

# Psychosocial assessment of quarantine (sign-on and sign-off) among oil and gas workers in Malaysia during COVID-19 outbreak

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## ABSTRACT

**Introduction:** COVID-19 still wreaking havoc in Malaysia, with 3,221,680 cases and 32,326 deaths as of 20 February 2022. In the Oil and Gas industry, implementing quarantine before mobilising to or after mobilising from onshore and offshore locations was mandatory to help stop the spread of the virus. However, previous studies have shown that quarantine can significantly impact public mental health. This study intends to assess the psychosocial stress experienced by Oil and Gas industry employees during periods of quarantine in various regions (PMA: Terengganu, SBA: Sabah, SKA: Sarawak) and between onshore and offshore employees. Additionally, it aims to identify the factors that are linked to psychosocial stress in this workforce.

**Materials and Methods:** A cross-sectional study involving 86 respondents was conducted using an online survey between the middle of March and April 2022. The Perceived Stress Scale (PSS) developed by Cohen et al., (1983) was used to assess the stress levels of individuals. Data analysis was carried out using the SPSS statistical program, which included descriptive statistics, Mann-Whitney, Kruskal Wallis and Linear Regression tests.

**Results:** The majority of respondents, 75.6% (n=65) reported moderate stress levels, while 14.0% (n=12) declared severe stress levels. The Mann-Whitney test showed no significant difference in psychosocial stress scores among workers between onshore and offshore ( $\chi^2=-0.523$ ,  $p=0.601$ ), whereas the Kruskal Wallis test showed a significant difference in psychosocial stress scores among workers between states (PMA, SKA, and SBA) ( $\chi^2=6.415$ ,  $p=0.040$ ). According to the regression test, workers with medical histories of diabetes and Covid-19 ( $R^2=0.158$ ) ( $p<0.005$ ) are two factors linked to psychosocial stress.

**Conclusion:** The study found that there were significant differences in psychosocial stress among oil and gas workers between SKA, SBA, and PMA due to quarantine activity. Mobile workers and those with certain medical histories were identified as being particularly vulnerable to psychosocial stress. However, it was noted that the overall improvement in the quarantine period had a positive impact on the mental health of these workers.

## KEYWORDS:

*Psychosocial assessment, mental health awareness, oil and gas industry, pandemic, COVID-19*

## INTRODUCTION

On 25th January 2020, the first case of novel coronavirus was identified in Malaysia a few days after the reported case of a cluster in Wuhan, China.<sup>1</sup> As the number of verified cases rose to 673 on 17th March 2020, Malaysia reported its first two coronavirus deaths. The novel coronavirus or COVID-19 has continuously hit Malaysia and almost reach as Spanish Flu in 1918, which killed 34,644 people.<sup>2</sup> The COVID-19 pandemic has become Malaysia's biggest infectious illness outbreak, infecting over three million individuals.<sup>3</sup> Due to the continuous mutating and spread of the COVID-19 variants (such as Omicron, Deltatron, etc), Malaysia has decided to delay the transition from the pandemic into the endemic phase.

Under the Occupational Safety and Health Act 1994 (OSHA1994), it is the general duties of the employer to provide a safe workplace for its employees.<sup>4</sup> Therefore, all sectors, especially essential services continue to play role in maintaining the Standard Operating Procedure (SOP) at the workplace throughout this pandemic. Oil and gas workers in Malaysia are mandated to adhere to COVID-19 preventive measures enforced by their respective companies such as PETRONAS, ExxonMobil, and others. These preventive measures are subject to different guidelines from various authorities such as the Local Authority (PBT), State Health Department, State Disaster Committee, and District Health Office.

