

ORIGINAL ARTICLE

Prevalence of Work Ability and its Associated Factors among Secondary School Teachers in Selangor, Malaysia

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ABSTRACT

Introduction: Work ability is the relationship between a person's personality, health, lifestyle, and employment-related factors. There are, however, few studies evaluating the variables linked to school teachers' work ability. The purpose of this study was to assess school teachers' work ability and the factors that affect it. **Methods:** A cross-sectional study of secondary school teachers was carried out. Sociodemographic characteristics, physical activity, body mass index, low back pain (LBP), psychological factors, work-related factors, health-related quality of life (HRQoL), and work ability were all collected through the questionnaire. The association between potential factors and job ability was investigated using ordinal logistic regression. Results were presented using odds ratios (OR) and 95 % confidence intervals (CI). **Results:** Of 1280, there were 1037 (81.0%) teachers who returned the questionnaire. The majority (71.9%) of the participants had moderate work ability, while 22.6% had good, and 5.5% had poor work ability. None of them were particularly had excellent work ability. The factors associated with increased work ability in the multivariable analysis were better HRQoL, namely physical (OR 1.11, 95%CI: 1.07, 1.15) and mental (OR 1.12, 95%CI: 1.06, 1.16) health and wellbeing. **Conclusion:** Positive associations exist between a teacher's work ability and their physical and emotional well-being. Henceforth suggesting that these factors should be incorporated in workplace health promotion programs to maintain teachers' work ability.

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INTRODUCTION

Work ability is referred as an individual's physical and psychological ability to perform routine, compensated work and their ability to deal with the demands of that work (1). It is important to assess the level of work ability as it might help to predict the one's life career, sickness absence, presenteeism and early retirement (2). Other countries have also started to conduct studies on work ability among various working populations such as healthcare workers (3, 4) and blue-collar workers (5, 6). To date, lack of studies assessing the work ability level among schoolteachers have been conducted in Malaysia.

Teachers have an essential role in the overall efficiency of schools. (7). The dynamic and ever-changing education system requires them to always be prepared, making it physically and mentally demanding, which

may cause them to feel worn out, overburdened, and depressed as a result. This is known as job stress. Job stress occurs when physiological and psychological capabilities are outstripped by the imbalances of job demand and individual's work ability. A previous study on coal chemical workers in China discovered a strong correlation between job stress and poor work performance (8) which strongly support findings from a different study conducted among Chinese power supply workers (9). This has been demonstrated by earlier studies which discovered that levels of occupational stress vary among different occupational groups, including teachers (10), healthcare professionals (11), oil workers (12), and coal miners (13). Other work-related psychosocial factors such as low social support and high psychological job demands were found to be risk factors for lower work ability among white-collar workers (14).

Meanwhile, a previous study conducted in the Netherlands found that work-related physical factors, such as strenuous work postures and manual handling, were associated with lower work ability among blue-collar workers (15). These findings were expected as blue-collar workers, including construction workers and

factory workers, often perform physically demanding tasks using specialized tools. Conversely, teachers are generally categorized as professional workers, engaging in intellectually demanding work that requires mental effort to fulfill their responsibilities. However, a previous local study discovered that teachers have a high prevalence of work involving physical tasks, such as prolonged sitting, prolonged standing, and lifting heavy weights (16). This implies that teachers' jobs encompass both mental and physical work demands. Nevertheless, the specific association between work-related physical and psychosocial factors and work ability among schoolteachers remains unspecified.

Besides work-related factors, socio-demographic (age and gender) and unhealthy lifestyles were linked to work ability. Several studies reported that increasing age can lower the level of work ability due to the increase in comorbidities (14, 17). Meanwhile, a large general population in Norway found that unhealthy lifestyle habits like smoking, being overweight or obese, not getting enough exercise during free time, and following a poor diet were significantly linked to having less work ability (18).

Considering the detrimental implications associated with a decline in work ability among various worker groups, coupled with the lack of research on work ability among teachers in Malaysia, the authors were motivated to conduct this study. Therefore, this study aimed to assess the level of work ability and identify its associated factors among teachers from public secondary schools in Selangor.

