

Disposal of Pharmaceutical Waste by the Rural Population

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Abstract: Improper disposal of expired medicines and treatment leftovers can contaminate the environment and compromise the human health, however, the implementation of reverse logistics for medicines is a challenge for municipalities. The objective of this study was to characterize the medicines disposal by the rural population of the Correia Pinto municipality/SC. Study was quantitative, descriptive-transversal, with data collection in the field from the application of a questionnaire to 156 rural residents. The results showed that basic sanitation is precarious, as 64.7% of people consume untreated water and are not served by waste collection, although 94.9% use the septic tank as sewage treatment. A high percentage of the population (63.43%) reported the daily use of medication. About 75% discard leftovers from drug treatment and expired drugs inappropriately. The data collected can contribute to the implementation strategies of the reverse logistics system for medicines waste, in addition to show the gaps in rural sanitation.

Keywords: Emerging pollutants. Rural population. Environmental contamination. Basic sanitation. Chemical waste.

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São Paulo. Vol. 26, 2023

Original Article

DOI: <http://dx.doi.org/10.1590/1809-4422asoc20220044r1vu2023L1OA>

Introduction

The emerging contaminants are synthetic chemical or natural compounds which are not usually watched on the environment and are not into the vigilance programs, but they have potential to cause harmful effects to the environment, to the wild life and to the population's health (FREITAS; RADIS-BAPTISTA, 2021; RÍOS *et al.*; 2021; USEPA, 2021; ROSENFELD; FENG, 2011). They consist of pharmaceutical compounds, industrial chemical products, surfactants, personal care products, among others (ROSENFELD; FENG, 2011). The drugs widely used with therapeutic purposes in human, veterinary and aquaculture medicine are increasingly more present into many environmental matrices, mainly water and soil, either by the discharge of original products or its metabolites (COSTA *et al.*, 2020; HEBERER, 2002; RÍOS *et al.*, 2021). Most of the pharmaceutical products found in the environment are from human activities, which include its making, consumption in order to heal diseases, inadequate disposal of expired medicines and disposal into the environment of residual water from houses and hospitals (PEÑA-GUZMÁN *et al.*, 2019, TENORIO-CHÁVEZ *et al.*, 2020).

The pharmaceutical waste is classified as health system waste (HSW), and, according to RDC 222/2018, it is defined as HSW makers all the services which its activities are linked to human or animal health care (BRASIL, 2018). In Brazil, 2017, 256.941 tons of health system waste (HSW) were collected, treated and had its environmentally friendly disposal (ABRELPE, 2017). Into this category are included chemical waste (Group B) that embraces chemical substances, blister packs, bottles, tubes, medicine leftovers and expired medicine (BRASIL, 2018). According to ABRELPE, each inhabitant in Brazil makes around 1,2 kg of HSW a year. From this amount, it is estimated that Brazil's populations discard every year more than 10,3 tons of medicine waste (BRASIL, 2013). From the Brazilian municipalities, 27,5% allocate their HSW without declaring previous treatment to it, going against the current sanitary rules (ABRELPE, 2017). An interview done by Quadra *et al.* (2019) with a sample of 540 people from different states demonstrated that 66% of the interviewed people throw away their expired medicine and other medicines they do not use anymore in the common garbage can and 7% throw away in the sink or the toilet, moreover the researchers found out that 71,9% of the people interviewed never received information regarding the adequate way to discard the medicine.

The Brazilian law about the health system waste management has been advancing by the publishing of many laws, resolutions and normative to give the environmental adequate destination for those dangerous waste, involving the Health and Environment Ministry. The most important ones are Decree 10.388/2020, RDC 222/2018 from AN-VISA and the resolution 358/2005 from CONAMA, which must be respected by the people who are involved in activities that generates health system waste (BRASIL, 2005, 2018, 2020). Only in 2020 it was published the Decree 10.388/2020 which regulates the reversal logistic to home expired or unused medicine, as well as its packages, after the disposal from its consumers (BRASIL, 2020). Up to this point, there was no protocol to guide the population about the disposal of those items. The decree also details the responsibilities of the consumers, drug stores, distributors, manufacturers and importers

regarding handling and disposal of home medicine (BRASIL, 2020).

According to the quoted law, the consumers must discard the medicine at fixed locations in drugstores, which have to make available dispensers into their facilities in the proportion of one place for every ten thousand inhabitants (BRASIL, 2020). The law makes no reference to small municipalities and rural area population.

