ORIGINAL ARTICLE

Prevalence and associated factors of depression symptoms among Vietnamese seafarers: a cross-sectional study

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ABSTRACT

The seafaring profession is physically demanding and perilous, presenting numerous risks that can lead to mental health disorders among seafarers. This study aimed to determine the prevalence and factors associated with depressive symptoms among Vietnamese seafarers. A cross-sectional descriptive study was conducted with 423 male seafarers working on 22 ocean freighters that docked at ports in Vietnam, following their voyages at sea from January to December 2023. Direct interviews were held with seafarers on board to identify depressive symptoms and associated factors. The Patient Health Questionnaire-9 scale (PHQ-9) was used to evaluate depressive symptoms among the seafarers. The result revealed that 45.2% of participants reported symptoms of depression with 30.0% experiencing mild depression, 12.3% moderate depression, and 3.1% severe depression. Various factors associated significantly with depressive symptoms among the seafarers, which included: non-officer status (OR = 1.61, 95% CI: 1.03 - 2.67); sea time exceeding 9 months (OR = 2.02, 95% CI: 1.07 - 3.65); chronic disease (OR = 1.82, 95% CI: 1.08 - 3.02); poor sleep quality (OR = 2.05, 95% CI: 1.39 - 3.21); alcohol abuse (OR = 1.97, 95% CI: 1.09 - 4.27); irregular exercise (OR = 1.51, 95% CI: 1.03 - 2.38); stress from noise (OR = 2.69, 95% CI: 1.78 - 4.15); isolation from land (OR = 2.13, 95% CI: 1.31 - 3.24); and emotional stress related to sexual matters (OR = 2.52, 95% CI: 1.69 - 3.87). To prevent depression on board, seafarers should engage in regular exercise, adopt healthier lifestyles, and improve awareness of depressive symptoms and mental health issues.

Keywords:
associated factors; depression; Vietnamese seafarers.

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INTRODUCTION

Mental disorders encompass a range of conditions characterized by significant disturbances in cognition, emotional regulation, or behavior, affecting an individual's mood, thoughts, and actions.[1] Currently, mental disorders are prevalent worldwide and are on the rise in many communities. In 2019, approximately 1 in 8 individuals, equivalent to 970 million people globally, were affected by a mental disorder, with anxiety and depression being the most common. By 2020, the number of individuals experiencing anxiety and depression significantly increased due to the impact of the COVID-19 pandemic.[4] Depression is associated with a range of mental health issues including, loss of interest and pleasure in ordinary activities, feelings of sadness, and various emotional, cognitive, physical, and behavioral symptoms.[2] Depression is the second leading cause of global disease burden, after cardiovascular diseases, and is expected to become the leading cause by 2030.[5] Additionally, depression is a primary contributor to suicides, accounting for 75% of suicide cases.[6]

The seafaring profession is exceptionally demanding and hazardous. During voyages at sea, the ship serves as both a living space and a workplace for seafarers. Working conditions at sea are extremely challenging, often requiring labor under harsh natural conditions such as rough seas, strong winds, and inadequate standard working conditions, including vibrations, noise, high temperatures, humidity, and slippery surfaces. Each voyage typically lasts 9-10 months, and sometimes even longer. During this time, seafarers face loneliness and isolation from land, living and working in an unusual social environment marked by a male-dominated society, cultural differences, and hierarchical structures on board.[7,8] As a result, seafarers experience significant psychological and behavioral burdens, leading to mental health disorders.[9–11]

Several studies have shown that the prevalence of depression among seafarers is higher than that of land-based workers.[12,13] A study by Wenzhe Qin et al. on Chinese seafarers found that 41.7% experienced depressive symptoms, with 23.35% mild, 9.30% moderate, and 9.07% severe levels of depression.[12] Another study on Thai seafarers also found a prevalence of seafarers with depressive symptoms.[13]

Vietnam has a large number of seafarers, approximately 54,000 individuals.[14] Currently, most research focuses on the physical health of seafarers, while their mental health has not received adequate attention. There is a lack of data on mental disorders among Vietnamese seafarers, particularly in the aftermath of the COVID-19 pandemic. Therefore, this study aims to determine the prevalence and associated factors of depressive symptoms among Vietnamese seafarers in 2023. The findings could be valuable in shaping policies and practices aimed at preventing depression among Vietnamese seafarers.