MATERIALS AND METHODS

Study area, Study Design, and Sample size estimation

Peninsular Malaysia is divided into eleven states, and Selangor was selected to conduct this research. The width area of Selangor covered up to 8,104 km² and with 0.81 human development index (HDI) which can be considered high. This state has a higher HDI than other states due to its progressive economy as demonstrated by its high gross domestic product (GDP) per capita (PPP), high standard of living, good infrastructure such as highway and public transportation, and high availability of tertiary institutions, including both public and private universities (22). Since high HDI and population density are positively correlated, a bigger class size is anticipated. However, this led teachers in Selangor to experience greater job stress and poor work ability as compared to teachers in other states in Malaysia. Nonetheless, this hypothetical assumption needs to be confirmed.

This cross-sectional study includes teachers from public secondary schools in Selangor (Figure 1) (19). To obtain a representative sample, a two-stage sampling strategy was employed. In the first stage, schools were randomly selected from each district in Selangor proportionate to

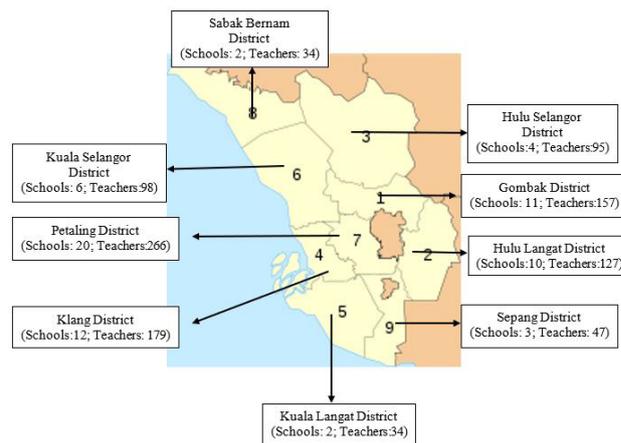


Figure 1: Number of public secondary schools and respondents among teachers according to Selangor's district

the number of public secondary schools in each district. From the total of 232 public secondary schools in Selangor, only 50% (116) of the schools were randomly chosen and invited to take part in the survey (Figure 2). However, only 70 schools concurred to take part in this survey. Prior approval was acquired from the Selangor Education Department and the Ministry of Education Malaysia. Data was gathered between May and October of 2015. Universal sampling was employed to recruit teachers in these schools. Participation was voluntary and the teachers were required to return written informed consent before data collection. The Medical Ethics Committee of the University of Malaya granted approval for the study's ethical practices (Reference Number: MEC 950.1).

The open-source software (OpenEpi version 3.01) was used to calculate the sample size for the cross-sectional study. This study referred the information from a previous study which aims to investigate the association between work ability among the working population

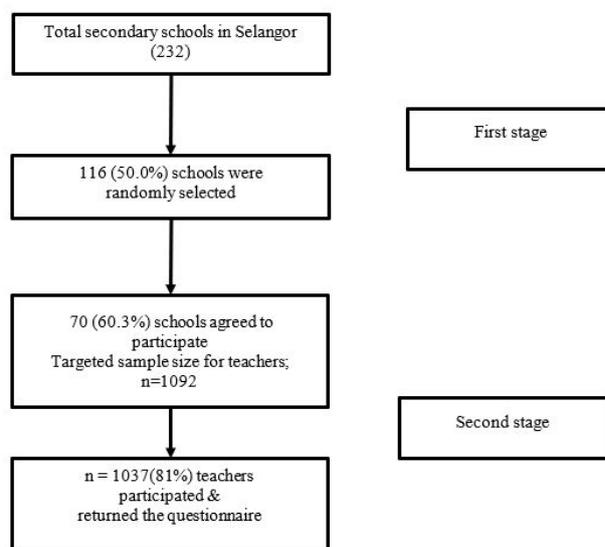


Figure 2: Flow chart of data collection process

and potential factors such as demographics, lifestyle, mental and physical health and wellbeing (SF-12), workplace physical and psychosocial factors, and low back pain (20). The findings from each of these variables were used to calculate the sample size. Finally, a sample size of 1092 was determined to be necessary in order to achieve a 95% confidence interval, 80% statistical power, and a 5% margin of error.

