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MEDICAL WASTE TREATMENT ANALYSIS IN *HOSPITAL REFERAL EDUARDO XIMENES* (HOREX) BAUCAU 2020

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ABSTRACT

The processing of medical waste also involves side events related to vectors such as mosquitoes, rats, flies and cockroaches which have a habitat in organic waste and domestic waste produced by health service facilities (Asmadi, 2012). Medical waste is waste originating from medical services, dental care, pharmacy, or the like; research, treatment, care, or education that uses materials that are toxic, infectious, dangerous or can be harmful, unless certain safeguards are taken (Riza, 2010). Hospitals as a means of health improvement efforts that carry out health services as well as educational and research institutions for health workers, have positive and negative impacts on the surrounding environment (Riza, 2010). The research objective was to determine the treatment of medical waste at the Regional General *Hospital* (***Hospital Referal Eduardo Ximenes***) Baucau. The method in this research is quantitative with an observational approach. The population used in this study were the leaders and all health personnel managing the waste. The sample of this research is the entire population that has a role in waste management. The analysis used is the result data from interviews and a *checklist* of observation result. Results in the implementation of most of the waste treatment procedures have been carried out. At the stage of selecting, collecting, transporting and storing sharps medical waste, processing and destroying, recording and reporting there are still a number of requirements that have not been implemented. It is known that complete waste management documents are available and available. It is known that most of the waste management analyzes have been carried out. However, in the infrastructure and infrastructure indicators, cleaning staff, the treatment of waste and warning signs has not been carried out thoroughly. The conclusion in this study is that the implementation of medical waste treatment procedures at the Eduardo Ximenes (HoREX) Baucau *Referral Hospital is* not in accordance with health policies , due to facts that have occurred in the field, that officers mix all the waste into one, which should be waste syringes, infusions sterilized and disposed of. in a particular place but instead it is mixed with other waste and dumped in a public place and burned then buried in the ground.

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INTRODUCTION

In the era of globalization and modernization, at this time, the need for the Ministry of Health is very important to control and observe every employee or health worker to properly control who is in a work location, from the center or *capital* to the existing rural areas.

Hospital Referal Eduardo Ximenes (HoREX) is a large hospital located in the city of *Baucau* and is a health service center for residents or local communities and people outside the city such as *Viqueque* City and *Lospalos* City, so that in this activity it creates a lot of dirt such as waste or medical waste and non-medical waste. Infectious medical waste can transmit various diseases such as HIV[1] , hepatitis B and hepatitis C. Transmission of the disease can be through used needles and gloves that have been used to treat patients infected with HIV and the hepatitis virus (Diba, et al.[2] ., 2013). According to the author, this medical waste is very dangerous and will cause various negative impacts if not handled properly. The thing that must be considered is that medical waste should not be scattered, let alone be used by irresponsible people, even to the point of impacting diseases

that can endanger the community (Djohan & Halim, 2013). The processing of medical waste also involves side events related to vectors such as mosquitoes, rats, flies and cockroaches which have a habitat in organic waste and domestic waste produced by health service facilities (Asmadi, 2012). Hospital waste treatment, hospital waste management is carried out in various ways . The emphasis is sterilization, which is a reduction (*reduce*) the volume, reuse (*reuse*) the first sterilization, recycling (*recycle*), and treatment (*treatment*) (Slamet R., 2000). In HoREX Baucau Hospital, there are 20 workers assigned to manage medical waste, but the management is still less than standard equipment limitations are a major problem in HoREX Baucau.*Hospital Referal* Eduardo Ximenes Baucau serves patients 24 hours non-stop so that the medical waste generated from this activity is increasing, sometimes the waste officers are overwhelmed to collect the remains of the waste because in just a few hours medical and non-medical waste accumulates, so that in one day the 20 officers were deployed to collect burning to stockpiling.

