

Mortality among Finnish Seafarers in 2001-2013

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Introduction

Socioeconomic mortality differences are great in Finland and in other European countries (Mackenbach et al. 2015). Identifying occupations with high mortality and the causes of death behind that is essential for targeting preventions.

Studies have shown that seafarers are exposed to many occupational risk factors. There are many ship-related environmental stress factors such as ship motion, noise, vibration, UV-light, adverse weather conditions and hazardous substances (Oldenburg et al. 2010). Seafarers have high accident rates although the disaster and accident rates in seafaring have fallen sharply (Oldenburg et al. 2010; Carter 2011) .

Important psychological stress factors on board are e.g. separation from the family, loneliness on board, fatigue, multi-nationality, limited recreation opportunities and sleep deprivation (Carotenuto et al. 2012; Iversen 2012). Seafarers are among the most isolated demographic working groups in the world (Oldenburg et al. 2010). Seafarers also have risky health behavior e.g. smoking, obesity and hazardous drinking (Pougnnet et al. 2013; Hemmingsson & Ringbäck Weitoft 2001; Kaila-Kangas et al. 2015).

Seafarers have increased risk of some diseases, like some cancers. This is partly attributable to specific occupational risks, but a large part relates to the lifestyle of seafarers (Carter 2011; Oldenburg et al. 2010). Health-related selection to seafarers' occupations was only partly able to explain the increased relative risks of mortality and morbidity faced by seamen found in Swedish study. The occupation itself remains a strong risk indicator, even after controlling for a large number of selection factors. (Hemmingsson et al. 1997.)

Finnish seafarers have had high risk of mortality (Marin 1986, Notkola et al. 1995, Notkola et al. 1998, Pensola et al. 2004, Pensola et al. 2012), disability pension (Notkola et al. 1995) and incidence of some diseases, like cancers (e.g. mesothelioma, oesophageal, kidney) (Pukkala et al. 2009). The risk has been especially high among deck and engine crew. Their risk of death had been higher than among other employees also in Sweden (Hemmingsson et al. 1997; SCB 2014) and Denmark (Hansen & Pedersen 1996). In earlier Finnish studies only the mortality of males have been examined due to small numbers of female seafarers.

In case of emergency at sea it is often impossible to get help, therefore all personnel on board has to be able to participate in rescue operations. This places high requirements for seafarers' health and work ability (IMO 2011). In addition medical care onboard is applied by a medical health officer who is not a medical professional. Seafarers are required to undergo medical examinations every second year to reduce risks to other crew members and for the safe operation of the ship, as well as to safeguard their personal health and safety.

Seafaring has gone through many changes in last decades e.g. reduced crew size, modern techniques, larger vessels, shortening turn-around times, automation and higher qualification standards.

Conditions on board differ from those ashore: mostly shift work, long working hours per day, lack of leisure time facilities, long-time separation from family and home, leisure time on board and ship motion (Oldenburg et al. 2010). Because of difficult conditions there are reasons to assume that working on board is more demanding than ashore.

Aim

The main aim of this study is to examine, whether there are still differences in mortality by cause of death between seafarers and other employees in Finland. In addition, variation in seafarers' mortality between different occupational groups is analyzed.

Data and methods

We used longitudinal individual level register based data. Study population was from data files of The Seafarer's Pension Fund of Finland: seafarers who have had a period of employment and were 25-64 years old during the year 2000 (N=8445, 66% men). Reference population was obtained from Statistics Finland: all other employees at the end of year 2000, except those who had work history as seafarer (N=1 720 100). Information from various registers (The Seafarer's Pension Fund of Finland, Statistics Finland, The Finnish Centre for Pensions) was linked together via unique personal identification number.

The study population at baseline, 31 December 2000, was followed up for mortality from 1 January 2001 to 31 December 2013. A study person was censored at the time of death, at the time person was lost to follow up or at the end of the follow up. During the follow up period 2001-2013 there were 427 deaths and 106 500 person years in the cohort of seafarers.

Information on seafarers' occupation in 2000 by The Seafarer's Pension Fund occupation classification and type of ship in 2000 by shipping companies registration numbers were from The Seafarer's Pension Fund. If person had more than one seafarer occupation or worked on several ship types during the year 2000, the occupation or the ship type with highest amount of employment days was selected.

