

Medicine disposal: a socio-environmental and health issue

Descarte de medicamentos: uma questão socioambiental e de saúde¹

Descarte de medicamentos: una cuestión socioambiental y de salud

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ABSTRACT

Objectives: Describe how the disposal of drugs is carried out; To evaluate the knowledge of professionals working in Family Health Units regarding drug disposal. **Methods:** Qualitative, exploratory, descriptive research, carried out with 16 professionals in four Family Health Units of a municipality in the south of Brazil. The collection took place through semi-structured interviews. The analysis of the data was through discursive textual analysis. **Results:** Workers do not follow the steps of the correct disposal, most are unaware of the current legislation, the professionals identified the contamination of the environment, misuse of incorrectly discarded drugs and bacterial resistance to medications as the main consequences of incorrect disposal. **Conclusions:** This research can contribute to the management and assistance, making managers, professionals and users rethink their doing, improving the health of people and the environment. **Descriptors:** Medical Waste, Family Health Strategy, Environmental Impact.

RESUMO

Objetivo: Descrever como é realizado o descarte de medicamentos; avaliar o conhecimento de profissionais que atuam em Unidades de Saúde da Família a respeito do descarte de medicamentos. **Método:** Pesquisa qualitativa, exploratória, descritiva, realizada com 16 profissionais em quatro Unidades de Saúde da Família de um município do sul do Brasil. A coleta ocorreu por meio de entrevistas semiestruturadas. A análise dos dados foi por meio da análise textual discursiva. **Resultados:** Os trabalhadores não cumprem os passos do descarte correto. A maioria desconhece a legislação vigente. Os profissionais identificaram a contaminação do meio ambiente, uso indevido dos medicamentos descartados incorretamente e resistência bacteriana aos medicamentos como as principais consequências do descarte incorreto. **Conclusão:** Esta pesquisa pode contribuir na gestão e na assistência, fazendo com que gestores, profissionais e usuários repensem o seu fazer, melhorando a saúde das pessoas e do meio ambiente.

Descritores: Resíduos de serviços de saúde, Estratégia da saúde da família, Impacto ambiental.

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RESUMEN

Objetivos: Describir como es realizado lo descarte de medicamentos; evaluar el conocimiento de profesionales que actúan en Unidades de Salud de la Familia acerca del descarte de medicamentos. **Métodos:** Investigación cualitativa, exploratorio, descriptiva, realizada con 16 profesionales en cuatro Unidades de Salud de la Familia de un municipio del sur del Brasil. La recolección ocurrió por medio de entrevistas semi-estructuradas. El análisis de los datos fue por medio del análisis textual discursiva. **Resultados:** Los trabajadores no cumplen los pasos del descarte correcto, la mayoría desconoce la legislación vigente, los profesionales identificaron la contaminación del medio ambiente, uso indebido de los medicamentos descartados incorrectamente y resistencia bacteriana a los medicamentos como las principales consecuencias del descarte incorrecto. **Conclusiones:** Esta investigación puede contribuir en la gestión y en la asistencia haciendo con que, gestores, profesionales y usuarios replanteen su hacer, mejorando la salud de las personas y del medio ambiente.

Descriptor: Residuos Sanitarios, Estrategia de Salud Familiar, Impacto Ambiental.

INTRODUCTION

Medicines are of extreme importance for society, since they can help in the treatment of some pathologies and favor a better life quality. A medicine is a chemical preparation, which in general, but not necessarily, contains one or more drugs, administered for the purpose of causing a therapeutic effect.¹

A study carried out in Brazil found that 64.6% of women and 45.4% of men in adulthood use at least one medication/day.² About 80% of people with non-transmissible chronic diseases such as hypertension, diabetes and asthma use drugs on a daily basis.³ In many of these cases, non-drug treatments could be used, yet drugs are the most common alternative.

