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Research Article

Sleep Quality Among Scuba Diving Instructors, Andaman and Nicobar Islands, India

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I N F O

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A B S T R A C T

Background: Water-based sports improve sleep quality and literature shows that it is superior to land-based physical activity in improving sleep. These occupational risks associated with scuba diving might affect sleep quality also. Hence, the current study aimed to determine sleep quality among scuba instructors in Andaman & Nicobar Islands.

Method: A cross-sectional research was done using a participant-administered questionnaire on 423 scuba diving instructors, in Andaman and Nicobar Islands between 2022 and 2023. Data on sociodemography, health profile, diving-related data, hazards faced in diving and on health, sleep quality and safety-related knowledge and practices in scuba diving was collected and analysed using SPSS ver 25. Approval from the institutional ethics committee was secured. Written informed consent was obtained from all the participants.

Results: The mean age of the participants was years. The majority (189, 44.7%) reported the problem of not being able to sleep within 30 minutes in bed about once or twice a week. Two hundred and seventy (63.8%) did not need any medications to go to sleep.

Conclusion: Sleep quality was low among scuba diving instructors with the lowest score being the sleep duration component.

Keywords: Scuba, Blue-Space, Diving, PSQI, Sleep, Water Sports

Introduction

Blue spaces by themselves have been linked to different forms of well-being, including induction of psychological restoration when compared with man-made urban areas.[1] Physical activity, by itself, provides psychological betterment including improving focus, motivation, etc., in addition to the physical health benefits.[2] Regular exercise improves sleep quality.[2] Engaging in water-based exercises offers various benefits, including the comfort provided by the temperature of the water.[3,4]

Self-Contained Underwater Breathing Apparatus (SCUBA) diving is an adventurous water-related sports activity which carries a baggage of degree of hazard, risk and good psychological aspects. Scuba diving is a thrilling and popular recreational activity that allows individuals to explore the fascinating underwater world.[5] Scuba diving,

in particular, has been reported to reduce the levels of anxiety or depression and improve social functioning.[6] Scuba diving has psychological benefits and was proposed as a therapeutic intervention to improve depression, anxiety and other mental conditions.[6]

Water-based sports improve sleep quality and literature shows that it is superior to land-based physical activity in improving sleep.[7,8] Occupational health hazards are a significant concern for various professions, including those that involve unique work environments and tasks.[9] Similarly, scuba diving presents unique challenges and potential health risks for both recreational divers and professionals. These occupational risks associated with scuba diving might affect sleep quality also. Though limited in quantity, research has presented that water sports like swimming are related to poor quality of sleep significantly and present with excessive daytime sleepiness.[10] Assessing the quality of sleep and understanding the underlying determinants of sleep quality among scuba divers is essential to plan health-related work guidelines for people engaged in scuba diving for a long duration of time. Hence, the aim of the present research was to determine sleep quality among scuba instructors in Andaman & Nicobar Islands.

Materials and Methods

A questionnaire-based cross-sectional study was done on certified scuba diving instructors at various levels in the Andaman and Nicobar Islands, India from 2022 to 2023. Scuba diving is among the most popular water sports activities globally and Andaman and Nicobar Islands are best suited for the sport owing to its rich geography. Andamans are enclosed by long stretches of reefs and are home to one of the densest ecosystems of coral reefs and formations. Andaman has 10 beautiful islands with more than 40 places to dive in with suitable factors including depth of water, clarity of water, safety, abundance of corals and fish, water current and weather.

Inclusion Criteria: Scuba diving instructors who had been diving in the study setting for the last 6 months.

Exclusion Criteria: Instructors who did not possess a valid certificate to be an instructor.

