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PERCEPTION OF PSYCHOLOGICAL EFFECTS ON MALAYSIAN SEAFARERS DURING COVID-19 IN THE PERIOD OF MALAYSIA'S FIRST MOVEMENT CONTROL ORDER (MCO)

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ABSTRACT
The outbreak of COVID-19 might enhance the perception of psychological effects among Malaysian seafarers during the first phase of Malaysia's Movement Control Order (MCO), often known as a 'lockdown' for six weeks to stop the spread of coronavirus disease. According to recording data from GARD, an average of 4.6 suicides among seafarers are reported each year because of mental illness. Many researchers have investigated this issue covering medical, psychological, and causal factors, among others. However, limited research has been conducted on the perception of psychological effects during the first MCO that contributed to these alarming issues. Therefore, this paper attempts to identify, rank, and assess causal factors of the psychological perception of Malaysian seafarers. Two mathematical methods will be used to achieve these objectives: An Analytic Hierarchy Process (AHP) and Evidential Reasoning (ER). An AHP is used to rank each identified perception of psychological effect on Malaysian seafarers. Then, an ER is applied to assess the perception of psychological impact and synthesize the subset. The results showed that the most critical effect of a perception of psychological effects among Malaysian seafarers is depression (0.6658), followed by anxiety (0.5216), and stress (0.5122). Half of the respondents agreed that their perception of psychological effect during the first phase of movement control order (0.5863). This research is expected to benefit the researchers, seafarers, experts in psychology fields, and even people who have psychological problems to profoundly understand the causal factors and psychology of Malaysian seafarers.

Keywords: Movement Control Order, Malaysian seafarers, psychological effect, perception, COVID-19.

Introduction

The outbreak of COVID-19 in December 2019 had a devastating effect on the world without sparing any country. Most people infected with COVID-19 experienced mild moderate respiratory distress and were able recover without any special treatment. On January 25, 2020, the first case of COVID-19 was detected in Malaysia. This attributable to the imported cases from Wuhan, China. They were tracked back to three Chinese nationals who previously had close contact with infected individuals Singapore. With the most significant number of people infected daily in the worlds, including Malaysia, the COVID-19 pandemic is rapidly increasing (New Straits Times, 2020). This forced the Malaysian prime ministers to declare phase one of the movement control order (MCO) on March 18, 2020. According to the Malaysia Health Ministry data cases, till July 26, the virus had infected 1,061,476 people in Malaysia and caused 8,551 deaths (Figure 1). This country enforced three phases of lockdown movement control order (MCO) from March 18, 2020. The lockdown was enforced based on the cases in Malaysia and aimed promote social distancing without declaring state of emergency.

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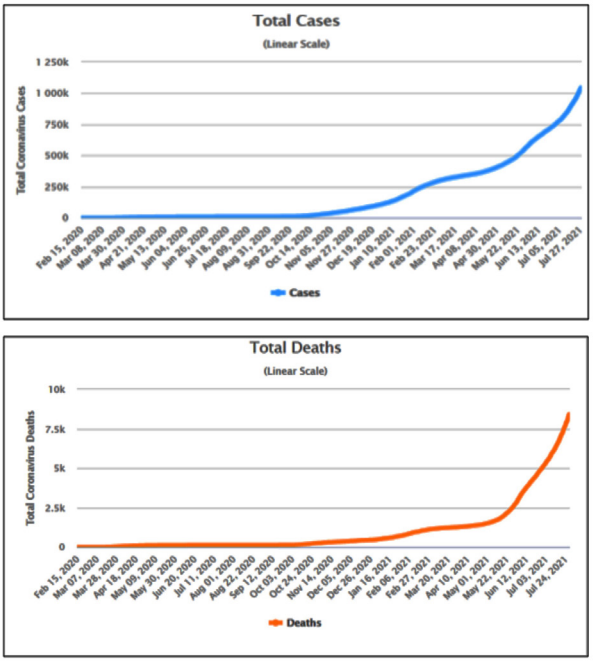

Figure 1: Total cases of COVID-19 and total deaths in Malaysia between July 27, 2021 and July 24, 2021
Source: worldometer.info

COVID-19 has impacted lives worldwide and severely affected the world supply chain and economy, including shipping and the world of work (Doumbia-Henry, 2020). Since all governments across the world were issued orders to close their borders, economic recession occurred because the trade of the world had to be stopped immediately. Further, no approval was given to any vessel to be berthed at ports and some of the vessels were detained.

Shipping is one of the world's most important industries, it is an essential element of the supply chain and is responsible for 80% of world trade (ESCAP's Transport Division *et al.,* 2020). The maritime sector is a national trade that contributes to one's country. Global shipping relies on nearly 2 million seafarers worldwide, allowing the world to obtain goods and products needed for daily life. Seafarers became collateral victims of the crisis, leaving tens of thousands stranded on ships or unable to enter ships because of travel restrictions (IMO, 2019).

The issue raised in this research concerns the perception of psychological effects on Malaysian seafarers due to this pandemic. For example, port authorities had forbidden the vessel's crew to disembark. The COVID-19 pandemic arrested the shipping companies' ability to conduct crew-changing operations as usual. This circumstance leads seafarers to remain on board longer than their work schedule. The outbreak of COVID-19 has significantly affected crew changes, with seafarers suffering from shift suspensions and a lack of consideration for other medical conditions.

The issue resulted in a psychological impact on seafarers. Crew changes are vital to prevent fatigue and protect seafarers' health, safety and well-being, ensuring a maritime trade's safe operation. It cannot be indefinitely delayed because of that factor.

Previously, seafarers have been commonly associated with mental problems such as feeling depressed or suicidal because their profession requires them to spend six months onboard a vessel. However, during this pandemic, COVID-19 had a minimal impact on seafarers' mental health. Figure 2 shows the data on mental health and suicide among seafarers before COVID-19 from 2010 to 2019. The number of those suffering from mental illness and suicide has not changed. In 2013, the number of injuries and illnesses that resulted in fatalities decreased.

