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Collaborative, cross-national studies on health and safety in seafaring for evidence-based maritime policy and regulations

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ABSTRACT

Background. *Until recently, maritime health and safety policies and regulations were sparsely based on health and safety research, and only a small number of countries contributed to new research.*

Objectives. *To strengthen maritime health and safety research activities by presenting a study example and discussing the possibilities and needs for more national and cross-national research.*

Methods. *In a cross-national epidemiological study example, the seafarers from eleven countries completed small, anonymous questionnaires concerning the working conditions on their latest tours at sea while waiting for their health examinations.*

Results. *Significant disparities were pointed out among the nationalities, e.g., the length of the tours at sea, the proportional distribution of officers and non-officers, the mean age structure, the injury incidence rates, and the differences of occupational safety standards. The analysis of all data together increased the statistical strength of the multivariate analyses and allowed for valid comparisons among the nationalities.*

Conclusions. *The questionnaire data was used successfully in the collaborative study example, but other data sources and methods are useful for health and safety research in seafaring as well. More national and cross-national research on maritime health and safety is warranted.*

Key words: cross-national, seafaring, questionnaire, injury, health, incidence, occupational, epidemiology

INTRODUCTION

This article is based on a presentation given at the First International Congress on Maritime, Tropical, and Hyperbaric Medicine on 4–6 June 2009 in Gdynia, Poland on the 70th anniversary of IIMTM [1]. The intention is to raise interest for increased maritime occupational health and safety research on a national and a cross-national collaboration basis. The word "cross-national" is here used instead of "international" with the intention to include collaboration among two or more countries or two or more independent states, cities, or regions in larger countries. The example is based on an epidemiological study that used self-completed questionnaires, but this is just one of several different methods that can be used for maritime cross-national health research [2].

Seafaring is global and multiethnic and has for many years been regulated by the international maritime regulations and recommendations from the ILO, IMO, and national governments. The international regulations have not been based on updated research about the seafarers' health and safety conditions. Historically, occupational health and safety surveys did not cover the seafarers' working environment.

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The maritime working conditions were held to be so specific that the regulations and preventive measures should be specifically targeted at the working conditions at sea.

Apart from the research in the Seafarers International Research Centre in Cardiff, the previous studies are mainly based on national data. For example, the relative risk of fatal accidents for seafarers was over 30 times higher than that of other occupational groups but has recently been reduced to just 10 times the risk [3–5]. The relative risk of fatal injuries for seafarers has been shown to be even higher in the UK, Denmark, and Poland [6–7]. In addition, the risk of non-fatal accidents and the risk of chronic disease in some parts of the seafarers' and fishermen's populations have been shown to be higher than for other occupational groups [8]. The objectives are to inspire researchers and all other professionals to do more national and cross-national maritime health and safety research based on different research methods and using different data sources.

METHODS

The cross-national study example aimed to analyse the person-time incidence rates of sustained injuries during the latest tour of duty, the prevalence rates of some specific exposures, and self-rated health by the use of the epidemiological method. As few countries have registers of sufficient validity for comparable cross-national epidemiological studies, the best solution would be to use a questionnaire study. Further, a questionnaire study provides the possibility to add questions regarding exposure to chemicals and personal characteristics, which would not be available from the health registers. The collection of data was performed in the seafarers´ health clinics. As the seafarers are often required to complete health information schemes for health examination purposes, the research questionnaires needed to be of limited size. The creation of short questionnaires caused a great deal of discussion regarding the selection of the most relevant items in a limited space. A four-page questionnaire was created with items concerning their latest tour at sea, working hours, exposure to chemicals, use of personal protective devices, and injury experiences (including whether slips, trips, or falls were involved). In addition, a question regarding self-perceived health was added. The questionnaires were translated into 6 different languages and were anonymously completed by the seafarers at their health examinations. The methods have been described previously in more detail. Probably due to the questionnaire being small and easy to complete, there was a high participation rate of 94% with 6,500 participants from the following 11 countries: Denmark, Poland, the Philippines, Croatia, Spain, South Africa, Ukraine, Russia, the United Kingdom, Indonesia, and China. From these 11 countries, 200–1700 questionnaires were completed per country. Stratified tables on the major variables were presented. Multiple logistic regressions were used to assess the relations between the independent variables such as age, position on board, and type of ship and the effect variables such as the incidence rates of injury, the prevalence rates of health, etc.

RESULTS

THE OVERALL RESULTS FROM THE STUDY EXAMPLE

The average length of tour varied from about 8 months for Indonesian and Filipino seafarers to about 3 months for Danish and UK seafarers. The proportion of seafarers over 50 years of age was much higher for seafarers from the UK, Poland, Denmark, and Spain in contrast to the younger seafarers of Southeast Asian nationalities. Among the Filipino and Indonesian seafarers, 15–30% were officers, while 80% of the seafarers from the United Kingdom and Denmark were officers. Furthermore, about 80% of the seafarers from the UK and Denmark worked on ships of their countries, while the Filipino and Indonesian seafarers mainly worked on foreign ships. The hours of work varied but were not very different among the nationalities. On average, seafarers worked 60–80 hours per week, and 80% worked 7 days per week. Self-perceived health was generally good among the seafarers. The youngest seafarers assessed their health as better than the older seafarers did in a dose-response trend over the age groups. The cumulative incidence rates for all types of ships were: 9% of the seafarers were injured on their last tour at sea, and 20% of those injured were disabled for > 1 day from their normal work; and 78% of the injuries were treated by another person. Slips, trips, and falls represent 43% of all reported injuries and accounted for more days unfit for duty than any other injury. The percentage of slips, trips, and falls increased according to age group-up to 70% for the oldest seafarers.

