

# Survey and Analysis of Common Diseases about Seafarers on a Voyage

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**Abstract:** Objective: to investigate the incidence and characteristics of common diseases of seafarers during long voyage, and to put forward relevant treatment schemes for medical security. Methods: to investigate and analyze the incidence of various diseases during the voyage from December 2017 to February 2018 of the crew of a survey ship, to understand the incidence of various diseases during the voyage and analyze the possible causes, and to provide corresponding treatment plans for the incidence of each stage during the voyage, so as to provide scientific basis for the medical support of the survey ship at sea. Results: the survey was conducted on 300 crew members of a survey ship, including 292 men and 8 women, aged 18 to 60, with an average age of 39. The top five diseases in the survey crew during the voyage were upper respiratory tract infection (35.33%), skin disease (22.33%), oral ulcer (14.67%), training injury (14.33%) and gastrointestinal diseases (13.67%). The incidence of upper sensations, skin diseases, oral ulcers and gastrointestinal diseases in the under 30s group was significantly higher than that in the other two age groups ( $p < 0.05$ ), while the incidence of training injuries was mainly concentrated in the 31 - 40s group ( $p < 0.05$ ). Conclusion: during the voyage, diseases such as upper respiratory tract infections, skin diseases, oral ulcers, training injuries and gastrointestinal tract diseases are more common. Drug stockpiling, prevention and health education of related diseases before voyage should be done well, so as to reduce the incidence of common diseases of seafarers.

**Keywords:** Epidemiological Studies, Marine Medicine, Therapeutic Regimen

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## 1. Introduction

With the development of social economy and science and technology, long-term and long-distance marine scientific research work and maritime transport activities are becoming more and more frequent. For people who have special operations, it is a problem that can not be ignored to adapt to unhealthy diseases. The maladaptive diseases are caused by various stimuli and last for a long time. The manifestations of different patients are also different. Some are mainly physical symptoms, some are mainly psychological abnormalities, and some are mainly behavioral and physical disorders, which

lead to abnormal behavior. The study of maladaptive diseases related to space flight and navigation and the discussion of the stability and adjustment of human life and health are important subjects to guarantee the health of human special environment. With the deep exploration of aviation and navigation in various countries, in the special environment of space and navigation, the related difficult diseases seriously affect the physical and mental health of astronauts and crew. Therefore, exploring the pathogenesis of these special diseases, seeking their prevention and treatment techniques and methods to ensure the special environmental health of the body has become an important and special demand in the field of medical health such as aerospace and navigation.

[1-5]

In addition, human disease is not only a pathological process of human cells or organs, but also a problem in the process of interaction between human body itself and natural, psychological and social environment. So disease not only reflects the state of the body and the interaction with nature, but also reflects the psychological state of people, and reflects the interaction between people and social environment. Psychosomatic diseases and psychosomatic diseases are two aspects of this interaction. Seafarers need to navigate at sea for a long time. Changes in the natural environment are prone to stress response. In the course of navigation, extreme weather, such as high temperature, cold, storms, sea waves and hail, will be encountered. This unstable environment is more likely to increase seafarers' pressure and intensify stress. During the voyage, seafarers' diet, drinking water and environment on board will affect seafarers' health. For example, the ship's diet is high in animal protein, high in purine, low in dietary cellulose and high in sugar intake. The high temperature environment in the cabin and deck leads to excessive sweating and less drinking water, which are easy to cause urinary calculi. The intense work during the voyage is constantly exposed to the environment of vibration, turbulence and noise. Vomiting, gastric and duodenal retrograde motion and bile reflux damage caused by seasickness. The disturbance of biological clock and dietary rhythm caused by shifting duty is easy to cause gastritis, gastric ulcer and other digestive system diseases. Seafarers' own personality characteristics, personality types, emotional state and bad behavior habits can also lead to psychosomatic diseases. People with type A personality or behavior tend to be competitive, have a strong sense of time urgency, have strong competitiveness and lack of patience. Studies have shown that for type A personality, prolonged mental stress can lead to functional disorders of nervous system, cardiovascular system, digestive system and endocrine system, which can easily lead to psychosomatic diseases such as coronary heart disease, hypertension and peptic ulcer. In the study of anxiety and hypertension in seafarers, it was found that there was a significant positive correlation between anxiety score and the prevalence of hypertension; long-term negative emotions could increase the incidence of coronary artery events in patients with coronary heart disease, and severe depression could increase the mortality of myocardial infarction. The study on the correlation between *Helicobacter pylori* infection and psychological factors also showed that the psychological factors related to *Helicobacter pylori* infection among seafarers during working period on board ships were related to *Helicobacter pylori* infection. Bacteria were positively correlated. The long-term effects and effects of some bad behaviors, such as preference for food, smoking, excessive drinking, lack of sleep, lack of exercise, limitation of activities, and inability to take regular vacations, can also lead to the occurrence of some psychosomatic diseases.

