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Research Article

Comprehensive Assessment of Occupational Traumatism of Members of Vessel's Crew on Transport and Fishing Fleets of the Northern Water's Basin

Abstract

Members of vessel's crew of transport and fishing fleets is a professional group of industrial workers contingent operating the important links of the economic mechanism of many types of industries. Loss of ability to work, disability, and in some cases may be fatal occupational traumas of members of vessel's crew, determine the socio-hygienic and medical nature of the problem and its economic importance.

The analysis of the provision of medical care in 2216 occupational damages of members of vessel's crew of the Northern Water's Basin obtained on board of ships of sea transport, river transport and fishing fleets.

Occupational accidents on vessels were 156.4 per 1000 employees, including 198.2 in the sea transport ones; 132.9 - river transport and 67.7 - fishing. Women from among this cohort of industrial workers are injured on vessels in 1.8 times less often than men. With increasing production time traumatism of members of vessel's crew sequentially reduced by more than 3.4-fold in patients with experience of over 15 years compared persons the first year of operation. The volume of urgent measures in vessel's medical point due to the high frequency of fractures among the victims (60.7), including - open (10.7); extensive infected wounds with massive damages of deeply lying tissues (23.7) wearing complicated or a combined character. Occupational falls from a height with ladders into the open hold or overboard occur with the sailors and minders when performing general vessel's, cargo-handling and mooring work (9%). Proportion damages of members of vessel's crew in alcoholic intoxication on vessel when performing work up to 8% in the total traumatism, including in sea transport fleet - 9% (18.0); river transport - 9% (9.9) and fisheries ones - 4% (2.8). Deadly accidents of members of vessel's crew reached 10% in the overall structure of traumas. Risk factors in the composition of members of vessel's crew of sea and river transport and fishing fleets in the Northern Water's Basin depended of type of work performed, special vessel's affected, drinking of alcohol, sex, age, length of service.

Introduction

In the context of ensuring the life of modern sea power countries of the world, have a lot of transport and fishing ships accident prevention of members of vessel's crew is one of the most important reserves of saving labor and health of this contingent of professional group of industrial workers. The urgency of the problem of medical care to persons affected by the trauma of the number of the members of vessel's crew is determined by the high mortality rate in severe damages, duration and severity of the injury with a temporary and sometimes permanent loss of ability to work. The consequences of occupational traumatism are the socio-hygienic and medical-psychological conditioning. Often, it can become a cause of production, personal and family tragedies. Due to

the limited labor force inflow to fleets reduction of traumas in the conditions of all the members of vessel's crew increasing automation of labor, the development of preventive measures should be considered as one of the effective measures to save manpower [1-4].

To unify the diagnosis, prognosis, organizational tactics and methods of treatment of various work-related injuries of members of vessel's crew medical workers of vessel's medical point, ambulances port cities, outpatient and hospital units of hospitals, specialized departments and specialized medical center have to apply uniform criteria. Failure to follow the sequence of steps in the evacuation and treatment of victims leads to misallocation on injury severity and negative impact on the immediate and long-term results of treatment [5-8].

In addition, one of the outstanding issues hindering the further development of practical vessel's trauma is insufficient consideration of "sustained minor injuries" and lack of generalized data enabling an objective understanding of the socio-sanitary characteristics of occupational traumatism of members of vessel's crew with the influence of medical, biological and socio-economic factors. The lack of systemic analysis in the prevention of traumatism, leads to a repetition of similar hazardous situations injury, ending with serious damages [9-12].

Materials and Methods

Northern Water's Basin includes Barents, Norwegian, North seas and high latitudes of the Atlantic Ocean. Fishing is carried out in any time of the day there. Members of vessel's crew of sea transport fleet provides transportation of cargoes in the same latitudes. Members of vessel's crew of river transport fleet operates in the waters of the large northern rivers Onega, Northern Dvina, Mezen and Pechora, flowing into the Arctic Ocean.

The object of the study was on the processes of distribution and features of formation of structure of traumatism of members of vessel's crew on transport of sea and river, as well as the fishing fleets of the Northern Water's Basin, which were based on a set of primary health statistical maps, expert assessments of data recording and reporting documents, regulatory and reference materials. Injury frequency calculated 1000 for each of the operating parameters deprecated.