The guidelines will be varied at different entry points. This different preventive measure shall align with Annex 9: Management of COVID-19 at Point of Entry imposed by the Ministry of Health (MOH) and the Malaysian National Security Council (MNSC) to further break the COVID-19 chain. Among a few SOPs implemented, isolation or quarantine is the main important step to control infectious disease as stated in section 15(1)(2) of OSHA1994. Oil and gas companies in Malaysia have made quarantine requirements before and after sign-on for both onshore and offshore projects mandatory. This was due to the risk of

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COVID-19 clusters among workers, as exemplified by the Galaxy Cluster in Bintulu.<sup>5</sup> The cluster involved oil and gas workers who were mobilised by a supply vessel, resulting in a total of 125 persons being affected. To prevent similar incidents from occurring and causing losses to the company, workers were required to quarantine before departing (sign-on) and after leaving (sign-off) the platform. In the event of a COVID-19 outbreak, affected workers will be treated at designated facilities, such as the Bintulu Hospital and the district's COVID-19 Low-Risk Quarantine and Treatment Center (PKRC). However, it has been recognised that quarantine before sign-on and after sign-off for mobile Oil and Gas workers could lead to more psychosocial stress.<sup>6</sup>

In Malaysia, quarantine periods for onshore and offshore varies due to their location, with the offshore quarantine period being longer compared to onshore. Moreover, quarantine periods for PMA (Terengganu), SKA (Sarawak), and SBA (Sabah) are varied due to their different state government and regulatory bodies. Terengganu was under the jurisdiction of the State Health Department of Terengganu (SHDT), whereas Sarawak and Sabah were overseen by their respective State Disaster Management Committee (SDMC).

Psychosocial stress experienced during a disease outbreak may encompass concerns about contagion, feelings of isolation, and challenges in interpersonal relationships.<sup>7-8</sup> These health-related fears and social isolation, triggered by the situation, could lead to social exclusion. Such exclusion might impact specific health conditions, such as elevated cortisol levels, especially in individuals with high sensitivity.<sup>9</sup>

There is a belief that quarantine during COVID-19 outbreak could affect the psychosocial well-being of employees in the Malaysian oil and gas sector. Hence, this research was commenced to evaluate the degree of psychosocial stress encountered by workers during quarantine in the Oil and Gas industry. The study aimed to analyze stress levels across various states (PMA, SKA, and SBA) and distinguish between onshore and offshore stations. Moreover, the research aimed to pinpoint the factors associated with psychosocial stress among individuals in this sector.

## MATERIALS AND METHODS

### *Questionnaire Instrument*

The questionnaire form was used as an instrument to collect data on the psychosocial study. It is a valid and more reliable tool especially for accessing sociodemographic, economic, and health issues.<sup>10</sup> The questionnaire used in this study was adapted from previous studies<sup>11-14</sup> and divided into four sections. In Section 1, the sociodemographic data of respondents were collected including age, education level, marital status, annual income, primary residence, job position, work-based location, and working experience. For Sections 2 and 3, the medical history of respondents and quarantine experience details were recorded. Lastly for Section 4, mental health status was recorded through the PSS-10. PSS-10<sup>14</sup> is a 10-item survey used in screening for psychosocial depression. The PSS helped to measure

respondents' perceptions of how unexpected, unmanaged and overburdened their lives were. The scale also includes several direct inquiries concerning present levels of perceived stress. The PSS showed adequate reliability and was linked with assessments of life events, mental symptomatology, and physical symptomatology.<sup>15</sup> The approval for the questionnaire distributed was obtained from UiTM Research Ethics Committee with Reference Number FERC/FSK/MR/2022/0166. Throughout the research, information confidentiality and respondent anonymity were maintained.

### *Sample Method*

A cross-sectional study, utilizing the convenience sampling method, was conducted for a group of people who were readily available for research. This study focused on a population of oil and gas workers engaged in quarantine activities during the pandemic, encompassing the PMA, SKA and SBA, each with an estimated mobile workforce of approximately 1,000 individuals, spanning both onshore terminals and offshore platforms. The sample size was determined using a conservative response distribution of 80%, a margin of error of 5%, and a confidence level of 95%. According to Raosoft calculator (which is available free at: <http://www.raosoft.com/samplesize.html>), we calculated that the recommended sample size for a minimum population of 3,000 mobile oil and gas workers was determined to be 228.

