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The Effectiveness of Workplace Health Promotion Programme in Improving Sickness Absenteeism, Medical Cost Claims and Work Engagement Among Manufacturing Workers in Malaysia: A Randomised Control Trial

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ABSTRACT

Job-related stress at the workplace has a tremendous effect on employees' work performance. This study aims to evaluate the effectiveness of the Workplace Health Promotion (WHP) programme on employee sickness absenteeism, medical cost claims and work engagement among blue-collar manufacturing workers in Malaysia. The WHP intervention comprised organisational and individual stress management programmes delivered through the Occupational Stress Management Course and Employee Assistance Programme. Data on sickness absenteeism and medical cost claims were gathered from the records of the Human Resource Department. In addition, work engagement data were collected through the Malay Validated Utrecht Work Engagement Scale (UWES). Eighty-eight employees participated in the study. Most employees worked 45 hours a week, with more than 80% working overtime and shifts. Pre-intervention sickness absenteeism among manufacturing workers varied from 0.98 to 2.57 days. At baseline, medical cost claims ranged from RM92 to RM196 for three months and RM127 to RM359 for six months. After six months of participation in the WHP programme, sickness absenteeism was significantly reduced (d = 0.414) and

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work engagement was significantly enhanced ($d = 1.958$) in the intervention group. Medical cost claims, on the other hand, increased significantly post-intervention ($d = 0.039$). These findings are intended to help organisations and government bodies in recognising the potential of WHP to enhance employee work engagement and reduce sickness absenteeism to improve work organisation and personal development.

Keywords: Employee assistance programme, medical cost claims, sickness absenteeism, work engagement, workplace health promotion programme

INTRODUCTION

Work-related stress is the harmful physical and emotional reactions that arise when work requirements do not match workers' skills, resources and needs, affecting individual work performance and health outcomes (NIOSH, 1998). Today, work-related stress is increasing and has adversely impacted the organisation. The high level of stress among workers will result in low productivity, a higher incidence rate of occupational injuries, increased absenteeism, job insecurity, lower job satisfaction, lower productivity, and greater intention to leave. Moreover, work stress can lead to other problems such as alcoholism, drug abuse, domestic violence, hypertension, and cardiovascular diseases (Ajayi, 2018).

Malaysia is a newly industrialised country that relies on manufacturing as one of the main economic revenues. Industrial workplaces are associated with working conditions that have harmful effects, heavy lifting, and repetitive work that can be sources of stress for workers. The Department of Occupational Safety and Health (DOSH) recently published a report on Occupational Accident Statistics by States in Malaysia, revealing that 6933 work-related accidents occurred between January and December 2020, resulting in permanent and non-permanent disabilities at the construction sites (DOSH, 2020).

While the effects of stress on individuals are gaining much attention, the effects on employers and organisations are equally important. Therefore, in this study, it was interesting to investigate the consequences of occupational stress on the organisational level related to sickness absenteeism, medical cost claims and work engagement. Indeed, it has been estimated that stress-related illness results in the loss of at least 9.9 million working days in the United Kingdom between 2014 and 2015 (ILO, 2016). In Europe, the estimated cost of depression related to work stress for the year 2012 was 617 billion, which includes the cost of absenteeism and presenteeism (271 billion), loss of productivity (242 billion), and healthcare (63 billion) and social welfare (39 billion). While in Malaysia, Chee (2003) reported that 42.9% of employees took 1–7 days of sick leave in the past year. The common causes of employee absenteeism were related to the musculoskeletal system (31.4%), gastrointestinal system (25.8%), hypertension (24.4%), respiratory system (18.1%) and minor ailments (19.3%) (Manjunatha et al., 2011).

Meanwhile, the financial costs for employers may be equally significant as occupational stress leads to increased sick pay, increased healthcare costs and disability payments, higher compensation costs as well as costs of equipment damage (Vokić & Bogdanić, 2007). The United States spent almost 2.79 trillion dollars on healthcare costs in 2012. The employers reported nearly 4 million non-fatal workplace injuries and illnesses, and 55,000 deaths from work-related injuries and illnesses, annually (CDC, 2015). Malaysia's total health expenditures between 1997 and 2012 increased from RM 8,286 million to RM 42,256 million (Ministry of Health, 2014). De Beer et al. (2013) reported that employees in the high burnout group had significantly more GP visits, higher GP insured benefits expenditure, higher total insured benefits expenditure, and more medical claims than low burnout participants.

Furthermore, work engagement plays an important part in the organisation that contributes to job performance. It is an indicator of positive psychology characterised by vigour, dedication and absorption, influencing worker health (Schaufeli, 2012). Therefore, stress affecting one employee increases the work demands and workloads on colleagues, thereby affecting their morale and job satisfaction leading to poor internal communications, diminished cooperation, more internal conflicts, and a dysfunctional workplace climate, which in turn lead to productivity losses, poor services and damaging the corporate image and reputation (Beheshtifar & Nazarian, 2013).

In recent years, intervention studies for work-related stress have mainly focused on individual intervention and individual psychological outcomes (Edimansyah et al., 2008; Jesus et al., 2014; McConachie et al., 2014). However, there are limited RCTs that documented the effectiveness of the WHP programme on the organisational outcomes in the manufacturing industry in Malaysia. Therefore, this study aims to determine the effectiveness of the WHP intervention programme in reducing the rate of sickness absenteeism and medical cost claims and improving work engagement levels among blue-collar manufacturing workers in Malaysia. In this study, a comprehensive WHP programme was developed, consisting of both individual and organisational interventions. In addition, the effectiveness of the intervention programme was further evaluated between the intervention and control groups.

The study's findings can provide evidence of the effectiveness of the workplace stress management programme implementation, which will initiate further necessary measures by employers and policymakers to develop strategies that contribute to a healthy working environment and reduce the burden of medical cost claims.

