

# OCCUPATIONAL HAZARDS INVOLVED IN THE WORK PROCESS OF STREET SWEEPERS

*RISCOS OCUPACIONAIS ENVOLVIDOS NO PROCESSO DE TRABALHO DOS  
GARIS*

*RIESGOS LABORALES QUE INTERVIENEN EN EL PROCESO DE TRABAJO DE  
LOS BARRENDEROS*

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## ABSTRACT

The objective of this study was to analyze the scientific productions on the occupational hazards involved in the work process of street sweepers. This is an Integrative Literature Review, carried out from January to February 2024, in MEDLINE, LILACS, BDNF – Nursing, SciELO and Google Scholar. It was found in the studies that street sweepers are exposed to all occupational risks (biological, physical, chemical, accident and ergonomic). Such risks are mainly due to bad weather, chemicals thrown in the garbage, dust, bacteria, viruses, venomous animals, heavy lifting, physical exertion, incorrect postures, muscle fatigue, accidents with sharps, aggression, being run over, improper work tools, among others. It was also evidenced that street sweepers are exposed to such risks because they do not use personal protective equipment. Therefore, the presence of risks and insalubrity has consequences for the health of street sweepers, requiring interventions with the promotion of public policies to resolve the critical situation experienced.

**Keywords:** *Street Sweeper; Occupational Hazards; Health; Work.*

## RESUMO

Objetivou-se analisar as produções científicas sobre os riscos ocupacionais envolvidos no processo de trabalho dos garis. Trata-se de uma Revisão Integrativa da Literatura, realizada de janeiro a fevereiro de 2024, na MEDLINE, LILACS, BDNF – Enfermagem, SciELO e Google Acadêmico. Constatou-se nos estudos que os garis estão expostos a todos os riscos ocupacionais (biológicos, físicos, químicos, acidente e ergonômico). Tais riscos são decorrentes, sobretudo, das intempéries climáticas, dos produtos químicos jogados no lixo, poeiras, bactérias, vírus, animais peçonhentos, levantamento de peso, esforço físico, posturas incorretas, fadiga muscular, acidentes com materiais perfurocortantes, agressão, atropelamento, instrumentos de trabalho impróprio, entre outros. Ainda, evidenciou-se que os garis estão expostos a tais riscos por não utilizarem os equipamentos de proteção individual. Portanto, a presença de riscos e insalubridade traz consequências à saúde dos garis, necessitando de intervenções com fomento de políticas públicas para dirimir o quadro crítico vivenciado.

**Descritores:** *Gari; Riscos Ocupacionais; Saúde; Trabalho.*

## RESUMEN

El objetivo de este estudio fue analizar las producciones científicas sobre los riesgos laborales involucrados en el proceso de trabajo de los barrenderos. Se trata de una Revisión Integrativa de la Literatura, realizada de enero a febrero de 2024, en MEDLINE, LILACS, BDNF – Enfermería, SciELO y Google Scholar. En los estudios se encontró que los barrenderos están expuestos a todos los riesgos laborales (biológicos, físicos, químicos, accidentales y ergonómicos). Dichos riesgos se deben principalmente al mal tiempo, a los productos químicos tirados a la basura, al polvo, a las bacterias, a los virus, a los animales venenosos, al levantamiento de objetos pesados, al esfuerzo físico, a las posturas incorrectas, a la fatiga muscular, a los accidentes con objetos punzocortantes, a las agresiones, a los atropellos, a las herramientas de trabajo inadecuadas, entre otros. También se evidenció que los barrenderos están expuestos a tales riesgos porque no utilizan equipos de protección personal. Por lo tanto, la presencia de riesgos e insalubridad tiene consecuencias para la salud de los barrenderos, requiriendo intervenciones con la promoción de políticas públicas para resolver la situación crítica vivida.

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**Descriptores:** *Barrendero; Riesgos Laborales; Salud; Trabajo.*

## INTRODUCTION

The street sweeper is considered a cleaning professional who works exclusively with garbage, ensuring the cleanliness of the public road. This category can be divided by position/function, in which sweeping and collection sweepers stand out. During their working hours, they perform services that involve, from sweeping, scraping and collecting garbage on public roads, to loading and unloading garbage trucks, collecting garbage from public places, cleaning and collecting the company's facilities, among other activities related to the maintenance of urban cleanliness<sup>1</sup>.