Formula:

$$\text{Response rate} = \frac{\text{Number of Respondents}}{\text{Number of Sample}} \times 100\%$$

$$\text{Response rate} = 118/228 \times 100\%$$

$$= 51.75 \%$$

The response rate for this study was 51.75%, which was good for specific mobile population considering the survey's time constraints and other restrictions, such as the need to avoid physical contact and maintain anonymity. Moreover, this response rate was in line with response rates from comprehensive reviews of mental health surveys, which exhibited significant variation among different nations, ranging from a low of 7.0% in Australia to a high of 79.3% in Mexico.<sup>16</sup> Additionally, the most recent study, which examined the average response rate across 20 research projects focusing on online questionnaire responses from individuals with anxiety disorders or depression, yielded a mere 42.8%.<sup>17</sup>

### *Sample Collection*

Data collection was carried out between the middle of March 2022 and April 2022. The questionnaire was disseminated through Facebook, WhatsApp, and other social media platforms in google form format daily for one and a half month because the oil and gas quarantine centres operated regardless of weekdays and weekends. A total of 118 respondents from the oil and gas industry completed the questionnaire, and their responses were validated to ensure that they all complied with the criteria stated as follows; oil and gas workers who undergo quarantine/ self-isolation at

Table I: Demographic background and quarantine details of respondents (n=86)

Characteristics	n	%
<b>Demographic</b>		
Age (years old)		
<25	5	5.8
25-30	30	34.9
31-40	35	40.7
41-50	10	11.6
>50	6	7.0
Education level		
SPM / Vocational / Training Certificate	28	32.6
Diploma / College certificate	30	34.9
Bachelor's Degree	25	29.0
Master's Degree	3	3.5
Marital Status		
Single	27	31.4
Married without children	9	10.5
Married with children	50	58.1
Annual Income		
<RM36,000	20	23.2
RM36–72 thousand	39	44.2
RM72–120 thousand	17	19.8
RM120–180 thousand	3	3.5
>RM180 thousand	7	9.3
Primary Residence		
Terengganu	34	8.1
Sarawak	14	31.4
Sabah	29	33.7
KL/Selangor	9	17.5
Others	37	9.3
Job Position		
Technical (Rigger/Technician/Electrician)	36	43.0
Engineering (Engineer/Senior Engineer)	23	25.6
Management (Supervisor/Manager)	6	7.0
Others (Operator, planner, etc.)	21	24.4
Working experience (years)		
<5	24	27.9
5-10	31	36.0
10-20	27	31.4
20-30	3	3.5
>30	1	1.2
<b>Quarantine details</b>		
Purpose of quarantine		
Sign-On	66	76.7
Sign-Off	4	4.7
Positive case	16	18.6
Quarantine location		
OTC	34	39.5
Self-sponsored hotel	36	41.9
Home	16	18.6
No. of days quarantine for this mob		
<3 days	19	22.1
4–7 days	53	61.6
8 – 10 days	10	11.6
More than 10 days	4	4.7
Longest quarantine you have ever spent		
Less than 7 days	6	7.0
7 – 14 days	37	43.0
14 – 21 days	26	30.2
More than 21 days	17	19.8

**Table II: Comparison of the psychosocial stress scores for station (onshore and offshore) (n=86)**

	Onshore (n=17) Median (IQR)	Offshore (n=69) Median (IQR)	$\chi^2$	p <sup>a</sup>
Psychosocial stress scores	20.00 (13.00)	20.00 (5.00)	-0.523	0.601

a Mann-Whitney test

**Table III: Comparison of the psychosocial stress scores for between states (n=86)**

	PMA (n=27) Median (IQR)	SKA (n=24) Median (IQR)	SBA (n=35) Median (IQR)	$\chi^2$	p <sup>a</sup>
Psychosocial stress scores	18.00 (7.00)	20.00 (9.00)	20.00 (5.00)	6.415	0.040*

a Kruskal Wallis test; \* p < 0.05, (statistically significant) (n=86); Post Hoc with pairwise comparisons: Group PMA vs Group SBA: adj p=1.000; Group PMA vs Group SKA: adj p=0.039; Group SBA vs Group SKA: adj p=0.222

**Table IV: Association medical history with psychosocial stress (n=86)**

Variable	B(95% CI)	SE	t-stat	p <sup>a</sup>
Diabetes	16.711	5.388	3.101	0.003*
High blood pressure	2.568	2.188	1.174	0.244
Positive COVID-19	2.766	1.237	2.236	0.028*
Others	5.211	2.796	1.864	0.066

a Simple linear regression; \* p < 0.05, (statistically significant) (n = 86); R<sup>2</sup>=0.158

PMA, SBA and SKA during the pandemic phase of COVID-19 and aged between 20 to 60 years old. Missing data and irrelevant data in all the variables were removed using the row deletion method.