METHODS

Population, Sample Size and Participants

The population studied consisted of blue-collar workers involved in the production line of a Food and Beverage (F&B) manufacturing company located in Kuala Lumpur, Malaysia. The factory chosen for this study is part of Malaysia's large international chain of food and beverage manufacturing facilities. This factory was chosen because workers were exposed to machines daily in their production lines, and the factory had never implemented an employee assistance programme prior to this study. The white-collar (office) workers were not included in this study due to their work nature, which is different from those involved in the production line. The sample size was estimated using an unpaired t-test via PS Software Version 3.1.2 with a 95% confidence interval, $\alpha = 0.05$. The total sample size for this study was 88 ($n = 44$/group).

This study included participants aged 18 and 65, Malaysian citizens, who worked in the factory for at least one year and completed the informed consent. The exclusion criteria included individuals diagnosed with a psychiatric disorder and currently monitored by a psychiatrist, who have chronic diseases with major complications such as heart diseases and chronic kidney diseases, a known case of cancer, participated in the stress management programme within the last two years and currently on medications for any psychiatric illnesses.

Study Design

A parallel, randomised-controlled trial study design was conducted using a 1:1 allocation ratio. Purposive sampling was performed to select the study area and target population. Convenient sampling was then applied to select participants who met the inclusion criteria in this study. The intervention programme was based on individual practice and a participatory intervention model.

Recruitment, Randomisation and Blinding

Permission to conduct this study was obtained from the factory's management prior to the recruitment process. The recruitment process took two months by advertising on the notice board and through the factory supervisors. In addition, informed consent was obtained from all selected study subjects.

A simple randomisation technique was applied in this study. First, the name list of the study subjects was arranged in alphabetical order to ensure allocation concealment. Then, a list of random numbers was generated from the computer software that produced a random allocation sequence to ensure each participant had equal chances of being assigned to the intervention or control group. Based on the sample size calculation, each group consisted of 44 subjects.

Single blinding was applied to the outcome assessors, data collectors and participants. The health promotion team assessed outcome measures. The health promotion programme provider and the participants were aware of group allocations.

The intention-to-treat analysis was applied in this study; thus, all participants were included in all analyses regardless of their attendance or response to the intervention programmes.

Research Instruments

Data collection on sickness absenteeism and medical cost claims were obtained from the Human Resource records. Pre-intervention data include 3-month and 6-month records from the beginning of the study (baseline). Post-intervention data include 3-month and 6-month follow-ups following intervention implementation.

Malay Validated Utrecht Work Engagement Scale (UWES)

Work engagement is an important part of the organisation that contributes to job performance. Work engagement is an indicator of positive psychology and works well-being. The UWES was widely used in international studies, with translations available in various languages, including Italian, Norwegian, Japanese, and Spanish (Shimazu et al., 2008; Balducci et al., 2010; Nerstad et al., 2010). The robustness and relevance of the construct of work engagement have been demonstrated in different cultures. Previous research has suggested acceptable psychometric properties for the UWES-17 in terms of internal consistency and constructs validity (Schaufeli & Bakker, 2004; Van Doornen et al., 2009). Schaufeli and Bakker (2003) reported that the UWES has reliability ranging from .80 to .90.

The UWES-17 is composed of 17 items consisting of three domains, which are vigour (six items), dedication (five items), and absorption (six items). A previous study showed that UWES should be treated as a unidimensional construct in which the individual scores be interpreted in a summative manner giving a single global score (De Bruin et al., 2013). Therefore, this questionnaire uses a seven-point Likert scale where '0' indicates "Never," and '6' indicates always.

A psychometric study of the Japanese version of UWES (UWES-J) was conducted to examine the suitability of UWES-J using a total of 2334 samples. The analysis results did not change the three subscales: vigour, dedication, and absorption. Furthermore, the internal consistency was high with $\alpha = .92$, and test-retest reliability within a two-month range was 0.66 (Shimazu et al., 2008).

In Malaysia, the validation study was conducted among 205 salespersons above 18 years old in Kuala Lumpur. Prior to the study, the samples were tested using Measures of Sampling Adequacy Kaiser-Meyer-Olkin (KMO) to determine whether they fulfilled

the measurement sampling adequacy and the results obtained showed the KMO value was 0.608 ($p < 0.01$), indicating an acceptable and significant value. In addition, three items (i.e., items 4, 14 and 16) with poor factor loadings were eliminated as the meanings were deemed unsuitable for Malaysian culture upon direct translation. The final result of factor analysis was between 0.321 and 0.795. The reliability test was performed using the internal consistency method with Cronbach's alpha value of 0.514 (Sulaiman & Zahoni, 2016). Furthermore, concurrent validation was also conducted in this study to assess job performance using the Contextual and Task Performance Scale (Goodman & Svyantek, 1999), job meaningfulness using the Meaningfulness Scale (May et al., 2004) and turnover intention using Turnover Intention Scale (Shore & Martin, 1989). The UWES and job performance showed a significant and positive relationship with $r = 0.541$, $p < 0.01$. In addition, a positive and significant relationship was observed between UWES and job meaningfulness with $r = 0.828$, $p < 0.01$. Meanwhile, a negative association was observed between UWES and turnover intention ($r = -0.657$, $p < 0.01$) (Sulaiman & Zahoni, 2016). These findings also contributed to the concurrent validity of the UWES questionnaire.

Therefore, this study adopted the Malay validated UWES by Sulaiman and Zahoni (2016). The mean difference of UWES between the pre-and post-intervention programmes was compared.