The analysis of traumatism of members of vessel's crew of Northern Water's Basin have been based on 2216 occupational injuries on board of vessels with temporary loss of ability to work during 20 years. Of them were 1 367 occupational damages received by members of vessel's crew on board sea transport vessels, 377 - on river transport vessels and 320 - on fishing ones. It was happened 152 traumas on board of other types of vessels.

Analyzed were the age structure of the crews of the Northern water pool and data obtained on the basis of medical documentation, namely: a) regular reports written by the vessels' medical staff; b) vessels' medical journals; c) medical files of the discharged patients; d) fragments of patients' medical records; e) medical records of the patients; f) reports on causes of temporary disability; g) occurrences of accidents happening on board of vessel.

Diagnoses stating alcohol intoxication were given on the basis of statements of the ambulance doctors, ER doctors, teams of surgeons, and results of blood alcohol content examinations. In all the cases, diagnosis "alcohol intoxication" was a secondary diagnosis. Traumatism affecting workers of vessels under alcoholic intoxication is reflected in the documentation of accidents at work.

While working on these documents, the following methodological approaches were used: systematic, comprehensive, integrative, functional, dynamic, process,

regulatory, quantitative, administrative, and situational. Methods of comparison were also employed such as grouping, comparison of absolute and relative values, averaging, continuous observation, and generalization.

When processing primary materials, a set of statistical methods was used: Calculation of the generalizing coefficients characterizing the different sides of each of the features of the program; - comparison of different statistical sets; - differentiation, evaluation and integration of factors. The paper uses a tabular method for analyzing the data obtained. Mathematics and technical support, carried out with the use of modern computer tools, included methods of mathematical and statistical processing and analysis of scientific information, the participation of mathematicians in the development of computer support of the work.

The author adheres to accepted ethical standards in research involving people, medical records and in human organs and tissues.

Results

The frequency of occupational traumatism in the performance of the members of vessel's crew during vessel's work was 156.4 cases per 1000 employees, including 164.0 in men and 90.2 - women. The average age of victims is 31.1 years. The highest level of trauma was observed in individuals under 20 years (305.1), which amounted to 5% of patients. The frequency of occupational accidents in the next age group 20-29 years persons decreased by 1.7 times. Between members of vessel's crew of 30-39; 40-49 and over 50 years, the pace of its reduction decreases. So compared to the novice workers injured persons over 50 years there is 2.2 times less than that of just what came to beginners on fleets. Among patients of vessel's health centers with injuries to the face 20-29 years accounted for 50%; 30-39 years - 22%; 40-49 - 14% and 50 years or more - 7%.

The frequency of occupational traumas on various fleets of Northern Water's Basin was uneven: the highest - on sea transport vessels (208.1); more lower - on river transport (132.9) and fishing (67.7) ones. Members of vessel's crew of the maintenance service of vessels amounted to 47.6% of the victims, which was more than the members of vessel's crews of operation of services - 40%; life - 6%, radio - 1%, the production processing - 2%, mining - 1%, health - by 1%.

The most common occupational injuries receive fish processing master (276.8), boatswains (272.0), captains (209.6), skippers (209.6), sailors (184.4), mechanics (163.4), mechanics (158.6), tin master (152.6), cooks, bakers (129.4), navigators (114.5) and bartenders, orderlies (80.6). Among the injured vessel's experts rank and file: the sailors (31.5%) and motorists (27.1%) by the specific gravity was significantly ($p < 0.001$) prevailed over the mechanics (11%), navigators (6%), cooks (5%), captains (4%), boatswain (4%), skipper (3%), fish production masters (1%), the heads of radio stations (1%), other specialists (6%).

In studying the work experience of victims found that only during the first year of production activities of the members of vessel's crew can be traced effectiveness acquired in learning special skills of safe work. Conduct technical training, induction and ongoing briefings before carrying out work gives positive results especially for novice workers. If among people with experience of up to 1 year rate of occupational injuries among members of vessel's crew is the highest, with experience length of 1 to 3 years, it is reduced 2-fold (357.2 and 117.2 respectively). With the increase of seagoing service injuries consistent decreases under the influence of systematic complex measures for its prevention, conducted by the departments of safety and health education of medical departments fleets with 174.1 cases in persons with 3-5 year experience up to 111.7 to have worked more than 15 years.

