



Perceived Training Needs of Maritime Doctors and General Practitioners



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Abstract

Introduction: Medical practitioners provide pre-employment examinations and periodic health examinations to seafarers, fishermen, offshore employees, and maritime students to ensure that they are fit for work. So far, very little is known about doctors' perceptions of their professional training needs and expectations. The objective of this study was to gain insight on (a) the breadth of services offered, (b) follow-up practices, and (c) perceived training needs on aspects of maritime medicine.

Methods: All maritime doctors (110) recognized by the Danish Maritime Authority (DMA) and 100 general practitioners (GPs) were invited to participate. A questionnaire was sent out electronically to gather information on the demographics, breadth of services, follow-up practices, and perceived training needs of the participants. Descriptive statistics described the characteristics of the 2 groups.

Results: The training priorities of maritime doctors were rules and regulations (68.7%) followed by working conditions and health risks aboard ship (62.8%). The self-rated training priorities of the GPs were working conditions and health risks aboard ship (44.1%), occupational disease diagnostics, prevention, and follow-up (41.1%), and health and safety at work (38.2%).

Conclusion: Members of both medical disciplines were in favor of flexible and accredited training. More specifically, GPs considered a course in occupational risks, diseases, and follow up targeting high-risk professions very important. Maritime doctors suggested the establishment of a website as a one-stop shop for relevant guidelines and information. The small size of the GPs sample prevented a more in-depth gap analysis; however, the results could be used to help the respective authorities establish relevant training programs.

Keywords: Maritime, Medicine, Education, Vaccination, Health Examination, Ships

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Introduction

Travel medicine deals with the prevention and management of health problems of international travellers.¹ Maritime medicine extends to the practices of occupational, tropical, and travel medicine. It has been defined as any medical activity related to questions concerning the employment, working conditions, living conditions, health and safety of workers at sea. This includes workers in commercial fleets, the Navy, fishing fleets, sea piloting, offshore installations, maritime academy students, and leisure boats. Maritime medicine is not a recognized specialty in terms of the mutual recognition of medical certificates in the European Union (Directive 2005/36/EC).²

About 1.5 million seafarers regularly sail around the globe, often for long periods of time, transporting more than 90%

of goods traded globally.^{3,4} Maritime employees are a hard-to-reach population, because their work imposes difficulties on seeking timely health services.^{5,6} Seafarers, fishermen, and offshore workers are subject to mandatory health examinations every second year in order to reduce risks to other crew members, to ensure the safe operation of the ship, and to protect their own personal health and safety.

In the context of the Maritime Labor Convention (MLC 2006) that came into force in Denmark in 2013,⁷ the respective authorities have an interest in providing as comprehensive and good quality health services to seagoing professionals as the rest of the population enjoys. Fundamental components of these services are pre-employment medical certificates as well as periodic medical fitness examinations for seafarers, fishermen, offshore employees, and students as described

by the respective International Labor Organization/International Maritime Organization (ILO/IMO) guidelines on the medical examinations of seafarers.⁸ These services are provided by medical practitioners who should have a clear understanding of the living and working conditions aboard ships. However, because seagoing professionals may consult general practitioners (GPs) or their health concerns while ashore, authorities should have in place relevant guidance for this medical specialty to better cope with the health needs of seafarers.

There have been long discussions between government agencies and medical associations on training content for maritime doctors, the licensing of professionals, and the accreditation of institutions to provide such training, but with limited success so far. Training is a fundamental part of medical practice due to advancements in biological sciences. Thus, medical doctors, and health professionals in general, put a lot of effort into lifelong learning activities to update their knowledge and stay current so as to better serve the population in need. A number of training programs on maritime medicine are offered at certificate, diploma, and master's levels in different countries, including Spain and Norway. All programs have a flexible organization and are provided as a combination of distance learning and face-to-face teaching. In Denmark, training on maritime medicine is lacking, and doctors seeking more knowledge about maritime medicine must travel to other neighboring countries, mainly Norway.⁹

