Female seafarers adopt the high risk lifestyle of male seafarers

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Abstract

***Objective*—To study the mortality of women in an occupation known to have a high mortality among men.**

***Methods*—A total of 6788 female seafarers of all job categories who had been employed on Danish merchant ships, passenger ships, and privately owned ferries between 1986 and 1993, were followed up until the end of 1993.**

***Results*—Standardised mortality ratio (SMR) was 1.20 (95% confidence interval (95% CI) 0.89 to 1.58) for all causes of death and job categories together. For women in traditionally male jobs, SMR was 2.82 (1.41-5.05), whereas galley and catering staff had SMRs close to the general female population. The high mortality among women in traditional male jobs could be explained by a high risk of fatal accidents including occupational accidents. In the whole cohort, there were fewer deaths from natural causes than expected but an excess risk of death due to lung cancer, heart diseases, and non-natural deaths.**

***Conclusion*—The increased mortality could primarily be explained by an excess risk of fatal accidents and suicide. Especially, female seafarers entering traditional male jobs had a high risk of fatal accidents, not only at sea but also ashore. An excess risk of dying of lung cancer and heart diseases probably reflects a high tobacco consumption. Female seafarers are probably influenced by their occupation towards hazardous behaviour and a high risk lifestyle but people with a high risk lifestyle may also be attracted by or forced into high risk jobs such as traditional male jobs at sea.**

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Seafaring is known as a dangerous occupation with a high risk of fatal accidents in the workplace.[1 2] Seafarers have also been identified as a group with a high mortality in general.[3–8] None of these studies include female seafarers, however, and nothing seems to have been published on the mortality of female seafarers. Although seafaring is traditionally a male dominated occupation, an increasing number of women are entering it, especially in the galley and catering departments of passenger ships, but also in other types of ships where women are employed in traditional male ranks as seamen, navigation officers, and radio operators. Only the engine room remains almost completely dominated by men.

The object of this study is to describe the mortality pattern of Danish female seafarers in recent years with special reference to the influence of deaths caused by accidents in the maritime workplace and ashore and deaths related to lifestyle.

Material and methods

The study is a historical follow up study. Data were obtained from a register in the Danish Maritime Authority where seafarers have been recorded in a computerised database since 1 April 1986. It is mandatory for shipping companies to record each time a seafarer is signed on or off a ship under the Danish flag and send a copy to the authorities. Seafarers signed on ships owned by the government or on small vessels in domestic use are not included in the database. Only seafarers resident in a county in Denmark at the time of entrance into the register were included. New seafarers were included until the end of the follow up on 31 December 1993.

To establish the place of residence at the time of entry into the database, and to identify seafarers who had taken up residence abroad, disappeared, or died during the follow up period, the personal identification number of each seafarer was record linked with the central population register kept by the Ministry of the Interior. Time of observation for each seafarer was calculated from the day of first employment until 31 December 1993 or date of death, date of taking up residence abroad, or recorded date of disappearance before 31 December 1993. Note has been taken of all the seafarers who left the occupation before the end of the follow up period.

Causes of death were obtained from the registry of causes of deaths at the Danish National Board of Health. The underlying cause of death was coded with the 8th revision of the international classification of diseases (ICD-8) which was in force in Denmark throughout the study period. The Danish National Board of Health only accepts Danish death certificates for coding. Seafarers who die aboard a ship at sea or in a foreign port or abroad will not get a Danish death certificate. In this study, the cause of death was not available in seven cases, although all were recorded as having died. As part of another study of causes of deaths aboard ships,[1] it was possible to obtain information on diagnosis in six of the cases. Causes of death were subsequently determined in cooperation with a specialist in forensic

Table 1 Number of seafarers, person-years of observation, observed number of deaths, and SMR (95% CI) for 6788 female seafarers followed up from April 1986 to the end of 1993 (the seafarers are divided into main job categories and cause of death by main diagnostic group)