After being collected by the drugstore, the adequate final destination of the medicines is a special landfill to chemical products, incinerated or co-processing, and the procedure's cost has to be paid by the manufacturers and importers (BRASIL, 2018, 2020). It is important to emphasize that the HSW have many compositions, and it changes constantly, making it harder to make a standard procedure in order to manage and discard the waste in an environmentally safe and economically affordable way.

The health system waste can be dangerous to public health or the environment, due to its flammability, corrosiveness, toxicity, and reactivity (BRASIL, 2018). In Brazil, some studies have detected medicine molecules or its metabolites in the environment, such as antibiotics, antihypertensive, anti-inflammatory, antidepressant, antimicrobials, benzodiazepines, hormones, among others (BERETTA *et al.*, 2014; IDE *et al.*, 2017; LOCATELLI *et al.*, 2011; MONTEIRO *et al.*, 2016). A study done in São Paulo State, where it was analyzed Atibaia River's water, in order to look for the waste from the main antimicrobials drugs sold in Brazil, it was detected contaminants antibiotics such as amoxicillin, cephalexin and norfloxacin (LOCATELLI *et al.*, 2021). At the coast of Salvador, BA, Brazil, more specifically at Todos os Santos Bay, that drains many hydrographic basins, it was also found the presence of many different drugs in the aquatic ecosystem, such as ibuprofen, atenolol, diclofenac, diazepam, carbamazepine and erythromycin (BERETTA *et al.*, 2014). Despite the studies have shown the drug presence in shallow and deep water, the current water potability legislation do not monitor such substances in the distributed water to the Brazilians (BRASIL, 2017; HESS, 2018).

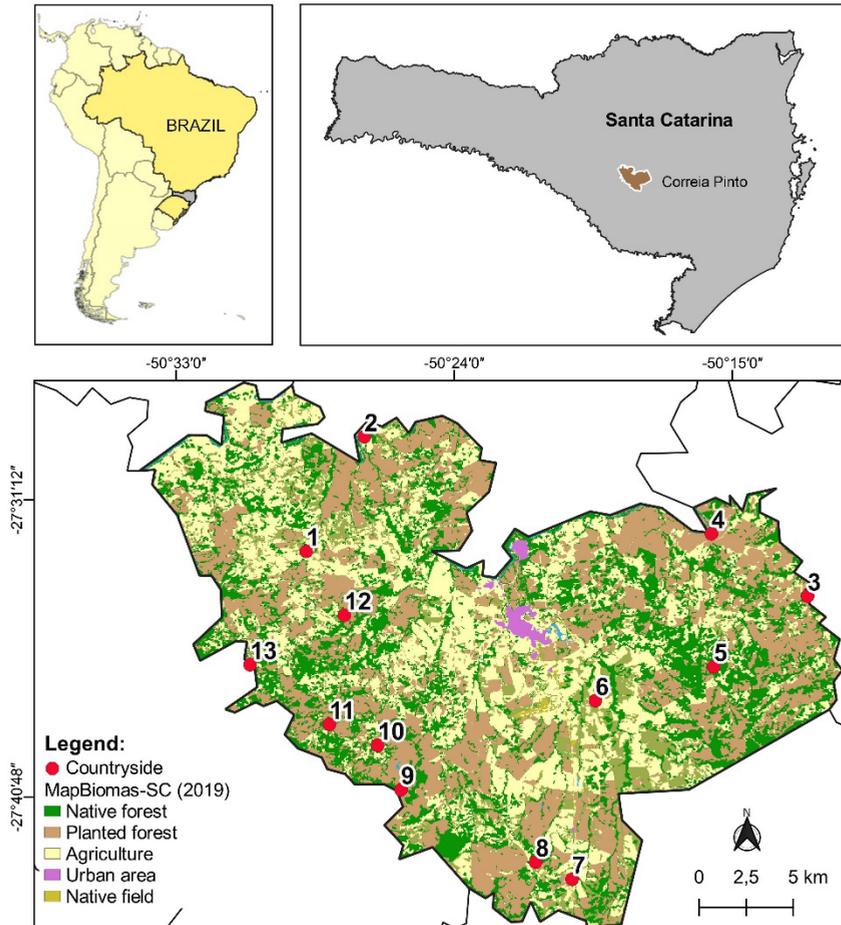
The worry gets bigger about the countryside, since the inadequate waste disposal can contaminate the water catchment reservoir to consumption. It is important to emphasize that the area of this study is in the hydrographic basin from Canoas River, where there are many sources and streams which supplies the Aquifer System Guarani/Serra Geral with many places which sandstone rocks appear to recharge aquatic systems used to supply the population from the municipality as well as the region with water (CURTARELLI; SILVA; FERREIRA, 2010). However, in Brazil there is few data about waste management, specially regarding medicine in rural area. So, the objective of this study is to characterize the medicine disposal by the rural population from the municipality of Correia Pinto situated at Catarinense Plateau, also to get information about the access to the water supply, as well as the sanitary sewer in rural zone.