[6-12]

During the voyage, ensuring the physical and mental health of all the crew members is the key to the successful completion of the voyage task. How to deal with the common diseases and sudden diseases of the surveying crew during the voyage is particularly important. This paper investigates 300 crew members of a survey ship who are on mission to the South Pacific Ocean from December 2017 to February 2018, and investigates and analyses the incidence of all crew members during their 82-day voyage. The purpose is to understand the common and frequently-occurring diseases of the crew members during the voyage, so as to explore the research distance. The causes of diseases during voyage and the Countermeasures of medical insurance at sea can provide reliable basis for improving the level of medical treatment during voyage.

## 2. Method

### 2.1. Objects

The subjects of this survey were 300 crew members of a survey ship, including 292 males and 8 females, aged 18 to 60 years, with an average age of 39 years. For the first time, 70 sailors participated in the long voyage and 230 sailors who had participated in more than 2 voyages. There was no acute disease before physical examination.

### 2.2. Methods

The 300 sailors were divided into three groups according to age: group <30, 31 to 40 years old, >41 years old. Statistics of various diseases during voyage. During the voyage, the same patient suffered from multiple diseases according to multiple cases, acute disease recovery after the recurrence of 2 cases, chronic disease repeated treatment according to 1 case. For convenience of analysis, this study only lists the top 10 disease frequencies and incidence of more than 10 cases, and less than 10 diseases are classified into other categories. Data analysis was processed by PASW19.0 software and X<sub>2</sub> test. The incidence of common diseases and frequently-occurring diseases was different among different age groups. Setting  $p < 0.05$  is of statistical significance for differences.

## 3. Results

### 3.1. Disease Types and Incidence Distribution During Long Voyage

In this survey, there were 451 cases of various diseases. Among all kinds of diseases, the common diseases accounted for a larger proportion. The common diseases and frequently-occurring diseases were upper respiratory tract infection, dermatophytosis, oral ulcer, training injury, gastrointestinal diseases, acute bronchitis, allergic dermatitis, motion sickness, periodontitis, hypertension (hypertension is a disease after seafarers embarked on board) in turn. Table 1 (middle table) List the top 10 high

incidence diseases, ranging from high to low according to the number of diseases.

**Table 1.** Morbidity of 300 crew members at sea (top 10).

| Disease                           | Cases | Morbidity |
|-----------------------------------|-------|-----------|
| upper respiratory tract infection | 106   | 35.33     |
| Mouth ulcer                       | 44    | 14.67     |
| Training injury                   | 43    | 14.33     |
| Tinea                             | 41    | 13.67     |
| Gastrointestinal diseases         | 41    | 13.67     |
| Acute bronchitis                  | 33    | 11.00     |
| Allergic dermatitis               | 26    | 8.67      |
| Motion sickness                   | 15    | 5.00      |
| Periodontitis                     | 12    | 4.00      |
| Hypertension                      | 11    | 3.67      |
| Other diseases                    | 89    | 19.73     |
| Total                             | 451   | 150.33    |

### 3.2. The Incidence of Various Stages of Long Voyage

The 82-day voyage divided the whole voyage into three stages: the first stage (1-27 days), 127 cases; the second stage (28-54 days), 226 cases; the third stage (55-82 days), 98 cases. The number of cases of sensory, dermatological, oral ulcer, training injuries and gastrointestinal diseases during the three periods of voyage and the number and proportion of each disease during that period are shown in Table 2.

**Table 2.** Incidence of the first five diseases in different sailing periods. (n, %).

| Incidence                         | First stage | Second stage | Third stage |
|-----------------------------------|-------------|--------------|-------------|
| upper respiratory tract infection | 45 (15.00)  | 40(13.33)    | 21(7.00)    |
| Skin disease                      | 18(6.00)    | 37(12.33)    | 12(4.00)    |
| Mouth ulcer                       | 18(6.00)    | 20(6.77)     | 6(2.00)     |
| Training injury                   | 17(5.67)    | 22(7.33)     | 4(1.33)     |
| Gastrointestinal diseases         | 10(3.33)    | 23(7.67)     | 8(2.67)     |
| Total                             | 127         | 226          | 98          |

### 3.3. Incidence of all Ages

The corresponding number of the first five diseases in each age group and the number and proportion of the five diseases in each age group are shown in Table 3.

