

**Risk Factors: Individual factors:** It indicates that the prevalence of MSD is substantially linked to age, according to the analysis of these studies. In relation to the supporting the theory, there are the findings of a Pahang study<sup>20</sup> in which teachers aged 35 to 40 tend to experience LBP compared to youthful teachers aged 20 to 24 (10.1% vs. 5.7%). Along with that, study in Penang<sup>19</sup>, LBP was highly reported by age group of 40 to 49 years compare to younger age group 20 to 29 years old (17.1% vs. 6.4%) with statistically significant MSD prevalence rate ( $p = 0.002$ ). Nevertheless, other studies in Kuala Lumpur<sup>14</sup>, Klang Valley<sup>9</sup> and Putrajaya<sup>15</sup> stated that most of their respondents were in age group between 31 to 49 years old that contributed to complaint of having MSD pain/discomfort.

Regardless school levels whether in primary school or secondary school, teachers had developed MSDs due to the length of service in their school. Study from Penang by Zamri et al.<sup>14</sup> stated that teaching years up to 15 years had statistically significant ( $p = 0.013$ ) to self-reported LBP among secondary school teachers. In addition, teachers who complained about LBP were those who worked more than 1 year at secondary school in Bentong, Pahang<sup>20</sup>, Putrajaya<sup>15</sup> and primary school in Klang Valley area<sup>9</sup> as well.

**Physical Factors:** According to Balakrishnan et al. research<sup>20</sup>, secondary school teachers that complained having LBP symptoms, worked more than 37 hours were mostly respond 'no' (62.0%) compared to 'yes' (38.0%) to frequent physical exercise. Moreover, the higher risk of getting LBP were those that standing for long duration, followed by sitting for long duration and working with computers (23.4% vs. 19.0% vs. 16.5%).

Next study in this review paper was study by Nur Farawahida et al.<sup>15</sup> reported that most of the respondents were subject coordinators (92.5%), while 50.8% were classroom teachers, and 45.0% of respondents were both classroom and subject coordinator. With reference to teachers' work tasks, 70.0% of teachers mentioned that they lift loads with their hands during school hour, 37.5% of them claimed that they sit more than 4 hours per day, and 92.5% of them stated that they stand for more than 2 hours per day during school hour. The reason they sit for long time because of marking exam papers, students'

exercise and complete teaching plan. For prolonged standing is involved while writing on white and black boards, monitoring students' work and performance from desk to another desk in classroom and also during teaching process. Other than that, 93.0% of respondents stated that they have to walk up and down stairs with likely 2 to 5 times per day and 95.0% of them reported that they always write on white or black board 2 to 5 times per day during school hour.

Samad et al.<sup>9</sup> reported that lifting loads was the primary task that led to LBP among Klang Valley teachers. The listed loads were textbooks, test papers and lifted heavy sport equipment conducted by physical education teachers. In addition to lifting loads, prolonged sitting (25.2%) and prolonged standing (23.4%) also contributed to the LBP. Prolong sitting involved with such marking test and examination papers, assignments and school books that resulting with sitting posture for a long time. Physical education session that involved with numerous physical activities and walking up and down the stairs as well were partly contributed to LBP (13.5%) among teachers. Lastly, teachers that spend on working with computer were also contributed to LBP (6.3%).

**Psychosocial Factors:** According to study by Ng et al.<sup>19</sup>, both the psychosocial factor and depression have given an impact on MSD. For MSD and depression, the squared multiple correlation ( $R^2$ ) was 0.06 and 0.10, respectively. This value relates to 6% of depression variation can be explained by psychosocial factor, while 10% of the variability can be described by psychosocial factor and depression. Additionally, the psychosocial factor's non-direct impact on MSD during depression was -0.069. As a result, depression was a partial mediator as the significant direct effect from psychosocial factor to MSD decreases after depression.

