

# **Nutrition as the basis for a healthy and productive work life onboard: Facts and insights from different perspectives**

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## **Abstract**

The fact that seafarers have to live on board ships, which are both their home and workplace, for long periods has increased a number of psychological and physical problems. Among the few ways they can take to endure the challenges onboard is having a delicious meal, carefully prepared in a balanced way, cooked by efficient galley staff. This study aims to provide the basic information for a training module for the galley staff. To this end, nutrition onboard was evaluated from the perspectives of three stakeholders who are seafarers, galley staff, and employers through three surveys addressing these three important stakeholders prepared in the frame of the CUL-MAR-Skills Project. The surveys were distributed electronically to relevant groups in four project-partner countries and were replied to by 321 students and seafarers, 55 galley staff, and 19 employers. The results revealed that seafarers did not know properly what to eat to stay healthy and strong onboard, whereas cooks were aware of the requirements of balanced nutrition, although incomplete and inadequate. The employers were quite knowledgeable about nutrition on board and the importance of healthy nutrition for seafarers. Data obtained from the surveys helped lay the foundations for four courses in the module that aimed to train and educate the galley staff who should be equipped with skills and knowledge to prepare a well-balanced, nutritious, and delicious menu that can help seafarers both be healthy and boost their morale, resulting in high motivation and better performance.. Further studies on this topic can be about teaching the requirements of a nutritious and balanced diet to seafarers to help them stay healthy on board.

**Keywords:** Cook, Galley, Training and Education, Seafarers, Well-Balanced Nutrition.

## **1. Introduction**

In addition to all the deprivations of life on board, having to struggle with the challenges of working on a ship negatively affects seafarers' social, psychological, and physical well-being and leads to poor performance. For this reason, studies emphasizing the factors necessary to enhance seafarers' all-around well-being have recently increased. Among these factors, food has a special place. A carefully prepared and properly balanced menu not only contributes to seafarers' psychological well-being by boosting their morale but also contributes to their physiological well-being by ensuring a sufficient intake of nutrients necessary for a healthy life. With happy and healthy seafarers onboard, life will be less harsh and work will be more efficient. For these reasons, providing seafarers with satisfying, healthy, and proper food should be one of the most important priorities onboard.

As concerns grow over the seafarers' quality of life, the International Labor Organization (ILO) took it upon itself to take some constructive steps to enhance it and adopted the Maritime Labor Convention (MLC) in 2006. (1) Title 3 of the MLC, which aims to increase the well-being of seafarers onboard, is about "Accommodation, Recreational Facilities, Food and Catering." This title requires ship owners to obey some regulations, which can be grouped under three topics. Firstly, it requires that seafarers be provided with food in an appropriate quantity, quality, and nutritional value prepared in line with their religious and cultural values. Secondly, it wants ship owners to make sure that the galleys are well-organized and adequately equipped to cook nutritious food under hygienic conditions. Finally, it demands that the cooks have the necessary training to work onboard and are competent according to the laws and regulations concerned. Moreover, MLC demands that authorities make frequent inspections of the galleys to ensure that the rules and regulations for food and catering services are being followed. Among the other responsibilities shipowners are entitled to have are making sure that food waste is prevented and hygiene is maintained at appropriate standards, and new training materials and methods for sustainable food procurement and catering should be developed and shared among interested parties.

Before and after the adoption of MLC, there have been studies focusing on the food on board, the nutrition of seafarers, and the importance of a balanced diet for the well-being of seafarers.

## **2. Literature review**

Research into the role of food in keeping seafarers healthy started as early as 1820 when Navy Surgeon Usher Parsons mentioned the scurvy disease that killed almost 2 million sailors between the 16th and 18th centuries in his book “The British 'Limeys' Were Right: A Short History of Scurvy” (2). Dr. Parsons described all the symptoms of scurvy, which is caused by the lack of vitamin C in the body. This was quite normal at that time since there were no modern refrigerators to keep the fruit and vegetables fresh, so the sailors had to eat salted food, which does not contain vitamins. On learning the reason for the illness, the British began to store lime and lemon juice on the ships to contribute to the health of seafarers.

From then on, several studies focusing on the healthy diet of seafarers have been conducted. The main themes of these studies have usually been obesity, overweight, and malnutrition. Of these, the one that was prepared by Jeżewska et. al. (2009) investigated obesity among seafarers and how this problem can be overcome with the right nutrition (3). While they said the primary reason for obesity might be boredom onboard, Oldenburg et.al. (2013) emphasized that the nonexistence of suitable food provisions for seafarers from different cultures with different habits was responsible for their malnutrition that causes obesity (4). In addition to weight gain, Zyriax et.al. (2018) mentioned cardiovascular risk factors caused by malnutrition. They compared European and Kiribati seafarers and found that seafarers coming from different backgrounds have different food choices, and their knowledge about a healthy diet is quite different from each other (5). Neuman et. al. compared European and Asian seafarers' eating habits at home and onboard and found that although they had healthy eating habits at home, they got overweight and even obese onboard. Their study revealed that there were cultural differences in eating habits since those who put on weight onboard are mostly Europeans (%52,7) (6). The study by Westenhoefer et al. (2018) reinforced this result, emphasizing cultural differences regarding eating habits (7). The findings of other research that were conducted with seafarers from different cultures all blamed a lack of fresh fruit and vegetables on board and having a diet high in protein and low in fiber for their being overweight or obese. They also warned that this eating style could put seafarers' health and careers at risk in the long run ( 7, 8, 9) and advised drastic measures to be taken such as cutting down on saturated fat and increasing fiber in their diet in addition to quitting smoking, reducing alcohol consumption, avoiding junk food and increasing physical activity to prevent the situation from worsening (10, 11,12). Baygi et. al. (2021), who conducted a review study on the 26 articles written before February 2020, agreed with the findings of previous studies since they found that the seafarers' eating habits and diet were unhealthy because they consumed vegetables, fresh fruit, dairy products, and cereals less than recommended and ate meat, processed meat, egg, food items that are canned or frozen, drinks high in sugar, alcohol, fatty and salty food a lot. They recommended the use of new technologies for dietary assessment purposes (13). Contrary to these studies, the study that focused on Turkish seafarers found that they were quite conscious about nutrition. They ate the right amounts of various kinds of food to stay healthy (14).

Unlike the other studies, the study conducted by Babicz-Zielińska and Zabrocki (1998) investigated the cooking methods in addition to the eating habits of seafarers. Their study covered the menus of 91 ships for 112 weeks. They found that seafarers took high amounts of cholesterol and saturated fat but insufficient amounts of calcium and complex carbohydrates. They also ate eggs, meat, sausages, and processed food excessively while their diet lacked fresh fruit and vegetables. The study pointed out that the seafarers are

in danger of having coronary and heart disease, liver and stomach diseases, in addition to being obese or overweight (15).

