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RESEARCH ARTICLE OPEN ACCESS

SOLID WASTE MANAGEMENT PROCEDURES AT THE MEDICAL CLINIC OF CHILDREN'S HOSPITAL DR. FAJARDO

João Carlos Da Costa Pinheiro*[1], David Barbosa de Alencar[2], Antônio Estanislau Sanches[3], José Roberto Lira Pinto Júnior[4], Gisele de Freitas Lopes[5] and Camila de Lopes de Alencar[6]

[1]Academic, of the Postgraduate Program in Engineering, Process Management, Systems and Environmental (PPEPMSE) - Institute of Technology and Education Galileo of the Amazon – ITEGAM; [2]Professor, of the Postgraduate Program in Engineering, Process Management, Systems and Environmental (PPEPMSE) - Institute of Technology and Education Galileo of the Amazon – ITEGAM; [3]Professor at the Academic Department of the Engineering and Technology Course at the University NiltonLins – UNINILTONLINS; [4]Professor at the Academic Department of the Engineering and Technology Course at the Metropolitan University Center of Manaus – FAMETRO; [5]Academic, of the Postgraduate Program in Engineering, Process Management, Systems and Environmental (PPEPMSE) - Institute of Technology and Education Galileo of the Amazon – ITEGAM; [6]Academic Department of the Veterinary Medicine Course at the Metropolitan University Center of Manaus - FAMETRO

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Corresponding author:
João Carlos Da Costa Pinheiro

ABSTRACT

To reduce the risk to health and the environment in the handling of hazardous health waste, it is necessary to develop a Standard Operating Procedures (SOP) for the management of Health Services Waste (RSS) that include ensuring correct disposal practices and packaging of waste. hospital. However, hospital waste can cause serious environmental damage, and are potentially more dangerous because they contain chemical and biological residues. In addition, these residues constitute a danger of harm to people's health. It is pointed out that the general objective is to develop and apply RSS SOP in which it encourages its correct management and know-how among the employees of a children's hospital in Manaus-AM. The methodology applied regarding the approach is qualitative-quantitative data, of the descriptive type, and the research procedures are a case study of the Children's hospital Dr. Fargado (HIDF). According to data obtained, the RSS from groups A, B and E are the main waste collected in the health unit of the children's care network, and are potentially dangerous because they present a risk to the health of HIDF employees and patients. The research also elaborated and presented a SOP on the management of RSS at Children's hospital Dr. Fajardo for the outpatient sector. The document consists of information such as: waste classification; symbology; packaging; collection and transport; internal RSS management flow; recommended treatments for health waste; risks associated with accidents; and recommendations on health and safety at work in a health unit. Such data are essential for building meaningful knowledge among all people, including staff and patients, about the risks of HSR. The implementation of the SOP on the management of RSS to HIDF employees took place in September, in which employees gained essential knowledge, since safe waste management protects hospital staff, the public and the local environment.

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INTRODUCTION

Solid waste is considered an environmental problem of great intensity due to population growth, the industrial process and the increase in people's consumption (FARIA, 2019). According to Aguiar et al. (2004) waste can be classified as: industrial, urban, health services, ports, airports, road and rail terminals, agricultural, radioactive and rubble. The hospital produces different types of waste, which may contain different types of polluting agents that need to be disposed of properly so as not to contaminate the environment and people. Thus, the management of solid waste from health services is fundamental because this waste has a crucial effect on the development of diseases, work accidents, environmental impacts and the degradation of public health. In this sense, Fröhlich (2016) elucidate that hospital

waste can cause serious environmental damage, and are potentially more dangerous because they contain chemical and biological residues. In addition, these residues constitute a danger of harm to people's health, if in undesired circumstances, the microbial load containing the bio contaminated residue enters the human organism or if the residue is special when entering through the airways, digestive or dermal. In view of the potential that hospital waste offers, it is understood that care must be taken regarding the destination, packaging, handling and destination of the waste generated by them, seeking to meet the requirements of the regulatory standards that are NBR 12.808/93, NBR 9191/01, NBR-12809/1993, NBR 12235/92 and NR-32 that are used in Brazil. However, the absence of planning and monitoring means that these residues are not properly disposed of, contaminating the environment and people. The techniques used correctly for the management of waste from health service establishments are necessary to allow the safety of patients, visitors and employees, considering that the management of Waste Services (SANTOS, SANTOS, 2019).

