

# The population's knowledge about the proper disposal of expired medication

## O conhecimento da população sobre o descarte adequado de medicamento vencido

### El conocimiento de la población sobre la correcta eliminación de los medicamentos vencidos

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**How to cite:** Parente GC, Silva MMP, Carvalho CR. The population's knowledge about the proper disposal of expired medication. *REVISA*. 2020; 9(4): 784-91. Doi: <https://doi.org/10.36239/revisa.v9.n4.p784a791>

# REVISA

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Received: 10/07/2020

Accepted: 12/09/2020

#### RESUMO

**Objetivo:** investigar o conhecimento da população sobre maneira correta de descarte do medicamento. **Método:** pesquisa descritiva qualitativa com aplicação de questionário estruturado e 59 pessoas foram escolhidas aleatoriamente para colher as informações, em maio de 2020. **Resultado:** Observou-se que 88,1% dos entrevistados tem o hábito de olhar a validade do medicamento, 54,2% compra somente o que o médico prescreve, 61% descartam o medicamento vencido no lixo comum e 22% disseram devolver no posto de saúde ou farmácia, 55,9% disseram ter conhecimento do local correto de descarte, 67,8% afirmaram saber que o descarte inadequado tem impacto no meio ambiente, 40,7% jogam fora a medicação em desuso. **Conclusão:** O desenvolvimento do presente estudo possibilitou enxergar que quase a totalidade das pessoas pesquisadas não faz o descarte de forma adequada, não tem conhecimento sobre os locais de entrega destes medicamentos e uma parcela significativa não sabe que o descarte inadequado tem grande impacto ao meio ambiente.

**Descritores:** Medicamento; Descarte; Meio ambiente; População.

#### ABSTRACT

**Objective:** to investigate the population's knowledge about the correct way to dispose of the medication. **Method:** A qualitative descriptive research was carried out with the application of a structured questionnaire and 59 people were chosen at random to collect the information, in May 2020. **Results:** 88.1% of the interviewees have the habit of looking at the validity of the medication, 54.2% buy only what the doctor prescribes, 61% discard the expired medicine in the common garbage and 22% said they return it to the health post or pharmacy, 55.9% said they knew the correct disposal site, 67.8% stated they knew that inadequate disposal has an impact on the environment, 40.7% throw away the disused medication. **Conclusion:** The development of the present study made it possible to see that almost all of the people surveyed do not dispose of properly, do not have knowledge about the places of delivery of these drugs and a significant portion does not know that inappropriate disposal has a major impact on the environment.

**Descriptors:** Medicine; Disposal; Environment; Population.

#### RESUMEN

**Objetivo:** investigar el conocimiento de la población sobre la forma correcta de desechar el medicamento. **Método:** investigación descriptiva cualitativa con la aplicación de un cuestionario estructurado y se eligieron aleatoriamente 59 personas para recolectar la información, en mayo de 2020. **Resultados:** Se observó que 88.1% de los entrevistados tienen el hábito de mirar la validación de la medicación, 54, El 2% compra solo lo que prescribe el médico, el 61% descarta el medicamento caducado en la basura común y el 22% dice que lo devuelve al puesto de salud o farmacia, el 55,9% dice conocer el sitio de eliminación correcto, el 67,8% dice saber que la eliminación incorrecta tiene un impacto en el medio ambiente, el 40,7% juega por el medicamento en desuso. **Conclusión:** El desarrollo del presente estudio permitió ver que casi la totalidad de las personas encuestadas no disponen de forma adecuada, no tienen conocimiento sobre los lugares de entrega de estos medicamentos y una porción significativa desconoce que la disposición obsoleta tiene un impacto importante en el medio ambiente.

**Descritores:** Medicamento; Disposición; Medio ambiente; Población

ORIGINAL

## Introduction

Health industries and services have been major generators of waste. However, for a long time, due to the lack of regulation on the subject, the correct destination and treatment were not given to them. In this perspective and in view of the global situation of prevention of possible risks arising from the bad destination of waste of various types, the Brazilian state also had the responsibility to intervene, through public policies, for the formulation and implementation of strategies, in order to guide on the management and the final destination of health service waste. Thus, both the Ministry of Health and the Ministry of the Environment have established regulations for the management of waste generated in different health establishments.