On the other hand, Hijorne and Leppin (2014) approached the topic of malnutrition onboard from two different viewpoints. Firstly, they found cooks in the galleys had insufficient training or no training at all. Secondly, they concluded in their study that the reasons for improper nutrition onboard might be limited storage capacity and inadequate kitchen equipment, together with high prices of fresh vegetables and fruit (16).

Research results pointing to the relationship between poor diet and overweight with obesity, cardiovascular risks, and stress have prompted authorities to take measures to improve seafarers' diets. For example, Frohold and Rasmussen (2025), on finding that among the seafarers' poor health conditions revealed by studies are high levels of obesity, smoking, insufficient sleep, and low physical activity, conducted a health promotion intervention activity consisting of workshops, coaching, health checks, interviews, and questionnaires to reduce or eliminate the impact of these problems. They pointed out that one of the achievements of the activity was the increase in seafarers' intake of salad, fish, and vegetarian food (17).

Another study made to research cooks and cooking practices revealed that there were no standards for training them. This study also found that some seafarers think the threat of losing their job onboard forces the cook/ galley staff to behave in a way that pleases the captain and other high-level seafarers through preparing the food they like, although this might imperil the well-being of other seafarers (18). The study also provided hints about seafarers' views on the quality, reliability, and cultural appropriateness of the food on board. To provide these, there should be more regulations, training opportunities, and awareness for the well-being of seafarers. (17) (COST)

Contrary to other studies, the study conducted by Neumann et. al. (2024) aimed to evaluate the food on board from the perspectives of two different groups, who are seafarers and cooks (19). The first part of their research, which was about seafarers, revealed that the majority of the seafarers appreciated the importance of a healthy diet and said they could change their present eating habits to eat healthy food. The second part of their study revealed that the cooks onboard considered the demands of the seafarers from various cultures and tried to cook to satisfy them; however, they would appreciate being given a course to learn about different cuisines to be more effective cooks. The study also found that a great majority of the ship's cooks wanted to use a tablet for better performance in the galley.

Equipping galleys with personnel who are trained, nutritionally conscious, and who have acquired 21st-century skills such as sustainability and entrepreneurship will help ensure that seafarers have balanced, nutritious, and delicious diets, thus contributing positively to their mental and physical well-being. Almost all the studies conducted so far investigated the problems related to the nutrition onboard from the perspectives of the seafarers, while some of them approached the subject from the viewpoints of cooks. However, no study has considered the viewpoints of all close stakeholders of the issue, who are seafarers, cooks, and employers, and aimed to assess the views of these three groups of participants about nutrition onboard the ship. This not only provided an opportunity to assess the issue of nutrition awareness on board from the perspectives of different stakeholders but also highlighted the scope of a training course for cooks, who have a key position in this regard. The study was conducted within the scope of the CUL-MAR-Skills (MARitime Soft Skills for Onboard Healthy Nutrition and CULinary Arts in Seagoing Services) Project, the ultimate aim of which is to create a module to educate and train personnel for the galleys.

### **3. Methodology**

In this study, the data were collected through three surveys that were prepared in the frame of the CUL-MAR-Skills Project. The first survey was prepared to assess seafarers' and students' dietary habits. Students in their third or fourth year at maritime faculties of the partner universities were included in the survey as participants since they completed their internship onboard ships. The second survey was designed to assess the knowledge and competency of the galley staff about nutrition, and the third was designed to assess the employers' general views on the nutrition of seafarers. The surveys consisted of different sections, each of which was intended to measure a different aspect of nutrition-related topics on board, such as proper eating and well-being, sustainability, hygiene, or challenges. This paper deals only with the proper eating and well-being aspects of the topic.

To develop survey questions, a four-step study was carried out. In the first step, each partner university formed a committee of experts who teach courses relevant to the topics the surveys were planned to cover. These committees drafted questions to be included in the surveys. In the second step, drafted questions were sent to the partner responsible for finalizing the surveys. The same or similar questions were eliminated, and the remaining ones were grouped according to the topics they intended to cover. After the prototypes of the surveys were prepared, they were administered to a small group of participants to check their comprehensibility. Pilot tests were carried out, and after some minor mistakes were corrected, they were sent back to the partners for final consideration. Upon their approval, the surveys were activated online. Some questions in the surveys were on a 5-point Likert scale, others were multiple-choice questions.

At the beginning of each survey, some information explaining its purpose was given. Then the surveys started with demographic questions asking about the gender, age, and country of origin of the respondents. They continued with the questions about their eating habits. In the following part, the data obtained from the relevant part of the surveys were given.

## 4. Results

### 4.1 Seafarers and Students

The first survey, consisting of 20 questions, 8 of which were demographic, was prepared to measure the eating habits of seafarers and students. 321 participants, 174 students, and 147 seafarers replied to this survey. The reason that this survey included students in addition to the seafarers is that all participating schools in the project were maritime universities. The students in their third or fourth year in these schools go to training on board for 6 months before graduation. We sent the surveys to those who finished their onboard training, in addition to seafarers, since we thought they had adequate experience responding to the questions related to the food onboard. Figure 1 below shows the distribution of the respondents to the first survey by country.

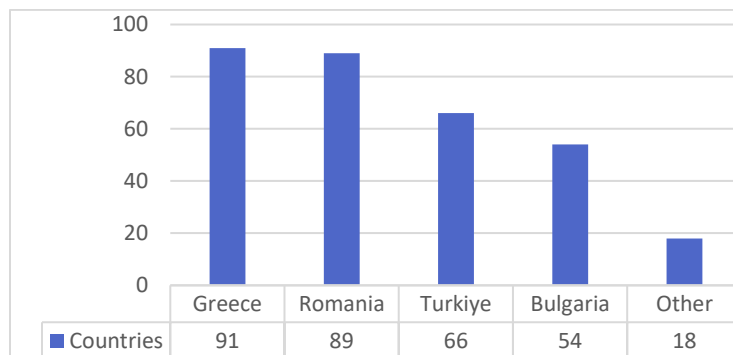


Figure 1. The distribution of the participants by country

As the figure shows, most participants are from the partner countries. 14 of the participants didn't write which country they came from. 2 participants were from Latvia, and 1 participant was from Georgia.

In evaluating the responses, two resources were used as references. One of them was "Healthy Eating", a booklet prepared by the International Transport Workers' Foundation (ITF) (20). "Healthy Eating" draws the attention of seafarers to the importance of eating nutritious food and gives guidelines for choosing the right amounts and kinds of meals to meet the needs of their body as macro and micronutrients, which are proteins, carbs, fats, vitamins, minerals, and water.