To reduce the risk to health and the environment in the handling of hazardous health waste, it is necessary to develop a Standard Operating Procedures (SOP) for the management of Health Services Waste (RSS) that include ensuring correct disposal practices and packaging of waste. hospital. Thus, the study developed a procedure of good practices and solid waste management in a health unit in Manaus. The debate related to solid waste management has been constantly raised due to the increase in the degradation of the environment and the consequences for the quality of life of the population. All this discussion reveals the growing awareness of society, which has come to understand that quality of life is associated with a balanced environment. One of the causes of discussion between managers and society is the generation, packaging and final disposal of waste. Because, in each of these stages, it can represent a risk or consequence to society, and the development of preventive measures is essential. The city of Manaus, capital of the state of Amazonas, has approximately 100 health hospitals in the state and municipal public network and 12 medium and large units in the private network to serve the population. Due to this high demand, the large amount of solid waste produced by these units is observed. Do all these public units accompany the market that increasingly requires hospital equipment that is more efficient, contaminated and polluting a minimum rate to the environment?

Given the above, from a social and environmental point of view, this research work develops and presents a Standard Operating Procedures (SOP) for the management of Health Services Waste (RSS) to employees and patients of Children's hospital Dr. Fajardo, which is a fundamental process in the good management of hospital waste, since it offers a preventive protocol. Thus, this work seeks to identify and qualify the Good Practices and Management of hospital waste in public and private health units in Manaus - AM. Seeking through good conduct, cause the least possible impact on the environment to health professionals and society in general. For this to occur, a set of rules created and supervised to be complied with by hospital units is necessary, such as: Training and training of all servers and professional health workers, More efficient and effective hospital equipment capable of polluting less the environment as well as all health products and medicines. Such operational procedures must contain knowledge in biosecurity, biological risks, personal protective equipment, cleaning and conservation - biological containment, health service waste management programs and legislation. These procedures will enable the handling of good practices and waste management, establishing the continuous improvement of all operational procedures regarding the use and destination of all solid waste from hospital units. Finally, it is noteworthy that the motivation of this study was due to the need to establish standardized operational procedures in health units with a focus on the outpatient sector of Children's hospital Dr. Fajardo (HIDF), for examples such as what happened with the conservation and cleaning employee pierced his finger in a syringe discarded in the common waste of the health unit. However, the same accident could be avoided if the residue was disposed of correctly, so the appeal of this unit, certainly has an impact on other health units in the capital and interior of Amazonas.
General objective is to develop a good practice procedure for solid waste management in a children's hospital in the city of Manaus - AM. The specific objectives are: to characterize the RSS in the HIDF; to elaborate an SOP for the management of RSS in the HIDF in the outpatient sector; implement SOP of RSS management with HIDF collaborators; and analyze the results of improvements after the implementation of the SOPs.

MATERIALS AND METHODS

Research design: The research was carried out in 3 phases, each of these steps consisting of the specific objective. The first to do was to get to know the hospital's facilities through a technical visit to the HIDR, in which the unit's solid waste management procedures were verified. After this step, in order to verify whether management standards are carried out in accordance with the NRs, a literature search was carried out. The second phase consists of identifying the stages of solid hospital waste management, such as: waste classification; symbology; packaging; collection and transport; internal RSS management flow; recommended treatments for health waste, risks associated with accidents; health and safety recommendations at work in a health unit; and continuing education program. Afterwards, each step is described according to the relevant NRs and environmental, solid waste and labor legislation. After carrying out the previous phases, the next step consisted of developing the standard operating procedure (SOP) for waste management at Children's hospital Dr. Fajardo. Finally, the research ends with the presentation and completion of the course with the Standard Operating Procedures (SOP) for the management of Health Services Waste (RSS) to the employees of the Children's hospital Dr. Fajardo. In short, it is explained the phase one is the knowledge of the Children's hospital Dr. Fajardo, phase two is how the development of the Standard Operating Procedure (Appendix A) took place, and phase three is how the training of the employees of the health unit took place, which are presented in the result is discussion.