Intervention

The Workplace Health Promotion (WHP) intervention programme is comprised of a personalised and organisational stress management programme. The study period consisted of an intervention period of three months followed by a post-intervention period of three and six months. Four different modules were used in this study as part of the WHP programme since each module focused on a different aspect of job stress-related factors and interventions. The mental health promotion intervention programme was based on:

i. Healthy Mental Health Module by the Ministry of Health, Malaysia (MOH, 2005) aims to provide awareness and knowledge on mental and early detection of mental health problems in society. In addition, this module allows users to conduct healthy mind screening, identify the signs of stress, depression, and anxiety, perform healthy mind interventions, and serve as referrals based on healthy mind screening scores.
ii. Anxiety Management Technique Book (Wehrenberg, 2008) provides techniques to understand and manage the anxious brain, body, mind and behaviour.
iii. Mindfulness for stress (Breathworks, 2017) provides a foundation in mindfulness, compassion, and meditation skills and teaches how to apply them in life.

iv. Stress at work (NIOSH, 1998) provides knowledge to understand better the influence of 'work organisation' or 'psychosocial' factors on stress, illness and injury and identify ways to redesign jobs to create safer, healthier workplaces.

The following intervention components were offered in the intervention group (n = 44):

i. Educational and behavioural group sessions (organisational-level intervention)
This part of the programme comprised the Occupational Stress Management Course (OSMC) consisted of five modules delivered in two sessions within two months. The course comprised of (a) psychological screening test, (b) discussion on occupational stress, (iii) personalised stress management therapy that included diaphragmatic breathing technique, mindfulness relaxation technique, anger control and healthy lifestyles, (iv) corporate occupational stress management that focused on organisational change and (v) corporate empowerment organisation that focused on SWOT analysis (strength, weakness, opportunity, and threats), problem-solving skills, interpersonal and communication skills.

ii. Individual counselling session (individual-level intervention)
All participants in the intervention group received one counselling session via the Employee Assistance Programme (EAP) that discussed their physical and psychological health, management of stress at the workplace and daily application of personalised stress management therapy. There was also a daily practice on diaphragmatic breathing, progressive muscle relaxation, and the mindfulness technique.

The details of the OSMC course and modules are attached in Appendix. All programmes were delivered by the Occupational Safety and Health specialist (i.e., principal investigator) and supported by the health promotion team from the Ministry of Health Malaysia. Without further intervention, the control group participants received a general brochure on stress from the Promotion Unit, Ministry of Health. The response rate monitored the process evaluation during the assessment and intervention. This study followed the Consort flowchart for the randomised controlled trial study (Figure 1).

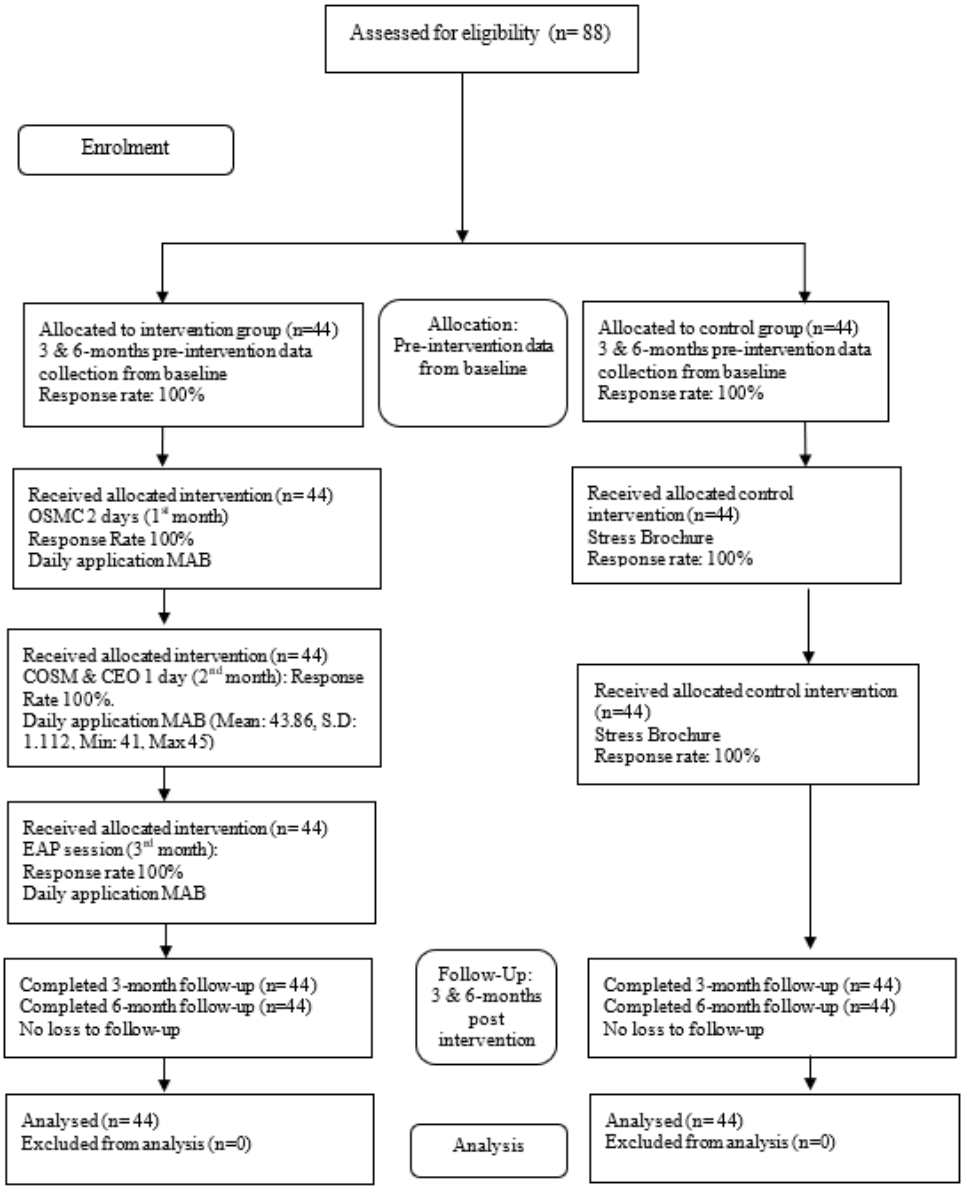

Figure 1. CONSORT Flow chart of the study

Note. OSMC: Occupational Stress Management Course; MAB: Managing Anxious Body; COSM: Corporate Occupational Stress Management; CEO: Corporate Empowerment Organisation; EAP: Employee Assistant Programme

