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Factors Associated with Medical Waste Management at Haji Saeful Anwar General Hospital in Pagaden, Subang Regency, in 2026

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Abstract

The results of a preliminary study conducted on February 20, 2026, in the field, including observations and interviews with the sanitation department, revealed dissatisfaction among nurses and sanitation staff regarding medical waste management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency. The purpose of this study was to determine factors related to medical waste management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency, in 2026. The study used a descriptive analytical method with a cross-sectional design. The population in this study consisted of all 74 nurses and sanitation staff at Haji Saeful Anwar Pagaden General Hospital, Subang Regency. The sampling technique employed was total sampling, using bivariate and univariate analysis of the independent and dependent variables, with a questionnaire as the data collection instrument. The results of the study showed that of the 74 respondents, the majority (58 respondents, 78.4%) had good knowledge of medical waste management; the majority (69 respondents, 72.2%) had good attitudes toward medical waste management; the majority (65 respondents, 87.8%) had good infrastructure for medical waste management; the majority (65 respondents) implemented the rules properly for medical waste management; and the majority (55 respondents) had good supervision of medical waste management. Statistically, the relationship between the variables of medical waste management factors and medical waste management implementation showed a significant association, with a Chi-Square test result of 10.503 and $\alpha < 0.05$, yielding a P-value of 0.00.

INTRODUCTION

Environmental problems are closely related to health. To create a healthy society, a good and supportive environment is needed. Therefore, hospitals need to pay attention to this relationship. Hospitals as health service providers produce waste from various activities, both medical and non-medical, which are generally hazardous and toxic (Wiknjosastro, 2021). Deteriorating environmental conditions can have an impact on the lives of living beings. Therefore, environmental problems need to be handled seriously by all parties, because the environment is an important factor that affects the health of living things (Azrul, 2018). In the implementation of health services, hospitals produce medical waste in various forms, such as solids, liquids, and gases. Therefore, the implementation of hospital sanitation through waste management is an important effort to create and maintain a healthy environment (Aditama, 2018).

According to a report by the World Health Organization (WHO), about 80% of waste generated from health service activities is in the form of general waste, while the remaining

20% is hazardous waste that is infectious, toxic, or radioactive. Of the total waste, about 15% is infectious waste or body tissues, 1% is in the form of sharps waste, 3% is chemical and pharmaceutical waste, and the other 1% is genotoxic and radioactive waste (Ministry of Health, RI, 2021). According to the Indonesian Health Profile, in 2020 medical waste is defined as all waste produced from medical activities in solid, liquid, and gaseous forms (Mangkunegara, 2021). Medical waste has the potential to cause health problems and pollute the environment if not managed properly. This condition can increase the risk of infection in the community, because hospital waste originates from service activities for patients who are undergoing treatment (Notoatmodjo, 2019). Infectious waste such as used masks, gloves, bandages, tissues, plastic packaging for food and beverages, used paper, syringes, infusion sets, personal protective equipment, and patient food scraps are included in the category of hazardous and toxic material waste (B3). Based on data from the Ministry of Environment and Forestry (KLHK), the amount of waste produced by health service facilities in DKI Jakarta reached 4,630 tons. This figure does not include additional medical waste from vaccination activities that began in January 2021, with a target of reaching around 180 million Indonesians (Arikunto, 2019).

In March 2022 in Indonesia, the total waste in the form of personal protective equipment (PPE) and medical waste processed using incinerators reached 4,500 kg. The Ministry of Health estimates that the production of medical waste in Indonesia reaches 294.66 tons per day. However, the increase in the amount of infectious waste is not offset by the availability of adequate waste management facilities (Watik, 2021). Nationally, in 2022, only around 18.9% of health service facilities (hospitals and health centers) have managed waste according to standards. The provinces with the highest percentage include Bengkulu (43.5%), Central Java (43.4%), South Sulawesi (42.3%), and West Java (38.6%). Meanwhile, the provinces with the lowest percentage are Papua (0.2%), North Maluku (0.6%), and Gorontalo (0.9%). The data describes the percentage of hospitals that implement medical waste management according to standards through 2025 (Mangkunegara, 2021). The results of research by Salis Setiawati et al. show that in medical solid waste management, the percentage of officers who have a positive attitude is higher than those who do not, at 31.8%. Analysis using the Spearman Rank test also showed a relationship between respondents' attitudes and the management of medical solid waste in the working area of Karang Mekar Hospital in 2023, with a p-value = 0.008, which was smaller than α (0.05) (Martin, 2020).