Data collection instruments

The participants were given two weeks to complete the self-administered questionnaire. All completed questionnaires were collected by the researcher at the respective schools. The dependent and independent variables were assessed using different instruments.

The Work Ability Index (WAI) questionnaire was used to evaluate work ability. The questionnaire comprises of seven items and the total scores were calculated by summing the scores from each item according to the predefined formula (21). The range for the total score was between 7 and 49. Then, the sum of work ability score was categorized into four levels; which are poor (7-27), moderate (28-36), good (37-43), and excellent (44-49) and the categorization was similarly adopted by the previous studies (4, 14, 20). The reliability of WAI score was found to have an acceptable internal consistency (Cronbach's alpha 0.89) and reliability (intraclass correlation coefficient (ICC) 0.81).

The 12-item Malay version of the Short Form Health Survey (SF-12v2) was used to gauge health-related quality of life. This instrument in the Malay language has good internal consistency (Cronbach's alpha = 0.70) (22). The SF-12v2 encompasses eight scales and these eight scales form two major dimensions namely the Physical Component Summary (PCS) and Mental Component Summary (MCS). Higher scores of PCS and MCS indicate better physical and mental health and well-being.

Information on low back pain (LBP) was acquired using a modified Nordic Musculoskeletal Questionnaire (NMQ). NMQ has been widely used in the assessment of musculoskeletal pain (MSP) among teachers in Malaysia (23). Participants were asked about having LBP symptoms in the past 12 month. The answers were categorized between 0=no and 1=yes. The 21-item Depression Anxiety Stress Scale was used to assess psychological subscales namely depression, anxiety, and stress symptoms (DASS-21)(24). Each subscale has seven items scored from 0 (did not apply to me all) to 3 (applied to me very much). The total score for each subscale ranged between 0 and 21 and needs to be multiplied by two. Higher scores of each subscale indicate worse psychological symptoms.

Information on socio-demographic variables such as age and gender were collected. Height and weight were

self-reported. Body mass index (BMI) was calculated as weight in kilograms divided by height in metre square. Work-related physical factors were measured with four observed variables which are prolonged sitting, prolonged standing, lifting weights (≥ 25 kg) by hand, and climbing up or down more than 30 steps of stairs a day. The answers were categorized between 0=no and 1=yes. Meanwhile, the Job Content Questionnaire (JCQ) was adopted to collect the information related to job's psychosocial risk factors. JCQ was found to be a reliable instrument for assessing psychosocial work factors among school teachers (25). By using the demand-control-support model, the categories include demand-control (strain job versus no-strain job) and social support (high versus low) (26). Figure 3 illustrates the summary of listed factors that might be associated with work ability.

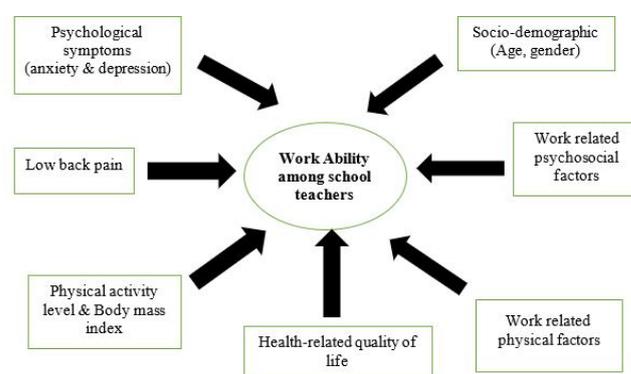


Figure 3: Factors associated with work ability

Statistical Analysis

The Statistical Package for Social Sciences for Windows, version 26.0, was used for statistical analysis (SPSS Inc., Chicago, IL, USA). For continuous data, medians and interquartile range (IQR) were shown if the data had a not normal distribution, whereas means and standard deviation (SD) were shown otherwise. Frequency and percentage (%) were presented for categorical data.

