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Descriptive analysis of serious accidents at work related to artisan fishermen in Brazil

Análise descritiva dos acidentes graves de trabalho relacionado a pescadores artesanais do Brasil

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RESUMO | INTRODUÇÃO: A pesca artesanal é uma atividade complexa e popular. Os acidentes de trabalho mais frequentes entre pescadores destacam-se: afogamento; ferimento com materiais perfuro cortantes, além de acidentes com animais terrestres e marinhos. **OBJETIVO:** Descrever o número de acidente grave relacionado ao trabalho de pescadores artesanais no País. **MÉTODOS:** Trata-se de um estudo descritivo de vigilância da amostra de acidente grave relacionado ao trabalho de pescadores artesanais. A análise foi realizada através do Sistema de Informação de Agravos e Notificações (SINAN), dentre o período de 2014 a 2016. As variáveis da pesquisa foram: dados sociodemográficos e características do acidente. **RESULTADOS:** Foram encontrados 216 casos no SINAN. O perfil das vítimas de acidente grave relacionado a pescadores eram trabalhadores do sexo masculino, média de idade foi de 42 anos, não brancos, baixo nível de escolaridade, naturais da Bahia, sem informações sobre tempo de trabalho, trabalhavam de maneira informal. Muitos acidentes ocorreram em vias públicas, no turno da tarde, quase todos os acidentes registrados tiveram atendimento médico, os acometimentos foram em: membro superior (35,3%); membros inferiores (14,8%); mais de um membro (12%). A maioria não realizou a comunicação de acidente no trabalho (41,6%). **CONCLUSÃO:** Foi observado um perfil de trabalhadores do sexo masculino, em sua maioria moradores de estados do Nordeste, que estudaram até o nível fundamental e sem registro profissional. Encontrou-se um grande número de subnotificação de informações principalmente com relação ao tempo de trabalho.

PALAVRAS-CHAVE: Acidente de trabalho. Saúde do trabalhador. Acidentes.

ABSTRACT | INTRODUCTION: Artisanal fishing is a complex and popular activity. The most common occupational accidents among fishermen include: drowning; injury from sharps, as well as accidents with land and sea animals. **OBJECTIVE:** To describe the number of serious accidents related to the work of artisanal fishermen in the country. **METHODS:** This is a descriptive and surveillance study of the sample of serious accidents related to the work of artisanal fishermen. The analysis was performed through the Information System of Diseases and Notifications (SINAN), from 2014 to 2016. The research variables were: sociodemographic data and characteristics of the accident. **RESULTS:** 216 cases were found in SINAN. The profile of the fishermen-related serious accident victims was male workers, average age was 42, non-white, low-educated, native of Bahia, with no information on working time, working informally. Many accidents occurred on public roads, in the afternoon, almost all accidents registered had medical attention, the involvement was: upper limb (35.3%); lower limbs (14.8%); more than one member (12%). Most did not report accident at work (41.6%). **CONCLUSION:** It was observed a profile of male workers, mostly residents of northeastern states, who studied to the elementary level and without professional registration. A large number of underreporting of information was found mainly regarding working time.

KEYWORDS: Accident at work. Worker's health. Accidents.

Introduction

Fishing is a complex activity because, not only involves experiences that are practices of local knowledge, but also has low technical division in the activities' realization. This kind of work is characterized as an individual and informal practice, considered as an ambulant activity because of the necessity of displacement during the crustaceans' capture and commerce. It exercise a great influence on the worker's life, as in the community in which it lives[1,2,3].

The fishing activity is an occupation protected by law and conducted by the Decree Law number 221 of February 28th of 1967 (Decreto-Lei nº221, de 28 de fevereiro de 1967), which accomplish systematizations over the protection and incentive of the fishing practice. According to the available data by Brazilian's Federal Government, the country's counts more than 1.1 million fishermen, which are distributed in the many different fishing modalities, but it is estimated that 90% of these fishermen are native of a fishermen community[4].

