CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter discusses the results of socio-demographic characteristics of the hospital shift workers, physical activity, eating habits, and their psychosocial well-being status. The data collection was done from February 2020 until August 2021 during the COVID-19 pandemic. Of 413 respondents, 123 responded to the printed questionnaires and 290 answered the online surveys. The IBM Statistical Package for Social Science (SPSS) version 26.0 (SPSS Inc., Chicago, IL, USA) software was utilised for statistical analyses. The data from the printed questionnaires were entered into the Excel software and merged in the same format together with the data from the online questionnaires. The data was then transferred into the IBM SPSS Statistics software Version 26 to be analysed statistically. The descriptive results primarily focus on respondents' socio-demographic characteristics, physical activities, eating habits and sleep quality. Meanwhile, the inferential statistic results highlight the observed associations between various independent variables with the psychosocial well-being status of hospital shift workers.

4.2 Socio-Demography of Hospital Shift Workers

Table 4.1 describes the socio-demographic characteristics of the respondents. A total of 413 respondents who met the inclusion and exclusion criteria were included in this study. The respondents' age ranged from 23 to 54 years old. The mean (SD) age of the respondents was 31.7 (5.9) years. Out of 413 respondents participated in this study, 81.1% were women (n = 335) and 18.9% were men (n = 78). The majority of them were Malays (81.6%), followed by Indians (11.4%), others such as Sikh, Punjabi and Bidayuh (4.1%) and Chinese (2.9%). A total of 90.6% had tertiary education, which consisted of diploma holder (55.9%), bachelor's degree (34.5%) and postgraduate (0.2%). The rest of the respondents had Malaysian Certificate of Education (SPM) (6.5%), and Malaysian Higher School Certificate (STPM) (2.9%). Two-third of respondents were married (66.6%), while nearly a third were single (32.7%), and 0.7% were either divorced, separated or widowed.

Table 4.1: Background of Respondents, n = 413

	n	**%**
Age		
20-29	190	46.0
30-39	178	43.1
40-49	35	9.0
50-59	8	1.9
Gender		
Men	78	18.9
Women	335	81.1
Ethnicity		
Malay	337	81.6
Indian	47	11.4
Chinese	12	2.9
Others	17	4.1
Religion		
Islam	347	84.0
Hinduism	37	9.0
Christian	15	3.6
Buddhism	12	2.9
Others	2	0.5
Educational Status		
SPM	27	6.5
STPM	12	2.9
Tertiary education	374	90.6
Diploma	231	55.9
Bachelor	142	34.5
Postgraduate	1	0.2
Marital status		
Married	275	66.6
Single	135	32.7
Divorced/separated/widowed	3	0.7
Household income*		
< RM4,850	192	46.5
RM4,850 – RM10,959	207	50.1
≥ RM10,960	14	3.4

Work place (Hospital)		
Ampang	117	28.3
Shah Alam	76	18.4
Banting	70	16.9
Klang	65	15.7
Kajang	41	10.0
Others	44	10.7
Work Department		
Emergency & Trauma	175	42.4
Medical-based departments	125	30.3
Surgical-based departments	113	27.3
Healthcare Position		
Staff nurses	251	60.8
Medical officers	91	22.0
House officers	47	11.4
Paramedics	24	5.8
Part-Time Job Involvement		
No	369	89.3
Yes	44	10.7
Comorbidity		
No	353	85.5
Yes	60	14.5
Smoking/Vaping Status		
No	390	94.4
Yes	23	5.6
Alcohol Consumption		
No	399	96.6
Yes	14	3.4

*Based on the Department of Statistics Malaysia official portal classification

Based on the categories by the Department of Statistics Malaysia Official Portal (Department of Statistics 2019), most of the respondents were from the middle-class socio-economic status with the percentage of 50.1% that accounted the household income of RM4,850 – RM10,959, followed by 46.5% from the household income of

less than RM4,850 of the lower-class socio-economic status and 3.4% from the upper-class socio-economic status of household income more than RM10,960.

Figure 4.1 illustrates the percentage of respondents working at hospitals in Klang Valley. The majority of the respondents served in Ampang Hospital (28.3%), followed by Shah Alam Hospital (18.4%), Banting Hospital (16.9%), Klang Hospital (15.7%), other hospitals (10.7%) and Kajang Hospital (10.0%). Other hospital referred to other hospitals in Klang Valley, included Serdang Hospital, University of Malaya Medical Centre, Kuala Lumpur Hospital and Selayang Hospital.

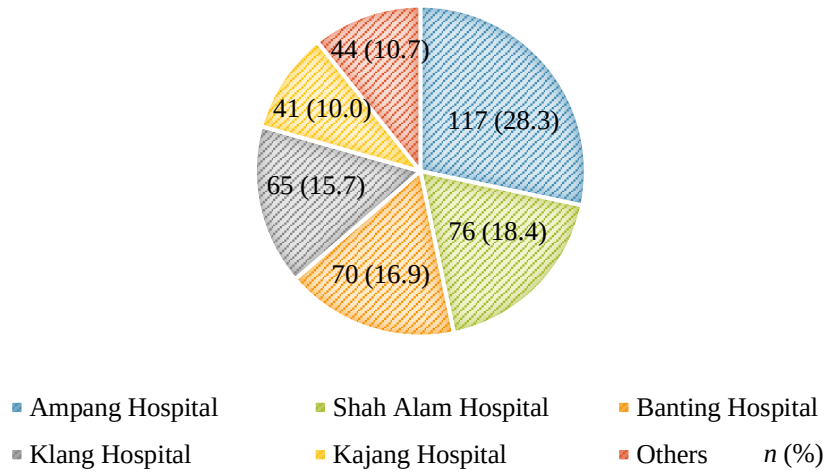


Figure 4.1: Percentage of Respondents' Working Hospitals, *n* = 413

Figure 4.2 shows the departments where the respondents were working in the hospitals. Out of 413 respondents, 42.4% of them worked in the department of Emergency, 30.3% of them in medical-based departments and 27.3% in surgical-based departments. The medical-based departments included the departments of Medical, Anaesthetic & Intensive Care, Psychiatry, and Paediatrics. Meanwhile, the surgical-based departments represented the Surgical, Orthopaedics, and Obstetrics & Gynaecology departments.

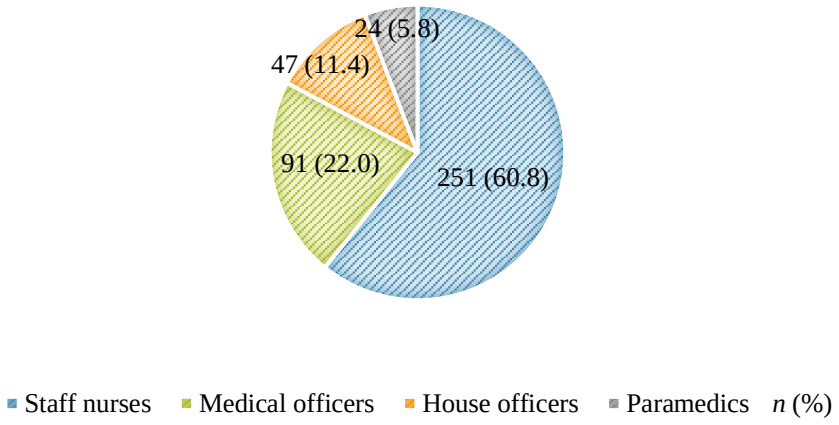


Figure 4.2: Percentage of Respondents' Department, n = 413

Meanwhile, Figure 4.3 portrays the healthcare position of the respondents. There were 60.8% of respondents working as staff nurses, 22.0% of them as medical officers, 11.4% as house officers and 5.8% of them as paramedics. Medical officers and house officers are doctors who work in the hospitals. Part-time job involvement included respondents participated in other part-time-work beyond their working hours. There were 10.7% involving in the part-time job, and 89.3% who did not involve in the part-time job.

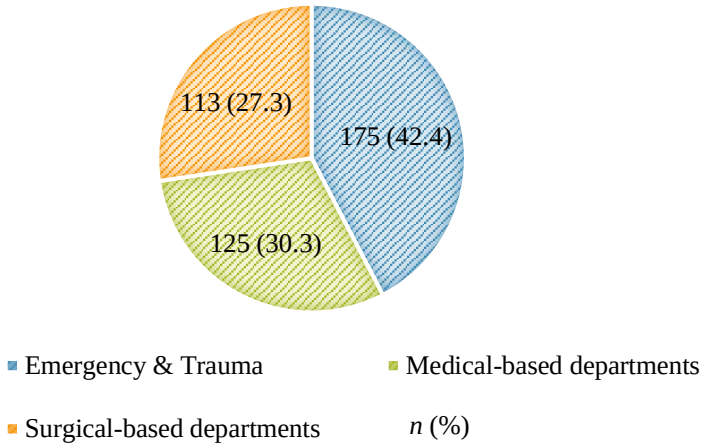
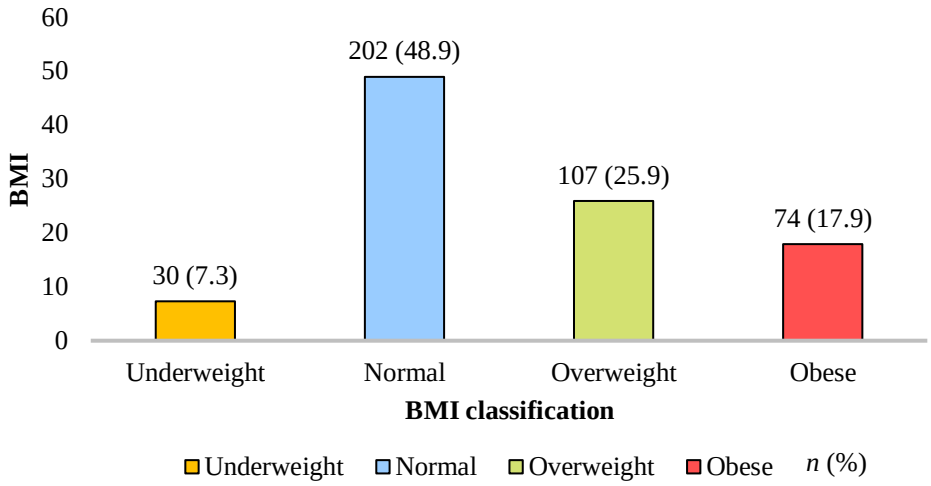


Figure 4.3: Percentage of Respondents' Healthcare Position, *n* = 413

Regarding the comorbidity of the respondents, the majority of them did not have any illness (85.5%), and 14.5% suffered from various diseases that include hypertension (20.3%), diabetes mellitus (8.7%), arthritis (8.7%), asthma (8.7%), anaemia (8.7%), dyslipidaemia (4.3%) and others (40.6%). Other diseases included migraine, gastritis, acute rhinitis and back pain. Some of the respondents had multiple comorbidities. A small percentage of 5.6% of them were smokers or vapers, and 3.4% of them were alcohol consumers.

4.3 Body Mass Index (BMI) of Hospital Shift Workers

The mean (SD) height of the respondents was 1.60 (0.08) metres, and the mean (SD) weight was 63.76 (15.07) kilograms. The body mass index (BMI) of the respondents was computed and classified accordingly based on the WHO classification. The mean (SD) BMI of the respondents was 24.86 (4.99) kg/m^2. Almost half of them (48.9%) were classified as normal BMI group (18.5 – 24.9 kg/m^2), 25.9% was overweight (25.0 – 29.9 kg/m^2), 17.9% was obese (≥ 30.0 kg/m^2) and 7.3% was underweight (< 18.5 kg/m^2). Figure 4.4 presents the percentage of the body mass index of the respondents.



Note: Body mass index (BMI) of the respondents based on the WHO classification; underweight (<18.5 kg/m^2); normal (18.5–24.9 kg/m^2); overweight (25.0–29.9 kg/m^2), obese (≥30.0 kg/m^2).

Figure 4.4: Percentage of Respondents' Body Mass Index, *n* = 413

4.4 Physical Activity Level and Eating Habits of Hospital Shift Workers in Klang Valley

This section caters Study Objective 1 which is to determine the physical activity level and eating habits of hospital shift workers in Klang Valley. This is important to assess the balance between habits that influence energy uptake and energy expenditure.

4.4.1 Physical Activity Level of Hospital Shift Workers

In this study, the physical activities of the respondents were evaluated by using the International Physical Activity Questionnaires-Short Form Malay (IPAQ-M). IPAQ-M assessed the specific types of physical activity that include walking, moderate-intensity activities, vigorous-intensity activities and sitting; the frequency measured was based on days per week; and duration measured was based on time per day. The amount of energy used during physical activity was measured in MET minutes. There was no international consensus on the best way to describe physical activity levels derived from self-report surveys or questionnaires (Forde 2018). Therefore, the reporting of this study was based on previous literatures from Lim et al. (2019) and Babiolakis et al. (2015).

Table 4.2 reports the median MET-minutes per week of the respondents' activities of walking, moderate-intensity, and vigorous-intensity activities. Median MET-minutes/week and interquartile ranges (IQR) were reported since the data were not normally distributed. In addition, the median for sitting time was 240 minutes (IQR: 225 minutes).

Table 4.2: Physical Activity MET-Minutes/Week Scores, *n* = 413

Physical Activity	MET-minutes/week Median (IQR)
Walking	594 (2170)
Moderate intensity activity	240 (480)
Vigorous intensity activity	240 (720)
Total scores	1571 (4172)

The respondents' physical activity in this study were further categorised into three levels; inactive, minimally active, and health–enhancing physically active (HEPA) according to the criteria mentioned in the guidelines and algorithms of IPAQ-M. As shown in Figure 4.5, majority of the respondents were either inactive (31.7%) or minimally active (43.6%), and only 24.5% of them were HEPA active.

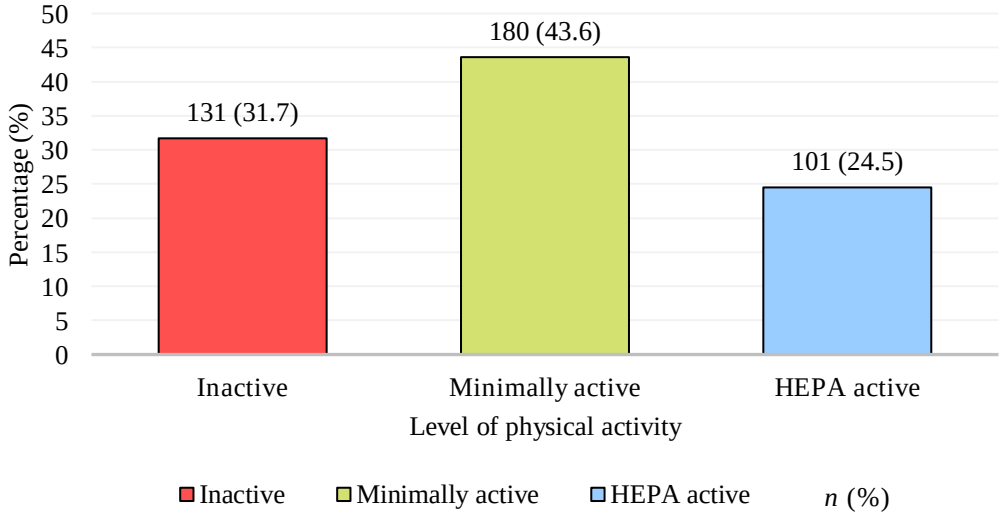


Figure 4.5: Percentage of Respondents' Level of Physical Activity based on IPAQ-M, *n* = 413

Respondents were also asked about intentional exercise, which referred to exercise that were performed at least 3 times per week for 20 minutes during their free time. Figure 4.6 shows the percentage of intentional exercise that were carried out by the respondents, with the proportion of 61.3% (n = 253) did not perform intentional exercise as defined above and 38.7% (n = 160) intentionally exercise during their free time.

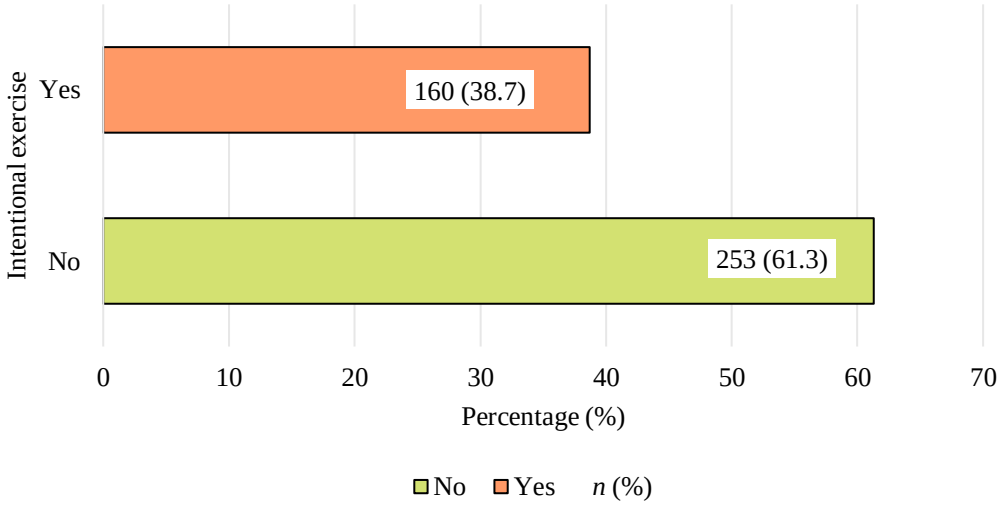


Figure 4.6: Percentage of Intentional Exercise among Respondents, n = 413

4.4.2 Eating Habits of Hospital Shift Workers

The tool of the Dutch Eating Behavior Questionnaire (DEBQ) was used to evaluate the eating habits of the respondents in this study. This questionnaire assessed eating behaviour in three domains; emotional eating, external eating and restrained eating. Table 4.3 highlights the eating habits of the respondents according to the three different domains. The mean (SD) of emotional eating was 2.48 (0.80). The majority of the respondents had good emotional eating habit (low scores) (86.9%) and others (13.1%)

had poor emotional eating habit (high scores) with the cut-off point of 3.25. Meanwhile, the mean (SD) of external eating was 2.96 (0.60), and the mean (SD) of restrained eating was 2.78 (0.80). There were 78.0% and 63.4% of the respondents had poor eating habits (high scores) for external eating and restrained eating respectively with cut-off point of 2.5.

Table 4.3: Eating Habits of Respondents based on DEBQ Scores, *n* = 413

DEBQ Domains	***n* (%)**
Emotional Eating	
(Question 1, 3, 5, 8, 10, 13, 16, 20, 23, 25, 28, 30, 32)	
Low	359 (86.9)
High	54 (13.1)
External Eating	
(Question 2, 6, 9, 12, 15, 18, 21, 24, 27, 33)	
Low	91 (22.0)
High	322 (78.0)
Restrained Eating	
(Question 4, 7, 11, 14, 17, 19, 22, 26, 29, 31)	
Low	151 (36.6)
High	262 (63.4)

4.5 Psychosocial Well-Being Status of Hospital Shift Workers in Klang Valley

This section caters the Study Objective 2, which is to determine the psychosocial well-being status of hospital shift workers in Klang Valley in the aspects of mental health (depression, anxiety and stress level), quality of life, work engagement and sleep quality.

