ORIGINAL ARTICLE

A SURVEY ON MUSCULOSKELETAL PAIN AND DISCOMFORT AMONG INDUSTRIAL WORKERS

M.H Nurhanisah*, Ruhaizin Sulaiman, Khairul Manami, Rosalam Che Me

Department of Industrial Design, Faculty of Design and Architecture, Universiti Putra Malaysia, 43400, UPM Serdang, Selangor, Malaysia

***Corresponding author: M.H Nurhanisah**
Email: mhnurhanisah@gmail.com

ABSTRACT

Musculoskeletal disorders (MSDs) are one of the major occupational health problems among industrial workers, especially in developed and developing countries, such as Malaysia. Although several studies on MSDs have been conducted, the different culture, environmental, and regulatory practices related to hazards and risks of each task might differ. The objective of this study is to describe the work-related MSDs among industrial workers in the context of their work conditions, sleep health, and social life. A descriptive study was conducted on 54 industrial workers from the factories and rehabilitation centres in Peninsular Malaysia using a survey questionnaire. Significant complaints of discomfort involving eight body regions, i.e., the neck, shoulder, elbow, wrist, hand, upper back, lower back, and foot, associated with work conditions, sleep health, and social life were identified. The obtained results indicated that, the lower back was the most prevalent pain and discomfort caused by work conditions, sleep health and lifestyle. The prevalence of MSDs associated with work conditions, sleep health, and social life among industrial workers is high; therefore, attention must be given to the current problem.

***Keywords**: Musculoskeletal disorders (MSDs), work condition, sleep health, social life, occupational health problem, industrial workers*

INTRODUCTION

Industrial fields possess a high risk for work-related musculoskeletal disorders (WMSDs) due to intensive manual handling and repetitive movements. The issues of occupational accidents and illnesses are increasing worldwide, especially in developing countries, due to the increasing global mitigation of trade and the economy in addition to the technological revolution (1). The Department of Occupational Safety and Health Malaysia (DOSH) stated that an increasing number of accidents occurred among industrial workers with 5,264 in 2019, with the manufacturing sector recording the highest number of accidents at 3,419. Statistics released by the Social Security Organisation (SOCSO) Malaysia also revealed that in 2019, approximately 39,796 industrial accidents were reported. Thus, occupational safety and health require persistent attention in Malaysia.

WMSDs are very common occupational injuries affecting workers globally (2). The concerns about the risk of WMSDs among industrial workers have been increasing over the years. The causes of WMSDs are multifactorial and involve various risk factors. It is associated with physical, psychosocial, and modifiable and unmodifiable risk factors. WMSDs are often portrayed as the leading cause of absenteeism from work. It also leads to significant costs for public health systems. Furthermore, the symptoms may result in loss of productivity, poor work quality, product error and failures due to fatigue, pain, and discomfort.

WMSDs are not only affected by physical stressors but also psychosocial risk factors. This included job dissatisfaction, social support and rest breaks. Quality of life plays an important role in every worker's daily life. A study by Prommawai et al. has resulted in MSDs being deleterious to quality of life among workers (3) and impairs workers' personal life (4,5). MSDs condition may cause pain, and it may interrupt a good night's sleep. It was reported that workers with inadequate sleep were at a greater risk for workplace injuries (6). Approximately 13% of work injuries could be attributed to sleep problems (7). Vinstrup et al. concluded that musculoskeletal pain is associated with poor sleep (8). The balance between work conditions, sleep health, and the social life of workers is important to ensure the physical and mental health of every worker is well maintained. Due to the increasing cases of MSDs and job burnout among employees, especially among industrial workers, a study of the ergonomic aspects and WRMSDs toward job performance is crucial to estimate the prevalence and risk factors of MSDs among industrial workers. Recent studies have been made to evaluate the prevalence of WMSDs among industrial workers (9–11); however, the prevalence of work conditions, sleep health, and social life associated with WMSDs and their consequences have not been well identified.