However, these professionals have an arduous working day and are exposed to occupational risks due to the great exposure to toxic waste, sharps materials and objects, contaminated garbage, among others, in addition to the psychic overload that can be developed during their work process. It is also noteworthy that it is a devalued profession, highlighting the low remuneration, the lack and/or non-use of Personal Protective Equipment (PPE) and the absence of training and qualifications. It is important to emphasize that these factors predispose street sweepers to the risk of physical and mental illness and to the occurrence of accidents<sup>2</sup>.

Lucena and Bakke<sup>3</sup> readily describe that the occupational hazards to which street sweepers are exposed can be classified as: Biological Hazards, Physical Hazards, Chemical Hazards, Accident Hazards, and Ergonomic Hazards. In view of these risks, Regulatory Standard No. 15 (NR-15), originally issued by Ordinance No. 3,214 of the Ministry of Labor (MT), of June 8, 1978, updated by Ordinance No. 426, of October 7, 2021, which establishes the "Unhealthy Activities and Operations", points out that the work of street sweepers is considered unhealthy to the maximum degree, that is, it is a high-risk job<sup>4</sup>.

Thus, because of the occupational risks associated with the work process of street sweepers, safety at work becomes essential to reduce illness and possible accidents to which these professionals are exposed. Therefore, knowledge of such risks is essential for the success of the actions to be developed, thus aiming at the prevention and control of work-related accidents and pathologies<sup>3</sup>.

Therefore, the adoption of preventive measures and actions is essential for workers' health. Thus, in the case of street sweepers, the use of PPE should be mandatory according to Regulatory Standard 6 (NR-6)<sup>5</sup>. It is noteworthy that the mandatory use of PPE reflects greater safety in the face of the activities that expose these professionals, and with this, the risk of accidents and illness decreases.

In view of the above, this study aimed to analyze the scientific productions on the occupational risks involved in the work process of street sweepers.

## METHODS

This is an exploratory, descriptive study, with a qualitative approach of the Integrative Literature Review (RIL) type, excerpted from the monograph entitled: "INVISIBLE WORKERS": Analysis of the work process of street sweepers and its implications on health conditions.

Unlike other types of reviews, RIL follows a pre-established protocol, which must follow six distinct steps. Therefore, the present study followed the following steps: I) Identification of the theme and selection of the research question; II) Establishment of inclusion and exclusion criteria; III) Identification of pre-selected and selected studies; IV) Categorization of the selected studies; V) Analysis and interpretation of the results; and VI) Presentation of the review/synthesis of knowledge<sup>6</sup>.

Promptly, the guiding question of this research was: What do the scientific productions present about the occupational risks involved in the work process of street sweepers? Therefore, the PVO (Population, Variables and Outcomes) strategy was used to elaborate the question, described in detail in Chart 1.

**Table 1 - PVO strategy for the formulation of the guiding question.**

STEPS	DESCRIPTION	DeCS
P – Population	Sweepers	Street sweeper
V – Variable	Working Process	Work
O – Outcome	Occupational risks to which street sweepers are exposed in their work process	Health

**Source:** survey data.

As inclusion criteria, articles published in full, in Portuguese, available electronically and in the format of scientific articles were established. The exclusion criteria were: duplicate or repeated articles and those that did not meet the eligibility criteria and/or did not answer the guiding question.

It is important to highlight that, in the present study, a period for the year of publication of the studies was not taken into account among the inclusion and exclusion criteria, due to the lack of publications on the researched theme.

The identification of the pre-selected and selected studies took place in the period from January to February 2024, through the MEDLINE, LILACS, BDENF – Enfermagem databases, both accessed through the Virtual Health Library (VHL) portal, the Scientific Electronic Library Online (SciELO) repository and Google Scholar. To assist in the search, the Health Sciences Descriptors (DeCS) were used: "Gari", "Saúde" and "Trabalho", associated through the *Boolean operator* AND.

In the stage of identification of the studies, a total of 66 articles were first identified. Of this total, after applying the filters, 12 articles were excluded, leaving 54 for the reading of titles, objectives and methodological design. Subsequently, 46 more were excluded, as they were duplicated/repeated and did not meet the readability criteria, leaving 08 articles to compose the results and discussions of this integrative review (Chart 2).

**Table 2 - Number of studies identified in databases and repositories.**

DATABASE/ REPOSITORIES	TOTAL NUMBER OF STUDIES IDENTIFIED	TOTAL NUMBER OF STUDIES IDENTIFIED AFTER APPLICATION OF FILTERS*	STUDIES EXCLUDED BECAUSE THEY WERE DUPLICATES OR DID NOT MEET THE ELIGIBILITY CRITERIA	SELECTED STUDIES
MEDLINE	1	1	0	1
LILACS	49	37	34	3
BDENF – Nursing	9	9	8	1
SciELO	7	7	4	3

<b>Total</b>	<b>66</b>	<b>54</b>	<b>46</b>	<b>8</b>
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Source: Authors (2024); survey data.

