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RESEARCH

RESIDUES GENERATED BY INSULIN USERS IN DOMICILE

RESÍDUOS GERADOS POR USUÁRIOS DE INSULINA EM DOMICÍLIO

RESIDUOS GENERADOS EN EL DOMICILIO POR USUARIOS DE INSULINA

Jeanine Geraldin Estequi [1]
Sílvia Carla da Silva André [1]
Raissa Silva Souza [2]
Rosely Moralez de Figueiredo [1]

[1] Universidade Federal de São Carlos – UFScar, Departamento de Enfermagem. São Carlos, SP – Brazil.
[2] Universidade Federal de São João del-Rei. Divinópolis, MG – Brazil.

Corresponding author: Rosely Moralez de Figueiredo. E-mail: rosely@ufscar.br
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ABSTRACT

Objective: To know the management of residues generated by insulin users at home. **Method:** This is a descriptive, exploratory and quantitative study. There were 98 individuals interviewed with Diabetes *Mellitus*, insulin users at home enrolled in the Family Health Units of the municipality of São Carlos – SP; by a previously validated instrument and proceeding to the analysis by descriptive statistics. **Results:** the incorrect disposal of at least one of the inputs used either in a rigid container or not occurred both among the participants who reported receiving information about the correct discard of the HSR as well as among those who did not receive it. **Conclusion:** It is considered that there are gaps concerning the management of residues produced in homes, demanding political changes, management, and education in health.
Keywords: Medical Waste; Insulin; Diabetes *Mellitus*; Primary Health Care; Family Health; Nursing.

RESUMO

Objetivo: *conhecer o manejo dos resíduos gerados pelos usuários de insulina em domicílio.* ***Método:*** *pesquisa descritiva, exploratória, quantitativa. Entrevistados 98 indivíduos com diabetes mellitus, usuários de insulina no domicílio cadastrados nas Unidades de Saúde da Família do município do interior paulista, por meio de instrumento previamente validado e procedendo-se à análise por estatística descritiva.* ***Resultado:*** *o descarte incorreto de ao menos um dos insumos utilizados, seja acondicionado em recipiente rígido ou não, ocorreu tanto entre os participantes que referiram ter recebido informações sobre o descarte correto dos RSS quanto entre os que não receberam.* ***Conclusão:*** *considera-se que há lacunas no que diz respeito ao manejo de resíduos produzidos nos domicílios, demandando mudanças políticas, de gestão e educação em saúde.*
Palavras-chave: *Resíduos de Serviços de Saúde; Insulina; Diabetes Mellitus; Atenção Primária à Saúde; Saúde da Família; Enfermagem.*

RESUMEN

Objetivo: *conocer el manejo de los residuos generados en el domicilio por los usuarios de insulina.* ***Método:*** *investigación descriptiva, exploratoria, cuantitativa. Se entrevistaron 98 individuos con diabetes mellitus, usuarios de insulina en el domicilio, registrados en las Unidades de Salud de la Familia del municipio de São Carlos - SP; por medio de un instrumento previamente validado y procediendo al análisis por estadística descriptiva.* ***Resultados:*** *la disposición final incorrecta de al menos uno de los insumos utilizados, ya sea acondicionado en recipiente rígido o no, ocurrió tanto entre los participantes que mencionaron haber recibido información sobre el desecho correcto de los RSS como entre aquéllos que no recibieron ninguna información.* ***Conclusión:*** *se considera que hay lagunas en lo que se refiere al manejo de residuos producidos en los domicilios, lo cual exige cambios políticos, de gestión y educación en salud.*
Palabras clave*: Residuos Sanitarios; Insulina; Diabetes Mellitus; Atención Primaria de Salud; Salud de la Familia; Enfermería.*

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INTRODUCTION

One of the main changes that have occurred in the health field over the years is the creation of innovative instruments and materials in the health area. In this context, the instruments and disposable materials that contributed to greater patient safety are highlighted; but at the same time, they favored an increase in the generation of waste.

