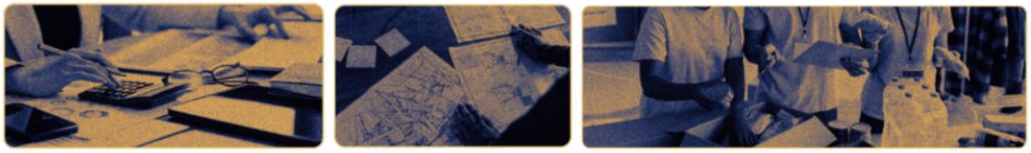

IMPACTO CIENTÍFICO EDITORA

CAUSES AND CONSEQUENCES OF OCCUPATIONAL ACCIDENTS WITH WASTE FROM HEALTH SERVICES AND THE INFLUENCE OF TRAINING TO MITIGATE THE OCCURRENCE OF ACCIDENTS

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ABSTRACT

From the environmental point of view, going beyond the linguistic sign of fauna and flora, the constituent legislator draws attention to the existence of the work environment, which deserves attention and protection, so that the health of the worker is also protected. The cleaning sector of the hospital environment, by its nature, exposes the worker to the risk of occurrences of Occupational Accidents (OA) with aggravating biological risk, since the Waste of Health Services (RSS) may contain the presence of biological agents that, due to their characteristics, can generate a risk of infection, intensified by sharps or scarifying materials, discarded irregularly. This is a qualitative and quantitative research of exploratory-descriptive character. The bibliographic search was carried out in the *Web of Science*, *Scientific Electronic Library Online* (SciELO) and CAPES Periodicals databases, and the field research was carried out in three hospitals of the urgency and emergency network of the municipality of Belém-PA. The objective was to research the causes and consequences of OA with HSW and the influence of training to mitigate the occurrences of the event. With a sample of 133 subjects, reliability was 90% and the margin of error was 2.35%. The results revealed that 26.7% of the interviewees suffered OA with HSW; only 20% of the occurrences were recorded in CAT; 37.1% started working with HSW without previous training on the safe handling of this type of waste; 41.3% received information about the risks, but did not exceed two hours of verbalized guidance. The research concluded that TA with RSS can cause, in addition to the biological risks of infectious diseases, in the victims: fear, panic, anguish, anxiety crisis, depression, hypertension and arrhythmia. That training is the responsibility of the employer and has the potential to reduce the occurrence of accidents.

Keywords: Occupational Accidents. Causes and Consequences. Health Bureau Waste. Capacity building and training.

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INTRODUCTION

Overcoming the view of work as being punishing, degrading and destined for dominated peoples, the contemporary view shows that the fruit of human beings' work guarantees their subsistence and determines their position in society. Through work, natural resources are transformed into something useful of economic value. Work brings personal, family, financial and social development, which impacts local, regional and consequently global development. Work brings dignity to the human person, a sense of well-being and capacity. However, due to the way it is performed, it can expose the worker to risks of Occupational Accidents or Occupational Diseases.

The highest law of the Brazilian State establishes the dignity of the human person as one of its foundations and adopts an anthropocentric view of the natural world, by determining that *everyone has the right to an ecologically balanced environment, essential to a healthy quality of life* (Brasil, 1988), thus understood *as the set of conditions, influences and interactions of a physical order, chemical and biological, which allows, shelters and governs life in all its forms* (Brasil, 1981).

The United Nations-UN, together with the representatives of its Member States, has closely observed this complex relationship between the preservation of the environment in the face of sustainable development, advocating the conscious use of natural resources in order to avoid their scarcity in the medium and long term (Zorzo *et al.*, 2022).

This complex relationship is a global concern embodied through the UN's 2030 Agenda, whose main objective is to combat several global problems, such as the one provided for in the Sustainable Development Goal - SDG 8, target 8.8.1 which deals with the frequency rates of fatal and non-fatal occupational injuries.

Ratifying the anthropocentric view from the environmental point of view, going beyond the linguistic sign of fauna and flora, the constituent legislator draws attention to the existence of the work environment (Brasil, 1988), which deserves attention and protection, so that the health of the worker is also protected. For Marx (1984), work is a process that is established between man and nature.

Among the various establishments that generate Health Services Waste (RSS), the hospital was chosen as the research field. When entering the work environment of those whose activity includes the management of HCW, one finds the workers of the companies that provide cleaning services and those who provide services to the companies that transport the HCW from the hospital to the final destination, both hired for the function of general services.

HSW is part of the urban reality and is a concern present in the 2030 Agenda, SDG 11. Management is regulated in the Resolution of the Collegiate Board - RDC No.

222/2018, edited by ANVISA (Brazil, 2018), considered a norm that contributes to the achievement of goal 11.6, which deals with policies for the collection and treatment of solid waste.

Workers are continuously exposed to suffering OA with RSS, whether due to the potential contamination, improper handling, lack or inappropriate use of Personal Protective Equipment (PPE), lack of information about the dangers of improper handling, among others (Cruz and Dusek, 2024).