RESEARCH METHODS

The method used in the research to get the data that is quantitative method by way of distributing questionnaires. Respondents are asked to fill out a questionnaire and will be asked back after the respondent has finished filling out the questionnaire. Such a study is usually referred to as a *cross-section study* [3]. The variables in this study are the dependent variable and the independent variable. The dependent variable is Medical Waste Treatment and the independent variable is Human Resources (HR), Equipment (Equipment*)* and Policy. Understanding Samples According to Experts Sugiyono (2008), explains that the sample means a part of the whole as well as the characteristics possessed by a population. If the population is large, so the researchers certainly do not allow it to study the entirety of that population, some of the obstacles that will be faced, such as limited funds, energy and time, in this case the need to use samples taken from that population. This study used a sample of the population at the *Hospital* Referal *Eduardo Ximenes* (HoREX) Baucau which aims to save time, effort and money to obtain relevant data, the following is the target population to be studied by researchers:

1. The target population here are waste treatment officers and departmental employees in charge of medical waste treatment who work at the *Eduardo Ximenes* Baucau *Referral Hospital* based on gender.
2. Affordable population based on the number of officers who reach 150 people so that research can be carried out in a relevant way to become the research target.

Inclusion Criteria and E exclusion: According to Notoatmodjo (2012) and Sastroasmoro (2014), he explained that there are two types of sampling criteria, namely: Inclusion type and Type E exclusion. The type of inclusion is a criterion by which the research subject can represent the research sample that meets the requirements as a sample. The type of exclusion is a criterion where the research subject cannot represent the sample because it does not meet the requirements as a research sample. For this reason, in this study, researchers used the type of inclusion, namely the characteristics that must be met by members of the population to be sampled, so that researchers can determine:

1. Health workers who work in inpatient rooms, operating rooms, pharmacy rooms, *emergency* rooms must be *permanent.*
2. Health workers must be physically and mentally healthy, both men and women.
3. Health workers must be available to be interviewed.

While type E exclusion is the characteristics of members of the population that cannot be taken as a sample, so that the researcher can determine as follows:

1. Health workers working in the patient's room.
2. Health workers who work in the administration room.

Research *Instrument:* *The* research *instrument* is a tool used to measure social and natural phenomena observed by the researcher himself, therefore the researcher as an *instrument* must also be validated, meaning that the researcher understands quantitative research methods, mastery of insight into the field to be studied, the readiness of the researcher to enter the research object. , both academically and logistically (Sugiyono, 2016). *Instrument* Research using several questionnaires that are relevant to Human Resources variables consisting of 10 items of questions, variable equipment (Equipment*)* consists of 10 items of questions, policy variables consisted of 10 items of questions and variables medical waste treatment consists of six items of questions. *This* research *instrument* has not been tested for validity and reliability because of limited time and funds.

Research Ethics: Describing that the researcher has taken steps or procedures to fulfill the ethical requirements of the research, whether in the form of humans, experimental animals, institutions or systems in an institution or what is called *ethical clearance.*

Inform Consent: Before the consent form is given to the respondent, the researcher first explains the aims and objectives of the study. The goal is that respondents know the aims and objectives of the research and the impact under study during data collection. In carrying out the research process so that respondents know in this case refuse or accept being interviewed.

Anonymity: To keep responding to respondent's confidentiality, the researcher did not include the respondent's name, but the researcher used a specific code for each respondent.

Confidentiality: The confidentiality of the information collected from the respondents is guaranteed by the researcher. The data is only presented or reported to parties related to the research.

Data analysis: In this case the researcher can use the *Prevalence Ratio* (RP) with a 2x2 table with the formula:

RP = A / (A + B): C / (C + D)

A / (A + B) = Proportion (prevalence*)* of subjects who have risk factors experiencing effects.
C / (C + D) = Proportion (prevalence*)* of subjects without risk factors experiencing effects.

The *prevalence* ratio should always be accompanied by the *confidence interval* you want, for example *the* 95% confidence *interval. The* confidence *interval* indicates the range of *prevalence* ratios obtained in the reachable population when the *sampling* is repeated in the same way. How to calculate the interval of confidence for the ratio of prevalence can be calculated by the air like a statistical computer program. What matters to us is understanding that these confidence intervals must be calculated and understanding how to interpret them.

Research Variable: The research variables are all things that shaped what is defined researchers to be studied in order to obtain information about it, then be deduced from two variables: the independent variables and the dependent variable.