*Statistical Analysis*

First of all, the scoring for each PSS-10 question was calculated with a scale of 0 (Never) – 4 (Every often) except the reverse score for Q4, Q5, Q7, and Q8 (0=4, 1=3, 2=2, 3=1, 4=0). Based on total data scoring for the PSS questionnaire, the level of psychosocial stress was determined accordingly for each respondent. The total score was computed and categorized into three categories: 1] Low (scores between 0 to 13), 2] Moderate (scores between 14 to 26), and 3] High (scores between 27 to 40).

All respondents' socio-demographic information, medical and health history, quarantine periods, and level of psychosocial stress were analysed using Statistical Packages for Social Sciences (SPSS) statistic software version 27. SPSS offers data analysis for descriptive and bivariate statistics, numerical result forecasts, and predictions for classifying groups. The descriptive statistic (mean, standard deviation, frequency, and percentage) and inferential statistics (correlation and regression) were used to summarise and describe the result for each objective.

The second objectives were analysed using advanced statistical analyses and non-parametric tests; the Mann-Whitney test and Kruskal-Wallis Test, since the sample size for one group was less than 30. If the sample size was small and the data does not meet the assumption of normality, the standard deviation calculated may be less reliable. Both tests were used to compare the medians of two groups and the medians of three groups respectively. For these non-

parametric tests, median and interquartile range (IQR) were presented instead of mean and standard deviation for result presentation and conclusion.

Lastly, the details of the respondents, such as their status as mobile workers, medical histories, and quarantine period, were further analysed to determine the factors associated with the level of psychosocial stress. Linear regression was conducted to identify factors associated with psychosocial stress.

**RESULTS**

*Reliability Test*

The Cronbach's Alpha reliability scores obtained for the point of view (POV) and PSS-10 were 0.705 and 0.852 respectively. The reliability values obtained were acceptable if greater than 0.7, based on the statistical analysis performed on the result of the questionnaire. Therefore, the elements in the question about quarantine among Oil and Gas industry workers can be used for data collection and analysis for this psychology study.

*Demographic Characteristics of Respondents*

The demographic background of respondents and details of their quarantine were categorised into several groups based on their responses utilising a straightforward frequency data analysis (Table I and II).

In summary, the demographic background of this study revealed that most of the respondents were married with children (58.1%), age range from 31-40 years old (40.7%) and majority have diploma qualification (34.9%). The Oil and Gas workers participating in this study were from the technical level (Rigger/Technician/Electrician) (43.0%),