Dias (2023) perceives WA with HCW as a worrying situation, which is why he highlights the importance of specific training for these workers as a strategy to prevent such accidents. Ferreira *et al* (2022) perceive continuing education as a practice in which the personal and professional development of workers is fundamental for the improvement of skills, as well as a greater view of the reality in which they are inserted, aiming at the construction of knowledge.

In view of the facts narrated, this study aimed to investigate the causes and consequences of OA with HSW and the influence of training and training to mitigate the occurrence of accidents.

The research field was limited to three public hospitals of the urgency and emergency network of the city of Belém-PA, namely: Hospital do Pronto Socorro Municipal Mário Pinotti - HPSM-MP; Humberto Maradei Pereira Municipal Emergency Room Hospital – HPSM-HMP; and Hospital de Retaguarda Dom Vicente Zico - HRDVZ, all belonging to the City Hall of the city of Belém-PA. The observation of the phenomenon was delimited by the management cycle from collection to collection for transport. The research subjects were workers in the cleaning sector and workers who transport HCW from the hospital to final destination.

To preserve the identity of the companies, they will now be identified as: Cleaning Company, understood as the one contracted for cleaning in hospitals; and Transport Company that is contracted to transport the RSS for final destination.

METHODOLOGY

Started on October 11 and ended on December 20, 2024, the research analyzed the causes and consequences of WA with HSW borne by workers in the cleaning and conservation sector and the influence of training and training to mitigate the occurrences of the accident. The research field was delimited in three hospitals of the urgency and emergency network of the city of Belém-PA, namely: Hospital do Pronto Socorro Municipal Mário Pinotti-HPSM-MP; Humberto Maradei Pereira Municipal Emergency Hospital-HPSM-

HMP; and Dom Vicente Zico Rear Hospital-HRDVZ, all belonging to the City Hall of the city of Belém-PA.

The HPSM-MP has more than 100 years of history as a reference of service and care for all Belenenses, it was inaugurated on August 8, 1921. It currently provides medium and high complexity care, with the capacity to serve more than six thousand people per month, with 190 (one hundred and ninety) beds, of which 24 (twenty-four) classified as complementary - distributed between isolation, adult and pediatric ICU, 28 (twenty-eight) surgical beds, 100 (one hundred) clinical beds and 38 (thirty-eight) pediatric beds. It receives, on average, a demand for non-hospitalization care of 8,373 visits per month, which makes about 272 visits per day. The current human resources structure currently has about 1,556 (one thousand, five hundred and fifty-six) servers/employees distributed in 45 functional categories and effective, temporary, commissioned, provider, assigned and outsourced contracts. In the cleaning and conservation sector, it has 64 outsourced employees of the Cleaning Company.

The HPSM-HMP was reopened on June 29, 2021, it is a medium and high complexity hospital, with 53 (fifty-three) inpatient beds, between clinical and surgical specialties and another 10 (ten) adult ICU beds. With an average of more than 65,000 (sixty-five thousand) annual attendances. The current human resources structure currently has about 667 (six hundred and sixty-seven) civil servants, distributed among the professional categories and with effective and temporary contracts. In the cleaning and conservation sector, it has 48 outsourced employees of the Cleaning Company.

The HRDVZ inaugurated on March 8, 2019, has 54 beds, 7 of which are ICU, an isolation in the ICU, is responsible for supporting the urgent and emergency network in the municipality of Belém, in low and medium complexity procedures, which are entered by the HPSM-MP, HPSM-HMP or the Emergency Care Units-UPA. In the cleaning and conservation sector, it has 26 outsourced employees of the Cleaning Company.

To carry out the research in the chosen locations, authorization issued by the SUS School in the municipality of Belém-PA was required, embodied in the Letter of Consent, dated April 18, 2024. What motivated the choice was the possibility of capturing the phenomenon studied in the environment of its occurrence. As it is a research with human beings, an Ethical Certificate was required, which was issued by the Research Ethics Committee of the Augusto Motta University Center – UNISUAM, dated 10.16.2024, after approval of the research project, according to opinion No. 7,163,790.

In possession of the Ethical Certificate issued by the CEP of UNISUAM and the Letter of Consent issued by the SUS School, the exploratory phase was initiated, through

bibliographic research with searches for scientific articles that dealt with the theme, having as search source *Web of Science*, *Scientific Electronic Library Online (SciELO)* and CAPS journals, as well as field research, with the aim of perceiving some specificities and, based on this, having the possibility of constructing procedures for the investigation and defining the theoretical directions adopted by the research.

In order to understand the meanings and characteristics of the research participants, a qualitative-quantitative methodology of an exploratory-descriptive nature was chosen, systematically collecting, describing and recording data related to the theme chosen as the object of study, ending with an analysis of what was collected from the reality experienced by these workers in the face of the observed phenomenon (Trivinos, 1987). The choice of this methodology is justified by the perception of the need for observation, description and interpretation of the real causes and consequences that give rise to TA with HSW, experienced by those involved in the research.

The observation of the TA phenomenon with HSW was delimited in the cycle of generation and segregation management to the moment of collection for transport to the final destination, within the limits of the research field, namely, hospitals. In the phase of the cycle that comprises collection, separation, packaging, storage, the subjects of this research were the workers of the hospitals mentioned, who are hired as general services by the outsourced company. In the phase of collecting external storage for transportation, the subjects of this research were the workers of another outsourced company hired for this purpose, who are also hired as general services.