Methodology

The research was done in 13 places covered by Correia Pinto's Health Secretariat,

located in Serrano Plateau from Santa Catarina, Brazil (Figure 1). The municipality has an area of 623.77 km², being part of the Hydrographic Basin from Canoas River and currently has a population of around 14.785 inhabitants, from those 2.293 inhabitants (15.5%) live in the rural zone (IBGE, 2010). The municipality has low Human Development Index (HDI = 0,702). The town has its economy based on agribusiness, more specifically agriculture and silviculture.

Figure 1 - Location of the places selected to study in Correia Pinto, Catarinense Plateau



Source: authors, 2023

The rural population is assisted by a multidisciplinary team from Health Municipality Secretariat (HMS) formed by a doctor, a nurse, a pharmacist, a nurse assistant, a dentist, tooth/dental hygiene assistant, a laboratory assistant and two drivers, who frequently go to the inner locations from the municipality, offering medical and dentist care, health exams, medicine, and lectures in order to instruct about health care.

The municipality also has 4 public medical clinics located downtown and 3 in different neighborhoods, as well as a hospital working 24 hours a day. It also has a public pharmacy and six drugstores.

The research was transversal-descriptive, with quantitative approach and data gathering from the places in which people have been assisted by HMS. The participants selection for this research was made by convenience, since the people were available at the places determined by HMS to receive assistance from the health team. The average of people attended during a week is 20 people in each rural location. So, the people attended between August to November 2019 were invited to attend this research, in a total of 260 people attended.

From this amount of people (260) it was made the sample calculation. To the calculation it was used the sample error of 5% and reliability level 95%, by this method the outcome of representative sample is 156 people who attended the research. The sample calculation was made by SestatNet program (NASSAR *et al.*, 2019). It is important to emphasize that the research attendants were selected by the following method: people who live in the rural area from Correia Pinto, SC, Brazil who looked for medical assistance from the health assistance team during the research period, people over 18 years-old, individuals who agreed to sign Free Informed Agreement Term (FIAT) and attend the research by free will. The research was approved by Research Ethic Committee with human being from Catarinense Plateau University, under the rule n.3.380.101.

The tool used to gather the data was a questionnaire made with both closed and opened questions about sociodemographic data, basic sanitation, medicine used by the population, and how the disposal of expired and leftover medicine and packages was done, thus the population's perception about such matter related to environmental contamination by this waste. The questionnaire was read by the researchers and the answers were taken according to what the interviewed told (face to face).

As the participants went to receive medical care by HMS team at the rural location, they were invited to attend the research, so the researcher in charge read FIAT, explaining the research. The questionnaire was made in a private individual place to ensure the participant's privacy, with an average time of 20 minutes.

With the gathered data from 156 people it was established the profile of the sample population, made by people from the rural area (90.38% n=141 people), females (53.84%, n=84 people), with low (41.67% n=65) or no (12.18% n=19) level of education and earnings of one Brazilian salary or less (48.08%, n=75), calculation done with the average salary from 2019 in Brazil (Table 1). The average age of the participants was 52 ± 15.32 years old, from those 41.67% (n=65 people) from the sample population is from ages of 41 to 59 years-old, 33.97% (n=53) from age over 60 years-old and 24.36% (n=38) between 18 and 40 years-old (Table 1).

Table 1 - Sociodemographic profile from the sample population of a municipality from a catarinense plateau (n=156 participants)

Demographic data	n	%
Genre		
Male	84	53,85
Female	72	46,15
Age		
18 to 40 year old	38	24,36
41 to 59 year old	65	41,67
≥60 year old	53	33,97
Level of Education		
Non literate	19	12,18
Literate	65	41,67
Elementary school	50	32,05
High School	19	12,18
University education	3	1,92
Income		
≤ 1 salary	75	48,08
>1 <3 salary	63	40,38
≥ 3 salary	18	11,54
Relation about land ownership		
Owner	141	90,38
Tenant	5	3,21%
Worker	20	6,41

Source: Authors, 2023

The data obtained was tabulated in Excel app and submitted to descriptive statistical analysis (percentage, average and standard deviation) and the results presented in figures and tables. Beside this, the sociodemographic variables were associated with consumption variables and medicine disposal through chi-squared test by Statistical Package software for the Social SPSS 2.0, adopting a significance level of 5% ($p \leq 0,05$).