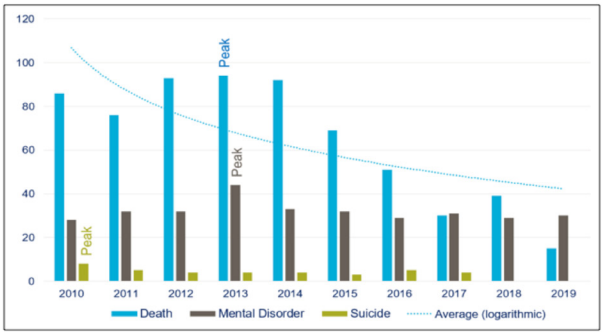

Figure 2: Data on deaths, mental disorders, and suicide from 2010 to 2019
Sources: GARD

Therefore, this articles primary aim is to use secondary data for identifying, assessing, and proposing the best solution to define the perception of psychological effects on seafarers during COVID-19 in the period of Malaysia's first movement control order (MCO). From the literature and interview, it is expected that this study's outcome could identify the psychological perception effect of COVID-19 during the period of Malaysia's first movement control order (MCO). Finally, the Analytic Hierarchy Process (AHP) is performed to rank and assess the psychological perception effect based on expert consideration to get the most influence factor (Adhabi & Anozie, 2017).

Literature Review

The success of any shipping operation depends on the seafarers' performance. Today, COVID-19, an infectious disease caused by a newly discovered coronavirus has infected people across the entire world. The latest epidemic outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) originated in Wuhan City, Hubei Province, China, in December 2019 and has spread to the rest of the world. During the COVID-19 outbreak in Malaysia, the Prime Minister, Muhyiddin Yassin announced the closing of the borders for both foreign and Malaysian citizens who would not be able to leave the country from Wednesday, March 18, 2020 and Malaysia's phase one movement control orders was implemented (The Straits Times, 2020).

The outbreak of the COVID-19 pandemic, which occurred at the end of 2019 has to some extent, psychologically affected seafarers because this pandemic was sudden and its impact was uncertain.

During the COVID-19 outbreak in Malaysia, in phase one, the MCO covered shipping companies. Crew changeover is needed at required intervals to ensure the smooth operation of the vessel which in turn will help maintain the operation of the global supply chain and ensure the seafarers' well-being (Doumbia-Henry, 2020). In this situation, crew changes may be significantly delayed due to travel restrictions in different countries. Nevertheless, several cases

prevented seafarers from disembarking at the port to conduct the crew changes because of the restrictions adopted at the national level.

This resulted in extending the service of seafarers on board ships for many months at sea, well beyond the limits set (Whiting, 2020). Challenges were also faced by seafarers after disembarkation while repatriation which was delayed due to quarantine measures implemented at the airport. There are a few new procedures that need to be followed by the seafarers.

According to the STA Law Firm (2020), there is a reduction in the demand for cargo. The danger of the spread of COVID-19 can be prevented by the competency of the health authorities of each country, which has contributed to a decrease in imports and exports of products and goods between countries. During this pandemic, all goods must follow a set standard of rules and procedures with limited demand for such cargo. The delay in such transportation has further decreased orders for shipments due to added complications of quarantine periods. Perishable goods cannot be transported due to a waiting period of 14 days or for a period prescribed by the competent authorities in each region.

The Perception of the Psychological Effect of Seafarers During the COVID-19 Outbreak

Psychological states are synonymous with the mental conditions related to a situation in which features are relatively stable, even though the state itself can be dynamic. Psychology studies the mind and how it works and affects behaviour (Timothy J, 2018). The meaning of states is the condition that has a relation and is connected with a proposition. According to the Oxford Review (2018), they are experiencing a temporary condition for a short period. Stress, anxiety, and depression are signs of psychological effects that start when an individual experiences stress. If a person has chronic stress without treatment, the person may experience anxiety and depression. An article by the Anxiety and Depression Association of America (2020) says everyone experiences stress and anxiety at one time or another. Moreover, there is a difference between stress, anxiety, and depression. Stress and anxiety may seem similar, but they are not the same.

According to Premier Health (2017), stress corresponds to daily pressures, a threatening situation, or an external cause such as a tight deadline at work or an argument with someone, while anxiety is a stress reaction. Stress typically goes away when the stressors disappear. All people suffer from stress which influences their mental and physical health. Stress, anxiety, and depression share many emotional and physical symptoms, but have different origins. However, chronic stress can escalate into anxiety, or depression. Stress symptoms include headaches, high blood pressure, chest pain, skin rashes, and sleep loss. Chronic stress has many ways to manage and reduce symptoms, including physical activity, breathing exercises, and adequate sleep. They also have different treatments for stress and anxiety (Ross, 2018). Depression refers to an experience about how you feel down from the “low mood” phase and often feel lost interest in activities you usually enjoy doing. According to the Anxiety and Depression Association of America (2019), 264 million people worldwide live with depression.

Anxiety Disorder

Anxiety occurs when an individual faces potentially harmful or worrying triggers, feelings of anxiety are ordinary and necessary for survival. According to the American Psychological Association, anxiety is an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood

pressure (APA, 2020). There are differences between the typical sense of anxiety and an anxiety disorder. Knowing the difference can help that person identify and treat the condition to get proper medical treatment. Anxiety disorders refer to a group of mental health disorders. There are five major types of anxiety disorders include; Generalized Anxiety Disorder (GAD), Obsessive-Compulsive Disorder (OCD), panic disorder, Post-Traumatic Stress Disorder (PTSD), and Social Phobia (or Social Anxiety Disorder) (Felman, 2020).