The other was "Guidelines for Healthy Food Onboard Merchant Ships", a guide prepared by the International Seafarers' Welfare and Assistance Network (ISWAN) (21). Seafarers must get proper nutrition in addition to getting enough rest and sleep, regular exercise, and caring about hygiene to be healthy and energetic onboard.

These sources advise seafarers to follow the dietary guidelines below:

- Eat plenty of fruit (3 servings/day), vegetables (300 g/day), and potatoes (3-5/day): choose more dark green and bright colored vegetables and orange fruits as they are low in calories and high in nutrients
- Reduce the amount of meat (+/- 100 g / day), fat (<35%), oil, sugar, and salt you eat
- Drink plenty of safe drinking water (> 1.5 liters/day or 6 to 8 glasses/day)
- Choose higher fiber, whole grain options in bread, grain products, rice, and pasta. Eat 25 to 35 grams of fiber each day.
- Drink skimmed and half-fat milk and eat milk products that are good sources of protein at breakfast.
- Eat light meals such as soups, salads, and lean meat to avoid sleeping problems, nausea, and digestive problems during periods of shift work or watchkeeping.
- Start the shift by eating food rich in protein, such as half-fat milk or yogurt, to be more energetic, and later eat carbohydrates such as bread, potatoes, pasta, fruit, and whole grains to sleep better.
- Do not drink more than three cups of coffee per shift since too much caffeine causes side effects such as tension (stress), restlessness, trembling, insomnia, headaches, and heart palpitations
- Avoid eating biscuits, cakes, chocolate, crisps, and chips every day since they have large quantities of fat, salt, and sugar and cause weight problems or heart disease.
- Never skip breakfast.
- Eat at least two portions of oily fish a week, which are high in Omega 3 fats, since they prevent heart disease.

As the explanation makes it clear, both eating breakfast and consuming foods high in nutrients are indispensable prerequisites for a healthy life onboard. In the survey prepared for seafarers and students, the answers of the participants for these options are shown below.

Table 1. Responses of the participants to the questions related to food consumption

Kind of Food	Rarely/Never %	Monthly %	Weekly %	Daily %
Whole meal/Bread/Cereals/Pasta	9.3	10.3	42.1	38.3
Fresh Fruit	3.4	6.5	40.8	49.2
Fresh Vegetables	3.4	6.2	32.4	57.9
Cooked Vegetables	4.0	6.9	39.3	49.8
Fish	7.5	23.1	62	7.5
Beef, Lamb, Pork	5	8.4	59.8	26.2
Dairy Products (Yogurt/Milk/Cheese)	2.2	4	29.6	64.2
Eggs	4	6.9	45.5	43.6

Butter/Margarine	17.1	15.6	37.1	30.2
Olive Oil	15	12.8	34.6	37.7
Legumes (Lentils, Beans, Chickpeas)	3.7	10.9	57.6	27.7
Offal	42.9	26.4	26.4	4.2

As Table 1 shows, only 38% of the respondents in this group eat wholemeal bread, cereals, or pasta weekly, although they were advised to consume 25 to 35 grams of fiber daily. 19.6% of the participants responded that they never ate them or ate weekly if they did. However, bread and whole grain products contain B1, B2, B6, B11 E, and K1 vitamins, which are essential for energy production.

Although seafarers were advised to eat fruit, especially the deep or brightly colored (yellow, orange) colored ones, every day, it was seen that almost half of the seafarers and students were not aware of this requirement which means they are likely to suffer from the lack of vitamins A- B2-B5-B11, C-E-K11. Seafarers are advised that half of their meals should consist of fresh vegetables every day, with 1 serving daily of dark green or yellow-orange vegetables. (22), or they should eat at least five portions of a variety of fruits and vegetables every day (20), although they have limited access to fresh fruit and vegetables (24). They are important for seafarers since they are rich sources of the vitamins A, B1, B2, B5, B11, C, E, and K1, which are generally responsible for eyes functioning correctly, the formation of skin cells, hair and gums, healthy immune system and correct functioning of the nervous system. Although two servings a day is recommended for seafarers, it was found that 32% of them eat vegetables once a week, 6% eat once a month, and 3.4 % never eat vegetables. The situation is worse when it comes to cooked vegetables, since 51% of the seafarers eat vegetables either once a week or less frequently.

Meat ( beef, lamb, pork) and fish are rich in A, B1, B2, B5, B6, B12, and K1 vitamins. They are also rich sources of protein and minerals. The guide prepared by ITF recommends that seafarers should eat two portions of fish a week since the Omega 3 fats they contain help prevent heart disease (21). Survey results show that 62% of seafarers eat fish weekly, which is the recommended amount. On the other hand, the percentage of those who eat fish less is not to be underestimated, which signals that seafarers need to know what and how often they need to eat to be healthy.

Dairy products are excellent sources of protein and calcium. Inadequate consumption of milk and dairy products among sailors led to calcium deficiency and thus to diseases such as osteomalacia. This disease, which means the softening of joints and bones, caused sailors to lose their limbs in the event of an accident (23). Seafarers are advised to drink at least 2 glasses of milk and to eat 2 servings of cheese daily. In our survey, the majority (64.2%) eat dairy products daily. 29.6% eat them weekly, while 4% eat them monthly. It is interesting to learn that 2.2% never eat them, which may be because of being allergic to some kinds of food or similar food.

Eggs, which contain vitamins A, B8, B12, B5, B6, and K1, are consumed daily by less than half of the seafarers. It is not enough if they do not have any reason that prevents them from eating eggs, like high cholesterol. It is advised that 1-2 eggs should be eaten daily for a healthy diet (24). The number of seafarers and students eating eggs weekly is more than those eating them daily. %10 of the 333 participants eat them neither weekly nor daily, which may be due to health problems, since people with high cholesterol are not advised to eat eggs. As a result, it is revealed that seafarers and students do not eat eggs as much as they need. They should be encouraged to eat eggs more and be taught the nutritional values of eggs.

Another food group that was investigated is the group of fats and olive oil. Although they give energy and contain essential vitamins, they can cause an increase in weight and cholesterol levels. Therefore, seafarers should be careful about the amount of fat they consume so that they can be healthier

and more productive. This group also contains oily products like chips, mayonnaise, various sauces, cream, etc., which should be taken in limited quantities.

The survey also found that only 15 % of seafarers have a daily intake of seeds and nuts, which contain B8 and E vitamins. This finding is in parallel with that of Zyriax et al. (2018), who found that seafarers have a low intake of dietary polyunsaturated fats, especially of fatty acids of omega-3 origin (e.g., fish, nuts, rapeseed oil) (5). Therefore, seafarers should prefer a variety of nuts and seeds that are both affordable and readily available to benefit from their many advantages.

Crews should not eat snacks rich in fat and sugar. Instead, healthy alternatives such as nuts or yogurt should be preferred, and seafarers should be encouraged to consume healthy snacks.[5].