With this high consumption of drugs, the concern regarding the discard of these drugs arises, when for some reason they are no longer used. In Brazil, the drug industry moves millions of reals per year and the *Agência Nacional de Vigilância Sanitária* (Anvisa) [National Agency of Sanitary Surveillance] estimates that around 30,000 tons of medicines are disposed of by consumers every year in the country.⁴

The loss of drugs or its leftovers are common both in health services and in residences, and thus constitute a problem, since inappropriate disposal, especially in common waste or sewage network, can contaminate the soil, surface water (rivers, lakes and oceans), and groundwater. These chemicals, when exposed to adverse conditions such as humidity, temperature, and light, can become toxic substances and affect the balance of the environment, altering the biogeochemical cycles, interfering in the web and food chains.⁵

Regarding to the legislation, in 1998, the *Política Nacional dos Medicamentos* (PNM) [National Medicine Policy] was created through the Legal Opinion No. 3,916. The purpose of this policy is to ensure the necessary safety, efficacy and quality of medicines, the promotion

of rational use, and the access of the population to those considered essential.⁶ However, the PNM did not address issues related to the disposal of unused drugs.

In 2004, the ANVISA created through the *Resolução de Diretoria Colegiada* (RDC) [Collegiate Directory Resolution], under the No. 306, the *Regulamento Técnico para o Gerenciamento de Resíduos dos Serviços de Saúde* (GRSS) [Technical Regulation for Health Services Waste Management]. The RDC No. 306/2004 provides the basic guidelines for the GRSS, including: segregation, packaging, identification, transportation, storage, treatment, collection and final disposal.⁷ In 2005, the *Conselho Nacional do Meio Ambiente* (CONAMA) [National Environment Council] created the resolution No. 358, which maintains the same classification made by the RDC No. 306/2004.⁸

The *Política Nacional dos Resíduos Sólidos* (PNRS) [National Solid Waste Policy] established by Law No. 12,305 of August 2nd, 2010, is the most recent law on Health Service Waste (HSW) and aims the environmentally correct disposal of solid waste to protect the public health and the environment.⁹ It represents an advance in environmental preservation, since it directs the disposal of medicines discarded by consumers, attributing their return to manufacturers, promoting a change in the model of responsibility for social and environmental damages caused by incorrect disposal.¹⁰

According to the legislation, all health services that are linked to human or animal, including basic health units and Family Health Units (FHUs), are generators of health service waste. These services are one of the main generators of waste, including pharmaceutical waste.¹¹ Among the contributing factors are drug management, from the prescription, dispensing, and distribution of free samples to presentations beyond what is necessary.¹² Another situation that contributes to the increase of drug waste is the incorrect management of inventories that results in drug loss by expiration of validity.¹³

All professionals who work in health services, even those who work temporarily or are not properly involved in waste management activities, should know the system adopted for waste management.⁷ However, studies show that many professionals of basic health units and FHUs do not know how to properly dispose of medicines and because of this they do it inadequately.^{12,14}

Basic health units and FHUs, as a source of medication distribution and management, play an important role in this problem, since the professionals who work in these places directly deal with issues related to the disposal of medicines. In this sense, nurses and other health care professionals need to consider the socio-environmental context in which the people they serve live, since the improper medicine disposal can affect the environment and cause health problems.

The health care team has the responsibility for environmental issues, since the environmental health is closely related to public health, contributing to the protection and promotion of human health, favoring the citizens' right to health and an ecologically balanced

environment in accordance with the principles and guidelines of the *Sistema Único de Saúde* (SUS) [National Health System].¹⁵ This team must be properly trained and informed to carry out this waste correctly.¹⁶

Thus, considering the relevance of this topic and the importance of researches that address it, the objectives of this study were to describe how the disposal of drugs is carried out in FHUs of a municipality in the South region of Brazil, and to evaluate the knowledge of professionals working in those FHUs regarding the disposal of medicines.