Differences in studied population, socioeconomic, and social environment area contribute to the disparity in WMSDs prevalence. MSDs can affect different parts of the body and occupational activities. Therefore, we conducted a preliminary question to indicate their pain and discomfort of body parts through their influence on the performance of work tasks, sleep disruption, and daily lifestyle outside their workplace. Ultimately, we aimed for better work organisation strategies to improve work schedules or work station design to ensure a healthier occupational environment for industrial workers in Peninsular Malaysia. Hence, the results may help ergonomists to indicate the level of MSDs discomfort related to work, life, and sleep among industrial workers.

METHODS

Study design and study location

The cross-sectional method was used for this survey due to easy to conduct and suitable on descriptive analysis. Descriptive research was use for this survey. This survey aims to obtain information to describe MSDs on three situation involving work condition, sleep health, and social life among industrial workers. Participants of this survey were recruited from the SOCSO Rehabilitation Centre (30 persons) in Melaka, a wood manufacturing factory (13 persons) in Pahang, and a warehouse factory (11 persons) in Selangor. These places are chosen as availability of participants' inclusion criteria.

Study sample and sampling procedure

A total of 54 questionnaires were sent out from April 2021 to September 2021. The inclusion criteria in this sampling procedure are industrial workers, both gender and aged between 16 to 61 and above. The age meets the requirement of the Department of Human Resources (DOHR), which allows workers 16 years of age to do light work commensurate with their capabilities. In this study, we defined industrial workers as those who perform their jobs in heavy industries and are generally engaged in labour-intensive activities such as manufacturing, construction, woodworking, agriculture, etc. The respondents' information sheet and consent letter were distributed to the workers to obtain their permission before answering the questionnaire.

Instruments and procedures

The questionnaire was divided into three sections. Section one focused on the demographic data of all subjects to identify and express statistically the respondents' job-related characteristics. Section two assessed experiences of WMSDs among industrial workers in seven situations, including "While working is the pain or discomfort," "After your shift, is the pain or discomfort," "After a week away from work, is the pain or discomfort," "To what degree has your pain or discomfort interfered with your work, your life outside of work, and your sleep in the past year?," "How much does it interfere with your work?," "How much does it interfere with your life outside of work?," and "How much does it interfere with your sleep?." Lastly, the workers' opinions on WMSDs and their prevention in the future were gained. Each questionnaire took about 20 minutes. The approval to conduct the study in the factories and the rehabilitation centre was obtained from the authorities. However, due to the COVID-19 pandemic, face-to-face interviews or personal data collection were not allowed. Thus, all the procedures and purposes of the study were briefly explained in the respondent's information sheet, attached to the consent letter.

Data analysis

The answers to the questionnaire were analysed using IBM SPSS Statistic software version 21 to determine the frequency of respondents' answers. Descriptive analyses were used to evaluate demographic description which content of gender, age, marital status, education level, smoking status, years of working experience, working hours, job rotation, current job, job task and years of working. Other than that, the survey on musculoskeletal pain and discomfort associated with three situation was analysed by descriptive analyses which content of work condition, sleep health, and social life among industrial workers.

RESULTS

Demographic data

The demographic data were collected to determine the respondents' background. Table 1 show the frequency of respondent's background. Of fifty-four workers who completed the questionnaire, 39 (72.2%) were male and 15 (27.8%) were female. Regarding the respondents age, it was established that eighteen subject were between 21-30 years old (33.3%), sixteen subjects were between 31-40 years old (29.6%), fourteen subjects were between 41-50 years old (25.9%), five subjects were between 51-60 years old and only 1 were >60 (1.9%). Details of the respondents are described in Table 1 below.

Table 1: Frequency of respondent's background

Respondent's background	N	%
Gender		
Male	39	72.2
Female	15	27.8
Age		
21 - 30	18	33.3
31 - 40	16	29.6
41 - 50	14	25.9
51 - 60	5	9.3
>60	1	1.9
Marital status		
Married	30	55.6
Single	24	44.4
Education level		
No school	1	1.9
UPSR	5	9.3
SPM	24	44.4
Cert/Dip/Degree	24	44.4
Smoking		
Yes	16	29.6
No	38	70.4
Working Experience		
0 to 5	20	37
6 to 10	12	22.2
11 to 15	5	9.3
16 to 19	3	5.6
>20	14	25.9
Working hours		
< 8 hours	8	14.8
> 8 hours	46	85.2
Job rotation		
Yes	14	25.9
No	40	74.1
Current job		
Manager	4	7.4
Supervisor	11	20.4
Administrative	6	11.1
General worker	33	61.1
Job task		
Maintenance	20	37
Supervising	12	22.2
Management	8	14.8
Delivery service	5	9.3
Organize object	9	16.7
Years of working		
0 to 5	33	61.1
6 to 10	6	11.1
11 to 15	4	7.4
16 to 19	5	9.3
> 20	6	11.1