**Table 3.** Incidence of the first five diseases in different age groups (n, %).

| Incidence                         | <30       | 31~40     | >40      | P    |
|-----------------------------------|-----------|-----------|----------|------|
| upper respiratory tract infection | 45(15.00) | 41(13.67) | 20(6.67) | 0.03 |
| Skin disease                      | 40(13.33) | 18(6.00)  | 9(3.00)  | 0.04 |
| Mouth ulcer                       | 38(12.67) | 5(1.67)   | 1(0.33)  | 0.03 |
| Training injury                   | 16(5.33)  | 25(8.33)  | 2(0.67)  | 0.03 |
| Gastrointestinal diseases         | 25(8.33)  | 14(4.67)  | 2(0.67)  | 0.04 |
| Diseases Total                    | 190       | 86        | 24       |      |

In the second stage of voyage, the incidence of various diseases increased significantly: the incidence of upper sensation, skin diseases, oral ulcers and gastrointestinal diseases in the group under 30 years old was significantly higher than that in the other two age groups ( $P < 0.05$ ), while the incidence of training injuries was mainly concentrated in

the group aged 31-40 years ( $P < 0.05$ ). (see Table 3)

## 4. Discussion

### 4.1. Analysis and Treatment Plan of Navigation Period

The first stage of morbidity analysis and treatment options: upper respiratory tract infection, oral ulcer, training injury, motion sickness in this stage is more frequent, 12 cases. The patient showed severe vomiting and poor appetite. Only bed rest can relieve symptoms. Especially the crew who first went to sea was particularly obvious. Upper respiratory tract infections are easily caused by pre-time zone, inland marine climate change, rapid change from winter to summer, limited range of marine activities, and long-term cold and humid working and living cabin environment. [13]Vegetables are rotten and dietary structure is difficult due to long-term storage of fresh vegetables with ships. In order to achieve scientific and reasonable, high-fat and low-fiber diet or mildew food is easy to cause gastrointestinal dysfunction, gastrointestinal tract infectivity, oral ulcer; due to the swaying and bumping of the hull, people have not established a certain period of tolerance to bump and sway in the initial stage of voyage, and the incidence of motion sickness is relatively high in the first voyage, and at the beginning of voyage. The disease is also quite frequent during the sailing period. For these reasons, adaptive training for halo related motion should be carried out before the first crew sailing. Medical staff should do a good job in health education, timely remind crew to prevent cold and keep warm to reduce the incidence of upper respiratory tract infection, pay attention to appropriate supplementation of vitamins, trace elements, plant cellulose to ensure a balanced diet nutrition, reduce the incidence of nutritional deficiency diseases, gastrointestinal functional or gastrointestinal infectious diseases. We should strengthen the inspection of vegetables in stock to prevent decay and deterioration, standardize the cooking and processing of food, and minimize the loss of vitamins.

The second stage of disease analysis and treatment plan: the second stage of the voyage, after entering the mission implementation stage, stop at the port to replenish, the incidence of five diseases are more obvious, especially gastrointestinal diseases. At this stage, the incidence of various common diseases has increased significantly, which may be caused by the imbalance of body and mind caused by the influence of task, mental stress, high tension, time difference leading to the disturbance of biological clock, frequent staying up late, and irregular diet and rest caused by night tasks. At this stage, the importance of psychological intervention should be taken into consideration, [14]. Timely psychological counseling, proper cultural and recreational activities to eliminate tension, adequate sleep and rest before the mission, and arranging some sports according to the situation are all good ways to adjust the balance of the crew's body and mind. It is also very important for medical staff to strengthen daily health education and popularize common

sense of health so as to enable crew members to establish healthy lifestyles themselves. In addition, seafarers should also develop good hygiene habits. Because seafarers' bedding can not be exposed to the sun all the year round, they should wash and change frequently. However, in view of the high incidence of training injuries at this stage, when the wave height is 2.5m and the wind force is above grade 5, the medical staff should remind the crew to pay attention to the restriction of sports, especially the violent and unstable activities such as running, playing basketball and dancing. Sports enthusiasts should wear knee pads, ankle pads and other protective devices, and keep the medical room adequately medicated to deal with trauma. Sample can effectively reduce the possibility of training injury. [15-16]

The incidence of various diseases decreased significantly in the third stage. Successful completion of the task, low work pressure, adequate sleep and rest time, coming back to sea, and jet lag callback, closer and closer to home, the crew's physical and mental pleasure, increased physical exercise time, low susceptibility to disease, thereby reducing the incidence of disease.

