Working conditions in international seafaring

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Introduction

Seafaring has been recognized as a high-risk occupation and the safety and health aspects of work on board ships are a major concern for shipowners and seafarers [1]. The world merchant fleet comprises ~1.4 million seafarers of whom two-thirds work within multiethnic crews. The crew composition reproduces the global economic order in that none of the seafarers from the Organisation for Economic Cooperation and Development (OECD) are employed under seafarers from other nations [2]. Seafarers have a second home on board ships during tours of duty which can last for several months. Their health and living conditions are influenced by the working conditions in a global industry, still increasing in size and importance. The increasing need for effective and fast transport of goods requires a continuous change in technology and work organization on board, with new exposures related to health and safety. While merchant seafaring is a highly international industry, the epidemiological studies of safety and occupational health in seafaring have so far mainly been concerned with national studies and the relevance of international studies has been recognized for many years [3,4]. Studies of the health-related aspects of seafaring have primarily been concerned with studies of mortality and morbidity, while studies related to the health of seafarers are sparse. Self-rated health may be even more relevant to the goals of health programs than mortality rates [5]. Self-rated health is widely recognized as an excellent predictor for actual health status and a good predictor for prognosis of health [6,7].

The objective of the study is to describe the self-rated health and the main characteristics of seafarers’ working conditions in an international setting.

Methods

The study was part of a large collaborative project: International Surveillance of Seafarers’ Health and Working Environment [8]. A questionnaire study was carried out in 2001 in 11 countries. In all, 200–1700
questionnaires were collected in each country in one or more medical clinics (31 clinics in all). Of the 30 countries that have signed the Convention of the OECD, member countries in this study were Denmark, Poland, Spain and the United Kingdom.

The questionnaire, originally written in Danish, was translated into English, Polish, Croatian, Russian, Spanish and Chinese. The English edition was later retranslated into Danish by an independent translator and no discrepancies between the two editions were found. Furthermore, the questionnaires used in Spain, Russia, Ukraine and China were checked and compared to the Danish edition by language specialists, and no significant discrepancies were reported. The questions used in this study were self-rated health, ship type, flag state, tonnage, main work area, occupational position and length of the tours and working hours (Appendix 1 available as Supplementary data at Occupational Medicine Online). A short questionnaire without the questions on hours of work and length of the tours was used in Croatia, so the analysis of these two parameters could not be made.

The method of multiple logistic regressions was used. None of the multivariate analyses for self-rated health were significant for the following variables: age, gender, ship type, position on board, length of tours, work area on the ship and nationality. Unanswered or wrongly ticked off questions were always analysed as missing values. In the analysis, the statistical programmes used automatically left out the missing values. To obtain comparability between nationalities, means and proportions were calculated specifically for cargo ships and tankers. The lengths of the tours on the latest tour of duty, given in months, were based on the number of days at sea divided by 30.4. The included tour lengths were limited to 14 months in the analyses as <4% were for >14 months and we felt that most were probably due to errors or poor recall. The study was approved by the Danish Data Protection Agency and the protocol complied with the medical research ethics.

Results

A total of 6896 eligible seafarers were invited to participate, and 6461 participated with a response rate of 94%. Of the participants in the study, 95% were from the country of the data collection and 235 (3.6%) were from foreign nations. The most frequent types of ships were containers, bulk carriers, dry cargo ships and passenger ships. Female seafarers represented ~4% of the population and they worked mainly on passenger ferries. In all, 18% of the female seafarers and 43% of the male seafarers were officers.

Table 1 shows the results of the multivariate analyses for self-rated health with clear differences among the nationalities. Multivariate analysis of self-rated health by age groups decreased significantly by higher age. The adjusted ORs and 95% CIs for good or very good health compared with fair or bad health, in specific age groups with the totals, were as follows—age groups 16–29: OR = 1.41 (95% CI: 0.80–2.48), 30–39: OR = 0.76 (95% CI: 0.47–1.23), 40–49: OR = 0.57 (95% CI: 0.35–0.93), 50+: OR = 0.47 (95% CI: 0.29–0.78). The adjusted OR for females compared to males with good health was 2.65 (95% CI: 0.34–19.4). When the category very good health alone was compared to the other possible categories of health, the adjusted OR for female seafarers was equal to 2.04 (95% CI: 1.15–3.60).

The adjusted OR for good self-rated health for those who worked 7 days and >80 h/week and >92 days at sea compared with all others was 0.90 (95% CI: 0.76–1.07).

None of the multivariate analyses for self-rated health were significantly different for the following variables: officer/non-officer, length of the tour at sea (<90 days or >90 days), working area (deck/machine, service) and type of ship (cargo ship, passenger ship, tank ship or other types of ships).
The length of tours at sea varied markedly among the nationalities (Figure 1). The mean number of working hours per week on cargo ships was 68 h for non-officers and 69 h for officers. A total of 81% of all seafarers worked 7 days a week and one-third worked 11 h a day, 7 days a week. In all, 18% worked 70 h/week, 25% worked 84 h/week (7 days with 10 and 12 h a day, respectively) and 5% worked 90 h/week.

The proportions of non-officers were highest in South-East Asian countries (Figure 1). The proportions of seafarers who worked on foreign flagships were also mainly from South-East Asian countries. In contrast to this, the number of older seafarers 50 years of age was predominantly from western nationalities.