This is imperative to elucidate the main concern of the respondents' psychosocial well-being status.

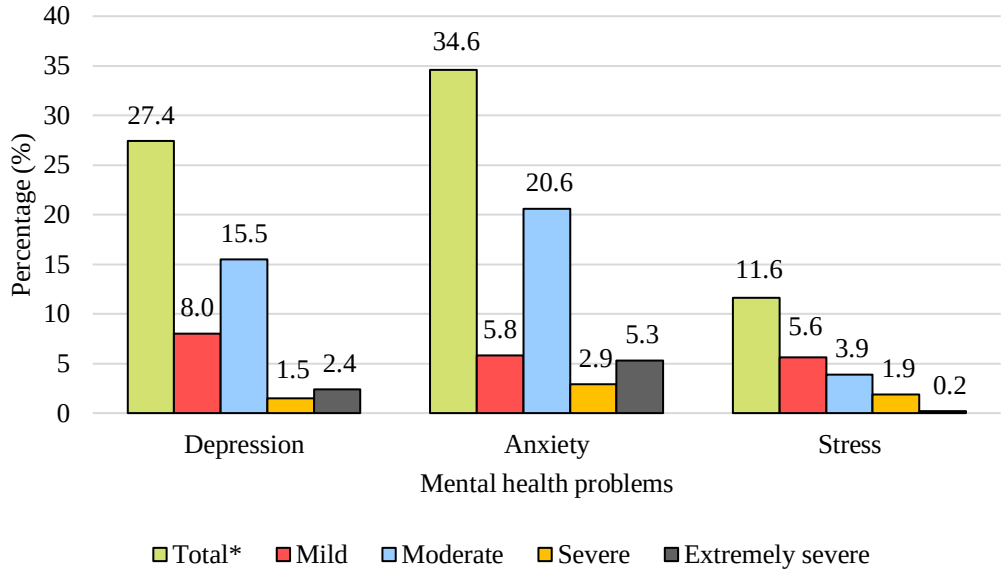
4.5.1 Mental Health of Hospital Shift Workers

The questionnaire of Malay Depression, Anxiety, Stress Scale-21 Items (Malay-DASS-21) was utilised in this study for the assessment of mental health. Malay-DASS-21 measured the psychological distress along the constructs of depression, anxiety and stress.

Results on mental health status based on Malay-DASS-21 were described in Table 4.4. Overall, there was 60.0% (n = 248) of the respondents with normal mental health without any symptoms of depression, anxiety and stress, whilst 40.0% (n = 164) of them had one or more symptoms of mental health problems of either depression, anxiety or stress at different levels. Table 4.4 illustrates in details the respondents' mental health status. There were 27.4% of the respondents had symptoms of depression ranging from the severity of either mild, moderate, severe, or/and extremely severe. Besides, 34.6% of them had the anxiety symptoms, whilst 11.6% of them had symptoms of stress. Figure 4.7 portrays the mental health status of the respondents with regard to depression, anxiety and stress. Presentation of results is based on recently published study by Juliana et al. (2022) on the mental health of healthcare shift workers.

Table 4.4: Malay-DASS-21 Subscales of Self-Perceived Depression, Anxiety and Stress, *n* = 413

Malay-DASS-21 Domains	*n* (%)	Mean ± SD
Depression		15.61 ± 5.70
(Question 3, 5, 10, 13, 16, 17, 21)		
Normal (0-9)	299 (72.4)	
Mild (10-13)	33 (8.0)	
Moderate (14-20)	64 (15.5)	
Severe (21-27)	6 (1.5)	
Extremely severe (28+)	10 (2.4)	
Anxiety		13.89 ± 5.50
(Question 2, 4, 7, 9, 15, 19, 20)		
Normal (0-7)	269 (65.1)	
Mild (8-9)	24 (5.8)	
Moderate (10-14)	85 (20.6)	
Severe (15-19)	12 (2.9)	
Extremely severe (20+)	22 (5.3)	
Stress		21.04 ± 5.30
(Question 1, 6, 8, 11, 12, 14, 18)		
Normal (0-14)	364 (88.1)	
Mild (15-18)	23 (5.6)	
Moderate (19-25)	16 (3.9)	
Severe (26-33)	8 (1.9)	
Extremely severe (34+)	1 (0.2)	



Note: Respondents may have more than one symptom of mental health problems.
*The total bar represents the cumulative percentage of those who had mild, moderate, severe and extremely severe mental health problems.

Figure 4.7: Mental Health Status of Respondents, *n* = 413

4.5.2 Quality of Life of Hospital Shift Workers

In this study, the quality of life of the respondents was determined via the 5-Item World Health Organisation Well-Being Index Malay (WHO-5-Malay) and the Malay 36-Item Short Form Survey (Malay-SF-36). WHO-5-Malay focused on subjective psychological well-being. The Malay-SF-36 questionnaire assessed health-related quality of life, measuring on the dimensions of physical health and mental health.

Table 4.5 shows the results of the WHO-5-Malay scores, 55.4% of them had good well-being and 44.6% of them had poor well-being. Meanwhile, for the Malay-SF-36 scores, highlighting that most of the respondents had a good quality of life, with a percentage of 91.8% having good quality of life for the total score, 90.3% having a

good quality of life for the domain of physical health and 89.3% having a good quality of life for the mental health domain.

Table 4.5: Quality of Life based on WHO-5-Malay and Malay-SF-36 Scores, *n* = 413

Domains	*n* (%)	Mean ± SD
WHO-5-Malay Score		53.64 ± 19.90
Good well-being	229 (55.4)	
Poor well-being	184 (44.6)	
Malay-SF-36 Total Score		73.28 ± 15.00
Good quality of life	379 (91.8)	
Poor quality of life	34 (8.2)	
Malay-SF-36 Physical Health		72.12 ± 15.20
Good quality of life	373 (90.3)	
Poor quality of life	40 (9.7)	
Malay-SF-36 Mental Health		70.67 ± 14.70
Good quality of life	369 (89.3)	
Poor quality of life	44 (10.7)	

4.5.3 Work Engagement of Hospital Shift Workers

The work engagement component utilised the questionnaire of Utrecht Work Engagement Scale Malay (UWES-M). UWES-M consisted of three factors that include vigour, dedication and absorption. Each domain was classified accordingly based on the category of low, average and high scores.

Table 4.6 illustrates the work engagement of the respondents referring to the domains in the UWES-M scores. Based on the total score, majority of the respondents

(61.0%) had an average score of work engagement. For the domain of vigour, most of them (42.6%) fall in the category of low score. Meanwhile, both domain of dedication and absorption showed that most of the respondents had average scores of dedication (61.5%) and absorption (52.5%).

Table 4.6: Work Engagement based on UWES-M Scores, *n* = 413

UWES-M Domains	*n* (%)	Mean ± SD
Total Score		3.81 ± 1.20
Low (≤ 2.88)	59 (14.3)	
Average (2.89 – 4.66)	252 (61.0)	
High (≥ 4.67)	102 (24.7)	
Vigour		3.61 ± 1.20
(Question 1, 2, 5)		
Low (≤ 3.25)	176 (42.6)	
Average (3.26 – 4.80)	163 (39.5)	
High (≥ 4.81)	74 (17.9)	
Dedication		3.83 ± 1.20
(Question 3, 4, 7)		
Low (≤ 2.90)	64 (15.5)	
Average (2.91 – 4.70)	254 (61.5)	
High (≥ 4.71)	95 (23.0)	
Absorption		3.98 ± 1.20
(Question 6, 8, 9)		
Low (≤ 2.33)	40 (9.7)	
Average (2.34 – 4.20)	217 (52.5)	
High (≥ 4.21)	156 (37.8)	

4.5.4 Sleep Quality of Hospital Shift Workers

The quality of sleep of the respondents was examined by using the Pittsburgh Sleep Quality Index Malay (PSQI-M) questionnaire. The items from PSQI-M represent the subscales of subjective sleep efficiency, sleep latency, sleep duration, sleep quality, sleep disturbance, sleep medication use, and daytime dysfunction due to sleepiness.

The mean (SD) of the global score of PSQI-M in this study was 6.49 (3.10), suggesting poor sleep quality of the respondents. Figure 4.8 shows the histogram of the PSQI-M global score. Based on PSQI-M, the majority of the respondents had poor sleep quality with the percentage of 58.1% (n = 240), and 41.6% of them (n = 172) were having good quality of sleep, as portrayed in Figure 4.9.

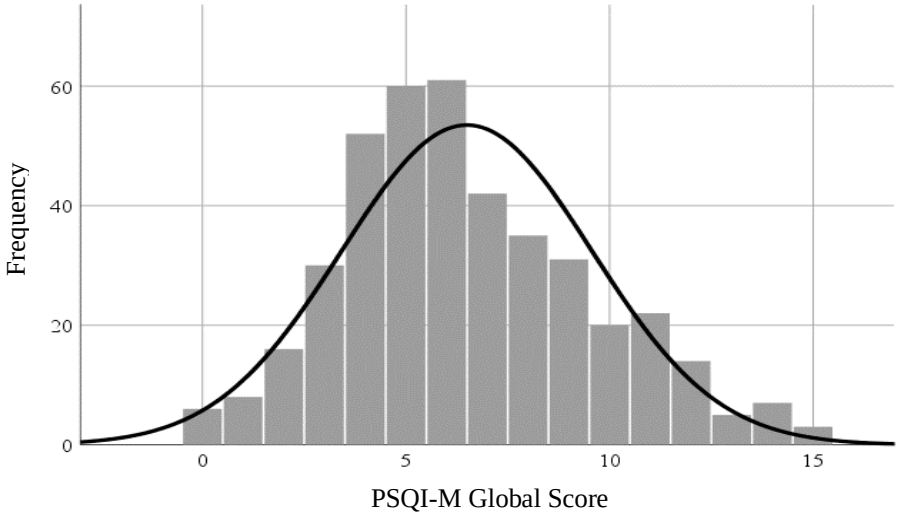


Figure 4.8: Histogram of PSQI-M Global Score of the Respondents, n = 413

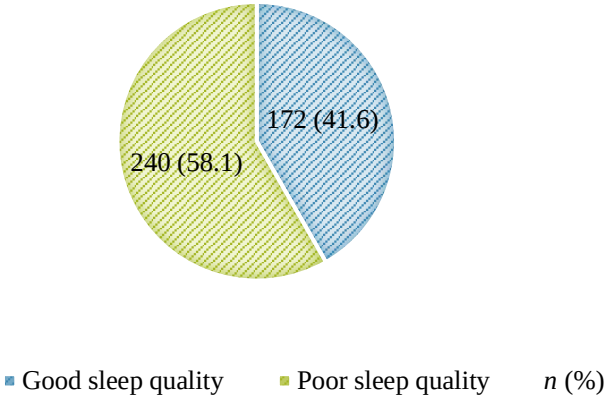


Figure 4.9: Sleep Quality Categories of the Respondents based on PSQI-M, *n* = 413

4.6 Associated Factors (Socio-Demographic Factors, Physical Activity, and Eating Habits) with Psychosocial Well-Being of Hospital Shift Workers in Klang Valley

This caters the Study Objective 3; which is to determine the factors (socio-demographic factors, physical activity, and eating habits) that are associated with the psychosocial well-being of hospital shift workers in Klang Valley. These predictors are important to be tackled to preserve the psychosocial well-being of the shift workers.

Further analysis was done to determine the association of independent variables with the psychosocial well-being of the hospital shift workers. Chi-square test was performed and subsequently followed by logistic regression for those variables with significant associations ($p < 0.05$).

4.6.1 Associated Factors with Mental Health Status

Table 4.7 shows the association between variables affecting depression among the respondents. The respondents were grouped into two groups and the association was made between those without depression and those with depression (combination of mild to extremely severe). The Chi-square test proved that there was significant association between age group, ethnicity, religion, marital status, healthcare position, hospital, physical activity and sleep quality with depression based on Malay-DASS-21 scores, $p < 0.05$. Other variables had no significant associations with the mental health status of depression among the respondents; $p > 0.05$ (Table 4.7).

Table 4.7: Association of Factors Affecting Depression based on Malay-DASS-21 Scores, *n* = 413

Group	Normal (*n* = 299) *n* (%)	Depression (*n* = 113) *n* (%)	X^2	df	*p* value
Age Group					
< 40 years old	260 (70.8)	107 (29.2)	4.455	1	0.035*
≥ 40 years old	37 (86.0)	6 (14.0)			
Gender					
Men	57 (73.1)	21 (26.9)	0.012	1	0.912
Women	242 (72.5)	92 (27.5)			
Ethnicity					
Malay	251 (74.7)	85 (25.3)	4.150	1	0.042*
Non-Malay	48 (63.2)	28 (36.8)			
Religion					
Muslim	258 (74.6)	88 (25.4)	4.313	1	0.038*
Non-Muslim	41 (62.1)	25 (37.9)			
Marital Status					
Single/divorced/separated/widowed	90 (65.2)	48 (34.8)	5.640	1	0.018*
Married	209 (76.3)	65 (23.7)			
Educational Status					
SPM and STPM	30 (76.9)	9 (23.1)	0.410	1	0.522
Tertiary education	269 (72.1)	104 (27.9)			
Household Income					
< RM 4,850	140 (73.3)	51 (26.7)	3.378	2	0.185
RM 4,850 – RM 10,959	146 (70.5)	61 (29.5)			
≥ RM 10,960	13 (92.9)	1 (7.1)			
Healthcare Position					
Doctors	86 (62.3)	52 (37.7)	10.961	1	0.001*
Staff nurses and paramedics	213 (77.7)	61 (22.3)			

Hospital					
Ampang	94 (81.0)	22 (19.0)	19.644	5	0.001*
Klang	43 (66.2)	22 (33.8)			
Shah Alam	42 (55.3)	34 (44.7)			
Banting	53 (75.7)	17 (24.3)			
Kajang	34 (82.9)	7 (17.1)			
Others	33 (75.0)	11 (25.0)			
Department					
Emergency & Trauma	119 (68.0)	56 (32.0)	3.478	2	0.176
Medical-based	96 (77.4)	28 (22.6)			
Surgical-based	84 (74.3)	29 (25.7)			
Part-Time Job					
No	269 (73.1)	99 (26.9)	0.477	1	0.490
Yes	30 (68.2)	14 (31.8)			
Comorbidity					
No	254 (72.2)	98 (27.8)	0.208	1	0.648
Yes	45 (75.0)	15 (25.0)			
Body Mass Index (BMI)					
Underweight	20 (66.7)	10 (33.3)	3.664	3	0.300
Normal	151 (74.8)	51 (25.2)			
Overweight	80 (75.5)	26 (24.5)			
Obese	48 (64.9)	26 (35.1)			
Smoking/Vaping					
No	283 (72.8)	106 (27.2)	0.111	1	0.739
Yes	16 (69.6)	7 (30.4)			
Alcohol Consumption					
No	289 (72.6)	109 (27.4)			1.000¥
Yes	10 (71.4)	4 (28.6)			

Intentional Exercise					
No	182 (72.2)	70 (27.8)	0.040	1	0.841
Yes	117 (73.1)	43 (26.9)			
Category of Physical Activity (IPAQ-M)					
Inactive	81 (61.8)	50 (38.2)	11.221	2	0.004*
Minimally active	137 (76.5)	42 (23.5)			
HEPA active	80 (79.2)	21 (20.8)			
Emotional Eating Habit (DEBQ)					
Low	265 (74.0)	93 (26.0)	2.883	1	0.090
High	34 (63.0)	20 (37.0)			
External Eating Habit (DEBQ)					
Low	72 (79.1)	19 (20.9)	2.516	1	0.113
High	227 (70.7)	94 (29.3)			
Restrained Eating Habit (DEBQ)					
Low	106 (70.2)	45 (29.8)	0.675	1	0.411
High	193 (73.9)	68 (26.1)			
Sleep Quality (PSQI-M)					
Good	141 (82.5)	30 (17.5)	14.543	1	< 0.001*
Poor	157 (65.4)	83 (34.6)			

*Significant to *p* value = < 0.05, using Chi-square test

¥Fischer's exact test was utilised since more than 20% of the expected counts are less than 5.

In Table 4.8, those who were in the age group of less than 40 years old recorded the higher odds of having perceived symptoms of depression (OR = 2.54; 95% CI: 1.1 – 6.2). Non-Malay and Non-Muslim were more likely to develop depression (OR = 1.72; 95% CI: 1.1 – 2.9); (OR = 1.79; 95% CI: 1.1 – 3.1). As for the marital status, those who were either single, divorced, separated or widowed was demonstrated to have higher odds of depression symptoms (OR = 1.72; 95% CI: 1.1 – 2.7). Furthermore, doctors were having higher chances of getting depression compared to staff nurses and paramedics (OR = 2.13; 95% CI: 1.4 – 3.3). The respondents who worked in Klang Hospital and Shah Alam Hospital had greater odds to have depression with the reference of Ampang Hospital (OR = 2.19; 95% CI: 1.1 – 4.4); (OR = 3.46; 95% CI: 1.8 – 6.6).

Physical activity level was also one of the strong associated factors for depression among the shift workers, in which as compared to the group of HEPA active, those who were inactive had the odds of two times to be having depression (AOR = 1.96; 95% CI: 1.1 – 3.7). Apart from that, the respondents with poor sleep quality were also two times higher to suffer from depression (AOR = 2.44; 95% CI: 1.5 – 4.0).