Independent Variable

- **Human Resources (HR) :** Human Resources are workers or employees who play a very important role in increasing the productivity or progress of the organization or institution. However sophisticated facilities and infrastructure of the organization or institution without supported by the ability of its employees (human resources), the organization was not going to go forward and develop (Ludfia, 2013).
- **Equipment (Equipment*)***: In providing professional, quality and sustainable health services, hospitals need to be supported by the availability of medical devices that meet standards, the equipment consists of medical equipment for emergency room installations, outpatient care, inpatient care, intensive care, inpatient surgery, childbirth, radiology, laboratory clinics, blood services, medical rehabilitation, pharmacy, nutritional installations, and morgues. To get medical devices that meet your needs, meet standards and are optimal in utilization, good logistical management is needed (Jon Kenedi, et al., 2017).
- **Policy:** The policy itself can be defined as a saying or writing that provides general instructions regarding the determination of a scope that provides a general boundary and direction for a person to move (Siti, et al., 2017). The medical service policy is to improve the quality of Yan Hospital by fulfilling World-class hospital standards through improving the quality and professionalism of human resources and the provision of supporting service facilities and infrastructure (Dr. Hanief, 2010). In the opinion of researchers about policy refers to the ways all parts of government direct to manage their activities. In this case, policy is related to the idea of organizational regulation and is a formal pattern that is equally accepted by the government or institution so that they try to pursue their goals.

Dependent Variable

- **Medical Waste Treatment:** The medical waste treatment system at the Eduardo Ximenes (HoREX) Baucau *Referral Hospital* still uses manual methods, namely by burning medicinal waste, cassa infusion, injections, According to Ivan (2017), handling medical waste, one of which is medical waste, needs to be taken seriously in accordance with the medical waste handling techniques established by the health department.

This is due to the potential hazards that can arise from carelessly disposing of medical waste containing hazardous and toxic materials, the points for Processing and Disposing of Solid Medical Waste, are as follows:

1. Medical waste is not allowed to be disposed of directly into the landfill of domestic waste before it is safe for health.
2. The method and technology for processing or destroying solid medical waste is adjusted to the capacity of the hospital and the types of solid medical waste available, by heating using autoclaves or by combustion using an incinerator.

RESULTS AND DISCUSSION

In this study, there were 150 respondents who participated. Respondents who participated were health workers, both men and women who worked at the *Eduardo Ximenes* (HoREX) Baucau *ReferralHospital* . Data collection was carried out in person for eight days, starting from February 19, 2020 to February 27, 2020. The reason the researchers went directly to distributing questionnaires to respondents were to: (1) ensure that the respondents who took part in this study were in accordance with the specified criteria;(2) assist respondents in a way to fill out questionnaires, and (3) assist respondents in interpreting the intent of the statement item questionnaire if there are less obvious. Before distributing the questionnaire, the researcher confirmed with a few interviews asking the respondent's willingness to participate in the study. The response rate of respondents can be seen in table 1 below:

Questionary Distribution Results

No.	Information	Respondents
1.	Distributed questionnaires	180
2.	Questionnaires returned	150
3.	Response rate	83.3%
Total Analyzed Questionnaires		150

Based on table 1, it states that the initial distribution of questionnaires was 180 but only 150 were returned in the author's hand but the remaining 30 questionnaires did not return due to various factors, including respondents who did not have time to complete or fill out the questionnaire.

Respondent Characteristics: Respondent characteristics are used to determine the profile of the respondent. In this study, the characteristics of respondents were carried out by classifying respondents based on age group , gender, education level and position. The results of the characteristics of the respondents are summarized in the following table:

Respondent Characteristics Data

Based on table 2, the characteristics of the respondents can be described based on age group, gender, education level and position. From these results it is stated that the most participating to respond in this study were men with a total of 92 respondents from women, which only amounted to 58