In Denmark, maritime doctors are GPs appointed by the Danish Maritime Authority (DMA) to provide pre-employment and periodic health examinations to seagoing personnel.¹⁰ Further training in maritime medicine is not provided in the country. It can be argued that regular GPs may need more detailed guidance in dealing with professionals who work at sea and should receive training in maritime medicine too, as seagoing professionals might consult their regular GP with health concerns.⁸

The education and training of health professionals are essential factors in the development of health systems.¹¹ Education and training improve the responsiveness and performance of health professionals and lead to the optimization of services.^{12,13}

In Denmark, the policy on patient-centered care has been in place for some years now. It requires a different approach in doctor-patient relations and builds on the principal that patients are equipped to make informed decisions about their health. Health systems should give attention to the needs of marginalized groups.¹⁴ Seafarers are a hard-to-reach population, because they are most often far from hospitals and have a great range of health needs due to their specific working environment and long working hours.¹⁵ Research findings have shown that their perceived health is often impaired with limited access to health information.^{16,17} They also face difficulties in communicating with health professionals who should be trained to understand and respond to their needs.¹⁸

So far, very little is known about the range of services offered to seagoing personnel and the training needs of doctors who need to stay current and better serve their populations. The

aim of this survey was to gain insight into the (a) breadth of services offered to seamen, (b) follow-up practices, and (c) perceived training needs of doctors in aspects of maritime medicine. The results could be used by the relevant authorities to establish a maritime medicine training curriculum.

Methods

GPs – DMA-Designated Seafarers

All seagoing participants in this study were designated maritime doctors by the DMA and authorized to provide the mandatory medical examinations of seafarers, fishermen, offshore workers, and maritime students.

The survey took place electronically from May 31 to June 28, 2017. It was distributed electronically and anonymously through Google Forms software. An e-mail was sent out to all e-mail addresses provided by the DMA which contained an invitation letter explaining the scope of the survey and a link to the online questionnaire. Clinics with more than one affiliated maritime doctor were contacted by phone to make sure that all recognized maritime doctors received the invitation e-mail. In total, 110 approved maritime doctors were invited to participate. Three e-mail reminders were sent one week apart. The survey was completed by 51 (46.4%) maritime doctors.

The questionnaire was created in close cooperation with the DMA, national medical experts and the Research Unit for General Practice, University of Southern Denmark. It was initially developed in English for use in international comparisons and then translated into Danish using the standard forward-backward method. Different researchers performed the forward and backward translations of both questionnaires, while a Danish linguistics professional aided in the final editing of the tool. It was pilot-tested on a small sample of maritime doctors to investigate content validity.

The instrument had drop-down menus to facilitate quick responses. Self-administered, it contained 40 questions, three of which were open-ended, covering four aspects of maritime medicine performance, namely (a) demographic characteristics, (b) attributes of physicians who issue a pre-service fit-for-work certificate for seafarers, (c) continuity of care with questions on disease management, prevention, follow-up practices, and notifications of occupational diseases based on periodic medical examinations, and (d) competencies and training needs. Completion time for the questionnaire was around 7-10 minutes.

GPs – Non-designated Seafarers

The Department of Research in General Practice ran the survey for GPs during the same time interval as the one for maritime doctors. Due to factors beyond the control of the Department, this survey was done in a both manual and electronic formats. Thus, the invitation letters were sent by post, and the questionnaire was uploaded on the electronic platform SurveyXact. The survey achieved a response rate of 34% with an equal distribution between male and female GPs and a representative distribution between individual practitioners and group practices.

Based on the maritime doctor survey, the electronic

questionnaire targeting the GPs was developed with input from the project team and collaborating partners. The questionnaire contained questions on four domains: (1) demographic characteristics, (2) the breadth of services offered to seafarers, fishermen, and offshore employees, (3) follow-up practices, and (4) GPs' perceived training needs, and included topics meaningful to GPs only. It was prepared in English for use in international surveys and translated into Danish following the same process as the one for the maritime doctors. It contained 29 questions, one of which was open-ended.