Search location: The research was carried out at Children's hospital Dr. Fajardo (Figure 1) and is located at Avenue Joaquim Nabuco, 1886 - Centro, Manaus - AM, 69020-031.

Source: Author (2021).

Figure 1. Children's Hospital Dr. Fajardo

Search ranking: As for the procedures, the research is a case study of the Children's hospital Dr. Farted. The research is classified as a case study to be able to analyze the RSS generated by the hospital unit, as well as develop and apply a course with the purpose of improving the know-how of the employees of this health unit. For Gerhardt and Silveira (2009) points out that the case study aims to know in depth the how and why of a given situation that is supposed to be unique in many aspects, trying to discover what is most essential and characteristic in it. The case study can take place according to an interpretive perspective, which seeks to understand what the world is

like from the participants' point of view, or a pragmatic perspective, which simply aims to present a global perspective, as complete and coherent as possible, of the object of study. study from the investigator's point of view. The approach to the results took place by a mixed method, or as it is known, qualitative and quantitative. Mixed research involves mixing quantitative and qualitative methods or paradigmatic characteristics (CASTRO, 2014). In addition, Figueiredo and Souza (2008,) state that the need to work with statistical data and non-measurable information depends on the problem question. There are no rigid rules, the most important thing is that there is flexibility in the methodological procedures, as long as they are adequate to the object to be known and the problem to be answered. Quantitative research is used to quantify the problem by generating numerical data or data that can be turned into usable statistics. Data collection methods are much more structured than qualitative data collection methods. Quantitative data collection methods include various forms of surveys - online surveys, paper surveys, mobile surveys and kiosk surveys, face-to-face interviews, telephone interviews, longitudinal studies, website interceptors, online surveys and systematic observations (STAKE, 2016). The quantitative data, in relation to hospital waste generated Children's hospital Dr. Fajardo, were analyzed through descriptive statistical correlations and percentage calculations using the Excel 360 program and the results were presented using graphs. As for the qualitative data, information collected in the existing literature was used to support the objectives proposed at the beginning of the study. Qualitative research can be defined as that which is mainly based on qualitative analyses, characterized, in principle, by the non-use of statistical instruments in data analysis. This type of analysis is based on theoretical-empirical knowledge that makes it possible to attribute scientificity to it (ZANELLA, 2011, p.35). Already the qualitative data approach used to analyze was inductive. Lakatos and Marconi (2010, p. 68) say that "induction is a mental process through which, starting from particular data, sufficiently verified, a general or universal truth is inferred, not contained in the examined parts". When talking about classifying the research in terms of objectives, it is pointed out as descriptive. Descriptive research uses surveys to gather data on a variety of subjects. These data seek to know to what extent different conditions can be obtained among these subjects. Data collection methods for descriptive research can be employed singly or in various combinations, depending on the research questions at hand (DE PÁDUA, 2019). In order to obtain results in descriptive research, data collection and analysis techniques are used that generate reports on measures of central tendency, variation and correlation. The combination of its characteristic summary and correlational statistics, together with its focus on specific types of research questions, methods and results, is what distinguishes descriptive research from other types of research (KAUARK, MANHÃES, MEDEIROS, 2010).

Data Analysis Technique: The analysis of qualitative data took place in a descriptive way, in which the history of the Dr. Fajardo, the solid waste generated by the health institution and how the course took place with the operational procedures with the current collaborators at the Children's Hospital in Manaus. Quantitative data were analyzed using descriptive statistical correlations and percentage calculations using the Excel 360 program and the results were presented using graphs.