In addition, Zamri et al.<sup>14</sup> reported psychological distress, recognized as signs of depression, desolation, anxiety and stress (whether uncritical or critical), that a specific connection existed between self-reported LBP and NSP. LBP was significantly related with self-reported psychosocial factors related to severe anxiety and depression, such as low decision-making or discretionary skills and high demand for psychological work after adjusting age, gender, diabetes disease, smoking status, teaching hours and duration of teaching in years. In the final model, NSP was substantially correlated with anxiety, depression and poor supervisor support in the bargain after being adjusted for gender, age, present smoking status, hypertension, teaching hours and duration of teaching in years.

Significant with other above research, Samad et al.<sup>9</sup> reported that poor mental health status was considerably higher than usual (OR:1.11, 95% CI: 1.06-1.15) when compared with 1.11 times of LBP. This study showed that the positive contributing variables to the LBP problem were also represented psychosocial factors among primary school teachers.

**Discussion: Assessment of MSDs:** On the whole, studies in this paper had measured mostly on low back region by using different assessments. This review suggests that MSD among school teachers represents a higher risk occupation of experiencing MSD even though teachers were given less attention compare to other occupational groups<sup>21</sup>. It appears that Standardized Nordic Questionnaire are commonly used as assessment for analyzing the prevalence of MSD among these studies<sup>9,14,15,20</sup>. Other assessments used included Cornell Musculoskeletal Disorder Questionnaire<sup>19</sup> for measuring prevalence of MSD, whilst self-developed and psychosocial questionnaire such as Work Organization Assessment Questionnaire (WOAQ), Beck Depression Inventory for Malays<sup>19</sup>, Depression Anxiety Stress Scale, Job Content Questionnaire, Mental Component Summary Scale, Physical Activity Questionnaire<sup>14</sup>, General health questionnaire<sup>9,20</sup> and Teachers' Satisfaction Scale<sup>15</sup>. In spite of using questionnaire and survey, this type of assessments is affordable and data collection process that become more convenient, but they have some disadvantages to the study. They may expose to recall bias and difficult to follow respondents up as well especially when it comes to anonymous participation of questionnaires. Physical examination known as quantitative assessment might obtained more accurate results and findings, even though these methods are high-cost and time-taking research especially tested on large population of respondents<sup>21</sup>. Studies that provide reliable data needs to be accurate and repeatable. However, presence of MSD is considered as subjective with no definitive test to document it, there is currently no clear benchmark definition. As a result, most cross-sectional studies like in this review paper utilized self-reported data for the prevalence MSD among school teachers to be discovered<sup>18</sup>.

**Prevalence:** This review paper discovered 5 studies among school teachers in Malaysia on musculoskeletal disorders (MSDs) that reported higher prevalence of MSDs as shown in a Table 1. These surveys showed a prevalence of MSDs ranging from 40.4% to 80.1%<sup>9,14,15,19,20</sup>. Only 2 out of 5 trials showed lifetime prevalence for MSDs. For instance, the study by Ng et al. provided data for all body parts on the 6-months prevalence of MSDs. MSD's prevalence was 80.1%, with 80.5% of female and 77.5% of male teachers reported discomfort on past 6 months. This finding has also resulted in a research by music teachers in Sweden with 82% of female and 80% of male teachers<sup>22</sup>. This prevalence was comparable to that of primary and secondary school teachers in Botswana with a prevalence rate of 83.3%<sup>23</sup>.

Besides that, information on 12-months prevalence of MSD for LBP (48.0%) and NSP (66.1%) were recorded in the research by Zambri et al. The prevalence of NSP among these secondary school teachers was greater than LBP and substantial, with only a few researches examining the prevalence of NSP among teachers in international level with neck and shoulder reported prevalence rate separately. 2 studies from Hong Kong, for instance, found that between 64.4% and 66.7% of complained

secondary school teachers are suffering pain from neck (24-25). A study conducted in China reported neck and shoulder pain together with a prevalence of 57.9% among school teachers<sup>11</sup>.