The questionnaire for GPs took an estimated 5-10 minutes to complete. A pilot test aimed at assessing comprehensibility, comprehensiveness, and acceptability was performed on a small sample (5 persons). Based on this test, minor revisions were made, and finally, research colleagues with no previous acquaintance with the survey tested its layout and functionality.

Invitations to participate in the survey were sent to a random sample of 100 GPs from all over the country, excluding those appointed as maritime doctors by the DMA. Respondents were instructed to log on to the website of the electronic platform using a personal, unique 16-digit code that was provided in the invitation. Respondents were offered a participation compensation corresponding to approximately 18 Euro. Two reminders were sent out at 2-week intervals.

GPs were recommended to participate in the study by the Committee of Multipractice Studies in General Practice.

Statistics

Initial descriptive statistics were compiled directly using electronic tools. Stata 15 statistical software (StataCorp, College Station, TX, USA) was employed to further analyze the data. Demographics were displayed with frequency tables and by subgroups to examine differences between groups. Based on the surveys of both maritime doctors and GPs, common

questions were selected for gap analysis. The importance of training needs was answered on a 5-point Likert scale where 1 was not important and 5 was very important. To increase the robustness of the answers, this question was recoded into three categories in the analysis: 1 and 2 were not important, 3 equaled neutral, and 4 and 5 were very important. The reliability and validity of the applied questionnaire was assessed by Cronbach's alpha with the results of 0.90. Chi-square tests with *P* values for Tables 2 and 3 were calculated to determine the associations (if any) between each variable and the 2 categories.

Results

Table 1 illustrates the demographics of medical practitioners who participated in the survey. Almost all maritime doctors (98%) had a quite good knowledge of the living and working conditions on board ships, while only 55.9% of GPs scored this high.

Table 2 illustrates the questions on the range of services and knowledge. Almost all maritime doctors (98.0%) and about half of the GPs (47.0%) were familiar with ministerial order BEK999/13 on medical examinations of seafarers and fishermen; this result indicates a need to further communicate the ministerial order to GPs, while also indicating the GPs' extensive range of knowledge.

Table 3 illustrates the common topics and perceived training needs for GPs and maritime doctors. Among the maritime doctors, during consultations, almost 9 out of 10 made a point of educating their patients about health issues. The same applied to the pool of GPs. The majority of maritime doctors (64.7%) performed vaccinations for seafarers, while conversely, most GPs (82.4%) did not perform vaccinations for seagoing personnel. Seventy-two percent of maritime doctors provided follow-up consultations to seafarers. This percentage was even higher among GPs (89%). A vast majority of the maritime doctors (88.3%) indicated that, with their current knowledge, they could handle all cases efficiently. This percentage was lower among GPs (61.8%).

The next question dealt with training needs. Thirty-nine (76.4%) maritime doctors agreed or strongly agreed that taking courses in maritime medicine could improve their knowledge, while (15.7%) neither agreed nor disagreed, and only 4 (7.9%) disagreed or strongly disagreed. Likewise, more than half of the GPs (58.8%) agreed or strongly agreed that they could improve their knowledge by taking courses in maritime medicine. This result indicates that the doctors had a favorable attitude toward training.

The 2 professional groups were then asked to rank the topics in which they wanted training. The ranking was based on a Likert scale where 1 equaled not important and 5 equaled very important. The responses were recoded into three categories, as already mentioned, so that 1 and 2 equaled not important, 3 equaled neither important nor unimportant, and 4 and 5 were very important. The results for only the common topics are presented in Table 3 below. The self-rated training priorities of GPs were working conditions and health risks aboard ship (44.1%), followed by occupational disease diagnostics, prevention, and follow up (41.1%) and health

Table 1. Demographic Characteristics of General Practitioners' (n = 34) and Maritime Doctors (n = 51)

