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Awareness of health risks and communicable diseases among undergraduate maritime students

Taha Talip Türkistanlı, Coşkan Sevgili

Dokuz Eylül University Maritime Faculty, Tınaztepe Campus, İzmir, Turkey

ABSTRACT

Background: *In case of an emergency related to crew's health the first responsible person on board is the appointed officer of the ship. Sometimes these officers aren't just the only responsible person but also the only available option. Therefore, they are expected to handle various types of cases from disease outbreaks to food poisoning. However, officers on board aren't particularly trained or prepared for such extreme circumstances. Services like Telemedical Assistances may provide great help in such moments, but the first identification and contamination of various diseases might not be possible without previously acquired knowledge and awareness. This study aims to examine and discover the basic health knowledge and risk awareness of undergraduate maritime students and assess the needs for improved health training for future maritime officers.*

Materials and methods: *The study was conducted by proposing an anonymous questionnaire to the undergraduate students of maritime faculties located in Turkey. Questionnaire form was adapted from the study of Grappasonni et al. This questionnaire examines the awareness of health risks and risks of contracting communicable diseases among seafarers. A total of 266 Turkish participants joined the study.*

Results: *Basic health knowledge of the maritime students seems to be well acquired expect for the communicable diseases and food hygiene. General risk perception for most health issues especially for the communicable diseases is low for all participants. Findings note that most maritime students get their health and disease information from Internet sources. Several differences between Marine Transportation Engineering and Marine Engineering students are found, related to concerns they feel on board for health issues. All maritime students are more concerned about the risks of psychological problems due to isolation. A risk, perception and in some cases awareness shift is observed between classes. All results are limited with participants' nationality.*

Conclusions: *Seafarers should be educated and trained according the conditions they face on board. An improved training method should be adopted. This way, the future officers will be qualified to intervene in emergency situations.*

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Key words: communicable diseases, food hygiene, health knowledge, awareness training

INTRODUCTION

International maritime trade has different characteristics compared to other transportation modes in terms of health care and treatment possibilities of the employees. Crew on board may not have access to health services in a short time due to long navigation periods and large service areas of the vessel. In addition to that, closed and semi-closed spaces on board as well as the working conditions on vessels can cause frequent health problems and emergency situations [1]. It is also a general assumption that ships represent an environment which disease can spread easily [1–3]. Underestimating the outbreaks on board ships may cause serious public health problems. International Health Regulations requires shipmasters to notify port authorities

Dr. Taha Talip Türkistanlı, Dokuz Eylül University Maritime Faculty, Tınaztepe Campus, 35035 İzmir, Turkey, e-mail: t.turkistanli@hotmail.com

in "any cases of illness indicative of a disease of an infectious nature or evidence of a public health risk on board." [4]. Yet the knowledge and awareness of the crew on board may be inadequate to even notice possible outbreaks or serious communicable diseases. Since most outbreaks are unreported or even undetected, an infected ship arriving to a port may further spread diseases to port or local workers. Nevertheless, containing and treating diseases in ports is more easily handled than on board considering the accessibility of several health facilities.

In case of diseases or injuries on board, medical assistance is given by the officers of the ship. Ship masters or officers generally have a limited medical training yet expected to intervene in extreme situations as well as carry out regular checks. Several developments such as Telemedical Assistance Services are long in use to enhance awareness and provide support on medical issues for seafarers [5]. However, food, water and air-condition inspections are still on the last in the officers' list. Poor disease awareness, low knowledge and refraining from taking any action on health issues creates suitable transmission environment for infections [6]. All of this combined together further proves the importance of basic health, disease and food hygiene knowledge and awareness of officers.

There are several studies in the literature with the subject of seafarer health knowledge and awareness and most of them were conducted on the actively working and experienced seafarers. Studies of Grappasoni et al. [6] evaluated health risks awareness of seafarers while the studies of Grappasoni et al. [7], Chowdhury et al. [8] and Laraquie et al. [9] studied on the STI/HIV/AIDS which is considered to be a significant infectious disease for seafarers. There are also various studies examining the health awareness of undergraduate students in many different fields [10–16]. All these studies on seafarers and students indicate that education and information about health issues should be given regularly. Although these studies have shown that seafarers are aware of some communicable diseases, they also point out some misconceptions and wrong attitudes. For this reason, researchers have advised that regular education and information about health issues and medical aids should be given to seafarers.