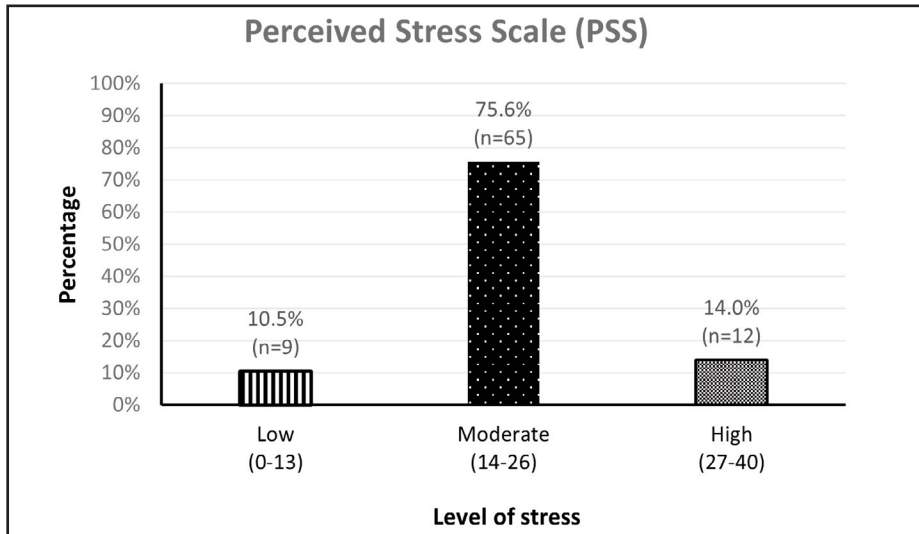


Fig. 1: The level of Perceived Stress Scale (PSS) among respondents

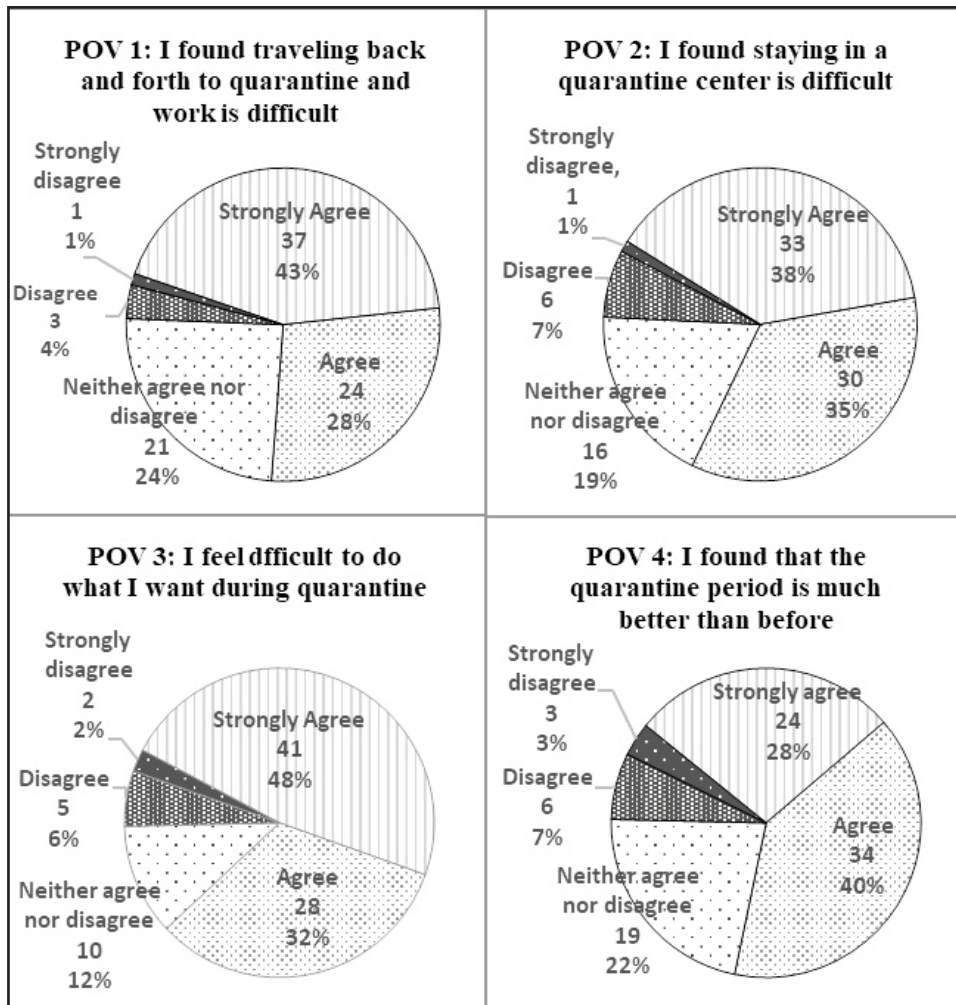


Fig. 2: The Point of View (POV) of the respondent about quarantine (n=86)



engineering level (Engineer/Senior Engineer) (25.0%), management level (Supervisor/Manager) (7.0%) and others (operator, planners, etc.) (24.4%) with average working experience 5-10 years (36.0%) and annual income range between RM36,000 and RM72,000 (44.2%).