The associated pain and discomfort of body parts with effected of work condition, sleep health and lifestyle among industrial workers

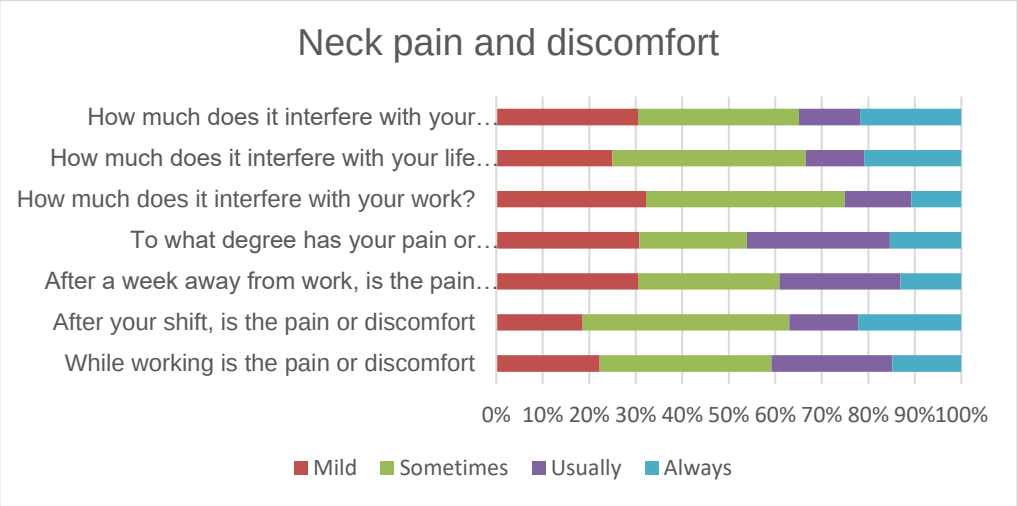

Figure 1: The neck pain and discomfort of industrial workers in seven situations that lasted seven days or more in the past year.

Figure 1 indicate the neck pain and discomfort of industrial workers in seven situations. Of fifty-four participants, we asked if they had neck pain or discomfort caused by the job that lasted seven days or more in last year. According to figure above, the higher pain and discomfort while working is sometimes with 18.5. The higher pain and discomfort after shift is sometimes with 22.2%. The higher pain and discomfort after a week away from work are mild and sometimes with 13%, respectively. The higher pain and discomfort interfered with your work, your life outside of work, and your sleep in the past year are mild and usually with 14.8%, respectively. The higher pain and discomfort interfere with your work is sometimes with 22.2%. The higher pain and discomfort interfere with your life outside of work is sometimes with 18.5%. The higher pain and discomfort interfere with your sleep is sometimes with 14.8%.