Table 4.8: Significant Factors Affecting Depression based on Malay-DASS-21 Scores, *n* = 413

Factors	Malay-DASS-21 Depression					
	Normal (*n* = 299) *n* (%)	**Depression (*n* = 113) *n* (%)**	**Crude OR (95% CI)**	***p* value**	**Adjusted OR (95% CI)**	***p* value**
Age Group						
< 40 years old	260 (70.8)	107 (29.2)	2.54 (1.1 – 6.2)	*p* = 0.041*	1.66 (0.6 – 4.3)	*p* = 0.295
≥ 40 years old	37 (86.0)	6 (14.0)	Ref		Ref	
Ethnicity						
Malay	251 (74.7)	85 (25.3)	Ref		Ref	
Non-Malay	48 (63.2)	28 (36.8)	1.72 (1.1 – 2.9)	*p* = 0.043*	1.08 (0.2 – 4.7)	*p* = 0.917
Religion						
Muslim	258 (74.6)	88 (25.4)	Ref		Ref	
Non-Muslim	41 (62.1)	25 (37.9)	1.79 (1.1 – 3.1)	*p* = 0.040*	1.11 (0.2 – 5.3)	*p* = 0.898
Marital Status						
Single/divorced/separated	90 (65.2)	48 (34.8)	1.72 (1.1 – 2.7)	*p* = 0.018*	1.48 (0.9 – 2.5)	*p* = 0.155
Married	209 (76.3)	65 (23.7)	Ref		Ref	
Healthcare Position						
Doctors	86 (62.3)	52 (37.7)	Ref		Ref	
Staff nurses and paramedics	213 (77.7)	61 (22.3)	0.47 (0.3 – 0.7)	*p* = 0.001*	0.69 (0.4 – 1.2)	*p* = 0.208
Hospital						
Ampang	94 (81.0)	22 (19.0)	Ref		Ref	
Klang	43 (66.2)	22 (33.8)	2.19 (1.1 – 4.4)	*p* = 0.027*	2.02 (1.1 – 4.2)	*p* = 0.059
Shah Alam	42 (55.3)	34 (44.7)	3.46 (1.8 – 6.6)	*p* = < 0.001*	2.36 (1.2 – 4.9)	*p* = 0.019*
Banting	53 (75.7)	17 (24.3)	1.37 (0.7 – 2.8)	*p* = 0.389	1.54 (0.7 – 3.4)	*p* = 0.288
Kajang	34 (82.9)	7 (17.1)	0.88 (0.3 – 2.2)	*p* = 0.788	0.81 (0.3 – 2.2)	*p* = 0.672
Others	33 (75.0)	11 (25.0)	1.42 (0.6 – 3.3)	*p* = 0.401	0.72 (0.3 – 1.8)	*p* = 0.478

Category of Physical Activity (IPAQ-M)						
Inactive	81 (61.8)	50 (38.2)	2.35 (1.3 – 4.3)	p = 0.005*	1.96 (1.1 – 3.7)	p = 0.039*
Minimally active	137 (76.5)	42 (23.5)	1.17 (0.6 – 2.1)	p = 0.607	1.24 (0.7 – 2.3)	p = 0.502
HEPA active	80 (79.2)	21 (20.8)	Ref		Ref	
Sleep Quality (PSQI-M)						
Good	141 (82.5)	30 (17.5)	Ref		Ref	
Poor	157 (65.4)	83 (34.6)	2.49 (1.5 – 4.0)	p = < 0.001*	2.44 (1.5 – 4.0)	p = 0.001*

*****Significant to p value = < 0.05, using logistic regression

Adjusted OR = Results are adjusted for age, ethnicity, religion, marital status, healthcare position, hospital, category of physical activity and sleep quality

The associated factors influencing anxiety based on Malay-DASS-21 scores among the respondents were presented in Table 4.9. The association was made between those without anxiety and those with anxiety (combination of mild to extremely severe). The findings recorded that the age group, gender, body mass index (BMI), emotional eating habit, external eating habit and sleep quality were significantly associated with anxiety; $p < 0.05$. Other variables had no significant associations with the mental health status of anxiety among the respondents; $p > 0.05$ (Table 4.9).

Table 4.9: Association of Factors Affecting Anxiety based on Malay-DASS-21 Scores, *n* = 413

Group	Normal (*n* = 269) *n* (%)	Anxiety (*n* = 143) *n* (%)	X^2	df	*p* value
Age Group					
< 40 years old	230 (62.7)	137 (37.3)	9.260	1	0.002*
≥ 40 years old	37 (86.0)	6 (14.0)			
Gender					
Men	59 (75.6)	19 (24.4)	4.548	1	0.033*
Women	210 (62.9)	124 (37.1)			
Ethnicity					
Malay	225 (67.0)	111 (33.0)	2.250	1	0.134
Non-Malay	44 (57.9)	32 (42.1)			
Religion					
Muslim	228 (65.9)	118 (34.1)	0.349	1	0.555
Non-Muslim	41 (62.1)	25 (37.9)			
Marital Status					
Single/divorced/separated/widowed	83 (60.1)	55 (39.9)	2.425	1	0.119
Married	186 (67.9)	88 (32.1)			
Educational Status					
SPM and STPM	23 (59.0)	16 (41.0)	0.759	1	0.384
Tertiary education	246 (66.0)	127 (34.0)			
Household Income					
< RM 4,850	121 (63.4)	70 (36.6)	1.480	2	0.477
RM 4,850 – RM 10,959	137 (66.2)	70 (33.8)			
≥ RM 10,960	11 (78.6)	3 (21.4)			
Healthcare Position					
Doctors	87 (63.0)	51 (37.0)	0.463	1	0.496
Staff nurses and paramedics	182 (66.4)	92 (33.6)			
Hospital					
Ampang	75 (64.7)	41 (35.3)	7.436	5	0.190
Klang	38 (58.5)	27 (41.5)			
Shah Alam	44 (57.9)	32 (42.1)			
Banting	48 (68.6)	22 (31.4)			
Kajang	30 (73.2)	11 (26.8)			
Others	34 (77.3)	10 (22.7)			

Department					
Emergency & Trauma	118 (67.4)	57 (32.6)	1.283	2	0.526
Medical-based	82 (66.1)	42 (33.9)			
Surgical-based	69 (61.1)	44 (38.9)			
Part-Time Job					
No	241 (65.5)	127 (34.5)	0.060	1	0.807
Yes	28 (63.6)	16 (36.4)			
Comorbidity					
No	228 (64.8)	124 (35.2)	0.287	1	0.592
Yes	41 (68.3)	19 (31.7)			
Body Mass Index (BMI)					
Underweight	16 (53.3)	14 (46.7)	9.122	3	0.028*
Normal	128 (63.4)	74 (36.6)			
Overweight	81 (76.4)	25 (23.6)			
Obese	44 (59.5)	30 (40.5)			
Smoking/Vaping					
No	254 (65.3)	135 (34.7)	0.000	1	0.994
Yes	15 (65.2)	8 (34.8)			
Alcohol Consumption					
No	258 (64.8)	140 (35.2)			0.396[¥]
Yes	11 (78.6)	3 (21.4)			
Intentional Exercise					
No	156 (61.9)	96 (38.1)	3.284	1	0.070
Yes	113 (70.6)	47 (29.4)			
Category of Physical Activity (IPAQ-M)					
Inactive	79 (60.3)	52 (39.7)	4.352	2	0.113
Minimally active	115 (64.2)	64 (35.8)			
HEPA active	74 (73.3)	27 (26.7)			
Emotional Eating Habit (DEBQ)					
Low	242 (67.6)	116 (32.4)	6.412	1	0.011*
High	27 (50.0)	27 (50.0)			

External Eating Habit (DEBQ)					
Low	68 (74.7)	23 (25.3)	4.587	1	0.032*
High	201 (62.6)	120 (37.4)			
Restrained Eating Habit (DEBQ)					
Low	97 (64.2)	54 (35.8)	0.117	1	0.733
High	172 (65.9)	89 (34.1)			
Sleep Quality (PSQI-M)					
Good	127 (74.3)	44 (25.7)	10.600	1	0.001*
Poor	141 (58.8)	99 (41.3)			

*****Significant to *p* value = < 0.05, using Chi-square test

[¥]Fischer's exact test was utilised since more than 20% of the expected counts are less than 5.

Further analysis of logistic regression was done, and it was shown that age group, gender, body mass index (BMI), emotional eating habit, external eating habit and sleep quality were the strong predictors of anxiety. Those who aged less than 40 years old were three times greater to be having anxiety (AOR = 3.43; 95% CI: 1.4 – 8.6). Women had double chances of developing anxiety than men (AOR = 2.13; 95% CI: 1.2 – 3.9) (Table 4.10).

On the other hand, with reference to normal body mass index (BMI), those who were overweight were less likely to suffer from anxiety (OR = 0.53; 95% CI: 0.3 – 0.9). Referring to the eating habits of the respondents, emotional eating habit and external eating habit were among the strong predictors of anxiety. Those with poor eating habits of emotional eating habit and external eating habit (high scores) had higher chances to have anxiety (OR = 2.09; 95% CI: 1.2 – 3.7); (OR = 1.77; 95% CI: 1.1 – 3.0). The odds of developing anxiety were two times greater for those with poor sleep quality (AOR = 2.23; 95% CI: 1.4 – 3.5) (Table 4.10).

Table 4.10: Significant Factors Affecting Anxiety based on Malay-DASS-21 Scores, *n* = 413

Factors	Malay-DASS-21 Anxiety					
	Normal (*n* = 269) *n* (%)	**Anxiety (*n* = 143) *n* (%)**	**Crude OR (95% CI)**	***p* value**	**Adjusted OR (95% CI)**	***p* value**
Age Group						
< 40 years old	230 (62.7)	137 (37.3)	3.67 (1.5 – 8.9)	*p* = 0.004*	3.43 (1.4 – 8.6)	*p* = 0.009*
≥ 40 years old	37 (86.0)	6 (14.0)	Ref		Ref	
Gender						
Men	59 (75.6)	19 (24.4)	Ref		Ref	
Women	210 (62.9)	124 (37.1)	1.83 (1.1 – 3.2)	*p* = 0.035*	2.13 (1.2 – 3.9)	*p* = 0.013*
Body Mass Index (BMI)						
Underweight	16 (53.3)	14 (46.7)	1.51 (0.7 – 3.3)	*p* = 0.293	1.47 (0.6 – 3.3)	*p* = 0.358
Overweight	81 (76.4)	25 (23.6)	0.53 (0.3 – 0.9)	*p* = 0.021*	0.59 (0.3 – 0.9)	*p* = 0.062
Obese	44 (59.5)	30 (40.5)	1.18 (0.7 – 2.0)	*p* = 0.553	1.36 (0.8 – 2.4)	*p* = 0.302
Normal	128 (63.4)	74 (36.6)	Ref		Ref	
Emotional Eating Habit (DEBQ)						
Low	242 (67.6)	116 (32.4)	Ref		Ref	
High	27 (50.0)	27 (50.0)	2.09 (1.2 – 3.7)	*p* = 0.013*	1.70 (0.9 – 3.2)	*p* = 0.093
External Eating Habit (DEBQ)						
Low	68 (74.7)	23 (25.3)	Ref		Ref	
High	201 (62.6)	120 (37.4)	1.77 (1.1 – 3.0)	*p* = 0.034*	1.5 (0.8 – 2.6)	*p* = 0.174
Sleep Quality (PSQI-M)						
Good	127 (74.3)	44 (25.7)	Ref		Ref	
Poor	141 (58.8)	99 (41.3)	2.03 (1.3 – 3.1)	*p* = 0.001*	2.23 (1.4 – 3.5)	*p* = < 0.001*

*****Significant to *p* value = < 0.05, using logistic regression

Adjusted OR = Results are adjusted for age, gender, BMI, emotional eating habit, external eating habit and sleep quality

The association was made between those without stress and those with stress (combination of mild to extremely severe). According to Table 4.11, there were significant associations between marital status, healthcare position, physical activity, restrained eating habit and sleep quality with stress among the respondents. Other variables had no significant associations with the mental health status of stress among the respondents; $p > 0.05$ (Table 4.11).

Table 4.11: Association of Factors Affecting Stress based on Malay-DASS-21 Scores, *n* = 413

Group	Normal (*n* = 364) *n* (%)	Stress (*n* = 48) *n* (%)	X^2	df	*p* value
Age Group					
< 40 years old	321 (87.5)	46 (12.5)	2.314	1	0.128
≥ 40 years old	41 (95.3)	2 (4.7)			
Gender					
Men	67 (85.9)	11 (14.1)	0.562	1	0.453
Women	297 (88.9)	37 (11.1)			
Ethnicity					
Malay	300 (89.3)	36 (10.7)	1.551	1	0.213
Non-Malay	64 (84.2)	12 (15.8)			
Religion					
Muslim	310 (89.6)	36 (10.4)	3.257	1	0.071
Non-Muslim	54 (81.8)	12 (18.2)			
Marital Status					
Single/divorced/separated/widowed	112 (81.2)	26 (18.8)	10.422	1	0.001*
Married	252 (92.0)	22 (8.0)			
Educational Status					
SPM and STPM	36 (92.3)	3 (7.7)			0.601¥
Tertiary education	328 (87.9)	45 (12.1)			
Household Income					
< RM 4,850	168 (88.0)	23 (12.0)	0.305	2	0.858
RM 4,850 – RM 10,959	183 (88.4)	24 (11.6)			
≥ RM 10,960	13 (92.9)	1 (7.1)			
Healthcare Position					
Doctors	113 (81.9)	25 (18.1)	8.427	1	0.004*
Staff nurses and paramedics	251 (91.6)	23 (8.4)			
Hospital					
Ampang	105 (90.5)	11 (9.5)	10.346	5	0.066
Klang	60 (92.3)	5 (7.7)			
Shah Alam	60 (78.9)	16 (21.1)			
Banting	65 (92.9)	5 (7.1)			
Kajang	37 (90.2)	4 (9.8)			
Others	37 (84.1)	7 (15.9)			

Department					
Emergency & Trauma	151 (86.3)	24 (13.7)	1.291	2	0.524
Medical-based	111 (89.5)	13 (10.5)			
Surgical-based	102 (90.3)	11 (9.7)			
Part-Time Job					
No	327 (88.9)	41 (11.1)	0.868	1	0.352
Yes	37 (84.1)	7 (15.9)			
Comorbidity					
No	311 (88.4)	41 (11.6)	0.000	1	0.997
Yes	53 (88.3)	7 (11.7)			
Body Mass Index (BMI)					
Underweight	25 (83.3)	5 (16.7)	1.263	3	0.738
Normal	180 (89.1)	22 (10.9)			
Overweight	95 (89.6)	11 (10.4)			
Obese	64 (86.5)	10 (13.5)			
Smoking/Vaping					
No	344 (88.4)	45 (11.6)			0.741¥
Yes	20 (87.0)	3 (13.0)			
Alcohol Consumption					
No	352 (88.4)	46 (11.6)			0.672¥
Yes	12 (85.7)	2 (14.3)			
Intentional Exercise					
No	222 (88.1)	30 (11.9)	0.041	1	0.840
Yes	142 (88.8)	18 (11.3)			
Category of Physical Activity (IPAQ-M)					
Inactive	108 (82.4)	23 (17.6)	7.032	2	0.030*
Minimally active	165 (92.2)	14 (7.8)			
HEPA active	90 (89.1)	11 (10.9)			
Emotional Eating Habit (DEBQ)					
Low	318 (88.8)	40 (11.2)	0.605	1	0.437
High	46 (85.2)	8 (14.8)			

External Eating Habit (DEBQ)					
Low	82 (90.1)	9 (9.9)	0.352	1	0.553
High	282 (87.9)	39 (12.1)			
Restrained Eating Habit (DEBQ)					
Low	124 (82.1)	27 (17.9)	8.989	1	0.003*
High	240 (92.0)	21 (8.0)			
Sleep Quality (PSQI-M)					
Good	163 (95.3)	8 (4.7)	13.913	1	< 0.001*
Poor	200 (83.3)	40 (16.7)			

*****Significant to *p* value = < 0.05, using Chi-square test

[¥]Fischer's exact test was utilised since more than 20% of the expected counts are less than 5.

Strong predictors of stress among the respondents were recorded in Table 4.12. As for marital status, those who were either single, divorced, separated or widowed had higher odds of being stressed (OR = 2.66; 95% CI: 1.4 – 4.9) as compared to those who were married. Besides, healthcare position was also significantly associated to stress. Those who worked as doctors were found to have higher stress than the staff nurses and paramedics (OR = 2.44; 95% CI: 1.3 – 5.0). Physical activity level was not one of the significant predictors for stress according to the logistic regression analysis in Table 4.12.

The respondents who had good restrained eating habit (low scores) were having higher chances of getting stress (AOR = 2.27; 95% CI: 1.3 – 5.0). Furthermore, those who had poor sleep quality highlighted the odds of being stressed nearly four times than those who had good sleep quality (AOR = 3.66; 95% CI: 1.6 – 8.2).

Table 4.12: Significant Factors Affecting Stress based on Malay-DASS-21 Scores, *n* = 413

Factors	Malay-DASS-21 Stress					
	Normal (*n* = 364) *n* (%)	**Stress (*n* = 48) *n* (%)**	**Crude OR (95%CI)**	***p* value**	**Adjusted OR (95% CI)**	***p* value**
Marital Status						
Single/divorced/separated/widowed	112 (81.2)	26 (18.8)	2.66 (1.4 – 4.9)	*p* = 0.002*	1.96 (1.0 – 3.8)	*p* = 0.050
Married	252 (92.0)	22 (8.0)	Ref		Ref	
Healthcare Position						
Doctors	113 (81.9)	25 (18.1)	Ref		Ref	
Staff nurses and paramedics	251 (91.6)	23 (8.4)	0.41 (0.2 – 0.8)	*p* = 0.005*	0.58 (0.3 – 1.1)	*p* = 0.114
Category of Physical Activity (IPAQ-M)						
Inactive	108 (82.4)	23 (17.6)	1.74 (0.8 – 3.8)	*p* = 0.158	1.30 (0.6 – 3.0)	*p* = 0.529
Minimally active	165 (92.2)	14 (7.8)	0.69 (0.3 – 1.6)	*p* = 0.389	0.65 (0.3 – 1.6)	*p* = 0.330
HEPA active	90 (89.1)	11 (10.9)	Ref		Ref	
Restrained Eating Habit (DEBQ)						
Low	124 (82.1)	27 (17.9)	Ref		Ref	
High	240 (92.0)	21 (8.0)	0.40 (0.2 – 0.7)	*p* = 0.003*	0.44 (0.2 – 0.8)	*p* = 0.011*
Sleep Quality (PSQI-M)						
Good	163 (95.3)	8 (4.7)	Ref		Ref	
Poor	200 (83.3)	40 (16.7)	4.08 (1.9 – 9.0)	*p* = < 0.001*	3.66 (1.6 – 8.2)	*p* = 0.002*

*****Significant to *p* value = < 0.05, using logistic regression

Adjusted OR = Results are adjusted for marital status, healthcare position, category of physical activity, restrained eating habit and sleep quality

There was 60.0% (n = 248) of the respondents with normal mental health without any symptoms of depression, anxiety or stress, while 36 respondents had all the symptoms of depression, anxiety and stress (triple DAS symptoms). Meanwhile, there was 128 of them who had either one or two symptoms of depression, anxiety or stress. Chi-square test was performed, and it was shown that there were significant associations between age, gender, marital status, healthcare position, venue of the hospital, physical activity, emotional eating habit, external eating habit, restrained eating habit and sleep quality with DAS symptoms; $p < 0.05$ (Table 4.13).