Variables	Categories	General Practitioners		Maritime Doctors	
		No.	%	No.	%
Age	<45	14	41.2	5	9.8
	45-54	8	23.5	18	35.4
	55-64	11	32.4	20	39.2
	>64	1	2.9	8	15.6
Gender	Male	16	47.1	37	74.5
	Female	18	52.9	13	25.5
Region	Capital	7	20.6	9	17.6
	Zealand	6	17.6	4	7.9
	Southern Denmark	7	20.6	20	39.2
	Central Denmark	8	23.5	11	21.6
University	North Denmark	6	17.6	6	13.7
	Aarhus	12	35.3	21	41.2
	Copenhagen	15	44.1	16	31.4
Years as doctor	Odense	7	20.6	14	25.5
	Other	0	0	1	1.9
As doctor	0-5 Years	15	62.5	13	25.5
	6-20 Years	9	37.5	38	74.5

Table 2. Selected Questions About the Range of Services and Maritime Knowledge of GPs (n = 34) and Maritime Doctors (n = 51)

Variables	Categories	General Practitioners		Maritime Doctors		P Value ^a
		No.	%	No.	%	
Familiar with living and working conditions on board ship	Yes, quite well	2	5.9	23	45.1	<0.01
	Yes, to some extent	17	50.0	27	52.9	
	No	15	44.1	1	1.9	
Familiar with ministerial order (BEK999/13)	Yes	16	47.0	50	98.0	<0.01
	No	18	52.9	1	1.9	
Educate patients about their health	Yes	30	88.2	16	88.2	0.15
	No	4	11.8	6	11.8	
Perform vaccinations	Yes	6	17.6	33	64.7	<0.01
	No	28	82.4	18	35.3	
Follow-up consultations	Yes	19	89.0	37	72.5	<0.01
	No	5	21.0	14	27.5	
With present knowledge, confident to handle all cases efficiently	Agree or strongly agree	21	61.8	45	88.3	<0.01
	Neither agree nor disagree	11	32.4	5	9.8	
	Disagree or highly disagree	2	5.8	1	1.2	
Improve knowledge by taking courses in maritime medicine	Agree or strongly agree	20	58.8	39	76.5	<0.01
	Neither agree nor disagree	14	41.2	8	15.7	
	Disagree or highly disagree	0	0.0	7	7.8	

^a2-tailed *P* value based on chi-square calculation.

Table 3. Common Topics and Perceived Training Needs of General Practitioners' (n=34) and Maritime Doctors (n=51)

Variables	Categories	General Practitioners		Maritime Doctors		P Value ^a
		No.	%	No.	%	
Rules and regulations related to maritime medicine	Very important	12	35.3	35	68.7	0.04
	Neither nor	12	35.3	12	23.5	
	Not important	10	30.4	4	7.8	
Organization of maritime health services and resources in Denmark and abroad	Very important	5	14.7	19	37.3	0.08
	Neither nor	14	41.2	19	37.3	
	Not important	15	44.1	13	25.4	
Telemedicine medical advice	Very important	11	32.4	17	33.2	0.55
	Neither nor	11	32.4	19	37.4	
	Not important	12	35.2	15	29.4	
Occupational disease diagnostics, prevention, and reporting	Very important	14	41.1	14	27.5	0.79
	Neither nor	11	32.4	23	45.1	
	Not important	9	26.5	14	27.4	
Health and safety at work	Very important	13	38.2	25	49.1	0.62
	Neither nor	12	35.3	18	35.2	
	Not important	9	27.5	8	15.7	
Early diagnosis, follow up, and prevention of diabetes, obesity, and hypertension in seafarers	Very important	10	29.4	16	31.5	0.77
	Neither nor	11	32.4	15	29.4	
	Not important	13	38.2	20	39.1	
Working conditions and health risks on board	Very important	15	44.1	32	62.8	0.03
	Neither nor	10	29.4	14	27.4	
	Not important	9	26.5	5	9.8	
Communication between doctor and patient	Very important	9	26.4	13	25.5	0.68
	Neither nor	11	32.4	20	39.2	
	Not important	14	41.2	18	35.3	
Gender issues	Very important	3	8.8	11	21.6	0.04
	Neither nor	11	32.4	23	45.1	
	Not important	20	58.8	17	33.3	
Management of information for professional update	Very important	8	23.5	22	43.2	0.01
	Neither nor	11	32.4	19	37.2	
	Not important	15	44.1	10	19.6	