Dangerous situation for occupational traumatism most often created during vessel's work associated with the movement of the ladders and decks (32.4), service cars and mechanisms of the engine room (32.0) and deck equipment (13.6), mooring (12, 9), loading and unloading of the crew (11.0), galley (5.9), with the hatch covers (5.0), trawl (3.5). Particularly heavy occupational damage members of vessel's crew having a fall from height (37%). The largest number of work-related injuries is applied blunt (86%) and acute (6%) subjects, thermal agent (6%). On ships of Northern Water's Basin cases of acid poisoning marked, alkali metal vapor, carbon monoxide poisons (total - 3%). It is significant that 8% of all occupational accidents obtained in a state of alcohol intoxication (12.7). The share of injuries received by members of vessel's crew of the sea transport fleet in the influence of alcohol when the ship's work is in the overall structure of injuries 9% of the cases (18.0), river transport - 9% (9.9), fishing - 4% (2.8). Within this group of patients, 7% suffered alcohol intoxication combined with alkali, poisons, carbon monoxide.

The most secure against occupational traumas on vessels was the end of the weekly cycle: on Friday and Saturday it noted a significant decrease ($P < 0.05$). On vessels of Northern Water's Basin significant reduction in accidents (18%) occurs in the winter months (summer - 32%) due to the complete cessation of navigation on river transport ships, cargo shift into other water basins.

Members of vessel's crew carry the greatest losses from occupational accidents when docked in the port (67%). Carrying out a large number of little mechanized and manual works associated with the preparation of the vessel for berthing, loading and unloading in a relatively short period of time leads to the hasty execution of operations, disruption of certain safety rules, using of incorrect methods of occupational works. During flights to members of vessel's crew occur only a third of all work-related traumas, including in the Arctic region - 13% of cases, moderate - 20% and tropical - 1%.

All the reasons that led to the occupational accident, divided into organizational and technical. For organizational reasons, there were 82% of all cases, of which the main ones are: lack of supervision and deficiencies in the organization of

work (35%), violation of technological processes and safety regulations (23%), the disadvantages of instruction and training in safe methods of work (20%). From the technical reasons of occupational traumatism to members of vessel's crew the main are flaws and faulty equipment and tools - 65% of cases. Urgent aid for occupational injuries turns out in vessel's medical station by medical attendant with secondary medical education or doctors of general practitioners. As a rule, the amount of aid is limited to the first pre-medical emergency or medical assistance. And only on large vessels where the traumatologist is in state, the amount of medical action is extended to qualified and specialized medical care. It should be noted that only 74% vessel's doctors working in the northern basin of water, have a primary specialization in surgery and experience in coastal surgical hospitals.

Medical worker is in a particularly difficult situation with occupational accidents on board of vessel: on the one hand - the limitations of space and the unsuitability of the premises of ship medical center to assist with injuries of the musculoskeletal system, the lack of tools, on the other hand - the lack of experience and skills of trauma manipulation (reduction of dislocation, overlay skeletal traction, casts). Vessel's health worker has to independently solve difficult diagnostic problems in the absence of generally accepted and much needed in trauma x-ray, laboratory and instrumental methods of research. Therefore, on ships widespread phased evacuation system of trauma care to members of vessel's crew with evacuation as intended. The question of the extent of trauma allowances decided depending on the severity of damage, the presence of shock, bleeding, or their absence, opportunities vessel's medical worker, his experience, the location of the vessel and navigational aids.

Extreme conditions victim assistance: storm conditions, pitching; vessel's limited capacity combined medical unit to constructive deficiencies; difficulty in practical terms the principles of aseptic and antiseptic, sterilized surgical linen and materials narrow indications for operative treatment methods damage of members of vessel's crew in ship's environment.