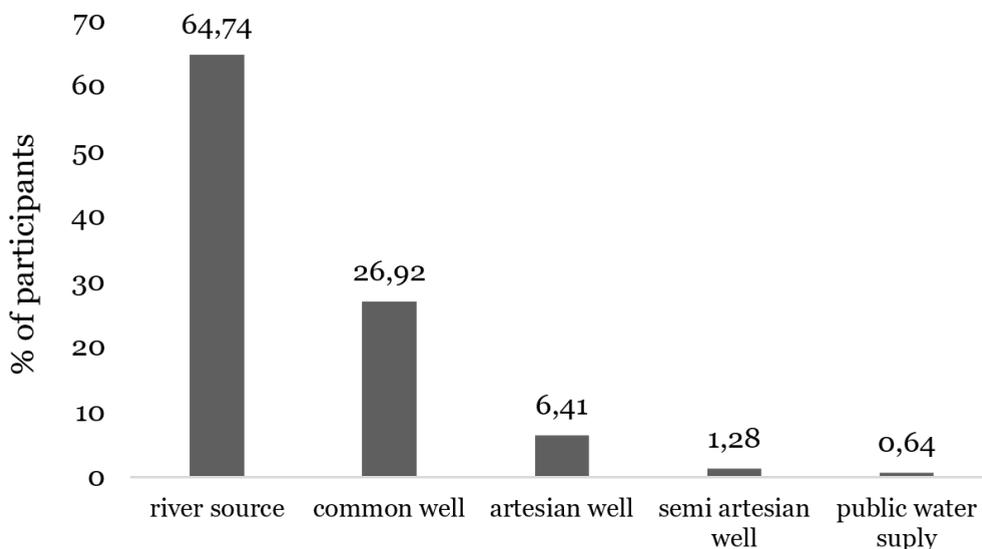
Results and discussion

The data has evidenced that there is still a lack of basic sanitation in the rural area, considering the access to potable water, treatment and collecting of waste, as well as expired and non-used medicine. Also, this research evidenced a high usage of medicine

related to chronic diseases and inadequate disposal of them, such as putting in home trash, burning, burying and discarding in sinks and toilets.

Concerning the access to drinking water, most (64.74%, n=101) participants have informed that they get water to consume straight from the natural source, without any protection of it, just 8,33% (n=13) of them had any kind of appropriate water capture (artesian well, semi artesian well and public water supply; Figure 2). Only 30.76% (n=48 people) did water quality parameter analysis.

Figure 2 – Water sources for human consumption used by the research participants in rural locations from Correia Pinto, municipality from Catarinense Plateau (n=156 participants)



Source: Authors, 2023

A high amount of people, 67.30% (n= 105 people) consume water without any treatment, only 26.28% (n= 41) use hypochlorite, 5.76% (n=9) use to boil the water before consuming and 0.66 (n= 1) use a filter. Such data is worrying because although the research has not analyzed the quality parameters from the consumed water by the participants, other research made in rural lands from Santa Catarina's southern plateau, a close region to Correia Pinto, had shown that 80% from the 56 analyzed sources were contaminated by fecal coliforms (RAMOS *et al.*, 2018). Another interesting data is the low percentage of people who use either filter or boiling water. In the same way, Rosseti, Caporlingua, Moura (2019) emphasize that despite filtering and boiling the water are efficient, cheap and accessible methods, they are not applied regularly by people from rural areas, this may occur by the lack of knowledge about the benefits of those methods.

There was a significant association between the kind of water source and the

relation of the participant towards the property ($X^2 = 31,30$, $p \leq 0,000$), in this sense the percentage of participants who get water from rivers and sources are also landowners, whereas the tenants have common well and the workers use both artesian and river sources to obtain water for consumption.