The survey results show that seafarers do not prefer eating offal; however, they should be encouraged to eat them often, especially liver, which is called the multivitamin of nature, to be healthier to withstand the harsh conditions on board.

The survey revealed that only 27.7% of the participants eat legumes daily, while 57.6% of them consume them weekly. 14.6% of the participants eat legumes monthly, rarely, or never. That signals that nearly a quarter of the seaman/students are aware of the benefits of legumes and consume them daily. So those who consume them less learn how beneficial they are and include them in their diet more often. However, they contain antioxidants and provide fiber, protein, carbohydrates, B vitamins, iron, copper, magnesium, manganese, zinc, and phosphorus. Legumes are extremely healthy foods because they do not contain cholesterol and are very low in saturated fat.

As stated by ISWAN (21), a seafarer in a hot environment and at a strenuous working pace sweats more than usual and therefore loses more water and minerals. The ITF recommends that seafarers should consume at least 1.5 liters or 6-8 glasses of water a day, as water is one of the most important nutrients for a healthy life (20). The Maritime Labor Convention states that good quality drinking water should be available on board to make up for the lost water and minerals.

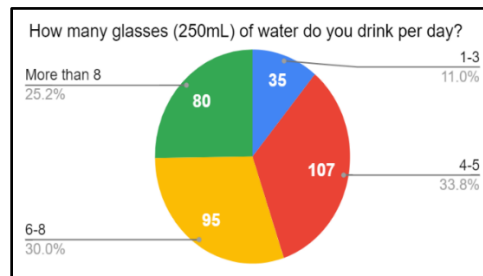


Figure 2. Consumption of water by seafarers

The ITF recommends drinking plenty of water, recognizing that it helps flush waste products from our systems and prevents dehydration, which causes fatigue, low energy, and headaches (20). As the figure shows, 30% of the seafarers drink 6-8 glasses of water every day, while 25.2% drink more than this amount. It is concluded that almost half of the seafarers (44,8%) do not drink an adequate amount of water daily, which means they need to know the benefits of drinking water sufficiently.

8 of the 20 questions in the survey require seafarers and students to evaluate their attitudes towards their nutrition awareness. Table 2 shows these questions and the responses to them.

Table 2. Responses of the participants to the statements related to their eating habits and awareness

Please specify how much you agree with the following statements.	Strongly Disagree n-%	Disagree n-%	Neither Disagree nor Agree n-%	Agree n-%	Strongly Agree n-%
a. I eat plenty of fresh fruit and green leafy vegetables	15 % 4.7	29 % 9	89 % 27.2	119 % 37.1	15 % 4.7
b. I follow a balanced diet	16 % 5	50 % 15.6	107 % 33.3	126 % 39.3	22 % 6.9
c. I know what to eat to maintain my health on board	12 % 3.7	21 % 6.5	61 % 19	167 % 52	60 % 18.7
d. I eat a lot of bread because I can't get enough food during the meal service	69 % 21.5	120 % 37.4	65 % 20.2	53 % 16.5	14 % 4.4
e. I try to do simple workouts when on board to keep in good health	20 % 6.2	44 % 13.7	63 % 19.6	141 % 43.9	53 % 16.5
f. When planning the menu, I believe the goal is to achieve a balanced diet while ensuring satiety	10 % 3.1	19 % 5.9	77 % 24	149 % 46.4	66 % 20.6
g. Being aware of having a nice meal at the end of the day increases my work motivation	---	10 % 3.1	39 % 12.1	120 % 37.4	152 % 47.4
h. I am satisfied with the current provision of healthy and nutritious food onboard.	15 % 4.7	44 % 13.7	101 % 31.5	122 % 38	44 % 13.7
j. I can eat healthy food when I want to.	18 -% 5.6	17- % 5.3	102-% 31.8	91- % 28.3	93- % 29

It is seen that 41.8 % of the participants are conscious about eating what is better for their health, and 46.2% of them say they follow a balanced diet. These figures represent less than half of the participants, suggesting that they know how to eat a balanced diet on board and what to eat to maintain their health.

Although the responses of 70.7 % of the participants to the third question imply that participants know what to eat to maintain their health on board their responses to the other questions revealed that their knowledge of healthy nutrition was not sufficient.

84.4% of the respondents stressed the importance of good food for motivation and high morale onboard, while 51.7% said they were satisfied with the current provision of healthy and nutritious food onboard. That means almost half of them are not happy with the current food provision or have no idea about the food onboard.

The last question in this part asked the seafarers and students if they could eat healthy food when they wanted to. The responses show that a bit more than half of them could, while 31.8 % indicated they could sometimes eat healthy food. Approximately 11 % of the participants responded that they could never or rarely eat healthily. This implies that access to healthy food is sometimes limited on board, and it may not be possible to get healthy food, even if they want to.

In conclusion, the survey results reveal some pretty significant gaps in the dietary habits and nutritional knowledge of seafarers and students in maritime training. While a few participants demonstrated an understanding of balanced nutrition and the importance of healthy eating, many fell short of the recommended dietary guidelines for essential nutrients like fiber, fruits, vegetables, dairy, and proteins. The low intake of vital vitamins and minerals among seafarers points to a pressing need for better awareness and improved access to healthier food options while at sea. These findings highlight the urgent need for structured nutritional education and policy changes to boost the dietary habits of seafarers. Promoting healthier food choices, increasing the availability of fresh produce, and ensuring proper hydration are crucial steps toward enhancing the overall health and well-being of those in the maritime profession.

Additionally, ship provisions should be organized more effectively to align with dietary recommendations from organizations like the ITF and ISWAN. Moreover, the survey shows that while seafarers understand how proper nutrition can affect their motivation and morale, many are unhappy with

the current food options available on board. This dissatisfaction underscores the importance of continuously evaluating and adapting meal planning to include healthier choices that meet the nutritional needs of seafarers. Tackling these issues through education, policy adjustments, and better meal planning will ultimately help improve the health, productivity, and quality of life for both seafarers and maritime students.

#### 4.2. Galley Staff

This survey was answered by 56 participants. Of these, 30 were from the Philippines, 14 were from Turkiye. The others were from Bulgaria, Romania, Honduras, and India. 31 of the participants worked as cooks in the galley, 20 were as messmen, and 5 were as stewards. Figures 3 and 4 show the distribution of galley staff according to their countries and roles.