Table 4.13: Association of Factors Affecting All Depression, Anxiety and Stress based on Malay-DASS-21 Scores, *n* = 413

Group	Normal (*n* = 248) *n* (%)	One or two DAS symptoms (*n* = 128) *n* (%)	Triple DAS symptoms (*n* = 36) *n* (%)	X^2	df	*p* value
Age Group						
< 40 years old	211 (57.5)	122 (33.2)	34 (9.3)	9.185	2	0.010*
≥ 40 years old	35 (81.4)	6 (14.0)	2 (4.7)			
Gender						
Men	54 (69.2)	14 (17.9)	10 (12.8)	8.471	2	0.014*
Women	194 (58.1)	114 (34.1)	26 (7.8)			
Ethnicity						
Malay	208 (61.9)	101 (30.1)	27 (8.0)	2.509	2	0.285
Non-Malay	40 (52.6)	27 (35.5)	9 (11.8)			
Religion						
Muslim	211 (61.0)	108 (31.2)	27 (7.8)	2.396	2	0.302
Non-Muslim	37 (56.1)	20 (30.3)	9 (13.6)			
Marital Status						
Single/divorced/separated/widowed	74 (53.6)	44 (31.9)	20 (14.5)	9.398	2	0.009*
Married	174 (63.5)	84 (30.7)	16 (5.8)			
Educational Status						
SPM and STPM	22 (56.4)	16 (41.0)	1 (2.6)	3.356	2	0.187
Tertiary education	226 (60.6)	112 (30.0)	35 (9.4)			
Household Income						
< RM 4,850	114 (59.7)	61 (31.9)	16 (8.4)	1.860	4	0.762
RM 4,850 – RM 10,959	124 (59.9)	63 (30.4)	20 (9.7)			
≥ RM 10,960	10 (71.4)	4 (28.6)	0 (0.0)			
Healthcare Position						
Doctors	71 (51.4)	47 (34.1)	20 (14.5)	11.098	2	0.004*
Staff nurses and paramedics	177 (64.6)	81 (29.6)	16 (5.8)			

Hospital						
Ampang	70 (60.3)	40 (34.5)	6 (5.2)	23.482	10	0.009*
Klang	36 (55.4)	25 (38.5)	4 (6.2)			
Shah Alam	36 (47.4)	26 (34.2)	14 (18.4)			
Banting	47 (67.1)	18 (25.7)	5 (7.1)			
Kajang	28 (68.3)	12 (29.3)	1 (2.4)			
Others	31 (70.5)	7 (15.9)	6 (13.6)			
Department						
Emergency & Trauma	103 (58.9)	53 (30.3)	19 (10.9)	6.167	4	0.187
Medical-based	81 (65.3)	32 (25.8)	11 (8.9)			
Surgical-based	64 (56.6)	43 (38.1)	6 (5.3)			
Part-Time Job						
No	221 (60.1)	117 (31.8)	30 (8.2)	1.948	2	0.378
Yes	27 (61.4)	11 (25.0)	6 (13.6)			
Comorbidity						
No	209 (59.4)	112 (31.8)	31 (8.8)	0.720	2	0.698
Yes	39 (65.0)	16 (26.7)	5 (8.3)			
Body Mass Index (BMI)						
Underweight	16 (53.3)	9 (30.0)	5 (16.7)	8.949	6	0.176
Normal	119 (58.9)	67 (33.2)	16 (7.9)			
Overweight	74 (69.8)	24 (22.6)	8 (7.5)			
Obese	39 (52.7)	28 (37.8)	7 (9.5)			
Smoking/Vaping						
No	234 (60.2)	122 (31.4)	33 (8.5)	0.713	2	0.700
Yes	14 (60.9)	6 (26.1)	3 (13.0)			
Alcohol Consumption						
No	238 (59.8)	126 (31.7)	34 (8.5)	2.128	2	0.345
Yes	10 (71.4)	2 (14.3)	2 (14.3)			
Intentional Exercise						
No	144 (57.1)	86 (34.1)	22 (8.7)	2.958	2	0.228
Yes	104 (65.0)	42 (26.3)	14 (8.8)			

Category of Physical Activity (IPAQ-M)						
Inactive	68 (51.9)	45 (34.4)	18 (13.7)	10.890	4	0.028*
Minimally active	110 (61.5)	59 (33.0)	10 (5.6)			
HEPA active	69 (68.3)	24 (23.8)	8 (7.9)			
Emotional Eating Habit (DEBQ)						
Low	226 (63.1)	102 (28.5)	30 (8.4)	10.143	2	0.006*
High	22 (40.7)	26 (48.1)	6 (11.1)			
External Eating Habit (DEBQ)						
Low	65 (71.4)	17 (18.7)	9 (9.9)	8.394	2	0.015*
High	183 (57.0)	111 (34.6)	27 (8.4)			
Restrained Eating Habit (DEBQ)						
Low	91 (60.3)	36 (23.8)	24 (15.9)	17.977	2	< 0.001*
High	157 (60.2)	92 (35.2)	12 (4.6)			
Sleep Quality (PSQI-M)						
Good	120 (70.2)	47 (27.5)	4 (2.3)	19.987	2	< 0.001*
Poor	127 (52.9)	81 (33.8)	32 (13.3)			

*****Significant to *p* value = < 0.05, using Chi-square test.

Further analysis of multinomial logistic regression is reported in Table 4.14. Those who were less than 40 years old had triple the odds of having one or two DAS symptoms than the older age group (AOR = 2.93; 95% CI: 1.1 – 7.6). Women were three times more likely to have one or two DAS symptoms (AOR = 2.83; 95% CI: 1.4 – 5.9). With the reference of Ampang Hospital, the respondents who worked in others hospital were less likely to have one or two DAS symptoms (AOR = 0.23; 95% CI: 0.1 – 0.6). Those who were inactive had double odds of having one or two DAS symptoms (AOR = 2.19; 95% CI: 1.1 – 4.2). The respondents with poor emotional and external eating habits (high scores) had more chances to get one or two DAS symptoms (AOR = 2.25; 95% CI: 1.1 – 4.4; OR = 2.32; 95% CI: 1.3 – 4.2). Besides, the respondents with poor sleep quality recorded double odds of having one or two DAS symptoms (AOR = 2.00; 95% CI: 1.2 – 3.3).

Zooming on the triple DAS symptoms, those who were in the group of single, divorced, separated or widowed was demonstrated to have higher odds of having triple DAS symptoms (OR = 2.94; 95% CI: 1.4 – 6.0). Staff nurses and paramedics had the odds of three times to be having triple DAS symptoms as compared to doctors (OR = 3.12; 95% CI: 1.5 – 6.4). In addition, those who worked in Shah Alam Hospital were more having higher chances of getting triple DAS symptoms than those who worked in Ampang Hospital (OR = 4.54; 95% CI: 1.6 – 12.8). Those with good restrained eating habit (low scores) had more chances to get triple DAS symptoms (AOR = 3.85; 95% CI: 1.7 – 10.0). The respondents with poor sleep quality had greater odds of having triple DAS symptoms (AOR = 7.60; 95% CI: 2.4 – 23.9).

Table 4.14: Significant Factors Affecting All Depression, Anxiety and Stress based on Malay-DASS-21 Scores, *n* = 413

Factors	One or two DAS symptoms				Triple DAS symptoms			
	Crude OR (95% CI)	*p* value	Adjusted OR (95% CI)	*p* value	Crude OR (95% CI)	*p* value	Adjusted OR (95% CI)	*p* value
Age								
< 40 years old	3.37 (1.4 – 8.2)	*p* = 0.008*	2.93 (1.1 – 7.6)	*p* = 0.027*	2.82 (0.6 – 12.3)	*p* = 0.167	0.74 (0.1 – 3.9)	*p* = 0.726
≥ 40 years old	Ref		Ref		Ref		Ref	
Gender								
Men	Ref		Ref		Ref		Ref	
Women	2.27 (1.2 – 4.3)	*p* = 0.011*	2.83 (1.4 – 5.9)	*p* = 0.006*	0.72 (0.3 – 1.6)	*p* = 0.422	1.54 (0.6 – 3.9)	*p* = 0.369
Marital Status								
Single/divorced/separated	1.23 (0.8 – 1.9)	*p* = 0.369	1.08 (0.6 – 1.9)	*p* = 0.785	2.94 (1.4 – 6.0)	*p* = 0.003*	2.18 (0.9 – 5.1)	*p* = 0.074
Married	Ref		Ref		Ref		Ref	
Healthcare Position								
Doctors	Ref		Ref		Ref		Ref	
Staff nurses and paramedics	1.45 (0.9 – 2.3)	*p* = 0.110	1.63 (0.9 – 3.0)	*p* = 0.124	3.12 (1.5 – 6.4)	*p* = 0.002*	2.19 (0.8 – 5.7)	*p* = 0.112
Hospital								
Ampang	Ref		Ref		Ref		Ref	
Klang	1.22 (0.6 – 2.3)	*p* = 0.551	1.04 (0.5 – 2.1)	*p* = 0.901	1.30 (0.3 – 4.9)	*p* = 0.702	0.76 (0.2 – 3.2)	*p* = 0.711
Shah Alam	1.26 (0.7 – 2.4)	*p* = 0.471	1.14 (0.5 – 2.4)	*p* = 0.724	4.54 (1.6 – 12.8)	*p* = 0.004*	2.37 (0.7 – 8.0)	*p* = 0.164
Banting	0.67 (0.3 – 1.3)	*p* = 0.240	0.65 (0.3 – 1.4)	*p* = 0.271	1.24 (0.4 – 4.3)	*p* = 0.733	1.20 (0.3 – 5.0)	*p* = 0.806
Kajang	0.75 (0.3 – 1.6)	*p* = 0.470	0.80 (0.3 – 1.9)	*p* = 0.599	0.42 (0.1 – 3.6)	*p* = 0.427	0.28 (0.1 – 2.7)	*p* = 0.267
Others	0.40 (0.2 – 0.9)	*p* = 0.045*	0.23 (0.1 – 0.6)	*p* = 0.004*	2.26 (0.7 – 7.6)	*p* = 0.186	0.87 (0.2 – 3.5)	*p* = 0.848
Category of Physical Activity (IPAQ-M)								
Inactive	1.90 (1.1 – 3.5)	*p* = 0.035*	2.19 (1.1 – 4.2)	*p* = 0.020*	2.28 (0.9 – 5.6)	*p* = 0.071	1.47 (0.5 – 4.1)	*p* = 0.471
Minimally active	1.54 (0.9 – 2.7)	*p* = 0.131	1.68 (0.9 – 3.1)	*p* = 0.101	0.78 (0.3 – 2.1)	*p* = 0.626	0.73 (0.2 – 2.2)	*p* = 0.581
HEPA active	Ref		Ref		Ref		Ref	

Eating Habits (DEBQ)								
Emotional eating								
Low	Ref		Ref		Ref		Ref	
High	2.62 (1.4 – 4.8)	*p* = 0.002*	2.25 (1.1 – 4.4)	*p* = 0.018*	2.06 (0.8 – 5.5)	*p* = 0.150	2.63 (0.8 – 8.1)	*p* = 0.094
External Eating								
Low	Ref		Ref		Ref		Ref	
High	2.32 (1.3 – 4.2)	*p* = 0.005*	1.88 (1.1 – 3.6)	*p* = 0.061	1.07 (0.5 – 2.4)	*p* = 0.877	1.54 (0.6 – 4.2)	*p* = 0.401
Restrained Eating								
Low	Ref		Ref		Ref		Ref	
High	1.48 (0.9 – 2.4)	*p* = 0.097	1.30 (0.8 – 2.2)	*p* = 0.332	0.29 (0.1 – 0.6)	*p* = 0.001*	0.26 (0.1 – 0.6)	*p* = 0.002*
Sleep Quality (PSQI-M)								
Good	Ref		Ref		Ref		Ref	
Poor	1.63 (1.1 – 2.5)	*p* = 0.029*	2.00 (1.2 – 3.3)	*p* = 0.005*	7.56 (2.6 – 22.0)	*p* = < 0.001*	7.60 (2.4 – 23.9)	*p* = 0.001*

The reference category for factors affecting all depression, anxiety and stress is *Normal*.

*****Significant to *p* value = < 0.05, using multinomial logistic regression

Adjusted OR = Results are adjusted for age, gender, marital status, healthcare position, hospital, category of physical activity, eating habits of emotional, external and restrained, and sleep quality.

4.6.2 Associated Factors with Quality of Life

The respondents' WHO-5-Malay quality of life scores is illustrated in Table 4.15. Healthcare position, hospital, department, external eating habit, restrained eating habit and sleep quality were the significant predictors that were associated with the quality of life of the respondents according to WHO-5-Malay scores; $p < 0.05$. Other variables had no significant associations with the quality of life of the respondents; $p > 0.05$ (Table 4.15).

Table 4.15: Association of Factors Affecting Quality of Life based on WHO-5-Malay Scores, *n* = 413

Group	Good quality of life (*n* = 229) *n* (%)	Poor quality of life (*n* = 184) *n* (%)	X^2	df	*p* value
Age Group					
< 40 years old	200 (54.3)	168 (45.7)	1.110	1	0.292
≥ 40 years old	27 (62.8)	16 (37.2)			
Gender					
Men	41 (52.6)	37 (47.4)	0.324	1	0.569
Women	188 (56.1)	147 (43.9)			
Ethnicity					
Malay	194 (57.6)	143 (42.4)	3.328	1	0.068
Non-Malay	35 (46.1)	41 (53.9)			
Religion					
Muslim	197 (56.8)	150 (43.2)	1.542	1	0.214
Non-Muslim	32 (48.5)	34 (51.5)			
Marital Status					
Single/divorced/separated/widowed	69 (50.0)	69 (50.0)	2.490	1	0.115
Married	160 (58.2)	115 (41.8)			
Educational Status					
SPM and STPM	26 (66.7)	13 (33.3)	2.194	1	0.139
Tertiary education	203 (54.3)	171 (45.7)			
Household Income					
< RM 4,850	101 (52.6)	91 (47.4)	1.178	2	0.555
RM 4,850 – RM 10,959	120 (58.0)	87 (42.0)			
≥ RM 10,960	8 (57.1)	6 (42.9)			
Healthcare Position					
Doctors	64 (46.4)	74 (53.6)	6.903	1	0.009*
Staff nurses and paramedics	165 (60.0)	110 (40.0)			

Hospital					
Ampang	76 (65.0)	41 (35.0)	21.770	5	0.001*
Klang	42 (64.6)	23 (35.4)			
Shah Alam	26 (34.2)	50 (65.8)			
Banting	38 (54.3)	32 (45.7)			
Kajang	20 (48.8)	21 (51.2)			
Others	27 (61.4)	17 (38.6)			
Department					
Emergency & Trauma	85 (48.6)	90 (51.4)	10.893	2	0.004*
Medical-based	67 (53.6)	58 (46.4)			
Surgical-based	77 (68.1)	36 (31.9)			
Part-Time Job					
No	202 (54.7)	167 (45.3)	0.698	1	0.404
Yes	27 (61.4)	17 (38.6)			
Comorbidity					
No	198 (56.1)	155 (43.9)	0.406	1	0.524
Yes	31 (51.7)	29 (48.3)			
Body Mass Index (BMI)					
Underweight	16 (53.3)	14 (46.7)	0.391	3	0.942
Normal	114 (56.4)	88 (43.6)			
Overweight	57 (53.3)	50 (46.7)			
Obese	42 (56.8)	32 (43.2)			
Smoking/Vaping					
No	217 (55.6)	173 (44.4)	0.106	1	0.745
Yes	12 (52.2)	11 (47.8)			
Alcohol Consumption					
No	220 (55.1)	179 (44.9)	0.458	1	0.498
Yes	9 (64.3)	5 (35.7)			
Intentional Exercise					
No	132 (52.2)	121 (47.8)	2.834	1	0.092
Yes	97 (60.6)	63 (39.4)			

Category of Physical Activity (IPAQ-M)					
Inactive	66 (50.4)	65 (49.6)	2.229	2	0.328
Minimally active	103 (57.2)	77 (42.8)			
HEPA active	60 (59.4)	41 (40.6)			
Emotional Eating Habit (DEBQ)					
Low	196 (54.6)	163 (45.4)	0.807	1	0.369
High	33 (61.1)	21 (38.9)			
External Eating Habit (DEBQ)					
Low	39 (42.9)	52 (57.1)	7.490	1	0.006*
High	190 (59.0)	132 (41.0)			
Restrained Eating Habit (DEBQ)					
Low	73 (48.3)	78 (51.7)	4.862	1	0.027*
High	156 (59.5)	106 (40.5)			
Sleep Quality (PSQI-M)					
Good	111 (64.5)	61 (35.5)	9.585	1	0.002*
Poor	118 (49.2)	122 (50.8)			

*****Significant to *p* value = < 0.05, using Chi-square test

According to the logistic regression analysis, Table 4.16 describes the strong factors associated with quality of life based on WHO-5-Malay. Based on nature of work positions, doctors have the odds of poorer quality of life as compared to the staff nurses and paramedics (AOR = 2.00; 95% CI: 1.1 – 3.3). With the reference of Ampang Hospital, the respondents who worked in Shah Alam Hospital were three times higher to have poor quality of life (AOR = 2.81; 95% CI: 1.4 – 5.5). The respondents in department of emergency and trauma had poorer quality of life in comparison with those who were in the surgical-based department (OR = 2.27; 95% CI: 1.4 – 3.3).

On top of that, eating habits based on DEBQ scores also contributed to the strong predictors of quality of life among the respondents. Those who had good external eating habit (low scores) and good restrained eating habit (low scores) were two times likely to have poor quality of life (OR = 1.92; 95% CI: 1.3 – 3.3); (OR = 1.56; 95% CI: 1.1 – 2.5). Besides, the respondents with poor sleep quality were also two times higher to have poor quality of life (AOR = 1.69; 95% CI: 1.1 – 2.6).