Based on quarantine details from Table I, a total of 66 of the respondents (76.7%) were quarantined before signing on to work, followed by 16 positive cases (18.6%) and only four respondents (4.7%) being quarantined after signing off from work. The majority of them were quarantined at a hotel with 39.5% (n=34) at OTC and 41.9% (n=36) at other self-sponsored hotels, leaving 18.6% (n=16) undergoing self-quarantined at home. As moved toward the endemic phase, the quarantine period showed a reduced trend as the majority of them 61.6% (n=53) were quarantined for 4-7 days only.

#### ***Psychosocial stress among Oil & Gas workers in Malaysia during quarantine***

The psychosocial stress experienced by oil and gas workers in PMA, SKA, and SBA during quarantine is described in Figure 1. The majority of respondents (75.6%) reported feeling a moderate amount of stress, while a smaller proportion (10.5%) reported a low level of stress. However, 12 respondents reported severe levels of stress (14.0%) overall.

#### ***Comparison of Psychosocial Stress Due to Quarantine between Onshore and Offshore***

The PSS score between onshore (n=17) and offshore (n=69) workers were compared using Mann-Whitney Test (Table II). The Mann-Whitney test showed no significant difference in psychosocial stress scores among workers between onshore and offshore ( $\chi^2=-0.523$ ,  $p=0.601$ ).

#### ***Comparison of Psychosocial Stress due to Quarantine between PMA, SA and SBA***

The PSS score between PMA, SKA, and SBA were compared using Kruskal-Wallis Test (Table III). The Kruskal Wallis test showed that there was a significant difference in psychosocial stress scores among workers between the three locations ( $\chi^2 = 6.415$ ,  $p=0.040$ ). Workers in SKA (median=20.00, IQR 9.00) had significantly higher psychosocial stress scores compared to those in PMA (median=18.56, IQR=7.00, adj  $p=0.039$ ) by pairwise comparisons. However, there were no significant differences in psychosocial stress scores between workers in PMA and SBA, and between SBA and SKA (adj  $p>0.05$ ).

#### ***Factors Associated with Psychosocial Stress among Oil and Gas Workers during Quarantine***

Table IV summarised the association between medical history and psychosocial stress. It was found that diabetes and positive COVID-19 were significantly associated with psychological stress ( $p<0.05$ ).

According to the POVs demonstrated in Figure 2, it shows that about half of the respondents strongly agreed or agreed with the statement 'I found traveling back and forth to quarantine and work is difficult' (70.9%, n=61). Conversely, about 24.4% (n=21) of respondents neither agreed nor disagreed, and only 4.7% (n=4) of them disagreed or strongly disagreed with the statement. In addition, most of the

respondents strongly agreed or agreed that staying in a quarantine centre was difficult (73.3%, n=63) and found it challenging to do activities during quarantine (80.3%, n=69).

Despite all the above difficulties during the quarantine, the majority of the respondents expressed a positive view regarding the improvement of the quarantine period. Around 66.2% of the respondents found that the quarantine period was much better than before, while only 10.5% disagreed or strongly disagreed with this statement. This indicates that most oil and gas workers are aware that the quarantine period has become shorter compared to an earlier outbreak in Malaysia. This improvement towards the Endemic phase has resulted in oil and gas workers experiencing less significant depression than before.

## **DISCUSSION**

As we move toward the endemic phase, the quarantine period has shown a reducing trend, as the majority of workers, 61.6% (n=53) were only quarantined for 4-7 days. This indicates a reduction in the enforcement of quarantine by authorities at PMA, SKA, and SBA. Based on the normal distribution of stress scores among respondents, the majority of participants (75.6%) reported feeling a moderate amount of stress. These results are consistent with research on how people react to trauma (such as earthquakes, fires, and floods), which demonstrates that most people can handle stress but a sizable minority is more likely to develop the psychology of stress.<sup>18</sup> Similarly, the corresponding data reported moderate depression, anxiety, and stress scores (73.2%, 66.5%, and 82.9%, respectively) among the oil and gas workers in Malaysia during the pandemic.<sup>19</sup>