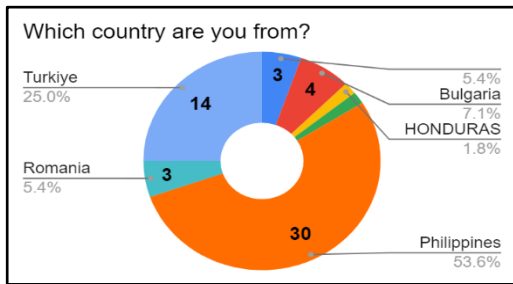


Figure 3. Country of origin of the galley staff

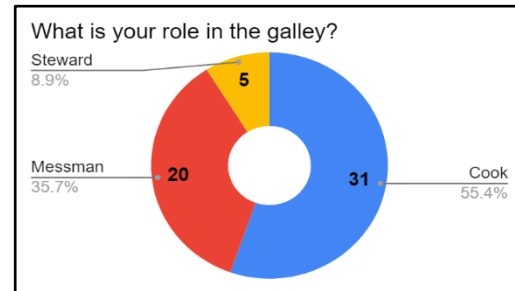


Figure 4. Role of the staff in the galley

The first group of questions was Likert-type questions about the staff 's attitude to nutrition onboard. They are given below:

Table 3. Attitudes of the galley staff on nutrition onboard

Galley staff's attitudes	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I know what to cook to maintain good health while on board.	% 1.5	% 3.5	% 5	% 36	% 54
I can prepare a balanced menu.	% 4	-	% 9	% 39	% 48
When planning the menu, I believe the goal is to achieve a balanced diet while ensuring satiety.	% 2	-	% 7	% 34	% 57
Having a nice meal at the end of the day increases the crew's motivation.	% 4	-	-	% 30	% 66

Studies on the relationship between nutrition and well-being have shown that nutrition impacts well-being to a great extent (25, 26). They show that balanced and well-cooked meals that meet the body's need for vitamins, minerals, and essential nutrients are effective sources of physical and psychological health. A study that explored various aspects of Filipino seafarers' lives, including their perceptions of stress, resilience, and well-being, discussed 11 domains and found that food is highlighted as a significant factor. The seafarers expressed concerns about the supply, quality, and nutritional value of the food provided on board, indicating that these issues contribute to their overall stress and dissatisfaction (27). Another study highlights the importance of food quality and nutrition on board in promoting seafarers' psychological well-being. The study argues that healthy eating and exercise habits, supported by nutrient-dense foods, are vital to improving overall well-being and reducing mental health problems among maritime

personnel (28). These studies point out the significant role of galley staff in providing seafarers with delectable meals prepared with a special emphasis on meeting the daily nutritional needs of seafarers.

Based on this, in the first section, we wanted to find out about the galley staff's awareness of the relationship between nutrition and well-being. The first sub-section in the "Proper Nutrition and Well-Being" section consists of four questions, all of which are designed to see if the galley staff are aware of the requirements and importance of a balanced and well-planned menu. As the responses show, a great majority of the galley staff think they know what they should cook to keep the crew healthy. This shows that the galley staff knew what and how much seafarers needed to eat to ensure a balanced diet. It means that they know the nutritional values and properties of foods and the food groups that seafarers need to work efficiently. 10,8% of the staff said they did not know what was necessary to maintain the good health of the seafarers, while 35,7% preferred the "Agree" choice instead of "Strongly Agree". This may indicate that some staff need to be trained, and some of the others need to get a refresher training and be equipped with detailed and up-to-date information.

The results show that galley staff know how to prepare such a menu and why eating a nice meal is important for the motivation of the crew. According to the results, about ten percent of the respondents did not know much about menu planning, but this is a low number compared to those who did. Nevertheless, it is very important to provide general information about menu preparation and to refresh and renew the knowledge of the galley staff on this subject.

A well-balanced diet is essential for employee well-being and productivity, while poor nutrition can lead to decreased efficiency. Employees who frequently make unhealthy food choices are 66% more likely to be less productive. Workplace wellness initiatives that promote proper nutrition can enhance cognitive function, increase energy, and reduce anxiety, ultimately improving overall performance (29).

Since the results emphasize the importance of food and nutrition, the opinions of the galley staff, who are directly related to food, were also sought. In this way, it will be possible to determine whether they are aware of the importance of the issue and whether they appreciate its significance. The questions that were asked about "Tasty Food and Its Impact" are given in Table 4, together with the percentage of the responses.

Table 4. Responses of the galley staff to the statements about tasty food

<b>Please specify how much you agree with the following statements regarding "Tasty food".</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
Tasty food contributes to a positive atmosphere on board by creating a feeling of comfort, enjoyment, and camaraderie.	%2	-	%2	%36	%60
Tasty food contributes to the physical well-being of individuals on board.	% 2	-	% 2	% 36	%60
Tasty food can positively affect mental health by improving mood, cognitive function, and general well-being.	% 2	% 4	% 2	% 38	% 55
Well-fed individuals are more alert, focused, and productive, which is essential for the efficient and safe performance of tasks on board.	% 2	% 2	% 2	% 37	% 57
Proper nutrition plays a vital role in optimizing performance and productivity.	% 2	-	% 2	% 34	% 62

As the figures in the table show, galley staff are aware of the importance of delicious meals and their positive impact on the crew. It is seen that about 95 % of the participants are conscious of the importance of a tasty meal, which leads to the expectation that they will emphasize cooking tasty and nutritious meals.

Although these results show that galley staff are aware of the importance of good food and do not need additional training on the importance of food, some kind of refreshing training and examples of good practices could be provided for both new entrants and existing staff.

One of the important jobs the galley staff is expected to fulfill is to be able to prepare menus suitable for the tastes of staff from different cultures, which requires a combination of the strategies like specialized training, flexible menu planning (30, 31), active communication with the crew (18, 32), and continuous professional development (33, 34). By implementing these strategies, ship owners can ensure that galley staff are well-equipped to provide meals that satisfy and respect the diverse backgrounds of the crew, thereby enhancing overall morale and well-being on board.

Table 5. Responses to the statements about the cooking behaviours of the galley staff

<b>Thinking about your cooking skills, how often do you... (%)</b>	<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Often</b>	<b>Always</b>
Cook dishes from different cultures?	-	<b>% 18</b>	<b>% 4</b>	<b>% 21</b>	<b>% 57</b>
Adjust the menu as required by weather and sea conditions?	-	-	<b>% 32</b>	<b>% 27</b>	<b>% 41</b>
Know how many calories each menu should have?	<b>% 5</b>	<b>% 4</b>	<b>% 13</b>	<b>% 32</b>	<b>% 46</b>

Adjusting the menu to the needs and expectations of the seafarers and cooking food from different cultures is a motivating factor for the seafarers (35). Besides, sometimes they should cook the kind of food suitable for the special conditions, whether expected, such as feast days, festivals, holy days, or unexpected, such as inclement weather or pandemic disease. The galley staff should have the necessary training and education to meet these various kinds of demands.

The survey results show that 78,5% of the galley staff are aware of the need to cook food from different cultures and they can cook them, and 66,9% of them are flexible enough to adjust the menu to the needs of the conditions onboard. However, 25% of them still need to get training regarding this section, while the others learn more recipes from various cultures and how food from quite different cultures can be integrated to have a better combination regarding the menu on board.