\* FILTERS: 1 - Full texts; 2 - Language - Portuguese; 3 - Type of documents (Articles).

Soon, due to the scarcity of studies in the databases and in SciELO, a search was also carried out on the Google Scholar portal. For this search, the same DeCS were also used with the help of the *Boolean* operator AND. Thus, in the first search, a total of 4,490 articles were found. Subsequently, the following filters were applied: publication period (open), language (Portuguese), type of document (article), and were also ordered by relevance. After applying the filters, 150 articles were excluded, leaving 4,340 articles. Then, in view of the large number of articles, the titles, objectives and abstracts of 76 articles that were selected by the Google Scholar portal as the most relevant were read, and the first pages of the portal were visited, and another 4,264 articles were excluded. Of the 76 articles analyzed, 69 more were excluded because they did not answer the guiding question, leaving 07 articles to compose the study sample.

For data collection and categorization of the selected studies, a form was developed, adapted from the data collection instrument model validated by Ursi<sup>7</sup>, to better organize and categorize the data collected. After selecting the articles, the following information was extracted: year of publication, authors, title of the articles, objectives, main results, database and/or repository from which the studies were taken.

After mapping and organizing the information extracted from the articles, the results were analyzed and interpreted. For this, the content analysis technique proposed by Bardin<sup>8</sup> was used, which proposes three stages: (1) pre-analysis; (2) the exploitation of the material; and (3) the treatment of results, interference, and interpretation.

Finally, for the synthesis of knowledge and the presentation of the review, it was decided to discuss the findings through the critical analysis of the material found, especially the similar subjects/themes, answering the objective and the guiding question.

## RESULTS

The research sought to extract information from the publications, so that it was possible to analyze the occupational risks involved in the work process of street sweepers. The final sample consisted of 15 (fifteen) publications. Chart 3 readily shows the information extracted from the selected articles after individual analysis, with the objective of characterizing them and then composing the discussion.

**Chart 3 – Summary of selected articles according to year of publication, authors, article titles, objectives, main results, database and/or repository from which the studies were taken.**

YEAR	AUTHORS	SECURITIES	OBJECTIVES	MAIN RESULTS	DATABASE/ REPOSITORY
2009	Santos MCO, <i>et al.</i>	Deregulation of work and deregulation of activity: the case of outsourcing of urban cleaning and the work of street sweepers.	Understand how outsourcing affects the activity and health of outsourced street sweepers; To compare aspects of the work organization (composition of the team and allocation of the script) of the TERC with those of the public agency, pointed out in previous research as significant for the health of the street sweepers.	It was identified in this research that street sweepers are mainly exposed to ergonomic risks. The street sweepers presented several indicators of early exhaustion, among them: body aches (reported by 67% of the interviewees) and chronic fatigue (reported by 54%).	SciELO
2009	Santos GO.	"From garbage to a new horizon": the perspectives of some workers in Fortaleza's garbage management system.	To present the perspectives (dreams, desires, aspirations) of some street sweepers and recyclable collectors in Fortaleza/CE, in the face of the social, economic and environmental reality experienced by them.	It was observed that street sweepers work with weight lifting and a lot of physical effort, as well as being pressured to develop their functions (ergonomic risk). They are also exposed to physical risks (noise, heat, cold, rain and sudden temperature variations) and risk of accidents (being run over).	Google Scholar
2011	Santos GO, Silva LFF.	The meanings of garbage for street sweepers and waste pickers in Fortaleza (CE/Brazil).	To bring a discussion about the meanings of garbage from the point of view of a group of street sweepers and waste pickers living in Fortaleza/CE.	The results revealed that street sweepers are exposed to biological, chemical and physical risks. The street sweepers have contact with flies, cockroaches and rats, as well as solid waste. It also has direct contact with dressing materials, irons, glass, syringes, dead animals, feces and even fetuses.	MEDLINE
2013	Gomes CC, Oliveira RS.	Public Cleaning Agents: A Study on the Relationship of Pleasure/Suffering in the Workplace.	To investigate the experiences of pleasure/suffering in the work environment, based on the dimensions of work organization and socio-professional relationships.	In this research, it can be evidenced that ergonomic risk is present in the work process of street sweepers, especially with regard to intense physical effort, intense working hours, weight lifting, among others.	SciELO
2014	Motta GMV, Borges LO.	Urban Cleaning: the Institutional Context and the Sweeping Activity in Belo Horizonte.	To describe, from an institutionalist perspective, the process of urban cleaning management in Belo Horizonte, from 1973 (creation of the Superintendence of Urban Cleaning, SLU) to 2012, focusing on the activity of street sweeping.	Ergonomic and physical risks were identified in this study. Among the ergonomic risks, incorrect postures and materials of inadequate sizes for the physical size of the workers stand out. The most prevalent physical risk is heat due to sun exposure.	SciELO
2014	Bento JJ, Matoski A, Catai RE.	Garbage collection – risk science: workers' view.	Characterize the safety conditions and risks involved from the worker's point of view.	By verifying the risks to which street sweepers are exposed due to their activities, it can be evidenced that chemical risks and accidents are the most present and evidently known among these workers. It was also identified that the most common accidents experienced by	Google Scholar