In pursuit of the ship along the coastline, the parking lot at the pier scope of activities is limited to emergency medical care, and the patient is transported to the nearest medical facility onshore. If in connection with the trip setting, remote shore or boat with highly qualified specialists on board the evacuation of the injured is not possible, then medical help should be provided to the fullest extent in vessel's medical station.

The forces and means of medical support of members of vessel's crew with occupational injuries is largely dependent on the number of victims and damage structures. Multiple work-related injuries predominate over with combined ($P < 0.001$). In the structure of the main injury groups were bone fractures (40%), contusions (16%) and wounds (16%), traumatic amputations (6%), burns (5%), traumatic brain injury (4%). The frequency of traumas to members of vessel's crew injuries on separate anatomical and functional segments are presented in table 1.

Table 1: Frequency of Traumatism of Members of Vessel's Crew of the Northern Water's Basin, on Fishing, Sea Transport, and River Transport Fleets Depending on Anatomical Localization of 1,000 employees (P±m).

Localization / Fleet	Northern Water's Basin	Sea Transport	River Transport	Fishing
Brush	42,9±0,6	53,2±0,6	29,3±1,2	24,1±0,7
Foot	17,3±0,4	28,3±0,7	6,6±0,8	5,0±0,7
Shin	17,1±0,4	24,3±0,5	12,5±1,0	5,0±0,7
Head	15,5±0,4	23,7±0,5	6,6±0,3	5,5±0,6
Forearm	10,7±0,4	16,6±0,5	7,9±0,9	1,3±0,5
Organ of vision	9,0±0,3	8,1±0,4	3,3±0,8	1,8±0,5
Rib cage	8,3±0,3	10,3±0,4	7,2±0,9	3,3±0,3
Knee-joint	6,1±0,2	9,6±0,3	5,9±0,8	0,4±0,2
Spine	5,3±0,2	7,7±0,4	3,3±0,8	2,4±0,3
Shoulder	3,9±0,2	5,3±0,3	--	3,3±0,3
Hip	3,5±0,2	5,0±0,3	1,3±0,4	1,8±0,2
Collarbone	1,5±0,1	3,1±0,2	--	--
Bones of the pelvis	1,5±0,1	1,3±0,2	1,3±0,4	1,3±0,2
Abdomen	0,9±0,1	1,3±0,2	--	--
Neck	0,2±0,1	--	--	0,4±0,1

Occupational injuries to the wrist injury are the most frequent between members of vessel's crew of Northern Water's Basin. Bruises (3.5) and wounds (10.5), taken together, account for fewer than fractures of various bones of the hand (17.7). Another formidable pathology of hands is amputation of fingers at different levels (9.6). On board of vessel's traumatic amputation of fingers brush occur when working with the hatch covers, when the doors are closed, maintenance deck machinery. Industrial injuries with damage to the brush in transport and fishing fleets it has different weight. Every second traumatic amputation on vessels leads to a loss of two or more fingers. Members of vessel's crew in the treatment process are formed functionally defective in the stump, and the treatment often ends adverse professional and labor outcomes.

Occupational damages of foot are characterized by high frequency of fractures (11.0). The number of traumatic amputations of the lower limb phalanges at different levels (0.9) 10.7 times was lower than the brush. Shin injury in the floating structure is characterized mainly by bone lesions (10.3), as compared to the soft tissues. Bruising tibia (3.9) and wounds (2.4) occur rarely objectively. Head injuries of members of vessel's crew lead to a concussion (36%), brain injuries (10%), bone fractures vault (8%) and the base of the skull (4%). In case of damage of the forearm on board of vessel notes the prevalence of bone fractures (58%; $P < 0.001$) over other types. Shoulder traumas are accompanied by the usual shoulder dislocations (38%), bruises and fractures of the humerus (23%), often the detachment of the tendon of the biceps (8%). Damage to the eye make up 4% of all injuries, among them most sailors are injured eye. High is the level of foreign bodies, contusions organ of vision.

When performing vessel's work associated with the transitions on the stairs and decks, falling from height injuries are accompanied by injuries of the chest with broken ribs. Two

broken ribs were observed in 20% of the victims; Ribs 3 - 8%; 4 or more - 2%.