RESULTS AND DISCUSSIONS

History of Children's Hospital Dr. Fajardo: The history of Children's Hospital Dr. Fajardo begins in a period when Manaus was experiencing the beginning of the economic collapse, based on extracting milk from the rubber tree. The progress, brought about by the money that circulated in the city, attracted thousands of immigrants from the northeast, who arrived without resources, with children and a luggage full of diseases caused by malnutrition and other diseases added to misery. In this context of abandonment that the Poor Child Protective League founded on December 19, 1922, by Dr. Samuel Uchôa, physician, director of Rural Prophylaxis in the Amazon, founded Casa Dr. Fajardo. The name was given in honor of Dr. Francisco de Paula Fajardo Júnior, physician and researcher, born in Rio de Janeiro on February 8, 1864, professor of prominent personalities in Brazilian public health, such as Carlos Chagas. The first headquarters of Casa Fajardo was located on the corner of street Ferreira Pena and street Ramos Ferreira, whose first director was Maria de Miranda Leão. Since its opening, the house has had the mission of taking care of the health of children in Manaus. Forty-three years after opening, in 1965, Casa Dr. Fajardo moves out of the building on street Ferreira Pena and takes up a new address on street Joaquim Nabuco and is then renamed Children's hospital Dr. Fajardo, which is where it is located to this day. The hospital unit for more than six decades was the only children's hospital in the state. Over the years, the physical structure of the hospital showed signs of wear and tear. These and other difficulties caused the hospital to close on August 11, 1998. There were three long years of absence from one of the most traditional and hospitals in Manaus. The unit was prepared to provide outpatient and secondary hospital inpatient care services, performing minor surgeries, targeting the Amazonian population under 14 years of age. One day before Children's Day, more precisely on October 11, 2001, the Board of Directors of Casa Dr. Fajardo delivered to the population the new Dr. Fajardo. In fact, it is on this date that a new and important page in the hospital's history begins to be written.

Waste generated at the Children's Hospital Dr. Fajardo: Tables 1 and 2 show Waste by groups collected in the HIDF in the year 2021 and the tabulation of this information is relevant for the compression of the waste generated by the health institution, and thus a SOP can be elaborated according to the reality of the HJDF.

Table 1. Waste by groups collected in the HIDF in the year 2020

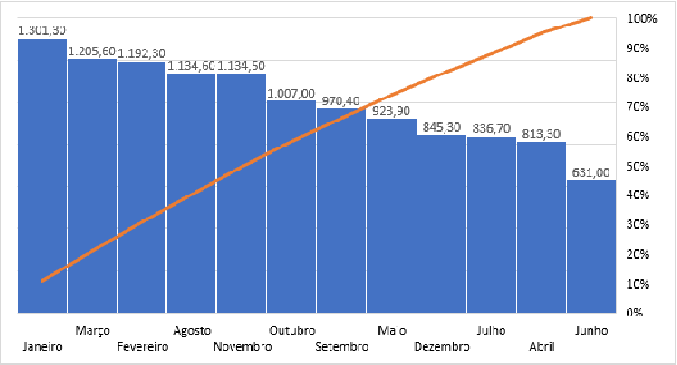
YEAR/2020	GROUP B	GROUP A	GROUP E	WEIGHT GROUPS (KG)
January	1.301,30	20	0	1.321,30
February	1.192,30	20	0	1.212,30
March	1.205,60	0	0	1.205,60
April	813,3	0	0	813,3
May	923,9	64	0	987,9
June	631	0	0	631
July	836,7	0	0	836,7
August	1.134,60	0	53	1.187,60
September	970,4	0	61	1.031,40
October	1.007,00	0	101	1.108,00
November	1.134,50	310	112,3	1.556,80
December	845,3	0	83	928,3

Source: Data granted by HIDF (2020)

The classification of RSS from group A, B, C, D and E are as follows:

- Group A - potentially hazardous waste: Waste with the possible presence of biological agents that, due to their characteristics, may present a risk of infection.
- Group B - Chemical Waste: Waste containing chemical substances that may pose a risk to health or the environment. Depends on its: flammability, corrosivity, reactivity and toxicity
- Group C - Radioactive Waste: Materials with radionuclides in quantities above the limits specified in the rules of the National Nuclear Energy Commission. (FIGUEIREDO, GOD, 2018).
- Group D - Waste equivalent to Household Waste: No biological, chemical or radiological risk to health or the environment. It is equivalent to household waste.
- Group E - Sharps.