Table 4.16: Significant Factors Affecting Quality of Life based on WHO-5-Malay Scores, *n* = 413

Factors	WHO-5-Malay					
	Good Quality of Life (*n* = 229) *n* (%)	**Poor Quality of Life (*n* = 184) *n* (%)**	**Crude OR (95% CI)**	***p* value**	**Adjusted OR (95% CI)**	***p* value**
Healthcare Position						
Doctors	64 (46.4)	74 (53.6)	Ref		Ref	
Staff nurses and paramedics	165 (60.0)	110 (40.0)	0.58 (0.4 – 0.9)	*p* = 0.009*	0.50 (0.3 – 0.9)	*p* = 0.020*
Hospital						
Ampang	76 (65.0)	41 (35.0)	Ref		Ref	
Klang	42 (64.6)	23 (35.4)	1.02 (0.5 – 1.9)	*p* = 0.963	0.79 (0.4 – 1.6)	*p* = 0.507
Shah Alam	26 (34.2)	50 (65.8)	3.57 (1.9 – 6.5)	*p* = < 0.001*	2.81 (1.4 – 5.5)	*p* = 0.003*
Banting	38 (54.3)	32 (45.7)	1.56 (0.9 – 2.9)	*p* = 0.149	1.34 (0.7 – 2.6)	*p* = 0.398
Kajang	20 (48.8)	21 (51.2)	1.95 (0.9 – 4.0)	*p* = 0.070	1.92 (0.8 – 4.3)	*p* = 0.120
Others	27 (61.4)	17 (38.6)	1.17 (0.6 – 2.4)	*p* = 0.672	0.78 (0.4 – 1.7)	*p* = 0.518
Department						
Emergency & Trauma	85 (48.6)	90 (51.4)	Ref		Ref	
Medical-based	67 (53.6)	58 (46.4)	0.82 (0.5 – 1.3)	*p* = 0.391	1.69 (0.9 – 3.2)	*p* = 0.105
Surgical-based	77 (68.1)	36 (31.9)	0.44 (0.3 – 0.7)	*p* = 0.001*	0.78 (0.4 – 1.4)	*p* = 0.418
Eating Habits (DEBQ)						
External Eating						
Low	39 (42.9)	52 (57.1)	Ref		Ref	
High	190 (59.0)	132 (41.0)	0.52 (0.3 – 0.8)	*p* = 0.007*	0.60 (0.4 – 1.0)	*p* = 0.056
Restrained Eating						
Low	73 (48.3)	78 (51.7)	Ref		Ref	
High	156 (59.5)	106 (40.5)	0.64 (0.4 – 0.9)	*p* = 0.028*	0.81 (0.5 – 1.3)	*p* = 0.350
Sleep Quality (PSQI-M)						
Good	111 (64.5)	61 (35.5)	Ref		Ref	
Poor	118 (49.2)	122 (50.8)	1.88 (1.3 – 2.8)	*p* = 0.002*	1.69 (1.1 – 2.6)	*p* = 0.016*

*****Significant to *p* value = < 0.05, using logistic regression

Adjusted OR = Results are adjusted for healthcare position, hospital, department, external eating habit, restrained eating habit and sleep quality

Table 4.17 illustrates the association of factors affecting the quality of life of respondents referring to the Malay-SF-36 scores of physical domains. In general, there was a significant association between comorbidity and sleep quality with the quality of life of the respondents in the aspect of physical domain of Malay-SF-36 scores; $p < 0.05$. Other variables had no significant associations with the quality of life of the respondents physically; $p > 0.05$. According to Table 4.18, the respondents with comorbidity were 3 times higher to have a poor quality of life physically. Besides, it was also shown that those with poor sleep quality were 5 times more likely to have a poor quality of life in the physical domain.

Table 4.17: Association of Factors Affecting Quality of Life based on Malay-SF-36 Physical Domain, *n* = 413

Group	Good quality of life (*n* = 373) *n* (%)	Poor quality of life (*n* = 40) *n* (%)	X^2	df	*p* value
Age Group					
< 40 years old	332 (90.2)	36 (9.8)			1.000¥
≥ 40 years old	39 (90.7)	4 (9.3)			
Gender					
Men	72 (92.3)	6 (7.7)	0.437	1	0.509
Women	301 (89.9)	34 (10.1)			
Ethnicity					
Malay	308 (91.4)	29 (8.6)	2.441	1	0.118
Non-Malay	65 (85.5)	11 (14.5)			
Religion					
Muslim	315 (90.8)	32 (9.2)	0.533	1	0.465
Non-Muslim	58 (87.9)	8 (12.1)			
Marital Status					
Single/divorced/separated/widowed	124 (89.9)	14 (10.1)	0.050	1	0.823
Married	249 (90.5)	26 (9.5)			
Educational Status					
SPM and STPM	35 (89.7)	4 (10.3)			0.781¥
Tertiary education	338 (90.4)	36 (9.6)			
Household Income					
< RM 4,850	169 (88.0)	23 (12.0)	3.170	2	0.205
RM 4,850 – RM 10,959	190 (91.8)	17 (8.2)			
≥ RM 10,960	14 (100.0)	0 (0.0)			
Healthcare Position					
Doctors	130 (94.2)	8 (5.8)	3.582	1	0.058
Staff nurses and paramedics	243 (88.4)	32 (11.6)			

Hospital					
Ampang	110 (94.0)	7 (6.0)	9.546	5	0.089
Klang	54 (83.1)	11 (16.9)			
Shah Alam	66 (86.8)	10 (13.2)			
Banting	63 (90.0)	7 (10.0)			
Kajang	37 (90.2)	4 (9.8)			
Others	43 (97.7)	1 (2.3)			
Department					
Emergency & Trauma	155 (88.6)	20 (11.4)	1.104	2	0.576
Medical-based	115 (92.0)	10 (8.0)			
Surgical-based	103 (91.2)	10 (8.8)			
Part-Time Job					
No	335 (90.8)	34 (9.2)			0.414¥
Yes	38 (86.4)	6 (13.6)			
Comorbidity					
No	326 (92.4)	27 (7.6)	11.521	1	0.001*
Yes	47 (78.3)	13 (21.7)			
Body Mass Index (BMI)					
Underweight	26 (86.7)	4 (13.3)	7.663	3	0.054
Normal	188 (93.1)	14 (6.9)			
Overweight	98 (91.6)	9 (8.4)			
Obese	61 (82.4)	13 (17.6)			
Smoking/Vaping					
No	354 (90.8)	36 (9.2)			0.262¥
Yes	19 (82.6)	4 (17.4)			
Alcohol Consumption					
No	360 (90.2)	39 (9.8)			1.000¥
Yes	13 (92.9)	1 (7.1)			
Intentional Exercise					
No	225 (88.9)	28 (11.1)	1.426	1	0.232
Yes	148 (92.5)	12 (7.5)			

Category of Physical Activity (IPAQ-M)					
Inactive	116 (88.5)	15 (11.5)	0.665	2	0.717
Minimally active	164 (91.1)	16 (8.9)			
HEPA active	92 (91.1)	9 (8.9)			
Emotional Eating Habit (DEBQ)					
Low	324 (90.3)	35 (9.7)	0.013	1	0.910
High	49 (90.7)	5 (9.3)			
External Eating Habit (DEBQ)					
Low	80 (87.9)	11 (12.1)	0.770	1	0.380
High	293 (91.0)	29 (9.0)			
Restrained Eating Habit (DEBQ)					
Low	133 (88.1)	18 (11.9)	1.360	1	0.244
High	240 (91.6)	22 (8.4)			
Sleep Quality (PSQI-M)					
Good	167 (97.1)	5 (2.9)	15.583	1	< 0.001*
Poor	205 (85.4)	35 (14.6)			

*Significant to *p* value = < 0.05, using Chi-square test

¥Fischer's exact test was utilised since more than 20% of the expected counts are less than 5.

Table 4.18: Significant Factors Affecting Quality of Life based on Malay-SF-36 Physical Domain, *n* = 413

Factors	Malay-SF-36 Physical Domain					
	Good quality of life (*n* = 373) *n* (%)	**Poor quality of life (*n* = 40) *n* (%)**	**Crude OR (95% CI)**	***p* value**	**Adjusted OR (95% CI)**	***p* value**
Comorbidity						
No	326 (92.4)	27 (7.6)	Ref		Ref	
Yes	47 (78.3)	13 (21.7)	3.34 (1.6 – 6.9)	$p = 0.001$*	3.01 (1.4 – 6.4)	$p = 0.004$*
Sleep Quality (PSQI-M)						
Good	167 (97.1)	5 (2.9)	Ref		Ref	
Poor	205 (85.4)	35 (14.6)	5.70 (2.2 – 14.9)	$p = < 0.001$*	5.37 (2.0 – 14.1)	$p = 0.001$*

*Significant to *p* value = < 0.05, using logistic regression
Adjusted OR = Results are adjusted for comorbidity and sleep quality

Meanwhile, referring to the mental domain of Malay-SF-36 scores, restrained eating habit and sleep quality were found significantly associated with the quality of life of the respondents; $p < 0.05$. Other variables had no significant associations with the particular domain of Malay-SF-36 (Table 4.19). Analysis of logistic regression highlighted in Table 4.20 found that respondents with poor sleep quality were 11 times more likely to have poor quality of life specifically in mental domain. On the other hand, the factor of restrained eating habit did not have significant association with the quality of life of the respondents based on Malay-SF-36 scores of mental domain.

Table 4.19: Association of Factors Affecting Quality of Life based on Malay-SF-36 Mental Domain, *n* = 413

Group	Good quality of life (*n* = 369) *n* (%)	Poor quality of life (*n* = 44) *n* (%)	X^2	df	*p* value
Age Group					
< 40 years old	325 (88.3)	43 (11.7)			0.067¥
≥ 40 years old	42 (97.7)	1 (2.3)			
Gender					
Men	72 (92.3)	6 (7.7)	0.886	1	0.347
Women	297 (88.7)	38 (11.3)			
Ethnicity					
Malay	305 (90.5)	32 (9.5)	2.581	1	0.108
Non-Malay	64 (84.2)	12 (15.8)			
Religion					
Muslim	314 (90.5)	33 (9.5)	2.984	1	0.084
Non-Muslim	55 (83.3)	11 (16.7)			
Marital Status					
Single/divorced/separated/widowed	118 (85.5)	20 (14.5)	3.209	1	0.073
Married	251 (91.3)	24 (8.7)			
Educational Status					
SPM and STPM	33 (84.6)	6 (15.4)			0.284¥
Tertiary education	336 (89.8)	38 (10.2)			
Household Income					
< RM 4,850	171 (89.1)	21 (10.9)	1.731	2	0.421
RM 4,850 – RM 10,959	184 (88.9)	23 (11.1)			
≥ RM 10,960	14 (100.0)	0 (0.0)			
Healthcare Position					
Doctors	121 (87.7)	17 (12.3)	0.604	1	0.437
Staff nurses and paramedics	248 (90.2)	27 (9.8)			
Hospital					
Ampang	108 (92.3)	9 (7.7)	10.529	5	0.062
Klang	59 (90.8)	6 (9.2)			
Shah Alam	61 (80.3)	15 (19.7)			
Banting	64 (91.4)	6 (8.6)			
Kajang	35 (85.4)	6 (14.6)			

Others	42 (95.5)	2 (4.5)			
Department					
Emergency & Trauma	153 (87.4)	22 (12.6)	2.328	2	0.312
Medical-based	116 (92.8)	9 (7.2)			
Surgical-based	100 (88.5)	13 (11.5)			
Part-Time Job					
No	332 (90.0)	37 (10.0)			0.296¥
Yes	37 (84.1)	7 (15.9)			
Comorbidity					
No	317 (89.8)	36 (10.2)	0.530	1	0.467
Yes	52 (86.7)	8 (13.3)			
Body Mass Index (BMI)					
Underweight	26 (86.7)	4 (13.3)	2.754	3	0.431
Normal	181 (89.6)	21 (10.4)			
Overweight	99 (92.5)	8 (7.5)			
Obese	63 (85.1)	11 (14.9)			
Smoking/Vaping					
No	348 (89.2)	42 (10.8)			1.000¥
Yes	21 (91.3)	2 (8.7)			
Alcohol Consumption					
No	355 (89.0)	44 (11.0)			0.380¥
Yes	14 (100.0)	0 (0.0)			
Intentional Exercise					
No	221 (87.4)	32 (12.6)	2.729	1	0.099
Yes	148 (92.5)	12 (7.5)			
Category of Physical Activity (IPAQ-M)					
Inactive	112 (85.5)	19 (14.5)	2.945	2	0.229
Minimally active	164 (91.1)	16 (8.9)			
HEPA active	92 (91.1)	9 (8.9)			
Emotional Eating Habit (DEBQ)					
Low	322 (89.7)	37 (10.3)	0.348	1	0.555
High	47 (87.0)	7 (13.0)			

External Eating Habit (DEBQ)					
Low	78 (85.7)	13 (14.3)	1.617	1	0.203
High	291 (90.4)	31 (9.6)			
Restrained Eating Habit (DEBQ)					
Low	129 (85.4)	22 (14.6)	3.834	1	0.049*
High	240 (91.6)	22 (8.4)			
Sleep Quality (PSQI-M)					
Good	169 (98.3)	3 (1.7)	24.714	1	< 0.001*
Poor	199 (82.9)	41 (17.1)			

*****Significant to *p* value = < 0.05, using Chi-square test

[¥]Fischer's exact test was utilised since more than 20% of the expected counts are less than 5.

Table 4.20: Significant Factors Affecting Quality of Life based on Malay-SF-36 Mental Domain, *n* = 413

Factors	**Malay-SF-36 Mental Domain**					
	Good quality of life (*n* = 369) *n* (%)	**Poor quality of life (*n* = 44) *n* (%)**	**Crude OR (95% CI)**	***p* value**	**Adjusted OR (95% CI)**	***p* value**
Restrained Eating (DEBQ)						
Low	129 (85.4)	22 (14.6)	Ref		Ref	
High	240 (91.6)	22 (8.4)	0.54 (0.3 – 0.9)	*p* = 0.053	0.61 (0.3 – 1.2)	*p* = 0.133
Sleep Quality (PSQI-M)						
Good	169 (98.3)	3 (1.7)	Ref		Ref	
Poor	199 (82.9)	41 (17.1)	11.61 (3.5 – 38.2)	*p* = < 0.001*	11.18 (3.4 – 36.8)	*p* = < 0.001*

*****Significant to *p* value = < 0.05, using logistic regression

Adjusted OR = Results are adjusted for restrained eating habit and sleep quality

4.6.3 Associated Factors with Work Engagement

Table 4.21 shows the association between variables affecting work engagement based on total scores of UWES-M among the respondents. The Chi-square test proved that there was significant association between age group, educational status, healthcare position, intentional exercise, physical activity, eating habits of external and restrained, and sleep quality with work engagement based on total scores of UWES-M, $p < 0.05$. Other variables had no significant associations with the parameter of work engagement among the respondents; $p > 0.05$ (Table 4.21)

Table 4.21: Association of Factors Affecting Total Score of UWES-M, *n* = 413

Group	Low Total Score (*n* = 59) *n* (%)	Average (*n* = 252) *n* (%)	High Total Score (*n* = 102) *n* (%)	X^2	df	*p* value
Age Group						
< 40 years old	56 (15.2)	228 (62.0)	84 (22.8)	6.647	2	*p* = 0.036*
≥ 40 years old	3 (7.0)	23 (53.5)	17 (39.5)			
Gender						
Men	10 (12.8)	47 (60.3)	21 (26.9)	0.347	2	*p* = 0.841
Women	49 (14.6)	205 (61.2)	81 (24.2)			
Ethnicity						
Malay	43 (12.8)	209 (62.0)	85 (25.2)	3.491	2	*p* = 0.175
Non-Malay	16 (21.1)	43 (56.6)	17 (22.4)			
Religion						
Muslim	48 (13.8)	213 (61.4)	86 (24.8)	0.366	2	*p* = 0.833
Non-Muslim	11 (16.7)	39 (59.1)	16 (24.2)			
Marital Status						
Single/divorced/separated/widowed	20 (14.5)	90 (65.2)	28 (20.3)	2.236	2	*p* = 0.327
Married	39 (14.2)	162 (58.9)	74 (26.9)			
Educational Status						
SPM and STPM	7 (17.9)	12 (30.8)	20 (51.3)	19.186	2	*p* = < 0.001*
Tertiary education	52 (13.9)	240 (64.2)	82 (21.9)			
Household Income						
< RM 4,850	32 (16.7)	112 (58.3)	48 (25.0)	3.686	4	*p* = 0.450
RM 4,850 – RM 10,959	27 (13.0)	130 (62.8)	50 (24.2)			
≥ RM 10,960	0 (0.0)	10 (71.4)	4 (28.6)			
Healthcare Position						
Doctors	22 (15.9)	93 (67.4)	23 (16.7)	7.190	2	*p* = 0.027*
Staff nurses and paramedics	37 (13.5)	159 (57.8)	79 (28.7)			

Hospital						
Ampang	10 (8.5)	69 (59.0)	38 (32.5)	13.578	10	$p = 0.193$
Klang	12 (18.5)	39 (60.0)	14 (21.5)			
Shah Alam	14 (18.4)	48 (63.2)	14 (18.4)			
Banting	13 (18.6)	39 (55.7)	18 (25.7)			
Kajang	7 (17.1)	27 (65.9)	7 (17.1)			
Others	3 (6.8)	30 (68.2)	11 (25.0)			
Department						
Emergency & Trauma	32 (18.3)	108 (61.7)	35 (20.0)	7.554	4	$p = 0.109$
Medical-based	12 (9.6)	80 (64.0)	33 (26.4)			
Surgical-based	15 (13.3)	64 (56.6)	34 (30.1)			
Part-Time Job						
No	50 (13.6)	227 (61.5)	92 (24.9)	1.532	2	$p = 0.465$
Yes	9 (20.5)	25 (56.8)	10 (22.7)			
Comorbidity						
No	52 (14.7)	217 (61.5)	84 (23.8)	1.219	2	$p = 0.544$
Yes	7 (11.7)	35 (58.3)	18 (30.0)			
Body Mass Index (BMI)						
Underweight	6 (20.0)	18 (60.0)	6 (20.0)	3.955	6	$p = 0.683$
Normal	25 (12.4)	128 (63.4)	49 (24.3)			
Overweight	15 (14.0)	67 (62.6)	25 (23.4)			
Obese	13 (17.6)	39 (52.7)	22 (29.7)			
Smoking/Vaping						
No	55 (14.1)	239 (61.3)	96 (24.6)	0.264	2	$p = 0.876$
Yes	4 (17.4)	13 (56.5)	6 (26.1)			
Alcohol Consumption						
No	58 (14.5)	242 (60.7)	99 (24.8)	0.838	2	$p = 0.658$
Yes	1 (7.1)	10 (71.4)	3 (21.4)			
Intentional Exercise						
No	37 (14.6)	167 (66.0)	49 (19.4)	10.230	2	$p = 0.006$*
Yes	22 (13.8)	85 (53.1)	53 (33.1)			

Category of Physical Activity (IPAQ-M)						
Inactive	28 (21.4)	69 (52.7)	34 (26.0)	10.334	4	p = 0.035*
Minimally active	23 (12.8)	113 (62.8)	44 (24.4)			
HEPA active	8 (7.9)	69 (68.3)	24 (23.8)			
Emotional Eating Habit (DEBQ)						
Low	53 (14.8)	214 (59.6)	92 (25.6)	2.289	2	p = 0.318
High	6 (11.1)	38 (70.4)	10 (18.5)			
External Eating Habit (DEBQ)						
Low	22 (24.2)	44 (48.4)	25 (27.5)	11.424	2	p = 0.003*
High	37 (11.5)	208 (64.6)	77 (23.9)			
Restrained Eating Habit (DEBQ)						
Low	36 (23.8)	82 (54.3)	33 (21.9)	17.750	2	p = < 0.001*
High	23 (8.8)	170 (64.9)	69 (26.3)			
Sleep Quality (PSQI-M)						
Good	10 (5.8)	108 (62.8)	54 (31.4)	20.344	2	p = < 0.001*
Poor	49 (20.4)	143 (59.6)	48 (20.0)			

*****Significant to p value = < 0.05, using Chi-square test.

Based on the multinomial logistic regression for the total scores of UWES-M, the variables of age group, educational status, healthcare position, intentional exercise, physical activity, eating habits of external and restrained, and sleep quality were significantly associated to work engagement, meanwhile other variables were non-significant (Table 4.22).

