

Awareness of health risks at the workplace and of risks of contracting communicable diseases including those related to food hygiene, among seafarers

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ABSTRACT

Background. The awareness of health risks on board ships in terms of knowledge of dangers and discomfort at the workplace, and of risks of contracting communicable diseases including those related to food hygiene was assessed in a sample of workers of an Italian shipping company. Analysis was performed on crew members and on ashore personnel of the same firm to assess possible differences in risk perception.

Materials and methods The study was conducted by proposing an anonymous questionnaire to the crew members of 9 tankers and to the office staff of the shipping company Finaval S.p.A., which has its headquarters in Rome.

Results. People living ashore have a better knowledge of infectious risks than seafarers. Both ashore workers and seafarers have a reasonable awareness of blood-borne and sexually-transmitted diseases. Seafarers are more concerned about the risks of psychological problems due to isolation than are office personnel. The risk of not being adequately cared for in case of disease or injury on board is also perceived as a major problem by seafarers. Ashore personnel, eating raw fish more than their mates on board, are at a greater risk of communicable gastrointestinal diseases.

Conclusions. Seafarers should be the target of specific informative campaigns about health risks, possible consequences, and how to minimize exposure to them during travel/life at sea.

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Key words: communicable diseases, seafarers, risky behaviours

INTRODUCTION

Ships are places in which communicable disease diffusion is favoured [1], being closed or semi-closed settings where infections can spread easily and can be difficult to control [2]. Communicable diseases in seafaring are a main health and occupational prob-

lem and represent a specific risk for these workers [3]. Seafarers represent one of the most isolated demographic working groups in the world, with limited access to medical care because they are at sea for days or weeks before ships can reach a port [3]. In case of diseases or injuries, medical assistance is

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given by the captain or another officer, who is unlikely to have enough medical education/training. Relevant health support nowadays is given by medical services provided from specialized centres ashore (TMAS, Telemedical Maritime Assistance Services) via telecommunication technology. These centres, by direct contact with whoever is taking care of the patient on board, are able to offer medical care of reasonable quality to ships at sea [4].

Various studies have reported outbreaks of gastrointestinal, respiratory, and other communicable diseases among seafarers [2, 5–8]. Unfortunately, these investigations were based primarily on data from pre-employment visits, reports of port clinics, and case/outbreak examinations [3].

This paper summarizes the results of a survey to assess awareness and knowledge of health risks on board ships. The target was represented by seafarers working on board the fleet of the Italian shipping company Finaval (Rome) and, as a reference, by employees at the company headquarters. It is the first time that an analysis has been performed specifically on a sailing crew and at the same time on ashore personnel of their own shipping company.

The questionnaire and publication are a part of the Healthy Ship project, a collaborative initiative between the Telemedicine and Telepharmacy Centre of Camerino University (UNICAM), the Italian TMAS International Radio Medical Centre (CIRM) in Rome and Finaval. The purpose of Healthy Ship is the prevention of diseases on board sailing ships through information campaigns on the major health risks for seafarers and on their prevention. The results of a survey on HIV risk perception and sexual behaviours were published in an earlier paper by our group [9].

MATERIALS AND METHODS

The survey was proposed as an anonymous questionnaire on the general perception of danger and discomfort in the workplace, the awareness of risks of contracting communicable diseases, and risky behaviours related to food hygiene.

STUDY POPULATION

Data on demographic characteristics of the study population are summarized in Table 1.

Questionnaire and data analysis

In September 2010 the employees of Finaval received the questionnaire reported below on awareness and knowledge of health risk(s) on board ships.