According to some data, the handmaid fishermen distribution per region is around 21% in the North Region, 39% in the Northeast Region, 18% in the Southeast Region and 22% in the South Region, which makes possible a variety on the fishing production since the salty water's fishing products is responsible for about 75% of its income[5].

The workers' health is thought through the existence of some conditioning factors and its relation with a installed health event that could be related with the situation in which the worker is exposed. According to the Health Ministry (Ministério da Saúde - MS) and the Pan American Health Organization (Organização Pan-Americana de Saúde - OPAS), in the Health Assistance Manual (2001), the classification of risks related with the work divide itself in five groups: physical, chemical, biological, ergonomic and psychosocial. Even with this classification, it is considered a risk of accident any possibility that puts the worker in a vulnerable situation that can interfere in its physical and mental integrity and well-being. A example of these risks are: an inappropriate physical adjustment, machines or unprotected working tools[6,7,8].

According to the Article 19 of the Social Welfare's Benefits Law – Law 8213/91 (Art. 19 da Lei de Benefícios da Previdência Social – Lei 8213/91) it is considered a work-related accident those that happens because of the exercise of the craft, receiving any kind of injury or functional disorder that can: cause loss of work ability; permanent/temporary restriction of the work ability; or death[9].

When it's taken into consideration that the fishing community, the main health harms described in medicine literature are: musculoskeletal, skin injuries, allergies, eye diseases, urogenital disorders, and others, noticing that the risk factor for the triggering of these diseases are related with the execution of this activity in conjunction with working in harsh condition as heat, humidity, negative effects of sunlight exposure, long workdays and many other health issues[7].

The analyses of the frequent work-related accidents in the fishing community are, mostly: drowning, sharp drill injuries (or by other equipment used during the activity) and even accidents involving marine animals[10].

Many health professional still didn't know how to deal with some patients that are victims of these accidents, which can create incapacity and took them away from work. This happens because it doesn't exists a proper training that approaches what it needs to be done when the victims search for medical assistance.

Therefore, scale the problem from official sources it's important to obtain a panoramic view on how to deal with the fishermen' situation about these accidents that occurs in the country, since that aren't enough studies that has a specific analysis on some accidents in this craft as an objective. The present study has as an objective to describe the number of serious accident related to the work of the country's fishermen.

Methods

Its a descriptive research of the accident's casuistry related to the fishermen' work in Brazil. It was made an informational' analysis about serious acidentes found in the database through Desease Notification System (Sistema de Informação de Agravos de Notificações – SINAN), that is supplied by notifications and investigations of diseases that appear in the national list of diseases of compulsory notifications Ordinance no.1.271, June 6 of 2014 and Ordinance no. 1.984, September 12 of 2014).

Severe work-related accidents notifications found in SINAN in the last three years of record, related from the years 2014 to 2016, were analyzed. The analysis of these data happened in October of 2018 to June of 2019.

To measure the population, the Brazilian' Occupation Classification (Classificações Brasileira de Ocupações - CBO) were used for the interest of the research: 631005 for the crab and siri collector; 631010 shellfish collector; 631015 lobster fishermen; 631020 fish and shrimp fishermen; 631105 freshwater fishermen.

The reseached variants were: sociodemographic characteristics, such as sex (masculine and feminine), race (Caucasian, African-American, people of color, Indigenous, ignored), school level (illiterate, Incomplete Elementary School, Complete Elementary School, Incomplete High School, Complete High School, ignored, not applyed), work time (Less than a Year; 1 to 10 Years; 11 to 20 Years; 21 or more), employment status (recorded job, unrecorded job, self-employed workers, retirees, temporary employment, labor cooperatives, casual employment, others, ignored) and outsource work (yes, no, not applied); accident as place characteristic's, as the place where the accident happened (employers work place, third party's workplace, public roads, private property, ignored), time of the accident; break time;

type of accident (injury during work activities and injuries while going to/coming from work); medical assistance (hospitalar, ambulatorial assistance, both or ignored), injury reporting/evolution (healing, temporary disability, partial disability, total disability, decease by severe work-related accidents, decease by non-work-related accidents, others, ignored) and Work-Related Accident's Communication (Comunicação de Acidente de Trabalho - CAT).