METHODS

It is a descriptive-exploratory research with a qualitative approach. It was carried out in FHUs of a municipality in the South region of Brazil. The population of the municipality, according to data of the *Instituto Brasileiro de Geografia e Estatística* (IBGE) [Brazilian Institute of Geography and Statistics], is 197,288 inhabitants¹⁷ and the FHUs coverage 54% of this population, with 34 teams: 20 in the urban zone, four in the coastal area, and ten in the rural area. Two FHUs were drawn from the urban area, one from the coastal area and one from the rural area, in order to carry out a representative sample of all areas of the municipality.

A physician, a nurse, a nursing technician and a community health agent from each FHU were randomly selected to participate in the study, with a total of 16 participants. The inclusion criteria were: a physician, a nurse, a nursing technician, a community health agent, a dentist or an oral health technician working with a team of the FHU randomly selected for at least six months, which makes the knowledge of local operation routines possible. Absent professionals due to vacation, medical leave, etc., during the period of data collection were excluded from this research. The selected FHUs did not have an oral health team, so no dentist or oral health technician was interviewed.

Data collection was carried out from February to April 2016 after the approval of the Research Ethics Committee of a Federal University of the South region, Brazil, under the No. 203/2015, and the Municipal Nucleus of Education and Public Health of the municipality, with Legal Opinion No. 31/2016. In order to perform data collection, a telephone contact was made with the nurse of each selected FHU to schedule a suitable day.

In each FHU, the objectives of the research were explained to the members of the team, and if they agreed participating, then the interview was already scheduled. The interview was conducted at the FHU in which the professional worked. After the explanation of the objectives and with the voluntary acceptance of the participants of the research, the reading of the Term of Free and Informed Consent was done and its signature was requested. Data collection was carried out by semi-structured interviews.

The interview script contained the following questions: “How and where is the disposal of medicines (from the FHU and brought by the community) carry out at the

FHU?”; “Have you received any training focusing on medicine disposal?”; “If so, was it helpful in your daily work?”; “Have you implemented it in practice?”; “If not, do you believe that some training on this is important?”; “How do you believe that drug disposal should be carried out?”; “What are the facilities and difficulties encountered in disposing of medicines?”; “What are the consequences of the improper disposal of medicines?”; “Do you often advise FHU users on how to dispose of medicines?”; “What do you include in this guideline?”

The interviews were recorded and later transcribed. Participants were identified according to their professional category using: P (physician), N (nurse), T (nursing technician) and A (community health agent). Also, according to the area where the FHU is located: 1 (first urban area), 2 (second urban area), 3 (rural area) and 4 (coastal area).

After the end of the interviews in each unit, a leaflet with instructions on the correct disposal of medicines and the environmental impact when it was done incorrectly was delivered. The leaflet was prepared exclusively for this study to inform the professionals who worked in the teams about the disposal of medicines.

Data were analyzed by the discursive textual analysis method. This approach is a self-organized process of producing new understandings of the phenomena that it examines.¹⁸ The proposed analysis organizes arguments in four groups.

The first three groups compose a cycle, in which are constituted as main elements: the disassembly of texts, also called unitarization, in which the materials and their details are examined and fragmented to obtain units of meaning; the establishment of relations or categorization, where the similar units of meaning are grouped, being able to generate several levels of categories of analysis; and the capture of the new emergent, where the intense impregnation in the materials of the analysis triggered by the previous process allows a renewed comprehension of the whole, closing the analysis cycle. Finally, the last focus, which is a self-organized process, where after the fragmentation and disorganization proposed in the first phase, a reconstruction occurs with the emergence of new understandings.¹⁸

RESULTS AND DISCUSSION

Among the participants in the research, four were nurses having working time between one year and thirteen years, four were nursing technicians having working time from one year and six months to fifteen years, four were physicians having working time from one to fourteen years, and four participants were community health workers having a working time from two to fourteen years.

There was a great variability of working time, being observed a direct relationship between the time of action in the FHU and the knowledge about the discard of medicines. Thus, the older the FHU worker the greater his knowledge about this subject.