Related to house's sewer treatment, 94.87% ($n = 148$) use septic tank and 5.13% ($n = 8$) throw away the sewer directly on the soil. It was reported that 64.74 ($n = 101$) of the interviewed have a source, stream or river passing through their lands. The very distinct result from the Brazilian panorama of sewer treatment of rural areas which is still very precarious, since only 17% of rural population have adequate attendance, at the North region 49.7% of the rural houses have a rudimentary tank, while the South region has the biggest percentage of houses with conditions considerate adequate (31.7%) like the general sewer system or the septic tank (IBGE, 2010). So, the data found in this research shows a better panorama regarding sanitary sewer in the municipality, where around 95% participants reported to have septic tank, in spite of the quality from those devices not being evaluated. It is also important to emphasize that this research can reflect upon the participant's perception about what they consider to be septic tank, since it was not investigated the characteristics of septic tank and if in fact they were such treatment method. Similar results were registered in research in Novo Hamburgo, RS, Brazil, in which 88% from the 26 people interviewed reported using the septic tank system in order to treat effluences in rural properties (ROSSETTI; CAPORLINGUA; MOURA, 2019).

When the participants were inquired about medicine usage and health condition, 63.43 ($n = 99$ people) reported everyday medicine usage and 65.38% check the expire date from it (Figure 2). The most used therapeutic kinds by the participants were the antihypertensives (64.65%, $n = 64$), diuretic (36.36%, $n = 36$), and antilipemic (24.24%, $n = 24$), controlled medicine according to rule 344/98 ANVISA (23.23% $n = 23$), antiulcer (19.19%, $n = 19$) and hypoglycemic (17.17%, $n = 17$).

From the research's participants, 46.79% ($n = 73$) reported having some chronic disease (Table 2). The diseases told were systemic arterial hypertension in 41.03% ($n = 64$) people participating this research, followed by dyslipidemia reported in 15.38% ($n = 24$) cases, gastric ulcers in 12.18% ($n = 19$) and diabetes in 10.90% ($n = 17$). It was also registered a high percentage of participants (33.33%, $n = 52$) who confirmed having indicated some kind of medicine to other people. The most indicate medicine kinds were painkillers (23.07%, $n = 36$), followed by anti-inflammatories (3.84%, $n = 6$) and antihypertensives (2.56%, $n = 4$).

Table 2 – Medicine usage and disposal by the sampled population in Correia Pinto

rural zone, a municipality from Catarinense plateau (n=156 participants)

Uso e descarte de medicamentos	n	%
Do you use medicine periodically?		
Yes	99	63.46
No	57	36.54
Do you check the expiring date from the medicine?		
Yes	102	65.38
No	53	33.97
Not answered the question	1	0.64
Do you have any chronic disease?		
Yes	73	46.79
No	83	53.21
Do you have any medicine leftover at home?		
Yes	70	44.87
No	86	55.13
Have you received any kind of information regarding medicine disposal?		
Yes	30	19.23
No	126	80.77
Have you ever indicated any medicine to someone?		
Yes	52	33.33
No	104	66.67
Do you consider medicine a environment pollutant?		
Yes	137	87.82
No	6	3.85
I do not know	13	8.33

Source: authors, 2023

The sociodemographic variables (genre, age and level of education) of the participants had significative association with the daily medicine usage and the occurrence of chronic diseases. There was significant association between age and medicine usage, the ones over 60 years old use medicine daily ($X^2 = 28.57, p = 0.000$) and they had some kind of chronic disease ($X^2 = 29.10, p = 0.000$), whereas the majority of participants age between 18 to 40 do not use any kind of continuous medicine and do not have any chronic disease.

Besides, there was a significant association between age and expire date checking

with a large amount of seniors not used to check this information on their medicines ($X^2 = 6.72$, $p = 0.035$). In addition, the chi square test showed that women check the expiring date whereas men do not do it ($X^2 = 4.69$, $p = 0.030$), so women also give medicine to other people, while men do not have this habit ($X^2 = 6.28$, $p = 0.012$). Also, the non literate ones do not use to verify the expiring date ($X^2 = 13.73$, $p = 0.008$).

The high percentage of people who use medicine regularly can contribute to create waste, which associated to the lack of an effective reversal logistic system to home medicine leads to inadequate disposal from this harmful waste. Such results align with a national research which investigated the medicine consumption and disposal, showing that 57% of the Brazilians use medicine currently, 41.7% of those participants use from one to two medicine kinds a day and 66% of the interviewed discard expired or out of usage medicine in common garbage (QUADRA *et al.*, 2019). This means this medicine is destined to sanitary landfills which are not adequate to receive waste from B group (chemical), category in which medicine are included. In addition, according to the authors, 71.9% of the interviewed never received any information regarding correct medicine disposal. Also in this current research, when inquired if they have received any kind of instruction regarding adequate medicine disposal and its waste, 80.77% of the participants ($n=126$) answered they never had received any kind of information (Table 2).