Generalized Anxiety Disorder (GAD) is characterized by a general, uncontrolled feeling of anxiety, exaggerated anxiety, and anxiety, even though there is little or nothing to cause it (Horne, 2021). This disorder might be sparked due to a traumatic situation, but often seems to have no source when it springs to life. Each year, up to 20% of adults are affected by anxiety (Munir, 2020).

According to Nichols (2020), Obsessive-Compulsive Disorder (OCD) is a mental well-being disease involving distressing, distracting, obsessive thoughts, and repeated physical actions such as hand washing, counting, or compulsive mental actions.

Each type of criteria was critically related to mental health and is known as an anxiety disorder.

Additionally, Post-Traumatic Stress Disorder (PTSD) is an anxiety that may develop following exposure to frightening occurrences or ordeals that cause or threaten significant physical harm. Traumatic incidents that may induce PTSD include aggressive personal attacks, natural or human-caused catastrophes, accidents or military action (Timothy, 2019).

Last but not least is a social phobia known as a social anxiety disorder that can be characterized by overwhelming anxiety and excessive self-consciousness in everyday social situations. Social phobia can be restricted to only one situation such as fear of speaking in formal or informal settings or eating or drinking in front of others. It can be so common in its most extreme form that a person has symptoms almost whenever they are around other people.

Depression

Depression is defined as a mood disorder that causes a persistent feeling of depressed mood or sadness and the often profound loss of interest in the thing that usually pleases you (Bains, 2020). The online article by Unique Mind Care has mentioned that there are seven common types of depression; Major Depression (MDD), Persistent Depression (PDD), Bipolar Disorder, Postpartum Depression (PPD), Premenstrual Dysphoric Disorder (PMDD), Seasonal Affective Disorder (SAD), and last one is Atypical Depression. MDD is a mood disorder characterized by key features such as depressed mood, lack of interest in activity normally enjoyed, weight changes, and so on. The person experiences these symptoms for longer than two weeks and will often be diagnosed with MDD. According to the previous study of PDD across the adult lifespan: Results from clinical and population-based surveys in Germany by Nübel *et al*. (2020), Dysthymia knowns as a persistent depressive disorder, refers to a chronicle present for more days than not for at least two years. It can be mild, moderate, or severe. These symptoms of PDD are feeling of sadness, anger, irritability, guilty, low self-esteem, changes in appetite, etc.

Methodology

This section explains the outline of the research methodology and how data is collected and identifies the perception of psychological effect on Malaysian seafarers during COVID-19 during Malaysia's first MCO using two research methods.

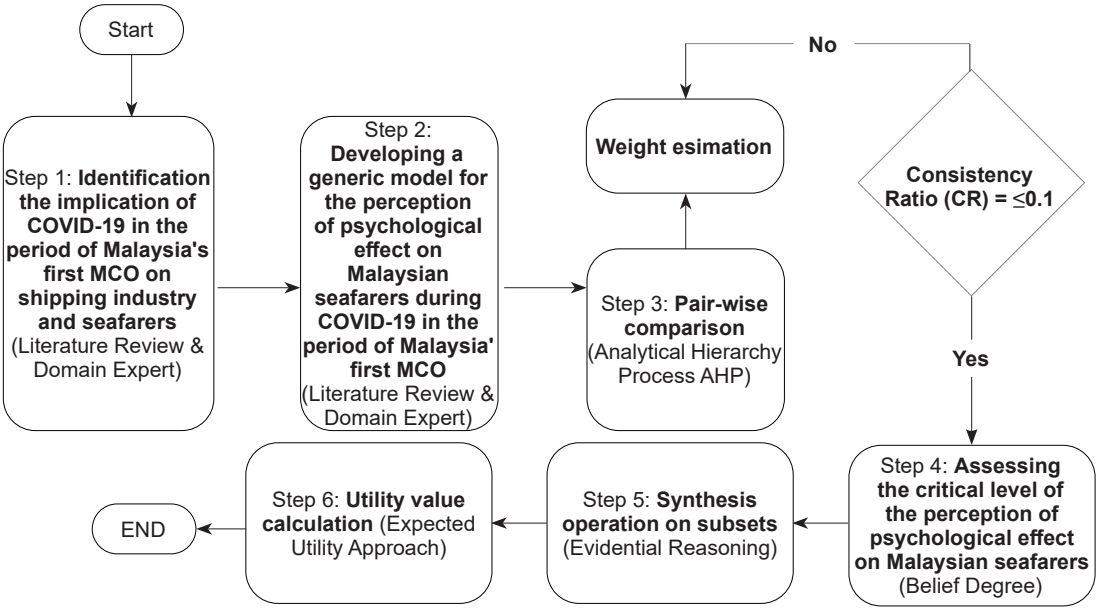

Figure 3: Research methodology

Figure 3 shows the process of identifying the implication of COVID-19 in the period of Malaysia's first MCO on Malaysian seafarers is based on a literature review and expert judgement. The literature review has been used as the primary technique to identify the sub-criteria. The general effect was determined initially and it was assessed to deduct the repetition of the effect factor until the final assessment criteria were selected. As a result, 15 psychological perceptions criteria have been listed in Table 1 for further study.

The development of a generic model of the perception of psychological effect on Malaysian seafarers during COVID-19 in Malaysia's first MCO by three criteria has been generic. Figure 4 shows that the perception of psychological effects listed in Table 1 is used to develop this generic model. Based on the literature review, the Analytical Hierarchy Process (AHP) and Evidential Reasoning (ER) have been chosen for expert decision-making. The AHP method will help identify the critical perception of psychological effect which is crucial during the first MCO. At the same time, ER ranks and assesses the human reasoning conflict in multi-criteria decision-making (Wang *et al*., 2006). Relevant data from alternatives or human decisions can be used in this comparison to provide underlying details (Saaty, 2008).