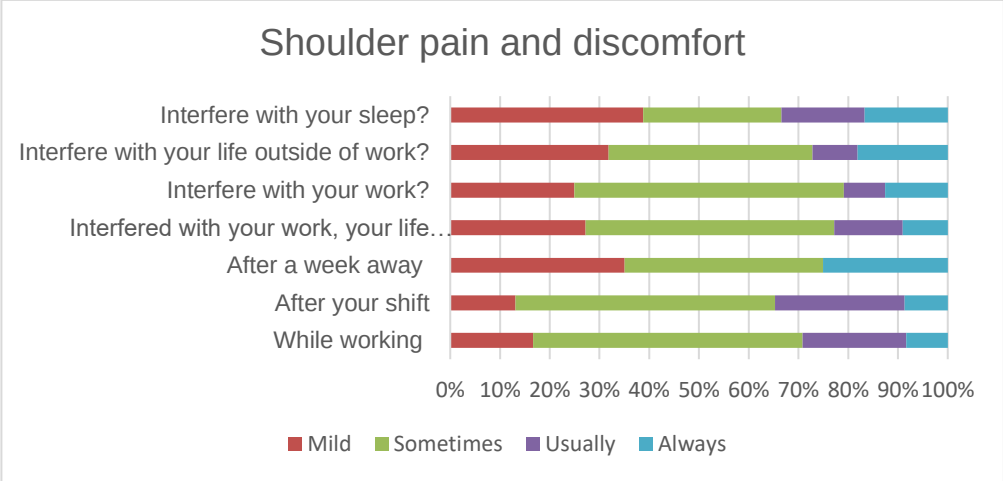

Figure 2: The shoulder pain and discomfort of industrial workers in seven situations that lasted seven days or more in the past year.

Figure 2 indicate the shoulder pain and discomfort of industrial workers in seven situations. Of fifty-four participants, we asked if they had shoulder pain or discomfort caused by the job that lasted seven days or more in last year. According to figure above, the higher pain and discomfort while working is sometimes with 24.1%. The higher pain and discomfort after working shift is sometimes with 22.2%. The higher pain and discomfort after a week away from work is sometimes with 14.8%. The higher pain and discomfort interfered with your work, your life outside of work, and your sleep in the past year is sometimes with 20.4%. The higher pain and discomfort interfere with your work is sometimes with 24.1%. The higher pain and discomfort interfere with your life outside of work is sometimes with 16.7%. The higher pain and

discomfort interfere with your sleep is mild with 13%.

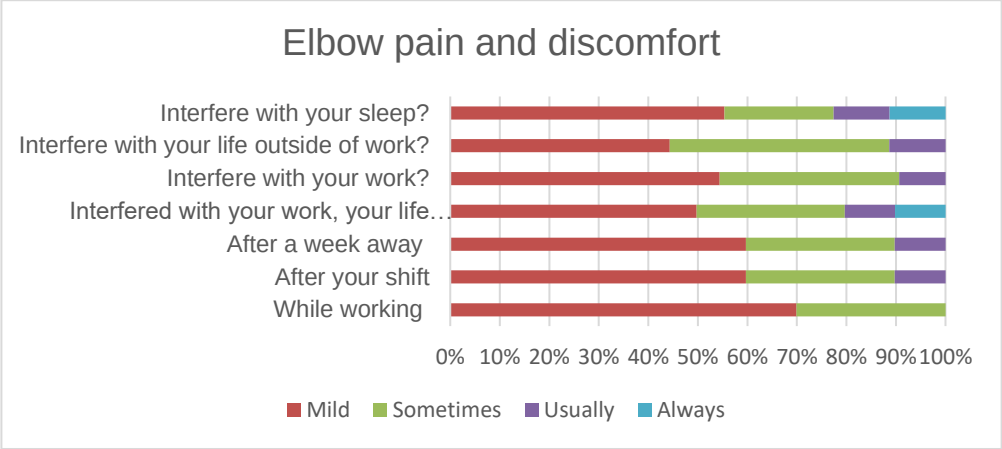

Figure 3: The elbow pain and discomfort of industrial workers in seven situations that lasted seven days or more in past year.

Figure 3 indicate the elbow pain and discomfort of industrial workers in seven situations. Of fifty-four participants, we asked if they had elbow pain or discomfort caused by the job that lasted seven days or more in last year. According to figure above, the higher pain and discomfort while working is mild with 13%. The higher pain and discomfort after shift is mild with 11.1%. The higher pain and discomfort after a week away from work is mild with 11.1%. The higher pain and discomfort interfered with your work, your life outside of work, and your sleep in the past year is mild with 9.3%. The higher pain and discomfort interfere with your work is mild with 11.1%. The higher pain and discomfort interfere with your life outside of work are mild and sometimes with 7.4%, respectively. The higher pain and discomfort interfere with your sleep is mild with 9.3%.