The results of Raysyah Rahmadhani Hasibuan's (2020) research show that the Fisher Exact test produced a p-value of 0.023 ($p < 0.05$), which means there is a relationship between the knowledge of cleaning service officers and the handling of medical waste. Based on a relative risk (RR) value of 4.444, respondents with good knowledge had 4.444 times greater chance of handling medical waste well compared to respondents with less knowledge (W. L., 2018). The results of the correlation test showed that respondents had good category availability of facilities in handling medical waste, with 28 (82%) respondents, and obtained a Pearson correlation value of 0.336, indicating a positive correlation with statistically strong correlation strength. The results of the statistical test obtained a p-value of 0.041, so H_0 was rejected because ($p < 0.05$) and H_1 was accepted; thus, it can be concluded that there is a meaningful relationship between the variable of facility availability and medical waste handling (Srimiyatun, 2019).

Non-optimal management of medical waste can cause various negative impacts on health and the environment, such as the risk of infection, injuries from sharps, work accidents, and soil pollution if solid waste is disposed of without undergoing incineration or third-party management. Therefore, the researcher is interested in conducting a study on "Factors Related to the Medical Waste Management System at Tamalanrea Jaya Hospital in 2022." This study aims to identify factors related to the medical waste management system by health workers at Tamalanrea Jaya Hospital. In addition, this research serves as a means of applying theory obtained during the lecture period into practice in the field, especially related to waste management by health workers. The results of this study are expected to serve as a reference for future research that examines similar topics, namely the medical waste management system (Singh et al., 2022).

Based on Law Number 18 of 2008 concerning Waste Management, waste management is defined as a series of activities that include efforts to reduce and handle waste in a planned, integrated, and sustainable manner. Thus, the implementation must be carried out appropriately and efficiently and in accordance with sanitation standards and operational procedures that have been established. In addition, waste management is also required to meet certain criteria, including not polluting the environment such as air, water, and soil, not causing offensive odors that interfere with aesthetics, and not causing potential hazards such as fire and other risks (Dharma, 2021). Medical waste includes a series of stages starting from the process of waste generation, storage, collection, transportation, to processing at the disposal site or final destruction, carried out in accordance with applicable procedures. In its implementation, the process must consider aspects of health, economic value, environmental sustainability, and ease of management (Sarwoto, 2021). On the other hand, knowledge can be understood as information or understanding that is possessed and realized by individuals. Knowledge is not limited to a descriptive description but also includes hypotheses, concepts, theories, principles, and procedures that are likely to be considered correct or provide benefits (Sulastom, 2020). Thus, all hospital staff must have adequate understanding of medical waste management. In addition, attitude is a very crucial factor in the educational process. A person's high level of knowledge and skills will not be meaningful if it is not accompanied by good behavior (Arwani, 2020).

Attitude is a concept used to explain human behavior in daily life. Attitude is related to the knowledge that individuals have in determining responses or actions to the situation at hand. By examining attitudes, it is possible to gain a deeper understanding of how a person acts (Djarwoto, 2019). According to the Ministry of Health of the Republic of Indonesia (2017), hospitals are the technical implementation units of the district/city health office that are responsible for organizing public health development in the work area (Muninjaya, 2019). Supervision is a process to ensure that goals and management can be achieved in accordance with planned activities (Hasibuan, 2017). The management of B3 solid waste (hazardous and toxic materials) in health care facilities is often not optimal, characterized by a lack of facilities (trolleys), incompatibility with the spatial layout of temporary storage sites (TPS), and the absence of special transportation routes. This is not in accordance with the Minister of Environment and Forestry Regulation No. 56 of 2015 and Government Regulation of the Republic of Indonesia No. 101 of 2014, which demand strict standards in the sorting, storage, transportation, and processing of waste (Ministry of Health, RI, 2021).