On the eighth rank place are the knee injuries. Among these types of trauma (2.4) prevail over the patella fractures (1.3), menisci fractures (1.1), wounds (0.7) and injuries of ligamentous apparatus (0.7).

Spine damages were reported in 3.4% of members of vessel's crew, who was injured on ships. Every second trauma is accompanied by fractures of the vertebrae. If the damage occurs in flight, the transfer of the victim to shore hospital is difficult, qualified medical care is delayed. When the spine fracture with spinal cord injury persons of the floating structure are patient recovery and rehabilitation of spinal centers. If the injuries of shoulder happened the most common damage is habitual dislocation (1.5) compared with fractures of the humerus (0.9) and bruises (0.9), the gap between the tendon of the biceps (0.2). Among the hip injury dominated soft tissue injuries (2.0) over the fractures of the femur (1.5). Collarbone traumas accounted for only 1.0% of total damage of members of vessel's crew, including fractures prevailed over gaps acromio-clavicular joint ($P < 0.001$). Fractures of the pelvis are the thirteenth rank place. Production damages to the abdominal cavity and to the neck of on board of vessel are rare types of pathology. Large group of injuries on ships constitute burns (6%), obtained in the performance of vessel's work. Dominated by thermal damage II degree (72%; $P < 0.001$), an area of 3% of the hands, shins, face, feet.

Occupational traumas of members of vessel's crew demanded of surgical treatment in 31% of cases. If there is no medical worker on board, first aid for injuries is provided by not experts, most chief mates, responsible for medical support on vessel. Further treatment for industrial vessel's injuries in a surgical hospital demanded 32% of the victims of the members of crew. Among operated ones, repeated interventions were performed in 14% of patients, which further emphasizes the complexity of the disease and the severity of injuries. The average time of treatment of patients with occupational injuries in the hospital up to 29.2 days, and the duration of their disability reaches 43.4 working days.

After treatment, recovery occurred in 83% of injured in production conditions on ships; translated into light work and then return to members of vessel's crew - 5%; set Group II disability - 1%; Group III - 1%; fatally ended 10% of accidents.

Discussion

Thus, the members of vessel's crew of the transport and the fishing fleets is a professional group of industrial workers contingent operating the important links of the economic mechanism of many types of industries. Loss of ability to work, disability, and in some cases be fatal occupational injuries of members of vessel's crew determine the socio-hygienic and medical nature of the problem and its economic importance.

Occupational traumatism of members of vessel's crew on ships of Northern Water's Basin is high per 1000 employees, including 198.2 on sea transport; 132.9 - river transport

and 67.7 – fishing ones. Women from among this cohort of industrial workers are injured on ships 1.8 times less often than men. Among the main occupations of marine professions on vessels work-related injuries occur more frequently with the rank and file: sailors and minders compared with mechanics and navigators, mainly on sea transport ships, compared with the river transport and fishing. With increasing production time injuries between members of vessel's crew in Northern Water's Basin sequentially decreases more than 3.4-fold in patients with experience of over 15 years compared to the first year of operation.

The volume of urgent measures in vessel's medical point due to the high frequency of fractures among the victims (60.7), including – open ones (10.7); extensive infected wounds with massive injuries deeply lying tissues (23.7); burn (8.3), traumatic brain (6.4), eye (5.7) traumas wearing concomitant or combined character.

Industrial falls from a height with ladders into the open hold, overboard occur with the sailors and minders when performing general ship, cargo-handling and mooring work (9%). Polytrauma make up 15% in the structure of traumatism of members of vessel's crew in the Northern Water's Basin. The leading symptomatic lesions are multiple fractures (40.4%), traumatic amputation (13%), traumatic brain injury (13%), burns (11%).

Proportion of injuries of members of vessel's crew in alcoholic intoxication on board of ships when performing work up to 8% in the total damage, including the sea transport fleet – 9% (18.0); river transport – 9% (9.9); fisheries – 4% (2.8). Within this group of patients, 6.8% suffered alcohol intoxication combined with alkali, poisons, carbon monoxide.