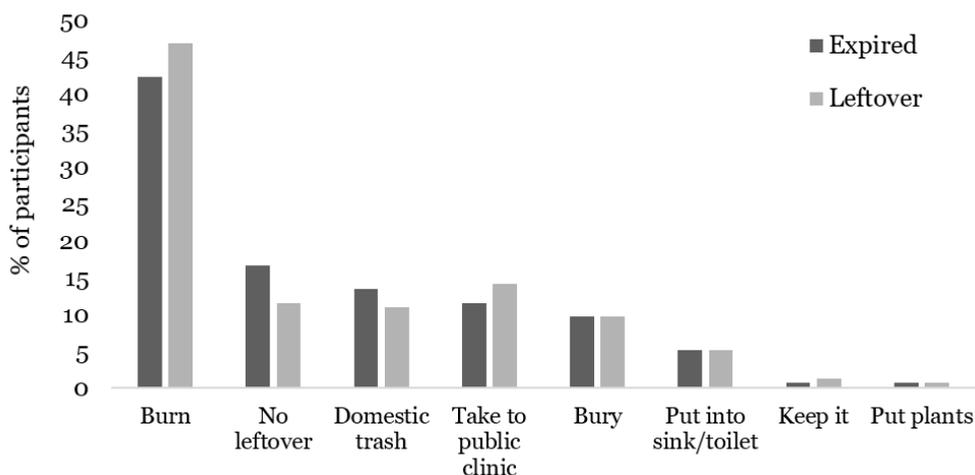
Concerning to how to handle the medicine, this research showed that women used to observe the expiring date, however, they also used to indicate medicine to other people, especially the painkillers. This care regarding medicine expiring date by women can be explained by the fact that Brazil has many health programs directed mainly to women (prenatal, cervix and breast cancer prevention), as a result, women are more likely to have medical care (FLORES; BENVENÚ, 2008), and often the women encourage their partners to seek medical assistance (PEREIRA; RECKZIEGEL; AGOSTINETTO, 2019).

In general, people keep medicine after usage at home due to expiring date, bigger amount than needed and changes during treatment, excessive medicine prescription, storage to further usage, treatment leftovers, self-medication, among other reasons (CONSTANTINO *et al.*, 2020). About 65% of Brazilians have the habit of self-medication, with the painkillers being used by 30% of the population, also it is a fact that indirectly self-medication is encouraged in Brazil since most medicine is sold without any demand of prescription by a doctor (QUADRA *et al.*, 2019). The medicine usage from self-medication can lead to side effects, as it was informed by about 40% of the Brazilians (QUADRA *et al.*, 2019). According the authors, 15% of the Brazilians who present side effects after starting a treatment usually change it, which leads to medicine leftover from the old treatment and the purchase of a new one which also can cause side effects, and contribute to medicine waste.

At the place in which the research took place, 74.37% ($n=113$) of the participants discard the medicine leftover inadequately (burning, burying, throwing away at trash can from home, sink or toilet, Figure 3), according to what is demanded by the current legislation about waste management from Brazil's health services (Decree 10.388/2020, RDC 222/2018/ANVISA, 358/2005/CONAMA). Only 14.10% ($n=22$) of the participants take

their medicine leftover to the Public Health Clinic (Figure 3). The same way, 72.77% (n=110) of the participants discard the expired medicine in the common home garbage and 7% of them in sinks or toilets, inadequate ways of disposal. However, data about rural area is incipient and by the results found in this research the situation regarding medicine waste disposal is more worrying when comparing to the Brazilian urban area.

Figure 3 – Final medicine disposal with expired date and medicine leftover by the sampled population in Correia Pinto rural zone, a municipality from Catarinense plateau (n=156)



Source: authors, 2023

In Correia Pinto's rural area, 93.68% (n=146) of the people asked by the research are not attended by the municipality urban trash collecting service, so the final destiny given to domestic waste by 69.23% (n=108) of the participants is burning, 10.12% (n=16) burying, 14.33% (n=22) take it to waste collecting places located in the city and only 6.32% (n=10) told that are attended by the municipality urban trash collecting service.