Probably the most important issue that galley staff need to be knowledgeable and aware of is the nutritional value of food and how much of each food group seafarers need to eat to be healthy and happy. A menu prepared by people with this knowledge will not only ensure a healthy and adequate diet but also help to keep seafarers' well-being and motivation high. To understand this, the galley staff were first asked whether they were aware of how many calories an average menu should contain.

The responses show that 78.5% of the participants consider themselves conscious and well-informed about this issue. However, 12.5% stated that they were unsure about this topic, while the remaining 9% stated that they knew little or nothing about it. This shows that a small part of the galley staff needs solid training on this subject, while the other part would be good for refreshing and updating their knowledge.

Table 6. Responses to the questions on basic food onboard by the galley staff

<b>Please specify which food groups should be readily available onboard ships. (%)</b>	<b>Strongly unrecommend</b>	<b>Unrecommend</b>	<b>Neutral</b>	<b>Recommend</b>	<b>Strongly Recommend</b>

Whole grains	-	-	% 16	% 46	% 38
Fresh Fruit and vegetables	-	-	% 2	% 12	% 86
Plant-based foods (tofu, legumes)	-	% 2	% 29	% 38	% 32
Low-fat dairy or dairy alternatives	-	% 2	% 7	% 43	% 48
Lean Proteins (e.g. fish, poultry)	-	-	% 2	% 34	% 64
Nuts and Seeds	-	5%	% 16	% 52	% 27

Considering the “would recommend” and “strongly recommend” responses to the questions in this sub-section, it was revealed that the food groups that the galley staff most recommended to be available on board the ship were fresh fruit and vegetables and lean protein such as fish or poultry. These food groups were recommended by 98.2% of the galley staff, followed by low-fat dairy or dairy alternatives by 91.1%, cereals by 83.9%, nuts and seeds by 78.6%, and plant-based foods like tofu or legumes by 69.6%.

It can be argued that “nuts and seeds” and “plant-based foods like tofu or legumes” are not given the importance they deserve. Nuts and seeds have a high concentration of nutrients, providing proteins, fiber, monounsaturated and polyunsaturated fats, and a wealth of vitamins, minerals, and phytochemicals. Their positive effects on a range of non-communicable diseases and weight control make them worthwhile additions to a healthy and well-balanced diet (35).

In light of the information in the table, it was concluded that it would be advisable to inform the galley staff about the appropriate foods to be kept in the galley and their benefits for health. Eating is not just about filling the stomach. Seafarers may not have much choice in this matter; they can only eat the meals prepared by the cook. However, it is important that the cook or the person who prepares the menu considers the special conditions of working on board and tailors the menu to meet the nutritional needs of seafarers. The study revealed that the galley staff on board were quite conscious of this issue. The question “How often do you prioritize the inclusion of healthy and nutritious options in meal planning and preparation?” was answered by 89% of the participants as “always” or “often”, as Figure 5 shows. Only 10,9% of them said they ignored the fact that the food onboard should be healthy and nutritious. Normally, this small percentage can be considered negligible; however, when the health of seafarers is in question, this is not an ignorable number of respondents, and some precautions should be taken to make these staff more aware of the crucial role of food for seafarers.

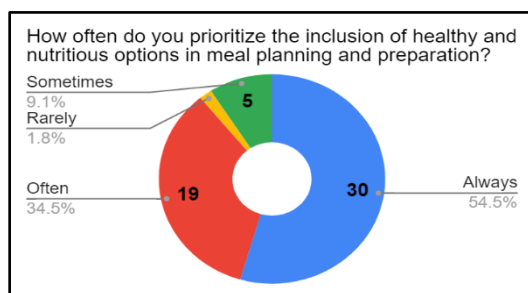


Figure 5. Inclusion of healthy food in menus supply

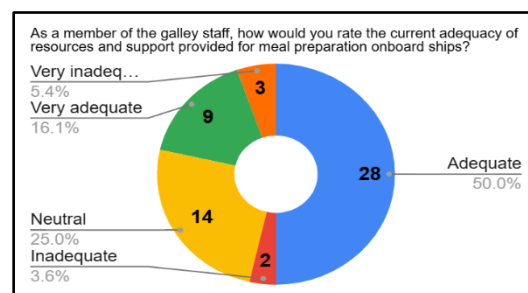


Figure 6. Opinions of the galley staff on the provision

As Figure 6 shows, 66 % of the galley staff think the supply of provisions for the galley is adequate to prepare healthy and nutritious food. Although the majority think they have adequate resources and support for meal preparation, 25 % of them are undecided, which may mean they have some reservations about answering this question in the affirmative. On the other hand, 9% of the participants do not think

adequate resources are provided for meal preparation. As a whole, although the majority think that the resources provided are sufficient, almost half of the kitchen staff, 40%, do not answer this question positively. This shows that the galley staff think that the necessary ingredients for a healthy, balanced, and nutritious menu are not always provided.

Based on what this study found, it's clear that the galley staff play a vital role in keeping seafarers healthy and productive through the right nutrition and meal planning. The results show that most galley personnel recognize how important balanced and nutritious meals are, along with how food quality can affect crew morale and performance. However, there's still a need for ongoing training and refresher courses to boost their knowledge, especially in areas like menu planning, cultural dietary preferences, and the nutritional benefits of various food groups. Moreover, while many galley staff are aware of how to prepare healthy meals, there are still some gaps, particularly when it comes to incorporating plant-based foods and nuts, as well as tailoring menus to accommodate different cultural and dietary needs. By addressing these gaps through training, better sourcing of ingredients, and improved communication with crew members, the overall dining experience on board can be enhanced. Ultimately, investing in the skills and knowledge of galley personnel will not only improve the health and well-being of seafarers but also lead to a more motivated and efficient workforce at sea. By consistently providing nutritious, culturally appropriate, and high-quality meals, shipowners and maritime organizations can greatly enhance the working conditions and satisfaction of their crews.

### 4.3. Employers

The last survey was designed and applied to see the attitude of the employers in the maritime sector toward the issues concerning nutrition onboard. The survey covers 3 questions with 20 subquestions.

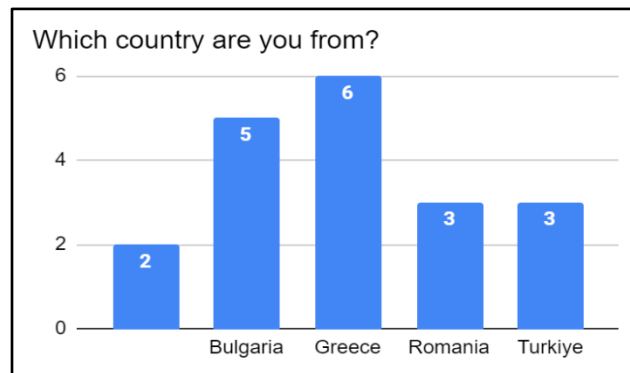


Figure 7. The country of origin of the employers

The survey was responded to by 19 employers from 4 countries. Although the number of participants is not high enough to form a generalization of the survey results to the whole employers, they can provide a significant insight into their attitudes toward the employers on the general situation. Figure 7 shows the distribution of the participants according to the countries. Six employers from Greece and 5 from Bulgaria participated in the survey. 3 employers from Romania and Turkiye each responded to the questions while 2 of the participants did not indicate their nationalities.