	Catering crew (n = 4773; person-years = 24481)			Galley crew (n = 1319; person-years = 6322)		
	Observed	SMR	95% CI	Observed	SMR	95% CI
All causes (001-E999)	33	1.07	0.74 to 1.50	6	0.88	0.32 to 1.91
Natural deaths (001-799)	25	1.04	0.67 to 1.53	3	0.58	0.12 to 1.69
Malignant neoplasms (140-209)	12	0.99	0.51 to 1.72	0	0	0.00 to 1.40
Respiratory system (160-163)	4	1.99	0.54 to 5.10	0	0	0.00 to 8.78
Heart diseases (390-429)	4	1.49	0.40 to 3.81	2	4.03	0.48 to 14.45
Stroke (430-438)	3	2.02	0.42 to 5.88	0	0	0.00 to 11.53
Other diseases (remaining < 800)	6	0.77	0.28 to 1.68	1	0.58	0.01 to 3.22
Non-natural deaths (E800-999)	7	1.11	0.45 to 2.29	3	1.94	0.40 to 5.66
Accidents (E800-E949, E960-E999)	2	0.57	0.69 to 20.64	1	1.14	0.03 to 6.33
Suicide (E950-959)	5	1.78	0.58 to 4.15	2	2.99	0.36 to 10.78
No information	1	1.99	0.05 to 11.14	0	0	0.00 to 28.38

* Traditional male occupations (ordinary seamen, able bodied seamen, navigation and radio officers, and ships' engineers).

medicine from the Department of Forensic Medicine, University of Aarhus, Denmark. Causes of death were afterwards independently coded by the staff at the register of causes of death to ensure homogeneous coding as described in detail elsewhere.[3 4] Details on deaths which had occurred aboard ships were obtained from the files of the Danish Maritime Authorities as described elsewhere.[1] Information about fatal occupational accidents ashore in the same period was obtained from a registry at the Danish Labour Inspection Service.[11] During the period 1986–93, a total of 35 fatal occupational accidents ashore among women have been identified and all economically active women had in the same period 9 708 776 years at risk, giving an incidence of 0.036/10 000 person-years. Fatalities at sea (including fishing) are not included in these statistics.

The number of expected deaths was calculated on the basis of the total number of person-years for each five year age category multiplied by the cause and age specific mortality for Danish women during the same period.[9] The standardised mortality ratio (SMR), the ratio between the observed and the expected numbers, was calculated with 95% confidence intervals (95% CIs) assuming a Poisson distribution.[10]

Results

The total cohort consisted of 6788 female seafarers and 34 492 person-years. A total of 50 deaths occured during the follow up period. Table 1 shows the observed number of deaths and corresponding SMRs. The seven deaths categorised as other diseases include one death due to chronic alcoholism and drug misuse, giving an SMR of 1.98 (0.05 to 11.03) for the diagnostic group drug and alcohol misuse (ICD303-305). The three cases of stroke were all diagnosed as subarachnoid haemorrhages (ICD 430.9).

Among the nine fatal accidents, four were accidents in the workplace giving an incidence of 1.1/10 000 years. But all four accidents were among female seafarers in male occupations giving an incidence of 10.8/10 000 for this particular group. The relative risk of fatal occupational accident for a female seafarer compared with all economically active women ashore is thus 32.2 (11.4 to 90.5) and for female seafarers in traditional male occupations 175.4 (62.3 to 493.4). Two of the fatal accidents were caused by suffocation in a tank and in the ship's hold, respectively. Both had been asked to enter these confined spaces by superiors, although this was in violation of basic safety regulations. One female seafarer drowned in the harbour after returning from a public house ashore, and the last fatal occupational accident was caused by a maritime disaster. The remaining fatal accidents consisted of five traffic accidents, giving an SMR of 2.52 (0.79 to 5.92) for this specific cause of death. There were no non-natural deaths caused by intoxication by alcohol or drugs. None of the nine cases of suicide took place during active service.

Discussion

The short follow up period in this study may have influenced the results. Many diseases possibly related to occupational exposures may force a seafarer away from the maritime workplace but years may pass before she dies of the disease. Because of the short follow up, the design thus tends to underestimate mortality due to natural causes and, probably to a lesser degree, due to accidents and suicide.