RESULTS REGARDING THE PERSON-TIME INJURY INCIDENCE RATES FOR CARGO SHIPS

The incidence rate of all injuries equalled 40 per 1 million work hours. The combined occupational safety and injury risk for fair or bad health conditions was 1.7, which was a higher risk of injury in contrast to those in good health conditions. Seafarers from the Philippines and Indonesia had lower incidence rates of injury. Calculations of the relative ratios (adjusted for age, gender, and position on board) for good self-rated health in contrast to "not so good health", showed that the Indonesian and Filipino seafarers rated their own health much better than seafarers from China, Croatia, Poland, Spain, and other countries did. The sea-

farers who said they had fair or bad occupational safety on board (in contrast to good occupational safety on board) had a 2.4-times higher risk of injury. Those who reported that they did not use personal protection for chemicals (possibly due to a lack of personal protection devices, and this category only applies to those who say they were exposed to chemicals) had double the risk of injury in contrast to those who used personal protection.

DISCUSSION

The questionnaire data was used in the epidemiological study example, but other types of data sources and methods are also useful for cross-national collaboration of health research in seafaring. Other data sources for cross-national epidemiological studies include insurance compensation data, hospital discharge registers, maritime authority data, Radio Medical data, search and rescue data, data from seafarer training centres, from health examination clinics, from shipping companies, and from national registers on mortality and morbidity. For the evaluation and improvement of the quality of the data, the degree of underreporting and the accuracy of the classifications are relevant to improve the quality of the administrative data and the research as well. Information on seafarer populations can be obtained from national population censuses, from the maritime authorities, or from ship owners´ organisations. If the data are unavailable or the information is insufficient on the seafarers´ substrata (e.g., information on age, position on board, nationality, and gender), or if different inclusion criteria for the diseases and injury cases are used, then the questionnaire data may be the only useful data source for epidemiological studies. The data from the maritime health clinics represent unbiased samples of the population unless specific clinics and geographic areas are used. Possible biases in the questionnaire-based studies are, for example, related to subjective health reporting when the study comes from the seafarers' health clinics, while other parameters like working time, hazardous exposures, and knowledge and attitudes about the risks are less biased. The advantages of using cross-national collaborative studies based on questionnaires include the following: (1) the information can be validly compared between the nationalities; (2) sufficiently large data samples can be obtained, which might be impossible in one country alone, and (3) professional experiences can be shared in fruitful and friendly collaboration. The possible study designs include cross-sectional, cohort, and case-control designs based on multicentre data collection. Although the method of cross-national research collaboration has not yet been used much in occupational health research, the method could be most useful in seafaring because of the relatively small populations of national seafarers. The study example could only be performed based on significant external financial donations, and adequate funding is needed for national and cross-national research development.

Fishing and sea transport is important in many developing countries, but maritime safety and health research is still absent due to the lack of valid data registers and lack of resources. Using the questionnaire method, developing countries could also participate in the cross-national collaborating studies. The strength of the questionnaire-based method is the fact that the studies can be feasibly conducted, especially if only a few countries are involved. The basic information on the seafarers and the ships in the study example can be reused in other national and cross-national studies. Examples of observational studies using different methods and data sources are national and cross-national studies on stress, fatigue, cardiovascular diseases, incidence rates of accidents, prevalence of occupational diseases like hearing loss and persistent disability from accidents, and incidences of HIV and other infectious diseases. In addition, intervention studies on the reduction of stress, fatigue, and chronic diseases (e.g. cardiovascular diseases and hypertension) are examples of important study objectives.

The success of the new editorial strategy of this journal depends, among other things, on increased national and international research activity, and international research collaboration could assist in that. In addition, the inclusion of research training modules in the maritime master educations in Spain, France, and other countries adds to this development. The creation of international maritime health research networks in different subjects is an important base for increasing international research collaboration in maritime health. Such networking would be most welcome in the International Maritime Health Association (IMHA), and the biannual international symposia provides the opportunity to develop cross-national collaboration projects. The ratifications and implementations of the new ILO 2006 Convention and the EU Commission's strategic goals and recommendations for the EU Maritime Transport Policy until 2018 call for the development of integrated health and safety policies in the maritime market [10, 11]. These overall strategies from the ILO and the EU do not include a great deal regarding the development of health and safety policies, which seems to be the most important integrated issue for the success of the overall strategic developments.

CONCLUSIONS

There is a need to improve maritime occupational healthcare by improving national and cross-national collaborative health research. Good data sources are needed as part of the safety and health culture to serve for adminis-

trative purposes and for monitoring and research. The required data include information on seafarer populations and information on events such as injuries, diseases, evacuations, and other incidents. The research can be strengthened by including projects on health and safety in all levels of maritime education and training courses. A network of maritime universities and maritime academies with online access to maritime students´ graduation theses could also strengthen this development.

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