				the street sweepers in this study are animal bites, cuts, punctures and traffic accidents.	
2015	Sousa VL, <i>et al.</i>	Occupational stress and quality of life of urban cleaning professionals.	OBJECTIVE: To evaluate the presence of occupational stress and the level of quality of life among urban cleaning professionals in a municipality in the upper hinterland of Paraíba.	It was evidenced that physical and ergonomic risks are present in the work of street sweepers. In this study, it was evident that all street sweepers had a workload and worked exposed to the sun, eight hours a day.	LILACS
2015	Bandeira LM, Almeida TMC.	The dynamics of inequalities and intersectionalities in the work of women in urban public cleaning: the case of street sweepers.	To analyze, based on the dynamics and intersectional conditions of a profession considered abject and devalued from a socioeconomic perspective, deep inequalities with direct consequences on the workers themselves and the structures of the world of work.	Physical risks (inclement weather), chemical risks (products thrown in the trash, dust), biological risks (bacteria, viruses, venomous animals), ergonomic risks (weight lifting, physical exertion, incorrect postures, muscle fatigue), accidents (aggression, being run over, improper work instruments in relation to size/physical profile) were identified.	Google Scholar
2016	Motta GMV, Borges LO.	The working conditions of street sweepers.	Describe the working conditions in the context of the management of the municipal authority, considering four categories of working conditions: contractual and legal conditions, physical and material conditions, processes and characteristics of the activity and socio-managerial environment.	In this study, it can be evidenced that street sweepers are daily exposed to physical risks (weather conditions), chemical risks (products thrown in the garbage), ergonomic risks (physical effort and incorrect postures), accidents (being run over, improper work instruments in relation to their physical size/profile).	LILACS
2017	Barboza GCR, Silva FM.	Evaluation of the occupational health of street sweepers in Palmas, Tocantins.	To evaluate the occupational health problems of the street sweepers in the city of Palmas, who are being assisted in a development model, in which the health and safety of the employee are not always objects of concern of the Public Administration, since the urban cleaning services are outsourced.	The research was carried out with sweeping sweepers and, when observing its results, we can observe that these workers are exposed to several risks on a daily basis, especially ergonomic risks (excessive tiredness, muscle fatigue and poor posture) and chemical risks (dust).	Google Scholar
2017	Rezende KJ, RM Guard.	Quality of life at work of the street sweepers of Palmas, TO.	To analyze the quality of life at work of street sweepers in the city of Palmas, TO.	Sweepers are exposed to the risks of accidents (cutting with sharps, falls, bruises, being run over) and ergonomic risks (incorrect postures, heavy lifting and inappropriately sized materials).	Google Scholar
2018	Menezes GFS, <i>et al.</i>	Musculoskeletal symptomatology in public cleaning workers in the city of Montes Claros, Minas Gerais, Brazil.	OBJECTIVE: To investigate the musculoskeletal symptomatological profile of street sweepers in the city of Montes Claros, Minas Gerais, Brazil.	The present study shows that street sweepers are exposed to ergonomic risks (incorrect postures, excessive weight lifting, materials of inadequate sizes for the physical size of the workers). The present study shows that the lumbar region is the main region affected by pain, and the cervical	Google Scholar