The questionnaire was divided into two sections. The first contained personal details such as gender,

Table 1. Demographic characteristics of interviewed workers

	Seafarers (%)	Ashore personnel (%)	Total workers (%)
Gender			
Male	93.91	65.38	90.58
Female	0.00	23.08	2.69
No answer	6.09	11.54	6.73
Age			
≥ 20	4.57	3.85	4.04
21–30	31.98	7.69	27.35
31–40	30.46	30.77	32.29
41–50	15.23	34.61	17.04
51–62	9.64	11.54	10.76
No answer	8.12	11.54	8.52
Nationality			
Italian	21.83	84.61	29.15
Indian	49.24	0.00	43.50
Filipino	17.77	0.00	15.69
Ukrainian	3.04	0.00	2.69
Romanian	2.03	0.00	1.79
Bulgarian	0.51	0.00	0.45
No answer	5.58	15.39	6.73
Education level			
Elementary diploma	3.55	0.00	3.14
High-school diploma	11.17	7.69	10.76
Professional diploma	22.84	3.85	20.63
Diploma	22.33	38.46	24.21
University degree	20.30	26.92	21.08
No answer	19.80	23.08	20.18

age, nationality, educational level, and work rank (Table 1). The second included specific questions about the perception of danger and discomfort in the workplace, the awareness of the risk of contracting communicable diseases, and on risky behaviours related to food hygiene. The second section of the questionnaire included the 11 questions shown in Table 2.

The questionnaire was sent by express mail to any of the 9 tankers in fleet and was also distributed to employees working in the Finaval headquarters in Rome. Details of the questionnaire distribution and collection are reported elsewhere [9]. Participation in the survey was anonymous. It was required that

Table 2. Questionnaire proposed to interviewed workers

Questions	Results section
1. What are, in your opinion, the major health risks for people working on board ships? (You can select more than one answer)	Perception of danger and discomfort in the workplace
2. Which diseases, in your opinion, have a higher risk of transmission. (You can select more than one answer)	Awareness of the risk of contracting communicable diseases
3. Are all infectious diseases transmitted through the air? (Only one answer)	
4. Vaccination prevents all infectious diseases? (Only one answer)	
5. Which among the pathologies listed below can be classified as infectious diseases? (Multiple choice answer)	
6. Which of the diseases listed below can be contracted via food? (Multiple choice answer)	
7. Which are the main symptoms of an infection transmitted via food? (Multiple choice answer)	
8. To which of transmittable diseases listed below do you feel to be more exposed to? (You can select more than one answer)	
9. Do you check the basic characteristics of foodstuff before consumption (e.g. appearance and smell)? (Only one answer possible for each type of food: meat, eggs, fish, dairy products)	Risky behaviours related to food hygiene
10. How should cooked food be preserved if not consumed on the day of preparation? (Only one answer)	
11. Do you eat raw fish or seafood? (Only one answer)	

the questionnaire be answered on a voluntary basis and within one week after receipt. After having filled it in, each seafarer or office worker placed the questionnaire back in the original envelope which was then sealed. The captain or an officer of the company for the ashore workers collected the envelopes, which were transferred into a box that was then sealed. One box per ship was sent to the epidemiology group of UNICAM by express mail from the first port of call or from Finaval headquarters. Questionnaire collection was concluded in January 2011.

The data were stored and processed using Microsoft Excel sheets. The GraphPad Software program [10] was used for statistical analysis. The Fisher Exact Test was used for comparing proportions, and statistical significance was considered at $p < 0.05$.

RESULTS

The total number of questionnaires distributed was 280; the completed ones amounted to 223 (percentage of respondents 79.64%). The answers provided by the participants were analysed independently for ashore personnel ($n = 26$; 11.66% of responders) and seafarers ($n = 197$; 88.34% of responders). The demographic characteristics and educational skills of the respondents to the survey are summarized in Table 1.

GENERAL PERCEPTION OF DANGER AND DISCOMFORT IN THE WORKPLACE

A significant difference in risk perception of not being adequately cared for in case of injury or disease on board ($p < 0.05$) was noticeable between the seafaring crew and the ashore personnel. 44.67% of seafarers considered the possibility of not receiving adequate medical care as a major problem, compared to 23.08% of the headquarters staff (Figure 1). Another key difference between the two groups ($p < 0.05$) was the concern by seafarers of suffering from psychological disorders due to isolation and/or affective and social deprivation. The percentage of response was 48.73% in seafarers versus 19.23% among ashore personnel (Figure 1). Suffering from eyesight problems was felt more ($p < 0.05$) by ashore staff (34.62%) than by seafarers (9.64%).