As seen in the literature review, there is a lack of studies on health awareness of maritime students. In this context, this study aims to assess health risk awareness, knowledge and risks of contracting communicable diseases in undergraduate students of maritime faculties located in Turkey. Our purpose is to determine different grade students' health knowledge and explore methods to increase awareness to reduce frequency of incidents and possible outbreaks. Results are compared with other studies available on the subject.

MATERIALS AND METHODS

In order to assess basic health knowledge and disease risk awareness, a survey was proposed to undergraduate students of maritime faculty located in Turkey. The questionnaire used in this survey is adapted from the works of Grappasonni et al. [6] and has been developed to assess awareness of health risks, general perception of danger and discomfort in the workplace and risks of contracting communicable diseases including those related to food hygiene [6]. First step of the adaption was to translate the questionnaire form from English to Turkish language. For the validity of this translation a two-step process is adopted. The text is separately translated to Turkish by the two authors and then authors translated each other's adaption back to English language. As a final step, final forms are compared with each other. The adaptation includes additional phrases added by authors, questioning the basic health knowledge sources and reliance towards these sources. The final form included an introduction and consent section which states the purpose and procedures of the research for the participants.

Survey was conducted online using the Internet resources. Each participant was asked for consent before filling out the form and reminded that he or she can refuse to participate in the research. Therefore, the participation in the survey was anonymous and on voluntary basis. Only one response per participant was allowed. Data collection was carried out between the dates of 01/03/2018 to 16/03/2018. A total of 266 participants joined the study. All participants are Turkish citizens and studying to get a bachelor's degree on maritime related areas.

STATISTICAL ANALYSIS

Data collected from these participants were stored and processed in excel spreadsheets. SPSS (Statistical Package for the Social Sciences) 22.0 software package was utilised for the statistical analysis of the research. Results were obtained through descriptive statistics and from χ^2 analysis. Statistical significance was established at $p < 0.05$.

RESULTS

A total of 266 Turkish undergraduate students answered the survey. Answers provided by these participants were analysed in accordance with their undergraduate programmes and their years in education. All participants were either studying Marine Transportation Engineering (MTE) or Marine Engineering (ME). Participants were also grouped by their years in education as such; those who were in their 1st (freshmen) and 2nd (sophomore) year grouped together and those who were in their 3rd (junior) and 4th (senior) year grouped together as well. Sampling group consists mostly of male students (89%), which is thought to be normal

considering the general population of maritime faculties. These demographic characteristics of the participants are shown in the Table 1.

First question asked to participants was questioning the sources of basic health and disease information. Figure 1 shows the distribution of responses to basic health and disease information sources and trust towards these sources. Answers revealed that majority of the students (84.2%) get their health and disease information and knowledge from the Internet. Nearly half (47.7%) indicated that they get this information frequently from the healthcare professionals or doctors. However, a reverse situation is observed regarding the trust towards these sources. A great majority (78.9%) indicated that they trust healthcare professionals and doctors, whereas 28.9% of the participants indicated they trust the Internet as an information source even though they most frequently use the Internet as the source of information for basic health knowledge. Journals or books weren't considered as information sources for maritime students and even fall behind the television and relatives in most cases.

Tables 2 and 3 lists the questions proposed on the survey and the percentage of given answers. These questions examine the risk awareness of contracting communicable diseases. Opinion of the 88% of the participants was towards that not all infectious diseases get transmitted

Table 1. Demographic characteristics of participants

Department	
MTE	182 (68.4%)
ME	84 (31.4%)
Total	266
Class	
Freshmen and sophomores	176 (66.2%)
Juniors and seniors	90 (33.8%)
Total	266
Gender	
Female	28 (10.53%)
Male	238 (89.5%)
Total	266
Age [years]	
Minimum	18
Maximum	28
Mean	21.43