The outcome variable was work ability which was an ordinal variable with four levels (1=poor; 2=moderate; 3=good; 4=excellent). Therefore, generalized ordinal logistic regression was used for data analysis. Univariable and multivariable ordinal logistic regression were conducted in this study. The risk estimate in the univariable analysis is based on individual variables. To account for potential confounders, multivariable analysis was conducted by including all significant variables (p -value < 0.05) and other relevant factors (with a cutoff of p -value < 0.25) simultaneously (27). The inclusion of independent variables with a p -value < 0.25 is justified due to their clinically important and the potential for a significant association in the multivariable analysis. In the multivariable analysis, the statistical significance was fixed at $p < 0.05$, and the odds ratio (OR) with a 95% confidence interval (CI) was given to measure the association. The Hosmer Lemeshow test

was used to determine the final model's fitness (Chi-Square statistic). The final model is considered fit if the p-value from the Chi-Square statistic is more than 0.05. Two-way interactions between the independent variables in the final model were also tested. There was no significant two-way interactions as the p-value > 0.05 were detected.

RESULTS

From the 116 invited public secondary schools in Selangor, 70 schools (60.3%) participated in the study. Out of 1280 questionnaires distributed to teachers, only 1037 (81.0%) were returned. In the Table I, results show the mean age of participants (SD) of 40.23 (8.8) years.

Majority of the participants were females (85.6%). There were slightly more than half of the participants who had low physical activity levels (54.3%) and high BMI (≥ 25 kg/m²) (52.7%). For work-related physical factors, there were more than 80% reported that their work is physically demanding and involves tasks such as lifting heavy weights, climbing up or down >30 flights of stairs, prolonged sitting, and prolonged standing. Meanwhile, for work-related psychosocial factors, more than 50% had reported having low job strain and high social support in the workplace. The participants' median depression symptoms score (IQR) of 4.0 (10.0) and considered participants had no depression symptoms. Meanwhile, the median(IQR) score for anxiety and stress symptoms were 8.0 (10.0) and 10.0 (10.0), respectively.

Table I: Distribution of participant's characteristics with work ability

Variables	Total (N=1037)		Work Ability (N=853)		
	n(%)	Mean (SD) ^a / Median (IQR) ^b	Poor (n=47)	Moderate (n=613)	Good (n=193)
Sociodemographic					
Age		40.23 (8.8)	42.71 (9.21)	39.67 (8.88)	39.50 (8.15)
Gender					
Male	149 (14.4)		5 (3.8)	86 (66.2)	39 (30.0)
Female	888 (85.6)		42 (5.8)	527 (72.9)	154 (21.3)
Physical activity (MET-min/week)^b (n=551)					
Low (<600)	299 (54.3)	360 (2388)	15 (6.1)	177 (72.5)	52 (21.3)
Moderate (600 – 1499)	136 (24.7)		8 (7.5)	67 (63.2)	31 (29.2)
High (>1500)	116 (21.0)		6 (6.1)	58 (58.6)	35 (35.4)
Body mass index(kg/m²)^a (n= 986)					
Underweight (<18.5)	38 (3.9)	25.77 (5.10)	4 (12.1)	22 (66.7)	7 (21.2)
Normal (18.5-24.9)	426 (43.4)		14 (3.9)	258 (72.3)	85 (23.8)
Overweight (25.0 – 29.9)	335 (34.2)		12 (4.5)	199 (74.0)	58 (21.6)
Obesity (≥ 30.0)	181 (18.5)		15 (10.0)	104 (69.3)	31 (20.7)
Psychological symptoms^a					
Depression (n=1000)		4.0 (10.0)	12.37 (7.70)	6.94 (6.36)	4.39 (5.15)
Anxiety (n=1008)		8.0 (10.0)	15.96 (8.46)	9.89 (7.05)	7.06 (6.42)
Stress (n=690)		10.0 (10.0)	15.87 (8.16)	10.68 (7.28)	7.67 (6.31)
Work-related factors					
Lifting weights ≥ 25 kg by hand (n=1019)	942 (92.4)		46 (5.9)	563 (72.3)	170 (21.8)
Climbing up or down >30 flights of stairs a day (n=1018)	1001 (98.3)		46 (5.6)	596 (72.1)	185 (22.4)
Prolonged sitting (n=1020)	903 (88.5)		44 (5.9)	533 (71.4)	170 (22.8)
Prolonged standing(n=1022)	996 (97.5)		46 (5.6)	589 (71.9)	184 (22.5)
Job strain					
Low	786 (80.5)		39 (6.0)	458 (70.5)	153 (23.5)
High	190 (19.5)		6 (3.9)	122 (78.7)	27 (17.4)
Social support					
Low	314 (31.4)		18 (6.8)	198 (75.0)	48 (18.2)
High	686 (68.6)		28 (4.9)	401 (70.8)	137 (24.2)
Low back pain symptoms					
No	532 (51.3)		18 (4.0)	326 (72.4)	106 (23.6)
Yes	505 (48.7)		29 (7.2)	287 (71.2)	87 (21.6)
Mean of MCS score (SF12v2) (n=914)^a		43.66 (6.61)	40.69 (7.02)	43.03 (6.58)	46.06 (5.49)
Mean of PCS score (SF12v2) (n=914)^a		47.01 (8.36)	41.32 (9.00)	46.78 (8.29)	50.45 (6.62)