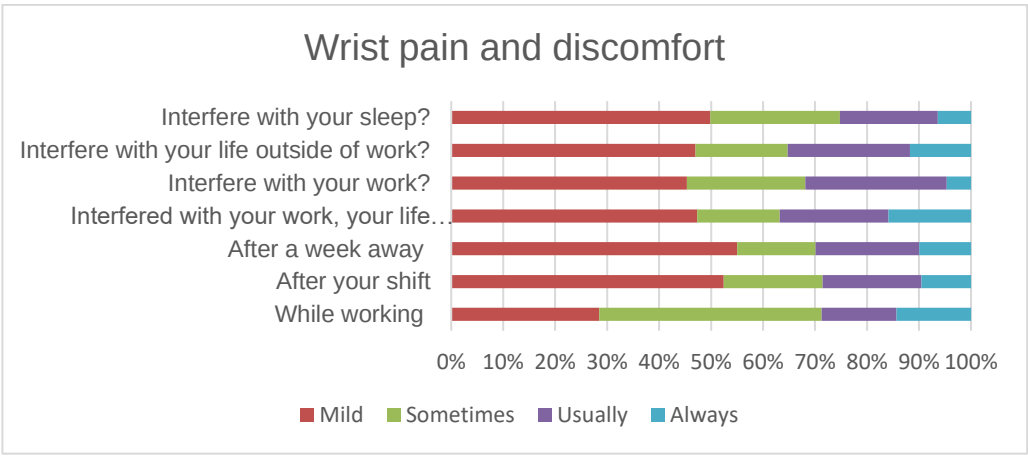

Figure 4: The wrist pain and discomfort of industrial workers in seven situations that lasted seven days or more in past year.

Figure 4 indicate the wrist pain and discomfort of industrial workers in seven situations. Of fifty-four participants, we asked if they had wrist pain or discomfort caused by the job that lasted seven days or more in last year. According to figure above, the higher pain and discomfort while working is sometimes with 16.7%. The higher pain and discomfort after shift is mild with 20.4%. The higher pain and discomfort after a week away from work mild with 20.4%. The higher pain and discomfort interfered with your work, your life outside of work, and your sleep in the past year mild with 16.7%. The higher pain and discomfort interfere with your work is mild with 18.5%. The higher pain and discomfort interfere with your life outside of work mild with 14.8%. The higher pain and discomfort interfere with your sleep is mild with 14.8%.

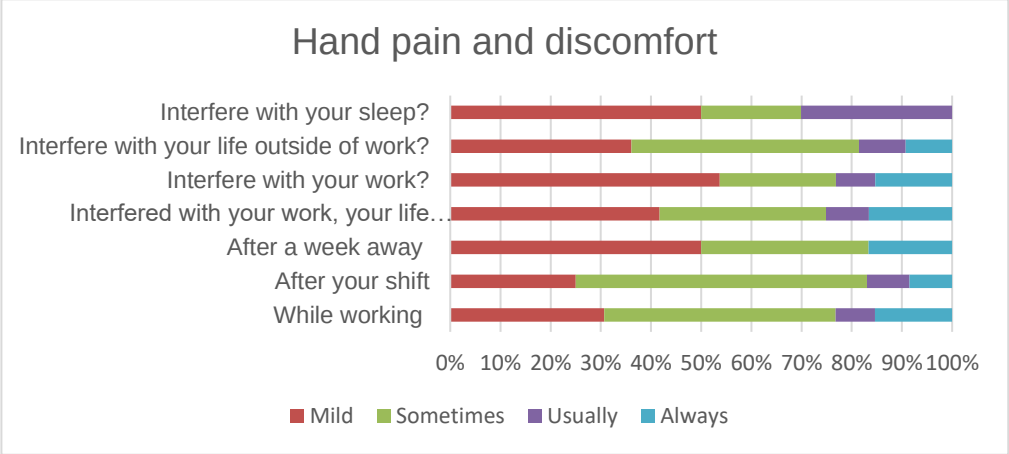

Figure 5: The hand pain and discomfort of industrial workers in seven situations that lasted seven days or more in past year.

Figure 5 indicate the hand pain and discomfort of industrial workers in seven situations. Of fifty-four participants, we asked if they hand had pain or discomfort caused by the job that lasted seven days or more in last year. According to figure above, the higher pain and discomfort while working is sometimes with 11.1%. The higher pain and discomfort after shift is sometimes with 13%. The higher pain and discomfort after a week away from work is mild with 11.1%. The higher pain and discomfort interfered with your work, your life outside of work, and your sleep in the past year is mild with 9.3%. The higher pain and discomfort interfere with your work is mild with 13%. The higher pain and discomfort interfere with your life outside of work is sometimes with 9.3%. The higher pain and discomfort interfere with your sleep is mild with 9.3%.