METHODS

Study Participants

A total of 423 male seafarers working on 22 ocean freighters that docked at the ports of Hai Phong and Quang Ninh, Vietnam, following their sea voyages from January 2023 to December 2023.

Study Design

This was a cross-sectional descriptive epidemiological study.

Study Sample

The sample size was calculated based on the formula for estimating the sample size for a proportion

$$n = Z^2_{1-\alpha/2}\frac{p(1-p)}{d^2}$$

In which Z: the level of confidence level of 95%, Z = 1.96; p: prevalence of seafarers with depressive symptoms from a previous study. Currently, there is no data on the prevalence of depression among Vietnamese seafarers, thus we chose p = 0.5; d: the margin of error (d = 0.05); n (minimum sample size) = 384 participants. To increase reliability, the minimum sample was multiplied by 1.1, resulting in a final sample size of n = 423.

Sampling Method

Convenience sampling. A list of all Vietnamese seafarers working on 22 ships docking at Hai Phong and Quang Ninh ports during the study period was compiled, totaling 517 seafarers. Among them, 96 seafarers either declined to participate or were unavailable during data collection. We selected 423 seafarers to interview regarding depressive symptoms.

Data Collection

Direct interviews were conducted with 423 seafarers to assess depressive symptoms using the PHQ-9 scale.

Direct interviews with seafarers to identify factors associated with depressive symptoms, including age, working experience, marital status (married, single, divorced/separated), educational level (intermediate, college/university), workplace on the ship (deck crew, engine room crew, other crew), rank (officer, non-officer), duration of the sea voyage (< 6 months, 6-9 months, > 9 months), physical exercise (regular and irregular), sleep quality (good, poor), isolation from land (yes, no), stress from noise (yes, no), economic burden (yes, no), sexual stress (yes, no), smoking status (yes, no), and alcohol abuse (yes, no).

Definitions

Assessment of depressive symptoms among seafarers was based on the PHQ-9 (Patient Health Questionnaire-9) scale, which is widely used in Vietnam to assess depressive symptoms in the community. Sensitivity and specificity were 87.8% and 88.0% at the cut-off score of 4, with Cronbach's alpha at 0.745 ($p < 0.001$).[15] The PHQ-9 consists of 9 questions related to the seafarer's emotions over the past two weeks. Each question corresponds to a score ranging from 0 to 3: 0 points (not at all); 1 point (several days); 2 points (more than half the days); 3 points (nearly every day). The total score ranges from 0 to 27, corresponding to increasing levels of symptoms as follows: Total score 0 – 4 (normal); 5 – 9 (mild depression); 10 – 14 (moderate depression); 15 – 19 (moderately severe depression); 20 – 27 (severe depression).[15]

Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), a self-rated questionnaire measuring sleep quality and disturbances over one month. It includes 19 items generating 7 components: "subjective sleep quality," "sleep latency," "sleep duration," "habitual sleep efficiency," "sleep disturbances," "use of sleeping medication," and "daytime dysfunction." Each item is scored from 0 to 3 based on the respondent's perception. The total score for these 7 components forms a global score (ranging from 0 to 21 points). Poor sleep quality is defined as a PSQI score > 5. Sensitivity and specificity were 89.6% and 86.5% at the cut-off score of 5, with Cronbach's alpha at 0.75 ($p < 0.001$).[16]

Alcohol Abuse Criteria: Seafarers were interviewed about their alcohol consumption over the past 7 days. Alcohol abuse is defined according to the standards of the World Health Organization: males consuming more than 3 units of alcohol per day or 21 units per week; females consuming more than 2 units per day or 14 units per week. One unit of alcohol is equivalent to 10 grams of pure alcohol contained in a beverage. One standard drink is equivalent to one 330ml can of beer with 5% alcohol, one 125ml glass of wine with

11% alcohol, one 75ml glass of fortified wine with 20% alcohol, or one 30ml shot of spirits with 30% alcohol.[17]

Regular physical activity is defined as engaging in at least 30 minutes of physical activity per day for ≥ 5 days per week; irregular physical activity is defined as 1-4 days per week.[18]

Smoking habits: A non-smoker is someone who has never smoked. A former smoker is someone who has smoked in the past but no longer smokes. An individual who smokes at least one cigarette per day is considered a current smoker. During the interview, participants were asked about the number of cigarettes they smoked daily.

