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Most Prevalent Diving Related Health Problems in SCUBA Divers

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Research Article

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ABSTRACT

There is a dearth of scientific studies about some common health related problems that don't pose any immediate danger to a diver's life. However, they are ruining the diving holidays of numerous people and may also lead to other life threatening situations.

Present paper is a small attempt to find out the most prevalent diving related health problems and their relation with frequency of diving, certification level, age, experience, and some other pre-existing health problems not associated with diving.

Through a social networking site, divers were asked to retrospectively complete a questionnaire on any pre-existing illness and most common diving related health problems experienced by them. A total of forty seven responses collected. Calculations were performed using Chi square test.

Pain in the ear was most prevalent problem, experienced by 35% divers, followed by headache (21% divers) and sea sickness (17% divers). Most common problem for divers was pain in the ear (25% divers), sea sickness (15%), and headache (8%). These problems were not found associated with frequency of diving, certification level, number of dives, age of the diver, and some pre-existing medical conditions, except pain in the ear that was found associated with pre-existing medical conditions (motion sickness, any form of respiratory discomfort, panic attack & phobias, recurrent ear problems, and migraine headaches).

INTRODUCTION

Recreational SCUBA diving is gaining popularity around the world in recent years, with an estimated 4 million divers in US alone [1]. With the growth of the sport, number of divers facing different health problems associated with diving is also increasing. These conditions range from life threatening rare events like Arterial Gas Embolism (AGE), Decompression Illness (DCI), and Pulmonary Barotraumas to apparently less dangerous but common conditions like barotraumas of the ear and sea sickness [2]. Arterial Gas Embolism, Decompression Illness, and Pulmonary Barotraumas receive much scientific attention because of their serious nature despite their low incidence rate [3]. On the other hand, very common conditions like Barotraumas of the ear and sea sickness don't pose any immediate threat to life but can be very debilitating for a diver and may lead to other life threatening situations like drowning. Out of these two problems, sea sickness has been completely overlooked by the scientific community and little documentation exists regarding its prevention and management [4]. Divers often take anti histamines such as dimenhydrinate and diphenhydramine as well as anticholinergic agents such as hyoscine to alleviate sea sickness. However, these antiemetic's have potential to alter mental alertness and increase the risk of nitrogen narcosis and drowning. Furthermore, only a few studies have evaluated the effects of anti-emetics in the hyperbaric environment [5-8].

Barotraumas of the ear has been reported in scientific literature to be the most common health related problem associated

with diving [9]. This condition usually arises due to failure equalizing ears during descent. Divers are taught to perform valsalva maneuver, frenzel maneuver or the combination thereof to equalize ears [10]. The purpose of the present study is to find out the prevalence of common diving related health problems and how they are related to age, certification level, frequency of diving, and some pre-existing medical conditions of a diver.

MATERIALS AND METHODS

Through a social networking site, divers were asked to retrospectively complete a questionnaire consisting of 11 questions primarily with tick box answers. Questionnaire contained questions on age, gender, level of certification, health problems not associated with diving as well as associated with diving.

The results obtained were tabulated on an excel spread sheet. Chi square test was used to investigate associations between different variables.

RESULTS

A total of 47 responses were received during 19th October 2014 to 19th November 2014. Pain in the ear was most prevalent problem associated with diving (25% divers), followed by headache (21%), and sea sickness (17%) **(Figure 1).**

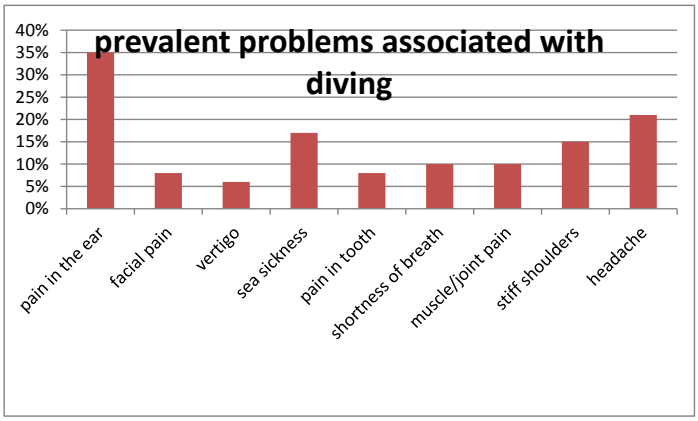

Figure 1. Prevalent Problems Associated With Diving.

According to 25% divers, pain in the ear was their most frequently experienced problem associated with diving, next was sea sickness (15% divers), and headache (8%) **(Figure 2).**

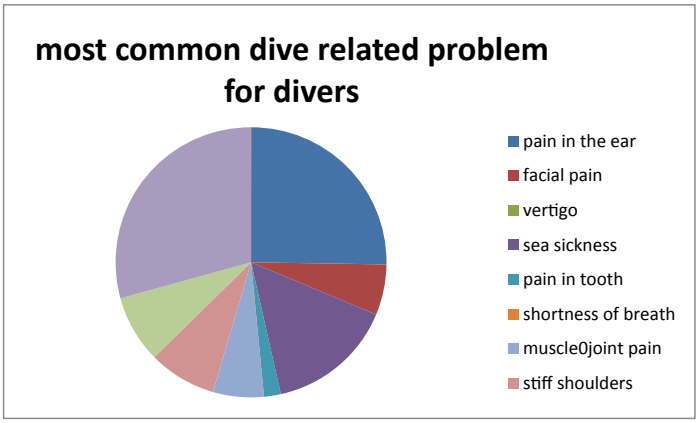

Figure 2. Most Common Dive Related Problem for Divers.