Table 1: Perception of psychological effects

Main Criteria	Sub-criteria	Reference
Stress	• High blood pressure • Stomach and digestive problem • Headaches, dizziness, or shaking • Chest pain and rapid heartbeat-Feeling like heart is racing • Weak immune system-Often get sick	Pathak (2019), Ministry of Health (2019, 2020), World Health Organization (2020, 2021), International Maritime Labour (2020), (Sundarasen *et al*., 2021), (Yee *et al*., 2021), (Wan Mohd Yunus *et al*., 2021) and (Rodríguez-Rey *et al*., 2020)
Anxiety	• Heavy breathing or hyperventilation, or difficulty breathing • Chest pain or heart palpitation • Chills, sweats, or hot flashes • Feeling like passing out • An overwhelming feeling of panic	(Amit *et al*., 2021), (Battineni *et al*., 2021), (Raza *et al*., 2020), (De Beukelaer, 2021), (Russtam Suhrab Ismail *et al*., 2021), (Birihane *et al*., 2021), (Kumar, 2021), (Perveen *et al*., 2020), and (Lanciano *et al*., 2020)
Depression	• Depressed mood-Sadness or negative emotions • Poor concentration • Lack of interest in work (Anhedonia) • Sleep difficulties-Have insomnia or sleep more than usually • Feelings of worthlessness or guilt	Pathak (2019), Ministry of Health (2019, 2020), World Health Organization (2020, 2021), International Maritime Labour (2020), (Ye *et al*., 2020), (Sampson & Neil, 2019), (Othman *et al*., 2015), (Hystad & Eid, 2016), (Ritchie & Roser, 2018), and (The New Straits Times, 2020)

Thirdly, the weight criteria will be measured using a comparison scale of AHP. A weight assignment is purposely used to determine the most critical perception of the psychological effect on Malaysian seafarers during COVID-19 during Malaysia's first MCO. In this step, AHP will be used to obtain the weight estimation by conducting a pairwise comparison. To accomplish this study, Saaty's regular pairwise comparison questionnaire was utilized. The Consistency Ratio (CR) is calculated to ensure that expert judgements are consistent. According to the standards, the CR should be less than or equal to 1. Because of the expert's judgement inconsistencies, more careful judgement is required if the CR is higher than 1.