According to the *Associação Brasileira de Normas Técnicas* (ABNT), waste is classified according to its origin: industrial, domestic, hospital, public, commercial, agricultural, services and sweeping. In this scenario, health services residues (HSR), generated in different healthcare facilities deserve attention due to their risks to the environment and the health of the population.[1,2] HSR is classified into five groups: group A (biological waste), group B (chemical waste); group C (radioactive tailings); group D (common waste) and group E (sharp objects).[1]

Regarding to healthcare waste, it is traditionally very concerned with those generated by hospitals and clinics, not always considering the huge volume generated in primary care (PC). The expansion of PC and the activities inherent to the work process of these teams, such as home care (HC), has produced new demands to be managed by health professionals. In this context, individuals with chronic non-communicable diseases (CNCD), especially with diabetes mellitus (DM), who also require the management of HSR produced in the home care and self-care process.[3]

HSR management takes place in phases such as segregation, packaging, storage, collection, transportation, treatment and final disposal, with official guidelines that regulate the whole management process, such as the Resolution of the *Diretoria Colegiada* (RDC) of *Agência Nacional de Vigilância Sanitária* (ANVISA) nº 306/04 and the Resolution of the *Conselho Nacional do Meio Ambiente* (CONAMA-BR) nº 358/2005.[4-6] Also, different publications have discussed aspects related to the management of HRS on the physical, material and human resources involved. However, the explanation of technical guidelines that can subsidize the management of HSR generated at home by the patient or family member is still little detailed in these documents.

In order for the HSR generated by individuals with DM at home to be adequately managed and the potential risks and impacts to the health of people, professionals and the environment be minimized, it is essential that health professionals guide and monitor this process, as well as implement management systems of all HSR generated in the intra-established and extra-established health stages.[4,7]

Thus, the guidance of the individuals with DM, caregivers and the professionals who work in the PC for the management of HRS generated at home can be considered a challenge, considering the sociocultural, managerial and political variables involved.[7]

Therefore, the nurse is a key element, since, in addition to providing care at home, he is directly involved in health education actions, including the training of patients for self-application of insulin and hemoglycetes and health community agents (HCA), considered an important link with the community and should be attentive to the issues related to the management of HSR generated at home. Also, this professional is also the manager of the unit, having the construction of streams and norms regarding the management of HSR as responsibility.[7]

In the literature, there are studies[8-12] about management of HSR generated in different scenarios, with a growing number of publications discussing issues related to the management of HRS by home insulin patients. However, not all of these studies used instruments previously tested and validated, hindering to compare the results found.

In this sense, this study aims to know the type of management offered to the HSR generated in households of people with DM using insulin, using a validated instrument. Therefore, it aims to broaden the knowledge in this scenario to subsidize future elaboration of technical standards for the proper disposal of HSR generated by insulin patients in households, and to strengthening the role of nurses in this context.

DEVELOPMENT

Description of the methodology

This was a descriptive and exploratory study of a quantitative nature carried out in 13 urban family health units (USF) in a city in the state of São Paulo. Data collection was held between November 2015 and January 2016.

The study sample was intentional, that is, the participants´ selection was based on the indication of the USF teams of individuals with DM enrolled in the units as insulin patients at home. The inclusion criteria initially established were to be insulin patients, to be responsible for self-administration or insulin administration in third parties, to have a record in the USF, to be enrolled in the Hiperdia Program system, to be over 18 years old and to have cognitive ability to answer the survey. However, due to technical problems in the municipality, it was not possible to access the Hiperdia system to identify the patients, which limited the search for possible participants.

Thus, the initial selection of the participants occurred through the consultation of manual record sheets of the individuals with DM, elaborated by the teams of the 13 UFS of the municipality. It is worth noting that the worksheets consulted are outdated, with incorrect or old addresses, with patients who had changed therapy or died.

With the identification data of the possible participants, the researchers went to the addresses indicated in the spreadsheets in different periods of the day (morning and/or afternoon). Patients who were not found in the households after two visits

at different times were established as exclusion criterion. There were 98 individuals with DM insulin users located and contacted at home, all of whom agreed to participate in the study.

For the data collection, a validated instrument[8] was used consisting of a script composed of 32 semi-structured questions about the types of residues of health services generated at home and the forms of their management, elaborated based on RDC Nº 306/04, of the ANVISA, and Res. 358/05, CONAMA.[5-6]

The data were collected through interviews conducted at the patients´ own home, doubly typed in an Excel spreadsheet and later analyzed through descriptive statistics.