The subjects were approached during working hours, at the workplace, and the first contacts began, clarifying the objectives of the research. After the clarifications, authorization was obtained, according to the signing of the Informed Consent Form (ICF) for the interviews to be carried out.

The population consisted of 149 subjects, of which: 134 from the Cleaning Company; and 15 from the Transport Company, which collects the RSS for transport and final disposal. There was no refusal to participate, however, considering workers on vacation or on leave, the sample had 133 participants.

The sample selected the interviewees according to the work team, considering the available information, who came to be considered representative of the population (Marconi, 2002). The research data were collected using a semi-structured questionnaire created in *the gogle forms*, with a face-to-face approach *in loco*. Oliva (2003, p.133) considers that in this way the research goes beyond the usual dimension of static data,

such as: gender, age, neighborhood, education, allows for advancement and capture in the discourse other indicators that portray the phenomenon.

The interview script focuses on the TA itself with HSW and the impacts borne by the victim and their families, in order to obtain the essence of the phenomenon. Topics related to the causes of the accident, the use of PPE, training, the way the accident affected the family, how it interfered in personal and professional life, were part of the interview.

Starting from basic questions, which were constructed as a result of the bibliographic research, we were able to capture in the spontaneity of the discourses information that would not be revealed if the questionnaire were only in the structured form (Trivinos, 1987, p.146). The textual data containing the answers to the open questions preserved the identification of the respondents through numbers and letters that identify the form and not the respondent.

Objective data were collected and organized according to the answers obtained in the questionnaires. Data tabulation, analysis and graphing were performed with the aid of Microsoft Excel software.

Bardin's Content Analysis (2009) was the method chosen to analyze the textual data, as it is a method that seeks a theoretical interpretation of the discourse produced. It was decided to use the thematic and categorical technique because it allows the dismemberment of the text into units, into categories according to analogical groups. For this research, the theme is Occupational Accidents with Health Service Waste and the influence of Training to mitigate the occurrences of accidents. The categories of analysis were: a) Labor market; b) Waste from Health Services; c) Causes and consequences of OA with RSS; d) Capacity building and training. Discussed under the mantle of David Hume's theory of cause and consequence (2009).

In David Hume's theory (2009, p. 42) there is a causal relationship, that is, the relationship between cause and effect. For this theorist, events happen as a consequence of an antecedent and, therefore, nothing happens by chance. According to this theory, a cause generates an effect and this will become the cause of a next effect, forming a chain of cause and effect until the final event materializes.

The data collection phase was completed and the latent situations of OA with HSW were identified. Based on scientific knowledge, two technical products were proposed to improve the living conditions of these workers. The first is a Proposal for a Municipal Bill that obliges companies providing cleaning and conservation services that participate in the management of the RSS to offer a training and accident prevention course for their

employees, already in progress in the City Council of the municipality of Belém-PA. The second is the teaching plan of the aforementioned course, to give effectiveness to the Law.

RESULTS

The population was mostly made up of workers from the three hospitals that formed the research field, namely: 134 workers hired as general services by the Cleaning Company, who carry out their work from the moment of generation and segregation to storage in the external shelter to wait for transport; 15 workers hired as general services by Empresa Transporte, identified in the two daily moments in which the RSS are collected from the hospital's external storage and transported to final destination, at 10 am and 5 pm, totaling 149 subjects.

The approach was carried out at the beginning of the shift of each team, those who work at the hospital. In the case of the workers of the Transport Company, the approach took place during the moment of the collection of the RSS. All were informed about the objectives of the study, and the Consent Form was signed, and we requested cell phone contact to send the questionnaire prepared by the researcher, made available via *Google Forms*.

Of the 149 questionnaires sent, 133 were returned, of which: 118 were from the hospital workers responsible for the cycle: generation, segregation, packaging, identification, collection, storage; 15 of the company's workers who collect the HSW from the hospital and transport it to the final destination. Using the *Solvis calculator* , the calculations show that, for a population of 149, a sample of 133, the reliability is 90% and the margin of error is 2.35%.

The sample surveyed showed that 21.9% were hired during the pandemic period and ended up being hired. Of the total studied: 26.7% suffered OA with RSS; only 20% of the occurrences were recorded in CAT; 20.4% contracted COVID-19; 97.1% believe that the training course offered by the company when the employee is hired and periodic training would contribute to reduce the occurrence of OA; 37.1% said they started working with HSW without previous training on safe handling; 41.3% said they received information about it, but did not exceed two hours of verbalized guidance.

The field research through the instrument used, made it possible to approach the phenomenon. The set of information extracted and that make up the topic of discussion is presented in the following categories: a) Labor market, b) Waste from Health Services, c) Causes and consequences of Occupational Accidents with HSW, d) Qualification and

training. Its purpose is to identify and systematize the evidence of the information for inferences and interpretations.