^a2-tailed *P* value based on chi-square calculation.

and safety at work (38.2%). Among the maritime doctors, the top-ranked training priorities were rules and regulations related to maritime medicine (68.7%), followed by working conditions and health risks aboard ship (62.8%). The results showed that when it comes to topics of mutual interest, both types of practitioners expressed common needs; however, the GPs scored their needs lower.

Discussion

Continuing education programs enable physicians to better respond to their populations' needs and expectations and to improve patient-centered care by educating patients on preventive medicine related to chronic diseases, including hypertension, diabetes, and cardiovascular diseases.^{19,20} Despite relevant guidelines being issued by responsible international organizations, including the ILO and the IMO, an internationally accepted continuous professional training program in maritime medicine is lacking. As maritime doctors perform the mandatory periodical examinations in addition to the pre-engagement ones for seagoing professionals, their performance is of crucial importance for the shipping industry in general and its employees in particular. Seafarers are required to be in good health to perform their duties. Sickness on the high seas, far from shore and their home GP, can be dangerous not only for the infected employee, but also for his colleagues, and evacuations have proven to be very expensive for the industry. It is important to update maritime doctors' knowledge and increase their awareness of living and working conditions on board as well as their knowledge of the specific laws and regulations of seafaring. The national health systems will benefit from lower hospitalization and evacuation costs by offering a higher quality of service with reduced costs.

Analyzing the similarities and differences in training needs between maritime doctors and GPs, the following points can be highlighted:

- Working conditions on board ships are seen as very important by 63% of maritime doctors and 44% of GPs.
- Training in health and safety at work is seen as very important by 63% of maritime doctors and 44% of GPs.
- Training in rules and regulations related to maritime medicine is very important for 69% of maritime doctors compared with only 35% of GPs.
- Training in reporting occupational diseases is seen as very important for 41% of GPs and 28% of maritime doctors.
- Training in gender issues is seen as very important for 22% of maritime doctors and 9% of GPs.
- Remarkably, less than one third find early diagnosis, follow up, and prevention of diabetes, obesity, and hypertension in seafarers to be very important.

The results of this survey showed that seagoing professionals usually turn to maritime doctors for health concerns, but they may consult GPs, though to a lesser extent. This may explain why few GPs (about 1 out of 4) had seafarers on their patient lists and why those who did had only very few. Both types of practitioner are involved in the education of their patients during consultations and provide follow-up consultations

to those at risk of chronic diseases. Furthermore, maritime doctors are mainly involved in the provision of vaccinations; however, both specialties do not usually report occupational diseases. When they do, they mainly identify musculoskeletal problems, followed by hearing and skin problems, in the seagoing population. Maybe the official reporting process is time-consuming and should be revised.

Based on the medical doctors' self-rated training needs, areas of knowledge were found that need to be updated to enable maritime doctors to optimize their services according to the needs of their seagoing population. As expected, the majority of maritime doctors highlighted the need for targeted training in the areas of fitness evaluation and medical examination guidelines, followed by rules and regulations within maritime medicine and working conditions and health risks on board.

Additional relevant interest in professional development was indicated through suggestions that an accredited training program that is flexible enough to comply with the doctors' high work burden be established. In line with this, the participants pointed out the potential benefit of setting up a website as a one-stop shop with relevant guidelines and information for medical professionals that includes regular updates, newsletters, and a one-day brush-up course. Furthermore, the establishment of an advisory board to improve quality in treating novel or complex cases and cooperation with all relevant stakeholders was defined as a priority.