The project was approved by the Committee of Ethics in Research with Human Beings of the *Universidade Federal de São Carlos* (Opinion 1,237,667).

RESULTS

Among the participants, 63.3% (n = 62) were women, 52% (n = 51) over 60 years old, 48.7% (n = 37) 62) with monthly income of up to two minimum wages.

Regarding the time of diagnosis of the participants, 28.6% (28) reported having DM for more than 20 years, followed by 26.5% (26) between five and 10 years. Despite the long period of disease diagnosis, 42.9% (n=42) of the participants did not know their type of diabetes. Regarding the follow-up of treatment for DM, most of the participants (n=70; 71.42%) said that USF is the reference service for professional follow-up and acquisition of materials and medications for the control and monitoring of the disease. The other participants reported follow-up in other services of the *Sistema Único de Saúde* (SUS-BR), such as Specialties Center and Basic Health Unit (n=13, 13.26%), in services offered by health plans and SUS simultaneously (n=2, 2.05%) and only in the private network (n=2, 2.05%). It should be noted that six participants (6.12%) stated that they did not follow any type of follow-up, only using the SUS to take inputs, and five (5.10%) individuals did not respond to the question.

Almost all participants (n=94; 96%) reported that they performed the entire therapeutic process for DM at home, and the others reported that they performed at least one of the steps at home, such as hemoglycetes or guarding the insulin bottle, for example. In the number of daily insulin applications, there was a predominance (n=60, 61.2%) of participants who used insulin twice a day (Table 1). It should be noted that all participants reported using the syringe coupled with the needle for the administration of insulin.

The reuse of syringes and needles was recognized by a little more than half of the participants (n=58, 59.2%), of which 32.6% (n=32) reuse the syringes only once; 11.2% (n=11) twice; and 15.3% (n=15) more than twice (Table 1). Concerning hemoglycotes, most of the participants (n=91; 92.9%) adopted this practice at least once a week, especially those who did once daily (n=30; 33%) (Table 1).

Table 1 - Behavior of home insulin users regarding insulin administration and reuse of syringes, attended at 13 USFs in the interior city of São Paulo. SP, 2017

Behavior	Participants (n = 98)	Frequency (%)
Time using insulin		
Less than 05 years	34	34.7
05 – 10 years	25	25.5
11 – 15 years	18	18.3
15 – 20 years	8	8.2
More than 20 years	9	9.2
They did not know	4	4.1
Administration of insulin		
Once a day	20	20.4
Twice a day	60	61.2
3 times a day	17	17.4
More than 3 times a day	1	1.0
Reuses Syringe/Needle		
Never	40	40.8
Once	32	32.7
Twice	11	11.2
More than twice	15	15.3
Frequency the hemoglicote is performed		
Once a day	30	33.0%
Twice a day	11	12.0%
More than twice a day	11	12.0%
Once a week	16	17.6%
Twice a week	9	10.0%
More than twice a week	14	15.4%
Never	7	7.2%

Regarding the disposal of sharp objects, the participants (n=71; 72.4%) who packaged the needle syringes and (n=65; 66.3%) lancets were placed in rigid containers and transported to the health unit for disposal (Table 2).

Table 2 - Management of HSR generated at home by insulin users registered in 13 USF in the interior city of São Paulo. SP, 2017

Packaging and disposal	n	%
Syringes and needles		
Rigid container and discarded in the health unit	71	72.5
Rigid container and discarded with the common residue	8	8.2
Plastic bag and discarded in the health unit	2	2.0
Not packed and discarded with the common residue	17	17.3

Continued...