Deadly accidents in members of vessel's crew reaching 10% in the overall structure damage. Groups at high risk of fatal injury are sailors and motorists under the age of 30 years, when performed general vessel's work and mooring, maintenance deck machinery. The probability of fatal injuries increases during the autumn when swimming in the temperate latitudes, as well as parking of vessels in ports. Drunkenness is a major factor in fatal injuries.

Risk factors in members of vessel's crew of sea and river transport and fishing fleets in the Northern Water's Basin in the event of bone fractures, wounds, head injuries, injuries are the type of work performed, special ships affected, drinking alcohol, sex, age, length of service.

Modern technological progress changes the nature of the content and composition of labor of members of vessel's crew. The commissioning of new types of vessels, the widespread introduction of automated processes, the approach of the labor of the crew to the work of operators are on a moving subject, have a decisive impact on the level of occupational traumatism. In recent years, there was a trend weighting accidents, complicated clinical course, frequent complications, worsening of occupational injury outcomes of members of vessel's crew [13-15].

Work in Northern Water's Basin occurs in extreme industrial and climatic conditions. Pronounced effect was found difficult working conditions during the polar night, poor visibility, ice conditions on ships and moorings on the ice, the duration of the period of adaptation of the organism to the polar latitudes to the level of traumatism on ships with the crew. The combined influence of cold and moisture, noise and vibration, hypodynamic disease have a negative effect on the musculoskeletal system of members of vessel's crew in Northern Water's Basin [16-18]. The specific conditions of employment define indicators of occupational injuries. The climate in northern latitudes is characterized by low outdoor temperatures and negligible its monthly and annual fluctuations. Sea water temperature is low, so moisture content in the Arctic cold air creates conditions for slow evaporation of water, whereby the water vapor content in the atmosphere is small. Low absolute humidity of cold arctic air causes considerable evaporation of moisture from the surface of the lungs by inhalation that at low temperatures causes an increased sensation of thirst [19-22].

The wind activity in the northern latitudes is characterized by gusty winds of different directions throughout the year. The average annual wind speed is 10.8 meters per second. In winter, there is a sharp increase in wind activity. On average, about one third of all days at this time are the storm. Frequent cyclones passing over the territory of the Northern Water's Basin, entail a quick change of the outdoor air, accompanied by rain and fog. In wet weather on the deck and arrangements formed ice raises slippery decks. Fashion member of the deck crew become wet during operation [23-26].

Characteristic features of the northern latitudes are the long period of snow, long distance ice. When navigating in ice hull undergoes constant jolts and bumps of ice fields. Visibility is sharply reduced due to frequent snow squalls, blizzards, snowstorms and fog. Heavy working conditions of the floating structure during the polar night, poor visibility in the Arctic ice on ships and the berths have a direct impact on the frequency and structure of occupational injuries. The duration of the period of adaptation to the polar latitudes is the most dangerous in relation to accidents [27,28]. Among the factors of extreme sailing in the northern latitudes, it should be noted: sudden changes in barometric pressure; low temperature combined with high humidity; large fluctuations of geomagnetic activity and expressed photoperiodicity during the polar day and polar night. Swimming in the Arctic ice, storms are frequent in autumn and winter, snowfall and fog considerably complicate voyage execution tasks speeds up the creation on vessels of dangerous situations for industrial injuries [29-31].

Long stay in flight leads to the development of general fatigue, and therefore increases the likelihood of accidents. Therefore, the problem of prevention of accidents on vessels is one of the most pressing issues of maritime medicine [32,33].

The reason for slowing bone regeneration at the local action of cold is persistent poor circulation due to vascular spasm [34]. Under the effect of cooling in a moist environment on members of vessel's crew, representatives of other public facilities in

the North 98% of X-ray examination detected changes in bone degenerative nature. They observed mainly in the bones of the extremities that are exposed during cooling, namely, phalanges, heads and metaphases of the first metatarsal bone, the metacarpal bones. The changes are expressed in the formation of osteophytes, diffuse osteoporosis, thickening of the bone trabeculae of the spongy substance. Expansions of marrow spaces between the beams depend on the depth of the cooling period and neurovascular disorders and appear not only in the application of cold spot, but also in the bone tissue of alveolar processes [35,36].