In general, hospital medical waste (including infectious and sharps) must be managed according to the rules, which include sorting, temporary storage at the B3 waste site, and destruction by a licensed third party. As an illustration, the pile of medical waste in health care facilities in Indonesia can reach 296.86 tons per day. The characteristics of medical waste consist of infectious, pathological, sharps, pharmaceutical, cytotoxic, and chemical wastes (Ministry of Health, RI, 2021).

The novelty of this research lies in five aspects. First, this study comprehensively examines five factors (knowledge, attitudes, infrastructure, regulations, and supervision) simultaneously in medical waste management, a practice rarely explored in previous studies. Second, the research location is Haji Saeful Anwar Pagaden General Hospital in Subang Regency, an area where medical waste management has not been studied before. Third, the use of total sampling (the entire population of 74 people) minimizes sampling bias. Fourth, the development of a questionnaire instrument adapted to the latest regulations (Minister of Health Regulation No. 7 of 2019 and Minister of Environment and Forestry Regulation P.56 of 2015). Fifth, the integration of behavioral theory (knowledge, attitudes) with management theory (facilities, regulations, supervision) within a single analytical framework.

All nurses and sanitarians at Haji Saeful Anwar Pagaden General Hospital, Subang Regency, during the period of February 2026 (total 74 people) need to have knowledge, attitudes, adherence to rules, and supervision of medical waste management with existing infrastructure facilities so that medical waste can be handled properly according to existing standards and regulations. By having good knowledge and attitudes among all hospital employees, medical waste management will be good and properly handled, so that there will be no further medical waste problems and patient care at the hospital will be comfortable.

The results of the preliminary study conducted on February 20, 2026, in the field, including observations and interviews in the sanitation section, revealed an overview of dissatisfaction among nurses and sanitarians regarding medical waste management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency. The preliminary results showed nurse and sanitarian knowledge at 68.4%, attitudes at 64.7%, medical waste infrastructure facilities fulfilling 60.8%, nurses and sanitarians meeting rules at 63.6%, medical waste supervision at 65.1%, and medical waste management at 65.4%.

The problem at Haji Saeful Anwar Pagaden General Hospital, Subang Regency is that the management of hospital medical waste (including infectious and sharps) has not been managed properly and optimally according to the required rules, which include sorting, temporary storage at the B3 waste site, and destruction by a licensed third party. This has not been handled and managed specifically. One issue is the continued buildup of medical waste both in treatment rooms and at the medical waste disposal site, along with lack of knowledge, facilities, rules, and supervision, unprofessional managerial management, and ineffective communication. The average production of medical waste at Haji Saeful Anwar Pagaden General Hospital, Subang Regency varies and generally ranges from 0.14 kg to 8 kg per bed per day, influenced by occupancy rate and type of service. In general, the total generation of medical waste in hospitals can reach hundreds of kilograms per day depending on the number of patients. The staff consists of 64 nurses and 10 sanitarians at Haji Saeful Anwar Pagaden Hospital, Subang Regency, for a total of 74 people in February 2026.

In this case, the knowledge, attitudes, facilities, rules, and supervision at Haji Saeful Anwar Pagaden General Hospital, Subang Regency—especially among sanitarians, who total 10 people—have not met optimal standards in managing medical waste. Therefore, it needs to be managed professionally so that a balance is realized between medical waste management and the demands of the hospital organization. This balance is the main key to a productive and reasonable hospital organization (Mangkunegara, 2021).