The data's descriptive analyses were done through proportion, pattern deviation, standard, minimum/maximum charts and graphs' values. This information was organized in Microsoft Excel's worksheets.

Results

The data's analysis period were between the years 2014 and 2016, being found in Notification System's record that 202.939 cases of work-related accidents in Brazil, being 216 cases (through Brazilian' Occupation Classification) of fishermen profession and its many modalities: 59 cases registered in 2014, 77 in 2015 and 80 in 2016. When taken in consideration, the results obtained by data's percentage were: 0,4% (crabs and siri collector); 1,3% (lobster fishermen), 3,7% (shellfish fishermen); 31,9% (fishermen and shrimp fishermen) and 62,5% (freshwater fishermen).

Among the notification of grave accident's notifications, the marjority were characterize as: masculine sex (96,2%); a standard age around 42 years old = 12,4 Standard Deviation (Desvio de Padrão - DP); person of color (74,9%) and low level of education (58,7%); a majority of these workers (32,8) didn't informed about working time, while those who informed (27,7%) had around 1 to 10 years of it; from these workers (55,5%) perform their activity as an autonomous work (Chart 1).

Chart 1. Sociodemographic characteristics of Fishermen that suffered a severe accident between the years of 2014 to 2016

| Variants	Frequency	Percentage (%)
Sex		
Masculine	208	96,2
Feminine	8	3,7
Age		
Under 20 years old	9	4,1
20 to 30 years old	35	16,2
31 a 40 years old	44	20,3
41 a 40 years old	59	27,3
Over 51 years old	66	30,5
No Information Given	2	0,9
Race		
White	36	16,6
Afro-American	23	10,6
Person of Color	58	63,4
Indígenous	2	0,9
Ignored	14	5,5
No Information Given	6	2,7
Education		
Illiterate	15	6,9
Elementary School	112	51,8
High School	17	7,8
Ignored	43	19,9
Not Applied	3	1,3
Without Information	26	12
Working Time		
Less than 1 ano	20	9,2
1 to 10 anos	60	27,7
11 to 20 anos	32	14,8
21 or mais	33	15,2
No Information Given	71	32,8
Employment Status		
Recorded Employment	17	7,8
Non-Recorded Employment	16	7,4
Autonomous Work	120	55,5
Retiree	2	0,9
Temporary/cooperative or sporadic	28	12,9
Others		
Ignored	17	7,8
No Information	12	5,5
	4	1,8

Fonte: SINAN/2014-2016

While analyzing the characteristics of the grave accidents that occurred with the fishermen, (31,9%) of these accidents happened in a public road and (15,7%) happened in the employer's workplace; (35,4%) of the accidents happened during the morning shift, which hadn't any difference if compared with the afternoon shift, that had (34,5%); the majority of the of the accidents happened 1 to 5 hours after the beginning of the working hours (30,0%), after an expressive number of cases, there was no registration about after how many work hours the accident happened (44,8%), the medical assistance happened in (90,2%) of those recorded cases, being (63,9%) of these assistance in a Day Hospital; the majority of these accidents didn't generate any work-related accidents communication (CAT) (41,6%) (Chart 2).