Employers were asked three questions about their views on nutrition on board. The first question was about the cooking practices onboard. It covered 12 sub-questions. The table and the figure reflecting the responses of the participants are given below.

Table 7. Opinions of the employers on cooking practices onboard (%)

Please specify how much you agree with the following statements regarding cooking practices:	Strongly disagree %	Disagree %	Neutral %	Agree %	Strongly agree %
a. We are aware of nutritious diets to ensure seafarers' healthy nutrition.			5	53	42
b. The menu is prepared to meet seafarers' daily energy requirements.			6	38	56
c. We ensure that seafarers are both well-nourished and healthy to fulfill their duties		1		31	63
d. It is important to purchase quality food for the galley		1		18	75
e. We ensure the adequacy of water and food supplies for everyone on board.				25	75
f. We pay attention to the quality of the water and food on board				25	75
g. The nutritional value of the water and food on board is important		6		31	63
h. We are aware of the crew's food allergies			6	50	44
i. We are aware of diseases caused by malnutrition		6	6	63	25
j. We consider offering a good menu as a motivational tool			6	31	63
l. Crew and staff are allowed to eat whatever they like 24 hours a day	6	25	25	25	19

The responses to these questions show that the employers know the importance of nutrition for seafarers. All of them but one agreed or strongly agreed with the statements that they were aware that nutritious diets are crucial for seafarers' health and that the menu is prepared to meet the seafarers' energy needs.

Over and above these, they want to ensure seafarers are well-nourished with good quality food. They know how important it is to provide them with adequate amounts of water and food with high nutritional value, as the figures below show.

The nutritional value of the food is considered important by 94,8 % of the respondents. That means the quality of the food is as important as its quantity, and they know good food is the key to the motivation, success, and productive work of the crew. They sometimes offer a good menu as a motivational tool. *Nutrifusion* says, "To maintain and increase the motivation level of seafarers, nutrition is the first factor to be considered". Otherwise, it will be hard to persuade people to perform duties enthusiastically. Healthy nutrition and delectable food not only serve seafarers as excellent sources of motivation but also help them maintain their strength and energy and support them physically and mentally. It can be concluded that nutrition has a lot to do with how motivated people feel. If they want to maintain and increase their level of motivation, you should start with nutrition. (36).

Concerning this, ITF Seafarers state that:

- Healthy eating helps to protect against malnutrition and non-communicable diseases (NCDs), such as diabetes, heart disease, stroke, and cancer.
- Unhealthy eating and lack of physical activity are leading global risks to health.
- Switching to healthy eating does not have to mean all or nothing. You do not have to eliminate the foods you enjoy or change everything all at once. Just make a few small changes at a time (20).

The survey results show %89,4 of the employers are aware of the diseases caused by malnutrition, 94.8% of them consider offering a good menu as a motivational tool.

%52,7 of the employers say the seafarers can eat whatever they like while onboard, while %26,4 of them do not agree with this idea. %21,1 do not have an idea. Eating whatever they like while on board may not be a good idea for the seafarers because unconscious eating is one of the causes of malnutrition. Oldenburg et. al. (2013) say seafarers have limited influence on the quality and quantity of food over several months. Furthermore, the nutrition on board is characterized by different dietary habits in the multi-ethnic crews, differential food supply in the crew's and officers' mess room, and irregular mealtimes due to the shifts on board. Internationally, the nutritional situation on board is not standardized but reflects the flag-state standard (37).

When the answers given to the questions in this group are considered, it is seen that the employers in the maritime sector are sufficiently knowledgeable and interested in the diet and needs on board. Employers who have sufficient knowledge about the reasons why seafarers should be well-nourished and the positive effects of good nutrition on health, motivation, and work efficiency are making efforts to ensure good nutrition. It can be said that one point to be considered here is the individual nutritional characteristics and problems of seafarers, such as allergies.

One question to which employers did not predominantly give the same answer was the freedom of seafarers to eat the food they want whenever they want. There may be different reasons for this. For example, if it is a question of eating by entering the galley, it is not an appropriate course of action in terms of hygiene for anyone to enter the galley at any time and eat what they want. In addition, there may have been a restriction on seafarers' eating hours to prevent various health problems that may be caused by uncontrolled nutrition. As a result, it should not be considered a negative situation that employees cannot eat whatever they want whenever they want. The opposite may also be the case. Eating whatever you want whenever you want may not be a positive attitude. Therefore, both seafarers and employers should be informed about the requirements of healthy nutrition.

Table 8. Opinions of the employers on equity and diversity

<b>Please specify how much you agree with the following statements</b>	<b>Strongly disagree %</b>	<b>Disagree %</b>	<b>Neutral %</b>	<b>Agree %</b>	<b>Strongly agree %</b>
a. We ensure that meals that are part of the culture of the ship's personnel are also prepared		6	6	57	31
b. We ensure that meals that are special on national/religious days for ship personnel belonging to different nationalities are prepared on these days.				62	38
c. Special conditions of crew members, such as eating gluten-free, being allergic to certain foods, or being vegetarian, are considered		12	12	38	38
d. We ensure a representative proportion of women in the galley staff.	6	20	25	44	6
e. We consider the innovative and entrepreneurial ideas of the galley staff and implement them if possible.		13	6	56	25

The responses show that the majority of the employers agree or strongly agree with the fact that meals representing the culture of the seafarers should be included in the menu.

The second question in this section is complementary to the first one since it asks if the employers ensure that meals that are special on national/religious days for ship personnel belonging to different nationalities are prepared on these days. The responses to this question prove that they are conscious of the culturally important days or events for the seafarers, and they tend to prepare the menu to celebrate them.

The third question asks if the special conditions of crew members regarding food are taken into consideration. It is seen that %68,4 of the employers consider these conditions, while %31,6 do not care about this. However, this is a crucial issue since it is directly related to the health of the seafarers.

Employers discuss the meals that are appropriate to the seafarers' culture to be prepared, and menus that celebrate their special days and holidays are created. However, they do not show the same high level of sensitivity when it comes to considering the impact of meals on individual health. Accordingly, it is important to identify in advance if any dishes may adversely affect seafarers' health and to ensure that such dishes are removed from the menu as far as possible or not served to people with allergies. Of course, some employers pay attention to this issue, but it is useful to scrutinize the issue to ensure that positive behavior is adopted by more people.

