



ORIGINAL RESEARCH PAPER

Epidemiology

WORKSITE HEALTH PROMOTION INTERVENTION AMONG SEAFARERS

KEY WORDS: seamen, occupational health, health promotion

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ABSTRACT

Work on a ship has a higher risk than other professions, mainly because of the higher frequency of traumatism and chronic non-infectious diseases. This fact justifies the necessity of active health prophylaxis among that occupational group. The aim of the study is to track the effect of a interventional program, which includes health discourse and extra medical examination with occupational health consultation among risk groups of seamen. For the period of 1 year, we tracked the dynamic changes in the body mass and lipid profiles in blood among 96 working sailors. People with obesity before intervention are 25,8% against 23,7% after, these with higher value of total cholesterol in blood before are 59,8% against 44,3% (p<0.05) and the number of sailors with higher level of triglycerides is reduced from 37,5% to 37,1%. Improvement of health condition among workers in maritime transport is possible by necessary activity in health promotion.

Introduction:

Aging of the work force is a fact not only in Bulgaria, but also in the EU countries. One of the main problems caused by it is the growing pathology linked to the growing work age. Higher frequency of absence due to sickness which is established in almost every sphere of the labor is caused not only by the aging of population but also by a lot of health risk factors. One part of them is determined by the lifestyle, which forms behavior risk factors for health (smoking, unhealthy nutrition, alcohol abuse, low physical activity etc.) These factors by themselves increase the possibility of appearance of the so-called biological risk factors (hypertension, hypercholesterolemia, obesity etc.). But these factors have a co-effect with the risk factors on the workplace and enhance the negative health effects of the labor conditions like overheating microclimate, noise, vibration, infrasound etc. Work on board of ship has a higher risk than other professions, mainly due to the higher frequency of traumatism and chronic non-infectious diseases like cardio-vascular or endocrine pathology which are a result of unhealthy behavior. This justifies the necessity of active health prophylaxis among this occupational group.

The purpose of the study is to track the effect of an interventional program, which includes health discourse and extra medical examination with occupational health consultation among risk groups of seamen.

Materials & Methods:

For the period February 2016 to February 2017, we tracked the dynamic changes in the body mass and lipid profiles in blood among 96 working sailors. A structured questionnaire is applied including questions about: nutrition regime, food-eating frequency, a different group of questions refer to physical activity and unhealthy habits. Anthropometric traits as height and weight are measured. Height among examined people is measured with accuracy up to 1 mm with a portable stadiometer while the person is in standing position. During measurement, the person is without shoes. Weight is measured with accuracy up to 0.1 kg with calibrated electronic scale. BMI of each participant is calculated by the standart formula. BMI = Weight (kg) / Height² (m²). The results of underweight, overweight or obesity is determined by the criteria of WHO for BMI by the population at age over 18 years old. (1)

Blood glucose, total cholesterol and triglycerides are examined. To each of the people with obesity or/and with higher blood level of total cholesterol and triglycerides are given occupational health consults about healthy working conditions, the necessity of being fit for work at sea, physical capacity and possibilities for correction of the modified risk factors for cardio-vascular diseases. Individual correction in nutrition and in the level of physical activity are recommended.

For statistic, processing is being used analysed data from SPSS v. 17 for descriptive statistics (graphic and table method), methods for hypothesis check: Student's t-test and Pearson's chi-squared test. For a level of significance is accepted p=0.05.

Results:

In the research are included 96 people at the age of 48,03±0,9 years, the youngest is 26-years old and the oldest is 65-years old. Distribution of the examined sea-workers is even. (Figure 1)

Fig.1 Distribution of the examined sea-workers by professional groups (%)

At the beginning of the research only 18 people or 18,6% of the included in the examination sea-workers are with optimal BMI. People with higher numbers in the BMI are more than 54 or 55,7%. These numbers are increasing drastically the numbers for the country. According to the most recent research among men in active working age in Bulgaria the distribution of the overweight is at 32,7% and obesity at 16.1%. (2) (Figure 2)

Fig. 2 Distribution by percentage of the BMI at the beginning of the research (%)

With higher numbers in blood glucose level are 3,3%, of the total cholesterol 59,8%, and with triglycerides 37,5% of the seafarers. (Figure 3)

Fig. 3. Distribution by percentage of the laboratory results at the beginning of the research (%)

According to physical activity, we take the conclusion that 10% of the surveyed sea-workers do not exercise or exercise rarely. Moderate walking on a daily basis more than 30 minutes do only 35,2%.

Table 1. Distribution of the examined people according to physical activity (%).