The risk of contracting communicable diseases (hepatitis, tuberculosis, HIV, scabies, etc.) was more felt by the crew members (36.55%) than by the ashore personnel (23.08%). Office staff did not consider sexual ailments as a potential danger (0%). Other perceived risks were similar for both groups. They include awareness of the risk of nutrition or digestive problems, pathologies related to assumption of abuse substances, and the risk of contracting diseases due to poor hygiene. The company headquar-

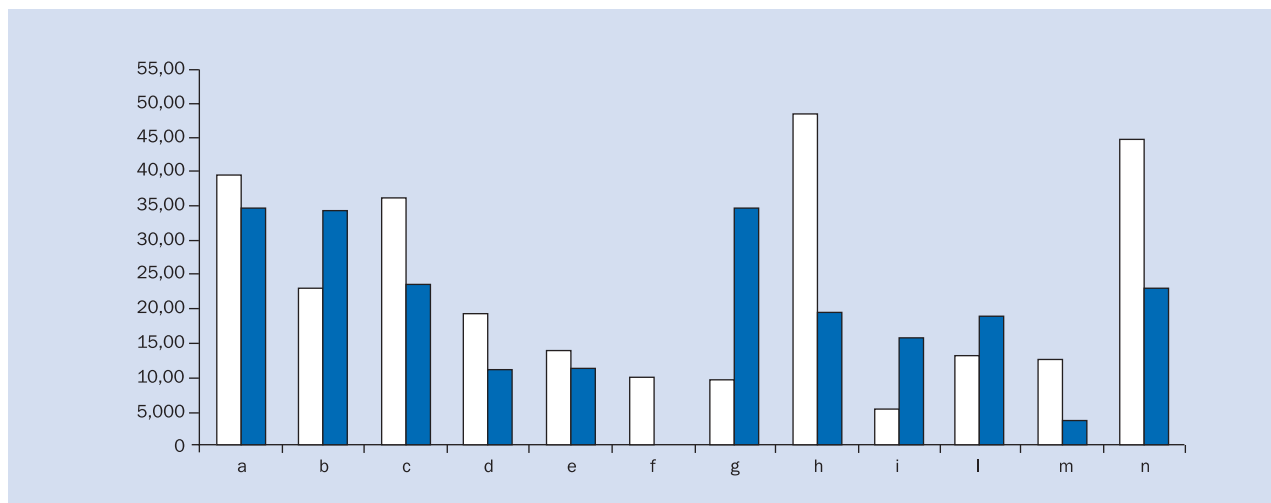


Figure 1. Percentage of answers by seafarers (white columns) and ashore workers (black columns) to the question: "In your opinion, what are the major health risks for people working on board ships?" (More than one answer allowed) a: nutrition/digestion problems, b: restricted space, c: communicable diseases, d: poor hygiene, e: passive smoking, f: sexual ailments, g: eyesight problems ($p < 0.05$), h: psychological problems ($p < 0.05$), i: physical violence, l: psychological abuse, m: drug abuse, n: lack of adequate assistance in case of diseases ($p < 0.05$)