METHOD

This study uses the Descriptive Analytical method with a cross sectional approach, where data related to independent variables, namely, knowledge, attitudes, infrastructure, rules and supervision of medical waste management and bound variables, namely, medical waste management are collected together at one time. The research population is all nurses and sanitarian personnel at Haji Saeful Anwar Pagaden General Hospital, Subang Regency, which totals 74 people for the period of February 2026. The sampling technique uses the total sampling technique. So that the sample in this study amounted to 74 people. The research instrument used for data collection was in the form of a closed questionnaire with an optional form that affixed a checklist (√) to the answer that was considered correct, namely: good = 2, Not Good = 1 The number of questions in this study was 35 questions. 5 questions about knowledge, 5 questions about medical facilities, 5 questions about attitudes, 5 questions about the medical waste management process, 5 questions about supervision and 5 questions about medical waste management rules.

Data collection techniques are in the form of primary and secondary data. Primary data is factual data collected directly during research. Secondary data is official report data that supports this research. The data processing process is carried out through stages: data editing, data coding, data entry, data tabulation. Data analysis was carried out by descriptive variables through percentage distribution, and univariate analysis was carried out to obtain an overview of the frequency distribution of respondents' answers, and to obtain an overview or to describe the characteristics of each variable studied, and bivariate analysis using the Chi-Square method statistical test, and to see the meaning of statistical calculations the meaning limit of Pα (0.05) was used, so that if The P value < P α then (Ho) is subtracted, meaning that there is a significant relationship between the two variables. It is better if the P value > P α then (Ho) is accepted, meaning that the relationship between the two variables is not statistically significant.

RESULTS AND DISCUSSION

Univariate Analysis

The results of the study, entitled Factors related to Medical Waste Management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency in 2026, are displayed using the following frequency table:

Knowledge

Table 1. Distribution of Respondent Frequencies Based on Respondents' Knowledge Factors at Haji Saeful Anwar Pagaden General Hospital, Subang Regency in 2026

Knowledge	Quantity (n)	Percentage (%)
Good	58	78,4
Not Good	16	21,6
Total	74	100

In the knowledge variable of 74 respondents at Haji Saeful Anwar Pagaden General Hospital, Subang Regency, most of the respondents as many as 58 respondents (78.4%) stated that the respondents' knowledge was good.

Attitude

Table 2. Distribution of Respondent Frequencies Based on Respondents' Attitude Factors at Haji Saeful Anwar Pagaden General Hospital, Subang Regency in 2026

Attitude	Quantity (n)	Percentage (%)
Good	69	93,2
Not Good	5	6,8
Total	74	100

In the attitude variable of 74 respondents at Haji Saeful Anwar Pagaden General Hospital, Subang Regency, most of the respondents as many as 69 respondents (93.2%) stated that they were good for the attitude of medical waste management.

The Relationship of Knowledge Factors with Clinical Waste Management

Table 3. The Relationship between Knowledge Factors and Clinical Waste Management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency in 2026

Knowledge	Medical Waste Management				Total		*P Value*
	Good		Not Good				
	N	%	N	%	N	%	
Good	33	44,6	25	33,8	58	78,4	0,001
Not Good	2	2,7	14	18,9	16	21,6	
Quantity	35	47,3	39	52,7	74	100	

Statistically, the relationship between the variable of medical waste knowledge and medical waste management showed a meaningful relationship, namely the results of the statistical test obtained a p value = 0.001 ($\alpha < 0.05$).

The Relationship of Attitude Factors with Clinical Waste Management.

Table 4. Relationship between Attitude Factors and Clinical Waste Management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency in 2026

Attitude	Medical Waste Management				Total		*P Value*
	Good		Not Good				
	N	%	N	%	N	%	
Good	33	44,6	36	48,6	69	93,2	0,001

Attitude	Medical Waste Management				Total		*P Value*
	Good		Not Good				
	N	%	N	%	N	%	
Not Good	2	2,7	3	4,1	5	6,8	
Quantity	35	47,3	39	52,7	74	100	

Statistically, the relationship between attitude variables and medical waste management showed a meaningful relationship, namely the results of the Chi-Square statistical test obtained a p value = 0.001 (< 0.05).