The Brazilian culture of self-medication and the easy acquisition of these products ended up generating a collection of medicines in Brazilian homes. The "home pharmacies", as they are known, usually contain some formulas reserved for emergencies (flu, painkillers, antipyretics), sold without a prescription, together it is very common to contain leftovers of controlled drugs (antibiotics, among others) that will probably no longer be used. used but kept until the expiration date.<sup>1</sup>

To reverse this scenario, the Federal Government regulates the flow for the correct disposal of drugs with an environmentally appropriate destination.<sup>2</sup>

Medicines disposed of improperly, especially in the common garbage or in the sewage network, can contaminate the soil, surface waters, as in rivers, lakes and oceans and groundwater, in groundwater. These chemicals, when exposed to adverse conditions of humidity, temperature and light, can turn into toxic substances and affect the balance of the environment, altering biogeochemical cycles, interfering in the webs and food chains. Examples include antibiotics that, when improperly disposed of, favor the emergence of resistant bacteria, and the hormones used for replacement or present in contraceptives that affect the reproductive system of aquatic organisms, such as the feminization of male fish.<sup>3</sup>

However, drugs are not removed by conventional water treatments, as their chemical properties are persistent, have a high potential for bioaccumulation and low biodegradability. Therefore, there is no sanitary method to remove them completely from the water, even in a sewage treatment network.<sup>4</sup>

The release of medications in quantities greater than the treatment may occur, due to incomplete or incorrect prescription, failure to check the prescription, at the time of dispensing, to error by the dispenser. It is also necessary to make the population aware of the correct final destination of medicines and the problems that can be caused, if it is done incorrectly. Awareness can be raised through educational programs and campaigns to collect medicines that are no longer used.<sup>5</sup>

In contrast, the National Environment Council (CONAMA) aims to classify and evaluate the disposal of solid waste in the environment. In its Resolution No. 358, of 04/29/2005, Article 21, solid waste is classified according to the hazard it offers to health professionals, the population and the environment. Among the residues belonging to Group B are cytostatic, antimicrobial and chemotherapeutic drugs, among others, and these must undergo specific treatment and final disposal. In addition to CONAMA, the

Ministry of Health also has responsibilities for the disposal of solid waste, which is carried out by ANVISA, which has the obligation to guarantee the sanitary safety of products and services, through inspection.<sup>6</sup>

In this case, the legal responsibility for solid residues of pharmaceutical origin lies with both the Ministry of Health and the Ministry of the Environment. These bodies are responsible for ensuring the correct disposal of waste, as they work with the same objective: precaution with public and environmental health.<sup>7</sup>

The National Congress is processing Bill No. 595/11, which adds Article 6 to Law No. 5991/73, which provides for the sanitary control of the trade in drugs, medicines, pharmaceutical supplies and related items. This PL aims to oblige pharmacies, drugstores and health centers to receive expired medicines from the population or to expire and send them to the laboratories of the pharmaceutical industry, which in turn must allocate them in an appropriate and sustainable way to the environment.<sup>8</sup>

This work aimed to analyze the population's knowledge about the correct way to dispose of expired drugs within a sample of 59 volunteers. The study will also discuss the consequences of the incorrect disposal of expired medicines for the environment.

Although it is not known to the majority of the population, common garbage or toilets are not the correct destinations for disposal of these products. Thus, the discussion about medicines should be an issue not only in the political space, but also in academia and health services.

In this sense, this study aimed to assess the knowledge of the population about the disposal of expired medication and the degree of knowledge about the existence of places to receive this waste and their knowledge about the environmental impacts.

## **Method**

This study had priority to bibliographic research, interviews through research questionnaire and scientific articles.

All activities related to the research depended on the problem and the questions that were answered throughout the study, and to answer the proposed objectives, a qualitative and descriptive research was used, through a cross-section, which was intended to investigate empirically, the purpose and design of the study.