Health Promotion Team

This study comprised a health promotion team led by the principal investigator, the Occupational Safety and Health specialist, and the health promotion team. The principal investigator trained the team. The team was responsible for the overall planning, implementation, follow-up, and study evaluation. This study received support from the Occupational Safety and Health team of the factory to monitor all planned activities.

Ethical Approval

The Medical Ethics Committee, University Malaya Medical Centre (MECID NO: 201512-1975) reviewed and approved this study protocol. This study was also registered with the National Medical Research Register (NMRR ID: 16-504-30274).

Statistical Analysis

Data analysis was carried out using SPSS Version 20.0. Data were presented in mean ± SD, frequency, and percentage (%). The intention-to-treat analysis was applied. Differences between the intervention and control groups were analysed using the Chi-Square test and Independent *T*-Test. The results include the mean difference between within-group (time effect) and between-group (group effect), 95% confidence interval, *p*-value, and Cohen's *d* effect size.

RESULTS

Socio-Demographic Characteristics

A total of 88 Malaysian manufacturing workers were recruited for this study. There was no follow-up loss in this study from the beginning until the post-intervention stage. The intention-to-treat analysis was applied in this study; thus, all participants were included in all analyses regardless of their attendance or response to the intervention programmes making the response rate 100%. Most employees were male, 88.6% in the intervention group and 79.5% in the control group. The mean age of the intervention group participants was 35.98 ± 9.31, and the control group participants were 36.05 ± 8.09. More than two-thirds of the employees had secondary education (SPM and lower); 81.8% were intervention group participants, and 77.3% were control group participants. More than 90% of the employees were Malay and Muslim. Most of the employees were married (75% in the intervention group and 88.6% in the control group). There was no significant difference between the intervention and control groups regarding their demographic characteristics (Table 1).

Table 1

Socio-demographic characteristics of the employees

	Intervention Group		Control Group		
Variables	Frequency (%)	Mean (SD)	Frequency (%)	Mean (SD)	*P*-Value
Gender:					
Male	39 (88.6)		35 (79.5)		0.244
Female	5 (11.4)		9 (20.5)		
Age (Years)		35.98 (9.31)		36.05 (8.09)	0.971
Education:					
SPM and lower	36 (81.8)		34 (77.3)		0.597
STPM and above	8 (18.2)		10 (22.7)		
Marital Status:					
Single, Divorce	11 (25.0)		5 (11.4)		0.097
Married	33 (75.0)		39 (88.6)		
Race:					
Malay	43 (97.7)		41 (93.2)		0.306
Non-Malay	1 (2.3)		3 (6.8)		
Religion:					
Islam	44 (100)		41 (93.2)		0.078
Non-Muslim	0 (0)		3 (6.8)		
Employment:					
Permanent	44 (100)		44 (100)		a
Contract	0 (0)		0 (0)		
Job Position:					
Operator	37 (84.1)		31 (70.5)		0.127
Supervisor	7 (15.9)		13 (29.5)		
Unit:					
Production	38 (86.4)		33 (75.0)		
Warehouse, R&D, Engineering	6 (13.6)		11 (25.0)		0.177
Working Duration (Months)		131.73 (85.55)		113.34 (80.20)	0.301
Working hours per day (hours)		8.0 (0.43)		8.11 (0.43)	0.219
Working hours per week (days)		5.64 (0.39)		5.53 (0.42)	0.220
Working shift:					
Yes	38 (86.4)		34 (77.3)		0.269
No	6 (13.6)		10 (22.7)		

Table 1 *(Continue)*

Variables	Intervention Group		Control Group		
	Frequency (%)	Mean (SD)	Frequency (%)	Mean (SD)	*P*-Value
Overtime:					
Yes	41 (93.2)		36 (81.8)		0.107
No	3 (6.8)		8 (18.2)		
Monthly income (RM)		2603.61 (1018.51)		2584.86 (967.28)	0.930
Smoking status:					
Non-smoker	18 (47.4)		20 (52.6)		0.667
Smoker	26 (52.0)		24 (48.0)		
Alcohol Intake:					
Yes	1 (2.3)		1 (2.3)		1.000
No	43 (97.7)		43 (97.7)		
Daily sleep time (hours)		6.63 (1.12)		6.40 (1.50)	0.401
Exercise:					
Moderate intensity (150 mins/week)	13 (40.6)		19 (59.4)		0.184
Non-active exercise (less than 150 mins/ week) & Not exercise	31 (55.4)		25 (44.6)		

a: No statistic was computed because it is a constant

Workplace Characteristics

All participants were permanent employees (100%), and most of them were operators (>70.5%) working in the production unit (>75%). Most of the participants have worked in this company for more than nine years. Regarding hours spent at work, the employees worked eight hours per day, 5.6 days a week, making approximately 45 hours per week. Most of the employees worked in shifts (86.4% in the intervention group and 77.3% in the control group), and more than 80% worked overtime. The average salary of the employees was between RM 2500 to RM 2600 per month. There was no significant difference between the intervention and control groups regarding their workplace characteristics (Table 1).