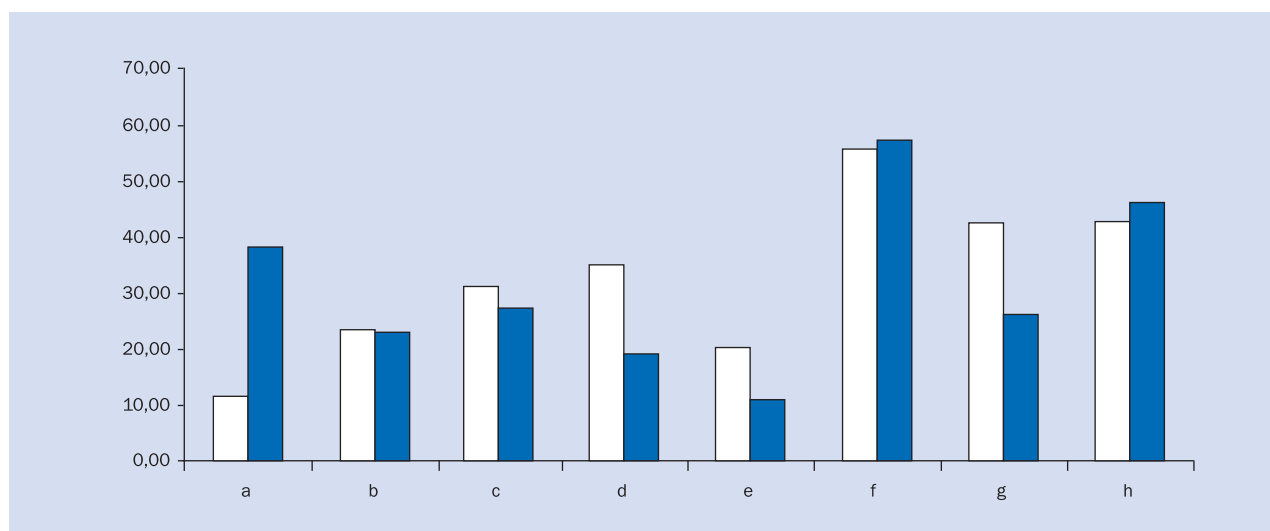


Figure 2. Percentage of answers by seafarers (white columns) and ashore workers (black columns) to the question: "In your opinion, which contagious diseases have a higher risk of transmission?" (More than one answer allowed) a: meningitis ($p < 0.05$), b: hepatitis A, c: hepatitis B and C, d: tuberculosis, e: scabies, f: HIV, g: skin diseases, h: sexually transmitted diseases (e.g. syphilis...)

ters staff were apparently more concerned about the risk of physical and psychological violence. Awareness of the risk of contracting diseases from passive smoking was low for both groups (Figure 1).

AWARENESS OF THE RISK OF CONTRACTING COMMUNICABLE DISEASES

In terms of risk of transmission of communicable diseases, 55.84% of the crew members identified HIV/AIDS as the most dangerous, followed by other

sexually transmitted diseases (42.64%), skin diseases (42.13%), tuberculosis (35.03%), and hepatitis B and C (31.47%). Hepatitis A (23.35%), scabies (20.30%), and meningitis (11.68%) were perceived as less contagious (Figure 2).

Table 3 summarizes the answers to the questions on communicable diseases.

Answers to the question on vaccination (question number 2 on Table 3) were also analysed taking into account seafarers' nationality and education

Table 3. Answers of 223 interviewed workers to the 6 questions on communicable diseases

Questions	Seafarers			Ashore personnel		
	Yes	No	NA	Yes	No	NA
1. Are all infectious diseases transmitted through the air? Yes/No (p < 0.05)	12.18	83.25	4.57	0.00	100	0.00
2. Vaccination prevents all infectious diseases? Yes/No (p < 0.05)	44.67	48.22	7.11	23.08	76.92	0.00
3. Which, among the pathologies listed below, can be classified as infectious diseases?:						
• HIV/AIDS	69.04	-	-	76.92	-	-
• tuberculosis	54.82	-	-	69.23	-	-
• hepatitis C (p < 0.05)	47.21	-	-	73.08	-	-
• scabies and pediculosis (lice)	32.99	-	-	42.31	-	-
• pulmonary emphysema	6.60	-	-	7.69	-	-
• cataract	4.57	-	-	3.85	-	-
• heart attack	4.06	-	-	0.00	-	-
4. Which of the diseases listed below can be transmitted via food?						
• gastroenteritis	65.99	-	-	84.62	-	-
• cholera	38.58	-	-	34.62	-	-
• hepatitis A (p < 0.05)	37.06	-	-	61.54	-	-
• tetanus	2.03	-	-	0.00	-	-
5. Which are the main symptoms of an infection transmitted via food?						
• vomiting (p < 0.05)	81.22	-	-	100	-	-
• diarrhoea (p < 0.05)	63.45	-	-	100	-	-
• fever (p < 0.05)	22.84	-	-	61.54	-	-
• cough	1.52	-	-	0.00	-	-
6. To which of the transmittable diseases listed below do you feel to be more exposed						
• unprotected sexual intercourse (p < 0.05)	53.81	-	-	19.23	-	-
• uncooked/raw food that is not sufficiently washed	39.09	-	-	26.92	-	-
• poor hygiene in cabins and showers (p < 0.05)	38.58	-	-	11.54	-	-
• intravenous drug use	30.46	-	-	15.38	-	-
• incorrect maintenance of sanitary instruments (e.g. Dental instruments)	29.95	-	-	23.08	-	-
• poor ventilation in cabins	26.90	-	-	11.54	-	-
• mixed use of razors, scissors, etc.	22.34	-	-	15.38	-	-
• tattooing	10.66	-	-	3.85	-	-
• poor hygiene in case of wounds, cuts, etc.	8.63	-	-	0.00	-	-