The Relationship of Facilities and Infrastructure Factors with Clinical Waste Management

Table 5. The Relationship between Facilities and Infrastructure Factors with Clinical Waste Management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency in 2026

Facilities and Infrastructure	Medical Waste Management				Total		*P Value*
	Good		Not Good				
	N	%	N	%	N	%	
Good	30	40,5	35	47,3	65	87,8	
Not Good	5	6,8	4	5,4	9	12,2	0,002
Quantity	35	47,3	39	52,7	74	100	

Statistically, the relationship between the variables of medical waste facilities and infrastructure and medical waste management showed a meaningful relationship, namely the results of the chi-square statistical test obtained p value = 0.002 (α < 0.05).

The Relationship of Hospital Rule Factors with Clinical Waste Management.

Table 6. Relationship of Hospital Regulation Factors with Clinical Waste Management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency in 2026

Rules	Medical Waste Management				Total		*P Value*
	Good		Not Good				
	N	%	N	%	N	%	
Good	33	44,6	32	43,2	65	87,8	
Not Good	2	2,7	7	9,5	9	12,2	0,001
Quantity	35	47,3	39	52,7	74	100	

Statistically, the relationship between the hospital rule variable and medical waste management showed a meaningful relationship, namely the results of the chi-square statistical test obtained a P Value = 0.001 (α < 0.05).

The Relationship of Supervisory Factors with Clinical Waste Management.

Table 7. Relationship between Supervisory Factors and Clinical Waste Management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency in 2026

Supervision	Medical Waste Management				Total		*P Value*
	Good		Not Good				
	N	%	N	%	N	%	
Good	31	41,9	24	32,4	55	74,3	0,008

Supervision	Medical Waste Management				Total		*P Value*
	Good		Not Good				
	N	%	N	%	N	%	
Not Good	4	5,4	15	20,3	19	25,7	
Quantity	35	47,3	39	52,7	74	100	

Statistically, the relationship between the variables of medical waste supervision and medical waste management showed a meaningful relationship, namely the results of the chi-square statistical test obtained a p value = 0.008 ($\alpha < 0.05$).

Factors Related to Clinical Waste Management

Table 8. Factors Related to Clinical Waste Management at Haji Saeful Pagaden General Hospital, Subang Regency in 2026

All Factors	Medical Waste Management				Total		*P Value*
	Good		Not Good				
	N	%	N	%	N	%	
Good	31	41,9	21	28,4	52	70,3	
Not Good	4	5,4	18	24,3	22	29,7	0,001
Quantity	35	47,3	39	52,7	74	100	

Statistically, the relationship between variable factors related to medical waste management showed a meaningful relationship, namely the results of the chi-square statistical test obtained p value = 0.001 ($\alpha < 0.05$).

The Relationship of Knowledge Factors with Clinical Waste Management

Based on the results of the relationship between knowledge variables and clinical waste management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency, it was found that a large proportion of respondents as many as 58 respondents (78.4%) stated that knowledge about medical waste management was good. From the results of the bivariate analysis, it is known that as many as 16 people (21.6%) feel that the knowledge of medical waste management is not good at work so that the knowledge of medical waste management in providing medical waste management is not good, it is appropriate that according to the opinion of Keith Davis, Waxley and Yuki, the quality of medical waste management is an effort organized by hospitals alone or together in an organization to environmental sanitation management, especially in medical waste management (Watik, 2021). Tiffin (2019) in As'ad (2020) stated that medical waste management is an individual matter that is closely related to the knowledge of nurses and sanitarians about their own work, work situations and cooperation between leaders and fellow employees (Martin, 2020).

The knowledge factor is very necessary to improve the performance of nursing and sanitarian employees which will ultimately provide employee self-actualization and provide psychological maturity. The knowledge factor has a significant relationship with employee performance in medical waste management, this shows that the knowledge factor is needed to improve employee performance and provide opportunities to improve knowledge and skills (Srimiyatun, 2019). The knowledge factor or improvement of human resource (HR) ability has a very significant relationship with clinical waste management in hospitals. The quality of

medical waste management is highly dependent on the competence, behavior, and management of officers in the field with good knowledge.