From the analysis of the interviews, four categories emerged that will be discussed below: “The way in which the disposal of medicines is carried out in FHUs”; “The (lack of) knowledge of health care workers about the correct disposal of medicines”; “Facilities and difficulties for carrying out the disposal of medicines”; and “Consequences of the incorrect disposal of medicines”.

The way in which the disposal of medicines is carried out in FHUs

The nursing technicians and nurses are responsible for the flow and destination of medicines within the FHU and are the ones that effectively carry out their disposal. The following statements show this:

“The expired medicines are like this, we take it from the poster, take all that medication and also put in the waste container [...] we put the liquids in a container and have the purge, we put it in the grate or in the sink itself.” (T3)

“We separate them to help the pharmacy there, by batch, expiration date and the description of the medicine. [...] it goes in a box properly packed, and we take care of this so that the package can't get lost in the way.” (T4)

“There are some medicines in which we do an incorrect disposal, that's we know, we put something small in the waste container, of course that the waste container's going to be incinerated, but something we do, we know it's wrong.” (N1)

“They are in a box describing the lot, the validity, the type and the due date. [...] they stay in a little corner there in the waiting room when they come to pick them up.” (N2)

Community health agents only know that the medicines are sent to the Health's Secretary of the municipality, but they do not know how they are handled within the FHU. They identify the nurse as a reference person to carry out the disposal and as the bearer of knowledge about waste, reporting to them whenever they need it, as the lines below show:

“I do not know for sure but it stands there apart. [...] we bring the community medicines in the backpack and put them there for the nurse.” (A3)

“Then we'll send them to the health department.” (A2)

The physicians know that the waste of medicines will be sent to the Health Secretary of the municipality and they believe that the nursing team is responsible for having this knowledge and for carrying out the management of the drugs that will be discarded.

“The only thing I know is that they are collected by the Secretary.” (P3)

“Usually those who get involved with this disposal are the nursing team.” (P1)

“They are returned to the secretary. [...] I am not part of it, it is not my job, this is the role of the nurse and the technician, I just observe.” (P2).

According to the legal apparatus, all professionals working in the service, even those who work temporarily or are not directly involved in waste management activities, must know the system adopted for this purpose. Thus, they should have knowledge about the practice of residual segregation, recognize the symbols, expressions, color standards adopted, know the location of waste shelters, among other factors indispensable for the complete integration to the *Plano de Gerenciamento dos Resíduos de Serviços de Saúde* (PGRSS) [Health Service Waste Management Plan].⁷

The nurse has an important role because although the National Policy of Primary Care does not define it as the coordinator of FHUs, this professional often assumes this function due to several factors related to the practice of nursing and in this way he become involved more directly in the manipulation of the health service waste.¹⁹⁻²⁰ In addition, the nurse responsible for the FHU is obliged to be responsible for technical issues related to waste management including the disposal of medicines.¹¹

Regarding the place of final destination, after leaving the FHU, all interviewees believed that the medicines were sent to the Health Secretary of the municipality to make the final destination of the waste, according to the following testimonials:

“Usually we go back to the Secretary.” (N2)

“The only thing I know is that they are collected by the Secretary.” (P3)

“At the basic health unit we send it to the Secretary, whenever there is medication that is out of date, it is sent there.” (A4)

“We put them in boxes and send them to the Secretary.” (T1)

As stated by the law, health service waste generators are responsible for the management of this waste from segregation to the final disposal.⁷ It is necessary that inspection agencies, together with municipal governments, health and environmental secretaries, favor the correct disposal process, providing the collection and external transportation, as the discontinuity or the lack of a waste collection favors mistaken practices within the health units.¹²

The (lack of) knowledge of health care workers about the correct disposal of medicines

The following statements show that the workers believe they are correctly disposing of the medicines, but most of them cannot describe their steps in the FHU, which shows a lack of knowledge about the subject.