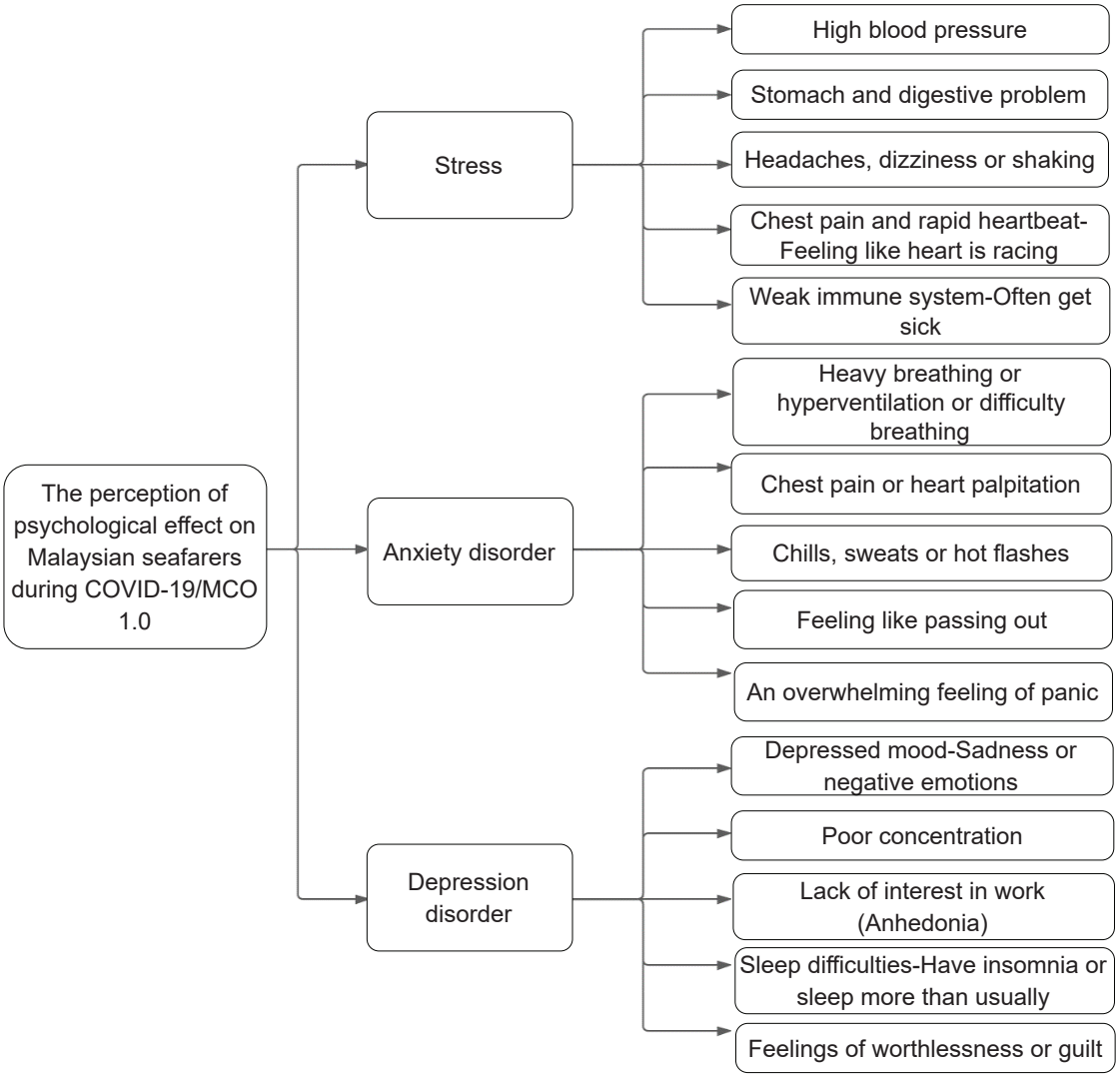

Figure 4: Generic model

A fundamental scale of numbers is used to compare the sub-criteria in the field of pairwise comparison mode. The pairwise comparison matrix can be constructed by setting up the $n \times n$ matrix. Table 2 shows a preferable scale from 1 to 9. The comparison scale is described scale using linguistic meaning where scale 1 is the equivalent between effect; scale 3 refers to weekly important. 5 is strongly important, 7 very strong important, and extremely important for 9. However, 2, 4, 6, and 8 are intermediate values between two adjacent judgements. The judgement of pair criterion A_i and A_j *is* presented by an n × n matrix D. The α_{ij} entries are defined by entry rules as follows:

- Rule 1: If $\alpha_{ij} = a$, then, $\alpha_{ji}=1/\alpha$, $\alpha \neq 0$
- Rule 2: If A_i is judged to be of equal relative importance as A_j, then, $\alpha_{ij} = \alpha_{ji} = 1$

Table 2: Comparison scale

Numerical Assessment (Scale)	Linguistic Meaning
1	Equally important (EQ)
3	Weekly important (WE)
5	Strongly important (ST)
7	Very strong important (VS)
9	Extremely important (EX)
2,4,6,8	Intermediate values between the two adjacent judgements

Source: Illustrated by authors

According to the above rules, the matrix D is shown (Rahman *et al.*, 2018) as follows:

$$D = a_{ij} = \begin{matrix} 1 & a_n \dots & a_{1n} \\ 1/a_n & 1 \dots & a_{2n} \\ 1/a_{1n} & \frac{1}{a_{2n}} \dots & 1 \end{matrix} \quad (1)$$

where i, j = 1, 2, 3, …, n and each a_{ij} is relatively effective criterion A_i to criterion A_j.

The quantified judgement comparison of pair (A_i, A_j) is noted as a_{ij} in the matrix *D;* a further step is to derive a weight vector for each criterion or alternative, as it shows the prioritization of the criterion or alternatives (Rahman *et al.*, 2018) a weight value w_k can be calculated (Rahman *et al.*, 2018) as follows:

$$wk = \frac{1}{n}\sum_{j=1}^{n}\left(\frac{akj}{\sum_{j=1}^{n} a_{ij}}\right) k = 1,2,3,\dots.,n \quad (2)$$

where a_{ij} stands for the entry row *i* and column *j* in a comparison matrix of order *n*.

Inconsistent pairwise comparison can be measured using the Consistency Ratio (CR) (Rahman *et al.*, 2018). If the CR value is 0.10 or less, the consistency of the pair-wise comparison is considered reasonable and can be accepted; the AHP continues with the calculation of the weight vector (Rahman *et al.*, 2018). However, if CR is more significant than 0.10, it will be inconsistent with pairwise judgements. Thus, the decision-maker shall review the pairwise judgement before proceeding. To check the consistency of judgements, a CR is computed using Equations 3 to 5 (Rahman *et al.*, 2018).

$$CR = \frac{CI}{RI} \quad (3)$$

$$CI = \frac{\lambda max - n}{n-1} \quad (4)$$

$$\lambda max = \frac{\sum_{j=1}^{n}\left(\frac{\sum_{j=1}^{n} wk\ ajk}{wj}\right)}{n} \quad (5)$$

where CI is the consistency index, RI is the average random index as shown in Table 3, *n* is the number of items being compared, and λ *max* is the minimum weight value of the n × n comparison matrix *D* (Rahman *et al.*, 2018).

Table 3: Value of average random index versus matrix order

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

Source: Illustrated by authors

The next step is to assess the most critical perception of psychological effect, conducted before the synthesis operation using the evidential reasoning (ER) algorithm in step 5. Finally, the utility value calculation will be performed to obtain a single for benchmarking and comparison purposes in step 6.

Steps 3 to step 6 can be achieved by Intelligent Decision System (IDS) software. A total of five people filled out the questionnaires. They are regarded as experts based on their combined experience, education, and managerial level. The experts were chosen based on their passion for the field of psychology.

Doctor in Psychology and counsellor are among the participants as shown in Table 4. The information in the questionnaires are given by having them fill out a Google Form. Due to the difficulty of distributing weights and eliminating bias, the questionnaire has been given equal weight. The questionnaire was divided into two parts: Part A and part B. For details, A is designed to obtain the demographic data of the experts. At the same time, part B aimed to conduct a pairwise comparison using the AHP method, where the expert needs to compare each effect in a given attribute. Then, the expert must choose which effect is dominant or has the same importance.

For example, stress and anxiety are important on a scale from 2 (least necessary) to 9 (extremely important). Lastly, another questionnaire was constructed and filled out by 100 Malaysian seafarers to assess the most critical effect on the perception of psychological effects during COVID-19 in Malaysia's first MCO by using the belief degrees under a fuzzy environment. In this paper, the assessment results from IDS are represented by five linguistic terms (i.e., high unlikely, unlikely, possible, likely, and very likely).