Chart 2. Characteristics of the severe accidents that happened with Fishermen in the years of 2014 to 2016

| Place of the Accident		Number	Percentage(%)
Instalações do contratante		34	15.7
Via pública		69	31.9
Instalações de terceiros		24	11.1
Domicílio próprio		24	11.1
Ignorado		65	30.9
Time of the Accident			
00:00 - 05:00		8	3,6
06:00 - 11:00		77	35,4
12:00 - 17:00		75	34,5
18:00 - 23:00		23	10,6
No Information		34	15,6
After the working time begins			
Working Time begins			
1-5 hours		14	6,4
6-10 hours		62	28,7
11-15 hours		29	13,4
16-24 hours		4	1,8
After 24 hours		1	0,9
No Information		3	0,9
Medical Assistance		103	47,6
Yes			
No		195	90.2
Ignored		13	6.0
No Information		4	1.8
Service Regime		4	1.8
Hospital Assistance			
Ambulatorial Assistance		138	63.9
Both		44	20.3
Ignored		8	3.7
No Information		13	6.0
Work-Related	**Accident's**	12	6.0
Communication (CAT)			
Yes			
No		10	4.6
Not Applies		90	41.7
Ignored		52	24.0
		64	29.7

Source: DATASUS/SINAN

Image 1. Evolution of severe work-related accidents' distribution that occurred in Brazil from 2014 to 2016
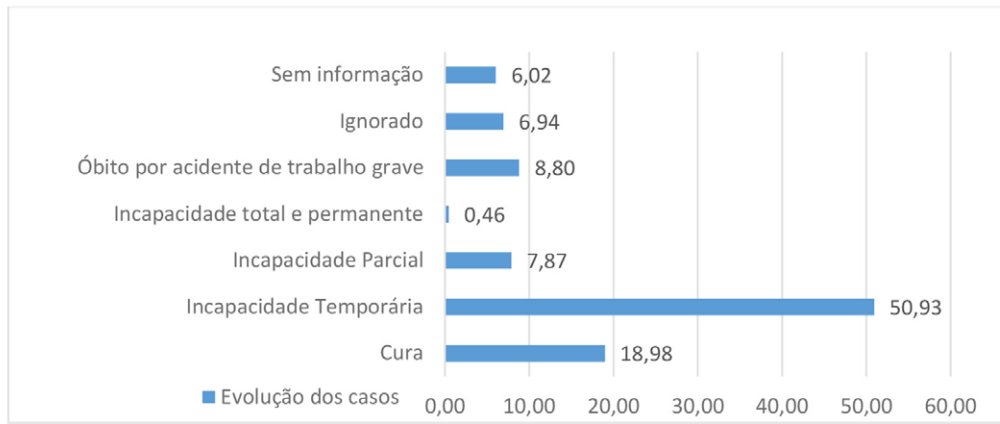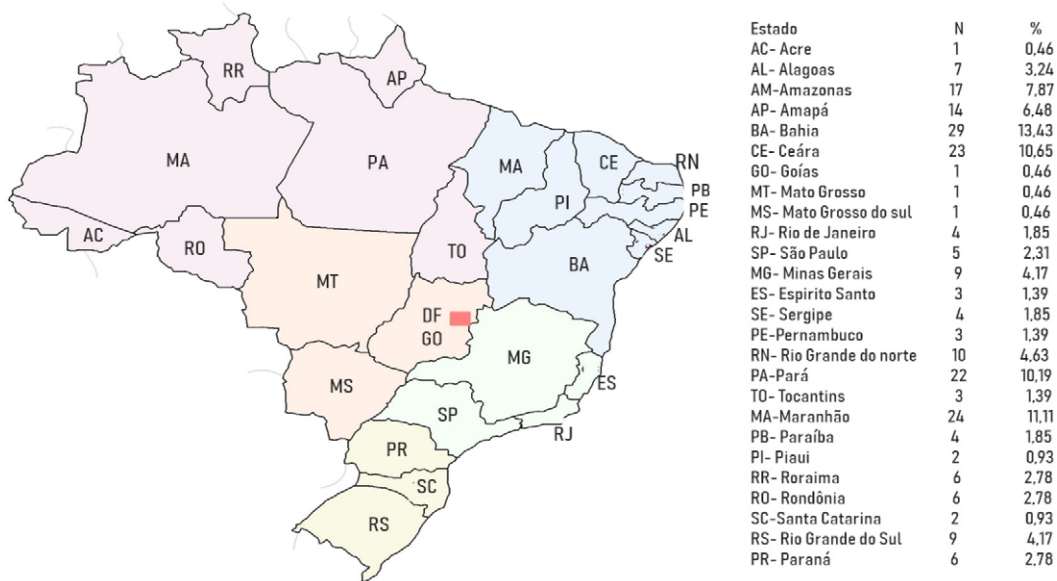