Sickness Absenteeism Pre- and Post-Intervention Programme

The mean scores of sickness absenteeism among intervention and control group participants in the pre-and post-intervention programme are presented in Table 2. No significant improvement was recorded in 3-month sickness absenteeism among the intervention group participants pre-and post-intervention programme, with 0.98 ± 1.36 and 1.11 ± 1.63, respectively (p = 0.613). Similarly, no significant changes were found in the sickness absence between the 3-month pre-and post-intervention scores among the control participants, with 1.20 ± 1.36 and 1.30 ± 1.17 (p = 0.647). In contrast, the means of 6-month sickness absenteeism were significantly reduced in the intervention group participants, from 2.48 ± 2.85 pre-intervention to 1.50 ± 2.13 post-intervention (p = 0.017). No significant changes were observed in the control group. Overall, the mean of sickness absenteeism increased between the pre-intervention periods of 3-months and 6-months in both groups. Moreover, control group participants showed a higher sickness absence at 3-months and 6-months pre-intervention periods than the intervention group participants. However, the results were not significant (p > 0.05). The Cohen effect showed that the intervention programme had a small effect size for sickness absence at 3-months (d = 0.031) and 6-months (d = 0.414) post-intervention programme.

Medical Cost Claim Pre- and Post-Intervention Programme

Table 3 shows the mean scores of medical cost claims at 3-months and 6-months among intervention and control group participants pre-and post-intervention. Results showed that claims for medical care increased between 3-months and 6-months pre-intervention study periods in both groups. In the intervention group, the 3-months period of medical cost claims increased from 92.42 ± 135.58 pre-intervention to 185.93 ± 432.62 post-intervention. However, the increment was not significant (p = 0.170). Meanwhile, 6-months medical cost claims were significantly increased among the intervention group participants, from 127.16 ± 185.77 pre-intervention to 393.11 ± 829.42 post-intervention (p = 0.039).

Regarding medical cost claims among the control group participants, no significant difference was observed between the 3-months and 6-months pre-and post-intervention scores (p > 0.05). The intergroup mean difference and Cohen d values for medical cost claims among study participants showed small effect sizes at 3-months and 6-months post-intervention programmes with d = 0.214 and d = 0.332, respectively.

Table 2

The mean scores of sickness absenteeism among intervention and control group participants pre- and post-intervention implementation

Variables	Pre-Score mean (SD)	Post-Score mean (SD)	Mean Score Diff (95% CI)	Mean Score Diff SD	t-statistic	P-value	Inter-group mean differences (95% CI)	*d*
Sickness Absence (3 months)								
Intervention	0.98 (1.36)	1.11 (1.63)	0.14 (-0.40, 0.68)	1.77	0.510	0.613	0.049 (-0.09, 0.19)	0.031
Control	1.20 (1.36)	1.30 (1.17)	0.091 (-0.31, 0.49)	1.31	0.461	0.647		
Sickness Absence (6 months)								
Intervention	2.48 (2.85)	1.50 (2.13)	-0.98 (-1.77, -0.18)	2.62	-2.475	0.017*	-1.03 (-1.11, -0.93)	0.414
Control	2.57 (2.50)	2.61 (1.79)	0.05 (-0.66, 0.75)	2.33	0.129	0.898		

*Results were statistically significant with $p \leq 0.05$
Data were homogenous between the study groups.

Table 3

The mean scores of medical cost claim among intervention and control group participants, pre- and post-intervention implementation

Variables	Pre-Score mean (SD)	Post-Score mean (SD)	Mean Score Diff (95% CI)	Mean Score Diff SD	t-statistic	P-value	Inter-group mean differences (95% CI)	*d*
Medical Cost Claim (3 months)								
Intervention	92.42 (135.58)	185.93 (432.62)	-93.51 (-228.71, 41.68)	444.67	-1.395	0.170	-82.63 (-159.60, -5.67)	0.214
Control	196.65 (160.30)	185.77 (133.89)	-10.88 (-69.11, 47.35)	191.53	-0.377	0.708		
Medical Cost Claim (6 months)								
Intervention	127.16 (185.77)	393.11 (829.42)	-265.95 (-518.33, -13.57)	830.14	-2.125	0.039*	-241.48 (-403.31, -52.50)	0.332
Control	359.15 (220.28)	383.62 (277.91)	-24.47 (-115.02, 66.07)	297.82	-0.545	0.589		

*Results were statistically significant with $p \leq 0.05$
Data were homogenous between the study groups.

Bonferroni Post-hoc Test

The Bonferroni post-hoc test results for sickness absenteeism and medical cost claim among the study participants between the 3-month and 6-month intervention programme are presented in Table 4. A statistically significant effect of time on sickness absence among the intervention group participants, F (3,129) = 5.668, (p = 0.003). The adjustment for multiple comparison Bonferroni revealed that trial 4 was statistically significant with trials 1, 2, and 3 with decrement of mean difference, -0.59 (p = 0.032), -1.11 (p = 0.007) and -0.73 (p = 0.007). There was no statistically significant time effect on sickness absence among the control group participants, F (3,129) = 0.104 (p = 0.927).

The 3-month and 6-month intervention programmes had no significant effects on medical cost claims among the intervention group participants, F (3,129) = 3.394 (p = 0.066). However, trials 3 and 4 were statistically significant with a mean difference of -57.677 (p = 0.017) after adjustment for multiple comparison Bonferroni. There was no significant effect of time on medical cost claims among the control group participants, F (3,129) = 0.260, (p = 0.790).

Work Engagement Pre- and Post-Intervention Programme

Table 5 shows the mean UWES scores for work engagement among the study participants pre-and post-intervention. At the beginning of the study, work engagement among manufacturing workers was 58.16 ± 10.43 in the intervention group and 61.11± 13.93 in the control group. Following the Workplace Health Promotion Intervention Programme's implementation, the intervention group participants observed a significant improvement in work engagement, with a mean score of 68.91 ± 5.00 ($p < 0.001$). However, no significant improvement was observed in the control group, 61.18 ± 11.97 (p = 0.896). The overall effect of work engagement was large, with d =1.958.