Despite the inadequate disposal, the rural population (87.83%) consider the medicine as an environmental pollutant (Table 2). As they were asked about the possibility of people, animals and environment contamination by inadequate medicine disposal in streams or rivers, 89.10% (n=139) answered they consider this fact likely to happen. The same way, as they were asked about if they consider the medicine disposal in the ground by burying a way human, animals and environment contaminate 52.56% (n=82) answered yes to this question.

The data from this research evidenced that most rural population is not attended by the municipality urban trash collecting service, thus this fact can motivate the incorrect solid waste disposal as well as expired or leftover medicine disposal. Data from IBGE (2010) already showed that 59.6% of solid waste were burned in rural areas. According

Quadra et al., (2019) 66% of the Brazilians discard their out of usage medicine or expired in the common domestic trash. The study from Fernandes et al., (2020) made in Minas Gerais evidenced the prevalence of incorrect medicine disposal in a urban area. Marquezotie and Bitencourt (2016) verified that in the urban area of Videira/SC, the incorrect medicine waste disposal is a common action, Brati *et al.*, (2021) interviewed 255 people in two urban neighborhoods from Lages, SC, and found that the expired medicine and pharmaceutical products disposal was done in the common domestic trash (39.6% and 69.6, respectively). It is important to emphasize that the adequate medicine waste disposal is not done even by environmental sanitation students (AGOSTINETTO *et al.*, 2019).

Information about medicine waste disposal in rural area are yet scarce in Brazil, as politics to provide the rural population's access to sanitation. Research developed in a plateau municipality in Santa Catarina reported that veterinary medicine waste has been discarded inadequately in rural lands, as example discarding at home trash, burying, donating to other people or throw away into the sink/toilet (OLIVEIRA *et al.*, 2019).

The inadequate medicine disposal has also been registered in other countries, even by environmentally aware people. A systematic review made by Kusturica, Tomas and Sabo (2016) reported that the most common expired and leftover medicine disposal method has been home trash (Kuwait, United Kingdom, Lithuania, Qatar, Serbia, Gana, Bangladesh, Malta and Saudi Arabia) followed by the habit of discarding the medicine into the sewer system (as New Zealand, USA and Bangladesh). Only in Sweden and Germany a high percentage of the population take back the medicine to drugstores, making the adequate disposal (KUSTURICA; TOMAS; SABO, 2017). More recent research has shown that the problem is still without solution. For example, in Poland, 68% of the participants discard their pharmaceutical products into the home trash or toilet (ROGOWSKA *et al.*, 2019). Similar results were found in developed regions in Hong Kong, China, where most of half population (53.9%) throw away unwanted medicine together with solid waste, that means 0.6 tons of discarded drugs in an incorrect way, which can contaminate the environment, action associated to the lack of public education about the topic to the population and a systematic management about pharmaceutical waste handling (CHUNGA; BROOKS, 2019).

The inadequate medicine disposal in Brazil happens mainly because the lack of effective reversal logistic chain, population's awareness, lack of collecting places to medicine at drugstores and pharmacies and the low investment in campaigns in order to inform people about how to discard correctly the waste, also the usage of many medicine kinds and the lack of package fragmentation. Despite the advances with the country's laws about medicine waste management, until 2020 there was no reversal logistic implemented politic about domestic medicines waste, neither encouragement, information and attempt to educate people about how to make the correct medicine waste disposal and the creation of collecting places to expired and leftover medicine (QUADRA *et al.*, 2019). Only in 2020 it was published the decree 10.388/2020 that puts clear the reversal logistic system to expired or unused medicine, determining the responsibilities of each sector in order to collect and discard domestic medicine waste. Up to this date, the

pharmacies and drugstores were not demanded to collect domestic medicine considering the national territory, only few places in some municipalities and states were implemented with a reversal logistic system to collect the discarded medicine from population (FREITAS; RADIS-BAPTISTA, 2021). So, besides implementing an effective reversal logistic system to domestic medicine waste with responsibility from all parts by the final environmentally correct disposal of these chemical products including the consumers, pharmacies and drugstores, manufacturers, dealers and importers, also it is necessary to establish strategies, programs and regulations to minimize the pharmaceutical pollution risk to the environment.

Conclusion

The research reported that the rural population who was studied has easy and free access to medicine, the majority of people use at least one medicine a day, especially the elders, due to arterial hypertension. It is also noticeable that although many people consider the medicine an environment pollutant, they never received any instruction or information about the adequate medicine disposal, which leads to inadequate ways of discarding this medicine (leftover and expired) such as burying and throwing away into toilets and sinks, which can lead to contamination of Guarani/Serra Geral aquifer and the shallow water. Also, this research shows that the population has a precarious sanitation, mainly regarding potable water and solid waste collection.

