

Original article

Prevalence of depression and anxiety among Thai recreational scuba diver

Ratchada Saengsanon¹, Sookjaroen Tangwongchai^{2,*}

¹*Program in Mental Health, Department of Psychiatry, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand*

²*Center of Excellence in Cognitive Impairment and Dementia, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand*

Abstract

Background: Scuba diving accidents linked to psychiatric medication side effects have been reported internationally. Prior studies have identified a significant prevalence of depression and anxiety among divers, with some individuals continuing to dive despite existing physical or psychiatric conditions. However, no such data exist for Thailand.

Objective: To examine the prevalence and associated factors of depression and anxiety among Thai recreational scuba divers.

Methods: A cross-sectional study consecutively recruited 126 certified Thai recreational scuba divers aged 18–60 years visiting Koh Tao, Surat Thani Province, between July and November 2024. Data were collected using an online questionnaire comprising five sections: demographic information, diving profile, health screening, the 9-item Patient Health Questionnaire (PHQ-9), and the 7-item Generalized Anxiety Disorder scale (GAD-7). Descriptive statistics and logistic regression analyses were used to identify factors associated with moderate to severe depression and anxiety.

Results: The prevalence of moderate to severe depressive symptoms was 18.3%, while 8.7% of participants reported moderate to severe anxiety. The most frequently reported medical condition was a previous COVID-19 diagnosis. Divers with fewer than 40 logged dives in the past 12 months were significantly more likely to report moderate to severe depression (OR = 4.56; 95% CI: 1.38–15.07; $P = 0.013$), as were those with a history of depression or suicidal ideation/attempt (OR = 5.61; 95% CI: 1.18–26.63; $P = 0.030$). The presence of bipolar disorder was significantly associated with moderate to severe anxiety (OR = 9.80; 95% CI: 1.54–62.50; $P = 0.016$).

Conclusion: A substantial proportion of Thai scuba divers exhibit clinically relevant symptoms of depression and anxiety, particularly those with psychiatric histories. Routine mental health assessments, conducted by professionals familiar with both psychiatric care and diving medicine, are essential for ensuring diver safety.

Keywords: Anxiety, depression, mental health, scuba diving, Thailand.

***Correspondence to :** Sookjaroen Tangwongchai, Center of Excellence in Cognitive Impairment and Dementia, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.

E-mail : Sookjaroen@gmail.com

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Scuba diving is considered a safe activity when conducted under the listed procedure. Divers are required to undergo standardized training and must agree to safety procedures, including physical and psychological readiness.⁽¹⁻⁴⁾ However, external factors such as weather, currents, visibility, or equipment malfunction may cause diver's stress during a dive.⁽³⁻⁷⁾ Therefore, individuals with health concern, especially psychiatric conditions^(3,6), should be medically evaluated before diving.^(4,8) Additionally, it is recommended that individuals with anxiety or impaired decision-making should not engage in diving activities without supervision from medical or mental health professionals^(4,9), as these conditions may lead to panic and confusion which may lead to diving accidents.^(2,4,10)

There are studies that have reported mental health issues among divers in many countries. For example, Taylor DM, *et al.*⁽¹¹⁾ found that 24.9% of Australian divers reported mental health problems, with 5.8% experiencing depression and 4.9% experiencing anxiety. St Leger Dowse M, *et al.*⁽¹⁰⁾ found that 15.0% of divers in the United Kingdom (UK) had a history of mental health conditions. Divers with higher Patient Health Questionnaire-9 (PHQ-9) and General Anxiety Disorder-7 (GAD-7) scores tended to reduce their diving frequency, suggesting an impact of mental health on diving motivation. Van Wijk CH, *et al.*⁽¹²⁾ found that South African military divers underreported anxiety, possibly due to occupational restrictions on disclosing mental health conditions. Danczyk DA, *et al.*⁽⁷⁾ study showed recreational scuba divers in the US using antidepressants, highlighting the importance of mental health screening prior to diving.