As this is a novel study with no available data on the sleep quality of this population exclusively, the sample size was calculated to be 423 with a prevalence of good sleep quality assumed to be 50%, an absolute error of 5% error, power of 80% and a non-response rate of 10%. The list of scuba diving instructors was obtained from the agencies offering scuba diving for recreational purposes in the Andaman and Nicobar Islands and simple random sampling by random number tables was used to select the desired number of samples. A purpose-designed, semi-structured, participant-administered questionnaire was employed to gather information on sociodemography, health profile, diving-related data, hazards faced in diving and health and safety-related knowledge and practices in scuba diving. Sleep quality was evaluated by a validated tool-Pittsburgh Sleep Quality Index (PQSI) scale which was free to use for educational and research purposes. PQSI mostly assessed sleep quality based on events in the past month. The responses of PQSI were recorded on a four-point Likert scale varying between 0 (no difficulty) and 3 (severe difficulty).

Statistical Analysis

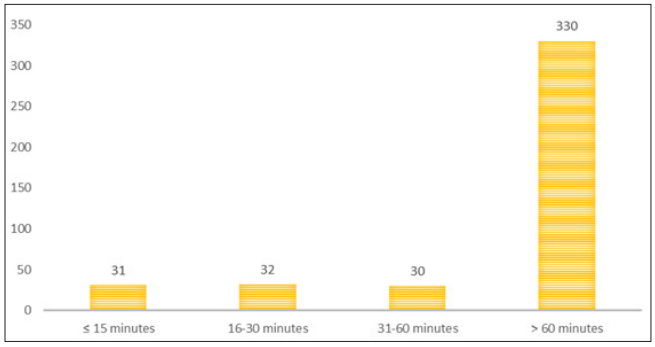
Responses will be fed into Microsoft Excel and analysed using SPSS ver. 27. Responses will be summarised using frequency, percentage and mean, standard deviation as appropriate. Bivariate and multivariable analysis were performed using appropriate tests. A p value less than 0.05 was taken as a statistically significant finding.

Ethical Consideration

Ethical clearance was obtained from the institutional ethics committee. Patients were provided the participant information sheet and explained the study along with addressing their queries. Written informed consent was obtained from all the participants before the start of the study.

Results

The average age of the participants was 26.24 ± 4.71 years and all the participants were males. About one-third (135, 31.9%) smoked tobacco. The average waking up time in the morning was 7.10 AM. More than three-fourths (330, 78%) fell asleep only after more than an hour of going to bed. The average time in bed was 8.5 ± 1.6 hours. The average time of actual sleep in the past month was 5.8 ± 1.2 hours (Figure 1).



(N = 423)

Figure 1.Time to Fall Asleep After Going to Bed

The average self-reported grading of not being able to sleep within 30 minutes was 2.15 ± 0.86. The majority (189, 44.7%) reported the problem of not being able to sleep within 30 minutes in bed about once or twice a week. The mean rating for experiencing awakenings in the middle of the night or early morning was 1.5 ± 1.12. About one-