Structured data collection was used from a standardized questionnaire with a direct approach from users with the main points to be considered in the study, seeking to identify behavioral niches.

The questions were based on the personal experiences of the authors and on the information found during the research regarding the "home pharmacy". Data collection was used to assess people's behavior regarding the disposal of expired drugs, the level of awareness about disposal sites, collection and environmental impact.

The questionnaire consisted of two parts: a first to assess the interviewee's profile (age, sex) and a second part with questions to analyze the disposal of medicines by the population and their knowledge about this procedure.

In confrontation visits were made to health posts and pharmacies, in order to obtain information on the collection and final destination of the discarded drugs.

Although it was desirable to obtain a representative sample, since the unit of analysis refers to the general population, a sample was obtained for convenience. The sampling technique used was non-probabilistic, guided by the choice of elements for convenience. Another fact to be considered is that the respondents' participation was voluntary, free and consented.

The choice for the unit of analysis evidenced in the general population was due to the fact that they understand that there may be, in the interviewees, a variation that have medicines in their homes and need to discard at some point.

59 questionnaires answered online were collected, in a period of 10 days in May, in the city of Valparaiso de Goiás, as a selection criterion to participate in the evaluation, a minimum age of 20 years and 41 years or more was established, preserving the interviewee privacy.

## Results

The sample consisted of 48 females (81.4%) and 11 (18.6%) males. There was a predominance of females. The average age of the interviewees was 31 to 40 years, as described in table 1.

**Table 1-** Frequency and distribution of age group.

Age Range	Amount	Percentage
20 to 30 years	9	15.3%
31 to 40 years	26	44.1%
41 or more	24	40.7%

We was asked if the interviewees are careful to observe the expiration date of the medication 52 (88.1%) answered that YES, they are concerned with the expiration date of the respective.

Another important point to know if the population buys medicine beyond what they need, 32 (54.2%) answered to buy only what is on the prescription and 27 (45.8%) replied to buy beyond the prescription, all this it generates unnecessary accumulation.

According to the expired drug disposal table, 1 (1.7%) respondents discard it in the bathroom sink and 9 (15.3%) discard it in the toilet and 36 (61%) discard it in the common trash, which is a significant portion 13 (22%) discard or return it to the health post or pharmacy.

**Table 2-** Destination of expired drugs.

Destination of expired drugs	Amount	Percentage
Discard in the bathroom sink	1	1.7%
Discard in the toilet	9	15.3%
Dispose at home in the trash	36	61%
Returns / discards at the health post or pharmacy	13	22%

It was asked about general knowledge of drug disposal and 33 (55.9%) will answer NO knowing the correct place of disposal and 26 (44.1%) answered that YES know where to discard expired drugs.

Regarding the destination of the medicine that remains and no longer uses it 24 (40.7%) throws it away, 20 (33.9%) replied save and 15 (25.4%) answered

another destination. Another important fact is to know if the population is aware of the impact generated on the environment, 40 (67.8%) will answer Yes and 19 (32.2%) Not knowing the impact on the environment.

## Discussion

Technologies and human intelligence are not efficient for impacts that are being caused to the environment. Therefore, from this work it was possible to verify a great concern of the population about the incorrect disposal of medication and also the final result of disposal in relation to the environment. For this, society needs to intervene immediately seeking alternatives to reduce this contamination that has been happening with gradual increase with frightening and drastic results, in which humanity itself is suffering from the manifestations caused by different types of pollution.