A review of international literature from countries such as the UK⁽¹⁰⁾, the Netherlands⁽¹³⁾, Australia⁽¹¹⁾, and South Africa⁽¹²⁾ suggests that depression and anxiety among divers are associated with increased risk of accidents and mortality.⁽²⁻⁴⁾ However, no such studies have been conducted in Thailand. Therefore, this study aimed to investigate the prevalence and levels of depression and anxiety among Thai scuba divers to provide foundational mental health data for assessing diving fitness and ensuring diver safety.

Methods

This study employed a cross-sectional descriptive research design. The research protocol was reviewed and approved by the Institutional Review Board, Faculty of Medicine, Chulalongkorn University

(IRB no. 0272/67). The study population included certified Thai recreational scuba divers who visited Koh Tao, Surat Thani Province. Koh Tao is considered one of the world's renowned diving destinations, as diving is possible year-round and there are more than 20 dive sites around the island. The data collection conducted between July 1 and November 30, 2024. Eligible participants were aged 18 - 60 years, used standard compressed air (21.0% oxygen and 79.0% nitrogen), held at least an Open Water Diver certification, were able to read and understand Thai, and provided informed consent. Individuals with disabilities or without any recorded dive activity within the past year were excluded.

A consecutive sampling method was employed. All divers who met the inclusion criteria and none of the exclusion criteria were consecutively invited to participate. Data collection was conducted directly by the principal investigator, who approached potential participants at dive shops and beaches during weekends and public holidays. All participants were informed of the study's objectives, their right to withdraw at any time, and the confidentiality of their responses. Those with elevated scores for depression or anxiety were advised to consult healthcare professionals and to discuss their fitness to dive with their instructors.

Measurements and questionnaires

Data were collected using a structured, self-administered questionnaire delivered via an online Google Form. Participants accessed the questionnaire by scanning a QR code or visiting a secure URL. The instrument consisted of five sections: 1) personal data; collected demographic information including gender, age, weight, height, marital status, education level, and average monthly income; 2) Diving profile; that captured diving-related variables such as highest certification level, duration of diving experience, number of logged dives in the past 12 months, total number of dives, and diving locations within Thailand; 3) Health information, that was adapted relevant items from the *Diver Medical | Participant Questionnaire*, focusing on psychiatric history, current medications, and other relevant health conditions; 4) Depression assessment; by utilizing the 9-item Patient Health Questionnaire (PHQ-9)⁽¹⁴⁾, to assess depressive symptoms. Each item was rated on a 4-point Likert scale, yielding a total score ranging from 0 to 27. Scores were categorized as follows: minimal or none

(0–4), mild (5–8), moderate (9–14), moderately severe (15–19), and severe (20–27); and 5) Anxiety assessment; that employed the 7-item Generalized Anxiety Disorder scale (GAD-7), Thai version to assess anxiety symptoms. These items were rated on a 4-point Likert scale, with total scores ranging from 0 to 21. Scores were classified as mild or slightly above average (0–9), moderate (10–14), and severe (15–21).

Statistical analysis

All data were analyzed using IBM SPSS Statistics version 28.0. Descriptive statistics were used to summarize demographic and clinical characteristics. Data were expressed as mean $\pm$ standard deviation (SD). and odd ratio (OR) and 95% confidence interval (CI). Associations between categorical variables and the presence of depression or anxiety were evaluated using Chi-square or Fisher's exact tests, as appropriate. Binary logistic regression analysis was performed to identify factors associated with moderate to severe depression and anxiety. A $P < 0.05$ was considered statistically significant.

Results

A total of 126 Thai scuba divers participated in the study. It was found that 51.6 % of the participants were female ($n = 65$). The mean age was 34.1 years (range: 20–57 years). Participants had average body mass index (BMI) of 22.7. Most participants were single and held a bachelor's degree or equivalent (71.4%). The largest occupational group was company employees; that accounted for 40.5%, and the most monthly income range was 30,001–50,000 THB (38.9%).