NA - no answer

level. In the opinion of 49.48% of Indians, 48.57% of Filipinos, 36.36% of Eastern Europe seafarers, and 32.56% of Italians, vaccination can prevent any transmittable disease. This assumption is shared by the 53.33% of seafarers with professional secondary school diplomas and 52.50% of those with a university degree.

Correct answers to this section of the questionnaire averaged 73.40% among ashore workers and 53.72% among crew members (Table 3).

RISKY BEHAVIOURS RELATED TO FOOD HYGIENE

In general, the respondents do not always check food before consumption. A different behaviour is

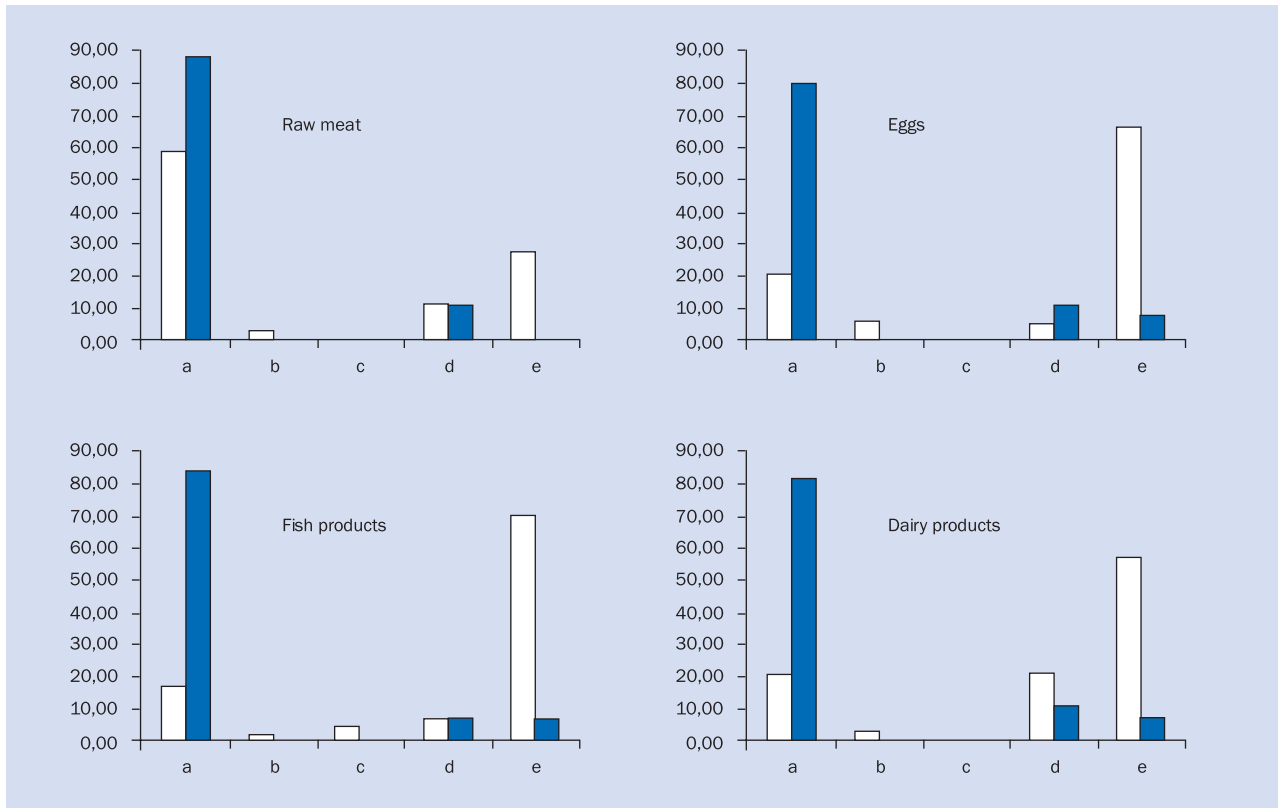


Figure 3. Percentage of answers by seafarers (white columns) and ashore workers (black columns) to the question “Do you check the basic characteristics of foodstuff before consumption (e.g. appearance and smell)? Do you check the condition of foodstuff before consumption (such as look and smell)?” The question was referred only to four different types of food: raw meat, eggs, fish products, and dairy products. Possible answer: a: always, b: rarely, c: never, d: depends on food, e: no answer ($p < 0.05$ for all of 4 types of food)

noted among seafarers, depending on the food type. Raw meats are the most controlled (59.39% of seafarers claimed to always check smell and the appearance of these products), whereas little attention is paid to eggs (20.30%), fish (17.26%), and dairy products (19.80%). Conversely, about 80% of ashore personnel always checked all food (Figure 3). Differences in the approach to food are statistically significant between crew members and the office staff (Figure 3).

Sub analysis of the above data for nationality of respondents revealed that Filipinos were less attentive than other groups to the inspection of eggs (8.57%), fish (0%), and dairy products (5.71%). Indians were the nationality paying the least attention to meat appearance (52.58% against the average of 71.02% for the other ethnic groups).

Knowledge by seafarers on how to preserve leftovers is generally poor. Only 48.73% of crew members know that cooked foods should be preserved in the refrigerator. 41.12% of them believe that the type of preservation depends on the food, while 4.06%