DISCUSSION

Along with the progress resulting from the growth and development of cities, problems arise that need to be addressed, among which is the growing generation of solid waste of various classifications, produced by the various forms of economic activities, which this research has delimited in the RSS. The management of solid waste is also an economic activity, carried out by companies that participate in the management procedure that comprises: generation, segregation, packaging, identification, collection, storage, transportation, treatment and final disposal. Zorzo *et al.* (2022) clearly characterizes the just cause for concern, which in constitutional terms seeks to preserve the ecologically balanced environment for present and future generations.

LABOR MARKET

HCW producers recognized by RDC No. 222/2018 develop economic activities, and thus participate in the labor market. Considering that the field researched was the hospital sector, we can observe, through the lens of the Brazilian Federation of Hospitals and the National Health Confederation, that Brazil has 7,191 hospitals, totaling 4,466 private hospitals and 2,725 public hospitals (FBH, 2022). Records show that there was an increase in the number of private hospitals in 2021 and 2022, possibly related to the fight against the pandemic of the new coronavirus. In the same period, without considering the field hospitals, which were later dismantled, public hospitals recorded an increase of 645. The State of Pará has 118 hospitals, including public and private (FBH, 2022).

This panorama leads to the understanding that the labor market in the health sector absorbs an important portion of workers, directly or indirectly, including the subjects of this research, workers hired as general services, both by the companies that provide cleaning and conservation services in hospitals, and by the companies that collect, transport, treat and dispose of HCW.

Research carried out by Messing (1998); Vance *et al.* (2022) and Hacker *et al.* (2022) show the existence of a disparity between the importance, recognition, and dignity conferred on these workers. It is as if they were invisible, however, although they are not recognized as part of the health team, the work they do adds to the systematic control of hospital infection, communicable diseases, safety and hospital well-being of the patient.

In the sample surveyed, we can observe the prevalence of workers aged between 41 and 54 years, corresponding to 55.8%. Women represent 61%, and of these 52% are heads of household. When we look at the length of service, we realize that 58.3% have been working for more than five years, a fact that demonstrates a certain stability. Still in terms of age, it can be seen that 2.9% of the interviewees are over 65 years old, female, who, despite having the right to retirement, continue to work to help their children and grandchildren.

Another fact revealed by the survey concerns schooling, no illiterate people were found, everyone knows how to read and write, 51.5% are among those who have elementary school and those who have not completed high school. This information demonstrates that a relevant part of the sample of working age has low qualification. A fact that, interpreted by the theory of David Hume (2009, p. 42), results in difficulties in entering the labor market in occupations that require greater qualification.

It is observed that 35.2% have completed high school; 4.8% are doing an undergraduate degree; 11.5% have a higher education degree, of which 6.7 have a lato sensu specialization. These data reveal that the population with higher education is growing. However, Vieira (2022) observes the existence of a contingent of workers with higher education who are unemployed or who are performing functions that require a lower level of qualification. A fact that leads Ribeiro (2021) to conclude that obtaining an undergraduate degree, by itself, does not guarantee a rapid transition from studies to the job market. This finding, interpreted by the theory of David Hume (2009, p. 42), suggests that it is a consequence of structural unemployment.

It is noteworthy that these workers are hired as general services, a position that denotes a broad function. The research showed that the work is not limited to sweeping, cleaning and collecting the RSS. Hospital cleaning is more complex, involves handling potentially infectious material, a true process of removing dirt from environmental surfaces, materials and equipment with the objective of preventing and systematically controlling hospital infection and communicable diseases. The contaminating potential of HCW and the uniqueness of the work developed by these workers in the hospital environment cannot be denied.

WASTE FROM HEALTH SERVICES - RSS

The transformation of natural resources into goods of economic value, the growth and development of cities, the generation of urban solid waste to the final destination with the respective consequences for the air, water, soil and life, in a context of sustainable

development, is a global concern embodied in the UN 2030 Agenda, especially SDG 16 that envisions sustainable cities, which in target 11.6 shows its concern with the reduction and management of urban solid waste.

The National Solid Waste Policy is established in Law No. 12,305/2010, adopts a systemic view in the management of solid waste, considering the environmental, social, cultural, economic, technological and public health variables, without losing sight of sustainable development. This standard classifies solid waste according to origin, complexity and hazardousness, among which are RSS (Brasil, 2010).

HCW are generated by establishments whose activity is related to human or animal health care. Studies show that HSW exposes workers to more than 60 different species of microorganisms, with HIV and hepatitis B and C viruses being considered infectious agents of greater epidemiological relevance (NR 32, 2005; Da Silva *et al,* 2020*;* Bertelli *et al*, 2020 and 2023; Frison *et al,* 2024). Motivated by the contaminating potential, they received special attention from the legislator (Brasil, 2018).

According to the risk to which RSS are associated, they are divided into 05 groups: 1- Group A: residues with the possible presence of biological agents that, due to their characteristics, may present a risk of infection; 2- Group B: waste containing chemical substances that may present a risk to public health or the environment; 3- Group C: waste contaminated with radionuclides, from clinical analysis laboratories, nuclear medicine and radiotherapy services; 4- Group D: waste that does not present a biological, chemical or radiological risk to health or the environment, and may be equated to household waste; 5- Group E: sharps or scarifying materials, such as needles and glass slides, contaminated or not (Brasil, 2018).