Regarding diving profiles, 62.7% were classified as recreational divers: those who hold license from open water diver to master scuba diver and dive within recreational scope, and 37.3% as professional divers: those who are holding license from dive mater to dive instructor and may be able to work in scuba diving industry. The most common certification level was Advanced Open Water Diver (32.5%). The average duration of diving experience was 4.9 years. In the past 12 months, participants reported an average of 108.1 logged dives, while the average total number of logged dives since beginning diving was 589.8. Within the previous year, 7.9% of participants reported experiencing panic attacks, and 4.0% reported having a diving-related accident.

The most commonly reported health condition was a prior diagnosis of COVID-19, found in 62.7% of respondents. Frequent migraine headaches within the past 12 months were reported by 13.5%, followed by severe allergic rhinitis or hay fever at 11.1%. A history of major depression or suicidal ideation/attempt was reported by 10.3%. At the time of the study, 5.6% were undergoing psychiatric treatment, and 5.6% reported using antidepressants or sleeping aids.

The prevalence of depression and anxiety. Among the participants, 18.3% of divers exhibited moderate to severe levels of depression, with a mean PHQ-9 score of 5.1. Additionally, 8.7% of divers reported moderate to severe levels of anxiety, with a mean GAD-7 score of 3.8. There were 9 divers, or 7.1% who exhibit both anxiety and depression.

The factors associated with depression among scuba divers included: having no more than 40 logged dives within the past 12 months (30.4%), hypertension (13.0%), a history of depression or suicidal ideation/attempt (26.1%), and bipolar disorder (17.4%). As for anxiety, the associated factors were single marital status (63.7%) and having a diagnosis of bipolar disorder (27.3%).

Logistic regression analysis identified significant associations between mental health outcomes and specific risk factors. Divers with ≤ 40 logged dives in the past year were significantly more likely to report moderate to severe depression (adjusted OR = 4.56; 95% CI: 1.38–15.07; $P = 0.013$). Similarly, participants with a history of major depression or suicidal ideation/attempt were more likely to report moderate to severe depressive symptoms (adjusted OR = 5.61; 95% CI: 1.18–26.63; $P = 0.03$).

Regarding anxiety, a diagnosis of bipolar disorder was significantly associated with moderate to severe anxiety (adjusted OR = 9.81; 95% CI: 1.54–62.50; $P = 0.016$). Notably, bipolar disorder was also the only associated factor identified among divers who experienced both depression and anxiety (adjusted OR = 13.35; 95% CI: 2.08–85.64; $P = 0.006$) highlighting its central in this comorbid presentation.

Table 1. General characteristics of the participants.

Personal information	n (%)
Gender	
Female	65 (51.6)
Male	61 (48.4)
Age (years) mean $\pm$ SD (min - max)	34.1 $\pm$ 7.6 (20.0 – 57.0)
Weight (kg) mean $\pm$ SD (min - max)	65.0 $\pm$ 11.3 (42.0 – 93.0)
Height (cm) mean $\pm$ SD (min - max)	168.8 $\pm$ 8.7 (150.0 – 190.0)
Body mass index (BMI, kg/m ²) Mean $\pm$ SD (Min - max)	22.7 $\pm$ 3.0 (17.1 – 37.0)
Marital status	
Single	109 (86.5)
Married	14 (11.1)
Divorce / widower	3 (2.4)
Education level	
Below Bachelor's Degree	9 (7.1)
Bachelor's Degree or equivalent	90 (71.4)
Master's/doctoral degree	27 (21.5)
Occupation	
Company employee	51 (40.5)
Freelance	30 (23.8)
Business owner	23 (18.3)
Student/others	14 (11.1)
Government officer/state enterprise	8 (6.3)
Average monthly income (Thai Baht)	
Less than 30,000	27 (21.5)
30,001-50,000	49 (38.9)
50,001-70,000	29 (23.0)
More than 70,000	21 (16.6)
Diving information	n (%)
level of certificate	
recreational level (total)	79 (62.7)
Open water diver	22 (17.5)
Advance open water diver	41 (32.5)
Rescue diver / master scuba diver	16 (12.7)
Professional level (total)	47 (37.3)
Dive master	16 (12.7)
Dive instructor	31 (24.6)
Total period of diving (year) mean $\pm$ SD (min -max)	4.9 $\pm$ 4.9 (0.1 – 34.0)
Total log in the past 12 months (dive) mean $\pm$ SD (min - max)	108.1 $\pm$ 184.1 (2 – 1000)
Total log since first dive (dive) mean $\pm$ SD (min -max)	589.8 $\pm$ 1094.2 (4 – 6001)
Report panic symptoms in the past year	10 (7.9)
Reported diving accident in the past year	5 (4.0)

Table 2. Details on diving-related medical conditions.