As for the poor work engagement (low scores), those with the educational status until SPM and STPM were more likely to have poor work engagement than those with tertiary education (AOR = 3.28; 95% CI: 1.1 – 9.5). The respondents who were inactive had triple odds of having poor work engagement as compared to those who were HEPA active (AOR = 3.17; 95% CI: 1.3 – 8.0). Besides, the respondents with good external and restrained eating habits (low scores) had greater odds of getting poor work engagement (AOR = 2.08; 95% CI: 1.1 – 5.0; AOR = 2.38; 95% CI: 1.3 – 5.0). Those who had poor sleep quality were also three times higher to have poor work engagement (AOR = 3.18; 95% CI: 1.5 – 6.7).

Meanwhile, referring to the good work engagement (high scores) among the respondents, those who were in the age group of more than 40 years old recorded double odds of having good work engagement (OR = 2.00; 95% CI: 1.1 – 3.3). As for the educational status, those who were educated until SPM and STPM were more likely to have good work engagement than those with tertiary education (AOR = 4.89; 95% CI: 2.2 – 10.9). In addition, staff nurses and paramedics were shown to have better work engagement as compared to doctors (OR = 2.01; 95% CI: 1.2 – 3.4). The respondents who practiced intentional exercise recorded the higher odds of having good work

engagement (AOR = 2.27; 95% CI: 1.4 – 3.3). Those who were inactive had double odds of having good work engagement than those who were HEPA active (AOR = 2.02; 95% CI: 1.1 – 4.0).

Table 4.22: Significant Factors Affecting Work Engagement for Total Score of UWES-M, *n* = 413

Factors	Low Total Score				High Total Score			
	Crude OR (95% CI)	***p* value**	**Adjusted OR (95% CI)**	***p* value**	**Crude OR (95% CI)**	***p* value**	**Adjusted OR (95% CI)**	***p* value**
Age								
< 40 years old	1.88 (0.5 – 6.5)	*p* = 0.316	1.79 (0.5 – 6.7)	*p* = 0.389	0.50 (0.3 – 0.9)	*p* = 0.043*	0.61 (0.3 – 1.3)	*p* = 0.182
≥ 40 years old	Ref		Ref		Ref		Ref	
Educational Status								
SPM and STPM	2.69 (1.1 – 7.2)	*p* = 0.047*	3.28 (1.1 – 9.5)	*p* = 0.028*	4.88 (2.3 – 10.4)	*p* = < 0.001*	4.89 (2.2 – 10.9)	*p* = < 0.001*
Tertiary education	Ref		Ref		Ref		Ref	
Healthcare Position								
Doctors	Ref		Ref		Ref		Ref	
Staff nurses and paramedics	0.98 (0.5 – 1.8)	*p* = 0.956	1.05 (0.5 – 2.0)	*p* = 0.882	2.01 (1.2 – 3.4)	*p* = 0.010*	1.40 (0.8 – 2.5)	*p* = 0.272
Intentional Exercise								
No	0.86 (0.5 – 1.5)	*p* = 0.605	0.71 (0.4 – 1.4)	*p* = 0.306	0.47 (0.3 – 0.8)	*p* = 0.002*	0.44 (0.3 – 0.7)	*p* = 0.002*
Yes	Ref		Ref		Ref		Ref	
Category of Physical Activity								
Inactive	3.50 (1.5 – 8.2)	*p* = 0.004*	3.17 (1.3 – 8.0)	*p* = 0.014*	1.42 (0.8 – 2.6)	*p* = 0.271	2.02 (1.1 – 4.0)	*p* = 0.043*
Minimally active	1.76 (0.7 – 4.1)	*p* = 0.199	1.64 (0.7 – 4.0)	*p* = 0.284	1.12 (0.6 – 2.0)	*p* = 0.703	1.22 (0.7 – 2.3)	*p* = 0.538
HEPA active	Ref		Ref		Ref		Ref	
External Eating (DEBQ)								
Low	Ref		Ref		Ref		Ref	
High	0.36 (0.2 – 0.7)	*p* = 0.001*	0.48 (0.2 – 0.9)	*p* = 0.042*	0.65 (0.4 – 1.1)	*p* = 0.131	0.65 (0.4 – 1.2)	*p* = 0.171
Restrained Eating (DEBQ)								
Low	Ref		Ref		Ref		Ref	
High	0.31 (0.2 – 0.6)	*p* = < 0.001*	0.42 (0.2 – 0.8)	*p* = 0.010*	1.01 (0.6 – 1.6)	*p* = 0.973	1.02 (0.6 – 1.8)	*p* = 0.951
Sleep Quality (PSQI-M)								
Good	Ref		Ref		Ref		Ref	
Poor	3.70 (1.8 – 7.6)	*p* = < 0.001*	3.18 (1.5 – 6.7)	*p* = 0.002*	0.67 (0.4 – 1.1)	*p* = 0.091	0.66 (0.4 – 1.1)	*p* = 0.102

The reference category for total score of UWES-M is *Average*.

*****Significant to *p* value = < 0.05, using multinomial logistic regression

Adjusted OR = Results are adjusted for age, educational status, healthcare position, intentional exercise, category of physical activity, eating habits of external and restrained, and sleep quality.

Table 4.23 illustrates the association between variables affecting work engagement based on the domain of vigour among the respondents. There were significant associations between age group, marital status, educational status, healthcare position, intentional exercise, and sleep quality with work engagement referring to vigour domain of UWES-M, $p < 0.05$ based on Chi-square test. Other variables had no significant associations with the domain of vigour of work engagement among the respondents; $p > 0.05$.

Table 4.23: Association of Factors Affecting Vigour Domain of UWES-M, n = 413

Group	Low Vigour (n = 176) n (%)	Average (n = 161) n (%)	High Vigour (n = 74) n (%)	X^2	df	p value
Age Group						
< 40 years old	167 (45.4)	140 (38.0)	61 (16.6)	10.508	2	p = 0.005*
≥ 40 years old	9 (20.9)	21 (48.8)	13 (30.2)			
Gender						
Men	30 (38.5)	30 (38.5)	18 (23.1)	1.842	2	p = 0.398
Women	146 (43.6)	133 (39.7)	56 (16.7)			
Ethnicity						
Malay	136 (40.4)	141 (41.8)	60 (17.8)	4.818	2	p = 0.090
Non-Malay	40 (52.6)	22 (28.9)	14 (18.4)			
Religion						
Muslim	144 (41.5)	142 (40.9)	61 (17.6)	1.938	2	p = 0.379
Non-Muslim	32 (48.5)	21 (31.8)	13 (19.7)			
Marital Status						
Single/divorced/separated/widowed	73 (52.9)	49 (35.5)	16 (11.6)	10.592	2	p = 0.005*
Married	103 (37.5)	114 (41.5)	58 (21.1)			
Educational Status						
SPM and STPM	13 (33.3)	13 (33.3)	13 (33.3)	6.993	2	p = 0.030*
Tertiary education	163 (43.6)	150 (40.1)	61 (16.3)			
Household Income						
< RM 4,850	84 (43.8)	78 (40.6)	30 (15.6)	2.404	4	p = 0.662
RM 4,850 – RM 10,959	88 (42.5)	78 (37.7)	41 (19.8)			
≥ RM 10,960	4 (28.6)	7 (50.0)	3 (21.4)			
Healthcare Position				14.830	2	p = 0.001*
Doctors	76 (55.1)	47 (34.1)	15 (10.9)			
Staff nurses and paramedics	100 (36.4)	116 (42.2)	59 (21.5)			
Hospital						
Ampang	47 (40.2)	42 (35.9)	28 (23.9)	14.346	10	p = 0.158
Klang	29 (44.6)	25 (38.5)	11 (16.9)			
Shah Alam	41 (53.9)	25 (32.9)	10 (13.2)			
Banting	23 (32.9)	31 (44.3)	16 (22.9)			
Kajang	19 (46.3)	18 (43.9)	4 (9.8)			

Others	17 (38.6)	22 (50.0)	5 (11.4)			
Department						
Emergency & Trauma	85 (48.6)	66 (37.7)	24 (13.7)	8.170	4	$p = 0.086$
Medical-based	48 (38.4)	55 (44.0)	22 (17.6)			
Surgical-based	43 (38.1)	42 (37.2)	28 (24.8)			
Part-Time Job						
No	157 (42.5)	147 (39.8)	65 (17.6)	0.301	2	$p = 0.860$
Yes	19 (43.2)	16 (36.4)	9 (20.5)			
Comorbidity						
No	155 (43.9)	136 (38.5)	62 (17.6)	1.670	2	$p = 0.434$
Yes	21 (35.0)	27 (45.0)	12 (20.0)			
Body Mass Index (BMI)						
Underweight	17 (56.7)	9 (30.0)	4 (13.3)	5.624	2	$p = 0.467$
Normal	85 (42.1)	82 (40.6)	35 (17.3)			
Overweight	49 (45.8)	38 (35.5)	20 (18.7)			
Obese	25 (33.8)	34 (45.9)	15 (20.3)			
Smoking/Vaping						
No	165 (42.3)	156 (40.0)	69 (17.7)	0.857	2	$p = 0.651$
Yes	11 (47.8)	7 (30.4)	5 (21.7)			
Alcohol Consumption						
No	173 (43.4)	155 (38.8)	71 (17.8)	2.773	2	$p = 0.250$
Yes	3 (21.4)	8 (57.1)	3 (21.4)			
Intentional Exercise						
No	112 (44.3)	106 (41.9)	35 (13.8)	7.474	2	$p = 0.024$*
Yes	64 (40.0)	57 (35.6)	39 (24.4)			
Category of Physical Activity (IPAQ-M)						
Inactive	60 (45.8)	47 (35.9)	24 (18.3)	1.877	4	$p = 0.758$
Minimally active	77 (42.8)	72 (40.0)	31 (17.2)			
HEPA active	38 (37.6)	44 (43.6)	19 (18.8)			
Emotional Eating Habit (DEBQ)						
Low	152 (42.3)	141 (39.3)	66 (18.4)	0.408	2	$p = 0.815$
High	24 (44.4)	22 (40.7)	8 (14.8)			

External Eating Habit (DEBQ)						
Low	38 (41.8)	32 (35.2)	21 (23.1)	2.301	2	$p = 0.316$
High	138 (42.9)	131 (40.7)	53 (16.5)			
Restrained Eating Habit (DEBQ)						
Low	71 (47.0)	55 (36.4)	25 (16.6)	1.889	2	$p = 0.389$
High	105 (40.1)	108 (41.2)	49 (18.7)			
Sleep Quality (PSQI-M)						
Good	57 (33.1)	75 (43.6)	40 (23.3)	11.887	2	$p = 0.003$*
Poor	118 (49.2)	88 (36.7)	34 (14.2)			

*Significant to p value = < 0.05, using Chi-square test

Based on the results of multinomial logistic regression, it was shown that age group, marital status, educational status, healthcare position, intentional exercise, and sleep quality were the significant predictors that affecting the vigour domain of work engagement of the respondents. Other variables were non-significant (Table 4.24).

Zooming on the poor work engagement of vigour domain (low scores), the respondents who were less than 40 years old had higher odds of having poor work engagement (OR = 2.78; 95% CI: 1.2 – 6.3). Those who were single, divorced, separated or widowed were more likely to have poor work engagement than the married group (OR = 1.65; 95% CI: 1.1 – 2.6). Moreover, healthcare position was also one of the significant factors associated with work engagement. Doctors were found to have higher chances of getting poor work engagement as compared to staff nurses and paramedics (OR = 1.89; 95% CI: 1.3 – 3.3). Those who had poor sleep quality highlighted the odds of having poor work engagement nearly two times than those with good sleep quality (AOR = 1.69; 95% CI: 1.1 – 2.6).

In addition, the significant factors associated with good work engagement of vigour domain (high scores) were educational status and intentional exercise. Those with the educational status until SPM and STPM were found to have good work engagement as compared to those who had tertiary education (OR = 2.46; 95% CI: 1.1 – 5.6). The odds of having good work engagement were two times greater for those who practiced intentional exercise (AOR = 2.08; 95% CI: 1.1 – 3.3).

Table 4.24: Significant Factors Affecting Work Engagement for Vigour Domain of UWES-M, *n* = 413

Factors	Low Vigour				High Vigour			
	Crude OR (95% CI)	***p* value**	**Adjusted OR (95% CI)**	***p* value**	**Crude OR (95% CI)**	***p* value**	**Adjusted OR (95% CI)**	***p* value**
Age								
< 40 years old	2.78 (1.2 – 6.3)	*p* = 0.014*	2.03 (0.9 – 4.7)	*p* = 0.101	0.70 (0.3 – 1.5)	*p* = 0.361	0.79 (0.4 – 1.8)	*p* = 0.570
≥ 40 years old	Ref		Ref		Ref		Ref	
Marital Status								
Single/divorced/separated/widowed	1.65 (1.1 – 2.6)	*p* = 0.029*	1.28 (0.8 – 2.1)	*p* = 0.336	0.64 (0.3 – 1.2)	*p* = 0.179	0.66 (0.3 – 1.3)	*p* = 0.247
Married	Ref		Ref		Ref		Ref	
Educational Status								
SPM and STPM	0.92 (0.4 – 2.0)	*p* = 0.839	1.09 (0.5 – 2.5)	*p* = 0.840	2.46 (1.1 – 5.6)	*p* = 0.032*	2.34 (1.1 – 5.5)	*p* = 0.052
Tertiary education	Ref		Ref		Ref		Ref	
Healthcare Position								
Doctors	Ref		Ref		Ref		Ref	
Staff nurse and paramedics	0.53 (0.3 – 0.8)	*p* = 0.006*	0.61 (0.4 – 1.1)	*p* = 0.055	1.59 (0.8 – 3.1)	*p* = 0.167	0.96 (0.5 – 2.0)	*p* = 0.903
Intentional Exercise								
No	0.94 (0.6 – 1.5)	*p* = 0.789	0.89 (0.6 – 1.4)	*p* = 0.609	0.48 (0.3 – 0.8)	*p* = 0.011*	0.48 (0.3 – 0.9)	*p* = 0.013*
Yes	Ref		Ref		Ref		Ref	
Sleep Quality (PSQI-M)								
Good	Ref		Ref		Ref		Ref	
Poor	1.76 (1.1 – 2.7)	*p* = 0.012*	1.69 (1.1 – 2.6)	*p* = 0.023*	0.72 (0.4 – 1.3)	*p* = 0.252	0.75 (0.4 – 1.3)	*p* = 0.311

The reference category for vigour domain of UWES-M is Average.
*****Significant to *p* value = < 0.05, using multinomial logistic regression
Adjusted OR = Results are adjusted for age, marital status, educational status, healthcare position, intentional exercise, and sleep quality.

Besides, Table 4.25 presents the significant predictors for the domain of dedication of UWES-M, $p < 0.05$ based on Chi-square test. These include educational status, healthcare position, intentional exercise, physical activity, external eating habit, restrained eating habit, and sleep quality. Other variables were non-significant; $p > 0.05$.

Table 4.25: Association of Factors Affecting Dedication Domain of UWES-M, *n* = 413

Group	Low Dedication (*n* = 64) *n* (%)	Average (*n* = 254) *n* (%)	High Dedication (*n* = 95) *n* (%)	X^2	df	*p* value
Age Group						
< 40 years old	61 (16.6)	228 (62.0)	79 (21.5)	5.400	2	*p* = 0.067
≥ 40 years old	3 (7.0)	25 (58.1)	15 (34.9)			
Gender						
Men	12 (15.4)	44 (56.4)	22 (28.2)	1.538	2	*p* = 0.464
Women	52 (15.5)	210 (62.7)	73 (21.8)			
Ethnicity						
Malay	48 (14.2)	211 (62.6)	78 (23.1)	2.239	2	*p* = 0.326
Non-Malay	16 (21.1)	43 (56.6)	17 (22.4)			
Religion						
Muslim	53 (15.3)	215 (62.0)	79 (22.8)	0.196	2	*p* = 0.907
Non-Muslim	11 (16.7)	39 (59.1)	16 (24.2)			
Marital Status						
Single/divorced/separated/widowed	22 (15.9)	89 (64.5)	27 (19.6)	1.393	2	*p* = 0.498
Married	42 (15.3)	165 (60.0)	68 (24.7)			
Educational Status						
SPM and STPM	8 (20.5)	13 (33.3)	18 (46.2)	16.291	2	*p* = < 0.001*
Tertiary education	56 (15.0)	241 (64.4)	77 (20.6)			
Household Income						
< RM 4,850	33 (17.2)	113 (58.9)	46 (24.0)	1.588	4	*p* = 0.811
RM 4,850 – RM 10,959	29 (14.0)	133 (64.3)	45 (21.7)			
≥ RM 10,960	2 (14.3)	8 (57.1)	4 (28.6)			
Healthcare Position						
Doctors	27 (19.6)	90 (65.2)	21 (15.2)	8.140	2	*p* = 0.017*
Staff nurses and paramedics	37 (13.5)	164 (59.6)	74 (26.9)			

Hospital						
Ampang	14 (12.0)	71 (60.7)	32 (27.4)	9.243	10	$p = 0.509$
Klang	11 (16.9)	40 (61.5)	14 (21.5)			
Shah Alam	17 (22.4)	44 (57.9)	15 (19.7)			
Banting	10 (14.3)	44 (62.9)	16 (22.9)			
Kajang	9 (22.0)	25 (61.0)	7 (17.1)			
Others	3 (6.8)	30 (68.2)	11 (25.0)			
Department						
Emergency & Trauma	35 (20.0)	105 (60.0)	35 (20.0)	9.175	4	$p = 0.057$
Medical-based	10 (8.0)	84 (67.2)	31 (24.8)			
Surgical-based	19 (16.8)	65 (57.5)	29 (25.7)			
Part-Time Job						
No	54 (14.6)	229 (62.1)	86 (23.3)	1.976	2	$p = 0.372$
Yes	10 (22.7)	25 (56.8)	9 (20.5)			
Comorbidity						
No	58 (16.4)	216 (61.2)	79 (22.4)	1.817	2	$p = 0.403$
Yes	6 (10.0)	38 (63.3)	16 (26.7)			
Body Mass Index (BMI)						
Underweight	7 (23.3)	18 (60.0)	5 (16.7)	4.594	6	$p = 0.597$
Normal	29 (14.4)	130 (64.4)	43 (21.3)			
Overweight	16 (15.0)	66 (61.7)	25 (23.4)			
Obese	12 (16.2)	40 (54.1)	22 (29.7)			
Smoking/Vaping						
No	60 (15.4)	241 (61.8)	89 (22.8)	0.255	2	$p = 0.880$
Yes	4 (17.4)	13 (56.5)	6 (26.1)			
Alcohol Consumption						
No	63 (15.8)	244 (61.2)	92 (23.1)	0.900	2	$p = 0.638$
Yes	1 (7.1)	10 (71.4)	3 (21.4)			
Intentional Exercise						
No	41 (16.2)	166 (65.6)	46 (18.2)	8.604	2	$p = 0.014$*
Yes	23 (14.4)	88 (55.0)	49 (30.6)			

Category of Physical Activity (IPAQ-M)						
Inactive	30 (22.9)	68 (51.9)	33 (25.2)	10.719	4	p = 0.030*
Minimally active	23 (12.8)	115 (63.9)	42 (23.3)			
HEPA active	11 (10.9)	70 (69.3)	20 (19.8)			
Emotional Eating Habit (DEBQ)						
Low	59 (16.4)	213 (59.3)	87 (24.2)	5.472	2	p = 0.065
High	5 (9.3)	41 (75.9)	8 (14.8)			
External Eating Habit (DEBQ)						
Low	20 (22.0)	46 (50.5)	25 (27.5)	6.454	2	p = 0.040*
High	44 (13.7)	208 (64.6)	70 (21.7)			
Restrained Eating Habit (DEBQ)						
Low	38 (25.2)	80 (53.0)	33 (21.9)	17.307	2	p = < 0.001*
High	26 (9.9)	174 (66.4)	62 (23.7)			
Sleep Quality (PSQI-M)						
Good	15 (8.7)	110 (64.0)	47 (27.3)	11.466	2	p = 0.003*
Poor	49 (20.4)	143 (59.6)	48 (20.0)			

*****Significant to p value = < 0.05, using Chi-square test

On top of that, the multinomial logistic regression further proved the significant associations of the age group, marital status, educational status, healthcare position, intentional exercise, and sleep quality with the dedication domain of work engagement of the respondents. Other variables were non-significant (Table 4.26).