From the set that forms the normative framework that deals with HCW, the following stand out: a) the Resolution of the Collegiate Board - RDC No. 222/2018, issued by ANVISA, which regulates good practices for the management of HCW (Brasil, 2018); b) CONAMA Resolution No. 05/93, which provides for the disposal of solid waste from health services and defines the responsibility of the generator from generation to final disposal (Brasil, 1993); c) RDC No. 33/2003, which provides for the technical regulation for waste management (Anvisa, 2003); d) NBR 12.807/93, which defines infectious waste as that generated in health services that, due to its characteristics of greater virulence, infectivity and concentration of pathogens, presents an additional potential risk to public health (ABNT, 1993a); e) NBR 12.808/93, which classifies waste from health services according to its nature and risks to the environment and public health (ABNT, 1993b); f) NBR 12.809/93, which establishes the procedures necessary for the intra-establishment management of

HSW (ABNT, 1993c); g) NBR 12.810/93, which establishes procedures required for the internal and external collection of HSW, under conditions of hygiene and safety (ABNT, 1993d); h) NBR 13.853/97, which establishes the characteristics of collectors intended for the disposal of RSS from piercing or cutting materials, type A.4 (ABNT, 1997); i) NR 32, which establishes guidelines and measures to protect the health and safety of workers, published by MTE Ordinance No. 485, of November 11, 2005.

It is important to remember that this research has as its field the hospital sector, however, home care services; analytical laboratories of health products; morgues, funeral homes and services where embalming activities are carried out (thanatopraxia and somatoconservation); forensic medicine services; drugstores and pharmacies, including compounding pharmacies; teaching and research establishments in the health area; zoonoses control centers; distributors of products pharmacists, importers, distributors of materials and controls for *in vitro* diagnosis; mobile health care units; acupuncture services; *piercing* and tattoo services, beauty and aesthetic salons, among other related areas, are also classified as generators of HSW (Brasil, 2010).

Hospital admissions and the length of stay of the patient impact the generation of HSW, a situation aggravated by the growth of care during the COVID-19 pandemic that generated tens of thousands of extra tons of HSW putting pressure on health waste management systems around the world, threatening human and environmental health (WHO, 2022).

Studies have shown a natural increase in HCW, aggravated in the context of COVID-19 due to the face masks used as one of the strategies to reduce community transmission of the disease, which, when discarded, can be classified as belonging to Group A - waste with the possible presence of biological agents that, due to their characteristics, may present a risk of infection (Brazil, 2018; Eikenberry *et al.* (2020); Naughton (2020); Sangkham (2020) and Hantoko *et al.* (2021).

In this context, it can be seen that in the same proportion as the increases in cases, more countries recommended the use of face masks when going out in public places (Sangkham, 2020), which due to the high demand and urgency of use, emerged in various forms: homemade or commercial, fabric, cotton or other materials (Naughton, 2020).

By estimates, in Europe alone, 891,476,038 face masks were used daily, with the total discarded per day reaching 2,674 tons and 70,338 tons of RSS were generated per day (Hantoko *et al,* 2021). It cannot be denied that during the pandemic period, products for hospital use, such as: masks, alcohol, gloves, aprons, among other supplies, also passed for domestic use, being discarded irregularly and without treatment.

In Brazil alone, in 2022, more than 307 thousand tons of RSS were generated, with the southeast region accounting for 66% of this total and the northern region 3.8% (ABREMA, 2023). The pandemic period generated the need to understand and review the classification and disposal process, and thus improve waste management practices (PIRES, *et al.,* 2024). The understanding and comprehension of work procedures and processes is done through training and training.

Observing the data from the field research and considering the increase in the generation of HCW, it can be seen that 21.9% of the subjects surveyed were hired during the pandemic period and ended up being hired. Therefore, these data lead to the perception that the consequence of the pandemic restricted the labor market in some sectors of the economy, in others it created new jobs or source of income, such as: the manufacture and sale of fabric face masks.

The sources researched support studies that lead to the understanding that the labor market in the health sector absorbs an important portion of workers, directly or indirectly. However, HCW, due to their own characteristics and phases of management, expose workers to potential OA risks estimated to be 1.5 times higher when compared to workers in other sectors (Gomes *et al*, 2019).

CAUSES AND CONSEQUENCES OF WA WITH RSS

The legal concept of TA makes it clear that the event can be the cause of bodily injury or functional disturbance that results in the loss or reduction, permanent or temporary, of the ability to work, in more serious cases, the death of the victim. Even if the worker is not a victim of an unexpected and unwanted event that causes bodily injury, he or she may be affected by an occupational disease, which the legislator equates to OA (Brasil, 1991).

Occupational disease can be classified in two ways: I- occupational disease, when it is produced or triggered by the exercise of work peculiar to a certain activity, for example: herniated discs, which can be caused by work activities that require frequent and excessive lifting and carrying of weight; II- occupational disease, when caused by specific conditions of the work environment or is related to it, for example: Burnout Syndrome, caused by chronic stress at work (Brasil, 1991).