Medical condition	n (%)
Prior diagnosed with COVID-19	79 (62.7)
Frequent migraine headaches within the past 12 months	17 (13.5)
Severe allergic rhinitis or hay fever	14 (11.1)
A history of major depression or suicidal ideation/attempt	13 (10.3)
Sinus disease, history of sinus surgery, or bronchitis	12 (9.5)
Respiratory illness requiring hospitalization within the past 5 years	10 (7.9)
Gastrointestinal diseases	9 (7.1)
Currently under mental health/psychiatric treatment	7 (5.6)
Bipolar disorder	6 (4.8)
Panic attack	5 (4.0)
Ear-related problems, hearing loss, or problem with balance	5 (4.0)
Episodes of dizziness, fainting, or loss of consciousness	5 (4.0)
Hypertension	4 (3.2)
Diabetes mellitus	2 (1.6)
Details on medications for psychiatric	
Antidepressants	7 (5.6)
Sleeping pills	7 (5.6)
Unknown	5 (4.0)
Anti-anxiety	4 (3.2)

Table 3. Depression and anxiety levels among scuba divers.

Depression level (PHQ-9)	n (%)
No or mild depression (0–8 points)	103 (81.7)
Moderate to severe depression (9–27 points)	23 (18.3)
Mean ± SD = 5.1 ± 4.0, min = 0.0, max = 19.0	
Anxiety level (GAD-7)	n (%)
No or mild anxiety (0–9 points)	115 (91.3)
Moderate to severe anxiety (10–21 points)	11 (8.7)
Mean ± SD = 3.8 ± 3.7, min = 1.0, max = 15.0	
Depression and anxiety level (PHQ-9 & GAD-7)	n (%)
No depression and anxiety	101 (80.2)
Depression or anxiety	16 (12.7)
Comorbid depression and anxiety	9 (7.1)

Table 4. Factors association with depression, anxiety.

	No or mild n = 103, n (%)	Moderate to n = 23, n (%)	P-value
Depression			
Number of logged dives in the past 12 months ≤ 40 dives	63 (61.2)	7 (30.4)	0.007* ^Δ
Hypertension	1 (1.0)	3 (13.0)	0.019* ^Δ
A history of major depression or suicidal ideation/attempt	7 (6.8)	6 (26.1)	0.006*
Bipolar disorder	3 (2.9)	4 (17.4)	
Anxiety	n = 115, n (%)	n = 11, n (%)	
Marital status: Single	102 (90.4)	7 (63.7)	0.042* ^Δ
Bipolar disorder	3 (2.6)	3 (27.3)	0.009* ^Δ

Table 5. Factors associated with depression and anxiety among scuba divers (n = 126).

Factors associated with depression	β	Adjusted odd ratio	95% CI		P-value
			Lower	Upper	
Number of logged dives in the past 12 months ≤ 40 dives	1.518	4.561	1.38	15.07	0.016*
Depression or history of self-harm/suicidal ideation/attempt	1.725	5.610	1.18	26.63	0.030*
Cox and Snell's $R^2 = 0.172$, Nagelkerke's $R^2 = 0.281$, $*P < 0.05$					
Factors associated with anxiety					
Bipolar disorder	2.283	9.807	1.54	62.50	0.013*
Cox and Snell's $R^2 = 0.072$, Nagelkerke's $R^2 = 0.161$, $*P < 0.05$.					
Factors associated with depression and anxiety					
Bipolar disorder	2.591	13.345	2.08	85.64	0.006*
Cox and snell's R^2 , 0.072; Nagelkerke's R^2 , 0.161; $*P < 0.05$.					