So it would be important to make further researches to evaluate the water quality parameter from the region, including measuring the main drugs used by the rural population asked during this present research.

It is important to emphasize that the results from the present research can contribute to improve the health service of waste management from the municipality of Correia Pinto-SC and Catarinense plateau, also it can contribute with the objectives 6 and 12 from the sustainable development goals 2030 from ONU, since from the results it was possible to establish the necessity of implementing the following local actions: a) develop an environmental education project with the goal of awaring the population about environmental contamination made by the incorrect medicine waste disposal; b) necessity to establish at the Municipality Basic Pharmacy, the Public Medical Clinics and at the pharmacies and drugstores collection places for medicine waste, c) train the health teams from public and private sector to instruct the population about the correct disposal, as well as the health care team must be able to receive and give an environmental adequate destiny to the medicine waste; d) promote preventive actions in order to reduce the generation of this waste, including training health professionals to make rational prescription of the medicine and, when possible, fractionate the medicine, also give guidance to population in order to avoid self-medication; and e) improve the sanitation for the population of the rural zone, specially related to potable water supply and solid waste collection.

Acknowledgments

The authors would like to thank the National Council of Technological and Scientific Development (MCT/CNPQ 441396/2017-8) for the financial support and Municipality Health Secretary from the municipality of Correia Pinto, SC, Brazil by the support and partnership in order to collect the data for the research.

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Submitted on: 02/03/2021

Accepted on: 20/11/2022

2023;26:e00441

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DESCARTE DE RESÍDUOS DE MEDICAMENTOS PELA POPULAÇÃO RURAL

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Resumo: O descarte inadequado de medicamentos vencidos e sobras de tratamentos podem contaminar o ambiente e comprometer a saúde humana, porém, a implementação da logística reversa para os medicamentos é um desafio aos municípios brasileiros. O objetivo deste estudo foi caracterizar o descarte de medicamentos pela população rural do município de Correia Pinto/SC. A pesquisa foi do tipo quantitativa descritiva-transversal, com coleta de dados a campo a partir da aplicação de um questionário a 156 moradores da área rural. Os resultados mostraram que o saneamento básico é precário, pois 64,7% das pessoas consomem água sem tratamento e não são atendidas pela coleta de resíduos, apesar de 94,9% utilizar a fossa séptica como tratamento do esgoto. Elevado percentual da população (63,43%) relataram a utilização diária de medicamentos. Cerca de 75% descartam as sobras do tratamento medicamentoso e os medicamentos vencidos de forma inadequada. Os dados levantados podem contribuir com as estratégias de implementação do sistema de logística reversa dos medicamentos domiciliares, além de mostrar as lacunas do saneamento básico rural.

São Paulo. Vol. 26, 2023

Artigo Original

Palavras-chave: Contaminantes emergentes; População rural; Contaminação ambiental; Saneamento básico; Resíduo químico.

ELIMINACIÓN DE RESIDUOS DE MEDICAMENTOS POR LA POBLACIÓN RURAL

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Resumen: La disposición inadecuada de medicamentos vencidos y sobrantes de tratamientos puede contaminar el medio ambiente y comprometer la salud humana, sin embargo, la implementación de la logística inversa de medicamentos es un desafío para los municipios. El objetivo de este estudio fue caracterizar la disposición de medicamentos por parte de la población rural del municipio de Correia Pinto/SC. La investigación fue cuantitativa, descriptiva-transversal, con recolección de datos en campo a partir de la aplicación de un cuestionario a 156 pobladores de la zona rural. Los resultados mostraron que el saneamiento básico es precario, ya que el 64,7% de las personas consume agua no tratada y no cuenta con recolección de residuos, aunque el 94,9% utiliza la fosa séptica como tratamiento de aguas residuales. Un alto porcentaje de la población (63,43%) refirió el uso diario de medicamentos. Alrededor del 75% desechan los restos del tratamiento farmacológico y los medicamentos vencidos de manera inapropiada. Los datos recopilados pueden contribuir a las estrategias de implementación del sistema de logística inversa para medicamentos domiciliarios, además de mostrar las brechas en el saneamiento rural.

São Paulo. Vol. 26, 2023

Artículo Original

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