Due to the small number of respondents, it seems ambitious to set up continuing medical education activities aimed only at this particular group of seagoing professionals. Nevertheless, a course in occupational risks, diseases, and follow up targeting high-risk professions could be relevant and of interest to all GPs.

Conclusion

The results of this survey showed that there is a clear need for adequate training in specific subjects, such as that called for by the MLC 2006 convention, and that the training should be tailored to doctors' needs and high workload. It is remarkable that less than one third of the study participants considered early diagnosis, follow up, and prevention of diabetes, obesity, and hypertension in seafarers as very important (Table 3). The need for a policy has been provided by the World Health Organization (WHO): "It is vital that the increasing importance of chronic disease is anticipated, understood and acted upon urgently. This requires a new approach by national leaders who are in a position to strengthen chronic disease prevention and control efforts, and by the international public health community."² The need is especially pressing when the prevalence of hypertension and prehypertensive among seafarers was found to be 45% and 42%, respectively, as only one important indicator of bad health.³

Policy Implications

The prospects emanating from the study are that it makes Denmark a pioneer in research in the field of maritime doctors' training needs in line with the ILO/IMO guidelines

on the medical examination and treatment of seafarers. This provides an opportunity to benchmark the situation and allow the international comparison of doctors' perceived training needs with those of other countries. The perceived training needs for working conditions and health risks on board was very important for 44% and 63% of GPs and maritime doctors, respectively, which shows their interest in and the relevance of continuing education.

As a further step, this survey could support the planning of targeted training in maritime medicine. In line with this, a comprehensive maritime medicine program could be planned, including occupational disease diagnosis and prevention based on the recommendations of the WHO and other respective medical associations. This training could be tailored to the shipping industry. Such training should be offered in cooperation with all stakeholders and medical associations. It should be flexible, accredited, and linked to the continuing professional development of medical doctors.

Study Limitations

It is well known that medical doctors (MDs) respond to surveys and questionnaires in fairly low rates, perhaps because they receive too many requests for research participation or have limited time. The completion time of the questionnaires was around 5–10 minutes, and this is within accepted survey time standards.

The sample size was limited to equal numbers of GPs and maritime doctors. In this survey, 51 (46.4%) maritime doctors and 34% of GPs completed the questionnaire. The latter figure was lower than the preceding one, but it was close to the expected response rate based on international literature. Even though the low response rate imposed some statistical limitations on the study's attempt to detect statistically meaningful differences in the characteristics of the 2 groups, it was still possible to obtain useful results. Another possible reason for the lower response rate might be that the part of the survey for GPs was implemented during a challenging work period for them, even though the government's Committee of Multipractice Studies in General Practice supported this survey.

Authors' Contributions

OCJ and DEA designed the study, substantially contributed to the interpretation of the data, and provided comments on all drafts. GC actively supported the data gathering and provided comments on all drafts. JVL gathered the GPs' data, analyzed the data, and drafted the respective report. All authors confirm that this manuscript describes original work and has not been published or submitted for publication elsewhere. All authors read and approved the final manuscript.

Conflict of Interest Disclosures

The authors declare that they have no competing interests.

Ethical Approval

This study complied with the ethical rules for database research in Denmark and for the University of Southern Denmark. Confidentiality in handling personal information

Research Highlights

What Is Already Known?

The Maritime Doctors are obliged to have knowledge about the seafarers working and living conditions on board.

What This Study Adds?

The Maritime Doctors highest self-rated training priorities are:

- Fitness evaluation and medical examinations guidelines
- Rules and regulations within maritime medicine
- Working conditions and health risks on board
- Age, gender and years of practice did not influence in their self-rated needs
- The GPs highest self-rated training priorities were:
- Working conditions & health risks aboard
- Occupational disease diagnostics, prevention and follow-up
- Health & safety at work
- There is a need for targeted postgraduate education

was maintained according to the rules set out by the Danish Data Protection Agency.

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