Discussion

The prevalence of depression among Thai scuba divers in this study revealed that 18.3% of participants had moderate to severe depressive symptoms, as indicated by PHQ-9 scores of 9 or above. The mean PHQ-9 score among the sample was 5.08, which is below the recommended clinical cutoff. ⁽¹⁴⁾ Furthermore, 8.7% of divers reported moderate to severe anxiety symptoms, as measured by the GAD-7, with a mean score of 3.8 which also below the clinical cutoff of 10.

These findings warrant attention, as they reflect a significant proportion of mental health symptoms among an otherwise physically active and health-conscious population. When compared to the general Thai population, the prevalence observed in this study is notably higher. National mental health surveys in Thailand report a prevalence of major depressive disorder at approximately 3.2 % and generalized anxiety disorder at less than 2.0%. ⁽¹⁵⁾ Even broader screening-based using tools like the PHQ-9 ⁽¹⁴⁾ in the community dwelling population reported a prevalence of 5.0% – 6.0% , which was lower than those found in this sample. The elevated prevalence among divers may be related to unique stressors such as traveling requirement, financial burden, performance expectations, or environmental exposure, though these require further exploration.

Internationally, studies examining mental health in recreational divers remain limited. However, some reports which has been using same tools with this study to examine mental health status among their divers showed comparable rates of common mental health condition to the general population estimates. ⁽¹²⁾ A UK-based study found that the prevalence of depression and anxiety in sport divers are 8.0% and

5.0% respectively, while a study in South African Navy divers showed 4.5% of depression and 0.8% anxiety, comparable level to their population estimates. ⁽¹⁰⁾ Conversely, research among military or commercial diving populations has shown variable results, with some groups exhibiting lower rates of anxiety and depression due to occupational context require more stringent than recreational standards. ^(7,12,16) However; some studies reported good mental health and that some individuals perceived diving as beneficial for managing stress and mood disorders. ⁽¹⁷⁾

The relatively high prevalence observed in this study may reflect regional, cultural, or contextual factors, including mental health stigma for seeking psychiatric treatment, resulting in underdiagnosis and treatment of mental health issues in Thai population. Some divers may not declare their medication on diver self-certification medical forms to avoid the activity constraint. ⁽¹⁰⁾ This may highlight that an important safety issue often ignored concerns the evaluation of the risk-to benefit ratio for divers suffering from mental illnesses such as major depression or panic disorder. Additionally, seasonal timing and the social context during data collection, which was post-COVID 19 pandemic recoveries, may also contribute. ^(18, 19)

Divers who had logged not more than 40 dives in the past 12 months and those diagnosed with major depression or suicidal ideation or attempt were significantly more likely to report moderate to severe depressive symptoms. This can imply that existing mental health conditions may reduce motivation to engage in diving activities. It is also possible that psychotropic medication side effects or self-awareness of one's mental health condition led some divers to avoid high-risk activities such as scuba diving. ^(7,9,11) Although modern psychiatric medications, particularly

SSRIs tend to have fewer side effects compared to earlier treatments⁽⁷⁾, divers with mild to moderate depression and comorbid anxiety should be closely monitored by healthcare professions.^(7, 20) The recommended observation for psychiatric medication is recommended 14 days before diving activities to ensure their safety and reduce the risk of diving-related accidents or fatalities.^(7, 9, 20)

Bipolar disorder is characterized by significant emotional dysregulation, leading to heightened sensitivity and reactivity to environmental stimuli. This emotional hyper-reactivity can manifest as intense mood swings and impulsive behaviors, which may impair judgment and increase vulnerability to panic in high-risk situations, such as underwater diving.⁽²¹⁾ Furthermore, individuals with bipolar disorder often exhibit impaired emotion regulation strategies and heightened impulsivity, even during euthymic phases.^(21, 22) These deficits can compromise their ability to manage stress and respond adaptively in challenging environments, potentially increasing the risk of disorientation and panic during activities like scuba diving.