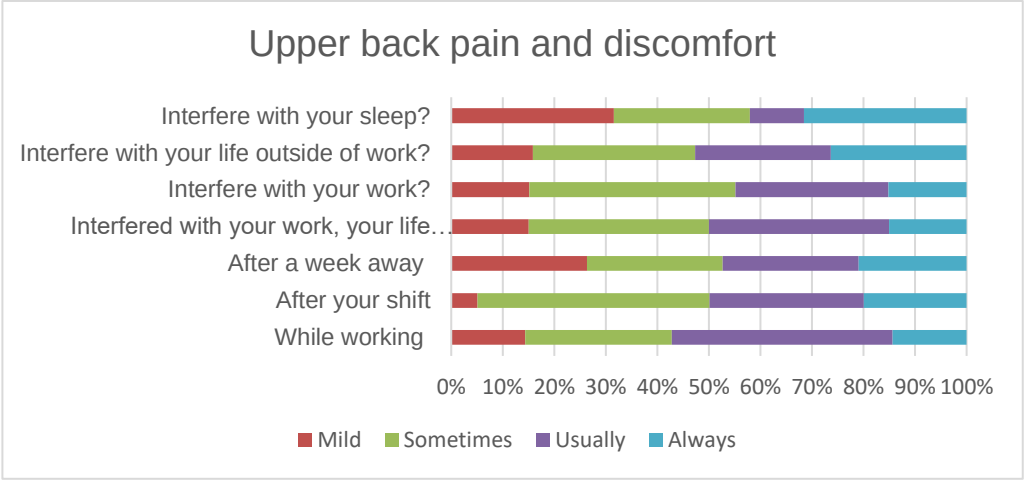

Figure 6: The upper back pain and discomfort of industrial workers in seven situations that lasted seven days or more in past year.

Figure 6 indicate the upper back pain and discomfort of industrial workers in seven situations. Of fifty-four participants, we asked if they had upper back pain or discomfort caused by the job that lasted seven days or more in last year. According to figure above, the higher pain and discomfort while working is usually with 16.7%. The higher pain and discomfort after shift is sometimes with 16.7%. The higher pain and discomfort after a week away from work are mild, sometimes and usually with 9.3%, respectively. The higher pain and discomfort interfered with your work, your life outside of work, and your sleep in the past year are sometimes and usually with 13%. The higher pain and discomfort interfere with your work is sometimes with 14.8%. The higher pain and discomfort interfere with your life outside of work is sometimes with 11.1%. The higher pain and discomfort interfere with your sleep are mild and always with 11.1%.

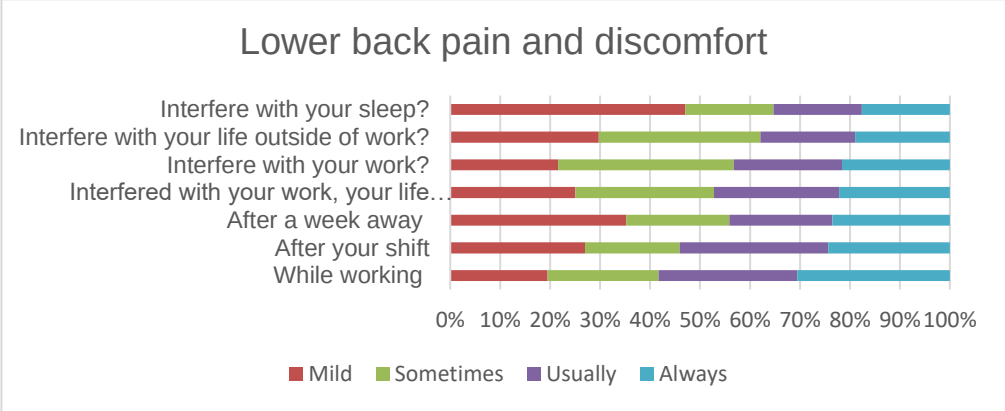

Figure 7: The lower back pain and discomfort of industrial workers in seven situations that lasted seven days or more in past year.