There was no significant difference in psychosocial stress scores between onshore and offshore workers. This may be attributed to the short shift rotations and the fact that majority of respondents (76.7%, n=66) were quarantined at the same onshore quarantine centre before mobilisation. However, if shift rotations were longer and assessments were conducted while working offshore, stress levels may be higher.<sup>20</sup> Another contributing factor is that both onshore and offshore quarantine facilities are handled by the same organisation before mobilisation and demobilisation. This consistent management of quarantine across facilities may have contributed to a lack of noticeable differences in stress levels among workers.<sup>6</sup>

In addition, there was no significant difference in psychosocial stress scores between workers in PMA and SBA and between workers in SBA and SKA ( $p>0.05$ ). This finding was correlated with the bi-weekly COVID-19 Situation Report Malaysia, which highlighted there was the highest increase in new cases in Sarawak (+79.0%) compared to Terengganu (+22.6%) and a decrease in cases in Sabah (-72.9%).<sup>21</sup> Moreover, the stress levels in these three locations were comparable regardless of whether workers were onshore or offshore due to differences in authorities' management, which vary by state. Terengganu was under the jurisdiction of the State Health Department of Terengganu (SHDT), whereas Sarawak and Sabah were overseen by their respective State Disaster Management Committee (SDMC). Due to the

increase in cases, the Sarawak Disaster Management Committee has drawn more focus toward persons under surveillance and charged compound notices to errant individuals for failing to follow SOPs.

Furthermore, the association between psychosocial stress and medical histories was consistent with recent studies on the psychosocial impact of COVID-19 conducted in Spain and Italy.<sup>22,23</sup> High blood pressure (29.0%), chronic respiratory disease (25.3%), and to a lesser extent, diabetes (8.3%) were the top three health-related factors linked to psychosocial stress.<sup>22</sup> As expected, a history of stressful events and health issues was associated with higher levels of depression and anxiety, whereas having an infected acquaintance was linked to higher levels of depression and stress.<sup>23</sup> Based on a study in China, individuals with pre-existing medical conditions, particularly those with chronic respiratory disease, were at higher risk of experiencing psychological stress during the pandemic.<sup>24</sup> In addition, those with a positive family history of diabetes, severe diabetes, or a specific type of diabetes treatment experienced additional diabetes-related stress even before being quarantined.<sup>25-27</sup>

Despite these challenges, the majority of respondents expressed satisfaction with the improved quarantine period, with 66.2% (n=57) reporting that it is much better than before. Only a small proportion of respondents disagreed or strongly disagreed with this sentiment (10.5%, n=9). This suggests that oil and gas workers are aware that the quarantine period is now shorter than during an earlier outbreak in Malaysia, and this improvement towards the endemic phase has helped to reduce significantly the level of depression experienced by these workers.

Resilience, which refers to the capacity to adapt to stressors and cope positively with adversity, can foster positive adjustment and development even in challenging circumstances. In the context of the COVID-19 pandemic, this study examined the resilience of oil and gas workers in response to preventive measures taken toward the end of the pandemic phase. It has been shown in previous research that individuals with high levels of resilience tend to experience better mental health and psychosocial well-being.<sup>28-30</sup>

## CONCLUSION

In conclusion, our study found that there were differences in psychosocial stress among oil and gas workers in SKA, SBA, and PMA related to quarantine activities. However, only a small proportion of respondents (14.0%, n=12) reported experiencing severe psychosocial stress during the pandemic's final stages. Our analysis showed medical history was a significant predictor of psychosocial stress among oil and gas workers during quarantine, regardless of their sociodemographic background. The POVs finding suggests the improvement in quarantine towards the endemic phase.

The limitation of this study is lie in the scope of data collection and analysis, which were constrained by the timing of the COVID-19 outbreak. The survey was conducted only during the final stages of the pandemic and the

constantly shifting regulations toward the endemic phase, resulting in a restricted understanding of stress patterns. The time constraints were beyond the researcher's control, and unless the research had been conducted earlier, a more comprehensive and nuanced depiction of the changes in stress levels before and after the pandemic phases could have been achieved. Nonetheless, this study provides valuable insights into the impact of COVID-19 on psychosocial stress, given the available data and resources.

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