#### **4.2. Analysis of the Incidence About Various Age Groups and Countermeasures**

The survey shows that the incidence of upper sensation decreases with the increase of age. The incidence of training injuries is higher in the 31-40 age group than in the other two age groups ( $P < 0.05$ ), while the incidence of skin diseases, oral ulcers and gastrointestinal diseases is mainly concentrated in the under-30 age group ( $P < 0.05$ ).

Analyzing the reasons, crew aged 31-40 are often active in antagonistic sports such as basketball and football, so the incidence of training injuries is higher than that of other two age groups. Because of lack of health knowledge and bad hygiene habits, crew under 30 years old have a higher number of skin diseases, and crew suffering from such diseases are the main ones. Concentrated in the power sector and security sector. In addition, the unhealthy factors such as irregular diet, disturbance of work and rest, persistent mental and physical load are evident in the crew of this age group, which is the main cause of oral ulcer and gastrointestinal diseases in the crew of this age group. Seafarers over 41 years of age should pay special attention to regular health monitoring in terms of weight, eating habits, sleep quality and physical exercise, especially in the monitoring and treatment of hypertension. Those who are obese, hyperlipidemia, sedentary and less active should adhere to aerobic exercise, which is appropriate for about 40 minutes each time and 3-5 times a week. [17] Seafarers aged 31-40 should pay attention to moderate exercise and avoid fierce antagonistic exercise. Seafarers under 30 years of age often feel good about their physical fitness and how unhealthy they are, such as sedentary, often staying up late, and drinking too much. Health education should be strengthened in healthy lifestyle, such as staying up less, adequate sleep, balanced diet, moderate aerobic exercise, cold-proof and warm-keeping in low-temperature cabin, daily

oral supplementation of cellulose such as vitamin tablets, trace elements, fruits and vegetables, and strengthening the study of health knowledge and cultivating good hygienic habits. [18-20].

## **5. Conclusion**

The top five diseases in the ship's crew during the voyage were upper respiratory tract infection (35.33%), skin disease (22.33%), oral ulcer (14.67%), training injury (14.33%) and gastrointestinal diseases (13.67%). These five diseases are high among the crew members. During each voyage, the supply of drugs for these five diseases is higher than that for other diseases. Moreover, the reason why these diseases are high among the crew members is closely related to the psychological and physical factors of the crew members. Seafarers need to sail at sea for a long time. Changes in the natural environment are likely to cause stress reactions to seafarers. In the process of sailing, extreme weather will be encountered, such as high temperature and cold, strong winds and heavy rain, sea waves and hail, etc. This unstable environment is more likely to increase the pressure of seafarers and strengthen stress, resulting in diseases. For the social factors of crew's mental health, we should start with improving the hard environment of seamen's work, study, life and culture, improving the soft environment of seamen's welfare treatment, interpersonal relationship, family care, career care, health care and cultural care, and establish a perfect social support system to relieve crew's psychological pressure and reduce the impact of natural environment stressors. For example, continuous shifts and night shifts can affect the internal biological rhythm of the human body, which can cause diseases for a long time, but this situation cannot be changed during sailing, so it is required to minimize its harmful effects. In recent years, some crew members have taken ganoderma lucidum spore powder, panax pseudo-ginseng and other Chinese herbal medicines to enhance their immunity during the voyage, effectively reducing the occurrence of high morbidity during the voyage and avoiding the side effects caused by taking western medicine in the harsh environment of the ship. This method is gradually being adopted by the crew.

This study made a statistical analysis of the incidence of crew members during a survey ship's mission to the ocean from December 2017 to February 2018, and obtained the disease spectrum and incidence of frequently-occurring diseases and common diseases, which provided a guiding study for the treatment of high-risk diseases of seafarers and scientific basis for the maritime medical and health care of ocean-going personnel. The incidence of ocean-going personnel needs multi-center and multi-range investigation and statistical analysis in order to improve and supplement the results of this study. [21-23]

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