Respondent Characteristics	Medical Waste Treatment		Total N (%)	Score P
	Yes N (%)	No N (%)		
Age Group				
• 31 - 48	9 (9.6)	85 (90.4)	94 (100)	0.053
• 49 - 65	12 (21.4)	44 (78.6)	56 (100)	
Gender				
• Men	19 (20.7)	73 (79.3)	92 (100)	0.003
• Woman	2 (3.4)	56 (96.6)	58 (100)	
Level of education				
• Junior High	1 (4.8)	20 (95.2)	20 (95.2)	0.242
• High school	16 (17.6)	75 (82.4)	91 (100)	
• PT[4]	4 (10.5)	34 (89.5)	38 (100)	
Position				
• Health workers	12 (16.2)	62 (83.8)	74 (100)	0.594
• Nursing Assistant	0 (0.0)	2 (100)	2 (100)	
• Nurse	4 (19.0)	17 (81.0)	21 (100)	
• Controlling	0 (0.0)	15 (100)	15 (100)	
• Midwife	1 (12.5)	7 (6.9)	8 (100)	
• *Security*	1 (10.0)	9 (90.0)	10 (100)	
• Head of Division	1 (10.0)	9 (90.0)	10 (100)	
• *Cleaner*	2 (40.0)	3 (60.0)	5 (100)	
• Driver	0 (0.0)	4 (100)	4 (100)	
• Dr. Specialist	0 (0.0)	1 (100)	1 (100)	
Total	84 (56.0)	66 (44.0)	150 (100)	

Risk factors of medical waste treatment in *hospital referral* eduardo ximenes baucau

Research variable	Medical Waste Treatment		Total N (%)	P value	RP value	95% CI	
	Yes N (%)	No N (%)				Lower	Upper
HR							
• Yes	11 (7.9)	128 (92.1)	139 (100)	0.000	0.909	0.001	0.073
• Not	10 (90.9)	1 (9.1)	11 (100)				
Equipment							
• Yes	5 (3.8)	127 (96.2)	132 (100)	0.000	0.086	0.001	0.027
• Not	16 (88.9)	2 (11.1)	18 (100)				
Policy							
• Yes	2 (14.3)	12 (85.7)	14 (100)	0.974	1,021	0.213	4,950
• Not	19 (14.0)	117 (86.0)	136 (100)				

respondents, so that they get a P value of 0.003 using the *Chi - Square* Test , so that means male- more men than women so that men participate more in the study. The age group classification in all respondents, the average age is ranging from thirty one (31) years to sixty-five (65) years, thus this age group is divided into two groups, namely the first starting from the age of 31 years to 48 years as many as 94 respondents, while respondents aged between 49 years to 65 years were 56 respondents, so there is a *value of* 0.388 with 95% *Confidence Interval* : 0.152 - 0.992 with a P value of 0.053. The character of the education level of the respondents, namely junior high school, high school and university, of the 150 respondents who researched can, namely: starting from the junior high school level up to the university level (PT) or university. Thus the junior high school level who participated in this study to participate in responding, namely as many as twenty one (21) respondents with a percentage of 14.0% either male or female, while the high school level who participated in responding in this study were as many as ninety one (91) respondents with a percentage of 60.7% both men and women and the most recent is the level of Higher Education (PT) where thirty eight (38) respondents participated in this research with a percentage of 25.3% both men and women. Thus from the respondents according to the level of education, there is a P value of 0.242 using the *Chi - Square* Test .

Risk Factors for Medical Waste Treatment: Risk factors are used to determine the risk to medical waste treatment at the Eduardo Ximenes *Referral Hospital* (HoREX) Baucau. In this study, using research variables, namely human resources, *equipment* and policies. The results of the risk factors can be seen in the following table:

Based on table 3 above, the data shows that 150 respondents consisting of Human Resources, *Equipment* and Policy on Medical Waste Treatment variables, then these three variables are analyzed statistically with *Bivariate* analysis. [5] using *Crosstabs* [6] and data using 2 X 2 tables were tested for *Chi-Square*. The result of the value of the *Prevalence* Ratio which shows from the human resource variable that there is a value of 0.909, meaning that if the value of the *prevalence* ratio <1 and the range of *the* confidence *interval* does not exceed the number 1, it means that the variable is a protection factor for the failure of human resource procedures to treat medical waste. Meanwhile, the results of the *Prevalence* Ratio value indicate from the *equipment* or *equipment* variable that there is a value of 0.086, meaning that if the *prevalence* ratio value is <1 and the confidence *interval* range does not exceed 1, it means that the variable is a protection factor so that there is no damage to the equipment or machine used. for medical waste treatment. For the results of the *Prevalence* Ratio value which shows from the policy variable that there is a value of 1.021, meaning that if the value of the *prevalence* ratio is > 1 and the confidence *interval* range does not exceed 1, it means that the variable is a risk factor.