Indicator	Every day	2-3 times/week	Rarely	Never
Sport	4,8% (3)	21%(13)	62,9%(39)	11,3%(7)
Moderate walking	35,2% (19)	38,9%(21)	24,1%(13)	1,9%(1)

A predominant percentage of sailors are having three meals/day 55,6%, but also the percentage of these who eat once or twice per day is high (6,4%, 28,6%). A conclusion is made that the main meal is dinner 42.6%. A nutritional regime while keeping proper eating hours and the number of eating per day is strictly followed by 22,6%, and when there is an opportunity for it-62,9%. Fresh fruits are not included in the meal by 30,4% of the sailors.

A reduction of the relative share of people in all risk groups is established. People with obesity before intervention are 25 (25,8%) against 23 (23,7%) after, these with higher value of total cholesterol in blood before 1 year are 58 (59,8%) against 43 (44,3%) and the number of sailors with higher level of triglycerides is reduced from 36 (37,5%) to 26 (37,1%). Reduction is statistically significant for the values of the total cholesterol.

The value of laboratory indicators also is being reduced so that the reduction is statistically real concerning the total cholesterol.

Table 2 Dynamics in the numbers of total cholesterol, triglycerides and BMI after 1-year monitoring and the relative share of people with higher total cholesterol, triglycerides and BMI and obesity (%).

Indicator	Average value Before Mmol/l	Average value After Mmol/l		Sailors with reduction	Sailors without reduction
Total cholesterol	5,9±0,1M mol/l	5,6±0,09M mol/l	0,021	60 (61,9%)	37 (38,1%)
Triglycerides	1,75±0,1 Mmol/l	1,66±1,14 Mmol/l	>0,05	63 (65,6%)	33 (34,4%)
BMI	28±0,3	28,3±0,4	>0.05	25 (25,8%)	72 (74,2%)

Discussion:

Work at sea is linked also to psychological stress factors (including long working hour shift, reduced sleep time at board, constant physical risk factors like moving of the ship, noise, infrasound and vibrations, outside control of the work and the lack of opportunity for self-decision-making. (3) High level of psychological stress in maritime professions could lead to psychosomatic diseases. Potentially unhealthy eating combined with lack of exercise and high professional stress are sufficient factors for cardio-vascular diseases. (4) A research of the risk for developing a coronary disease among sea-workers establishes that almost 50% of the examined ship workers have higher blood pressure and 40% higher plasma level of serum triglycerides. (5) Among Danish sea-specialists is established higher death rate from cardio-vascular diseases mainly because of the factors during the work on ship (unhealthy nutrition). (6) Furthermore work shifts on board can affect nutritional behavior of the crew like appearing of food distortions –“stress eating”.

According to previous examination, the average energy consumption of the seamen in the merchant fleet was quantified to 3000–3500 kcal. The individual energy consumption depends on the voyage episode of the ship (port or at sea), as well as the climatic conditions. In the 1960s, the energy consumption of seafarers in the tempo rate zone was estimated around 3000 kcal during moderate work and 3500 kcal during hard work. The frequency of obesity is getting drastically high for the last decade. (3) It is proven that the energy consumption is being reduced in the last decades because of the development of the technique of the ships which lead to replacement of the hard physical labor. (7) Despite that fact nowadays the crew on deck and in the engine hall still is exposed on intensive mainly physical labor especially during ship unloading while in harbor or during a repair (sometimes these actions are taken in extremely high temperatures and static work position). There is still little knowledge about the daily energy needs caused by the higher muscle activity on board because of the balance movements of the body during storm (8). Places for exercise and leisure on the ship are very few and the opportunities for physical activity when the sailor is off-duty are strongly reduced. Gyms for the crew of big merchant ships today are equipped with lifting weights, punching bags, bicycle gauge etc. According to recent surveys, gyms are used from less than a 20% of the crew regularly. Norwegian study shows that 70% of the surveyed sailors sport twice or more times per week when they are at home, while only 39% during duty on ship. (4)

Distribution of overweight and obesity among Bulgarian sailors is with higher percentage in addition to Bulgarian population in general. (2) In the meantime according to quoted by other nations results our percentage is lower. For example Danish research from 2010 establishes 70,5% overweight and obesity (6) and a Turkish one reports for 52,1% from men working at sea. (9) Recent research establishes that 64% from sea-workers were overweight and 23%–with obesity. Similar results are established also during survey of the sea-personel in Denmark in the 90-s years of the 20-th century-16% from 351 surveyed men show BMI >30. (10, 11)