The Relationship of Attitude Factors with Clinical Waste Management

The variable relationship between the attitude of medical waste management and medical waste management at the Haji Saeful Anwar Pagaden General Hospital, Subang Regency was obtained that most of the respondents as many as 69 respondents (93.2%) stated that the attitude of medical waste management in hospitals was good. Attitude is directly linked to medical waste management and gain sharing, employees will be able to carry out work due to increased productivity or attitude improvement. This form is generally carried out as a strategy to increase productivity and efficiency by companies in the face of increasingly fierce competition in the business world, where productivity is a very important thing by utilizing the behavior of employees who have a tendency to work casually or not optimally (W. L., 2018).

From this data, the implementation of minimum service standards refers to the basic conditions that must be met to ensure the implementation of quality health services. This includes the determination of minimum requirements on the necessary input elements, such as the type, number, and qualifications of implementing personnel, the type and specification of the facilities used, as well as attitudes or behaviors in providing services and it has been applied at the Haji Saeful Anwar Pagaden Hospital, Subang Regency. To direct health service providers to adhere to the standards that have been set, protocols or implementation guidelines are prepared. This protocol is a written statement that is systematically compiled and used as a reference in the implementation of health services (Dharma, 2021).

Meanwhile, to assess whether the standard has been achieved or not, indicators are used as a measuring tool that shows the level of compliance with the standards that have been set. The more in accordance with the measurement results with the indicators, the more in line with the applicable standards.The relationship between attitude factors and clinical waste management (B3 medical waste) is positive and significant. The availability of employees who have a good and adequate attitude is directly proportional to the improvement of medical waste management, while limited funds are the main obstacle in meeting the service standards for medical waste management in hospitals.There is a direct relationship where the attitude of medical waste management is a crucial factor. The better the attitude of employees, the better the clinical waste management will be (safe, in accordance with regulations, and hygienic), and vice versa.

The Relationship of Infrastructure Factors with Clinical Waste Management

The relationship between the variables of facilities and infrastructure and the quality of medical waste management at the Haji Saeful Anwar Pagaden General Hospital, Subang Regency, was obtained that there were a large majority of the respondents as many as 65 respondents (87.8%) stated that the facilities and infrastructure for medical waste management were good in hospitals. Various literature that says that the facilities and infrastructure to support hospital medical waste management include the following: generators, containers, garbage cans, incinerators, etc. are the standard of a work procedure in the management of medical waste in hospitals and if they can be fulfilled will cause satisfaction for employees at work (Srimiyatun, 2019).

Research by Bahtiar, Ayun Sriatmi, and Nurjazuli (2025), from 50 respondents, it was found that in the category of poor infrastructure, as many as 78.6% showed poor solid medical

waste management and 21.4% were good. Meanwhile, in the category of good infrastructure, there were 27.8% of solid medical waste management that was not good and 72.2% was good. The results of the statistical test using chi-square showed a continuity correction value with a p-value of 0.003 ($p < 0.05$). This indicates a significant relationship between infrastructure facilities and solid medical waste management at the Berangas Health Center in 2023 (Revianto, 2019). This research is in line with the results of Galih's (2021) research which shows that the behavior of cleaners in infectious waste disposal is influenced by the availability of facilities and infrastructure. From the data obtained, as many as 55 respondents (51.9%) with complete facilities and infrastructure showed good behavior in infectious waste disposal, while 32 respondents (30.2%) with incomplete facilities and infrastructure showed poor behavior. The results of the statistical test using chi-square showed a p-value of $0.000 < 0.05$, so it can be concluded that there is a significant relationship between facilities and infrastructure and behavior. Thus, it can be understood that the better the facilities and infrastructure available, the better the behavior of officers in infectious waste management (Siagian, 2018).

The relationship between infrastructure and medical waste management in hospitals is generally centered on the view that the availability, completeness, and feasibility of facilities are the main determinants (key factors) of the success of safe medical waste management. Overall, infrastructure facilities are considered as an enabling factor which, if not met, will hinder the performance of medical waste management even though the officer's knowledge is good.