According to 10 main of body parts, low back was the highlighter for 4 studies out of 5 among school teachers regardless in level of primary or secondary school. The prevalence has found with range between 40.4% to 72.9% and majority of LBP complaint were coming from female teachers<sup>9,14,15,20</sup>. On top of that, the prevalence of LBP among secondary school teachers was to be especially high in Putrajaya<sup>15</sup> as compare to worldwide studies such as study conducted in Ethiopia (53.8%)<sup>26</sup>, Botswana (55.7%)<sup>23</sup> and China (45.6%)<sup>25</sup>. According to author the reasons behind the difference may be the comfort and facility supplied for the teachers in their establishment or cultural and financial distinctions between Malaysia and the above countries.

**Risk Factors:** As overall, the review from these 5 studies identified few risk factors that might have contributed to high prevalence of musculoskeletal disorders (MSDs) that apparently high (80.1%) among school teachers.

**Individual Factor:** According throughout this review, there seems to be an association between the prevalence of musculoskeletal and female school teachers. Holding up to this previous statement are the result from latest study in this paper by Ng et al.'s<sup>19</sup> stated that 80.5% of female school teachers has higher 6-month prevalence rate of MSD compare to 77.5% of male teachers. Parallel can be drawn by the results of studies on LBP prevalence that significantly higher among female teachers compare to male in Klang Valley (48.1% vs. 39.6%)<sup>9</sup>, Bentong, Pahang (78.8% vs. 40.7%)<sup>20</sup> and also Putrajaya (82.4% vs. 50.0%)<sup>15</sup>. When given the problem of MSDs among school teachers, gender seems to be important. This is supported by the results of a Swedish research where female music teachers reported significant body parts involved in the neck ( $p=0.02$ ), upper back ( $p=0.01$ ) and shoulder ( $p=0.025$ ) as compared to male music teachers<sup>27</sup>. A research from Turkey also discovered that female teachers tend to report serious wrist pain ( $p=0.022$ ), upper back pain ( $p=0.008$ ) and lower back pain ( $p=0.022$ )<sup>28</sup>. Similar research outcomes among Chinese female teachers reported significant shoulder pain compare to their male peers ( $p<0.001$ )<sup>8</sup>.

However, there were no mutual agreement with findings from Zambri et al.<sup>14</sup> stated that gender is not significantly linked with LBP ( $p=0.982$ ) and NSP as well ( $p=0.608$ ). According to Cardoso et al.<sup>2</sup>, based on the fact that teaching is a profession populated mainly conquer by women compare to men, which resulting in a small sample size for comparison. Study by Yue et al.<sup>11</sup> also supported this statement that found being female was not a risk factor for MSDs in teachers. There was no significant relationship between teacher's sex and the prevalence of MSDs in the current studies, although female teachers reported a higher rate of MSDs than males did. In addition, Chong and

Chan also pointed out that women are more likely to report pain than men because women have less physical strength and may also be pressured by family or career<sup>18</sup>.

A study by Mohseni Bandpei et al.<sup>29</sup> stated that a higher prevalence rate in teachers who had worked more than 20 years. This highlight on length of employment may be due to longer time school teachers was exposed to physical and/or psychosocial factors that exposed to them causing to suffer pain and/or discomfort on body parts. Study from Penang by Zambri et al.<sup>14</sup> stated that teaching years up to 15 years had statistically significant ( $p=0.013$ ) to self-reported LBP among secondary school teachers. While MSDs were favorably linked with duration of employment, other studies discovered to be incompatible with the new teachers are more likely to report MSDs<sup>30</sup>. Longer period of employment may be subjected to occupational risk variables for teachers and the greater the likelihood of work-related disorders<sup>24</sup>. This relationship can be viewed as the impact of aging or a cumulative impact of workload experienced by the school teachers<sup>31</sup>. Whereas teachers with lesser teaching experience who reported MSDs, may not adapt well to the school work setting and added physical and psychological stress may affect their musculoskeletal well-being<sup>24</sup>.