Fonte: SINAN/DATASUS; 2014-2016

Image 2. Anatomic Structures affected by severe work-related accidents on fishermen from 2014 to 2016
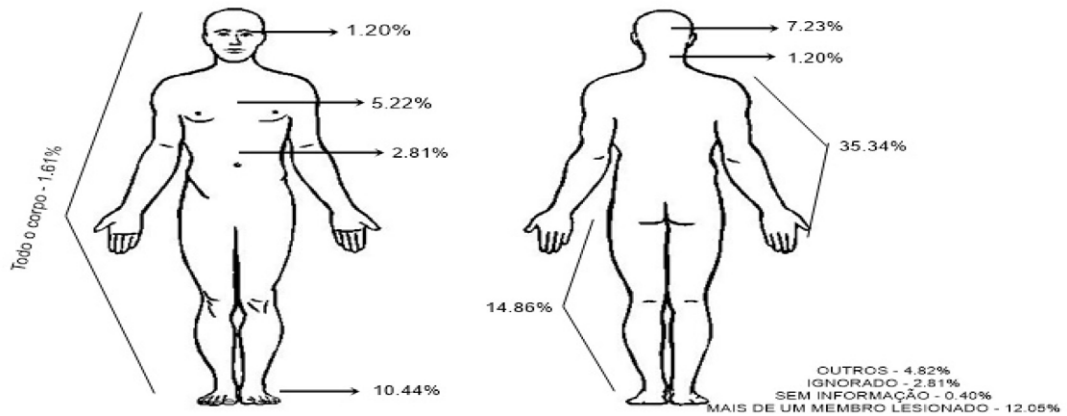
The consequences of these accidents (50,93%) temporary disability, while (8,80%) generated decease by work-related accident (Image 1). The anatomic region affected by the injuries verify that (35, 34%) of these injuries happened in the upper limbs, followed by (14,86%) on lower limbs and (12,05%) of the injuries both, upper and lower limbs. (Image 2).

Image 3. Severe work-related accident's fishermen percentage from 2014 to 2016, by the Federal States

Estado	N	%
AC- Acre	1	0,46
AL- Alagoas	7	3,24
AM-Amazonas	17	7,87
AP- Amapá	14	6,48
BA- Bahia	29	13,43
CE- Ceára	23	10,65
GO- Goías	1	0,46
MT- Mato Grosso	1	0,46
MS- Mato Grosso do sul	1	0,46
RJ- Rio de Janeiro	4	1,85
SP- São Paulo	5	2,31
MG- Minas Gerais	9	4,17
ES- Espirito Santo	3	1,39
SE- Sergipe	4	1,85
PE-Pernambuco	3	1,39
RN- Rio Grande do norte	10	4,63
PA-Pará	22	10,19
TO- Tocantins	3	1,39
MA-Maranhão	24	11,11
PB- Paraíba	4	1,85
PI- Piaui	2	0,93
RR- Roraima	6	2,78
RO- Rondônia	6	2,78
SC-Santa Catarina	2	0,93
RS- Rio Grande do Sul	9	4,17
PR- Paraná	6	2,78

The accident's distribution in Brazilian Federal States couldn't obtain any significant difference in the percentage, but the State of Bahia was highlighted with the largest notification percentage (13,43%), while the States of Goiás, Mato Grosso, Mato Grosso do Sul e Acre obtained (0,46%) of the records (Image 3).