MTE — Marine Transportation Engineering; ME — Marine Engineering

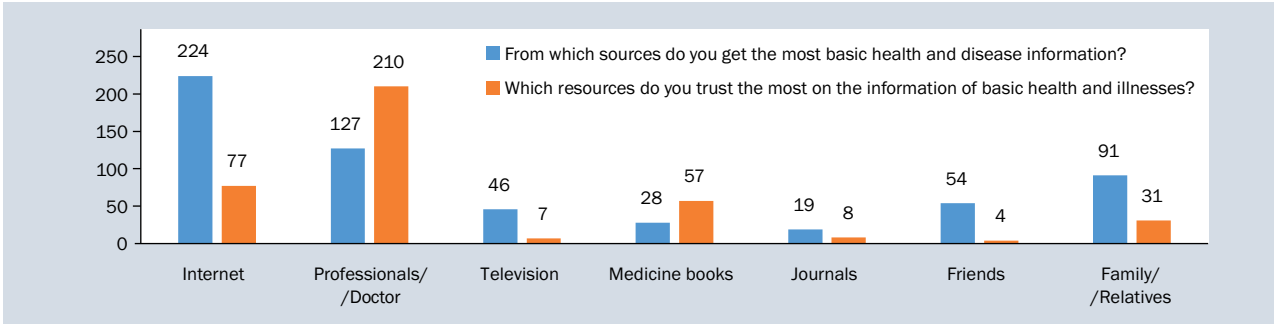

Figure 1. Health and disease information sources and trust

Table 2. Responses to questions regarding disease knowledge

Survey questions	Class		Department	
	Freshmen and sophomore	Junior and senior	MTE	ME
Are all infectious diseases transmitted through the air?				
Yes	2.3%	2.2%	1.1%	4.8%
No	88.6%	86.7%	90.7%	82.1%
No answer	9.1%	11.1%	8.2%	13.1%
Does vaccination prevent all infectious diseases?				
Yes	4.0%	5.6%	3.8%	6.0%
No	77.8%	82.2%	82.4%	72.6%
No answer	18.2%	12.2%	13.7%	21.4%

MTE — Marine Transportation Engineering; ME — Marine Engineering

Table 3. Responses to questions regarding basic heath and disease knowledge and awareness

Survey questions	Class		Department		Total
	Freshmen and sophomores	Juniors and seniors	MTE	ME	
	Yes	Yes	Yes	Yes	
In your opinion, which communicable diseases have a higher risk of transmission?					
Meningitis	16.5%*	3.3%*	11.0%	14.3%	11.9%
Hepatitis A	20.5%	14.4%	19.8%	15.5%	19.2%
Hepatitis B and C	41.5%	46.7%	44.0%	41.7%	44.1%
Tuberculosis	8.5%	7.8%	7.1%	10.7%	8.4%
Scabies	22.7%	20.0%	22.5%	20.2%	22.2%
HIV	38.1%	47.8%	41.2%	41.7%	43.7%
Skin diseases	55.1%	54.4%	54.4%	56.0%	54.8%
Which of the following can be classified as infectious diseases?					
HIV/AIDS	95.4%	91.1%	94.0%	94.0%	94 %
Hepatitis C	49.7%	52.2%	57.7%*	34.9%*	50.2%
Scabies and pediculosis	71.4%	66.7%	73.1%	62.7%	70.2%
Other	–	–	–	–	4.6%
Which of the conditions listed below are associated with the increased risk of acquiring transmittable diseases on board ships?					
Uncooked/raw food that is not sufficiently washed	57.4%	54.4%	58.2%	52.4%	56.4%
Poor hygiene in cabins and showers	66.5%	57.8%	69.2%*	51.2%*	63.5%
Incorrect maintenance of sanitary instruments	46.0%*	31.1%*	40.1%	42.9%	41%
Inadequate ventilation in cabins	53.4%	43.3%	54.4%*	40.5%*	50.4%
Mixed use of razors, scissors, etc.	44.9%*	28.9%*	41.2%	35.7%	39.5%
Inadequate hygiene in case of wounds, cuts, etc.	57.4%	47.8%	56.6%	48.8%	54.1%
Inadequate hygiene in public areas	64.8%*	50.0%*	62.1%	54.8%	59.8%
Intravenous drug use	15.3%	13.3%	13.7%	16.7%	14.7%