The Relationship of Regulatory Factors with Clinical Waste Management

The relationship between the rule variables and the management of medical waste at the Haji Saeful Anwar Pagaden General Hospital, Subang Regency, was obtained that there was a large majority of respondents as many as 65 respondents (87.8%) stating that the rules for processing medical waste in hospitals were good.

Various literature that says that what is a hospital environment include the following: supporting facilities and infrastructure, hospital policies and organizations, etc. are the standards of a work procedure in the hospital and if they can be fulfilled will cause satisfaction, various literature that says that the company and good management are able to provide services, stable work situations and conditions. An ins factor that determines employee job satisfaction. The quality of service from the company greatly affects the level of satisfaction for employees, where a manager who has the ability to carry out management functions well will tend to provide a better level of satisfaction to his employees.

Management will tend to decline if the organization is larger, unless management takes various actions according to the existing rules, including carrying out better and professional management functions, including implementing rules, rules, and periodic supervision activities as one of the management functions.Hospital rule factors (staffing, medical waste management, environmental and hygiene) have a significant and positive relationship with medical waste management in hospitals as well as employees and patient satisfaction. A good rule, based on the results of research and legal studies, the management of medical waste in hospitals is highly dependent on compliance with strict regulations. Research often highlights the gap between written regulations and practice in the field.

Although the rules are clear (Law No. 32 of 2009 and Permenkes No. 18 of 2020), many hospitals—especially in remote areas—have not been fully compliant. The causative factor is

due to the limitations of medical waste treatment facilities that meet standards (such as licensed incinerators) and the lack of socialization of rules that cause treatment practices to not follow procedures, especially in sorting and transportation.Effective management of medical waste in hospitals requires improving human resources through continuous training, provision of facilities in accordance with rules (technical standards), and strict supervision from hospital management.

The Relationship of Supervisory Factors with Clinical Waste Management

The relationship between supervision variables and medical waste management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency was obtained that there were a large majority of respondents as many as 55 respondents (74.3%) stated that the supervision of waste management in hospitals was good.

The results of the study on the supervision subvariable showed that as many as 19 respondents (25.7%) assessed that supervision in the management of medical waste in hospitals was still not good. This condition has an impact on the level of satisfaction of nurses and sanitarians in carrying out medical waste management. Supervision is often seen as the role of a superior who has authority like a leader figure. Imoptimal supervision can lead to increased absenteeism and labor turnover rates. Therefore, management needs to carry out objective and continuous supervision, so as to be able to provide quick and appropriate solutions to various problems faced by employees in medical waste management.

Research by Solikul Huda (2019) at Sukoharjo Hospital, it is still found to be a practice in nursing services and medical waste management where waste such as needles, syringes, and bandages are disposed of without first being separated (Muninjaya, 2019). In contrast to Jasmawati's (2018) research which states that there is no relationship between knowledge and the practice of medical waste collection officers. This is because most of the officers have a good level of knowledge and also carry out waste collection correctly, so the number of officers who have poor knowledge and practices is relatively small. In addition, knowledge and good practices in waste management in hospitals are also influenced by the level of education possessed by the officers (Hasibuan, 2017).

Companies in As'ad (2023) stated that the company and management and supervision are factors that affect job satisfaction where companies and management that are able to provide stable working conditions will provide higher performance compared to companies and management that do not provide stable performance conditions (Maslow, 2018). The ability of supervisors to carry out supervisory functions or supervision as part of management will have an impact on employee performance and job satisfaction. This plays an important role in improving the quality and productivity of work, so that in the end the organizational goals that have been set can be achieved.

From the description of the variables mentioned above, it can be concluded that medical waste management will be declared good in carrying out its work which is influenced by the various factors above and one of the factors is the implementation of supervision. Usually, medical waste management employees who feel performance at work will show a positive attitude towards the work that has been carried out and vice versa they will show a negative attitude towards their work and this negative attitude can result in the failure to achieve psychological maturity so that it will become frustrating. Workers who have low work morale,

get tired and bored quickly, are emotionally unstable, often absent, burn out and high turnover which in the end will have poor performance and decreased productivity.

