

ARTERIAL HYPERTENSION: BEHAVIORAL RISK FACTORS AMONG LITHUANIAN SEAMEN

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Abstract

Aim: to determine the prevalence of hypertension among Lithuanian seamen and to evaluate its association with behavioral risk factors.

Methods and results: A quantitative questionnaire survey was carried out with the aim to assess the behavioral risk factors for arterial hypertension. The study was carried out in Seamen's Hospital, at the Marine Healthcare Centre. Data were analyzed by calculating the chi-square (χ^2) value, the number of degrees of freedom (df), and the statistical significance (p). In 2012, elevated arterial blood pressure or hypertension was detected in 31.7% of seamen. The risk of arterial hypertension was related to the duration of smoking (p <0.01), body mass index (p <0.01), and age (p <0.001). In total, 50% of seamen with more than 15 years of smoking experience had elevated blood pressure. Every third (32.3%) seaman with overweight had elevated blood pressure, and one-half of seamen (50%) with obesity also had elevated blood pressure. Most seamen with AH grade I were >60 years of age or older.

Conclusion. The risk of hypertension was associated with the duration of smoking experience (p<0.01) and body mass index (p <0.01). Associations with other behavioral risk factors were not statistically significant (p>0.05).

Keywords: Arterial hypertension, smoking, alcohol consumption, salt intake, physical activity, prevalence, seamen

Introduction

Arterial hypertension (subsequently, AH) is one of the most common medical problems because ca. 1 billion people in the world are hypertensive (Reingardiene, 2005) In Western countries, hypertension is diagnosed in about one-third of the population. In Lithuania, this disease is especially common – its prevalence is among the highest in Europe, and its control in

the society is insufficient. About 50-60% of Lithuanian population aged 25-60 years is hypertensive.

Arterial hypertension is also common among seamen. Studies have shown that nearly every second (44.9%) 19-69 year-old seaman is hypertensive (Norkiene, 2004). Seamen are a specific group of the population requiring special attention due to the specificity of their working environment. Because they have to live in their workplace, seamen experience long-term stress and isolation when being at sea; their health is also affected by vibration, noise, electromagnetic fields, time and climate zone changes, and alterations in nutrition and sexual life (Salyga, 2005). Thus, seamen have a different lifestyle. Insufficient physical activity results in weight gain, which is compounded by nutritional habits, fat food, alcohol use, and smoking. All these behavioral risk factors are also associated with the development of arterial hypertension.

The aim of this study was to determine the prevalence of arterial hypertension among Lithuanian seamen, and to evaluate its associations with behavioral risk factors.

Associations between behavioral risk factors and AH

Most clinical and epidemiological studies have shown that people with AH demonstrate poorer evaluation of their quality of life, compared to people without AH (Raskeliene et al., 2009). Thus, unhealthy lifestyle - including smoking, immoderate alcohol use, improper nutrition, and insufficient physical activity - is one of the most common factors that damage health and promote the development of arterial hypertension. Early data show that untreated hypertension shortens life expectancy by approximately 5 years.

Tobacco smoking is the most common addiction, resulting in more health problems and premature deaths than any other legal and illicit narcotic substances (Veryga et al., 2008). The evaluation of age-dependent prevalence of smoking among seamen showed that the highest number of regular smokers was in the age group of 35-49 years (49.7%), and the lowest (38.6%) – among older (i.e. 50-64 year-old) seamen (Salyga et al., 2006).

Alcohol abuse is one of the most common risk factors for chronic non-infectious diseases (Jankauskiene et al., 2007). A study conducted among Lithuanian seamen showed that 6.8% of seamen used alcoholic beverages once a week, 2.6% of seamen used alcohol 2-3 times per week, and only 0.4% of seamen used alcohol on a daily basis; nearly every second seaman (46.8%) indicated that they did not use alcohol at all (Salyga, 2005).

Obesity is an increasingly important public health problem in all countries, significantly affecting the population's morbidity and mortality. Every second adult inhabitant of economically developed countries is

overweight, and every third is obese (Kriaucioniene, 2009). A study by S. Norkiene et al. (Norkiene et al., 2009) showed that seamen's mean BM was 26.4 kg/m²; 47.0% of seamen had overweight, and 65 seamen (14.6%) were obese. An association was also found between blood pressure and body mass index: the prevalence of hypertension ranged from 23% among overweight seamen to 67.1% among seamen with BMI ≥ 30 kg/m² (Norkiene et al., 2009).

According to researchers, nutrition habits and health are closely related. Epidemiological studies have shown that intake salt with food is the main cause of elevated arterial blood pressure (Salyga, 2005). A survey of seamen showed that over one-half of Lithuanians (i.e. 57.2%) added salt to their food according to their taste, and ca. 1.5% of Lithuanian seamen added salt to their food without even having tasted it (Salyga, 2005).