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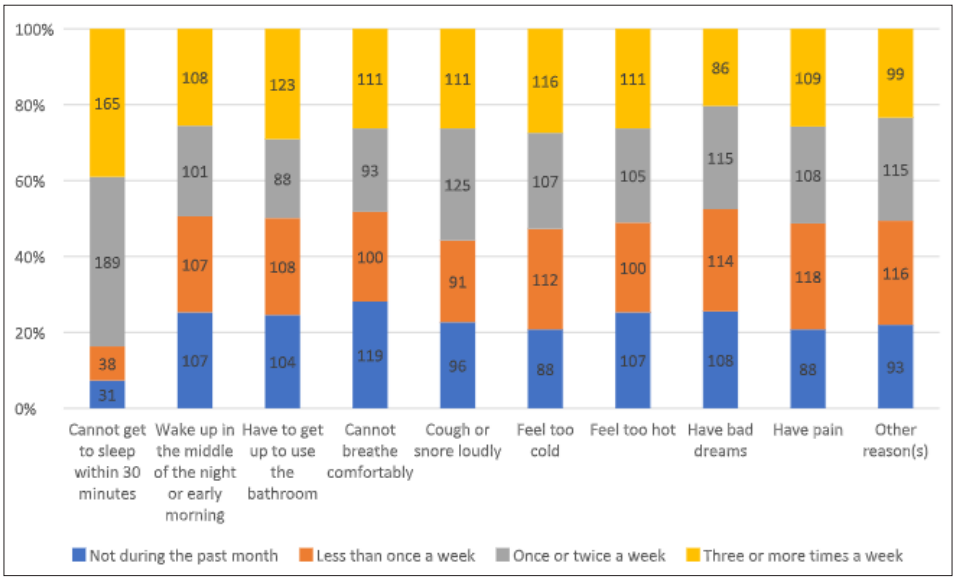
quarter (108, 25.5%) faced the problem of experiencing awakenings at midnight three or more times a week. The average score of waking to go to the restroom was 1.54 ± 1.15. One hundred and twenty-three (29.1%) participants faced the problem of waking up to use the bathroom in the middle of the night about three or more times a week. The average score of not being able to breathe comfortably was 1.46 ± 1.15. More than one quarter (119, 28.1%) did not face any breathing problems during sleep in the past month. The average score of having cough/ snore noisily during sleep in the last month was 1.59 ± 1.11. One hundred and twenty-five (29.6%) participants had the problem of coughing or snoring loudly in sleep about once or twice a week. The average score of feeling too cold was 1.59 ± 1.09. One hundred and sixteen (27.4%) felt too cold during sleep in the past one month (27.4%) three or more times per week. The average score of feeling too hot was 1.5 ± 1.13. Feeling too hot during sleep was felt by 111 (26.2%) subjects thrice weekly or more. The average rate of having bad dreams was 1.42 ± 1.08. One hundred and fifteen (27.2%) had bad dreams once or twice a week. About 118 (27.9%) subjects had pain in sleep less than once a week, and 109 (25.8%) had it more than thrice a week. Two hundred and seventy (63.8%) participants did not need any medications to go to sleep. About one-third (140, 33.1%) did not have any difficulty remaining alert during activities such as driving, meals, or social interactions over the last month. One hundred and two (24.1%) divers had a very big problem in keeping up the enthusiasm to get things done. About a quarter (113, 26.7%) rated the overall sleep quality to be very bad (Figure 2 and Table 1).

The PQSI was assessed based on seven components. The mean score of component 1 was 1.59 ± 1.08, component 2 was 2.62 ± 0.80, component 3 was 5.82 ± 1.21, component 4 was 1.85 ± 1.19, component 5 was 1.98 ± 0.39, component 6 was 0.41 ± 0.62, component 7 was 1.58 ± 0.76. The mean global PQSI score was 15.88 ± 2.31 (Figure 3).



(N = 423)

Figure 2.Sleep Disturbances Among Scuba Diving Trainers

Table 1.Trouble Staying Awake While Driving, Eating Meals or Engaging in Social Activity

(N = 423)

Sleep Disturbances	Frequency (%)
Needed medication to go to sleep	
Not during the past month	270 (63.8)
Less than once a week	138 (32.6)
Once or twice a week	7 (1.7)
Three or more times a week	8 (1.9)
Trouble in staying awake	
Not during the past month	140 (33.1)
Less than once a week	119 (28.1)
Once or twice a week	133 (31.4)
Three or more times a week	31 (7.4)