The comparison between the number of accidents among women ashore and women at sea can only be used as an indicator of the size of the difference. Firstly, the comparison only includes few deaths and is therefore statistically not strong. Secondly, some fatal accidents ashore may not be included, although the registry is known to be of high quality.[11] Thirdly, calculations of years at risk are not exact, and finally, it is not taken into account that some of the female seafarers left the maritime occupation before the end of the follow up, which tends to underestimate the risk for seafarers.

The criterion for inclusion in the cohort was active employment. It would therefore be expected that the cohort had a mortality below that of the general female population because of a healthy worker effect. This was not the case, mainly because of an excess of non-natural deaths but also of an excess of deaths caused by diseases related to lifestyle, especially smoking—namely, lung cancer and heart diseases. Although none of these causes of death were significantly increased in this small

Table 1 continued

Other jobs aboard (n = 696; person-years = 3689)*			*Total (n = 6788; person-years = 34492)*		
Observed	*SMR*	*95% CI*	*Observed*	*SMR*	*95% CI*
11	2.82	1.41 to 5.05	50	1.20	0.89 to 1.58
3	1.01	0.21 to 2.96	31	0.96	0.65 to 1.36
2	1.42	0.17 to 5.12	14	0.86	0.47 to 1.45
0	0	0.00 to 16.04	4	1.51	0.41 to 3.86
1	2.73	0.11 to 24.23	7	1.97	0.79 to 4.06
0	0	0.00 to 19.42	3	1.50	0.31 to 4.41
0	0	0.00 to 3.73	7	0.67	0.27 to 1.37
8	9.30	4.02 to 18.33	18	2.06	1.22 to 3.26
6	11.75	4.32 to 25.61	9	1.84	0.84 to 3.49
2	5.66	0.69 to 20.64	9	2.35	1.07 to 4.45
0	0	0.00 to 52.70	1	1.42	0.04 to 7.96

study, the results indicate that smoking may have a major impact on the health of female seafarers. In a small study, smoking has been shown to be more common among Danish female seafarers than among other Danish women.[12] Exposure to asbestos and other occupational hazards may possibly have influenced the occurrence of lung cancer, although the exposure in the catering and galley departments is likely to have been low.[13] In a large Finnish study of cancer among seafarers,[14] women were also found to have an excess risk of lung cancer but not of mesothelioma, which also indicates that exposure to asbestos is unlikely to be of major importance. It is noteworthy that there were no deaths from cirrhosis of the liver or intoxications by alcohol or drugs and only one death due to drug and alcohol misuse. These diagnoses were found to be of major importance in male seafarers in Denmark.[3] The female seafarers do not seem to have adopted this characteristic of male seafarers.

The diagnostic group other diseases, including diabetes and asthma, included fewer cases than expected. This is likely to reflect a healthy worker effect, as these diseases are among those which may debar working at sea. All Danish seafarers must pass a health examination at entry into the occupation and every second year thereafter. A healthy worker effect and an unhealthy worker effect[15] may thus both be present at the same time in this cohort. A recent Swedish study among male seafarers showed a health related selection into the occupation but the results also suggested that working conditions intrinsic to seafaring also contribute to a high morbidity and mortality.[16]

The risk of fatal accidents was significantly increased for the cohort but highly influenced by the high risk found among women in male occupations, not only in the workplace but also outside. The risk of fatal accidents in the workplace among female seafarers was found to be even higher than among Danish male seafarers.[1] Special attention should be given to the safety of young women at sea as they seem to risk being forced into dangerous situations.

A few other studies of mortality among women in traditional male dominated occupations such as the construction industry show a high risk of fatal accidents.[17 18] In Britain, women in some male dominated occupations have been shown to have a high crude mortality, mainly due to a high risk of cancer and accidents, poisonings, and violence.[19] Some of the trends found in this study have thus been found elsewhere.

In conclusion, women entering a traditionally male dominated occupation—such as seafaring—seem to some extent to have adopted the unhealthy, high risk lifestyle of male seafarers, although the present study is too small to show statistically strong relations. Female seafarers are probably influenced by their occupation towards hazardous behaviour and a high risk lifestyle, but people with a high risk lifestyle may just be attracted by or forced into high risk jobs such as traditional male jobs at sea.

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