Figure 7 indicate the lower back pain (LBP) and discomfort of industrial workers in seven situations. Of fifty-four participants, we asked if they had LBP or discomfort caused by the job that lasted seven days or more in last year. According to figure above, the higher pain and discomfort while working is always with 20.4%. The higher pain and discomfort after shift is usually with 20.4%. The higher pain and discomfort after a week away from work is mild with 22.2%. The higher pain and discomfort interfered with your work, your life outside of work, and your sleep in the past year is sometimes with 18.5%. The higher pain and discomfort interfere with your work is sometimes with 24.1%. The higher pain and discomfort interfere with your life outside of work is sometimes with 22.2%. The higher pain and discomfort interfere with your sleep is mild with 29.6%.

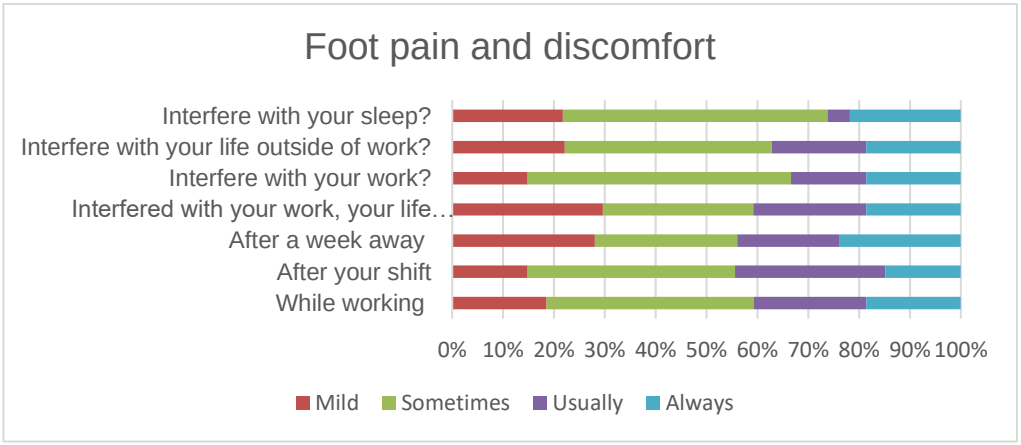

Figure 8: The foot pain and discomfort of industrial workers in seven situations that lasted seven days or more in past year.

Figure 8 indicate the foot pain and discomfort of industrial workers in seven situations. Of fifty-four participants, we asked if they had foot pain or discomfort caused by the job that lasted seven days or more in last year. According to figure above, the higher pain and discomfort while working is sometimes with 20.4%. The higher pain and discomfort after shift is sometimes with 20.4%. The higher pain and discomfort after a week away from work are mild and sometimes with 13%. The higher pain and discomfort interfered with your work, your life outside of work, and your sleep in the past year are mild and sometimes with 14.8%, respectively. The higher pain and discomfort interfere with your work is sometimes with 25.9%. The higher pain and discomfort interfere with your life outside of work is sometimes with 20.4%. The higher pain and discomfort interfere with your sleep is sometimes with 22.2%.

DISCUSSION

The effects of WMSDs on work conditions in industrial workers

Recent studies have explored musculoskeletal problems and symptoms of discomfort/pain as a significant health issue for industrial workers. The goal of this study was, therefore, to establish baseline data on musculoskeletal discomfort/pain among industrial workers in peninsular Malaysia over seven days or more in the past year. Through this study, we identified the body parts affected by pain and discomfort in industrial workers,

which could impact their tasks. The results showed that the lower back is most frequently affected by pain and discomfort among industrial workers, associated with their work that lasted seven days or more in the past year, followed by foot. These findings are consistent with research among workers in sawmill in India which had more frequently in lower back pain (12). A survey carried out towards factory workers indicates that lower back disorders were the most highest WMDSs and common causes of activity limitation (11).