The poor work engagement (low scores) based on the dedication domain showed significant associated factors that include educational status, physical activity, external eating habit, restrained eating habit and sleep quality. Those who had the educational status until SPM and STPM were found to have poor work engagement as compared to those who had tertiary education (AOR = 3.58; 95% CI: 1.3 – 9.7). The respondents who were inactive had higher odds of having poor work engagement than those who were HEPA active (AOR = 2.63; 95% CI: 1.1 – 6.0). Besides, the respondents who had good external and restrained eating habits (low scores) were more likely to have poor work engagement (OR = 2.04; 95% CI: 1.1 – 3.3; AOR = 2.78; 95% CI: 1.4 – 5.0). Those who had poor sleep quality were demonstrated to have greater odds of having poor work engagement (AOR = 2.13; 95% CI: 1.1 – 4.1).

Apart from that, the significant factors associated with good work engagement of dedication domain (high scores) include educational status, healthcare position, intentional exercise and physical activity. The respondents who had the educational status until SPM and STPM had higher chances to have good work engagement than those who had tertiary education (AOR = 4.20; 95% CI: 1.9 – 9.3). Staff nurses and paramedics were shown to have double odds of having good work engagement as compared to doctors (OR = 1.93; 95% CI: 1.1 – 3.3). Those who practiced intentional

exercise were more likely to have good work engagement (AOR = 2.13; 95% CI: 1.3 – 3.3). The respondents who were inactive were two times higher to have good work engagement than those who were HEPA active (AOR = 2.48; 95% CI: 1.2 – 5.0).

Table 4.26: Significant Factors Affecting Work Engagement for Dedication Domain of UWES-M, *n* = 413

Factors	Low Dedication				High Dedication			
	Crude OR (95% CI)	***p* value**	**Adjusted OR (95% CI)**	***p* value**	**Crude OR (95% CI)**	***p* value**	**Adjusted OR (95% CI)**	***p* value**
Educational Status								
SPM and STPM	2.65 (1.1 – 6.7)	*p* = 0.040*	3.58 (1.3 – 9.7)	*p* = 0.012*	4.33 (2.0 – 9.2)	*p* = < 0.001*	4.20 (1.9 – 9.3)	*p* = < 0.001*
Tertiary education	Ref		Ref		Ref		Ref	
Healthcare Position								
Doctors	Ref		Ref		Ref		Ref	
Staff nurses and paramedics	0.75 (0.4 – 1.3)	*p* = 0.317	0.73 (0.4 – 1.4)	*p* = 0.321	1.93 (1.1 – 3.3)	*p* = 0.018*	1.51 (0.8 – 2.7)	*p* = 0.171
Intentional Exercise								
No	0.95 (0.5 – 1.7)	*p* = 0.846	0.73 (0.4 – 1.4)	*p* = 0.330	0.50 (0.3 – 0.8)	*p* = 0.004*	0.47 (0.3 – 0.8)	*p* = 0.004*
Yes	Ref		Ref		Ref		Ref	
Category of Physical Activity (IPAQ-M)								
Inactive	2.81 (1.3 – 6.0)	*p* = 0.008*	2.63 (1.1 – 6.0)	*p* = 0.022*	1.70 (0.9 – 3.2)	*p* = 0.109	2.48 (1.2 – 5.0)	*p* = 0.011*
Minimally active	1.27 (0.6 – 2.8)	*p* = 0.543	1.22 (0.5 – 2.8)	*p* = 0.627	1.28 (0.7 – 2.4)	*p* = 0.430	1.42 (0.7 – 2.7)	*p* = 0.288
HEPA active	Ref		Ref		Ref		Ref	
Eating Habits (DEBQ)								
External Eating								
Low	Ref		Ref		Ref		Ref	
High	0.49 (0.3 – 0.9)	*p* = 0.022*	0.71 (0.4 – 1.4)	*p* = 0.327	0.62 (0.4 – 1.1)	*p* = 0.092	0.64 (0.3 – 1.2)	*p* = 0.149
Restrained Eating								
Low	Ref		Ref		Ref		Ref	
High	0.32 (0.2 – 0.6)	*p* = < 0.001*	0.36 (0.2 – 0.7)	*p* = 0.001*	0.86 (0.5 – 1.4)	*p* = 0.565	0.91 (0.5 – 1.6)	*p* = 0.744
Sleep Quality (PSQI-M)								
Good	Ref		Ref		Ref		Ref	
Poor	2.51 (1.3 – 4.7)	*p* = 0.004*	2.13 (1.1 – 4.1)	*p* = 0.023*	0.79 (0.5 – 1.3)	*p* = 0.317	0.77 (0.5 – 1.3)	*p* = 0.303

The reference category for dedication domain of UWES-M is Average.

*****Significant to *p* value = < 0.05, using multinomial logistic regression

Adjusted OR = Results are adjusted for educational status, healthcare position, intentional exercise, category of physical activity, eating habits of external and restrained, and sleep quality.

Table 4.27 and 4.28 show the findings of Chi-square test and multinomial logistic regression for the domain of absorption of UWES-M. Gender, ethnicity, department, external eating habit, and sleep quality were the strong associated factors that influence the work engagement of the domain of absorption among the respondents. Other variables were non-significant.

Zooming on the poor work engagement of absorption domain (low scores), the respondents who were non-Malay had double odds of having poor work engagement (AOR = 2.42; 95% CI: 1.1 – 5.5). Besides, those who worked in emergency and trauma department had greater odds to have poor work engagement with reference to medical-based departments (AOR = 4.00; 95% CI: 1.4 – 10.0). The respondents who had good external eating habit (low scores) had higher chances to have poor work engagement (AOR = 2.27; 95% CI: 1.1 – 5.0). Those with poor sleep quality were nearly four times to have poor work engagement as compared to those with good sleep quality (AOR = 3.70; 95% CI: 1.5 – 9.0). Meanwhile, the odds of having good work engagement of absorption domain (high scores) were two times higher for men (AOR = 2.04; 95% CI: 1.1 – 3.3).

Table 4.27: Association of Factors Affecting Absorption Domain of UWES-M, *n* = 413

Group	Low Absorption (*n* = 40) *n* (%)	Average (*n* = 217) *n* (%)	High Absorption (*n* = 156) *n* (%)	X^2	df	*p* value
Age Group						
< 40 years old	38 (10.3)	199 (54.1)	131 (35.6)	5.651	2	*p* = 0.059
≥ 40 years old	2 (4.7)	18 (41.9)	23 (53.5)			
Gender						
Men	7 (9.0)	32 (41.0)	39 (50.0)	6.284	2	*p* = 0.043*
Women	33 (9.9)	185 (55.2)	117 (34.9)			
Ethnicity						
Malay	27 (8.0)	185 (54.9)	125 (37.1)	7.450	2	*p* = 0.024*
Non-Malay	13 (17.1)	32 (42.1)	31 (40.8)			
Religion						
Muslim	31 (8.9)	189 (54.5)	127 (36.6)	3.588	2	*p* = 0.166
Non-Muslim	9 (13.6)	28 (42.4)	29 (43.9)			
Marital Status						
Single/divorced/separated/widowed	11 (8.0)	83 (60.1)	44 (31.9)	4.811	2	*p* = 0.090
Married	29 (10.5)	134 (48.7)	112 (40.7)			
Educational Status						
SPM and STPM	6 (15.4)	15 (38.5)	18 (46.2)	3.870	2	*p* = 0.144
Tertiary education	34 (9.1)	202 (54.0)	138 (36.9)			
Household Income						
< RM 4,850	20 (10.4)	106 (55.2)	66 (34.4)	3.385	4	*p* = 0.496
RM 4,850 – RM 10,959	20 (9.7)	104 (50.2)	83 (40.1)			
≥ RM 10,960	0 (0.0)	7 (50.0)	7 (50.0)			
Healthcare Position						
Doctors	17 (12.3)	76 (55.1)	45 (32.6)	3.200	2	*p* = 0.202
Staff nurses and paramedics	23 (8.4)	141 (51.3)	111 (40.4)			

Hospital						
Ampang	4 (3.4)	66 (56.4)	47 (40.2)	9.777	10	$p = 0.460$
Klang	9 (13.8)	35 (53.8)	21 (32.3)			
Shah Alam	10 (13.2)	37 (48.7)	29 (38.2)			
Banting	9 (12.9)	34 (48.6)	27 (38.6)			
Kajang	5 (12.2)	21 (51.2)	15 (36.6)			
Others	3 (6.8)	24 (54.5)	17 (38.6)			
Department						
Emergency & Trauma	23 (13.1)	86 (49.1)	66 (37.7)	10.070	4	$p = 0.039$*
Medical-based	5 (4.0)	77 (61.6)	43 (34.4)			
Surgical-based	12 (10.6)	54 (47.8)	47 (41.6)			
Part-Time Job						
No	34 (9.2)	196 (53.1)	139 (37.7)	1.021	2	$p = 0.600$
Yes	6 (13.6)	21 (47.7)	17 (38.6)			
Comorbidity						
No	38 (10.8)	185 (52.4)	130 (36.8)	3.507	2	$p = 0.173$
Yes	2 (3.3)	32 (53.3)	26 (43.3)			
Body Mass Index (BMI)						
Underweight	3 (10.0)	19 (63.3)	8 (26.7)	8.333	6	$p = 0.215$
Normal	17 (8.4)	108 (53.5)	77 (38.1)			
Overweight	10 (9.3)	61 (57.0)	36 (33.6)			
Obese	10 (13.5)	29 (39.2)	35 (47.3)			
Smoking/Vaping						
No	38 (9.7)	210 (53.8)	142 (36.4)	5.730	2	$p = 0.057$
Yes	2 (8.7)	7 (30.4)	14 (60.9)			
Alcohol Consumption						
No	39 (9.8)	211 (52.9)	149 (37.3)	0.929	2	$p = 0.628$
Yes	1 (7.1)	6 (42.9)	7 (50.0)			
Intentional Exercise						
No	26 (10.3)	138 (54.5)	89 (35.2)	1.898	2	$p = 0.387$
Yes	14 (8.8)	79 (49.4)	67 (41.9)			

Category of Physical Activity (IPAQ-M)						
Inactive	19 (14.5)	60 (45.8)	52 (39.7)	8.600	4	$p = 0.072$
Minimally active	17 (9.4)	97 (53.9)	66 (36.7)			
HEPA active	4 (4.0)	59 (58.4)	38 (37.6)			
Emotional Eating Habit (DEBQ)						
Low	38 (10.6)	184 (51.3)	137 (38.2)	3.273	2	$p = 0.195$
High	2 (3.7)	33 (61.1)	19 (35.2)			
External Eating Habit (DEBQ)						
Low	15 (16.5)	44 (48.4)	32 (35.2)	6.170	2	$p = 0.046$*
High	25 (7.8)	173 (53.7)	124 (38.5)			
Restrained Eating Habit (DEBQ)						
Low	21 (13.9)	72 (47.7)	58 (38.4)	5.477	2	$p = 0.065$
High	19 (7.3)	145 (55.3)	98 (37.4)			
Sleep Quality (PSQI-M)						
Good	7 (4.1)	90 (52.3)	75 (43.6)	12.241	2	$p = 0.002$*
Poor	33 (13.8)	126 (52.5)	81 (33.8)			

*****Significant to p value = < 0.05, using Chi-square test

Table 4.28: Significant Factors Affecting Work Engagement for Absorption Domain of UWES-M, *n* = 413

Factors	Low Absorption				High Absorption			
	Crude OR (95% CI)	***p* value**	**Adjusted OR (95% CI)**	***p* value**	**Crude OR (95% CI)**	***p* value**	**Adjusted OR (95% CI)**	***p* value**
Gender								
Men	Ref		Ref		Ref		Ref	
Women	0.82 (0.3 – 2.0)	*p* = 0.656	1.80 (0.7 – 4.8)	*p* = 0.243	0.52 (0.3 – 0.9)	*p* = 0.014*	0.49 (0.3 – 0.9)	*p* = 0.018*
Ethnicity								
Malay	Ref		Ref		Ref		Ref	
Non-Malay	2.78 (1.3 – 6.0)	*p* = 0.008*	2.42 (1.1 – 5.5)	*p* = 0.036*	1.43 (0.8 – 2.5)	*p* = 0.194	1.31 (0.7 – 2.3)	*p* = 0.353
Department								
Emergency & Trauma	Ref		Ref		Ref		Ref	
Medical-based	0.24 (0.1 – 0.7)	*p* = 0.006*	0.25 (0.1 – 0.7)	*p* = 0.011*	0.73 (0.4 – 1.2)	*p* = 0.205	0.98 (0.6 -1.7)	*p* = 0.927
Surgical-based	0.83 (0.4 – 1.8)	*p* = 0.640	1.10 (0.4 – 2.3)	*p* = 0.989	1.13 (0.7 – 1.9)	*p* = 0.626	1.37 (0.8 – 2.4)	*p* = 0.256
Eating Habit (DEBQ)								
External eating								
Low	Ref		Ref		Ref		Ref	
High	0.42 (0.2 – 0.9)	*p* = 0.020*	0.44 (0.2 – 0.9)	*p* = 0.035*	0.99 (0.6 – 1.6)	*p* = 0.955	1.07 (0.6 – 1.8)	*p* = 0.794
Sleep Quality (PSQI-M)								
Good	Ref		Ref		Ref		Ref	
Poor	3.37 (1.4 – 8.0)	*p* = 0.006*	3.70 (1.5 – 9.0)	*p* = 0.004*	0.77 (0.5 – 1.2)	*p* = 0.220	0.73 (0.5 – 1.1)	*p* = 0.145

The reference category for absorption domain of UWES-M is Average.

*****Significant to *p* value = < 0.05, using multinomial logistic regression

Adjusted OR = Results are adjusted for gender, ethnicity, department, eating habit of external, and sleep quality.

4.6.4 Associated Factors with Sleep Quality

Table 4.29 describes factors that affect sleep quality of respondents according to the PSQI-M scores. Besides analysing sleep quality as the dependent variable being affected by multiple factors below, previous sections have taken into account of the sleep quality as a factor that is able to affect other psychosocial well-being parameters.

There were significant associations between gender, healthcare position, working hospital and smoking/vaping status with the quality of sleep of respondents; $p < 0.05$. Other variables had no significant associations with the quality of sleep; $p > 0.05$.

Table 4.29: Association of Factors Affecting Sleep Quality based on PSQI-M, *n* = 413

Group	Good Quality of Sleep (*n* = 172) *n* (%)	Poor Quality of Sleep (*n* = 240) *n* (%)	X^2	df	*p* value
Age Group					
< 40 years old	149 (40.6)	218 (59.4)	2.626	1	0.105
≥ 40 years old	23 (53.5)	20 (46.5)			
Gender					
Men	23 (29.5)	55 (70.5)	5.947	1	0.015*
Women	149 (44.6)	185 (55.4)			
Ethnicity					
Malay	140 (41.7)	196 (58.3)	0.005	1	0.944
Non-Malay	32 (42.1)	44 (57.9)			
Religion					
Muslim	144 (41.6)	202 (58.4)	0.015	1	0.903
Non-Muslim	28 (42.4)	38 (57.6)			
Marital Status					
Single/divorced/separated/widowed	49 (35.8)	88 (64.2)	3.019	1	0.082
Married	123 (44.7)	152 (55.3)			
Educational Status					
SPM and STPM	18 (46.2)	21 (53.8)	0.344	1	0.558
Tertiary education	154 (41.3)	219 (58.7)			
Household Income					
< RM 4,850	85 (44.5)	106 (55.5)	3.054	2	0.217
RM 4,850 – RM 10,959	79 (38.2)	128 (61.8)			
≥ RM 10,960	8 (57.1)	6 (42.9)			
Healthcare Position					
Doctors	48 (34.8)	90 (65.2)	4.139	1	0.042*
Staff nurses and paramedics	124 (45.3)	150 (54.7)			

Hospital					
Ampang	60 (51.7)	56 (48.3)	17.395	5	0.004*
Klang	34 (52.3)	31 (47.7)			
Shah Alam	28 (36.8)	48 (63.2)			
Banting	28 (40.0)	42 (60.0)			
Kajang	11 (26.8)	30 (73.2)			
Others	11 (25.0)	33 (75.0)			
Department					
Emergency & Trauma	64 (36.6)	111 (63.4)	3.509	2	0.173
Medical-based	55 (44.4)	69 (55.6)			
Surgical-based	53 (46.9)	60 (53.1)			
Part-Time Job					
No	153 (41.6)	215 (58.4)	0.042	1	0.838
Yes	19 (43.2)	25 (56.8)			
Comorbidity					
No	153 (43.5)	199 (56.5)	2.935	1	0.087
Yes	19 (31.7)	41 (68.3)			
Body Mass Index (BMI)					
Underweight	12 (41.4)	17 (58.6)	0.321	3	0.956
Normal	82 (40.6)	120 (59.4)			
Overweight	47 (43.9)	60 (56.1)			
Obese	31 (41.9)	43 (58.1)			
Smoking/Vaping					
No	170 (43.7)	219 (56.3)	10.943	1	0.001*
Yes	2 (8.7)	21 (91.3)			
Alcohol Consumption					
No	164 (41.2)	234 (58.8)	1.412	1	0.235
Yes	8 (57.1)	6 (42.9)			
Intentional Exercise					
No	108 (42.7)	145 (57.3)	0.238	1	0.625
Yes	64 (40.3)	95 (59.7)			

Category of Physical Activity (IPAQ-M)					
Inactive	47 (35.9)	84 (64.1)	3.775	2	0.151
Minimally active	76 (42.2)	104 (57.8)			
HEPA active	49 (48.5)	52 (51.5)			
Emotional Eating Habit (DEBQ)					
Low	149 (41.6)	209 (58.4)	0.018	1	0.893
High	23 (42.6)	31 (57.4)			
External Eating Habit (DEBQ)					
Low	37 (40.7)	54 (59.3)	0.057	1	0.812
High	135 (42.1)	186 (57.9)			
Restrained Eating Habit (DEBQ)					
Low	54 (35.8)	97 (64.2)	3.512	1	0.061
High	118 (45.2)	143 (54.8)			

*****Significant to *p* value = < 0.05, using Chi-square test

Furthermore, the analysis of logistic regression was highlighted in Table 4.30 showing that men had double the odds of having poor sleep quality than women (OR = 1.92; 95% CI: 1.1 – 3.3). Doctors had poorer sleep quality as compared to staff nurses and paramedics (OR = 1.54; 95% CI: 1.1 – 2.5). Besides that, workplace was also a significantly associated to the sleep quality. Those who worked in Shah Alam Hospital, Banting Hospital, Kajang Hospital and other hospitals were more likely to have poor sleep quality compared to Ampang Hospital (OR = 1.84; 95% CI: 1.1 – 3.3; AOR = 2.02; 95% CI: 1.1 – 3.8; AOR = 3.15; 95% CI: 1.4 – 7.0); AOR = 2.88; 95% CI: 1.3 – 6.5). The respondents who were smoking/vaping were having higher chances of getting poor sleep quality (AOR = 8.69; 95% CI: 1.8 – 42.2).