^a refers to mean score
^b refers to median score

This indicates that participants had moderate anxiety and stress symptoms.

The mean work ability score was 33.68 (SD: 3.67). The majority (71.9%) of the participants had moderate work ability, while 22.6% had good, and 5.5% had poor work ability. None of them had excellent work ability. Recent results show that the mean age above 40 years old had poor work ability. Meanwhile, for those who had good work ability, their mean score of psychological distress (depression, anxiety, and stress symptoms) is lower compared to those who had poor work ability. The proportion of low job strain (23.5%) is higher than the proportion of high job strain (17.4%) in teachers who had good work ability. Participants who had good work ability, their mean scores of physical and mental health are better compared to participants who had poor work ability.

In the univariable analysis, male, symptoms of depression, anxiety, stress, high social support, and better physical and mental health were significantly associated with an increased level of work ability (Table II). The estimate of the OR for a good versus low work ability with male compared to female teachers was OR: 1.58 (95% CI 1.06, 2.34). The odds of good versus low work ability are 58% increase among male teachers. The estimate of the OR for a good versus low work ability with high social support compared to low social support was OR: 1.43 (95% CI 1.02, 1.99). The odds of good versus low work ability are 43% increase among teachers who had high social support. For psychological distress, there is about a 10% decrease in the odds of good work ability per 1-unit score increase in depression, anxiety, and stress symptoms. Meanwhile, there are 7% and 8% increases in the odds of good work ability per 1-unit score increase in physical and mental health scores respectively. Nonetheless, age, BMI, work-related physical factors, job strain, and the presence of LBP were not significantly associated with the level of work ability.

All the significant variables ($p < 0.05$) and variables that clinically important ($p < 0.25$) were tested simultaneously in the multivariable analysis. In the final multivariable model, there were physical (OR 1.11; 95%CI 1.07, 1.15) and mental (OR 1.12; 95%CI 1.06, 1.16) health remains significantly associated with the increased level of work ability after adjusted with the potential factors. There are 11% and 12% increases in the odds of good work ability per 1-unit score increase in physical and mental health scores respectively (Table II). The result of the Hosmer-Lemeshow test indicated that the p-value of the Chi-square statistic was 0.708, which is greater than the threshold of 0.05. Therefore, the model is a good fit.