Following the anthropocentric view of the natural world, adopted by the constituent legislator, the National Solid Waste Policy has scientific research among its instruments (Brasil, 2010). Due to this desideratum, researchers from various areas of knowledge study the work environment, waste management in the various classifications, its particularities and exposure to WA risks.

Turning the lens to the TA theme with RSS, a multiplicity of studies can be perceived, however, few are those that have among the study subjects the cleaning assistants of the hospital sector. It is as if these workers were invisible and their work had less importance in the promotion and recovery of patients' health. However, the COVID-19 pandemic period exalted the importance of the work carried out by them, as hygiene and cleanliness of the environment are part of the process of prevention, recovery and systematic control of hospital infection and communicable diseases.

The worker in the cleaning sector of the hospital environment, due to the nature of the activity he performs, is exposed to OA with aggravating biological risk, as HCW may contain the presence of biological agents that, due to their characteristics, can generate a risk of infection, intensified by sharp or scarifying materials, such as needles and glass slides, contaminated or not, discarded irregularly (Brasil, 2018). For Ferreira; Bianco and Santos (2022) the cleaning and sanitizing team is one of the main categories subject to exposure to biological material.

The concern with the risks of TA with HSW is embodied in the various standards mentioned, which govern good practices in the management of HCW. These norms seek to ensure the physical and mental safety of people in the exercise of work and recognize the existence of the work environment (Amado, 2016).

This study with a sample of 133 subjects showed a rate of 26.7% of occurrence of OA with HSW, of which 2.9% of the victims suffered accidents more than once and 12.4% had to be absent from work as a result of the accident. Among the victims, only one works in the phase of collecting the RSS from the hospital and transporting it to final destination. It is observed that 59% of the interviewees believe that the PPE used is sufficient to avoid OA, however, contrary to the perception, 91% of the victims with piercing and cutting answered that they used PPE.

> *"... in the second accident you no longer have good mental health, fear reigns to perform the service safely..."*11JSG.
>
> *"... first I pierced myself and didn't get a certificate... I know I caught COVID working, so I got a certificate... I experienced discomfort and anxiety in the workplace..."*44MSS.

The survey revealed that of the 26.7% victimized, only 20% filled out the Work Accident Report – CAT; the 6.7% who did not take the CAT justified themselves with the argument that they were initially unaware that such occurrences could be characterized as TA. For example: in one of the reports, the worker, while carrying a bag full of waste and liquids, which was punctured, soaked his clothes with the slurry, causing contact of the

liquid with his skin that had a small lesion, for him this would not be TA; others reported small scratches and skewers that didn't even bleed, which is why they thought it wasn't AT.

Recent research on HSA with RSS, which considered only occurrences with piercing and cutting materials, revealed rates of: 13.57%, in a sample of 199 subjects (Gomes *et al*, 2019); 5.8%, in a sample of 104 subjects (Aguiar *et al*, 2023). In a scenario that considers COVID-19 as an occupational disease and consequently equated to TA, of the 133 subjects in this research, 20.4% contracted COVID-19. The research carried out by Coelho *et al* (2022), in a sample of 1,354 subjects, the percentage was 23.8%.

Participants were asked to list what they perceived as the cause of OA with RSS. The answers that were most repeated: 69% lack of training, 5% inadequate PPE, 5% work overload, 2% lack of signage, 13% inadequate disposal; 6% do not know or did not want to answer. However, the reality revealed by the research pointed to: a) glass, blades and needles discarded without respecting the selectivity and classification of waste; b) liquid in the sharps collector; c) sharps collector with RSS above the established level. Piercing and cutting objects dominated the records, many of the victims cut or pierced their hands.

> *"... It's even annoying, people throw masks, hats, gloves, even syringes with needles in the common garbage..."* 129EAGS.
>
> *"There was a syringe with a needle in the garbage bag at the hospital, when I was transporting it from the container to the storage room it touched my leg and pierced me..."* 78HJFA.
>
> *"The dispatch was very full and there was a needle where I ended up piercing myself..."* 93CFCM.
>
> *"There was water in the discard, I think it was water..."* 42RGFO.

In Cruz's lessons (2018, p. 16 and 17), as a rule, every word refers to a linguistic sign, which is the union of a concept with an acoustic image that represents it, in other words it would be the meaning and signifier of the word. The linguistic sign "work accident" forms a mental image of injury, fracture, blood, because these are the reference elements that represent the sign (Cross; Dusek, 2024). This mental image, as a rule, does not represent the TA with RSS, for 15.2% of the interviewees it was presented in the form of: a simple scratch; the leachate that passed through the pierced glove and wet the finger that was injured when removing the cuticle; A hole that you want to have bled out. Something seemingly simple, however, the invisible consequences can affect the victim, the family, society and the economy.

The survey showed that 8.6% of the victims endured consequences that are often invisible, which presented themselves in the form of: fear, panic, anguish, anxiety crisis, depression, hypertension, arrhythmia. Symptoms that cannot be overlooked affect both the

victim's personal and family and professional life, which if not treated properly can result in mental illness (Bertelli *et al,* 2020).