“I could not tell you that, I think the way we do is right.” (T3)

“I think we do the right thing, I think this is the way, you know, move them to the Secretary and that they give the correct destination.” (A2)

“If I tell you that there is something, some rule I know, it should there to be but I don't have it.” (P1)

“Look, I believe the way it's made for me is the right one.” (N3)

A study carried out with nurses in four municipalities of the *Mato Grosso* State showed that eight of ten professionals interviewed reported not knowing the stages of management and final disposal of the health service waste generated in the units in which they were acting.²¹ There are public norms and guidelines on the correct disposal of this type of waste, but there seems to be a gap between theory and what is properly done inside and outside of health units, whether by managers, health professionals or even by the professionals who handle the waste on a daily basis. It is important to develop working instructions to address the lack of information, as well as guiding and standardizing the operations involving the health service waste so that its disposal is carried out correctly.²²

As stated by law, health service waste generators are responsible for the management of such waste from segregation to the final disposal. **Table 1** describes the steps for the management of the health service waste according to RDC No. 306/2004 according to the specificities of the medicines.

Table 1 - Steps for managing the health service waste in accordance with the RDC No. 306/2004.⁷

Step	Description
Segregation	It is the separation of the waste at the time and place of their generation, according to the physical, chemical, and biological characteristics; their physical state; and the risks involved.
Packaging	It consists in the act of packing the segregated waste in bags or containers that avoid leaks and resist the actions of puncture and rupture. The packaging of medicines must be carried out in the following way: the liquid waste must be packed in containers made of material compatible with the stored liquid, resistant, rigid and watertight, with a screw cap and a seal with identification. Solid wastes must be packed in containers of rigid material, suitable for each type of chemical, according to their physical and chemical characteristics and their physical state, with proper identification.
Identification	Consists of the set of measures that allow the recognition of the residues in bags and containers, providing information to the correct handling of them.
Transport	It consists in the transfer of waste from the generation points to the place of temporary storage or external storage for the purpose of presentation for the collection.
Storage	It consists of the temporary storage of the containers containing the already conditioned waste in a place near the generation points, in order to make the collection inside the unit faster and optimize the displacement between the generating points and the point destined to the presentation for external collection.
Treatment	It consists of applying a method, technique or process that modifies the characteristics of the risks inherent to the waste, reducing or eliminating the risk of contamination, occupational accidents or environmental damage.
Collection	It consists of removing the health service waste from the waste shelter (storage) to the treatment unit or final disposal.
Final disposal	It consists of the disposal of waste in a place previously prepared to receive them, obeying technical criteria of construction and operation with environmental licensing.

Some workers believe that certain procedures they perform for the disposal are incorrect and that it is necessary to do it in another way as stated by the following testimonials:

“There has to be a specific place, a box, something that you are going to put something there and it will be sent away, but in appropriate places, which do not even have needles and syringes, I think I should have a box for it, we could even put it in a closed acrylic box.” (A4)

“I think I should have a proper container with an adequate collection, which would not be this.” (P1)

“I don't know, maybe if I had a specific package that would come in a form of some box, something identified, to take no risk.” (N4)

A study carried out with nurses in four municipalities of the *Mato Grosso* state showed that almost half of the interviewed professionals identified irregularities during the waste management process within the FHU in which they worked, which corroborates with what was found in the present study.²¹ In both studies, the lack of knowledge of the current norms and rules about the management of the health service waste was observed.

Regarding the legislation, there is the RDC no. 306/2004 of the ANVISA, which provides the basic guidelines for the GRSS in Brazil;⁷ also, the resolution 358/2005 of the CONAMA, which maintains the same classification made by the RDC No. 306/2004 and considers that any area for transferring health service waste should have its own licensed environmental facility and guarantee its packaging characteristics.⁸

Lastly, the National Policy on Solid Waste aims the environmentally correct disposal of solid waste to protect public health and the environment.⁹ Regarding to the medicines specifically, this law establishes that the importer, the manufacturer and the distributor, as well as health service providers, are responsible for collecting the special waste resulting from products that have expired or are considered, by decision of competent authorities, unsuitable for consumption.⁹

All this legislation addresses the health service waste and includes the disposal of medicines. It is observed, then, that legislation about this exists and is valid in Brazil, yet, the FHU workers are unaware of that, often making their practice of discarding medicine incorrect.