*Statistically significant differences assumed at $p < 0.05$. MTE — Marine Transportation Engineering; ME — Marine Engineering

through the air. In addition to that, 79.3% of the participants pointed out that vaccination would not prevent all infectious diseases. This same trend observed for all bachelor programmes and for all education levels. No significant differences are found between groups regarding this question. This points to a positive situation. However, regarding the transmission of communicable diseases, participants were asked to identify the communicable diseases. 94% of the participants identified the HIV/AIDS and 70.2% of them identified scabies and pediculosis correctly. Identification rate and responses observed to be were relatively lower for other diseases like hepatitis C (50.2%) and tuberculosis (49.3%). A significant difference emerged between MTE and ME students for the hepatitis C disease. Compared with MTE students, most of ME students considered hepatitis C less contagious and less dangerous ($p < 0.05$). In addition to that most of ME students failed to identify hepatitis C (65.1%) as a communicable disease ($p < 0.05$). The most considerable finding was that most of the participants failed to make a distinction for the transmission risk for several diseases. Only a small percentage of participants, from all groups, believed that meningitis (11.9%), hepatitis A (19.2%) and tuberculosis (8.4%) were highly communicable. Also, transmission risk awareness of senior students for meningitis was rather low (3.3%) and significantly different from other groups ($p < 0.05$). These findings alone remark the poor awareness, if not the low knowledge, of maritime students regarding the transmission risk of diseases.

To examine the perceptions of danger towards communicable diseases and discomfort at workplace, participants were asked which conditions on board ships makes them feel more exposed to transmittable diseases. Responses to these questions are also shown in Table 3. The answers were relatively high for all options. Highest response was "poor hygiene in cabins and showers" with 63.5%, followed

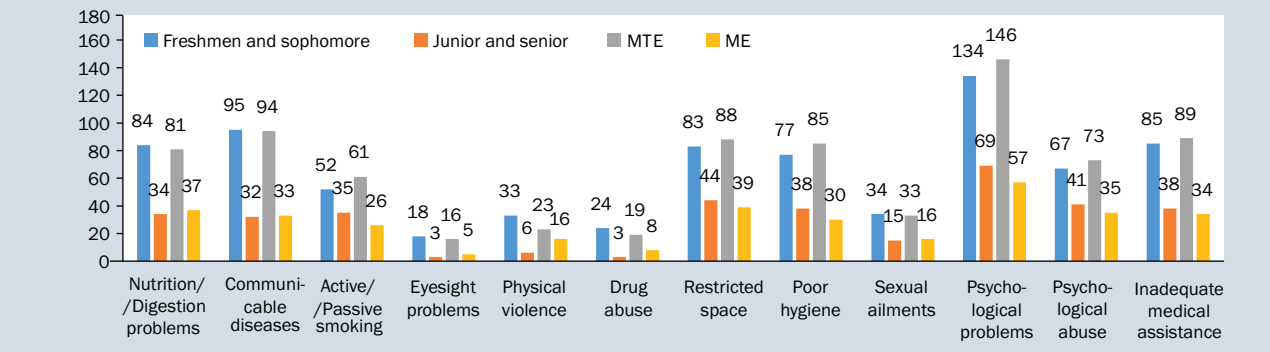

Figure 2. Health risks for people working on board; MTE — Marine Transportation Engineering; ME — Marine Engineering

by "poor hygiene in common areas" with 59.8% and lowest answer was "intravenous drug use" with 14.7%. Even though the intravenous drug use is a dangerous factor for communicable diseases, all groups of undergraduate maritime students believed that the intravenous drug use was a rare condition to see on board ships. Participant from all groups also agreed on the poor overall hygiene on commercial ships. A few significant differences were noticeable for the perceived risk question between freshmen and sophomore group and junior and senior group. 1st and 2nd grade students identified the "incorrect maintenance of sanitary instruments" and "mixed use of razors and scissors" as a riskier condition on board than the 3rd and 4th grades ($p < 0.05$). Another significant difference was between MTE and ME students. Marine transportation engineering students perceived more frequently than ME students ($p < 0.05$) that the inadequate ventilation and poor hygiene in cabins promotes communicable diseases.