Table 4: Experts' profile

Expert No.	Position/Department	Year of Experiences
1	Doctor in Psychology/Department of Psychiatric and Mental Health	20 years and above
2	Administrative Officer/Department of Psychiatric and Mental Health	10 - 14 years
3	Psychology Officer/Department of Psychiatric and Mental Health	Less than 10 years
4	Counselling/Department of Psychiatric	Less than 10 years
5	Psychology Officer/Department of Psychiatric and Mental Health	10 - 14 years

The calculation procedure commenced with obtaining aggregate comparison matrices once expert judgement had been compiled. The geometric mean (GM) method was used to complete this step. At this step, the primary criteria result in judgement have been used as an example to show the calculation. The following formula may be used to calculate the data collected from five expert opinions:

$$GM_{ij} = \left[e\frac{1}{ij} \cdot e\frac{2}{ij} \cdot \frac{3}{ij} \cdots\cdots e\frac{k}{ij} \right]\frac{1}{k} \quad (6)$$

The following calculation is the calculation of the relative importance of each main criterion:

GM_{ij} value between stress and anxiety disorder:

$GM_{ij} = [(7) \times (0.25) \times (3) \times (1) \times (0.25)].\frac{1}{5}$

$= 1.0559$

GM_{ij} value between stress and depression:

$GM_{ij} = [(5) \times (0.5) \times (0.1429) \times (0.125) \times (4)].\frac{1}{5}$

$= 0.7085$

GM_{ij} value between anxiety and depression:

$GM_{ij} = [(1) \times (1) \times (0.3333) \times (1) \times (1)].\frac{1}{5}$

$= 0.8027$

The identified evaluation is used to make a paired-wise comparison. The same calculation technique will be used for all paired-wise comparisons, and formula 1 to calculate α_{ij} values will be applied. In this test case, Matrix D's main criteria (i.e., stress, anxiety disorder, and depression) are shown as below.

$$\text{Matrix D} = \begin{pmatrix} 1.0000 & 1.0559 & 0.7085 \\ 0.9471 & 1.0000 & 0.8027 \\ 1.4114 & 1.2457 & 1.0000 \end{pmatrix}$$

Based on Matrix D, Equation 2 is used to calculate the weight for each main criterion and is demonstrated as follows:

$$W_S = \frac{1}{3}\left[\left(\frac{1}{3.3585}\right) + \left(\frac{1.0559}{3.3016}\right) + \left(\frac{0.7085}{2.5112}\right)\right] = 0.2999$$

$$W_A = \frac{1}{3}\left[\left(\frac{0.9471}{3.3585}\right) + \left(\frac{1}{3.3016}\right) + \left(\frac{0.8027}{2.5112}\right)\right] = 0.3015$$

$$W_D = \frac{1}{3}\left[\left(\frac{1.4114}{3.3585}\right) + \left(\frac{1.2457}{3.3016}\right) + \left(\frac{1}{2.5112}\right)\right] = 0.3986$$

As a result, stress (W_S) has a weightage of 0.2999, anxiety (W_A) has a weightage of 0.3015, and depression (W_D) has a weightage of 0.3986. Using Equations 3 to 5, the consistency ratio (CR) will be calculated and checked using this pairwise comparison. λ_{max} will be calculated using Equation 5 to lead the RI and CR.

S = (1 × 0.2999) + (1.0559 × 0.3015) + (0.7085 × 0.3986) = 0.9007
A = (0.9471 × 0.2999) + (1 × 0.3015) + (0.8027 × 0.3986) = 0.9054
D = (1.4114 × 0.2999) + (1.2457 × 0.3015) + (1 × 0.3986) = 1.1974

$$\lambda_{max} = \frac{\left(\frac{0.9007}{0.2999}\right)+\left(\frac{0.9054}{0.3015}\right)+\left(\frac{1.1974}{0.3986}\right)}{3} = 3.0034$$

CI is calculated using formula 4, followed by formula 3 for CR calculation. Based on Table 3, the random index of the three main criteria is 0.58.

$$CI = \frac{3.0034-3}{3-1} = 0.0017$$
$$CR = \frac{CI}{CR} = \frac{0.0017}{0.58}$$
$$CR = 0.00293$$

According to the rules of this data analysis, the judgement will only be regarded as acceptable if the CR value is equal to or less than 0.1 (Saaty,1980). As a result of this calculation, the CR for the main-criteria is 0.00293, and this result is deemed acceptable. The same analysis will be used for the sub-criteria of psychological effect on Malaysian seafarers during COVID-19 in the period of MCO 1.0, and the weight of the sub-criteria is indicated in Table 5.

H_n	High Unlikely	Unlikely	Possible	Likely	Very Likely
V_n	1	2	3	4	5
uH_n	$\frac{1-1}{5-1}=0$	$\frac{2-1}{5-1}=0.25$	$\frac{3-1}{5-1}=0.5$	$\frac{4-1}{5-1}=0.75$	$\frac{5-1}{5-1}=1$
$ß_n$	0.06	0.06	0.22	0.33	0.33
$\sum_{n=1}^{s} ß_n = 0.06 + 0.06 + 0.22 + 0.33 + 0.33 = 1 - ß_n = 0$					
$ß_n \times uH_n$	0	0.015	0.11	0.2475	0.33
$U_v = \sum_{n-1}^{s} ß_n \times uH_n = 0.7025$					

Five linguistic terms represent the assessment results from IDS (i.e., high unlikely, unlikely, possible, likely, and very likely). From the evaluation, professional decision-makers can use a single value for ranking the alternatives and for comparison purposes (Mohd. Salleh *et al*., 2014). To demonstrate the utility value calculation, the utility value of a "depressed mood" is evaluated as follows:

Results and Discussion

In this section, all the calculations will be presented in the figure and table. The result of the research after the obtained data has been analyzed based on the research methodology as explained in Methodology. The AHP approach is used in step 3 to establish the weight for each effect to determine the most critical perception of psychological impacts on Malaysian seafarers during COVID-19 in the period of Malaysia's first MCO.

The result of weight value and consistency ratios for all main criteria and sub-criteria perception of psychological effects on Malaysia seafarers during COVID-19 in the period of Malaysia's first MCO was presented in Table 5.

Table 5 shows that the most critical perception of psychological effect is depression (0.3986), anxiety (0.3015), and stress (0.2999). Depression is the highest perception psychology effect on Malaysian seafarers during COVID-19 during Malaysia's first MCO.