Facilities and difficulties for carrying out the disposal of medicines

When questioned about the facilities found for the proper disposal of medicines, organizing the inventory so that a few medicines need to be discarded, the existence of an appropriate location to dispose of them, and the goodwill of the professionals were the most facts cited by the workers:

“Organization, because if you have a well-organized and well-controlled warehouse so that people really can check the expiration date, it'll make it easier.” (P4)

“What you need is the goodwill and the place, the receptacle to receive it, the place to put it to not be exposed, easily accessible for the staff to throw it.” (A4)

Inventory management is within the concept of pharmaceutical care, with the pharmacist being responsible for its implementation.²³ Nevertheless, many FHUs do not have a pharmacist and the nursing team is responsible for the control and disposal of medicines. FHUs have

great potential to ensure the rational use of medicines through the reorientation of pharmaceutical assistance. As a primary care model, FHUs are committed to the integrality of health care, with a focus on the family unit in the community in which it is inserted. Considering, therefore, pharmaceutical care a preponderant factor of integral care, it is expected that the family health teams will contribute to minimize the irrational use of pharmaceuticals.¹⁶

The fact that some professionals mention goodwill as something that would facilitate the proper disposal of medicines is a concern, since the obedience to the current resolutions for health services stipulated by ANVISA and CONAMA regarding waste management, cannot be understood as a particular initiative. The obedience to what is stated in the current laws about health services is the minimum that must be done within a socio-environmental context in order to guarantee the health of the environment and the population.²⁴

As for the difficulties encountered in medicine disposal, there is no protocol, nor even a procedure in FHUs to receive or not the community's expired medicines, allowing each unit to do in the way it thinks is the best. The following statements highlight this:

“In the community, some people have a responsibility to call us and give us something to bring, but I'm not sure if everyone does this.” (A3)

“No, we do not accept it, and the guidance is passed on to them in order to be aware of not leave it there because as we do not accept it they go around with the medicines, then I'm wondering: wouldn't it be better for us to take it?” (T4)

“It depends, if it's the use like captopril, enalapril, we redistribute it to the people, unless it's expired, then we'll send it to the Secretary.” (T2)

The leftover of medicines resulted from disuse or expiration that are in the residences usually are destined directly for the common trash, sewage network or, in some cases, returned to the public network. Regarding these leftovers, there is still no specific legislation that regulates it and provides the correct handling and disposal of the waste of medicines. However, there are already defined regulations on solid waste in health services.²⁵ In this sense, it is necessary that each professional think about it and perceive himself as a social actor, becoming aware of the fact that the improper handling of the health service waste may lead to social, economic and environmental consequences.²⁶

In a study that aimed to know the perception of teachers, students and graduates of health courses of two higher education institutions of the State of *Rio Grande do Sul*, Brazil, about the generation of health service waste, the participants mentioned a concern with the destination of the tailings deriving from medications used

often in residences, expressing that such disposal often occurs improperly and that will erroneously affect the environment as a whole.²⁶

No interviewee cited the existence of a PGRSS. The RDC No. 306/2004 establishes the PGRSS, which is a document that is based on the principles of non-generation of waste and minimization of waste generation. The PGRSS must provide guidance for the institution's employees about the routines to be adopted in various stages of waste management and also in emergency and accident situations. In addition, the PGRSS defines the internal and external collection flow of the health service waste, the routing to the sterilization or grinding process, and the number of waste collections required for each FHU.⁸

FHUs, as well as the Health Secretary of the municipality, must elaborate a PGRSS, pointing out and describing the actions related to the management including aspects such as segregation, packaging, storage, collection and final treatment, and this should be elaborated by a qualified professional having a higher education degree.⁸ The lack of a PGRSS hinders the correct information on how to carry out the final disposal, thus causing the incorrect disposal of medicines.¹²

In addition to not having a routine regarding the disposal of medicines, there is also no qualification of the health teams on this topic since all the interviewees reported having no previous training on the disposal of medicines.