Regarding health problems not associated with diving, about 69% divers were not having any preexisting illness, 10% were suffering from any form of respiratory discomfort, 10% suffered from panic attacks or phobias, 4% were susceptible to motion sickness, 13% had recurrent ear problems, 6% had migraine headaches, and none of the divers had any heart related problem.

Pain in the ear was not found associated with frequency of diving, certification level, diving experience level, and age of the diver **(Tables 1-4).**

However, it was found associated with above mentioned preexisting health conditions of a diver **(Table 5).**

Sea sickness and headache were not found associated with diver's experience level, certification level, frequency of diving, and these preexisting health problems **(Tables 6-9).**

Table 1. Pain in the ear versus frequency of diving.

Frequency of diving	Pain in the ear(+ve)	Pain in the ear (-ve)
Almost daily or on weekends	8	14
After every three months or more	8	17
Chi square value=.099 P=.05		

Table 2. Pain in the ear versus level of certification.

Level of certification	Pain in ear(+ve)	Pain in ear(-ve)
Open water to Rescue diver	12	18
Dive master and higher	4	13
Chi square value=1.30 P=.05		

Table 3. Pain in the ear versus diver's experience level

Number of dives	Pain in the ear(+ve)	Pain in the ear(-ve)
0-100	8	12
100-500	5	11
500 and more	3	8
Chi square value=.591 P=.05		

Table 4. Pain in the ear versus age of the diver.

Age	Pain in the ear(+ve)	Pain in the ear(-ve)
Less than 35years	9	14
35 years and more	7	17
Chi square value=.516 P=.05		

Table 5. Pain in the ear versus pre-existing health problems.

Pre-existing health problems	Pain in the ear(+ve)	Pain in the ear(-ve)
Present	8	6
absent	8	25
Chi square value=4.739 P=.05		

Table 6. Sea sickness and headache versus dive experience.

Number of dives	Sea sickness/headache(+ve)	Sea sickness/headache(-ve)
Less than 100	6	14
100 and more	10	17
Chi square value =.23 P = .05		

Table 7. Sea sickness and headache versus level of certification.

Certification level	Sea sickness/headache(+ve)	Sea sickness/headache(-ve)
Upto rescue diver	11	19
Professional diver	5	12
Chi square value= .24 P=.05		

Table 8. Sea sickness and headache versus frequency of diving.

Frequency of diving	Sea sickness/headache(+ve)	Sea sickness/headache(-ve)
Almost daily or on weekends	8	14
Every three months or more	8	17
Chi square value=.11 P=.05		

Table 9. Sea sickness and headache versus pre-existing health problems

Pre-existing health problems	Sea sickness/headache(+ve)	Sea sickness/headache(-ve)
Present	5	9
absent	11	22
Chi square value= .0236 P=.05		

DISCUSSION

Barotraumas of the ear has been reported in scientific literature to be the most common complaint in SCUBA divers [11]. It manifests itself as an acute ear pain and is sometimes associated with vertigo and conductive hearing loss. Clinical findings range from infection of tympanic membrane to hymatympanum with or without ruptured tympanic membrane [2]. This mostly arises due to inability to clear ears by divers. Various techniques are taught during diving courses to mitigate this problem. According to one study, auditory complaints have been positively correlated with methods of equalizing, number of dives and female gender, while not associated with training level, age and education of a diver [12]. According to another study middle ear squeeze is the most common diving injury, occurring in 30% of first time divers and 10% of experienced divers [13].

However in our study we did not find any association with frequency of diving, certification level, diving experience and age of the diver. It was only found associated with pre-existing health conditions.

Advanced experience level and certifications did not improve the ability of a diver to reduce this problem, this may be an indication that present training techniques fail to handle these problems for medically fit divers. Furthermore divers with pre-existing health problems require extra attention to mitigate this problem.

According to DAN 2008 report, most frequent non DCI injury reported by divers was related to ear equalization followed by sea sickness. Acute health problems before diving reported by Project Dive Exploration (PDE) divers, sea sickness was most common (13%).

Sea sickness is still not clearly understood in scientific literature. Symptoms of sea sickness include visual and postural instability, pallor, diaphoresis, excess salivation, headaches and anxiety, nausea and vomiting [14-18]. Visual vestibular conflicts have been implicated as the provocative stimulus in sea sickness [19]. There are many theories of it that need to be fully tested. One theory to manage sea sickness is oculo-vestibular habituation that states, after repeated exposure to ocular and vestibular conflicts, sea sickness could be prevented. In a study, a case report of 34 year old woman, who suffered from severe sea sickness, following 10 weeks of a primarily home based program of visual vestibular habituation and balance training, her symptoms were alleviated and she could resume all work related activities [4]. However, we did not find any correlation of sea sickness with frequency of diving and experience level. More studies are needed to test this hypothesis with greater sample size.

Further research is indicated to understand the pharmacodynamics of anti-emetics under hyperbaric environment and its dangers to manage sea sickness safely.

CONCLUSION

1. Pain in the ear, sea sickness and headache are the most prevalent diving related health problems in scuba divers.

2. Pain in the ear found associated with some pre-existing health problems of divers, while not associated with experience level, certification level, and frequency of diving.

3. Sea sickness and headache don't have any correlation with experience level, certification level, frequency of diving, and pre-existing health problems.

4. Different techniques taught to equalize ears during dive courses are not sufficient to mitigate the barotraumas of the ear in medically fit divers. Furthermore, divers with pre-existing health conditions require extra attention.

5. Sea sickness has been completely overlooked by the scientific community in spite of its common occurrence. More scientific attention required with greater sample size to understand and mange sea sickness safely, that includes understanding the pharmacodynamics of antiemetic drugs in hyperbaric environment.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interests

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