Methods of the study

We conducted a questionnaire-based interview in order to evaluate the prevalence of arterial hypertension among Lithuanian seamen, and the influence of behavioral risk factors on AH. Arterial blood pressure data were taken from the medical records of patients undergoing compulsory health checkup, and were entered into the questionnaire after it was filled out. An anonymous single-time questionnaire survey was used; the questionnaire was bilingual – in Lithuanian and in Russian. The study was conducted during January and February of 2012. In total, 15,312 medical records were registered during this period. The questionnaire containing 21 questions was given to every second randomly selected seaman who during that period applied for compulsory health checkup at public institution Seamen's Hospital, the Marine Healthcare Centre. Questionnaires containing over 50% of responses were included into the study.

The age distribution of randomly selected seamen was the following: 49 (21.3%) seamen were ≤ 30 years of age, 49 (21.3%) - $30 < a \leq 40$ years, 53 (23.0%) - $40 < a \leq 50$ years, 63 (27.4%) - $50 < a \leq 60$ years, and 16 (7.0%) seamen were > 60 years of age. By the position occupied, the distribution of the seamen was the following: 18 (7.8%) captains, 54 (23.5%) navigators, 66 (28.7%) engineers (the most numerous group), only 10 (4.3%) cooks, 59 (25.7%) sailors (the second largest group), 14 (6.1%) motor mechanics, and 9 (3.9%) auxiliary workers (the smallest group). Data on seamen's height and weight were used to calculate their body mass index (BMI) using the following formula: $BMI = \text{weight (kg)}/\text{height}^2 \text{ (m}^2\text{)}$. When BMI was 18.5-24.9 kg/m², the body weight was considered to be normal, when BMI was 25.0-29.9 kg/m², the subject was seen as overweight, and when BMI was ≥ 30.0 kg/m², the subject was obese (Baceviciene et al., 2009).

Arterial blood pressure (ABP) was distributed into grades following arterial hypertension management guidelines (2007): optimal - <120/<80 mm Hg, normal - 120-129/80-84 mm Hg, high normal - 130-139/85-89 mm Hg, grade I arterial hypertension (AH) - 140-159/90-99 mm Hg, grade II AH - 160-179/100-109 mm Hg, grade III AH - $\geq 180/ >110$ mm Hg, and isolated systolic hypertension - $\geq 140/ <90$ mm Hg. For the analysis, ABP grades were distributed into two categories: elevated arterial blood pressure, and no blood pressure elevation. Arterial hypertension (AH) or elevated arterial blood pressure (ABP) was diagnosed when ABP was $\geq 140/ \geq 90$ mm Hg or $\geq 140/ <90$ mm Hg. No arterial blood pressure elevation was diagnosed when ABP was <140/ <90 mm Hg.

The questionnaire survey included 230 seamen. The respondents' age ranged between 21 and 67 years (mean age, 43.0 years (SD = 12.13 years)). The distribution of the subjects by sex was the following: 223 (97.0%) males and 7 (3.0%) females.

Results and discussion

Table 1. Arterial blood pressure in different age groups in 2012

Arterial blood pressure, mm Hg	Age groups (years)					Total
	≤ 30	$30 < a \leq 40$	$40 < a \leq 50$	$50 < a \leq 60$	> 60	
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
<120/ <80	15 (31.3)	10 (20.7)	2 (3.9)	1 (1.7)	0 (0.0)	28 (12.7)
120-129/80-84	29 (60.3)	21 (43.8)	30 (58.8)	15 (25.0)	3 (21.5)	98 (44.3)
130-139/85-89	2 (4.2)	9 (18.8)	6 (11.8)	7 (11.7)	1 (7.1)	25 (11.3)
140-159/90-99	1 (2.1)	3 (6.3)	10 (19.6)	32 (53.3)	9 (64.3)	55 (24.9)
$\geq 140/ <90$	1 (2.1)	5 (10.4)	3 (5.9)	5 (8.3)	1 (7.1)	15 (6.8)
Total	48 (100.0)	48 (100.0)	51 (100.0)	60 (100.0)	14 (100.0)	221 (100.0)

$$(\chi^2=91.18, df=16, p<0.001)$$

The obtained results showed that over one-half (60.3%) of seamen in the age group of ≤ 30 years were normotensive. In the age group of $30 < a \leq 40$ years, many seamen (43.8%) also had normal blood pressure, and nearly every tenth of them (10.4%) had isolated systolic hypertension. Over one-half of the seamen in the age group of $50 < a \leq 60$ years (53.3%) and in the age group of > 60 years (64.3%) had grade I hypertension. A highly statistically significant association was found between arterial blood pressure and age groups ($\chi^2=91.18, df=16, p<0.001$),

Exactly one-half (50.0%) of captains and over one-half (61.5%) of motor mechanics were hypertensive. Elevated ABP was also detected in 15.4% of navigators and one-third of cooks (30.0%) and sailors (30.5%). A significant part of engineers (40.3%) also had elevated ABP. A highly statistically significant association was found between the position occupied and elevated arterial blood pressure ($\chi^2=20.58$, $df=6$, $p<0.01$).