The Relationship of Clinical Waste Management Process Factors with Clinical Waste Management

The variable relationship between the medical waste management process and medical waste management at Haji Saeful Anwar Pagaden General Hospital, Subang Regency was obtained that there were a large majority of the respondents as many as 52 respondents (70.3%) stating that the hospital's medical waste management process was good. Some of the important factors in increasing the productivity of the management of a job depend on management; planning, effective work procedures, good communication, human resources, policies, decision-making (Sarwoto, 2021).

In line with the results of Nova Arikhman's research (2025), univariate analysis indicated that 53.2% of nurses had poor medical solid waste management, 48.4% had low knowledge, 58.1% showed negative attitudes, and 59.7% had a new working period. Bivariate analysis revealed a relationship between knowledge ($p = 0.020$), attitude ($p = 0.025$), and working period of nurses ($p = 0.003$) on the management of medical solid waste at BMC Hospital in Padang City. Therefore, it is recommended to increase socialization and training to nurses on solid medical waste management to minimize environmental pollution and prevent the spread of infectious diseases (Djarwoto, 2019).

The productivity management of a health worker, both medical/non-medical personnel, is closely related to his professional abilities and skills, productivity management must be supported by continuous education and training activities so that his abilities and skills can continue to develop following scientific developments that will be very supportive for the process of implementing optimal health services (Sulastom, 2020).

During carrying out a work, there are elements of planning and mobilization, the implementation of which is also supervision and control, which is the last function of the management process. This function is closely related to the three management functions above. Through the supervision and control function, the standard of success of the program outlined in the form of targets, work procedures and so on must always be compared with the results that have been achieved. If there are gaps or deviations, they must be able to be detected early, prevented, and controlled by the leadership. The supervision and control function aims to make the use of human resources more efficient, and the tasks of staff to achieve program objectives can be more effective (Arwani, 2020).

Based on various research studies on the medical waste management process in hospitals, it generally centers on the relationship between human behavior, infrastructure, and regulatory compliance. Researchers often assume that non-compliant management of medical waste is directly proportional to increased nosocomial health risks and environmental pollution. Therefore, efficient management of medical waste requires a systematic approach (reduction, sorting, storage, transportation, and destruction).

CONCLUSION

Based on the results of the research entitled Factors Related to Medical Waste Management at the Haji Saeful Anwar Pagaden General Hospital, Subang Regency in 2026 which has been carried out, it can be concluded: The knowledge factor of most of the

respondents as many as 58 respondents (78.4%) said that they were good in medical waste management. The attitude factor of most of the respondents as many as 69 respondents (93.2%) said that they were good in medical waste management. Facilities and Infrastructure Factors Most of the respondents as many as 65 respondents (87.8%) said they were good in medical waste management. Rule Factor Most of the respondents as many as 65 respondents (87.8%) said they were good in medical waste management.

The supervision factor was mostly from the respondents, as many as 55 respondents (74.3%) said that it was good in medical waste management. Most of the respondents (70.3%) said that medical waste management was good in medical waste management. There is a significant relationship between the knowledge factor and clinical waste management with the results of the Chi-Square statistical test with a (alpha) < 0.05 obtained p value = 0.001. There is a significant relationship between the attitude factor and clinical waste management with the results of the Chi-Square statistical test with a (alpha) > 0.05 obtained p value = 0.001. There is a significant relationship between facilities and infrastructure factors and clinical waste management with the results of the chi-square statistical test with a (alpha) > 0.05 obtained a p value of -0.001. There is a significant relationship between the rule factor and clinical waste management with the results of the chi-square statistical test with a (alpha) > 0.05 obtained p value = 0.001. There was a significant relationship between the surveillance factor and clinical waste management with the results of the chi-square statistical test with α (alpha) < 0.05 obtained p value = 0.002. There is a significant relationship between the factors of medical waste management and clinical waste management with the results of the chi-sqvare statistical test with a (alpha) < 0.05 obtained p value = 0.001.

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