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Table 2 - Management of HSR generated at home by insulin users registered in 13 USF in the interior city of São Paulo. SP, 2017

Packaging and disposal	n	%
Lancets		
Rigid container and discarded in the health unit	65	66.3
Rigid container and discarded with the common residue	10	10.2
Plastic bag and discarded in the health unit	2	2.0
Not packed and discarded with the common residue	21	21.5
Reagent Tapes		
Rigid container and discarded in the health unit	60	61.3
Rigid container and discarded with the common residue	6	6.1
Plastic bag and discarded in the health unit	2	2.0
Not packed and discarded with the common residue	30	30.6
Insulin bottles		
Rigid container and discarded in the health unit	24	24.5
Rigid container and discarded with the common residue	5	5.1
Plastic bag and discarded in the health unit	2	2.0
Not packed and discarded with the common residue	67	68.4

When patients were asked about prior receipt of guidelines on the disposal of inputs used for insulin administration and hemoglycetes, 75.5% (n=74) of the participants stated that they had been advised of the need to dispose of syringes and needles, 73, 5% (n=72) of the lancet discard, 70.4% (n=69) of the reagent tapes and 46.9% (n=46) of the insulin bottles. However, it was identified that the incorrect disposal of at least one of the inputs used, either in a hard container or not, occurred both among the participants who received information about the correct disposal of HSR and between those who did not receive it.

Of the 26 participants who were not advised to dispose of lancets, all were disposed of in the household waste. The same was observed in the discard of the reagent tapes, and all 29 participants who reported were not guided to carry out the disposal in the common waste. In the case of insulin bottles, the total number of participants who discarded them incorrectly was higher than the number of participants who acknowledged having received guidance about the procedure, that is 72 participants reported incorrect discarding, of which 52 said they had not been instructed about the correct procedure.

DISCUSSION

The data found in this study revealed that the individuals with DM who used insulin in the home assisted in the USF of the studied city were predominantly women, elderly, with low education level and monthly family income of up to two minimum wages, corroborating the findings in the literature.[9-12]

It is assumed that this profile is similar to the modern Brazilian population, composed mostly of women, with high life expectancy and more survival, and consequently more likely to develop CNCD, such as DM. Thus, it can be corroborated by data indicating that this is a vulnerable group that demands individualized health care and focuses on the promotion of self-care.[12] Also, due to the expressive demand for health services, women have the opportunity diagnosis of DM, contributing to the prevalence of the disease in this population group.[12]

The low level of education found in the participants in this study is also similar with other studies. It is a consensus that low education has a negative impact on all processes involving the control, monitoring, and treatment of DM at home, as it compromises the understanding of the therapeutic process.[12] Also, a study shows that low education level is associated with worse adherence to pharmacological and non-pharmacological measures of DM therapy.[13,14]

Considering the need for individuals to progressively assume a more active role in the health care and health care process, it is believed that there should be more investments in health literacy aimed at patients with DM. Health literacy consists of a strategy that aims at empowering decision-making based on different contexts, such as domicile, community, workplace and health services, increasing the control of individuals about their health. Adequate levels of literacy are related to the high probability of understanding written and oral information and compliance with medical prescriptions.[15]

In this study, it was identified that, despite the fact that individuals have diabetes for a long time, a significant portion is unaware of the type of disease (DM type 1 or 2). In this regard, study[12] pointed out that the lack of knowledge about the disease hinders to control it adequately, reinforcing the need for investments in health education strategies that value the patients´ prior knowledge and their reality and allow reflection on their care practices and self-care. Educational actions aimed at reorienting and renewing meanings and attitudes of individuals represent one of the main instruments of the *Estratégia Saúde da Família* (ESF) to empower the patients in the area of self-care and coping with the health-disease process.[16]

It should be emphasized that the systematic development of educational practices aimed at self-care has a positive impact on the processes of necessary changes in individuals with chronic diseases, favoring better practices in treatment, control, and prevention of diseases.[16]

As a greater proportion of participants in this study, the follow-up of the DM in the USFs was emphasized. It is believed that the systematization of the home visit would enhance the follow-up and co-management of the care and self-care of the patients by the teams, especially regarding the management of HSR generated in this context. It should be emphasized that

home-based care favors the exchange of knowledge between health professionals and patients, strengthening the link and favoring dialogue, exchange of experiences and construction of knowledge relevant to the context of people's lives.[12]

Concerning the inputs used in the therapeutic process for home-based DM, the almost unanimous re-use of syringes by the participants stands out, which is consistent with the guidelines established by the *Ministério da Saúde*(BR) on the subject.[17] It is known that the number of insulin applications is directly proportional to the generation of waste. In this sense, the reuse of syringes and needles, if practiced correctly, can be understood as an important ally in the reduction of the generation of sharp objects, contributing to the minimization of environmental and public health impacts. However, it should be noted that hand hygiene and safe and adequate storage of the syringe/needle assembly are essential to provide the necessary safety in reusing these supplies.