DISCUSSION

The purpose of this study was to evaluate secondary

Table II: Univariable and multivariable analysis on the factors associated with work ability level

Variables	Univariable ¹	Multivariable ²
	OR (95% CI)	OR (95% CI)
Sociodemographic		
Age	0.98 (0.97, 1.01)	0.99 (0.96, 1.02)
Gender		
Male	1.58 (1.06, 2.34)*	1.57 (0.83, 2.97)
Female	1.0	1.0
Physical activity (MET-min/week) (n=551)		
Low (<600)	1.0	1.0
Moderate (600 – 1499)	1.33 (0.82, 2.16)	0.98 (0.55, 1.77)
High (>1500)	1.79 (1.09, 2.91)*	1.79 (0.98, 3.25)
Body mass index(kg/m²) (n= 986)		
Underweight (<18.5)	1.0	
Normal (18.5-24.9)	1.58 (0.68, 3.65)	
Overweight (25.0 – 29.9)	1.40 (0.60, 3.27)	
Obesity (≥ 30.0)	1.07 (0.44, 2.60)	
Psychological symptoms		
Depression (n=1000)	0.90 (0.88, 0.93)*	0.98 (0.91, 1.05)
Anxiety (n=1008)	0.91 (0.89, 0.94)*	0.99 (0.93, 1.06)
Stress (n=690)	0.92 (0.90, 0.94)*	0.96 (0.90, 1.03)
Work-related factors		
Lifting weights ≥ 25 kg by hand (n=1019)	0.66 (0.38, 1.14)	
Climbing up or down >30 flights of stairs a day (n=1018)	0.98 (0.27, 3.51)	
Prolonged sitting (n=1020)	1.06 (0.67, 1.70)	
Prolonged standing(n=1022)	1.20 (0.47, 3.04)	
Job strain		
Low	1.0	
High	0.81 (0.55, 1.21)	
Social support		
Low	1.0	1.0
High	1.43 (1.02, 1.99)	0.91 (0.53, 1.55)
LBP symptoms		
No	1.0	1.0
Yes	0.80 (0.60, 1.09)	1.19 (0.72, 1.95)
Mean of MCS score (SF12v2) (n=914)	1.08 (1.05, 1.11)*	1.12 (1.06, 1.16)*
Mean of PCS score (SF12v2) (n=914)	1.07 (1.05, 1.09)*	1.11 (1.07, 1.15)*

¹Variables were analysed individually with the outcome (work ability level)

² Significant variables ($p < 0.05$) and clinically important variables ($p < 0.25$) were included in the model and analysed simultaneously

Model reasonably fits well (p -value from Chi-Square statistic > 0.05)

*refers to significant because p -value < 0.05

school teachers' work ability and its associated factors. Based on the recent findings, this study found that most of teachers had a moderate level of work ability. The finding was consistent with a previous study indicating that teachers were more likely to have a poor or moderate work ability than office workers with 37% versus 18% accordingly (28). Teachers appeared to have less work ability than other occupational groups because they were responsible for more than just teaching students;

they also managed the classroom and prepared lesson plans. It showed that teachers require physical and mental effort to complete their task. Besides, the teacher's health and well-being were negatively impacted by the workload and deadline pressure, which might reduce their productivity.

Results showed that mental and physical health were significantly associated with work ability, similarly as reported by a previous study (29). The state of one's physical and mental health has a strong influence on how productive one is at work (30). Work productivity is reduced if the workers have poor health (31). The association between mental health and work ability could be explained under job resources such as the presence of social support at the workplace. Recent findings showed that the participants had high social support at the workplace and were significantly associated with better mental health which resembles the preceding finding (32). High social support provides physical and psychological advantages for teachers experienced with stressful physical and psychosocial events at schools.

The association between physical health and work ability might be due to the healthy worker effect, as healthy workers may have stronger motivation to work compared to the less healthy ones. In addition, the selection of participants in this study through the exclusion of those with poorer health conditions such as musculoskeletal disorders, the workers who remain to be those in better conditions to perform their work (29). Physical health included four subscales namely physical function, role physical, bodily pain, and general health. These findings supported the previous studies which found a significant association between physical health and work ability, especially with regard to functional capacity and the presence of disease (30, 33).