Considering that group A is potentially infectious waste, which fits into the Ambulatory sector. On March 27, 2020, through the Official Gazette of the State of Amazonas, the publication of Resolution No. by Viral Infectious Diseases - COVID 19. Considering this determination, consequently, the suspension of outpatient consultations, the sector responsible for demanding patients for surgical center procedures. Waste collection was observed in group A – low due to suspension in the outpatient clinic.



Source: Data provided by HIDF (2021)

Graph 1. Total waste collected at the HIDF in 2020

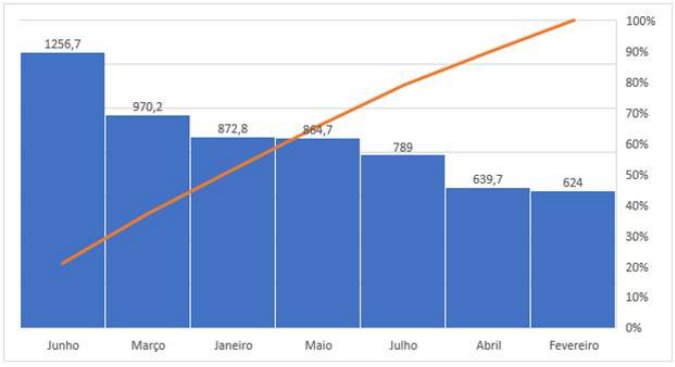
As shown in Graph 1, January 2020 was the month in which the HIDF generated the most medical waste, but specifically the waste classified as B. However, the month of June was the month that least quantified medical waste. However, an important point stands out in the result of the graph, which is that it is organized according to waste generation in each month of the year 2020.

Table 2. Waste by groups collected in the HIDF in the year 2021

YEAR/2021	GROUP B	GROUP A	GROUP E	WEIGHT GROUPS (KG)
January	872,8	0	41	913,8
February	624	0	16	640
March	970,2	0	22,5	992,7
April	639,7	0	59,9	696,6
May	864,7	0	31,1	895,8
June	1.256,70	31,3	67,3	1.355,30
July	789	60	81,1	930,1

Source: Data provided by HIDF (2021)

Considering that group A is potentially infectious waste, which fits into the Ambulatory sector. On March 6, 2021, through the Official Gazette of the State of Amazonas, the publication of Resolution No. due to the pandemic by Viral Infectious Diseases - COVID 19.



Source: Data provided by HIDF (2021)

Graph 2. Total waste collected at the HIDF in 2021

Graph 1 shows the total waste collected at the HIDF in 2021, as quantified the month of June was the month with the highest generation of hospital waste, especially, as shown in Table 2, the waste from Group B. However, in February, was the month with the lowest waste generation.

Conducting the course with the SOP of RSS management to the employees of the Children's hospital Dr. Fajardo: Considering the hiring of a new company providing hospital maintenance and cleaning services, the need to develop know-how among the employees of the Children's hospital Dr. Fajardo and due to work accidents with sharp punctures such as used syringes, as well as the need for training and qualification with new conservation workers and nursing technicians in the outpatient sector, a POP course was given by the author of this research, held on the 11th September 2021 in which the SOP was presented, described in the appendix. At the time, the children's hospital workers were trained on: Waste classification; Symbology; Packaging; Collection and Transport; Internal Management Flow of RSS; Recommended treatments for health waste; Risks associated with accidents; and Health and safety recommendations at work in a health unit. Figures 2, 3 and 4 are the record of the course taking place at the HIDF facilities.