Table 4.30: Significant Factors Affecting Quality of Sleep based on PSQI-M Scores, *n* = 413

Factors	PSQI-M					
	Good Quality of Sleep (*n* = 172) *n* (%)	**Poor Quality of Sleep (*n* = 240) *n* (%)**	**Crude OR (95% CI)**	***p* value**	**Adjusted OR (95% CI)**	***p* value**
Gender						
Men	23 (29.5)	55 (70.5)	Ref		Ref	
Women	149 (44.6)	185 (55.4)	0.52 (0.3 – 0.9)	$p = 0.016$*	1.04 (0.5 – 2.0)	$p = 0.907$
Healthcare Position						
Doctors	48 (34.8)	90 (65.2)	Ref		Ref	
Staff nurses and paramedics	124 (45.3)	150 (54.7)	0.65 (0.4 – 0.9)	$p = 0.043$*	0.68 (0.4 – 1.1)	$p = 0.141$
Hospital						
Ampang	60 (51.7)	56 (48.3)	Ref		Ref	
Klang	34 (52.3)	31 (47.7)	0.98 (0.5 – 1.8)	$p = 0.940$	0.99 (0.5 – 1.9)	$p = 0.994$
Shah Alam	28 (36.8)	48 (63.2)	1.84 (1.1 – 3.3)	$p = 0.044$*	1.72 (0.9 – 3.2)	$p = 0.091$
Banting	28 (40.0)	42 (60.0)	1.61 (0.9 – 2.9)	$p = 0.122$	2.02 (1.1 – 3.8)	$p = 0.028$*
Kajang	11 (26.8)	30 (73.2)	2.92 (1.3 – 6.4)	$p = 0.007$*	3.15 (1.4 – 7.0)	$p = 0.005$*
Others	11 (25.0)	33 (75.0)	3.21 (1.5 – 7.0)	$p = 0.003$*	2.88 (1.3 – 6.5)	$p = 0.012$*
Smoking/Vaping						
No	170 (43.7)	219 (56.3)	Ref		Ref	
Yes	2 (8.7)	21 (91.3)	8.15 (1.9 – 35.2)	$p = 0.005$*	8.69 (1.8 – 42.2)	$p = 0.007$*

*Significant to *p* value = < 0.05, using logistic regression

Adjusted OR = Results are adjusted for gender, healthcare position, hospital and smoking/vaping status

4.7 Validation of SHiFT Module

This caters the Study Objective 4 which is to develop a module on psychosocial well-being maintenance for hospital shift workers in Klang Valley and assess its content and face validity.

The results of this study demonstrated that the factors of sleep quality, inactivity and eating habits were significantly associated with the psychosocial well-being of the hospital shift workers. In fact, the main concern of psychosocial well-being among the hospital shift workers in this study was sleep quality. The factor of sleep quality was strongly associated with mental health, quality of life and work engagement of the hospital shift workers.

As a result, the findings of this study contributed to the development of SHiFT module that primarily focused on improving sleep quality of the hospital shift workers by modification of few associated factors that are modifiable. Hence, this module was developed with the intention to enhance the sleep quality of shift workers and subsequently giving beneficial impact on their psychosocial well-being.

4.7.1 Content Validity of SHiFT Module

The process of content validation was conducted after the development of SHiFT module. The objective was to make sure that the content of the module particularly in improving the sleep quality among the shift workers was easily understood by the respondents. In addition, the comments received were used for the improvement of the module. The assessment of the content validity of SHiFT module involved the participation of nine panel experts who volunteered to evaluate and answer questionnaires regarding the module (Refer to Appendix 7). Table 4.31 demonstrates the socio-demographic background of the respondents for the content validity of SHiFT module. The respondents age ranged from 29 to 51 years old with median (IQR) age of 34.00 (7.50) years. Majority of the respondents (n = 7) were women and married. Out of the 9, there were 8 of them with Malay ethnicity and Islam in religion. Most of them (n = 8) had the educational background of either Master degrees or Doctor of Philosophy (PhD). Referring to the respondents' job's title, 4 of them were academicians, 3 were physiotherapists and 2 were dietitians or nutritionists. More than half of them had the experience of at least 5 years involving in the field (n = 6).

Table 4.31: Socio-Demographic Information of the Panel Experts for Content Validity of SHiFT Module, $n = 9$

	n	**%**
Age		
< 40 years old	7	77.8
≥ 40 years old	2	22.2
Gender		
Men	2	22.2
Women	7	77.8
Ethnicity		
Malay	8	88.9
Chinese	1	11.1
Religion		
Islam	8	88.9
Buddhism	1	11.1
Educational Status		
Bachelor	1	11.1
Postgraduate (Master, PhD)	8	88.9
Marital Status		
Single	2	22.2
Married	7	77.8
Job's Title		
Lecturer/academician	4	44.4
Physiotherapist	3	33.3
Dietitian/nutritionist	2	22.2
Years Involved in the Field		
< 5 years	3	33.3
≥ 5 years	6	66.7
Monthly Household Income		
< RM4,850	3	33.3
RM4,850 – RM10,959	2	22.2
≥ RM10,960	4	44.4

Table 4.32 presents the percentage of the content validity items of SHiFT module among the expert panels based on the Likert scales. Further analysis was made and illustrated in Table 4.33. Based on the formula and calculation of CVI indices, the I-CVI was 0.89 – 1.00, S-CVI/Ave was 0.978, and the S-CVI/UA was 0.80. The values of I-CVI ≥ 0.78, S-CVI/Ave ≥ 0.90, and S-CVI/UA ≥ 0.80 were considered as excellent content validity (Rahmad & Teng 2020). Therefore, it was concluded that I-CVI, S-CVI/Ave and S-CVI/UA met satisfactory level. As a result, the scale of content validity questionnaire for the SHiFT module achieved the satisfactory level of content validity.

Table 4.32: Analysis of Content Validity of SHiFT Module among the Expert Panels, $n = 9$

Subtopics	*n* (%)			
	Totally Disagree	Partially Agree	Agree	Totally Agree
Pengenalan				
1. Contents are in agreement with the current knowledge	0 (0)	1 (11.1)	5 (55.6)	3 (33.3)
2. Recommendations are necessary and are correctly approached	0 (0)	1 (11.1)	3 (33.3)	5 (55.6)
3. Objectives are evident	0 (0)	0 (0)	7 (77.8)	2 (22.2)
4. Recommendation about the desired behaviour is satisfactory	0 (0)	1 (11.1)	6 (66.7)	2 (22.2)
5. There is no unnecessary information	0 (0)	0 (0)	3 (33.3)	6 (66.7)
6. Important points are reviewed	0 (0)	0 (0)	6 (66.7)	3 (33.3)
Panduan 1: 10-Minit Senaman Khas Ringkas				
1. Contents are in agreement with the current knowledge	0 (0)	0 (0)	6 (66.7)	3 (33.3)
2. Recommendations are necessary and are correctly approached	0 (0)	0 (0)	6 (66.7)	3 (33.3)
3. Objectives are evident	0 (0)	0 (0)	6 (66.7)	3 (33.3)
4. Recommendation about the desired behaviour is satisfactory	0 (0)	0 (0)	5 (55.6)	4 (44.4)
5. There is no unnecessary information	0 (0)	0 (0)	3 (33.3)	6 (66.7)
6. Important points are reviewed	0 (0)	0 (0)	4 (44.4)	5 (55.6)
Panduan 2: Senaman Pernafasan				
1. Contents are in agreement with the current knowledge	0 (0)	0 (0)	6 (66.7)	3 (33.3)
2. Recommendations are necessary and are correctly approached	0 (0)	0 (0)	4 (44.4)	5 (55.6)
3. Objectives are evident	0 (0)	0 (0)	5 (55.6)	4 (44.4)
4. Recommendation about the desired behaviour is satisfactory	0 (0)	0 (0)	4 (44.4)	5 (55.6)
5. There is no unnecessary information	0 (0)	0 (0)	3 (33.3)	6 (66.7)
6. Important points are reviewed	0 (0)	0 (0)	5 (55.6)	4 (44.4)
Panduan 3: Tidur Nyenyak				
1. Contents are in agreement with the current knowledge	0 (0)	0 (0)	7 (77.8)	2 (22.2)
2. Recommendations are necessary and are correctly approached	0 (0)	1 (11.1)	4 (44.4)	4 (44.4)
3. Objectives are evident	0 (0)	0 (0)	4 (44.4)	5 (55.6)
4. Recommendation about the desired behaviour is satisfactory	0 (0)	1 (11.1)	3 (33.3)	5 (55.6)
5. There is no unnecessary information	0 (0)	0 (0)	3 (33.3)	6 (66.7)
6. Important points are reviewed	0 (0)	0 (0)	6 (66.7)	3 (33.3)

Panduan 4: Pemakanan Sihat				
1. Contents are in agreement with the current knowledge	0 (0)	0 (0)	5 (55.6)	4 (44.4)
2. Recommendations are necessary and are correctly approached	0 (0)	0 (0)	4 (44.4)	5 (55.6)
3. Objectives are evident	0 (0)	0 (0)	5 (55.6)	4 (44.4)
4. Recommendation about the desired behaviour is satisfactory	0 (0)	1 (11.1)	3 (33.3)	5 (55.6)
5. There is no unnecessary information	0 (0)	0 (0)	5 (55.6)	4 (44.4)
6. Important points are reviewed	0 (0)	0 (0)	5 (55.6)	4 (44.4)

Table 4.33: Analysis of Content Validity of SHiFT Module among the Expert Panels, *n* = 9

Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Experts In Agreement	I-CVI	UA
Q1	1	1	1	1	1	0	1	1	1	8	0.89	0
Q2	1	1	1	1	1	0	1	1	1	8	0.89	0
Q3	1	1	1	1	1	1	1	1	1	9	1	1
Q4	1	1	1	1	1	0	1	1	1	8	0.89	0
Q5	1	1	1	1	1	1	1	1	1	9	1	1
Q6	1	1	1	1	1	1	1	1	1	9	1	1
Q7	1	1	1	1	1	1	1	1	1	9	1	1
Q8	1	1	1	1	1	1	1	1	1	9	1	1
Q9	1	1	1	1	1	1	1	1	1	9	1	1
Q10	1	1	1	1	1	1	1	1	1	9	1	1
Q11	1	1	1	1	1	1	1	1	1	9	1	1
Q12	1	1	1	1	1	1	1	1	1	9	1	1
Q13	1	1	1	1	1	1	1	1	1	9	1	1
Q14	1	1	1	1	1	1	1	1	1	9	1	1
Q15	1	1	1	1	1	1	1	1	1	9	1	1
Q16	1	1	1	1	1	1	1	1	1	9	1	1
Q17	1	1	1	1	1	1	1	1	1	9	1	1
Q18	1	1	1	1	1	1	1	1	1	9	1	1
Q19	1	1	1	1	1	1	1	1	1	9	1	1
Q20	1	1	1	1	1	0	1	1	1	8	0.89	0
Q21	1	1	1	1	1	1	1	1	1	9	1	1
Q22	1	1	1	1	1	0	1	1	1	8	0.89	0
Q23	1	1	1	1	1	1	1	1	1	9	1	1
Q24	1	1	1	1	1	1	1	1	1	9	1	1
Q25	1	1	1	1	1	1	1	1	1	9	1	1
Q26	1	1	1	1	1	1	1	1	1	9	1	1
Q27	1	1	1	1	1	1	1	1	1	9	1	1
Q28	1	1	1	1	1	1	1	0	1	8	0.89	0

Q29	1	1	1	1	1	1	1	1	1		9	1	1
Q30	1	1	1	1	1	1	1	1	1		9	1	1
											S-CVI/Ave	0.978	
Proportion relevance	1.00	1.00	1.00	1.00	1.00	0.83	1.00	0.97	1.00		**S-CVI/UA**		0.80
Average proportion of items judged as relevance across nine experts										0.978			

In addition, there were six open-ended questions provided in the questionnaires for the improvement of the module:

1. Do you have any suggestions regarding the definition of the topics or medical terms?
2. Do the subtopics appear to cover the full range of content on the booklet module?
3. Are the sentences clearly worded and easy to understand?
4. Are the sentences on the booklet module appropriate for a shift worker? Do you have any suggestions for improving the booklet module? (Please feel free to provide comments directly on the sentences regarding rewording and/or removing the words.).
5. Do you have any comments regarding the appearance or literacy presentation of the booklet module?
6. Do you have anything that you would like to add? Please feel free to comment.

The open-ended questions were given to get feedback from the experts in order for them to pinpoint the lacking parts of the module by providing comments and suggestions to revise it. The SHiFT module was then amended based on the comments from the expert panels.

Most of the expert panels reported that the terminology, sentence structure and the definition of the topics were very clear, simple, concise and easy to be understood for everyone. They also indicated that the module was appropriate for shift workers. The figures and illustrations were great, however, they suggested for standardisation of

fonts and theme colour for each subtopic in the module. Other suggestions given by the expert panels were to include more examples of the recommended local food that can be easily obtained by the shift workers and provide variety of choices for better understanding. All the comments and suggestions from the expert panels were taken into consideration and amended accordingly for improvement of the module.

4.7.2 Face Validity of SHiFT Module

The face validity was carried out after revising the SHiFT module according to the comments and suggestions from the expert panels. The evaluation of the revised version of SHiFT module (Refer to Appendix 8) for the face validity was done on 10 respondents with health sciences related background and 10 hospital shift workers in Klang Valley. The face validity was evaluated based on their understanding and acceptance of all information provided in the module.

Table 4.34 displays the socio-demographic profile of the respondents. It involved 20 respondents aged 25 to 51 years with mean (SD) age of 32.60 (5.60) years, with 70% women and 30% men. Majority of them were Malay and Islam (85%). Out of the 20, 45% were having the education of postgraduate (Masters or PhD), 30% with bachelor holder and 25% with diploma holder. Most of them were married (70%). Referring to the job's title, 20% of them were lecturer or academician, 15% were physiotherapist, 15% were dietitian or nutritionist, 10% were house officer, 10% were medical officer, 15% were staff nurse, and 15% were paramedics, with 60% of them were having at least five years' experience in the respective field.

Majority of the respondents had the monthly household income of less than RM 4,850 (45%), followed by 30% of them having income of more than RM10,960 and 25% of them having income ranged of RM4,850 to RM10,959.

Table 4.34: Socio-Demography of Respondents for the Face Validity of SHiFT Module, $n = 20$

	n	**%**
Gender		
Men	6	30.0
Women	14	70.0
Ethnicity		
Malay	17	85.0
Chinese	1	5.0
Indian	2	10.0
Religion		
Islam	17	85.0
Buddhism	1	5.0
Hinduism	2	10.0
Educational Status		
Diploma	5	25.0
Bachelor	6	30.0
Postgraduate (Master, PhD)	9	45.0
Marital Status		
Single	6	30.0
Married	14	70.0
Job's Title		
Lecturer/academician	4	20.0
Physiotherapist	3	15.0
Dietitian/nutritionist	3	15.0
House officer	2	10.0
Medical officer	2	10.0
Staff nurse	3	15.0
Paramedics	3	15.0
Years Involved in the Field		
< 5 years	8	40.0
≥ 5 years	12	60.0
Monthly Household Income		
< RM4,850	9	45.0
RM4,850 – RM10,959	5	25.0
≥ RM10,960	6	30.0

The analysis of face validity towards the SHiFT module was described in Table 4.35. The results indicated that all respondents understood the information provided in the module.

Majority of them (95.0%) reported that the terminology was easily understood, sentences clear and easily understood, figures clear, suitable and attractive and suitable to be recommended to the shift workers. In addition, 90% of them agreed with the suitability of the figures and illustrations, and also 90% of them responded that the combination of colours were attractive. It was found that most of the respondents (95%) claimed that the font size was easy to be read. The consideration of index of less than 80% was regarded as unacceptable and decided for elimination or modified accordingly (Teng et al. 2019). Thus, it was concluded that the percentages for all items in the analysis of face validity was more than 80%, in which met the satisfactory level. As a result, the scale of face validity questionnaire for the SHiFT module achieved the satisfactory level of face validity.

Table 4.35: Analysis of Face Validation of SHiFT Module among the Respondents with Health Sciences Related Background and Hospital Shift Workers [Presented as *n* (%)]

Assessment Parameters	Respondents with Health Sciences Related Background, *n* = 10 *n* (%)	Hospital Shift Workers, *n* = 10 *n* (%)	Total, *n* = 20 *n* (%)
Understanding of Information			
Yes	10 (100.0)	10 (100.0)	20 (100.0)
No	0 (0.0)	0 (0.0)	0 (0.0)
Items Facilitate Comprehension*			
Terminology easily understood	10 (100.0)	9 (90.0)	19 (95.0)
Sentences clear and easily understood	10 (100.0)	9 (90.0)	19 (95.0)
Figures clear, suitable and attractive	9 (90.0)	10 (100.0)	19 (95.0)
Suitability of recommendation to shift workers	10 (100.0)	9 (90.0)	19 (95.0)
Suitability of Figures/Illustrations			
Yes	9 (90.0)	9 (90.0)	18 (90.0)
No	1 (10.0)	1 (10.0)	2 (10.0)
Combination of Colours			
Attractive	10 (100.0)	8 (80.0)	18 (90.0)
Not attractive	0 (0.0)	2 (20.0)	2 (10.0)
Font Size			
Easy to read	10 (100.0)	9 (90.0)	19 (95.0)
Difficult to read	0 (0.0)	1 (10.0)	1 (5.0)

*The cumulative percentages more than 100% as respondents may have multiple answers.