"From the Health Secretary about the disposal of medicines, no. We have no training. What we have is the biochemistry and pharmacy assistance. When we have any questions, we are free to call her." (N3)

"We get a lot of training, but not with that focus." (A2)

Studies carried out in a hospital and in a Family Health Strategy (FHS) settings show that most of the professionals do not receive any training on health service waste.²¹ This training is important because it sensitizes the professionals to carry out the disposal appropriately and, in this sense, the ANVISA provides manuals that offer information about waste management, including the implementation of the PGRSS.²¹

In FHSs, the training should also make the health professionals closer to the real needs of the users and the system. In addition to enabling professional improvement, training is an important mechanism in increasing the team design and the link between professionals and the population - a characteristic that ground all the work of the FHS.²⁷

Regarding the relevance of the training on medicine disposal, all community agents claim it to be important:

"I think it would be because of course not all of them call us and give us, with others I have no idea what they do, so it would be a multiplier we know how to guide properly, I think it would be very important." (A3)

"It would be very important because I don't have this clarification, maybe if we had it... Look, let's do it and such, such place gets the medicines, take them there, we would pass it on to the community and the community would do it, too. Having this vision of what to do." (A4)

The testimonials point out to the interest of the community health agents in having information not only for themselves, but to be multipliers of this knowledge to the community, applying one of the responsibilities of the community health agent, which is to develop health promotion activities, disease prevention and health surveillance, through home visits and individual and collective educational actions at home and in the community.²⁸

Also regarding the difficulties encountered to carry out the disposal, only one nurse technician and two nurses stated that there was some difficulty, which would be the lack of time to perform it.

"It's that it robs us a lot of time, it releases us from a lot of time, it takes, it takes the withdrawal of the cabinets, medicines, it puts, it protocols, it sends, it's the lack of time itself."

"I think we don't have enough time, because today's time is not enough for us to do what we have to do now, so one more thing I find difficult." (N2)

"It's just that sometimes we don't have time." (T3)

It is known that the nursing team has many assignments within the FHU, which can cause the concern about waste disposal to be considered as one more assignment. In a study carried out with health workers²⁴ that aimed to know their perception about the environmental responsibility, the lack of time and incentive were also described as adverse conditions for the accomplishment of some socio-environmental activity. It is understood that some health teams lack professionals, which may influence their work dynamics.²⁴ However, working under an environmental perspective is not restricted to the need for time alone, but to an imperative of responsibility, sensitivity and environmental rationality that allows the development of labor activity through new perspectives and care, taking into account the specificities of the environment, which includes the proper disposal of medicines.²⁹

CONSEQUENCES OF THE INCORRECT DISPOSAL OF MEDICINES

Some of the interviewees expressed that the environmental contamination is the main consequence of incorrect disposal, according to the following testimonials:

"Environmental aggression, mainly in water, in rivers, I've once read a research that they did with that hormone,

that women took contraceptives, and the fish with feminine characteristics and such, then I was nervous [...] You know, it's a giant chain, you interfere in this business all the time, it's very confusing, I think the result may not arise now but it'll do it in a while. (P2)

"I believe that the main thing is the aggression to the environment itself because these substances interact [...] I think the damage is even more environmental." (N4)

The chemical properties of drugs present a potential risk to public health and the environment. Their waste has some components that are difficult to decompose, which can contaminate the soil and water.³⁰ This contamination is still a subtle form of pollution, as from 33% to 90% of all medicines consumed are excreted in the urine, and injectable drugs are eliminated through feces and urine in their original form, which can be active or inert metabolites.³¹