believe that food should always be kept at room temperature. One seafarer (0.51%) responded that it should be thrown away if not eaten just after cooking, 5.58% of the sample did not answer the question. Answers of ashore personnel to these questions were homogeneous. 73.08% of them know the proper method of food preservation, 23.08% stated that it depends on the food, and 3.85% of them believe that food should always be kept outside the refrigerator.

The interviewed subjects are apparently not regular consumers of risky food such as raw fish products. Only 14.72% of seafarers and 26.92% of ashore personnel consume them often, whereas 29.44% and 26.92% of them, respectively, eat raw fish rarely. The majority of respondents (48.73% of seafarers and 46.15% of office staff) do not consume them at all. 7.11% of crewmembers did not answer this question.

DISCUSSION

Analysis of health problems and of their awareness among seafarers of the merchant marine industry is in general performed ashore, based on in-

interviews done in ports after ship arrival or during medical check-ups [1, 3, 7, 11-13]. To have a more specific evaluation of the problems assessed in our survey, the questionnaire was delivered and filled-in on board. This posed several organisational problems, primarily related to the delivery of the materials on board ships, the maintenance of adequate levels of privacy during filling-in, as well as in returning tests ashore for their evaluation. In spite of this, the survey has the unique quality of being done on board seagoing vessels, without external influences, and therefore properly reflecting the awareness/knowledge of problems assessed on board ships. The survey was proposed in collaboration with CIRM, which, as mentioned in the introduction, is the Italian TMAS. CIRM is also the institution to which requests for medical advice are addressed from Finaval ships [14]. The appreciation among seafarers of the services the Centre offers them has probably contributed to the good percentage of respondents and to the relatively high number of answers to the questions. Another particularity of the present study is that analysis was not limited to seafarers, but it was referred also to a sample of ashore workers, employed by the same firm.