Participants were also asked to list major health risks for people working on board ships (Fig. 2). Most of them felt that psychological problems are a major concern (76.7%) when working on board ships. Also, MTE students were significantly more worried with psychological problems than ME students ($p < 0.05$). Concerns of lack of adequate assistance in health problems (47.7%), psychological abuse (41.4%), nutrition and digestion problems (45.1%), restricted living space (47.4%) and poor hygiene (44%) was pointed out by nearly half of the participants. Passive smoking (33.8%), sexual ailments (19.2%), eyesight problems (7.9%), physical violence (13.9%) and drug abuse (10.9%) were thought to be less concerning factors. 1st and 2nd grade students felt more concern towards the risks of drug abuse, physical violence and communicable diseases than the 3rd and 4th graders ($p < 0.05$).

There were also noteworthy findings for the food hygiene and risky food behaviours among maritime students. These findings and survey questions are shown in the Table 4. Most of the participants (68.8%) were aware that gastroenteritis can be transmitted by contaminated foods. On the contrary, most students (75.6%) failed to recognise hepatitis A which can also spread through contaminated food. In addition, ME students were significantly worse than the MTE at identifying diarrhoea as a symptom of food transmitted disease ($p < 0.05$). Nearly all MTE students (92.3%) indicated that they check basic characteristics of food. This percentage was lower (78.6%) in ME students ($p < 0.05$). Another noteworthy finding was that 54.9% of participants stated that they eat fish and seafood caught by amateurs when they are on board. This risky behaviour went up to 71.1% for 3rd and 4th grade students. This ratio was much lower (46.6%) for freshmen and sophomores ($p < 0.05$).

DISCUSSION

Seafaring is a profession that is inherently difficult, especially in terms of health and medical assistance. For this reason, undergraduate maritime students who are future seafarers should at least have general information and practice on health issues that can be seen on board. In this context, this study assessed the risk awareness and knowledge of communicable diseases and basic health issues in undergraduate students of maritime faculties. Students participating the survey were divided in two groups according to their class and department in order to compare students who have completed their open sea training and those who have not.

Our findings show that psychological problems were perceived as the most important health risks on board ships by students. This result is consistent and in line with the other studies on this subject [6, 17]. Isolation at work place is one of the primary problems that seafarers from all ages encounter in their professional life. Still, responses towards this issue are limited.

While Chowdhury et al. [8] stated in their study that one of the most worrisome health problems among seafarers was sexually transmitted infections; our study revealed that sexual ailments are not seen as a major health risk by young

Table 4. Risky behaviours related to food

Survey questions	Class		Department		Total
	Freshmen and sophomores	Juniors and seniors	MTE	ME	
	Yes	Yes	Yes	Yes	
Which of the diseases listed below can be transmitted via food?					
Gastroenteritis	69.3%	63.3%	65.4%	71.4%	68.8%
Cholera	40.3%	47.8%	46.2%	35.7%	43.5%
Hepatitis A	21.0%	28.9%	25.3%	20.2%	24.2%
Tetanus	4.5%	2.2%	2.7%	6.0%	4.2%
Which are the main symptoms of an infection transmitted via food?					
Vomiting	87.5%	88.9%	89.0%	85.7%	89.3%
Diarrheal	76.7%	83.3%	83.5%*	69.0%*	80.2%
Fever	61.4%	53.3%	58.2%	59.5%	59.5%
Cough	11.9%*	4.4%*	9.3%	9.5%	9.5%
Do you check the basic characteristics of food (e.g. appearance and smell)?	89.2%	85.6%	92.3%*	78.6%*	88%
Do you eat raw fish or seafood?	25.0%*	37.8%*	30.2%	27.4%	29.3%
Do you consume fish or seafood caught by amateurs when you are on board?	46.6%*	71.1%*	59.9%*	44.0%*	54.9%