				region also deserves to be highlighted. It was also found that the highest prevalence of pain complaints is in females.	
2020	Souza PPA, <i>et al.</i>	Prevalence of health problems and associated factors in public cleaning professionals.	OBJECTIVE: To evaluate the prevalence of health problems and the factors associated with somatoscopic, hematological, biochemical and parasitological alterations in public cleaning workers.	It can be evidenced that the street sweepers were exposed to physical and biological risks. It can be evidenced that the street sweepers were exposed to the sun daily and that many had parasitic infestation.	BDENF - Nursing
2021	Albuquerque FMP, <i>et al.</i>	The day-to-day life of those who clean up the dirt of Society: Pride or shame?	To know and understand the dynamics of the labor relations that are established with the street sweepers, and between them and the society in which they are inserted.	Street sweepers are exposed to the risk of needlestick accidents and dog bite accidents along traffic.	Google Scholar
2022	Belarmino DVB, <i>et al.</i>	Work and health: perception of garbage collectors.	To analyze the perception of garbage collectors about their work and their health.	It was found that the risk of accidents and ergonomic risks are present in the work process of street sweepers. The occurrence of occupational accidents and problems of excessive and repetitive effort, such as pain, tendinitis and bursitis, was observed.	LILACS

Source: Survey results.

From the analysis of the sixteen selected studies, it was possible to identify that street sweepers are exposed to all occupational risks (biological, physical, chemical, accident and ergonomic) in their work process. Such risks are due to bad weather, chemicals thrown in the garbage, dust, bacteria, viruses, venomous animals, heavy lifting, physical exertion, incorrect postures, muscle fatigue, accidents with sharps, aggression, being run over, improper work tools, among others.

Chart 4 shows the distribution of occupational hazards involved in the work process of the street sweepers found in the studies, according to group, type and color of risk identification. It is noteworthy that in most of the studies analyzed, more than one occupational risk was identified.

**Chart 4 – Distribution of occupational hazards found in the studies according to the group, type and color of risk identification.**

GROUP	TYPE OF RISK	RISK IDENTIFICATION COLOR	NO. OF STUDIES
1	Physical	GREEN	7 articles
2	Chemists	RED	5 articles
3	Biological	BROWN	3 articles
4	Ergonomic	YELLOW	Article 11
5	Accidents	BLUE	7 articles

Source: Survey results.

Ergonomic risks are accentuated in the studies, since these risks originate from the inadequacy of the working conditions involving street sweepers, which portrays the relevance of discussing the real work situations of this public, in the search for creating

strategies for improvement, prevention and promotion, aiming to consider ergonomics in all aspects. by conducting an investigation of the causal link of accidents with these workers.

It was also possible to evidence that street sweepers are exposed to such risks because they do not use personal protective equipment. Therefore, the studies present as strategies for care and mitigation measures the need for cyclical and continuous training with this public, as well as to guide them on the correct use of PPE for their health and safety. The population, being sensitized and storing their solid waste correctly, and the street sweepers, being properly qualified through a training process, will make a great contribution to the preservation of the environment, health and safety of the street sweepers.

## DISCUSSION

Occupational hazards are present in the work environment of street sweepers, and can lead to a series of health problems, as well as work accidents, and even death. A study shows that the following risks are present in most of the work activities performed by street sweepers: heat, cold, noise, vibration, rain and sudden variations in temperature (physical risk); dust and chemical/toxic substances (chemical hazard); disease-transmitting animals, medical waste (biological hazard); cutting with sharps, falls, bruises, being run over and crushing (mechanical/accidental); and incorrect postures, excessive weight lifting, running to keep up with the collection vehicle, activities of ascent and descent of the vehicle, and materials of inadequate sizes for the physical size of the workers (ergonomic)<sup>9</sup>.

Souza *et al.*<sup>10</sup> point out in their study some characteristics that trigger health risks for street sweepers, such as: sedentary lifestyle, exposure to the sun, ingesting less than 2 liters of water and less than 6 meals a day, medical appointments less than 2 times a year and the precariousness of the use of PPE. The authors interviewed also reported being stressed, which can be explained by the work routine linked to the lack of individual self-care.

It can be observed that the sweepers are exposed to ergonomic risk on a daily basis, due to the repetitive movements produced in their work. They face situations of exhaustion, physical and natural changes and are exposed to adverse situations. In addition, the sweepers face physical effort due to the daily commute that is made on foot, between the accommodation and the place where the work activities are carried out, also having to carry heavy tools and exposing themselves to dust and intense noise. The street sweepers are also exposed to the weather, with exposure to the sun as a highlight<sup>11</sup>.

When investigating the daily occupational risks that work offers, it was evidenced in a study in which most street sweepers have some problem of poor posture related to the equipment of daily use (cart, shovel and/or brooms), as well as excessive tiredness and muscle fatigue, which is configured as an ergonomic risk<sup>12</sup>.