During stay on board, seafarers have limited influence on quality and quantity of food over several months. Up to date, there is only little comprehensive research published concerning food patterns of seafarers; these studies often lack in objective examination methods to estimate the actual food intake and activity-related energy requirements. Therefore, to examine the food and nutrition of seafarers, shipping companies should be interviewed about food provisions on board, and seafarers about eating habits in consideration of possible socio-cultural and psychological backgrounds for malnutrition. These studies should also encompass seafarers’ health parameters related to nutrition on board (energy consumption, bioelectrical impedance analysis, ergo spirometry and blood analysis) (3). In total, further research directly on board is needed to know more about seafarers’ food and nutritional regime at sea. (12) A total number of 104 German seafarers were surveyed about the meals on board and the results revealed that: “very important” or “important” was the answer for 95 % of the surveyed sailors about the food as a crucial factor for their job satisfaction and well-being in the daily routine. A wish for healthier menu was expressed by around 80 % of the sailors; To have a food supply in their cabin was stated by 19%; “fresh products, native food, variety and quality” were most often missed in shipboard provision; pills as dietary supplements were taken by 20%.

It is important to be noted, although the chosen indicator for evaluation of the nutritional status from most of the ship-owners, insurance companies and hiring agencies is BMI; there are more exact methods to determine the risk of overweight and obesity. Some of the disadvantages of evaluation of body composition only by this method (13) It is desirable to continue the research among people with obesity and overweight through Bioelectrical impedance analysis in order to be made exact conclusions about the workability of the sailors.

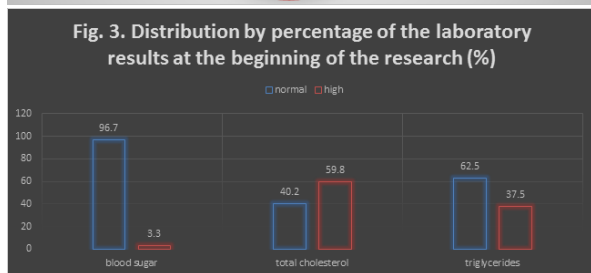
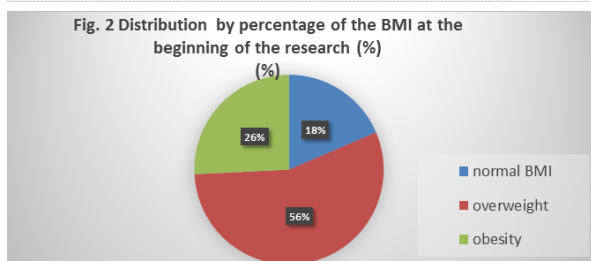
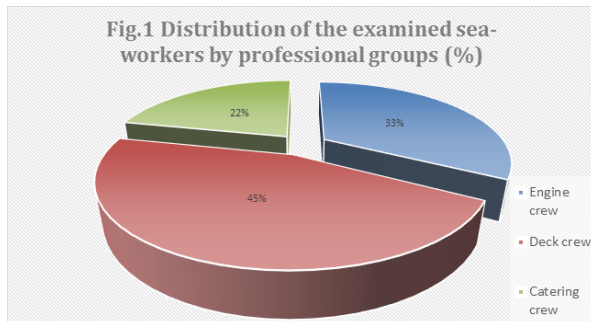
In scientific literature, there are proofs of higher cardio-vascular risk among seamen than other professions in Poland, France, Norway, Germany and Denmark. (10, 14, 15) In Bulgarian documents for work ability on ship there are not included screening laboratory research of the markers for higher cardio-vascular risk.

Interventional programs among seafarers by other authors find potential for change in their habits in order to achieve healthy lifestyle and better health indicators. (14, 16, 17, 18). They are not always highly effective. (11, 19, 20) More frequent meetings with the medical staff and adding more laboratory indicators are applied effectively by Spanish and Polish maritime crew. (15) The law in Bulgaria obliges the maritime workers to pass preliminary medical examination for certification of their medical fitness to work on ship on every 2 years for the age of 18-55. Over this age, the preliminary medical examination is every year. (21) This is a good chance for applying the ratified by Bulgaria international conventions including not only certification but also prophylactic activity. The most effective health risk management is the suitable prophylaxis and promotion of health. In the meantime, most often encountered diseases on ship after the traumas – cardio-vascular have also very prolonged hidden period during which adequate biomarkers are needed. There are a lot of sources proving the reliability of these markers. (5) That gives us the conclusion to think that the exact maritime-occupational expertise is aiming not only to determine the contraindications for work.

Conclusion:

Improvement of health condition among workers in maritime transport is possible by necessary activity in health promotion. Consult by a specialist in occupational health during the process of certification for occupational fitness of seafarers in Bulgaria, accompanied by extra medical exams and laboratory checks leads to better management of health risks caused by lifestyle.

Tables and Figures



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