Statistical Analysis

The research data were processed using biostatistical methods based on SPSS for Windows 22.0 software. Categorical variables were represented as frequency and percentage (%), while continuous variables were represented by mean and standard deviation (SD). The χ^2 test was used to compare two proportions. Multivariable logistic regression analysis was employed to calculate odds ratios (ORs) along with 95% confidence intervals (CIs) to assess the relationship between risk factors and depressive symptoms among seafarers. Statistical significance was determined with $p < 0.05$. Risk factors were identified through multivariable logistic regression analysis, using binary dependent variables representing depressive symptoms. The variables included in the model as potential risk factors comprised: working experience, educational level, rank on the ship, duration of sea voyage, chronic disease, sleep quality, smoking habits, alcohol abuse, physical exercise, stress from noise, isolation from land, economic burden, and emotional stress related to sexual activities.

Ethical Approval

This study has been approved by the Ethics Committee in Biomedical Research of the Maritime Medical Institute under decision 05/2023/QĐ-YHB. Participation in the study was entirely voluntary for all seafarers.

RESULTS

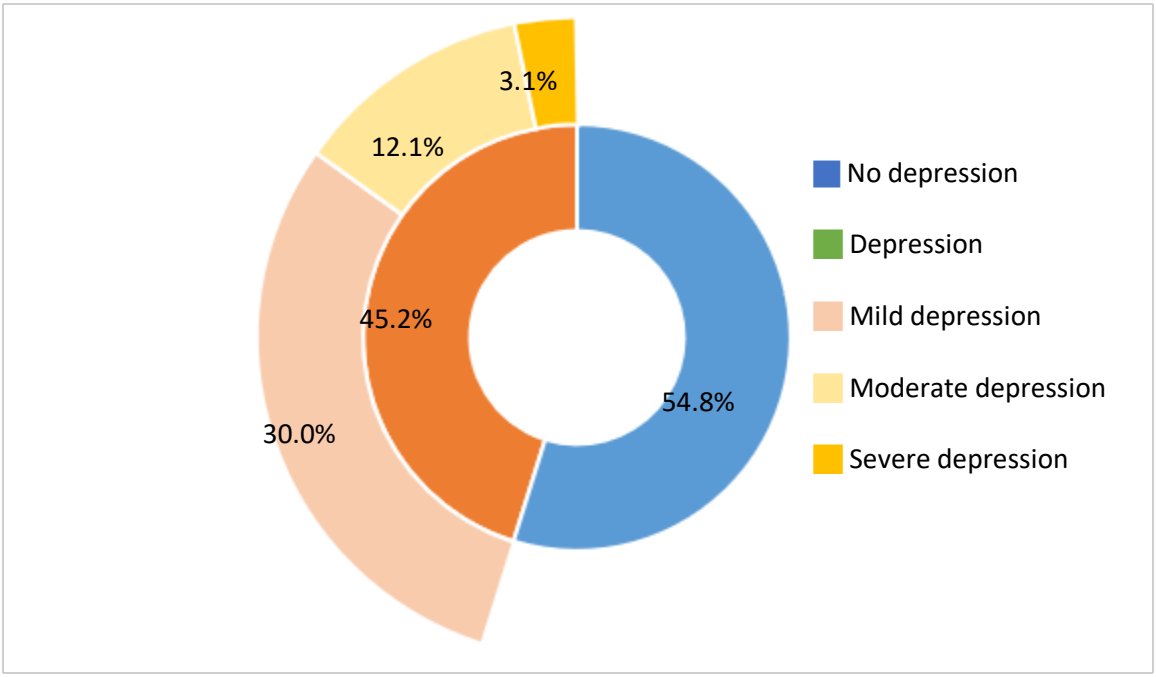

Figure 1. The prevalence of depression symptoms among seafarers (N = 423)

Table 1. Characteristics of the study participants (N = 423)

Variable		**n (%)**
Age (years)	20-29	124 (29.3)
	30-39	146 (34.5)
	40-49	96 (22.7)
	≥50	57 (13.5)
	Mean ± SD	36.5 ± 8.4
Working experience (years)	< 10	171 (40.4)
	10-19	180 (42.6)
	≥ 20	72 (17.0)
	Mean ± SD	12.1 ± 5.5
Marital status	Married	297 (70.2)
	Single	117 (27.7)
	Divorced/Separated	9 (2.1)
Educational level	Intermediate	291 (68.8)
	College/university	132 (31.2)
Workplace	Deck crew	178 (42.1)
	Engine room crew	149 (35.2)
	Other crews	96 (22.7)