Table 4

Bonferroni post-hoc test for sickness absenteeism and medical cost claim among intervention and control group participants between 3-month and 6-month intervention programmes

Variables	Groups	Trials	Mean (95% CI)	F Statistics (df)	P-value
Sickness Absenteeism	Intervention	1	0.977 (0.565, 1.39)	5.668 (3,129)	0.003*
		2	1.5 (0.82, 2.18)		
		3	1.11 (0.62, 1.61)		
		4	0.39 (0.16, 0.62)		
	Control	1	0.977 (0.565, 1.39)	0.104 (3,129)	0.927
		2	1.5 (0.82, 2.18)		
		3	1.11 (0.62, 1.61)		
		4	0.39 (0.16, 0.62)		

Table 4 *(Continue)*

Variables	Groups	Trials	Mean (95% CI)	F Statistics (df)	P-value
Medical Cost Claim	Intervention	1	185.93 (54.41, 317.46)	3.394 (3,129)	0.066
		2	243.63 (42.56, 444.71)		
		3	92.42 (51.20, 133.64)		
		4	34.74 (10.94, 58.54)		
	Control	1	196.65 (147.91, 245.38)	0.260 (3,129)	0.790
		2	167.87 (95.92, 239.81)		
		3	185.77 (145.06, 226.47)		
		4	173.38 (130.16, 216.61)		

Trials = Variables of different study intervals (i.e., pre-intervention at 3-month, pre-intervention at 6-month, post-intervention at 3-month, post-intervention at 6-month)
*Results were statistically significant with p≤0.05
Repeated measures ANOVA

Table 5

The mean UWES scores of work engagement among intervention and control group participants, pre- and post-intervention implementation

Variables	Pre-Score mean (SD)	Post-Score mean (SD)	Mean Score Diff (95% CI)	Mean Score Diff SD	t-statistic	P-value	Inter-group mean differences (95% CI)	*d*
Work Engagement								
Intervention	58.16 (10.44)	68.91 (5.00)	10.75 (8.65, 12.85)	6.90	10.337	<0.001*	10.68 (9.63,11.73)	1.958
Control	61.11 (13.93)	61.18 (11.97)	0.07 (-0.98, 1.12)	3.45	0.131	0.896		

*Results were statistically significant with p≤0.001
Data were homogenous between the study groups

DISCUSSION

This study demonstrates the importance of employees' sickness absence rate, medical cost claims and work engagement as determinants of the organisational outcomes of job stress at the workplace. In this study, the magnitude of sickness absenteeism among the manufacturing workers' pre-intervention programme between three to six months was between 0.98 to 2.57 days. This finding is comparable to studies by Tadesse et al. (2015) and Zare et al. (2017), which reported that employees' means of sickness absenteeism were 2.16 days and 1.73 days, respectively. A report by RAND Europe revealed that the overall health-related absenteeism in Malaysia was 8.2 days/67 working days per employee per year, while presenteeism was 58.8 days (Whitmore et al., 2018). It is estimated that the average annual costs of absenteeism and presenteeism exceed the medical costs associated with diseases. In the United States, absenteeism resulted in a total loss of $118 billion (Prater & Smith, 2011) and £8.4 billion in the United Kingdom (Wang et al., 2016). While in Malaysia, the cost of absenteeism and presenteeism in 2015 amounted to 4.5% of GDP with an average annual cost of RM2.7 million (Rasmussen et al., 2016).

The causes of sickness absenteeism are not always health or illness. Personal factors may also affect absenteeism. In the United States, the most common causes of employee absenteeism are illness (34%), followed by family issues (22%) and personal needs (18%) (Chenoweth, 2011). In addition, absenteeism is significantly associated with role overload, sleep quality, role limitation, responsibility, job dissatisfaction and job stress (Tadesse et al., 2015; Zare et al., 2017). Increased absenteeism is associated with the severity of depression, and according to a cohort study in Sweden, sickness absence is one of the predictors of suicidal behaviour (Ishtiak-Ahmed et al., 2013; Johnston et al., 2019).

According to the U.S. Bureau of Labor Statistics (2020), the highest rate of absence per industry includes healthcare (3.5%), the public sector (3.4%), education (3.3%), hospitality & food services (3.0%) and manufacturing (2.5%). Previous studies have shown an association between absenteeism and health-related risk factors (Suzuki et al., 2015; Brborovic et al., 2016). Workers in the manufacturing industry have reported high levels of job stress. The prevalence of depression among manufacturing workers ranged from 2.6% to 23.4% (Roche et al., 2016). Work-related stress is higher among blue-collar workers in the manufacturing sector than workers in other sectors because they are exposed to frequent and diverse stressors such as extreme noise, less lighting, stuffy atmosphere, high temperatures and mechanical/physical hazards (Mazerall, 2002).

In terms of socio-demographic factors of the studied population, most of the employees in this study belonged to the lower-income group, young age, lower education level and married. Previous studies have indicated that these demographic characteristics are common determinants of higher risk factors for absenteeism and presenteeism (Hansen & Andersen, 2008; Johns, 2009). Low income is associated with a high prevalence of absenteeism,

reduced work productivity and mental illnesses (Callan et al., 2015). Employees with a higher education level exhibit less absenteeism and are healthier mentally and physically than those with less education. Married employees with young children may also show a high degree of absenteeism due to emotional exhaustion and the burden of juggling work-life responsibilities compared to single employees (Greaves et al., 2017).