The results of our survey are consistent with those of Oldenburg and collaborators [3] and confirm that the two main concerns of seafarers are represented, in order, by the risk of suffering from psychological problems caused by isolation and/or affective and social deprivation and by the doubt of not being adequately cared for in case of illness or injury on board. These data indicate that seafarers are sensitive to their wellbeing when sailing. The sensitivity to the possible psychological and health problems of seafarers has been addressed by the recent International Maritime Labour Convention [15]. The document is going to be ratified by an increasing number of countries and it is hoped that, with its entry into force, the discomfort that accompanies work at sea may be more properly addressed.

Working activity of seafarers is characterized by exposure to constant, on-going stress factors (noise, ship motion, vibration, watch systems, etc.) affecting the workers on a 24-hour basis [16, 17]. Psychological stress, fatigue, limited living space, and isolation from the rest of the world [3, 17] can make a factor to be perceived as more risky than others. Those living in these conditions may have a greater awareness about the risks and dangers than would people living on land, who can only imagine it. Our survey has shown, from first-hand experience, that seafarers feel some problems to be more relevant com-

pared to their ashore mates and vice versa. This is the case, for instance, regarding the risk of visual problems. These problems are not considered relevant by seafarers, whereas they are important in ashore workers. Working for long periods in front of a video terminal is the most probable reason for the different awareness to this problem between the two categories considered.

The risk of communicable diseases is higher in seafarers than in ashore personnel because of the poor knowledge of this problem. From our survey it appears obvious that people ashore are better informed than isolated seafarers. Hence, specific campaigns for seafarers on health risks and prevention are appropriate and should be undertaken.

Respondents' answers on the possibility that vaccination can prevent all infectious diseases merit some comments. Unlike the ashore staff, seafarers have false expectations on vaccination. Among them Indians and Filipinos appear to be the most confused. Surprisingly, the wrong idea of overprotection of vaccinations is shared by seafarers with professional diplomas and degrees. These findings suggest that analysis of the syllabus of courses followed, and where they were obtained, is necessary for making the training of an international work force as seafarers more homogeneous.

Ashore workers have shown themselves to be a category with low foodborne risk compared to sailors. In fact, they pay more attention to food and on the method of food preservation. Among seafarers, Indians have a higher risk than other ethnic groups to foodborne diseases from meat. Filipinos are the ethnic group more at risk for almost every food. The unsafe behaviour of not checking food before eating it merits specific intercultural interventions to avoid the health risks of foodborne diseases.

Consistent with a review on outbreaks of foodborne disease, raw seafood is the most common vehicle implicated in infectious gastrointestinal diseases [5]. Nevertheless, the majority of respondents of our whole sample do not eat raw seafood. On the other hand, ashore personnel eat shellfish more than seafarers. Hence, they are at higher risk compared to crew members for gastrointestinal diseases related to raw sea products [18].

CONCLUSIONS

A recent study reported that most individuals are aware of the potential risks of infection, but choose not to take action despite information aimed at increasing awareness and responsiveness or alertness

of the population. It has been calculated that if the dissemination of information is fast enough, an infection could be eradicated. If this is not possible, information transmission has an important effect in reducing the prevalence of the infection [19]. In our opinion, information campaigns are important and useful for improving hygiene and responsible behaviours on board and consequently in reducing the spread of communicable diseases.

Better knowledge of the major health risks that may affect seafarers and the promotion of appropriate behaviours to minimize them is relevant for health protection. Seafarers should be actively involved in behavioural decisions and should receive relevant information about risks, possible consequences, and, especially, how to minimize exposure during travel. Of course, we must not prohibit; we have to inform.

CONFLICT OF INTEREST NOTIFICATION

The authors do not have financial and personal relationships with other people or organizations that could inappropriately influence this work.

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