All the weight sub-criteria have been shown in the figure with the consistency ratio. In the sub-criteria of stress, headaches, dizziness, or shaking is the most critical perception of psychological effect facing seafarers with a weight of 0.3455. An overwhelming feeling of panic is more prominent than the other sub-criteria in the same criterion, with a weight of 0.2965.

For the last criterion, depression, the sub-criteria are sleeping difficulties, insomnia, or sleep more than usually is the most prominent with a weight of 0.2763. In addition, Table 6 shows the ranking orders of the lowest level criteria by global weight. All the sub-criteria have been listed according to their weightage from the highest to the lowest level in the table.

Table 5: Weight and Consistency Ratio (CR)

Main Effect	Weight of Main Impacts	Sub-criteria	Local Weight of Sub-criteria	Global Weight
Stress	0.2999	High blood pressure	0.1431	0.0429
		Stomach and digestive problem	0.0727	0.0218
		Headaches, dizziness, or shaking	0.3455	0.1036
		Chest pain and rapid heartbeat-Feeling like heart is racing	0.3037	0.0911
		Weak immune system-Often get sick	0.1350	0.0404
			CR= 0.0624	
Anxiety disorder	0.3015	Heavy breathing or hyperventilation or difficulty breathing	0.1555	0.0469
		Chest pain or heart palpitation	0.1529	0.0461
		Chills, sweats or hot flashes	0.2196	0.0662
		Feeling like passing out	0.1755	0.0529
		An overwhelming feeling of panic	0.2965	0.0894
			CR= 0.0160	

Depression disorder	0.3986 **CR=0.0029**	Depressed mood-Sadness or negative emotions	0.1746	0.0696
		Poor concentration	0.1162	0.0463
		Lack of interest in work (Anhedonia)	0.1853	0.0739
		Sleep difficulties-Have insomnia or sleep more than usually	0.2763	0.1101
		Feelings of worthlessness or guilt	0.2476	0.0987
			CR= 0.0154	

To determine the most critical perception of psychology effect across the model, the local weight of each sub-criteria is multiplied by the weight of its main criteria. Table 6 shows the ranking orders of the lowest level criteria by global weight. According to the table, by looking at the sub-criteria order, the sleep difficulties-having insomnia or sleeping more than usual had the most noticeable impact at the first rank compared to the other 15 sub-criteria.

This result showed that the most critical perception of Malaysian seafarers in the first MCO was depression. Even though this sub-criterion is ranked at the top, it does not imply that all Malaysian seafarers are depressed.

Table 6: Ranking order of the lowest level criteria by global weight

Sub Each-criteria	Global Weight	Ranking
Sleep difficulties-Have insomnia or sleep more than usually	0.1101	1
Headaches, dizziness, or shaking	0.1036	2
Feelings of worthlessness or guilt	0.0987	3
Chest pain and rapid heartbeat-Feeling like heart is racing	0.0911	4
An overwhelming feeling of panic	0.0894	5
Lack of interest in work (Anhedonia)	0.0739	6
Depressed mood-Sadness or negative emotions	0.0696	7
Chills, sweats, or hot flashes	0.0662	8
Feeling like passing out	0.0529	9
Heavy breathing or hyperventilation or difficulty breathing	0.0469	10
Poor concentration	0.0463	11
Chest pain or heart palpitation	0.0461	12
High blood pressure	0.0429	13
Weak immune system-Often get sick	0.0404	14
Stomach and digestive problem	0.0218	15

After the weights have been calculated, the next step (step 4) is to assess each sub-criterion (lowest-level criterion in the model). This assessment considers the perception of the psychological effect level of sub-criteria based on the circumstance of Malaysia's first MCO. Based on Table 7, the result shows each sub-criteria assessed by

using belief degrees. The results indicated that the highest-level effect is depressed mood-sadness or negative emotions.

They do not know what will happen after being stranded on the sea for several months (0.7175). The second-highest effect is lack of interest in work (Anhedonia) (0.7075), and the third-highest effect is the prominent poor concentration (0.6775). The lowest impact assessed is stomach and digestive problems (0.3600). It happens to certain people according to the endurance of their bodies in the fight against the disease.

Table 7: Using the IDS software, assessment values for sub-effects and their utility values

Sub-effects	Assessment Values (belief degrees)					Utility Values
	High Unlikely	Unlikely	Possible	Likely	Very Likely	
High blood pressure	0.12	0.10	0.21	0.43	0.14	0.5925
Stomach and digestive problem	0.29	0.18	0.33	0.20	0	0.3600
Headaches, dizziness, or shaking	0.16	0.15	0.27	0.30	0.12	0.5175
Chest pain and rapid heartbeat-Feeling like heart is racing	0.19	0.16	0.22	0.26	0.17	0.5150
Weak immune system-Often get sick	0.22	0.16	0.29	0.23	0.10	0.4575
Heavy breathing or hyperventilation, or difficulty breathing	0.19	0.18	0.27	0.26	0.10	0.4750
Chest pain or heart palpitation	0.18	0.20	0.26	0.31	0.05	0.4625
Chills, sweats, or hot flashes	0.16	0.13	0.31	0.33	0.07	0.5050
Feeling like passing out	0.16	0.13	0.34	0.28	0.09	0.5025
An overwhelming feeling of panic	0.12	0.12	0.26	0.33	0.017	0.5775
Depressed mood-Sadness or negative emotions	0.05	0.06	0.21	0.33	0.35	0.7175
Poor concentration	0.09	0.07	0.19	0.34	0.31	0.6775
Lack of interest in work (Anhedonia)	0.05	0.04	0.25	0.35	0.31	0.7075
Sleep difficulties-Have insomnia or sleep more than usually	0.08	0.06	0.29	0.36	0.21	0.6400
Feelings of worthlessness or guilt	0.10	0.07	0.32	0.32	0.19	0.6075