Discussion

After achieve the analysis of the data, it was possible to identify the profile of Brazilian fishermen's Severe Work-Related Accidents. The casuistry reaches towards a low educated, middle aged, masculine, people of color majority, where most of them didn't know any information about working time, and exercised their activities as autonomous workers. Some set of considerable factors for this informality in the realization of this activity is that a Fisherman starts to exercise its profession on a young age and on their parents' guide, lives on a small community, stopped the studies too soon and uses the fishing as a proof of the subsistence of its family.

It's important to understand that, even if the fishermen starts to work on a young age and the standard age obtained by the analyzed data were 42 years old (which would make the largest injured workers rate being in the stratification of 21 or more years of working time), the found result was that the majority didn't have any information about the record of working time. This information can be interpreted in two forms: the first is that the notification file was incomplete, and the second is that the fishermen didn't have any knowledge about the time that they exercised their profession. Both cases, the results don't fit with the workers' profile.

According to Brazilian's Ministry of Labor, 75% of the fishing products are in sea water. Though, according to SINAN's data, the majority of the accidents happens on the 25% produced by freshwater's fishermen.

These fishermen are exposed to the risk of health decrease, as an example: musculoskeletal disorders because of bad posture and repetitive movements; exposition to sun and humidity can cause dermal diseases, neoplasm and urogenital infection, besides all the non-transmissible chronic diseases. The fishermen' vulnerability to work-related accidents by working tools, by exposition to Natural actions, unsafe or inadequate fishing boats are the

main purveyor of accidents. The absence of some mechanisms that can assure safety for the population and the high estimative of informalities increases the risk of accidents and aggravate the health of members from these communities[11,12,13].

Research describes a lack of accuracy about the work-related accident's estimation that happened with fishermen since the majority of the workers that exercise this activity don't have any formal employment relationship, moreover, the same activity suffers a great influence in the place where both are inserted, in which they are put in risky situations as: shipwrecks, heavy storms, musculoskeletal disorders, skin injuries and others[7,14,15].

According to Conceição and collaborators (2003), the profile of these accidents among the fishermen has some similarities with other professional categories in an Emergency Unit in the city of Salvador, in which a survey were made on medical assistance for incidents of external causes that could have any relations with work-related accidents in more than one professional category. Among these assistances, 89,7% were from the masculine sex, around 31 years old, 69,1% doesn't finished the High School and 41,2% were autonomous workers[15].

The data from this study supports Neto and collaborator's study (2005) that had, as the population of its study, fishermen, in which 93,5% were from the Masculine sex, 79,9% had between 31-50 years old and 70,7% had 3 or more years of study, plus 10 years active in the profession. A profile extremely similar to the ones obtained through the analysis of information available by SINAN[14].

In a study realized by Garcez e Botero (2005), the Rio Grande do Sul fishermen's profile had a standard age of 42,9 years old in a valuation of working time of, at least, 18 years; almost 8 to 10%, the total number of fishermen were of the feminine sex; 80% had low school level[16].

The profile of the workers that suffered a work-related accident shows that these accidents became a persistent problem over the years, and the time that the person applies itself to execute a certain craft

which became a time higher than 10 years. It's valid to give an analysis that, as the years move forward, the person's body mechanics suffers alterations that brings difficulties to some activities and presents an overload that can become a important element that happens in this accident.

The majority of these accidents happened on public roads, which doesn't allows to know if this was an commuting accident or if it happened before during the exercise of the activity because of the place where the fishing happens its open, followed by accidents on employer's workplace and majority during the afternoon shift, without records about what time since the beginning of the working time. According to Neto and Collaborator (2005), the major part of the accidents happened during the morning shift (35, 7%) and (46, 4%) of these accidents happened while the fishermen were still exercising a step of the work.