Among the residues of drugs considered dangerous by Brazilian laws, it can be cited: hormonal products; antimicrobials; cytostatic; antineoplastic agents; immunosuppressants; cardioglycosides; immunomodulators and antiretroviral drugs. When discarded incorrectly, they can be directly sent to the landfill, exposing urban cleaners and recyclers to direct contact with toxic agents, as well as facilitating the contamination of the environment.³²

People are not the only ones to be affected by the incorrect disposal of medicines, animals also suffer from this pollution, because some drugs, such as estrogens, compromise the endocrine system of aquatic organisms, feminizing male fish, thus generating an imbalance in nature.²³ There is also a research indicating that the exposure to active hormones in some animals during the prenatal period and even in adulthood increases the vulnerability to various types of cancer such as tumors in breasts, ovaries, prostate, and uterus.³³

Another consequence of the incorrect disposal of medicines reported by some professionals was the fact that another person takes medicines incorrectly discarded, making it a risk to his health:

"[...] improper use by others who have no indication. (P1)

Until these days I was talking to my daughter, you do not discard medication in the garbage, someone can take it, a child that tastes the garbage can take it, you don't know what it is, what you use it for, people still have the culture of self-medicating, then it's not cool, I believe, it's a risk to the people's health to discard it incorrectly. (A2)

"For example, if you don't dispose of it correctly, the destination where it goes, another person, a child can take it, this has already happened here." (N3)

The most common medicines found in the environment are: Atenolol, ibuprofen, paracetamol, dipyron or sodium

metamizole, simvastatin, fluoxetine and contraceptives³¹. The improper use of these medicines can lead to health problems.

A doctor and a nurse have reported bacterial resistance to drugs as a consequence of incorrect disposal.

"It's that you are causing drug resistance because it goes to the environment so the organisms are becoming more and more resistant to that antibiotic." (N1)

"In the case of antimicrobial drugs, not only the antibacterial ones, any antimicrobial drugs, any agent that has action on some living organism, you know, they will select multiresistant organisms." (P4)

Antibiotics are a class of drugs that are extremely harmful to the environment, because when there are environments exposed or contaminated by these drugs, the bacteria present may acquire resistance to these substances, since these organisms have genetic material with high mutation capacity.³⁰

The limitation of this study was the short time for data collection that made it impossible to conduct interviews in all units and with greater number of professionals. In this way, the data of this research cannot be generalized.

CONCLUSIONS

The results found in this study allow us to conclude that the workers do not follow all the steps of the correct disposal. The concern about the delivery of these drugs to the Health Secretary of the municipality is greater than the handling of the waste within the FHU. Furthermore, despite the existence of Brazilian laws about this subject, the interviewees are unaware of them.

By revealing the facilities and difficulties encountered by the workers to carry out the disposal of medicines, and inferring the knowledge and consequences of incorrect disposal, this study points out to the lack of training and information of workers of all professional categories as an aggravating factor. Moreover, this emerges to the need for elaborating a PGRSS, believing it is worth to minimize the execution of mistaken practices regarding the disposal of medicines in FHUs.

The study professionals identified the contamination of the environment, misuse of incorrectly discarded medications and bacterial resistance to medications as the main consequences of incorrect disposal. In this sense, the delivery of a leaflet after the interviews allows the workers to stay in touch with the correct information on how to dispose of the waste and the environmental consequences of the incorrect disposal, being a way of instigating them to find more information.

Nursing becomes extremely important for issues related to discarding, as it ends up assuming responsibility for it. Additionally, the nurse has the duty to obtain this knowledge in order to propagate it through his team, in order to multiply this knowledge beyond the walls of

the FHU, reaching users by making them rethink their actions about this subject.

Studies like this are important, since they can collaborate for strategies about the disposal of medicines in Brazil, as well as assisting in the field of research for future work. In addition, it can contribute to the management and assistance making managers, professionals and users rethink about their actions, improving public and environmental health.

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