LBP is most prevalently affected by pain or discomfort among workers due to prolonged standing and sitting while performing their tasks for two hours or continuously for more than two hours (13–15). WMSDs may cause fatigue and injury, leading to low productivity and absenteeism. Satisfactory work could be achieved if the workers schedule their work with a sufficient workload. Poor working characteristics are related to injuries and pain. Thus, work conditions and the task should be balanced to avoid a heavy workload that may lead to pain and discomfort.

The effects of WMSDs on sleep health in industrial workers

In this survey, we evaluate the interrupted sleep caused by MSDs caused by the job that lasted seven days or more in the past year. The results show that workers exposed to upper back pain and LBP always experience sleep disorders. This is in line with research among brickfield workers in West Bengal which found that relation between WMSDs and sleep disturbance which causes by carrying bricks and spading activities (19). A research by Lee (20) suggested that by night shift, which is associated with adverse health problems, including disturbed sleep, could be related to worsening the MSDs. Musculoskeletal and sleep disorders have been reported to be very common among industrial workers, especially shift workers. According to a study by Brossoit et al. demonstrates that construction workers who experience poor sleep quality were more likely to be involved with poor workplace safety and workplace injuries (6). Thus, proper sleep quality may reduce fatigue and increase mental health by creating early awareness that can reduce MSDs (21).

The effects of WMSDs on social life in industrial workers

Social life signifies work-life balance. Work-life balance has become a major issue in every worker's health and safety. An inadequate work-life balance can affect the quality of work, family relationships and health in the workplace. Findings from this study revealed that the lower back, upper back, foot and neck are the most common parts of the body affected by the social life of industrial workers that lasted seven days or more in the past year. This result is linear to the findings of the study among healthcare workers states that lower back was reported to be the highest MSD of all body parts, which distracting their social life (22). This was supported by previous study which indicates LBP were found to be highly associated with the occurrence of WMSDs while performing activities after work (23). In addition, there is study suggested that a decrease in the WMSDs would lead to increased total quality of life (24).

The work-life imbalance is significantly associated with MSD. This is agreed by Ann, who mentioned that poor work-life balance increased the prevalence of musculoskeletal disorders (25). Previous findings show a significant relationship between musculoskeletal disorders and work-life balance. Therefore, improving work-life balance could minimise musculoskeletal pain and discomfort in industrial workers.

WMSDs control and prevention

Workers with MSDs are often advised to manage their symptoms by changing their work habits and techniques or using appropriate work equipment. WMSDs can be prevented by reporting symptoms early. Workers can get proper treatment and suitable rehabilitation to prevent or minimise the MSDs. The preventive measures are cost-effective in reducing absenteeism, abandoning workers' ill-health and losing skilled workers, and lowering insurance costs. In promoting well-being for workers, physical exercise can improve our body health and performance by coordinating muscles, as well as the reaction speed and effective action of the human brain. In addition, well exercise may reduce the prevalence of low back pain (26). Interventions such as on-job ergonomics training, ergonomics awareness talk, brochures and posters indicated a positive impact on the control and prevention of the WMSDs in industrial workers. Workers are encouraged to prioritise their health by following Occupational Safety and Health (OSH) standards and policy and report to safety committees if any work-related problem is related. Rehabilitation helps reduce the effect of WMSDs by providing workers with self-management strategies, assistive equipment that treats pain or other complications, and maintaining occupational health by professionals including medicine, nursing, psychology therapy and recreation. In Malaysia, rehabilitation places for musculoskeletal disorders include SOSCO Rehabilitation Centre, rehabilitation hospitals, and private rehabilitation institutes.

CONCLUSION

This study investigated the association of work balance, sleep and lifestyle with musculoskeletal disorders among industrial workers. Overall, we identified that the lower back and neck are the most frequent pain and discomfort experienced by industrial workers, which interfered with work, life outside work, and sleep in the past year. Our

findings agreed that poor work conditions, sleep health, and lifestyle led to musculoskeletal pain and discomfort among industrial workers and provides the basis for implementing solutions to improve workers' occupational health and prevent work injury and musculoskeletal pain.

STUDY LIMITATION

Since this study is conducted during covid-19 pandemic situation, it is almost impossible to fully account the risk factors of WMSDs in this study due to the unable to confront the workers to get full information and time constraints.

COMPETING INTERESTS

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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