### Discussion

Seafarers from some of the countries with very long tours of duty had a higher self-rated health than for seafarers with shorter tours of duty. This indicates that the length of the tours as a single determinant is not a strong indicator for low self-rated health. Female seafarers had a higher self-rated health and this may be explained partially by the fact that they are mainly employed in catering on short-term employment. Further explanations remain to be studied. The majority of the seafarers worked 7 days a week. Seafarers who work every day of the week have less time to relax from work to do leisure activities including time to do physical training and to keep in contact with their family at home. In a study of the family relations for the Philippine seafarers, Lamvik [9] concluded that the Philippine seafarers, through their work at sea, offered sacrifices to their families at home as migrant workers. This may be one of the explanations why long tours of duty combined with many working hours per week do not have a negative impact on self-rated health. Corresponding to other studies, higher age was significantly correlated with a lower self-rated health [10].

The proportion of seafarers of 50 years of age was low for seafarers from some of the South-East Asian countries (Figure 1). As one possible explanation, it has been noted that some hiring agencies in the Philippines primarily want to hire the youngest seafarers [11]. A selection out of the occupation by higher age can have social medical impact for the seafarer and his/her family that is dependent on the income. This remains to be studied further.

The seafarers from the South-East Asian countries mainly work as non-officers on foreign flag-state ships during longer tours at sea. National differences in the general working conditions do not reflect any differences in the self-rated health. There is a need to study more closely the influence on health in relation to the working conditions.

The question for self-rated health (general health) is one of the several indicators of the quality of life, included in the SF-36 standardized questionnaire [12]. Separate use of the question about the general health status from the SF-36 questionnaire has been widely used [5]. In a study of the general population in Estonia, Finland, Latvia and Lithuania, 90%, 92%, 88% and 93%, respectively, reported their health as either good or reasonably good [13]. The seafarers were expected to be at least as healthy as or healthier than the general population due to the minimum health conditions required passing the regular health examinations. Assuming that the questions

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Very good (%)</th>
<th>Good (%)</th>
<th>Both (%)</th>
<th>Fair or bad (%)</th>
<th>Total</th>
<th>OR</th>
<th>95% CI</th>
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</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>46</td>
<td>52</td>
<td>98</td>
<td>1</td>
<td>495</td>
<td>5.9</td>
<td>2.6–13.5</td>
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<td>53</td>
<td>44</td>
<td>97</td>
<td>2</td>
<td>1609</td>
<td>3.4</td>
<td>2.4–4.9</td>
</tr>
<tr>
<td>UK</td>
<td>45</td>
<td>51</td>
<td>96</td>
<td>3</td>
<td>569</td>
<td>3.1</td>
<td>1.8–5.2</td>
</tr>
<tr>
<td>Ukraine</td>
<td>11</td>
<td>85</td>
<td>96</td>
<td>3</td>
<td>389</td>
<td>2.9</td>
<td>1.5–5.8</td>
</tr>
<tr>
<td>South Africa</td>
<td>43</td>
<td>50</td>
<td>93</td>
<td>6</td>
<td>186</td>
<td>1.1</td>
<td>0.5–2.1</td>
</tr>
<tr>
<td>Denmark</td>
<td>36</td>
<td>55</td>
<td>91</td>
<td>8</td>
<td>799</td>
<td>0.9</td>
<td>0.6–1.2</td>
</tr>
<tr>
<td>Russia</td>
<td>7</td>
<td>83</td>
<td>90</td>
<td>9</td>
<td>338</td>
<td>0.8</td>
<td>0.5–1.3</td>
</tr>
<tr>
<td>Spain</td>
<td>16</td>
<td>72</td>
<td>88</td>
<td>12</td>
<td>717</td>
<td>0.6</td>
<td>0.4–0.8</td>
</tr>
<tr>
<td>Poland</td>
<td>38</td>
<td>49</td>
<td>87</td>
<td>12</td>
<td>305</td>
<td>0.5</td>
<td>0.3–0.7</td>
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<td>Croatia</td>
<td>42</td>
<td>43</td>
<td>85</td>
<td>14</td>
<td>156</td>
<td>0.4</td>
<td>0.3–9.8</td>
</tr>
<tr>
<td>China</td>
<td>16</td>
<td>62</td>
<td>78</td>
<td>22</td>
<td>550</td>
<td>0.2</td>
<td>0.1–0.3</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>57</td>
<td>92</td>
<td>7</td>
<td>6113</td>
<td>1.0</td>
<td>-</td>
</tr>
</tbody>
</table>

Total number of respondents = 6593.

*Very good or good compared with fair or bad. Each stratum was compared with the total.

*Adjusted for age, gender, ship type, position on board, length of tours and work area on the ship.*
are comparable, the percentage of 93 of the seafarers with very good or good health was on the same level or higher than the general population in the four countries.

Expressing a low self-rated health at the health examination might not be beneficial for the seafarers in order to keep their job and the results therefore are supposed to be biased towards better conditions. To minimize this bias, full anonymity was guaranteed, but we cannot exclude all fear or the threat that the answer might be used in a negative way for the seafarers. Though cultural comparisons of self-rated health should be made with caution [14], we cannot exclude that the significant differences of the self-rated health among seafarers from different parts of the world may in part reflect true differences.

The study does not confirm a negative influence on the self-rated health from long hiring periods. However, the single used question for self-rated health is probably insufficient to point out the direct negative impact from long hiring periods. The results therefore do not contradict the results from other studies: Negative impact of the long hiring periods on seafarers and their family life has been described and shorter trips, continuous employment and opportunities for partners and family to sail have been recommended [15]. More studies are needed in this area.

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Conflicts of interest

None declared.

References