Variable		n (%)
Rank	Officer	148 (35.0)
	Non -officer	275 (65.0)
Duration of sea voyage	< 6 months	68 (16.1)
	6 – 9 months	205 (48.5)
	> 9 months	150 (35.4)

Note: SD = standard deviation

Table 2. Multivariate logistic regression analyses of associated factors with depression symptoms among seafarers

Variable	n	Depression n (%)	Without depression n (%)	Adjusted OR (95%CI)	p-value
Working experience					
<10 years	171	73 (42.7)	98 (57.3)	1	0.467
≥10 years	252	118 (46.8)	134 (53.2)	1.12 (0.61-1.37)	
Educational level					
University	132	53 (40.2)	79 (59.8)	1	
Intermediate	291	138 (47.4)	153 (52.6)	1.32 (0.88-2.17)	0.178
Rank					
Officer	127	47 (37.0)	80 (63.0)	1	
Non-officer	236	117 (49.6)	119 (50.4)	1.61 (1.03-2.67)	0.029
Duration of sea voyage					
< 6 months	68	24 (35.3)	44 (64.7)	1	
6 – 9 months	205	89 (43.4)	116 (56.6)	1.38 (0.81-2.58)	0.243
> 9 months	150	78 (52.0)	72 (48.0)	2.02 (1.07-3.65)	0.025
Chronic disease					
No	356	152 (42.7)	204 (57.3)	1	
Yes	67	39 (58.2)	28 (41.8)	1,82 (1.08-3.02)	0.022
Sleep quality					
Good	195	68 (34.9)	127 (46.1)		
Poor	228	123 (53.9)	105 (46.1)	2.05 (1.39-3.21)	0.004
Current smokers					
No	162	67 (41.4)	95 (58.6)	1	
Yes	261	124 (47.5)	137 (52.5)	1.25 (0.81-2.05)	0.232
Alcohol abuse					
No	44	12 (27.3)	32 (72.7)	1	
Yes	379	179 (47.2)	200 (52.8)	1.97 (1.09-4.27)	0.029
Regular exercise					
Yes	202	79 (39.1)	123 (60.9)	1	

Variable	n	Depression n (%)	Without depression n (%)	Adjusted OR (95%CI)	p-value
No	221	112 (50.7)	109 (49.3)	1.51 (1.03-2.38)	0.031
Stress from noise					
No	239	82 (34.3)	157 (65.7)	1	
Yes	184	109 (59.2)	75 (40.8)	2.69 (1.78-4.15)	<0.001
Isolation from land					
No	200	69 (34.5)	131 (65.5)	1	
Yes	223	122 (54.7)	101 (45.3)	2.13 (1.31-3.24)	0.003
Economic burden					
No	338	151 (44.7)	187 (55.3)	1	
Yes	85	40 (47.1)	45 (52.9)	1.07 (0.69-1.84)	0.537
Sexual stress					
No	154	47 (30.5)	107 (69.5)	1	
Yes	269	144 (53.5)	125 (46.5)	2.52 (1.69-3.87)	<0.001

Abbreviation: AOR = Adjusted odds ratio, CI: Confidence Interval

The study involving 423 Vietnamese seafarers working on ocean-going cargo ships docking at Hai Phong and Quang Ninh ports regarding depressive symptoms and associated factors yielded the following results: The average age of seafarers was 36.5 ± 8.4 years; among them, ages 20-29 accounted for (29.3%); 30-39 years (34.5%); 40-49 years (22.7%); and 50 years and older (13.5%). The average years of experience was 12.1 ± 5.5 years; with less than 10 years (40.4%), 10-19 years (42.6%), and ≥ 20 years (17.0%). The marital status: married (70.2%); single (27.7%); divorced/separated (2.1%). The majority of seafarers had intermediate education (68.8%), while some held university degrees (31.2%). The workplace on the ship included deck crew (42.1%); engine crew (35.2%); and other crews in positions such as electrical and service (22.7%). The rank of seafarers: officers (35.0%); non-officers (65.0%). Duration of sea voyage: less than 6 months (16.1%); 6 - 9 months (48.5%); over 9 months (35.4%).