> *"... It was horrible, all the workers who suffer this type of accident are psychologically shaken at the time of the accident, very afraid..."* 16KPM.
>
> *"... Due to the accident with piercing and cutting material, my emotional health was very affected, as I had to be accompanied by an infectious disease specialist, psychologist..."* 133MSM.
>
> *"... I was depressed for a long time, panic syndrome, hypertension, cardiac arrhythmia, anxiety crisis became constant... the psychological illness may have caused my divorce... my husband left, I think I was a wreck..."*44MSS.
>
> *"... In addition to working hours, I needed to have time to be accompanied by a psychologist and other professionals, completely changing my routine... I was very insecure in my personal relationship with my wife, after the accident, psychologically shaken, uncomfortable in the family environment..."*17FLP.
>
> *"... at the time I faced the lack of support in my workplace, lack of support in prophylaxis, in the face of the contamination suffered..."*54BMS.
>
> *"... I had to take tests for HIV and Hepatitis several times, I couldn't work, I kept thinking about the result, I didn't sleep well, I still had nausea and pain in my stomach because of the strong medicines I had to take since the moment of the accident...*13MGP.

The reality of the research revealed that TA with RSS can, in addition to the biological risks of infectious diseases, trigger mental illness. The studies by Bertelli *et al* (2020) point out that victims face psychological suffering, with emotional changes resulting from concern about possible seroconversion and contamination of their family members.

Mental problems are not only present, but are responsible for a decrease in life expectancy. The Pan American Health Organization estimates between 10 and 20 years less life expectancy, when mental problems present themselves and are not properly treated. The WHO has established that mental health is not only a matter of individual health, but is also a matter of economic development (WHO, 2022).

In the letters of the Law that provides for Social Security Benefit Plans, Law No. 8,213/91, the legislator's concern with the protection of workers who are victims of OA is embodied, which is why it included three theories, namely: 1 - theory of social risk, 2 - theory of administrative responsibility; 3- Theory of Remaining Civil Liability.

Law No. 8,212/91 establishes that social security will be financed by the whole society, directly and indirectly (Brasil, 1991). *In verbis:*

> Article 10. Social Security will be financed by the whole society, directly and indirectly, under the terms of article 195 of the Federal Constitution and this Law, through resources from the Union, the States, the Federal District, the Municipalities and social contributions.

Law No. 8,213/91 adopted the theory of social risk, through which the whole society assumes the joint commitment to, through the social security system, provide assistance to injured workers, as long as they are taxpayers. In the same vein is the theory of administrative responsibility, because in addition to the social risk assumed by the social security system of paying the benefits to which the injured taxpayer is entitled, employers have obligations to: maintain hygiene and safety at work, b) respect stability, maintaining the employment of the injured parties for the minimum period of time determined by law; c) to maintain or employ a certain number of disabled employees, starting from a certain number, thus assuming an indirect cost in accidents (Brasil, 1991). *In verbis:*

> Article 118. The insured who suffered an accident at work is guaranteed, for a minimum period of twelve months, the maintenance of his employment contract in the company, after the cessation of the accident sickness benefit, regardless of the perception of accident benefit.
>
> Article 93. The company with 100 (one hundred) or more employees is obliged to fill from 2% (two percent) to 5% (five percent) of its positions with rehabilitated beneficiaries or people with disabilities, qualified...

|Added to the first two theories mentioned, we find in the letters of the Federal Constitution the theory of remaining civil liability, which establishes obligations for employers, who must, due to the risk of the activity: a) maintain contracting with an insurance company; b) when intent or fault is proven by the TA, indemnify the victim. *In verbis:*

> Article 7, XXVIII - insurance against work accidents, at the expense of the employer, without excluding the indemnity to which the employer is obliged, when he incurs in intent or fault;

The analysis of the sample of data collected for this research suggests the understanding, in theory, that TA with HSW occurred due to the fault of another professional who disposed of it irregularly, stamped on the phrases: *"... It's amazing how they don't care which trash can to put the garbage in, you find masks, caps, remnants of bandages discarded in the common garbage...* 93CFCM. *"... The discard full of cotton and paper towels, when there should only be sharps...* 61TJS*". " ... we need training to know how to deal with risks, they need training not to put us at risk..."*52MBM.

In view of the above, the need for training and qualification on HSW for the entire team of workers in the hospital sector is evidenced, in such a way that good practices are a reality in the work environment and reduce the rates of WA with HSW.

QUALIFICATION AND TRAINING

The qualifications and training for workers in the hospital cleaning sector are recommended in the National Solid Waste Policy (Brasil, 2010); in the Good Practices for the Management of Waste from Health Services (Brasil, 2018) and in the Basic Guidelines for the implementation of measures to protect the safety and health of workers, contained in NR 32. Without leaving any doubts, these standards establish the importance of the training of the human resources involved, having among their objectives the reduction of risks, establishing that it is the employer's responsibility to train the employee before the start of activities and maintain a continuous training plan.

In the world of hypotheses, the legislation brings up the idea that through training and training, the worker can have a greater vision of the reality in which he is inserted, the risks and the proper and safe handling of waste. The construction of knowledge constitutes a protection against the risks of the activity.