Employment history at sea before the follow-up period was from The Finnish Centre for Pensions.

Age at the end of 2000 was classified to five-year age groups.

The mortality data was from the Statistics Finland register on causes of death (ICD-10) from 1 January 2001 to 31 December 2013. We classified the primary causes as following: neoplasms (C00-D48), lung cancer (C32-C34), circulatory system diseases (I00-I425, I427-I99), ischaemic heart diseases (I20-I25), cerebrovascular diseases (I60-I69), diseases of respiratory system (J00-J64, J66-J99), diabetes (including underlying causes) (E10-E14), alcohol-related diseases (F10, G312, G4051, G621, I426, K292, K70, K852, K860, K8600), other diseases, accidents and violence (V01-Y89), suicide (X60-X84, Y87.0), accidental poisoning by alcohol (X45) and other accidents and violence.

The primary or underlying causes of death due to alcohol-induced diseases or accidental poisoning by alcohol were mental and behavioral disorders due to use of alcohol (F10), degeneration of nervous system due to alcohol (G312), alcohol-induced epileptic seizure (G4051), alcoholic polyneuropathy (G621), alcoholic cardiomyopathy (I426), alcoholic gastritis (K292), alcoholic liver disease (K70), K852, K860, K8600, and accidental alcohol intoxication (X45).

Analysis methods included death rates (SDR per 10 000 py), age standardized mortality ratios (SMR) and 95 % confidence intervals.

Results

Mortality among seafarers was 1.3 times higher than that among other employees.

Among men, crew members had higher risk of death than officers. Engine personnel had higher risk of death than deck personnel. Engine crew had the highest mortality (SMR 195, CI 152-250). Mortality seemed to be highest in tankers. Among women mortality was highest among galley crew (SMR 171, CI 124-236).

Neoplasms were the most common cause of death among male (SDR 15, CI 12-18) and female (SDR 13, CI 9-16) seafarers. Among men circulatory system diseases (SDR 13) and accidents and violence (SDR 10) were also common causes.

All diseases (SMR 126-127) were more common cause of death among seafarers than other employees. The highest SMRs were found in diseases of respiratory system (SMR 239, CI 139-412) among men and lung cancer (SMR 346, CI 212-564) among female. Lung cancer were also more common among male seafarers (SMR 148, CI 103-215) than other employees. Instead, circulatory system mortality rate does not significantly differ from that of other employees. Accidents and violence (SMR 133, CI 106-168) were more common among male seafarers than other employees, especially accidental poisoning by alcohol (SMR 178, CI 107-295). Also alcohol-related diseases (SMR men 176 and women 275) were more common among seafarers than other employees.

The risk of all alcohol-related causes of death, including underlying, were 1.6 (CI 133-191) times higher among male seafarers than other employees, while the risk of other causes were only 1.2 (CI 105-136) times higher. Among female the risk of alcohol-related causes were even 2.7 (CI 177-417) times higher among seafarers and explained the higher risk of all-cause mortality.

Discussion

Despite improvements in occupational safety standards on board and health behavior campaigns seafaring is still a high risk occupation. The results suggest that the risk of death differs between seafarers working in different occupational groups. Prevention should be in particular focused on men working in tankers and male engine crew and female galley personnel in passenger ships.

Actions to limit alcohol consumption as well as methods of early prevention of alcohol-related problems have been applied in the 2000s in seafaring. The effect of these actions are not yet visible in this study. Despite of reduction in alcohol consumption, alcohol-related causes of death are still common among seafarers. In addition, causes of death related to smoking are also common.

Like in other studies the CVD mortality rate does not significantly differ from that of other employees but a healthy worker effect should be taken into account because of the selection through medical examinations (Oldenburg et al. 2010).

Health behaviour can be influenced by advocacy, but it is also important to change structures and practices behind unhealthy behaviour. In addition, culture tolerant of unhealthy behavior may have an impact. For instance, among restaurant workers, there may be tolerable attitude towards drinking simultaneously with an easy access to alcohol. It is important to pay attention to alcohol consumption and smoking, including passive smoking, on ships. Early prevention and improving occupational health services are important, as well as the commitment of the officers and shipping companies. Improving seafarers' occupational welfare will benefit seafarers, their families, shipping companies and the whole society.

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