The prevalence of depressive symptoms among seafarers: The research results indicate that the prevalence of seafarers with depressive symptoms was 191/423 (45.2%); with mild depression at 127/423 (30.0%); moderate depression at 51/423 (12.1%); and severe depression at 13/423 (3.1%); there were no seafarers with symptoms of very severe depression.

Multivariable logistic regression analysis of associated factors for depressive symptoms among seafarers revealed several identified factors, including: non-officer seafarers (OR = 1.61, 95% CI: 1.03-2.67, p = 0.029); prolonged duration of a sea voyage, over 9 months (OR = 2.02, 95% CI: 1.07-3.65, p = 0.025) compared to voyages lasting less than 6 months; having a chronic disease (OR = 1.82, 95% CI: 1.08-3.02, p = 0.022); poor sleep quality (OR = 2.05, 95% CI: 1.39 – 3.21, p = 0.004); alcohol abuse (OR = 1.97, 95% CI: 1.09 – 4.27, p = 0.029); irregular exercise (OR = 1.51, 95% CI: 1.03-2.38, p = 0.031); stress from noise (OR = 2.69, 95% CI: 1.78-4.15, p < 0.001); feeling isolated from land (OR = 2.13, 95% CI: 1.31-3.24, p = 0.003); and emotional stress related to sexual activities (OR = 2.52, 95% CI: 1.69-3.87, p < 0.001). No significant correlations were found between working experience,

educational level, smoking habits, economic burden, and depressive symptoms among seafarers.

DISCUSSION

Depressive disorder is a common mental health issue characterized by persistent feelings of sadness lasting for at least two consecutive weeks, loss of interest in previously enjoyable activities, and growing difficulties in carrying out daily tasks. In addition, severe depression symptoms include fatigue, low energy, and unexplained physical pain In some cases, severe depression can lead to suicidal behavior.[19] Using the PHQ-9 scale to assess depressive symptoms, the results indicate a prevalence of depressive symptoms among seafarers at 45.2%; of which mild depression accounted for 30.0%, moderate depression for 12.1%, and severe depression for 3.1%. The prevalence of depressive symptoms among seafarers in our study is higher than that reported for residents in Ninh Kieu District, Can Tho City, Vietnam, which was 16.0% (PHQ-9), with 12.2% having mild depression, 2.9% moderate depression, 0.7% moderately severe depression, and 0.2% severe depression.[20] Another study on the elderly population in Vietnam showed that 20.2% of subjects had depressive symptoms.[21] A study by Van T et al. on aquaculture workers in Hai Phong, Vietnam, found a prevalence of depressive symptoms of 28.7%, including mild depression (20.9%), moderate depression (6.3%), and severe depression (1.5%).[22] Therefore, the prevalence of depressive symptoms among seafarers in our study is higher than that reported in studies on other populations. This may be attributed to the demanding and hazardous nature of seafaring. During work at sea, the ship serves as both a workplace and living quarters, and seafarers often have to work in environments with high levels of noise and vibration.[8,23] The predominantly male social environment, long hours at sea, prolonged separation from family, friends, and society, shift-based work, hierarchical structures on board, and concerns about illness or accidents on board are all significant risk factors for mental disorders among seafarers.[24,25] Additionally, seafarers have recently experienced the impact of the COVID-19 pandemic onboard, which may have exacerbated depressive symptoms.[11,12]

Our study results are consistent with several other studies, all indicating a higher prevalence of depressive symptoms among seafarers compared to land-based workers and the general population.[12,26] A study by Qin W et al. on Chinese seafarers reported a prevalence of depressive symptoms at 41.72%, with mild, moderate, and severe levels at 23.35%, 9.30%, and 9.07%, respectively.[12] Another study by Zamora AA et al. found that approximately 30% to 37% of seafarers experienced mild, moderate, or severe anxiety and depressive disorders.[26] A further study involving 598 seafarers aboard ships indicated that over 50% exhibited depressive symptoms, with 25% at risk of severe depression.[27]