Similar to these study findings, records of the practice of inappropriate discarding of HRS in different scenarios is identified in the national and international literature. One of these[18] studies showed that 58.0% of the participants stated that they discard sharp objects, reagent tapes and insulin bottles directly in the common residue. Another research showed that 57.8% of the interviewees stored the syringes in plastic bottles and took them to the health unit. Also, the study showed alternatives used by patients to discard syringes, such as needle breaking.[19]

Incorrect disposal of needles and syringes has also been found in studies conducted in developing countries. A study conducted in Sri Lanka showed that 68% of home insulin patients discarded needles and syringes in common waste, and discarding options such as burying, incinerating or flushing were also recorded[8]. Another study[19], conducted in Ethiopia, found that two-thirds of the participants (63.3%) were not able to discard the needles after use, 40% discarded the syringes in the bathroom and 32% discarded along with common waste. The lack of public health education and the absence of safe waste disposal systems in Ethiopia were cited by the authors as justifications for the incorrect waste disposal in that context.

Considering the problematic of the inadequate disposal of the HSR, corroborated by the data of this study and the literature, it is believed that it is important to allocate investments to the structures responsible for waste management in the different assistance scenarios, with emphasis on the training of professionals and the population. Also, research[8,16] highlights the need for the elaboration of technical norms that regulate the management of these HRS, since the lack of clarity on this subject, existing in the official documents, favors the improper practice of packaging and final disposal of this waste in the home.

The construction of official documents that regulate the management of HSR by patients allows the increase of communication effectiveness between health professionals and between these professionals and the patients, considering the responsibility of these professionals in this orientation.[7]

In addition to the need for the publication of guidelines that explain the ways of managing HSR in the home, it is believed that investment in the construction and implementation of educational practices that allow the orientation and improvement of the individual's knowledge favor the adoption of better management.[12] The same authors found that the proportion of people who correctly disposed of wastes was significantly higher among those who received prior guidance when compared to those who did not, and 21 times more likely to be discharged properly when compared to non-oriented ones ($p < 0.0001$).[12]

Also, it is emphasized that the option of educational practices that foster interaction and dialogue between patients and health professionals are capable of providing critical reflection on the behavioral changes necessary to improve the individual and collective quality of life, including the environment.[12]

Also regarding the orientation of people with DM on the discarding of HSR generated at home, a study[16] conducted in *Ribeirão Preto-SP* found that 61.5% of home insulin patients emphasized receiving some type of guidance on the disposal of generated waste by the application of insulin and glycemic monitoring. Most of them (37.6%) reported being guided by UBS pharmacy staff and 12.6% by nurses. Another study showed that half of the participants (51%) of the research acknowledged having received information about the discarding of HRS during consultations in the health services, with most of them (90%) being guided by nurses, followed by doctors (10%).[12]

It is believed that the nurse needs to integrate the information about the discarding of the HRS generated in the home to guide the patients with DM, considering that they are inseparable activities in the therapeutics of the disease. Also, this professional needs to create conditions for patients to reflect on their contribution to minimizing the health and environmental risks related to the discarding of HRS, emphasizing the potential for accidents of family members, the community and even waste collectors.[12]

In this sense, it should be emphasized that the guidelines on care with residues resulting from the treatment and control of DM at home should be included in the list of health professionals, especially PC nurses, who are responsible for the instruction of insulin users at home.[12] Thus, it is essential that health professionals be periodically updated on the best practices of discarding HSR to enable the implementation of scientific evidence to practice care.[16]

CONCLUSION

The study allowed the formation of an overview about the generation and management of HRS in individuals with DM

who used insulin at home and evidenced an inadequacy in the waste disposal process.

Although the current legislation defines the guidelines for HSR management, there are gaps in terms of accountability for the management of HSR generated in the care and self-care carried out at home, which impacts on patients´ adoption of best practices. Also, the lack of clear definitions on this subject influences the heterogeneity of the information and guidance disseminated among professionals and by them to the patients.

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