The contamination of the environment by medical chemical residues is directly associated with its qualitative aspects and inadequate waste management policies, which may come from large waste generators (chemical-pharmaceutical industries), small waste generators (teaching and research institutions, hospitals, dental, medical and veterinary clinics) and micro generators, which are homes and farms.<sup>11</sup>

According to ANVISA it is estimated that about 30 thousand tons of medicines are thrown away by consumers every year in Brazil. The pharmaceutical industries generate a considerable amount of solid waste due to the return and collection of medicines from the market, the disposal of medicines rejected by the quality control and losses inherent to the process.<sup>12</sup>

The accumulation of medications in homes can produce leftovers, with several causes for leftover medications, among them are the dispensing of medications in quantity, in addition to what is necessary for treatment, the free samples distributed by pharmaceutical laboratories as a form of advertising, and inadequate drug management by pharmacies and other health facilities.<sup>3</sup>

Therefore, it presents itself as one of the gaps in the legislation, which establish responsibilities for manufacturers, distributors and health services, but do not institute actions for the disposal of medicines by users, nor do they determine the type of treatment according to the different classes of medicines, the that can harm the correct management of these residues.<sup>13</sup>

However, the preventive form of waste generation and, consequently, the pollution of the environment, it is necessary to promote the execution of the fractionation of medicines not only by the Unified Health System, but also, in private pharmacies and drugstores. Many industries have not yet adapted the packaging of their products to the conditions set out in Decree No. 5,775 of 2006, which provides for the fractioning of medicines, making it impossible for establishments already qualified to practice. The fact that the vast majority of drug users read the package inserts suggests that they could contain alerts and guidelines for their disposal.<sup>14</sup>

A pioneering initiative in Brazil is the "Farmácia Solidária" Program, which has existed for 10 years in Brazilian municipalities. The program aims to provide guidance on the correct destination of medicines, their collection and donation within the concept of "solidarity pharmacy". Volunteers collect leftover medications from homes and businesses and set up small pharmacies whose

products are distributed, free of charge and with pharmaceutical guidance to needy people.<sup>16</sup>

Pharmacies are based at their own addresses and inside public hospitals. By removing medicines from homes, the program reduces the danger of self-medication, rationalizes use and avoids waste with leftovers. Then, when selecting the items collected, solidary pharmacists perform the correct disposal, following scientific protocols. Action that resembles the points of drug disposal implemented in pharmacies, large retailers and hospitals. They are places where the population can take the medicines, expired or not, to be disposed of correctly.<sup>16</sup>

According to the regulations, sanitary and environmental, it is the responsibility of the legal guardians to manage waste from generation to final disposal, in order to meet environmental, public health and occupational health requirements, without prejudice to joint and several liability, which directly or indirectly cause or may cause environmental degradation.<sup>15</sup>

However, the most interesting thing would be the creation of stricter public policies, and the responsibility of manufacturers and suppliers for the collection and proper disposal for the residues of their products and services, through the publication of mandatory standards and the granting of incentives for their fulfillment.<sup>12</sup>

This study highlighted the importance of implementing a waste management system from health services and the community, which aims to reduce risks to immediate health and the environment, since drugs are important therapeutic agents in health systems, however generate a significant environmental liability and its users need to have the perception that they must have an appropriate destination.<sup>13</sup>

Therefore, while it is not possible to create an effective management of disposal of medical waste generated in homes, it is necessary to guide the population on the consequences of improper disposal of medicines, through educational programs or campaigns to collect medicines that are no longer used, that could be reused depending on their presentation conditions or forwarded to the competent health agencies (health posts, hospitals, drugstores) for proper disposal, which is a convenient situation for the companies that supply and produce them.<sup>17</sup>

## **Final Considerations**

Currently, much has been discussed about pollution and its consequences for the environment due to environmental changes, with the disposal of medicines having an environmental impact, by identifying the presence of drugs, both in water and in the soil.

The development of this study made it possible to see that almost all of the people surveyed do not dispose of properly, do not have knowledge about the places of delivery of these drugs and a significant portion does not know that inappropriate disposal has a major impact on the environment.

It was found in this research the lack of public power to invest in promotion campaigns aimed at raising public awareness regarding the disposal of expired medicines.

There is an immediate need, on the part of the government, to run information campaigns, using the main means of communication such as radio, internet and TV, mainly in prime time, in order to maximize the reach of objective. It is important to note that the inappropriate disposal of medicines has a relevant environmental impact, a fact that must also be addressed in public awareness campaigns, as society in general is unaware of the consequences that this act can cause to the environment.

## Acknowledgment

This research did not receive funding for its performance.

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