**Physical factors:** Prolong sitting, standing, lifting loads with hands and walking up and down stairs were positively associated with high rate of MSDs among school teachers throughout this review paper. School teachers mostly spend time in sustained sitting while reading, grading papers or using the computer. Besides that, teachers also must stand while teaching, and repetitively turning their heads to write on the board back and forth, that may lead to neck shoulder pain, LBP or upper limb pain<sup>2</sup>. Awkward positions while typing and staring at the computer that it may not be ergonomically right for a long time, which may cause pain to neck and back<sup>9</sup>. The 'head down' posture has been significantly associated with neck pain, and this can effect on school teachers who spend longer time correcting students' work and also preparing class lessons. During spending time with computer, neck pain suffered by school teachers also associated considerably with posture. In spite of awkward posture during computer session, 'poking chin' posture also may induce load on non-contractile and posterior cervical structure that lead to neck pain<sup>24</sup>.

**Psychosocial Factors:** As claimed by Karasek, man with employment characterized by a lack of control over his job and heavy and stressful demands for job could be both susceptible to illness and less satisfied with his job<sup>32</sup>. There have been important associations between psychosocial variables, depression and MSDs, according to the research by Ng et al.<sup>19</sup> Moreover, depression becomes an impact that partly mediates the relationship between psychosocial factors and MSDs. Hence, anxiety-induced stress or depression can increase the risk of muscle tension and pain, shifts in blood flow and oxygen demand supply, leading to a rise in algescic drugs in the body,

particularly for those with long-term muscle pain<sup>33</sup>. Zambri et al.<sup>14</sup> also indicated that low skill discretionary skills and higher job demand were substantially correlated with LBP, while low supervisory assistance among secondary school teachers was significantly associated with NSP. He and colleague also indicated that psychosocial factors related to depression, anxiety and work also lead to complaint among secondary school teachers about LBP and neck pain.

**Limitations:** As overall consideration, there were few limitations that should be highlighted in this review. Self-reported MSDs from school teachers as respondents can be considered as limitations among these studies and results as well, which giving many anonymous surveys for data collection. Recall bias from self-reporting questionnaire cause bias to the results due to completion was done by respondents rather than by certified physician or medical practitioner. It is because their expertise would provide more reliable and clinically-based diagnosis in medical circumstances and conditions. In addition, all the studies in this review used a cross-sectional study design to give cause and effect relationship which might not truly effective in order to determine causality<sup>18,23</sup>. The primary limitation for cross-sectional study design is generally no evidence of a temporal relationship between exposure and outcome due to the exposure and outcome at the same time<sup>34</sup>. Lastly, even though the studies in this review paper explore the correlation between the prevalence of MSDs and risk factors that may led to the prevalence of MSDs variables such as gender, age and other variables should be limited to one group only. For instance, school teachers should be selected among female teachers and age range between 20 to 35 years old that probably do not have any health problems compare to older teachers in order to have clear cause and effect of MSDs among school teachers in Malaysia.

## Conclusion

Parallels to the literature review can be taken: results from these 5 studies in Malaysia finally do not focus only low back, but also focus on neck, shoulder and other parts of the body. With these findings and results from studies in this review supports that school teachers did facing a serious issue on MSDs like other occupational groups in Malaysia, as well in the worldwide. It appears that primary and school teachers both developed discomfort/pain during their services and employment as school teachers. High prevalence of MSDs especially at wrist, thigh, upper arm, lower leg, low back, shoulder and neck definitely giving out new insight of work-related musculoskeletal disorders (WMSDs) among Malaysian school teachers. Further research should be carried out to explore MSDs among school teachers that also emphasize aspects on ergonomics. This would be a major eye-opener to other researchers or practitioners to implement control measures in order to minimize this issue among school teachers in Malaysia.

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