Among the reasons that cause the vessels to professional pathology, an important place belongs to the noise and vibration, providing a permanent effect on members of vessel's crew throughout the voyage. On fishing ships in 80% of cases increased the permissible noise levels in the 25% - vibration. In the engine room of marine transport vessel noise levels meet the standards in 26% of cases, the vibration - 73%; and river transport ones - of 30% and 75% respectively. The central point of management compliance is noise on marine transport vessels 15%, vibration - 82%, fisheries ones - 18% and 37% of cases. In the office, residential and public areas of noise and vibration levels do not fully satisfy the requirements of the standards [37,38].

The current levels of noise on marine transport vessels predetermine a high degree of mobilization of adaptive mechanisms of members of vessel's crew, which can lead to their accelerated depletion and the development of pathological changes in the body [39].

As a result of vibration factor can develop a number of pathological states of the elements of soft tissue and the skeleton framework, manifested in the form of reconstruction of bone structure, and bone strengthening by the lines of force of maximum pressure and traction. There is the development of bone disease trophic character, which is to develop an edge resorption of distal nail phalanges, formation of enostosis, thoracic spine spondylosis. In the development of lesions of bones and joints do not have the basic meaning of vibration parameters, and caused her neurotrophic disorders [40].

In the context of long flights an important determinant of the health of members of vessel's crew is hypo dynamic disease [41]. The motor activity of workers on ships decreased by 6-10 times compared with the coastal environment [42]. Experimental and clinical data suggest that the restriction of muscle activity causes of members of vessel's crew complex polymorphic composition by circulatory disorders, respiratory, neuromuscular and neuroendocrine systems are now merged term "hypokinetic disease." Thus, the combined effect of factors of production determines the major professional changes in various systems of the body of members of vessel's crew in Northern Water's Basin, creates conditions stress adaptation mechanisms that implement the appearance of the factors leading to increased industrial injuries contingent of this group of industrial workers [43,45].

Conclusion

1. Members of vessel's crew of the transport, river and fishing fleets is a contingent of industrial workers, ensuring the functioning of important parts of the state economic mechanism. Loss of ability to work, disability, and in some cases, deaths from injuries to the crew, determine the socio-hygienic nature of the problem and its national economic importance.

2. Traumatism of members of vessel's on ships is high and is 156.4 per 1,000 workers, including 198.2 on transport ships; 67.7 - fishing; 132, 9 - river.

3. Among the vessel's specialists of the main occupations on water transport, industrial injuries occur more often with ordinary personnel: sailors and motorists compared with mechanics and navigators, mainly on transport vessels as compared to river and fishery vessels.

4. The specific gravity of injuries received by members of vessel's crew of the transport fleet in alcoholic intoxication during shipboard operations is 8.9% of cases (18.0) in the general structure of injuries, 4.1% (2.8) in the fishing industry; river - 8,9% (9,9). The existing differences in the frequency of injury to the crew of the northern region, obtained in alcoholic intoxication, depend on the specifics of the production activity, the navigation area and the regularity of calls to the port. The most common injuries were experienced after drinking alcoholic drinks by the master of fishing (44.9), skippers (32.9), chiefs of radio stations (30.0), masters of fish processing (25.2).

5. Falls from height (15.3, 9.8%) were noted by sailors and motorists when they fell from the gangways to an open hold, overboard during general shipping, loading and unloading and mooring operations. The leading clinical manifestations of which are: multiple fractures (40.4%), traumatic amputations (12.8%), craniocerebral trauma (12.8%), burns (10.8%).

6. The likelihood of injuries with a fatal outcome increases in autumn when swimming in temperate latitudes, as well as ship parking in ports.

7. The type of work performed, the ship specialty of the victim, the use of alcoholic beverages, sex, age, length of service, etc., are risk factors for the appearance of transport, fishing and river fleets in the floating crew of fractures of bones, wounds, craniocerebral injuries, bruises.

8. Dispensary observation of members of vessel's crew allows expanding the indications for work in the conditions of Arctic navigation to a significant number of seamen, to achieve a decrease of 8.6% of those observed without disability for the underlying disease, and to increase the number of seafarers withdrawn from dispensary records with recovery.

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