It was evidenced in the studies that the street sweepers are exposed to the sun throughout the working day. These studies also revealed that street sweepers do not have access to sunscreen, which could prevent excessive exposure to ultraviolet rays and the appearance of problems such as skin spots and skin cancer<sup>9,10-13</sup>.



In view of this, it is noteworthy that the institutions responsible for the work of street sweepers should provide sunscreen, although it is not characterized as PPE, but the ideal would be that its use would be mandatory. It is noteworthy that they not only provide them, but also provide guidance for their correct use and show the positive effects on health, as well as emphasize the negative effects of not using them, such as the appearance of skin spots and skin cancer in the future<sup>14</sup>.

It was also possible to investigate that the garbage collectors suffer some types of accidents while performing their activities, especially animal bites, cuts, punctures, truck falls and being run over (traffic accidents)<sup>15</sup>.

Corroborating, Albuquerque *et al.*<sup>1</sup> refer to the fact that accidents with animals are constantly present in the work of street sweepers, especially accidents with dogs that live on the streets and survive on food and garbage debris thrown on the streets, as well as garbage discarded and destined for the collection of street sweepers. Soon, these animals end up running to attack these workers, who suffer bites, scratches, and even traffic accidents when the animals cross the streets.

Some of the most frequent accidents among street sweepers are: cuts, vehicle falls and being run over. Cuts and punctures with sharp objects such as thorns, nails, syringe needles, and skewers happen mainly due to the incorrect disposal of utensils. Automobile accidents and vehicle falls are mainly due to the inadequacy of vehicles for such transport, the greatest example being the collection truck, in which workers are transported without protection in the back of the truck<sup>12</sup>.

Since in their work the street sweepers have to travel several kilometers running through the streets and avenues, as well as getting on and off the garbage trucks, the risk of accidents increases, and they can be run over, suffer falls, and there is even a risk of death<sup>16</sup>.

Bandeira and Almeida<sup>17</sup> point out that being run over by motorcycles and cars, and even by the garbage truck itself, is a very common accident in the profession of street sweepers. Pedestrian collisions increase due to overloading of workers and speeding, as well as the fact that drivers often disobey traffic restrictions and rules. The absence of adequate uniforms (visible clothing, durable and non-slip footwear), as well as the non-use of them, are also considered factors that increase the risk of being run over<sup>12</sup>.

It is possible to identify that, in addition to the high exposure to biological hazards and episodes of occupational accidents, the street sweepers pointed out problems as a result of excessive and repetitive effort, configuring the ergonomic risk<sup>18</sup>. Another study identified that street sweepers presented several indicators of early wear and tear, among them: body aches (reported by 67% of respondents) and chronic fatigue (reported by 54%)<sup>19</sup>.

The work of the collector sweepers requires intense physical effort, exhausting working hours, weight lifting, in addition to going through psychological pressures in their activities, whether they are from the bosses, the inspectors or even the work process itself. Such factors are configured as ergonomic risks<sup>20,21</sup>, which were also found in the study by Gomes and Oliveira<sup>22</sup>, to which street sweepers are exposed in their daily work.

In their activities, street sweepers are also exposed to physical risk due to exposure to heat and cold, as well as to the noise produced by the garbage compactor present in the

garbage trucks and to the noise produced by transportation on the streets and in traffic<sup>16</sup>. In their study, Motta and Borges<sup>20</sup> also showed the presence of physical risks in the work of street sweepers.

Another type of accident suffered by street sweepers, reported in the study by Bandeira and Almeida<sup>17</sup>, was physical aggression. The street sweepers who participated in this research narrated the receipt of objects through their throwing by passers-by and drivers. In this research, it was also possible to identify that street sweepers are exposed to injuries/cuts by sharp materials, due to contact with pieces of wood, broken glass, nails and iron points. They are also exposed to contact with burning chemicals and highly contaminated biologicals (viruses, bacteria, venomous animals).

Bandeira and Almeida<sup>17</sup> also identified in their research that the work instruments are inadequate, making the activity more difficult and exhausting. The street sweepers pointed out that the wheelbarrow is heavy, causing pain at the end of the daily workday.

On the other hand, in the study by Santos and Silva<sup>23</sup>, the presence of vector-borne diseases such as flies, cockroaches and rats can be verified, thus demonstrating the various health risks caused by the presence of solid waste. In addition, in this same research, it can be observed in one of the statements of the street sweepers that various materials such as bandages, irons, glass, syringes, dead animals, feces and even fetuses are found in the garbage collected, which is why he highlighted the issue of infection, when talking about the dangers of garbage. Therefore, it became clear in this study that street sweepers are exposed to several risks (biological, chemical, physical) that were demonstrated by the term "danger" in the participants' reports.