Behavioral risk factors and their associations with arterial hypertension

The evaluation of the number of hours the seamen spent in rooms with tobacco smoke during their workday showed that 47% of the subjects almost never spend any time in rooms with tobacco smoke. Every fourth (24.9%) seaman spent less than 1 hour per day in such rooms. We found no association between the number of hours spent in a room with tobacco smoke per one workday and blood pressure elevation ($p=0.759$). The results also showed that over one-half (51.1%) of the seamen did not smoke at all, 16.0% of the seamen smoked occasionally, and every third (32.9%) seaman stated that they smoked every day. We found no association between the frequency of smoking and blood pressure elevation ($p=0.402$). Every tenth (10.4%) seaman smoked 3-5 cigarettes per day, and 34.0% of the seamen smoked 6-10 cigarettes; most seamen (37.7%) smoked 11-20 cigarettes, and 6.6% of the seamen smoked over 20 cigarettes per day. We found no association between blood pressure elevation and the number of cigarettes smoked per day ($\chi^2=6.59$, $df=4$, $p>0.05$).

Table 2. Associations between elevated ABP and the duration of smoking

Duration of smoking	Elevated arterial blood pressure (ABP)		Total N (%)
	No N (%)	Yes N (%)	
Up to 5 years	17 (85.0)	3 (15.0)	20 (100.0)
5-15 years	43 (82.7)	9 (17.3)	52 (100.0)
Over 15 years	17 (50.0)	17 (50.0)	34 (100.0)
Total	77 (72.6)	29 (27.4)	106 (100.0)

($\chi^2=12.95$, $df=2$, $p<0.01$)

The findings about the duration of seamen's smoking experience showed that 18.5% of the seamen had been smoking for less than 5 years. Nearly one-half (48.1%) of the seamen had been smoking for 5-15 years, and every third (33.4%) seaman had been smoking for over 15 years. In total, 15.0% of seamen with up to 5 years of smoking experience had elevated ABP, compared to 17.3% of seamen who had been smoking for 5-15 years, and 50.0% of seamen with over 15 years of smoking experience. A highly statistically significant association was found between the duration of smoking experience and elevated ABP ($\chi^2=12.95$, $df=2$, $p<0.01$), suggesting that longer duration of smoking increases the risk of arterial hypertension.

The obtained results showed that 29.1% of the seamen never added salt to the already prepared food, while over one-half (69.2%) of the seamen stated that they added salt if they thought the food was not salty enough. Only 1.7% of the seamen added salt into the prepared food almost always, without even having tasted the food. We found no association between elevated arterial blood pressure and adding salt into the prepared food ($\chi^2=0.64$, $df=2$, $p>0.05$).

The results of the study showed that 8.1% of the seamen used strong alcoholic beverages 2-3 times per week; 22.1% of the seamen used strong alcoholic drinks once per week, and one-third (34.1%) of the seamen - 2-3 times per month. We found no association between elevated arterial blood pressure and the frequency of strong alcoholic drink use ($\chi^2=1.50$, $df=4$, $p>0.05$).

Table 3. Associations between elevated ABP and body mass index (BMI)

BMI values, kg/m ²	Elevated arterial blood pressure (ABP)		Total N (%)
	No N (%)	Yes N (%)	
18,5-24,9	45 (84.9)	8 (15.1)	53 (100.0)
25,0-29,9	84 (67.7)	40 (32.3)	124 (100.0)
>30,0	22 (50.0)	22 (50.0)	44 (100.0)
Total	151 (68.3)	70 (31.7)	221 (100.0)

$$(\chi^2=13.58, df=2, p<0.01)$$

The results of this study showed that the seamen's mean BMI was 27.23 kg/m². Over one-half (56.1%) of the seamen had overweight, and every fifth of them was obese. Every third (32.3%) seaman with overweight had elevated ABP, compared to 50.0% of obese seamen. A highly statistically significant association was found between elevated ABP and the body mass index ($\chi^2=13.58$, $df=2$, $p<0.01$), which indicates that body weight does affect the prevalence of AH among seamen.

Conclusion

1. The results of the study showed that the highest number of seamen with grade I hypertension was in the age groups of $50 < a \leq 60$ and >60 years - respectively, 53.3% and 64.3%. Every third (31.7%) seaman was hypertensive.

2. The study showed that 47% of the subjects almost never went to rooms with tobacco smoke. Over one-half (51.1%) of the seamen were non-smokers, 16.0% of them smoked occasionally, and every third (32.9%) seaman smoked every day. Nearly one-half (48.1%) of the seamen had been smoking for 5-15 years, and every third (33.4%) seaman had been smoking for over 15 years.

3. One-fourth (25.0%) of the seamen who almost always added salt to the prepared food without even having tasted it had elevated ABP, as did one-third (30.6%) of the seamen who used strong alcoholic beverages once a week.
4. The seamen's mean BMI was 27.23 kg/m². Over one-half (56.1%) of the seamen were overweight, and every fifth of them was obese. Every third (32.3%) seaman with overweight also had elevated ABP, as did one-half (50.0%) of obese seamen. Associations were found between the prevalence of arterial hypertension and the duration of smoking experience ($p < 0.01$) and body mass index ($p < 0.01$). We found no associations between the prevalence of arterial hypertension and other behavioral risk factors.

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