In addition, the employees in this study worked approximately 45.12 hours per week, with 81.8% to 93.2% of the employees working overtime. On average, Malaysian employees worked 44 hours per week. Despite the high number of hours spent at work in the Asian culture, there is a higher productivity loss of 66 days annually to absenteeism and presenteeism than in western countries, which worked 35 hours a week but lost only 30 days annually (Jack, 2017). A previous study reported that employees who worked more than 48 hours per week and worked overtime were more likely to experience sickness absenteeism than those who did not (Viswanathan et al., 2012). In addition, working above regular working hours would cause mental tiredness and muscle fatigue, leading to an increased risk of accidents in the workplace.

Sickness absenteeism can harm various individuals and entities. At the individual level, high absenteeism results in loss of pay and discipline issues. It also increases the workload and conflicts between co-workers. In terms of organisation, absenteeism results in lower productivity, higher costs and a higher risk of accidents. Furthermore, the negative consequences for the family and society include lower incomes, lower work reputation and aggravated marriage and child problem. Therefore, sickness absenteeism implicates organisational financial loss and a lower quality of life among employees.

Most industrial jobs are associated with a certain degree of injury or illness. Musculoskeletal disorders, such as strains and sprains, are the leading cause (34%) of work disability in the industrial sector, with estimated costs for long-term disability between USD 13 and USD 20 billion annually (Baldwin, 2004). Therefore, medical cost claims were an important measure for the organisation. In this study, the average medical cost claims at baseline were between RM92 and RM196 for three months and RM127 and RM359 for six months. A report on the medical costs associated with musculoskeletal claims by industries between the years 1999 to 2004 indicated that most of the claims were from the manufacturing industry (25.1%). The average medical cost per claim among the manufacturing workers was USD 2,593, with the total cost for all claims amounting to USD 673 million (Dunning et al., 2009).

The average age group of participants in this study was 36 years. According to Muir et al. (2020), younger age groups between 35 and 44 made most medical claim requests. The most harmful condition in working adults is due to mood disorders. Approximately 15 to 20% of workers will receive short-term disability benefits each year.

The WHP programme has emerged as an attractive strategy for its health and cost benefits. Therefore, the study designed the WHP and EAP programmes to target both organisational and individual levels. The goal of the WHP programme is to improve employee lifestyles, which will improve health, work ability and work productivity (Rongen, 2013). Meanwhile, the EAP aims to rehabilitate the workers, reduce the absence rate and improve health. Previous studies and reviews have demonstrated the positive effects of the WHP programme on overall health and well-being (Groeneveld et al., 2010), mental health (Martin et al., 2008), as well as work-related outcomes such as sickness absence (Kuoppala et al., 2008) and work productivity (Cancelliere et al., 2011).

This study demonstrated a significant improvement in the primary organisational outcome measures, i.e., sickness absenteeism, following a 6-month WHP intervention programme. Hendriksen et al. (2016) reported similar results of significant improvements in employees' vitality, work performance, sickness absence and self-management among the white-collar workers of an insurance company after undergoing a 5-month workplace health promotion programme. Bertera (1990) reported that comprehensive WHP programmes among the blue-collar employees of a diversified industrial company reduced sickness absenteeism among the intervention participants up to 14% over two years compared to a 5.8% decline in control participants. This achievement has resulted in a good return on investment. Similarly, a cluster of randomised controlled trials in Sweden showed less sickness absenteeism among the intervention group participants 6 months post-intervention and managed to sustain after 12 months of follow-up compared to control group participants. In addition, the study found that the participatory intervention group had an early return to work and a significant improvement in their mental health status, such as depression, anxiety and exhaustion (Van De Poll et al., 2020).

The key elements of the WHP intervention include strong management support, effective communication, and involvement of employees at both individual and organisational levels. Moreover, the WHP programme targets improving self-management related to individual vitality, including goal setting, action planning and reflective counselling by well-trained coaches. By increasing employees' self-awareness and knowledge of health practices and stimulating the sense of responsibility, they are willing to improve their health behaviour resulting in improved health and vitality, increased work engagement and decreased absenteeism (Rongen et al., 2013).

No significant effect was found in sickness absenteeism during at 3-months intervention programme. It could be due to the short duration of intervention which is perhaps not adequate for changes in behaviour, and minimising the level of work stress might take longer. This outcome was supported by a randomised controlled trial study on work-related stress intervention via the Work Stress Questionnaire (WSQ), which conducted a brief consultation from the general practitioner (GP) that had two hours of training before the

conduct of the study and the results showed no significant difference in sick leave within 3, 6 and 12 months post-intervention programme (Holmgren et al., 2019). However, job stress is a complex issue that requires a multidisciplinary approach to treatment and a qualified trainer to handle the stress-management intervention programme. Therefore, brief intervention is inadequate to impact the individual and the organisation.

This study found that medical cost claims were not significantly reduced during the 3-months and 6-months post-intervention programme. Van De Poll et al. (2020) supported these findings, which found a higher cost for short-term sickness absence and production loss at work among the problem-solving intervention group from the employer's perspective. It is due to the intervention group being able to return early to work following a long-term sickness absence. Therefore, the long-term sickness absence turned into short-term sickness absenteeism, and the employer bore the cost compared to the long-term sickness absence, borne by the workers' social insurance benefit. Therefore, the costs of short-term and long-term sickness absenteeism incurred by the employer should be measured.

Measuring work engagement is important to an organisation because it mediates the relationship between high-performance work systems, perceived organisational support and affective commitment (Teo et al., 2020). The organisational intervention in this study emphasised organisational support. A study in Belgium found that perceived organisational support moderates the association between work engagement and job satisfaction (Côté et al., 2020). Besides that, the intervention also includes personality training like self-evaluation in mindfulness and effective training. It was supported by a study in Romania which showed that work engagement mediates personality characteristics (core self-evaluation, proactive personality and success-oriented) with job performance and mental health (Tisu et al., 2020). Moreover, high work engagement showed a reduced risk of cardiovascular diseases by lowering systolic blood pressure and heart rate (Black et al., 2017). Therefore, work engagement impacts mental health, job performance and affective commitment and has also reduced cardiovascular risk.