The street sweepers participating in the research conducted by Barboza and Silva<sup>12</sup> also feel uncomfortable with the particulate matter suspended in the air, especially with the inspired dust that is generated at the time of sweeping. This problem has also been identified in other studies and is configured as a chemical risk.

Those interviewed by Bento, Matoski and Catai<sup>15</sup> presented knowledge about mechanical and chemical risks. However, there were no reports on ergonomic, physical and social risks. The authors reported uncertainty as to the source of the lack of knowledge on the part of the street sweepers, leaving in doubt the level of education of these workers or negligence in the company's preparation.

Given the uncertainty of the source of employees' lack of knowledge, the importance of NR 09 is highlighted, which establishes the development, by employers, of the Environmental Risk Prevention Program (PPRA). This program works with the anticipation, recognition and assessment of existing risks in the work environment, thus promoting worker protection<sup>24</sup>.

The non-use of PPE has been evidenced by several authors, such as Souza et al.<sup>10</sup>. This non-use may be due to the street sweepers themselves, because they do not know the right technique for use or because of their own disobedience, or even due to the non-availability of this equipment by the employing company, as was found in the studies by Belarmino et al.<sup>18</sup> and Santos, Borges and Araújo<sup>9</sup>, in which the street sweepers reported that they receive only part of the equipment, but that other materials are delivered only when necessary. Belarmino et al.<sup>18</sup> also pointed out that the equipment that was made

available was not in good condition. Barboza and Silva<sup>12</sup> also identified in their study that street sweepers do not use PPE in their work activities.

According to NR 09, PPE must be provided appropriate to the risks to which the worker is exposed, considering its effectiveness and comfort. A training program should be offered for the correct use of equipment, standards should be developed for the correct supply, as well as cleaning, exchange, replacement, storage and characterization with the appropriate identifications of this equipment<sup>24</sup>.

Rezende and Guarda<sup>25</sup> questioned their participants about the performance of training. Therefore, 73% of respondents indicated that they did not receive any type of training, and the other 27% reported having received a lecture. Another factor that favors the increase in cases of work-related risks of accidents and illnesses is the non-use of training by the employers themselves. Just as training and delivery of adequate materials from companies is required, it is necessary for the worker to comply with the safety standards passed on and, thus, perform his work safely.

It is important to highlight the lack of hygiene of the street sweepers themselves and their trucks. It was reported that the street sweepers smoked, during office hours, with the same hand that carried the garbage and that when they threw the garbage bags into the trucks, if the bags burst, this accumulated garbage was not collected by them, although there was material necessary for this activity inside the trucks<sup>1</sup>.

Also contributing to accidents is the population's lack of knowledge about the correct disposal of garbage. In the previous study, several cases of needlestick accidents due to negligence or incorrect disposal of the population were also reported. When this happens, the street sweeper is forced to use the HIV cocktail as a precaution against infection. However, these medications usually trigger unpleasant side effects in the individual<sup>1</sup>.

Corroborating the findings, other authors affirm what has already been explained, as well as bring other risk situations to which street sweepers are exposed in their work activities. Working outdoors, these workers are exposed to heat, cold, rain, and temperature swings. The situation worsens during heavy rains, when parasites and rodents tend to emerge from nests and drains, and the contamination of the work environment and the proximity of waste often put workers in direct contact with poisons, bacteria and viruses<sup>3</sup>.

In addition to these factors, they are also exposed to the constant noise caused by the truck's garbage compaction system, to the bad smell caused by the decomposition process of organic matter, not to mention that, as they are outdoor workers, they are constantly exposed to RUV26. Pinto<sup>27</sup> points out that these professionals fit the profile of outdoor workers with high exposure to UV rays, as they exceed the healthy sun exposure recommended by dermatologists (10-45 minutes), as they face, on average, 6-9 hours per day of exposure.

The garbage collectors also travel long distances to collect the "garbage" left by the residents, traveling on potholed, poorly maintained roads and with the collection of garbage increasing the collection time, fear of ending up in places of difficult access, steep terrain, bad asphalt and risk of overtaking in areas of high traffic. These factors increase the risk of accidents during the workday<sup>27</sup>.

Another aggravating factor is the waste of chemicals, such as batteries, light bulbs, cleaning products, cosmetics, medicines, etc. Improper disposal of chemicals by consumers results in toxic components, including heavy metals such as lead, cadmium, and mercury. These products form residues and present a risk of harmful or harmful effects if inhaled or ingested<sup>28</sup>.