*Statistically significant differences marked with $p < 0.05$. MTE — Marine Transportation Engineering; ME — Marine Engineering

maritime students. According to our findings, maritime students have knowledge about sexually transmitted diseases, yet they believe these diseases are rare conditions to occur while they are on board, meaning they are lacking risk awareness for these conditions or perhaps lacking experience in sea shapes their risk perception this way. When examining the conditions that may cause communicable disease on board ship, it has been determined that students in freshmen and sophomore classes think they may be more exposed to these conditions than students in junior and senior classes. We believe that this finding shows that students with more experience or more training usually become numb over time to conditions that may cause infectious diseases. Other results on sexually transmitted diseases such as the studies of Grappasoni et al. [7] and Oppong and Oti-Boadi [15], which examined students, and of Ghana and Laraquie et al. [9], which examined seafarers in Northern Morocco, stated that their participants lack knowledge about sexually transmitted diseases. This was not the case for this study and we believe nationality and education level may affect this finding.

It has been revealed that maritime students have limited knowledge about the communicable diseases especially about the hepatitis A and hepatitis B. Approximately half of the participants didn't consider hepatitis B as a high-risk infectious disease. However, Al-Jabri et al. [12], who investigated the awareness for hepatitis B infection between non-medical and medical students, didn't find any significant difference between groups and determined that most of the students had knowledge about hepatitis B. Again, we believe the nationality of the sampling group and nationwide education system may slide these findings considerably regardless of the experience of the participants.

Also, previous researches conducted by Grappasoni et al. [6] found that seafarers have misinformation on vaccination regarding the communicable diseases. About half of their participants had given false answers to questions about the vaccines. Our findings however show otherwise. In this study it has been determined that maritime students' knowledge level for vaccination is at a fairly good level. These findings show an inconsistency and huge variability of seafarers' knowledge on health issues. These results call for a further study regarding the standard education of maritime students about highly infectious diseases and basic health principles.

One of the most notable finding was that students, in general, have insufficient knowledge of foodborne illnesses. Whereas the knowledge level of students on the symptoms of infectious diseases transmitted via foods is accurate, they failed to identify diseases and transmission risks of the food borne illnesses. Even though our participants opposed eating raw food, which coincides with the findings of Grappasoni et al. [7], we observed that junior and senior students are more likely to consume any kind of seafood than the other groups. In other words, consumption of seafood is

increased as the sea experience of students increases. Regardless of that, we discovered that most maritime students perform risky behaviours related to food hygiene.

There is also the issue of where most of the maritime students get their health and disease information from. Nowadays, students generally acquire basic information about health and disease from the Internet, thanks to the developing technology and information systems. On the other hand, they consider doctors and health professionals as the most reliable source of knowledge about health and diseases. Encouraging and promoting the use of appropriate sources for health and disease knowledge is crucial. Promoting the Telemedical Assistance Services and issuing a formal list of national and international recommended sources for health problems and diseases may shift habits of seafarers to a more convenient manner.

CONCLUSIONS

This study shows that most maritime students have adequate knowledge related to basic health issues. However they fail to identify transmission risks and have low awareness and even low knowledge about communicable diseases and food hygiene. In some cases they easily identified the well-known diseases, yet their knowledge was limited to what they read in the Internet and doubtful sources. Considering that most health issues need to be handled on board, it is clear that an upper level of knowledge and awareness is needed for seafarers than the for workers of other sectors. Risky behaviours related to food and food hygiene should be another consideration. Inadequate knowledge on this issue may lead to infections or disease outbreaks on board. Seafarers should be educated and trained according to the conditions they face on board. This should well include the basic health conditions and emergency cases. Therefore, standardised and improved training methods should be adopted by national and international organisations. Instead of waiting for worst to happen, risks and consequences should be minimised with proper and standardised training and testing. We must aim to eliminate risky behaviours and poor habits regarding the food hygiene on board and endeavour for high awareness for communicable diseases. Further studies should focus and explore ways to eliminate the risky food behaviours seen in seafarers. Development of a health and disease training for seafarers should also be considered.

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