This is a crucial issue since ignoring food allergies can lead to severe or even life-threatening reactions. Ensuring that crew members with allergies avoid certain foods is a basic safety requirement. Conditions like celiac disease (which requires a gluten-free diet) can cause significant health issues if not properly managed. Providing the right food helps prevent illness and ensures that crew members remain fit for duty.

Ensuring that crew members can eat food that meets their dietary preferences or restrictions can reduce stress and anxiety. This contributes to their overall morale and mental health. It can even boost job satisfaction and morale, leading to higher retention rates. On the other hand, respecting dietary restrictions and preferences, whether due to health reasons, ethical beliefs (such as vegetarianism), or religious practices, fosters an inclusive environment. This shows that employers value and respect the diversity of their crew.

The maritime sector is male-dominated; however, the number of women working both ashore and afloat is increasing. Galleys may be the places where women can easily find jobs. Despite this, only half of the participants support women working there. To prevent discrimination, the reasons for this tendency should be investigated and measures should be taken to ensure that more women are employed in this position.

The last question in this part asked if the employers considered the innovative and entrepreneurial ideas of the galley staff and implemented them, if possible. The innovative and entrepreneurial ideas of the galley staff are valuable for several important reasons. Innovative ideas from the galley staff can lead to more efficient food preparation, storage, and waste management processes. For example, implementing new cooking techniques or optimizing ingredient usage can save time and reduce costs. They are also important regarding resource management. Entrepreneurial thinking often includes finding ways to maximize resources, such as using surplus ingredients creatively or reducing food waste. This can significantly cut costs and improve the ship's overall operational efficiency. These ideas also help the creation of unique menus. Galley staff who think innovatively can create more varied and exciting menus. This can greatly enhance the eating experience for both crew members and passengers, making meals more enjoyable and satisfying. Because of these reasons, innovative and entrepreneurial ideas of the staff should be encouraged. When the survey results were evaluated, it was seen that 79% of the employers said they supported such ideas; strangely enough, 21 % of them indicated they were against these ideas.

All in all, it was seen that employers know the importance of including recipes belonging to different cultures in the menu onboard. They are also aware that the staff celebrating their special days should be served their special food. These are motivating for them. On the other hand, some steps should be taken by employers to ensure that seafarers can work effectively and efficiently. The first of these is to be aware of the problems of seafarers who require special diets and to take measures to prevent them from

being negatively affected. Secondly, they should pay attention to the fact that some of the personnel working in the galley should be women. In this way, they will both provide diversity and bring the perspective of a different gender to the gallery. Finally, employers need to value the innovative and entrepreneurial ideas of their galley staff and even encourage them to come up with such ideas. Employers need to be supported and informed on these three points.

Employers need to find out the opinions of ship personnel about shipboard practices to change the wrong ones. Therefore, they were asked questions about how they receive feedback. Table 9 shows these questions.

Table 9. The overall satisfaction of crew members with the food services provided onboard your ships from the employers' perspective

<b>Please specify how you assess the overall satisfaction of crew members with the food services provided onboard your ships.</b>	<b>Never %</b>	<b>Rarely %</b>	<b>Sometimes %</b>	<b>Often %</b>	<b>Always %</b>
a. Regular surveys and feedback mechanisms		13	13	56	18
b. Informal feedback channels (e.g., direct communication with crew members)			19	56	25
c. Observation and assessment by onboard management	6	-	19	56	19
d. Other ( <i>specify</i> ):	Management complaint booklet				

The results show that regular surveys and feedback mechanisms are widely used by employers for this purpose. %73,7 of the participants expressed that they always or often used this method to gather feedback. %15,8 of the employers said they sometimes do surveys or get feedback to assess the overall satisfaction of crew members with the food services, while %10,5 of them said they never do so.

The next two options to see how satisfied the crew members were with the food served on board were using informal feedback channels like direct communication with crew members and observation and assessment by onboard management. %36,6 of the employers said they always used informal feedback channels, while %31,6 of them expressed they preferred observation and assessment by onboard management. The percentage of those who said they often used these methods was %47,4.

It is important to have feedback from the crew because the employers can identify areas for improvement, respond to crew needs, and ensure that food services contribute positively to overall crew morale and well-being if they know what to improve. To provide this, the importance of getting feedback should be emphasized, and some forms to be applied at certain intervals should be developed. Thus, it is possible to initiate new practices or improve existing ones.

Employers in the maritime industry are aware of how crucial nutrition is for seafarers, understanding its significant role in health, motivation, and overall work performance. The survey findings showcase their dedication to offering nutritious, high-quality meals while also being mindful of cultural and religious dietary preferences. That said, there's still room for improvement, especially when it comes to addressing individual health issues like food allergies and promoting diversity within the galley staff. Moreover, creating an environment that encourages innovative and entrepreneurial thinking among galley staff can boost efficiency, cut down on waste, and elevate meal quality.

While employers already gather feedback through surveys to gauge crew satisfaction with onboard meals, implementing more thorough and regular assessments could further enhance meal services. By continuing to focus on nutrition, inclusivity, and innovation, employers can help foster a healthier, more motivated, and efficient workforce at sea.

## Conclusion

Improving the nutritional standards and dietary habits of seafarers is crucial for their overall well-being, motivation, and productivity while at sea. This study uncovers significant gaps in the current dietary practices and nutritional awareness among seafarers and maritime students, emphasizing an urgent need for systemic changes in education, food access, and meal planning on board. While crew members and galley staff have a basic understanding of balanced nutrition, many still struggle to meet essential dietary guidelines, especially when it comes to consuming enough fruits, vegetables, fiber, and vital nutrients.

The dissatisfaction among seafarers regarding current food provisions highlights a gap between what they know about nutrition and how it's applied. Tackling these issues calls for a comprehensive approach that includes structured nutritional education, ongoing training for galley staff, and regular updates to menu planning. Maritime organizations and employers need to back policies and take proactive measures to ensure that healthy, culturally appropriate, and high-quality meals become the norm on board.

Innovations in food services—like AI-driven meal planning, smart provisioning systems, and advanced food preservation techniques—can further enhance nutrition at sea. Promoting diversity among galley personnel and establishing consistent feedback mechanisms will also improve the dining experience on board. By fostering supportive environments for innovation and considering cultural aspects in meal preparation, we can make significant strides in seafarers' health, job satisfaction, and operational efficiency.

Future research should delve into the long-term health effects of maritime dietary habits, assess the effectiveness of nutrition-focused training programs, and explore regional and vessel-specific differences in seafarers' dietary practices. Such studies will provide valuable insights into best practices and help shape more effective strategies for enhancing nutrition at sea.

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