Source: Author (2021)

Figure 2. Record of the first course of the Continuing Education Program at HIDF

Source: Author (2021)

Figure 3. Record of the first course of the Continuing Education Program at HIDF

Source: Author (2021)

Figure 4. Record of the first course of the Continuing Education Program at HIDF

With the implementation of SOPs, it is possible to introduce information and procedures that will improve organizational behavior, generating new perceptions, attitudes, skills and abilities of the professionals involved, also modifying the work environment, that is, reducing occupational accidents with exposure to biological material.

FINAL CONSIDERATIONS

All the necessary information was collected, achieving the proposed objectives, the solid waste of the HIDF, making it possible to identify the types and classification of solid hospital waste, as established by the RSS of group A, B and E, which are the main waste collected in the child health unit, and are potentially dangerous as they pose a risk to the health of HIDF staff and patients. The research also elaborated and presented a SOP on the management of RSS at Children's hospital Dr. Fajardo for the outpatient sector. The document consists of information such as: Classification of waste; Symbology; Packaging; Collection and Transport; Internal Management Flow of RSS; Recommended treatments for health waste; Risks associated with accidents; and Health and safety recommendations at work in a health unit. Such data are essential for building meaningful knowledge among all people, including staff and patients, about the risks of HSR. The implementation of the SOP of the management of RSS to the collaborators of the Children's hospital Dr. Fajardo took

place in September in which employees will gain essential knowledge as safe waste management protects hospital staff, the public and the local environment. Finally, the handling of hospital waste in the HIDF was not carried out in accordance with the hospital waste management plan, presenting poor segregation, transport, storage and disposal of waste, which led to two occupational accidents with exposure to biological material in the outpatient sector. Thus, the implementation of the SOP will improve organizational behavior, generating new perceptions, attitudes, skills and abilities of the professionals involved, also modifying the work environment. As verified throughout the research, waste is produced in large quantities in hospitals: organic and non-organic materials, infectious materials, used disposable equipment, external packaging, etc. It is important that waste is handled, packaged, stored and transported to the site of destruction without exposing anyone to infectious materials. Patients, staff, visitors, people handling hospitality waste and the environment should not be exposed to infections from improperly disposed waste. mistreated, packaged or stored. The lack of standardization can lead to process failures, insecurity in carrying out activities, in addition to making it impossible for management practices to be effective. It is the adoption of all necessary measures in the activities of prevention, reduction and separation of sources, collection, storage, transport, use and/or recovery, treatment and/or final disposal, import and export of hazardous waste or waste, individually manufactured or properly combined are critical to protecting human health and the environment against temporary and/or permanent harmful effects that may arise from such waste or residues. Therefore, it is highlighted that POPS are essential in this requirement as they standardize the HIDF RSS protocols. However, the hospital must organize sufficient ongoing training programs for clinical and non-clinical staff, and the use of personal protective equipment must be emphasized. Efforts should be made to improve waste minimization at source, so the audit of waste management across the hospital, as well as chemical waste reengineering, is necessary to ensure that lessons learned in this study are not lost, but incorporated. to the HIDF waste management policy and practice. As highlighted throughout this research, hospital waste can be harmful and infect other people, patients, work staff and the general population. As part of the hospital waste generated in a health center, we can find microorganisms, radioactive materials, sharp objects, drugs, among others, given its dangerousness, it includes carrying out a study on disposal, packaging, treatment and other procedures that avoid accidents with RSS. Initially, considering only the HIDF, the place where the research was carried out, it is recommended to develop SOP of RSS for other areas of the HIDF, since this research was limited to the outpatient sector. However, the study opens the possibility of research in other hospitals in Manaus, since it appears that the SOP of RSS do not exist in some health units, There is also the possibility of developing and implementing POPs for solid waste in other public institutions such as schools and municipal and state secretaries. Therefore, it opens up the possibility of analyzing other public institutions to reduce the risk of accidents due to inappropriate waste disposal or packaging between employees and society who frequent such places, also working on environmental pollution.

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