However, the survey revealed that what is established in the standards is not being embodied in practice: 66.7% of the participants said that they do not undergo training or qualification on HSR by the company periodically; 41.3% said they received information about it, but did not exceed two hours of verbal guidance; 37.1% said they started working with HSW without previous training on safe handling.

It is important to mention that because they are outsourced workers, the companies that win the bidding process and sign administrative contracts with the municipality hire some workers from the previous outsourced companies, who have finalized the contract with the city hall, which is why some workers have more than five years of service.

> *"there was only one course, held by the first company I worked for, in the current company I never had a course or training"*27JMC

For 97.1% of the interviewees, the training offered by the company, at the time the employee is hired, and periodic training would contribute to reduce the occurrences of OA; 15.2% of the victims who participated in the survey believe that the lack of an adequate training course contributed to the occurrence of TA.

Coelho *et al* (2022) consider that the provision of training is a way to protect the worker. This understanding is shared by Ferreira; Bianco and Santos (2022) who defend investments by institutions in training and continuing education programs to raise collective awareness among professionals in this category, but there should also be inspection. Cruz and Dusek (2024) believe that training is an effective tool, as they realize that most OA with HSW are preventable, and the knowledge learned based on critical thinking and questioning of processes will result in the prevention and reduction of harmful events.

The evidence suggests that the lack of knowledge and lack of adequate information about hazardousness and risk control are central factors for errors in the handling of HCW, resulting in OA, and even more serious, the lack of communication of the event because it is thought that the event does not constitute a TA.

FINAL CONSIDERATIONS

Based on the results obtained in this research, considering the sample of 133 subjects from a population of 149, the calculations performed with the Solvis *calculator* that point to a margin of error of 2.35% and a reliability of 90%, the scenario presented by the study is considered reliable and representative in analogous situations.

The literature search revealed that OA with exposure to biological material is a worrying reality in health institutions. There is a multiplicity of studies on the subject, however, few have had workers in the hospital cleaning sector as subjects (Messing, 1998; Vance *et al,* 2022; Hacker *et al,* 2022), it is as if such subjects were invisible. However, the activity they develop is not limited to sweeping, cleaning and collecting solid waste.

When comparing the work performed by an employee hired as general services to clean any other establishment that is not an HSW generator, with the work performed by the one hired to work in the hospital cleaning sector, it is perceived that the cleaning of the hospital environment is more complex, involving handling of potentially infectious material. It is a true process of removing dirt from environmental surfaces, materials and equipment with the objective of preventing and systematically controlling hospital infection and communicable diseases. That is why it is believed that in the near future the legislator will recognize workers in the hospital cleaning sector as health professionals.

The research showed that the job market for workers in the cleaning sector of RSS generators is not limited to the 7,191 hospitals spread across Brazil, it reaches all establishments whose activity is related to human or animal health care (FBH, 2022 and Brasil, 2018). This constantly expanding market absorbs an important portion of workers, directly or indirectly. However, HCW, due to their own characteristics and phases of management, expose workers to potential OA risks estimated to be 1.5 times higher when compared to workers in other sectors (Gomes *et al*, 2019).

The concern with the risks of WA with HSW is embodied in several norms that govern good practices for HSW management. These standards seek to ensure the physical and mental safety of people in the exercise of work and recognize the existence of the work environment and advocate the importance of training and training workers as being the

responsibility of the employer (Brasil, 2018; Brazil, 1993; Anvisa, 2003; ABNT, 1993a; ABNT, 1993b; ABNT, 1993c; ABNT, 1993d; ABNT, 1997; NR 32 2005; Amado, 2016).

The field research revealed that the respondents attribute the following as causes of OA: lack of training, inadequate PPE, work overload, lack of signage and inadequate disposal. Of the 26.7% victimized, 2.9% suffered accidents more than once, caused by: glass, blades and needles discarded without respecting the selectivity and classification of waste; liquid in the sharps collector; sharps collector with RSS above the established level. Only 20% of the occurrences were recorded in CAT, a fact that leads to the understanding of the existence of underreporting.

The acoustic image formed by the word work accident that refers to a mental image of injury, fracture, blood... is not the same when TA happens with RSS. This event can present itself in the form of: a simple scratch; leachate in contact with a small existing wound; A hole that you want to have bled out. However, the biological risks of infectious diseases create psychological suffering in the victims, with emotional changes that are invisible and present themselves in the form of: fear, panic, anguish, anxiety crisis, depression, hypertension, arrhythmia. Which, if not treated properly, can trigger mental illness.

The survey revealed that what is established in the standards regarding training and training as the responsibility of the employer is not being embodied in practice: 66.7% of respondents do not undergo training or training on HSW by the company periodically; 41.3% said they received information about it, but did not exceed two hours of verbal guidance; 37.1% said they started working with HSW without previous training on safe handling.

It is true that the law does not establish a minimum time, manner or frequency for holding training events. The data suggest that the employer hides in the flaws of the law to fail to comply with this obligation. The lack of adequate information and the lack of awareness about proper disposal motivate underreporting and expose workers to avoidable risks. The lack of knowledge can cause accidents, serious or not, but accidents that generate suffering that is often invisible.

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