In this study, there was a significant improvement in work engagement among the participants in the intervention group compared to the control group post-intervention. This finding was supported by the stress intervention with a quasi-experimental and longitudinal study in Spain among 72 employees, showing a significant improvement in vigour and dedication in work engagement. On the other hand, the work engagement in the control group remained constant, which is consistent with this study (Cifre et al., 2011). Furthermore, this study trained the intervention group participants with venting, emotional support, and anger control. According to Chen et al. (2020), work engagement increased emotional exhaustion for less conscientious workers, while emotional exhaustion decreased for more conscientious workers that were emotionally stable. Besides that, the intervention programme also promoted a healthy lifestyle that includes exercise as one

of the components. This approach was supported by a study in Japan that indicated that workplace exercise is significantly related to work engagement (Jindo et al., 2020).

Work engagement cannot be achieved if we focus solely on individual intervention. Work engagement requires an organisational intervention in which the intervention must include managers and supervisors to ensure that the subordinates' opinions are heard. The intervention programme in this study included the supervisor and the management when workers highlighted some of their concerns, such as work schedule, claims, and attendance, among others. This approach was supported by a study by Gemeda and Lee (2020), which indicated that the transformational leadership style had a significant positive relationship with workers' engagement, and it also mediated the work outcome. This finding is also consistent with a study in the United States that found that schedule control and work engagement were mediated by schedule satisfaction and perceived supervisor support (Swanberg et al., 2011).

The study's strength includes a 100 response rate and no follow-up loss among the participants. Rigorous participant-retention strategies were employed in the design phase, at the beginning and throughout the study period. All the programmes were scheduled earlier to avoid production interruptions. All activities were monitored by the Human Resources and their Occupational Safety and Health team. All programmes were conducted in their internal training centre to ensure a high attendance rate. Frequent phone calls, site visits, and reminders on upcoming visits may have improved the likelihood of a high response rate. It is important to have experienced research coordinators who can implement the procedures that minimise loss to follow-up. Additionally, this study keeps participants interested and motivated by providing non-monetary incentives such as the stress management kit and free products from the company's brand.

Several limitations were observed in this study. First, data confidentiality and the implications on the company's brand from mental health issues that might be exposed to researchers and other parties made it challenging to find a suitable industry willing to engage in this study. Second, due to the participatory intervention study, double-blinding was not possible because the investigator was required to perform an intervention on the intervention group participants. It was, therefore, impossible to blind the participants and the investigator. However, blinding was still applied to data collectors and outcome assessors. Third, there is a risk of contamination between the intervention and control group participants because of the same workplace. This situation can create diffusion between groups. However, this study can minimise this effect due to the intervention programme focused on group intervention and individual intervention. In addition, the health promotion material was distributed to them to reduce the potential of resentful demoralisation among the control group members. Additionally, there is a possibility of a Hawthorne effect. Finally, the intervention group demonstrated an improvement in outcome measurement due to using self-reported questionnaires rather than biological measurements.

CONCLUSION

This study highlights the importance of sickness absenteeism, medical cost claims and work engagement in determining organisational outcomes. This study also suggested that the WHP programme is a good strategy that can be implemented to address the problem of workplace stress absenteeism because it helps improve health indicators among blue-collar employees, resulting in a favourable return on investment. However, it is important to note that employee absenteeism and work engagement can be influenced by many factors, from individual and social to organisational levels. Thus, a more detailed study should be carried out using different samples and methods. Furthermore, future studies may consider other socio-economic and background factors of employees that may contribute to the absence behaviour. In addition, interventions to reduce sickness absenteeism and medical cost claims may cover periodic medical check-ups, monitor employees' working hours, improve job satisfaction, and reduce workplace stress.

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APPENDIX

The Intervention Module Programme

No	Programmes	Time/Duration
1	**Occupational Stress Management Course (OSMC)**	1st Month (2-day course)
	Module 1: Psychological Screening Test • Personality Traits assessment	
	Module 2: Occupational Stress • Definition of Occupational Stress • Magnitude of Occupational Stress Problems • Models of Occupational Stress • Know Your Stressors • Symptoms and Signs of Stress • Effect of Stress	
	Module 3: Personalised Stress Management Therapy • Managing Anxious Body (MAB) ◊ Technique 1: Change your intake • Create Demand Delays • Lower Stimulation Intake ◊ Technique 2: Breathe (Diaphragmatic Breathing), Mindfulness breathing ◊ Technique 3: Mindfulness with shifting awareness ◊ Technique 4: Relax (Progressive Muscle Relaxation, Cued Relaxation) and Mindfulness Relaxation • Mindfulness for stress and anxiety • Anger control • Healthy Lifestyles (10 B, stress buster)	
	Module 4: Corporate Occupational Stress Management (COSM) • Organisational Change (PIE Concept)	2nd Month (1-day course)
	Module 5: Corporate Empowerment Organisation (CEO) • SWOT Analysis • Problem Solving Skills • Interpersonal Communication Skills • Assertiveness • Root cause problems • Discussion on the application of the corporate module (COSM & CEO)	
2	**EAP Counselling** • Discussion on physical and psychological health • Discussion on management of stress at workplace • Discussion on daily application of personalised stress management therapy	3rd Month (1 session per individual)
3	**Application of Managing Anxious Body (MAB) Module** • Diaphragmatic breathing • Progressive muscle relaxation • Mindfulness	Daily practice (individual) for 3 months