Since depression can be treated with antidepressants together with social support⁽²³⁾, regular physical activity, and engaging in joyful activities^(7, 10), scuba diving may serve a therapeutic role^(24, 25) when approached cautiously. Some studies suggest that scuba diving enhance positive mental health impact, improving self-esteem, cognitive ability, and emotional regulation, which may contribute to reduced depressive and anxiety symptoms in daily life.^(24, 26) When divers with mild to moderate depressive and anxiety are free from active symptoms and medication side effects^(7, 9), diving may be considered as part of a mental health recovery strategy⁽²⁵⁾ recommended to be conducted under close supervision by healthcare providers and supported by a reliable social network. Additionally, increased familiarity with diving equipment and experience in handling underwater stressors may reduce the likelihood of recurring underwater panic attack.^(1, 2, 6)

Several limitations should be considered when interpreting the findings of this study. First, the cross-sectional design precludes any inference of causality between diving activity and mental health status. Longitudinal studies are needed to explore the potential therapeutic effects or risks associated with diving over time. Second, the study population was limited to Thai recreational divers using standard air mixtures; the

findings may not be generalizable to divers using mixed gases, technical divers, or those from other cultural or geographic contexts. Third, mental health data were self-reported using screening tools, which may be subject to recall or social desirability bias and are not a substitute for clinical diagnoses. Finally, the relatively small number of participants with severe psychiatric symptoms may have limited the power to detect additional associations.

Despite these limitations, the study offers important preliminary insights and highlights the need for more robust mental health protocols in diving medicine, especially in Southeast Asian contexts where such data have been scarce.

Conclusion

This study provides the first empirical evidence on the prevalence and associated factors of depression and anxiety among Thai recreational scuba divers. The findings indicate that 18.3% of participants experienced moderate to severe depressive symptoms, while 8.7% reported moderate to severe anxiety. Notably, divers with fewer than 40 logged dives in the past year and those with a history of depression or suicidal ideation were at significantly higher risk for depression. Anxiety was significantly associated with a diagnosis of bipolar disorder.

These results underscore the importance of incorporating comprehensive mental health assessments into routine fitness-to-dive evaluations. Divers with known psychiatric conditions, particularly mood disorders, should undergo specialized evaluation by clinicians trained in both psychiatric care and diving medicine. Ensuring mental fitness is not only essential for individual diver safety but also for the prevention of avoidable underwater incidents.

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Conflicts of interest

The authors confirm they have no conflicts of interests to declare.

Data sharing statement

Data sharing statement. All data generated or analyzed during the present study are included in this published article. Further details are available for non commercial purposes from the corresponding author on reasonable request.