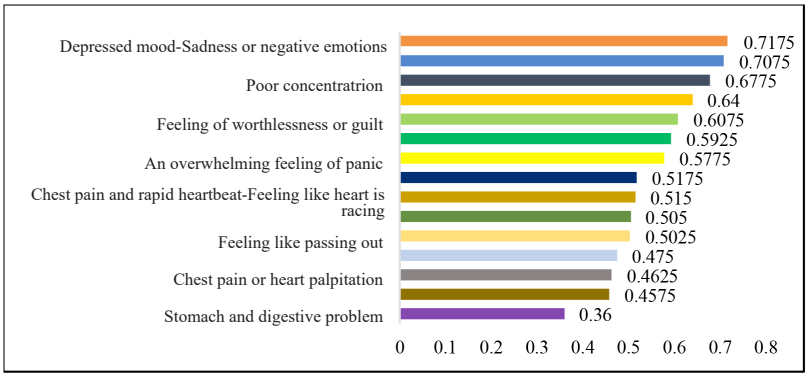

Figure 5: The ranked sub-criteria perception of psychological effects

Assessment values will be synthesised to impact step 5 after all the sub-criteria have been assessed. For example, the utility values for depressed mood-sadness or negative emotion, poor concentration, lack of interest in work (Anhedonia), sleep difficulties. Either having insomnia or sleeping more than usual and feelings of worthlessness or guilt are synthesised to obtain the effects of the depression. The utility values of the main criteria are calculated in step 6 by using the synthesis operation on subsets, as shown in Table 7.

A total of 100 respondents contributed to this online survey. Figure 5 shows the ranked perception of psychological effects that have been assessed. This study aims to see their perception of the psychological effects of COVID-19 during the MCO. The utility value for depressed mood-sadness or negative emotions is the most critical perception chosen by the seafarers with the value being 71%. Ismail *et al*. (2021) point out that seafarers can receive guidance from higher-ranking officers on following the rules and regulations to prevent this circumstance, especially during the MCO. From the results, the lower sub-criteria seafarers choose are stomach and digestive problems, at 36%.

This shows these sub-criteria are not affected by seafarers, especially during this pandemic. Next, the second higher perception psychology effect is lack of interest in work, known as anhedonia, with 70%. During this pandemic, seafarers tend to choose this criterion because there are many issues that seafarers are stranded at sea and think about their families at home. Because of this situation, A team led by Seafarers Crisis Action Team (SCAT) brought this message to the attention of NGOs having consultative status with the International Maritime Organisation (IMO), as well as with the flag and port states concerned (IMO, 2020).

However, most seafarers claimed that Malaysia's first MCO significantly hampered their concentration in doing work with values of 67%. To prevent more severe tragedies, such as suicide, the government and NGOs must pay close attention to society's mental health, especially seafarers (Raza *et al*., 2020). Figure 6 shows the ranked perception of the psychological effect on Malaysian seafarers during COVID-19 in the period of Malaysia's first MCO. The main criteria are depression (0.6658), followed by anxiety (0.5216), and the relatively same stress (0.5122). These indicated that the perception of psychological effects on Malaysian seafarers has more impact on depression than anxiety and stress. From Figure 6, the overall perception of the psychological effects on Malaysian seafarers during COVID-19 in Malaysia's first MCO is expected to have an effects

level of 58.63%, which can be considered a reasonably possible or medium effect on Malaysian seafarers. By contrast, a survey of 100 seafarers revealed that depression was significantly higher than any other criteria.

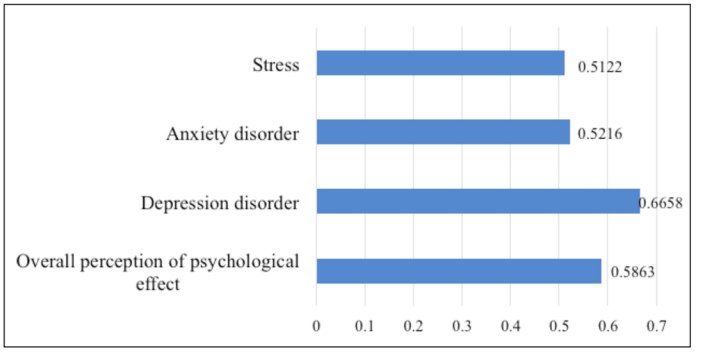

Figure 6: Utility value for main criteria and overall percept psychological effect on Malaysian seafarers during COVID-19 during Malaysia's first MCO

Conclusion and Implication

In conclusion, this paper studies the psychological effect on Malaysian seafarers during COVID-19 in Malaysia's first MCO. The psychological impact on Malaysian seafarers is divided into three criteria: Stress, anxiety disorder, and depression. All these impacts were investigated in this research.

Firstly, the implication of COVID-19 in the period of Malaysia's first MCO on the shipping industry and seafarers was gained from the literature review. Next, a generic model was developed in a hierarchical structure based on the literature review and expert consultation. 15 effects have been proposed in the generic model. Then, AHP was employed for weight for each sub-criterion. The critical perception of psychological impact was assessed before the synthesis operation using the ER algorithm. Finally, a utility value calculation was conducted to obtain each result for the guideline. The results show that seafarers claimed that depression is the most critical perception of psychological effect that affected Malaysian seafarers during COVID-19 in Malaysia first, followed by anxiety and stress. Even though depression has a high prevalence rate, this does not mean that a person suffers from depression. Before being diagnosed with depression, specific tests must be completed. Hopefully, from these results obtained and action taken, it is expected that the shipping industry and government both have a responsibility to play a role in ensuring the safety of Malaysian seafarers in the future, especially in terms of mental well-being. Nevertheless, research regarding this issue shall be conducted from time to time because the COVID-19 situation in Malaysia has yet to fully recover.

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