Multivariate regression analysis of factors related to depressive symptoms among seafarers indicates that non-officer seafarers have a lower risk of depression (OR = 1.61, 95% CI: 1.03-2.67). We attribute this to the hierarchical structure aboard ships, which non-officer seafarers often have to navigate. Research by Mellbye A and Brooks SK et al. also suggested that the hierarchical structure onboard ships is a risk factor for mental disorders among seafarers.[28,29] Prolonged sea voyages exceeding 9 months carry a higher risk of depression compared to those lasting less than 6 months (OR = 2.02, 95% CI: 1.07-3.65). This result aligns with findings by Slišković A et al., which identified significant stressors for seafarers,

including prolonged separation from home and family, social isolation, and long working hours.[30]

Sleep disorders are a common issue aboard ships, often stemming from shift work schedules (working 4-hour shifts followed by 8-hour breaks before the next shift) and stress from noise exposure. Seafarers with poor sleep quality are at a higher risk of depression. Research by Qin et al. also found that seafarers with poor sleep quality have a higher risk of depression (OR = 4.30, 95%CI: 1.65 – 11.24, $p < 0.05$).[12] Other studies on seafarers have also reported similar results.[29,31]

Seafarers who abuse alcohol are at a higher risk of depression (OR = 1.97, 95% CI: 1.09-4.27, $p = 0.029$). Work-related stressors aboard ships are associated with increased alcohol consumption, while alcohol consumption increases the risk of stress and depression among seafarers.[29] Our study's findings are consistent with those of other authors who have found that alcohol abuse increases the risk of depression.[9,32]

Seafarers who engage in regular exercise are at a higher risk of depression (OR = 1.51, 95% CI: 1.03-2.38, $p = 0.031$). Our study's findings align with those of Qin Wenzhe et al., who found that less leisure time or exercise is associated with depressive symptoms (OR = 3.93, 95%CI: 1.67 – 9.26).[12] A study by Noh J-W et al. showed that irregular exercise increases the risk of depression (OR = 1.48; 95% CI 1.13 - 1.94).[33] Other studies have indicated that exercise is an effective intervention for preventing and treating anxiety and depression.[34,35]

Noise on ships is a persistent issue that seafarers frequently encounter, especially those in the engine department. Although ship noise may not cause occupational deafness, it disrupts the autonomic nervous system, increases stress, and contributes to depressive symptoms.[7,36] The results indicated that seafarers exposed to frequent noise-related stress have a higher risk of depression (OR = 2.69, 95% CI: 1.78-4.15, $p < 0.001$). Other studies have also identified noise as a risk factor for stress and depression at sea.[29,36]

Seafarers experiencing emotional stress related to sexual matters are at a higher risk of depression (OR = 2.52, 95% CI: 1.69-3.87, $p < 0.001$). We attribute this issue to the unique nature of seafaring, which often requires prolonged separation from romantic partners and onshore life. Additionally, the predominantly male social environment onboard ships presents unique challenges, including emotional stress related to sexual matters.[37]

STRENGTHS OF THE STUDY

Currently, there are no studies on the mental health status of seafarers in Vietnam, including depression. The results may inform the development of policies and practices for preventing depression among Vietnamese seafarers.

LIMITATIONS OF THE STUDY

Firstly, the study results are based on self-reported depressive symptoms and may contain recall and reporting biases. Secondly, depressive symptoms may have been underestimated as almost all participants perceived themselves as healthy. Thirdly, this is a cross-sectional study, and the cause-and-effect relationship between certain factors and depressive symptoms among seafarers should be interpreted with caution.

CONCLUSION

Depressive symptoms are common mental health issues among Vietnamese seafarers with a prevalence of (45.2%) depressive symptoms among seafarers than that seen among onshore workers. Associated factors with depressive symptoms include hierarchical structures

onboard, prolonged duration at sea, chronic disease, poor sleep quality, alcohol abuse, irregular exercise, stress from noise, isolation from land, and emotional stress. To mitigate these symptoms, seafarers should engage in regular exercise, adjust their lifestyles, shorten their time at sea, and enhance awareness of depressive symptoms and mental health issues among seafarers.

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CONFLICTS OF INTEREST

There are no conflicts of interest among authors.

AUTHORS' CONTRIBUTIONS

TNV conceived the research idea and conducted the entire study, including data collection, experimentation and analysis. CTTQ took responsibility for Conception and design, writing the manuscript, revision, and finalization. DNHV took charge of data analysis and interpreting the findings, providing administrative, technical or logistic support.

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