Almost every accidents received medical assistance (90,2%), but a small part made the Work-Related Accident Communication (Comunicação de Acidente de Trabalho – CAT), information that counters Neto and Collaborator's studies, in which (87, 5) doesn't look for medical care, half of the accidents generated a temporary disability (that had an almost homogenous anatomical distribution through the whole body) with a special warning with the hands.

The work-related accidents are considered a Brazilian's Public Health problem that affects with predominance the economically active young adults that can practice any kind of activity. Some data estimates that in Brazil will happen a sub-notification of the work accidents, especially those that have a lesser degree of severity or if doesn't generate an increased degree of incapacity[17].

A question to be answered is about the accidents that received a medical assistance is around 90% obtained medical care in some support system, but only 4% performed the CAT, which needs to be analyzed with proper caution in subsequent researches.

SINAN's record has the most affected anatomic conditions were upper limbs with (35,3), where the responsible were: hands for (23,7%), limb for (8%), head for (7,2%) and neck for (1,2%); followed by the lower limbs (14,8%). This data was similar to the research of Neto and Collaborators (2005).

The increase in the number of fishermen's severe work-related accidents in the last three years of notification noted that it happened in a slow form. This tendency could be the answer of a better way to conduct the accidents' diagnosis. This increase in the percentage was also seen in other researches that related work accidents with functional disability, with the sub-notification that happens because of the workers exercise their activities on an informal way. The absence of information about the necessity to notify a work-related accident, just as the capacity of the existence of a diagnose, is known by health professionals that assists these cases to identify how these accidents happens[18,19].

When Lameiras and collaborators (2014) execute an analysis about accidents with freshwater stingrays of the Family Potamotrygonidae, they related that some found limitations was the inexistence of a specific treatment for the accidents involving theses types of animals, the lack of practice of the health professional on how to identify and provide the adequate treatment and, only then, exercise the CAT. This shows the importance of having a special look over these accidents since it can create a disability, removing the fishermen of their labor activities[20].

The Ministry of Health, through the Informatics' Department of the Unique Health System (Departamento de Informática do Sistema Único de Saúde), represents one of the most important sources of compulsive notifications information generated by the health assistance. However, the problem of being a sub-notify system by the lack of identification for the work-related accidents suffered by the injured workers and the lack of preparation by the health professionals is what it makes the system supply a lot more difficult.

Many researches presented as a difficulty for the analysis the sub-notification of the work-related accidents data. The absence of information affect negatively the objectives of the Worker's Health Vigilance, making impossible more deeper and permanent analysis of the workers' health situation and the construction of control strategies for risk of work accidents and diseases[21].

Conclusion

The data's analysis allowed to create a profile for fishermen that suffered any kind of work-related accident. This panoramic view allows to develop actions that can achieve methods to inform the population about the importance of the notification of a work accident, bearing in mind that one of the found data was that a great amount of injured fishermen didn't realize the Communication of Work-Related Accident (Comunicação de Acidente de Trabalho – CAT).

The severe accidents involving fishermen in a great number happens with adult men that have the possibility to exercise any kind of activity that can bring support for his families. The disability that these accidents can generate makes impossible for this workers, even if temporarily, achieve their basic needs.

Some limitations found in this research were: the absence of information in the data available by the system; the small amount of details about the accident's observations or the way how it happened (many data weren't completed). Nevertheless, important analysis could be made, which allows that public policies towards workers' health and security to be adopted by the public administrators for an improvement in the notifications of incidents. The sub-register found in this research isn't an exclusive characteristic of this workers' category, although is important to warn that the high rate of informality favors to the invisibility of risks to health.

Author contributions

Lima AJP participated in the conception, design, search and research's statistical analysis of data. Result's interpretation and scientific article's writing. Santos KOB participated in the conception, design, followed the analysis, and participated in the accuracy of the submission.

Competing interests

No financial, legal or political conflict involving a third party (government, private or non-private companies, etc.) was declared about any aspect if the submitted research (including, but not limiting, the subsidy and the funding, advising council participation, research design, manuscript's preparation, statistical analysis, etc.).

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