References

1. Tientawach P. Risk reduction management model of scuba diving in Thailand. *Acad J Thai Natl Sports Univ* 2019;11:177-88.
2. Kovacs CR. Scuba diving and the stress response: considerations and recommendations for professional and recreational divers. *Int Marit Health* 2023;74:186-91.
3. Casadesús JM, Aguirre F, Carrera A, Boadas-Vaello P, Serrando MT, Reina F. Diving-related fatalities: multidisciplinary, experience-based investigation. *Forensic Sci Med Pathol* 2019;15:224-32.
4. Denoble PJ, editor. DAN Annual Diving Report 2019 Edition: A report on 2017 diving fatalities, injuries, and incidents. Durham (NC): Divers Alert Network; 2019.
5. Nieuwenhuys A, Oudejans RR. Anxiety and performance: perceptual-motor behavior in high-pressure contexts. *Curr Opin Psychol* 2017;16:28-33.
6. Rumpoko SS, Sitiasih VS, Sudarmanto E, editors. Anxiety and performance of scuba diver. *Proceedings of the 2nd International Conference on Sports Sciences and Health 2018 (2nd ICSSH 2018)*. Dordrecht, Netherlands: Atlantis Press; 2019.
7. Danczyk DA, Pardo JV, Colvard DF. Scuba diving while taking an antidepressant: A case report of a diver with depression. *J Clin Images Med Case Rep* 2023;4:2249.
8. Querido AL. Diving and antidepressants. *Diving Hyperb Med* 2017;47:253-6.
9. Querido AL, Ebbelaar CF, Wingelaar TT. Diving with psychotropic medication: review of the literature and clinical considerations. *Diving Hyperb Med* 2023;53:259-67.
10. St Leger Dowse M, Whalley B, Waterman MK, Conway RM, Smerdon GR. Diving and mental health: the potential benefits and risks from a survey of recreational scuba divers. *Diving Hyperb Med* 2019;49:291-7.
11. Taylor DM, O'Toole KS, Ryan CM. Experienced, recreational scuba divers in Australia continue to dive despite medical contraindications. *Wilderness Environ Med* 2002;13:187-93.
12. Van Wijk CH, Martin JH, Firfirey N. Common mental health conditions among navy divers: A brief report. *Diving Hyperb Med* 2020;50:417-20.
13. Komdeur P, Wingelaar TT, van Hulst RA. A survey on the health status of Dutch scuba diving instructors. *Diving Hyperb Med* 2021;51:18-24.
14. Lotrakul M, Sumrithe S, Saipanish R. Reliability and validity of the Thai version of the PHQ-9. *BMC Psychiatry* 2008;8:46.
15. Siriwanarangsun P, Kongsuk T, Arunpongpaissal S, Kittirattanapaiboon P, Charatsingha A. Prevalence of mental disorders in Thailand: A national survey 2003. *J Ment Health Thai* 2004;12:177-88.
16. Zhao H, Wen Y, Liang K, Huang J, Fang Y. Anxiety and its relationship to demographic and personality traits data among special operations divers: a cross-sectional study. *BMJ Mil Health* 2024:e002732.
17. Youngson L, Foster C, Lambert J. The Physical and Mental Health Benefits of Lifestyle Sports for Disabled People: A Scoping Review. *Int J Disabil Sports and Health Sci* 2023;6:60-81.
18. Mahikul W, Srichan P, Narkkul U, Soontarawirat I, Kitro A, Pumipuntu N, et al. Mental health status and quality of life among Thai people after the COVID-19 outbreak: a cross-sectional study. *Sci Rep* 2024;14:25896.
19. Ettman CK, Abdalla SM, Cohen GH, Sampson L, Vivier PM, Galea S. Prevalence of Depression Symptoms in US Adults Before and During the COVID-19 Pandemic. *JAMA Netw Open* 2020;3:e2019686.
20. The Undersea & Hyperbaric Medical Society. Diver Medical Participant Questionnaire [Internet]. Durham (NC): Divers Alert Network; 2020 [cited 2025 Oct 7].
21. Kanske P, Schönfelder S, Forneck J, Wessa M. Impaired regulation of emotion: neural correlates of reappraisal and distraction in bipolar disorder and unaffected relatives. *Transl Psychiatry* 2015;5:e497.
22. Henry C, Phillips M, Leibenluft E, M'Bailara K, Houenou J, Leboyer M. Emotional dysfunction as a marker of bipolar disorders. *Front Biosci (Elite Ed)* 2012;4:2622-30.
23. Nair A, Kalembo F, Zhou H, Ng L, Hawley G, Grogan A, et al. Mental health and coping strategies among international health science students during the COVID-19 pandemic: A cross-sectional study. *Teach Learn Nurs* 2024;19:e208-16.
24. Lewis Youngson CF, Jeffrey Lambert. The Physical and Mental Health Benefits of Lifestyle Sports for Disabled People: A Scoping Review. *Int J Disabil Sports Health Sci* 2023;6:60-81.
25. Morgan A, Sinclair H, Tan A, Thomas E, Castle R. Can scuba diving offer therapeutic benefit to military veterans experiencing physical and psychological injuries as a result of combat? A service evaluation of Deptherapy UK. *Disabil Rehabil* 2019;41:2832-40.
26. Morgan WP. Anxiety and Panic in Recreational Scuba Divers. *Sports Med* 1995;20:398-421.