DISCUSSION

The Relationship between Human Resources and Medical Waste Treatment: Based on the results of the research and

data analyzed statistically shows that the data from thealculation of 150 respondents shows that one hundred thirty-nine or 92.7% of respondents chose to answer "YES" about the quality of human resources, while eleven or 7.3% of respondents chose "NO", this means that the workforce at HoREX Baucau is ready to carry out the task of managing medical waste despite the lack of training for human resources, no supervision by superiors when workers manage waste and there are not even comparative studies elsewhere. So, from the results of the statistical analysis significantly with the value of the confidence level or 95% *Confidence Interval* with RP = 0.909 (0.001 - 0.073) and the P value is 0.000, it can be concluded that when the P value <0.001 it indicates that it is *significant.* So, it can be concluded that human resources are very important in waste management. Sufficient or enabling human resources will assist in proper waste management, according to the analysis in this study. Human resources need to understand the importance of taking care of themselves because medical waste collection activities are dangerous if not carried out properly and carefully. The process of transporting medical waste is an activity that poses a risk to the safety and health of workers if they do not use PPE[7] and is not provided with training because of worker training, the use of PPE is indispensable for people who are at risk in handling medical waste, especially cleaners (Pruss, Giroult, and Rushbrook, 2005). Research conducted by Putri, et al (2012), shows that there are several components of the survey of hospital waste management health workers along with the qualifications of the survey results of each hospital. Overall, the human resources who are responsible for the regulation, collection, handling and storage of waste, are selected through direct appointment by the third-party companies. Cleaning staff are hospital human resources who are in charge of carrying out operational activities related to cleanliness in the hospital, including daily work and garbage collection and transportation (Muflikun, 2018).

Relationship between *Equipment* and Medical Waste Treatment: Based on the results of research data analyzed statistically shows that the data from the calculation of 150 respondents shows that one hundred thirty-two or 88.0% of respondents choose to answer "YES" about *equipment*, while eighteen or 12.0% of respondents choose to answer "NO", this means that the *equipment* is sufficient at HoREX Baucau, trash bins have been provided in each room and have been marked according to the types of waste and the medical waste disposal facilities are well utilized, even though there is a lack of funds or budget to be allocated for the procurement of management *equipment.* Medical waste, the incinerator machine at HoREX Baucau has not been operating optimally and equipment management has not been good. So from the results of the statistical analysis significantly with the value of the confidence level or 95% *Confidence Interval* with RP = 0.086 (0.001 - 0.027) and the P value is 0.000, it can be concluded that when the P value <0.001 it indicates that it in*significant.* Data analysis between *equipment* and medical waste management in this study also showed a positive relationship between the dependent and independent variables with a confidence level of P <0.001. It is concluded that, *equipment* also plays an important role in the management of medical waste. So complete *equipment* can help better waste management compared to insufficient *equipment.*

Existing facilities or equipment in the hospital include suitable trash cans, colored plastic bags, have crushers and sharps holders as well as having a temporary storage area for medical waste before incineration is readily available. Officers who work using personal protective equipment will keep the risk of disease for themselves away. In addition, there are no special officers to collect medical waste (100%). However, there are still facilities that need to be improved from the availability of proper and adequate equipment, such as a closed garbage dump and closed trolley transportation. Apart from that there is no special road to the landfill. Hospitals need to consider things such as waste road routes in hospitals (Muflikun, 2018).