As for the sweeping sweepers, they are also exposed to factors such as dust, excessive noise, cold, heat, smoke, carbon monoxide, uncomfortable positions and pathogenic microorganisms found in household waste<sup>29</sup>.

The work of the sweeping sweepers entails above all ergonomic risks, considering the weight of the carts and the distances traveled. Therefore, repetitive movements of flexion and torsion of the trunk, excess weight transported, lack of adequate carriers, long working hours and poor posture are risk factors that may be related to the occurrence of injuries and accidents<sup>30</sup>.

The damage caused to the worker is the result of a combination of the characteristics of the waste collected, the types of equipment used and the method of packaging. This condition makes the work of urban waste collection unhealthy, providing these professionals with the right to the maximum degree of unhealthy surcharge<sup>26</sup>.

As preventive measures against occupational risks, Lima<sup>29</sup> proposes the implementation of Regulatory Standards (NR), such as: NR 4, which promotes the realization of activities to raise awareness and guide workers for the prevention of occupational accidents and diseases; NR 9, already mentioned above; and NR 15, which establishes work in permanent contact with urban waste as the maximum degree of unhealthiness.

We can identify, in view of what has been exposed, that most street sweepers do not feel safe in their work environment, given the large number of occupational risks to which they are prone on a daily basis. These risks become even more imminent to life, due to the lack of training and the lack of adequate protective equipment.

In view of this, employers, bosses and/or those responsible for the work of street sweepers need to develop measures and strategies for the prevention of work-related accidents and occupational diseases, since, every day, occupational safety is developing more and expanding to different areas and functions. In addition, it is the employer's responsibility to prevent environmental hazards arising from the work and not just rely on the literal wording of medical and occupational safety regulations. However, it is necessary to seek additional legislation and specialists in the field or related areas who have experience and contribute to the prevention of accidents and occupational diseases<sup>31</sup>.

It is possible to see that in studies from other countries, such as in the city of Ismailia, Egypt, the occupational health risks among street sweepers are similar to the risks of street sweepers in Brazil, such as exposure to physical, chemical, psychological and ergonomic risks, as well as the lack of training, especially on the use of personal protective equipment<sup>32</sup>.

The discussion on occupational risks is intrinsically linked to environmental health, which has been gaining strength in the international scenario since 1990, through the adoption of prevention and social participation actions at the local level with a focus on Primary Health Care, with the incorporation of mitigating measures, such as the

creation of healthy environments, sensitizing the community about the risks to their health and well-being, as well as their responsibilities and duties in relation to health promotion and environmental health<sup>33</sup>.

## CONCLUSION

In view of the findings, it is highlighted that the continued contact with substances that are harmful to health makes the work of street sweepers one of the riskiest and most unhealthy activities. Thus, these workers would need to receive extra attention, as well as necessary information regarding health, protection and safety in the work environment, in addition to constant supervision to verify the proper use of protective equipment, as well as the following of standards and routines.

It is concluded that, in order to promote and maintain the health of street sweepers, it is necessary to identify early and combat harmful factors in the workplace, as well as to keep such workers aware of the occupational risks they are subjected to in their work process and their forms of prevention.

The limitations of the present study were the search for studies published only in Portuguese, as well as in few databases, thus resulting in a scarcity of publications on the subject, making it impossible to perform a more robust analysis of the results. Another weakness lies in intersectoriality, in which it is necessary to look at health together with the other departments, in an interconnected and integral way for the street sweepers, since their activities are directly linked to the area of health, environment, environmental sanitation, security and transportation, a service provided considered essential in society.

And based on the results presented, it is expected to arouse interest in new research, especially primary studies, as well as to subsidize the creation of new strategies for the prevention of accidents and illnesses related to the work process of street sweepers, the creation of mitigating measures by public management, as well as the strengthening of intersectoral strategies.

In this context, the review offers managers and professionals who work directly with this public quick access to the relevant results of research that support conduct or decision-making, providing critical knowledge.

We conclude with the following question: who is it that prevents the population from getting sick, that diseases from spreading through the cities or that health problems become a headache for public management?

If you only thought about health professionals, you were wrong! In fact, these preventive skills are also the responsibility of the street sweeper, the professional responsible for urban cleaning, but who is not always remembered and valued. Therefore, the work process of street sweepers is dangerous and unhealthy, presenting health risks and peculiar disease patterns, requiring interventions and the promotion of public policies to resolve the critical situation experienced by these workers.

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