In the univariable analysis, increased psychological symptoms namely depression, anxiety, and stress were significantly associated with reduced work ability. The presence of psychological symptoms that could be attributed to work or personal problems, including such excessive fatigue, sleep problems, social withdrawal, and mood disorders (34). Consequently, this will lead to a decrease in their work ability. Nonetheless, the association between psychological symptoms and work ability in the multivariable analysis was not significant. On the other hand, a previous longitudinal study found significant associations between psychological distress and poor work ability (35). These findings could differ due to the various study designs that were used.

Recent results showed that the occurrence of LBP among teachers is prevalence which was similarly reported by previous study (36). Nonetheless, no significant association between LBP and work ability was observed in both univariable or multivariable analyses. This is

in contrast with the previous study which found that higher disability due to LBP was significantly correlated with reduced work ability (37). The unavailability of such information in this study could be the reason for the non-association between LBP and work ability. It is postulated that this study population consisted of teachers with LBP that might have none to minimal disability. Future studies should explore this in detail.

Results from univariable analysis found that a moderate level of physical activity was significantly associated with an increased level of work ability. Meanwhile, a previous cross-sectional study on teachers found a positive relationship between moderate and vigorous intensity with improved work ability (38). This could be due to the benefit of physical activity which raises energy levels, combats stress, battles fatigue, and improves general well-being (39). This might eventually improve their work ability. The non-significant association in the multivariable analysis indicates that physical activity was not the strongest influence on work ability in this study population.

There were more than 50% of the participants had high social support at the workplace. In addition, results from the univariable analysis showed that higher social support had better work ability. Social support was found to be a prominent factor in managing with stress and thus, improving work ability (40). Findings in the multivariable analysis differ from a past longitudinal study which found a positive association between social support and workability (40). It can be postulated that the variations in study designs used in previous studies might interpret the difference in findings.

Since health-related quality of life (HRQoL) is significantly associated with work ability, it is crucial for schools to prioritize the improvement or maintenance of teachers' HRQoL. There are various ways to enhance the physical and health well-being of teachers and implementing a series of health promotion programs in schools is recommended (41). Educating teachers about the importance of adopting healthy lifestyles is also vital. They need to be well-informed about practicing healthy habits such as regular exercise, maintaining a nutritious diet, and getting sufficient rest and sleep. These practices can significantly improve their physical well-being and ultimately reduce the risk of developing chronic diseases. Past study demonstrated that workers with one or more comorbidities were more likely to experience reduced work ability (42). Although low back pain (LBP) was found not significantly associated with reduced work ability, it is important for the related stakeholders to ensure that schoolwork environments are ergonomically designed to minimize the risk of musculoskeletal pain, such as low back pain, neck, and shoulder pain. Previous study demonstrated that the presence of musculoskeletal discomfort was significantly associated with presenteeism and may potentially reduce work ability (43).

Besides focusing on physical health, schools should provide facilities that support teachers' mental well-being. Each school should ideally offer a stress management program, including guidelines for mindfulness techniques, breathing exercises, and cognitive-behavioral interventions (44). Creating a workplace environment that is conducive to mental health, including adequate lighting and temperature, can also contribute to improving workers' mental well-being. Previous studies have shown that blue and green lights have been effective in promoting relaxation and reducing the stress (45, 46). Overall, to create more conducive and satisfying school environments, it is essential to assess the specific needs and challenges of each school when implementing strategies to improve health-related quality of life and work ability.

To date, this is the first study assessing the factors related to work ability among Malaysian school teachers. On the other hand, this study has several limitations. All the information were subjective because the data was collected using self-reported questionnaire. However, the self-report method appears to be a practical way of obtaining information in epidemiological studies (47). Work ability, for example, has been defined as an employee's self-evaluation of their ability to continue work despite the nature of the job and individual resources. As a result, this is a case of subjective assessment because it involves assessing a person's capacity to continue working at a job based on how they perceive themselves.

CONCLUSION

In summary, better physical and mental health well-being positively affected the higher level of work ability of teachers. Future research on the planning of maintaining or improving the work ability and health promotion initiatives among teachers should focus on physical and mental health-related QoL. Further elaboration on such features will benefit the educators, schools and Ministry of Education hence remarked the significance of this research.

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