Relationship between Policy and Medical Waste Treatment: Based on the results of data analysis on the policies contained in table 3, it shows that of the 150 respondents who gave the answer "Disagree" about the policy with medical waste treatment was 136 (90.7%). From the results of statistical tests which show statistical significance. It can be concluded that most of the policies regarding medical waste treatment in HoREX Baucau are not in accordance with the existing health policies in HoREX Baucau . And it can be concluded that there is no relationship between the policy and medical waste treatment. Research according to the 2018 Muflikun, that there are warnings of medical and non-medical waste, warnings of maintaining cleanliness and standard operating procedures for handling waste from waste management installations, it is known that there are all (100%). There is one facility that does not exist, namely a warning to dispose of garbage in its place (92 , 86 %), so warnings of disposing of garbage in its place need to be reproduced and equipped again. Considering the improper disposal of garbage will pose a risk impact to patients, hospital staff and visitors as well as the surrounding environment. The results of the observations revealed that the waste produced, the facilities and treatment of medical staff at the hospital [8] PKU [9] Muhammadiyah Limestone has not been accomplished in accordance with policies which optimally. Medical solid waste is known to be the largest waste produced by hospitals, where there are still facilities that need to be improved from the availability of proper and adequate facilities. In addition, most of the waste treatment has been carried out by the hospital. The house needs to complete non-existent facilities such as a warning to dispose of garbage in its place to create optimal hygiene management (Muflikun, 2018).

CONCLUSION

After conducting research and analyzing the results of research taken from the research location, namely *Hospital* Referal *Eduardo Ximenes* (HoREX) Baucau, this proves that there are independent variables that have an influence on the dependent variable on medical waste treatment. These influences lie in the independent variable (Human Resources, *Equipment* and Policy) on the dependent variable (Medical Waste Treatment). Based on the discussion in chapter four (IV), several conclusions can be drawn, namely as follows:

1. The relationship between human resources and medical waste treatment shows a *significant.* This means that human resources have a positive influence on medical waste treatment, according to the results of the analysis in the waste study at the *Eduardo Ximenes* (HoREX) Baucau *Referral Hospital.* Even

though human resources with medical waste treatment show significant in HoREX Baucau, additional human resources are still needed to manage medical waste better in the future.

2. The relationship between equipment and medical waste treatment shows significant. This means that equipment has a positive effect on medical waste treatment, according to the results of the analysis in the waste study at the research location of the Eduardo Ximenes (HoREX) Baucau Referral Hospital. Although equipment with medical waste treatment shows significant, HoREX Baucau still needs additional equipment or equipment for HoREX Baucau so that the work at HoREX Baucau will be even better in the future.
3. The relationship between the policy on medical waste treatment at HoREX Baucau does not match the existing health policy at HoREX Baucau. So, the policy does not have a positive effect on medical waste treatment. This means that health workers who are at the *Eduardo Ximenes* (HoREX) Baucau *Referral Hospital are* not working according to the existing procedures in HoREX Baucau.

Therefore this research can be concluded that the three variables are meticulous in resources manus he, *equipment* and policies, it turns out there are only two (2) variables that have the influential factors more significant to the processing of medical waste, but only policy variables alone which is not a factor that has a significant effect on medical waste treatment.

Suggestion

In this section, the researcher wants to provide advice to the authorities so that they can be followed.

1. It is hoped that the Eduardo Ximenes (HoREX) Baucau Referal *Hospital* can meet all the limitations of human resources and equipment for waste treatment.
2. It is necessary to procure a new incinerator for *Hospital* Referal Eduardo Ximenes (HoREX) Baucau with a larger capacity so that the process of eliminating medical waste can run smoothly and smoothly.
3. Medical waste must be managed properly, that is, it must have a special building for burning medical waste and shredder for sharp objects left over from the *Eduardo Ximenes Hospital* (HoREX) Baucau , while HoREX Baucau has no adequate method.
4. For the government to implement strict regulations in the treatment of medical waste in all hospitals in Timor-Leste.
5. To the *Hospital Referral* Eduardo Ximenes (HoREX) Baucau, preferably in medical waste treatment to be more careful and use the system the way that applies from the government for the creation of an environment that is not polluted.

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