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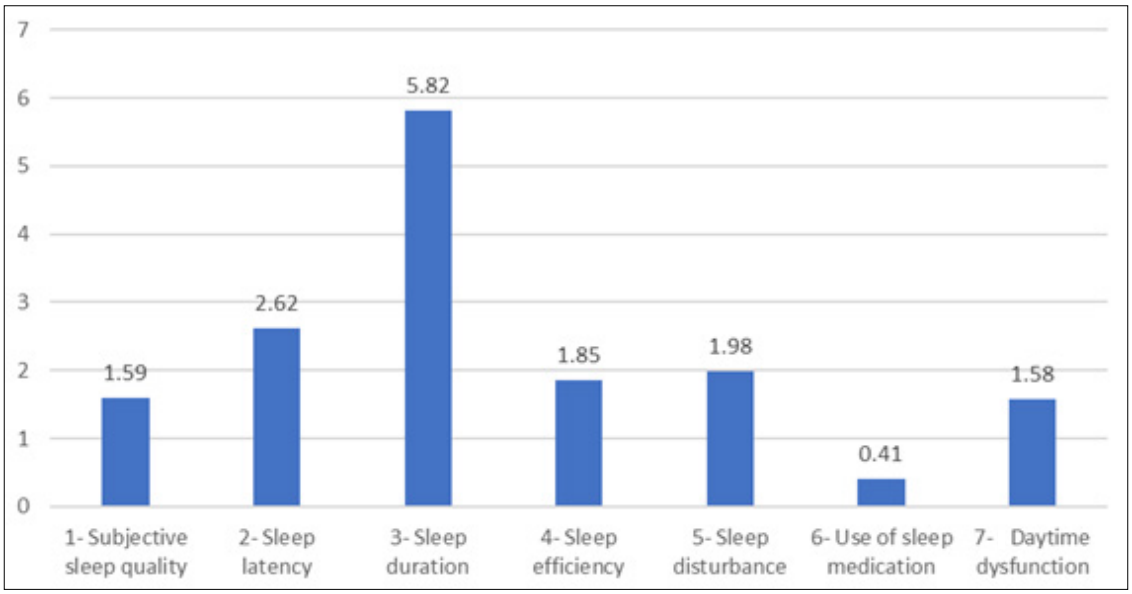
Problem in keeping enthusiasm to get work done	
No problem at all	103 (24.3)
Only a very slight problem	107 (25.3)
Somewhat of a problem	111 (26.2)
A very big problem	102 (24.1)
Rating overall sleep quality	
Very good	86 (20.3)
Fairly good	112 (26.5)
Fairly bad	112 (26.5)
Very bad	113 (26.7)



(N = 423)

Figure 3.Component Scores of PSQI

Discussion

The article is one of its kind and hence cannot be compared with sleep among people in similar occupations. Among the current participants, about one-third smoked tobacco. However, in a study by Surda et al.[10] on participants involved in similar sports, none of them smoked tobacco. The difference might be because of variations in the study setting. The current place relied mainly on tourism and hence the availability of substances was high for recreation. The mean waking up time was 7.10 am. Whereas the swimmers showed a high variation in waking time between training and non-training days (6.22 – 8.55 am).[10] About 14% fell asleep in less than 30 minutes and similarly in the study by Surda et al.,[10] also less than or equal to 20% across various sub-groups fell asleep in the same time interval. Sleep quality overall was low among scuba diving instructors. In accordance with the sleep assessment using the same tool in a different study setting (Malaysia)[11] showed that the majority of the adults were experiencing inadequate sleep. Surda et al.[10] also reported in a study on swimmers that 40% of them were poor sleepers. Similar to the current report, a study on athletes also showed that they suffered from excessive daytime sleepiness.[10,12] The global PSQI among scuba diving instructors was 15.88. However, a study on swimmers reported a relatively better PSQI of 5 (± 2.8). The difference might be because of the higher proportion of smokers and slightly higher mean age in the current study (26.24 vs 20.1 years). In spite of scuba being a water sport, with intense physical activity the sleep quality was low. Hence the role of other determinants of sleep including obesity, age, and pre-existing conditions, is to be explored.

However, the study is not without constraints, given that it was done among professionals of scuba diving and not those who undertook it for recreational purposes, the job-related financial or life risks might affect sleep. The sleep assessment tool used was a subjective tool lacking reliability. The study did not have a comparison group or baseline sleep quality assessment to show the short or long-term effects of scuba on sleep. Being a cross-sectional

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study, it was not able to establish temporal relationships in the variables.

Conclusion

Though sports are believed to increase sleep quality, the majority took more than 30 minutes to sleep after going to bed and faced breathing problems in sleep. About one-third required sleep medications in the past month though not regular. The overall sleep quality is affected by age and pre-existing morbidities. Sleep quality did not affect the common health problems that occurred in scuba diving. Diving variations were not shown to affect sleep. Hence, in conclusion, sleep quality was low among scuba divers, in spite of scuba diving being a good physical sport. The lowest score was on the sleep duration component. Hence, an exploration of the reasons for sleep quality among scuba divers in relation to occupational hazards is to be carried out.

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Conflict of Interest: None

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