

# THE EXISTENCE AND STRATEGY FOR MANAGING MEDICAL SOLID WASTE PRODUCTS IN RSUD SANJIWANI GIANYAR

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**Abstract:** Medical waste resulted from comprehensive health service provision at Sanjiwani Public Hospital requires strategic medical waste management to reduce potential environment hazards and public health risks especially communicable diseases. Therefore, this research is designed to review strategic management on medical waste disposal at Sanjiwani Public Hospital. This is a qualitative descriptive study which is aimed to analyse existence and strategic in management of solid medical waste at Sanjiwani Public Hospital. The research objects were the hospital directors and solid medical waste disposal unit. Data were collected from questionnaire, interview, and observation using guidance form Indonesian Ministry of Health number 120 year 2004, then analysed as qualitative descriptive, IFAS analysis (Internal Factors Analysis Summary), EFAS (External Factors Analysis Summary) and SWOT (Strengths Weaknesses Opportunities Threats) analysis. The results showed that solid medical waste resulting from the health services period July to December 2017 was 19.148 kgs, or 0.54 – 0.63 kg per bed per day. The waste management at Sanjiwani Hospital including medical waste and non medical waste was started from collection, segregation, transportation and final disposal. However. Thus, collection and segregation phase has not done well as medical and non medical waste was not seperated; disposal waste using incinerator emited air pollution; the result of IFAS and EFAS weight assessment, the total IFAS score of 3.39 and the total EFAS score of 3,37 are in quadrant I. Medical waste management at Sanjiwani Hospital has not consistended with regulation from Indonesian Ministry of Health It was sugested that strengths opportunities is the proper strategic in managing medical waste at Sanjiwani Public Hospital as it can maximize inner organisation strength to aim optimum opportunities.

**Keywords:** existence, strategic, management, solid medical waste.

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## 1. BACKGROUND

Clean and healthy environment is needed so that the hospital activities could run as it should be. Besides curing and improving the quality of life of the patients, health care service in the hospital also produce waste products in the form of solid, liquid and gas, in which they contain pathogens, chemical substances, radioactive materials that could make negative impact in public health and environment, also the ecosystem around the hospital area. (Adisasmito, 2017)

According to the paper published by Depkes RI and WHO in 2009 about 6 hospitals in Medan, Bandung, and Makassar, 65% of them have sorted waste products between medical and domestic (yellow and black plastic bags), but there were still some errors. Also 65% of them had incinerator with the ability to do combustion process in the temperature of 530 –

**International Journal of Novel Research in Interdisciplinary Studies**Vol. 5, Issue 3, pp: (37-50), Month: May - June 2018, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

800°C, but only 75% of them worked. Management of the ashes had not done very well, also besides that there weren't any accurate information about the medical waste product piles because 98% of the hospitals did not make any record about it. (Ditjen PP & PL, 2011 in KLH, 2014)

In Indonesian Health Profile 2017, there are 2,601 hospitals with 319,559 beds, but only 17% of them doing the correct waste products management according to 2016 standard (453 out of 2,601 hospitals) so the WHO criteria has not been reached in which the percentage of the medical waste products should reach 15%. (Pusat Data Kementerian Kesehatan RI, 2017)

The results of some studies about management of hospital waste products have not qualified, according to Kepmenkes RI No. 1204 Tahun 2004 about The Requirements of Hospital Healthy Environments, in which they could still found medical solid waste product in non-medical solid waste disposal. (Maharani, dkk. 2013) The input and process aspect of the system implementation in management of medical solid waste product had not done well. (Dewata 2016) The current score for temporary waste disposal is 0%, did not have any policy to provide temporary waste product shelter. (Darmawati, 2016)

The number of hospital in Bali reached 57. Assumed that each of them produces 10 kg of medical waste products every day, the total should be about 550 kg or 16.5 tonnes each months. (Suryajaya, 2016). According to the data mentioned above the production of the medical waste product could increase. One of the effort by the hospital in making the healthy environment is to do the sanitation service, such as waste product management.

The result of the interview with the cleaning service coordinator and waste product management staff, also initial observation conducted by the researcher on August 7, 2017 shows that solid waste is produced from both of the ward and supporting investigations room. The medical waste production in 2016 was 5,447.1 kg and 10,083 kg until the second quarter of 2017. Medical waste products will be collected in the temporary waste disposal in hospital (TPA) and would be exterminated by incinerator. The combustion process by the incinerator would result in complaint from the society about the residual and air pollution by the combustion products. Air pollution problem, which occurred around the hospital needed attention, especially for RSUD Sanjiwani Gianyar, because of its location surrounded by the residential area. If medical waste products were not managed very well, they would cause pollution, and uncomfortable environment, especially unpleasant smell and less attractive view according to esthetics. They could become the source of earth and water pollution, and suitable environment for pathogens that could harm human health.

Focusing to the problems mentioned above, the author planned a study about building existence and strategy in managing medical waste products in RSUD Sanjiwani Gianyar. The formulation of the problem in this study is: How is the existence in managing; sorting, packing, temporary waste disposal, transporting, and exterminating in RSUD Sanjiwani Gianyar? What is the strategy in managing solid waste product in RSUD Sanjiwani Gianyar? The aim of this study is to analyze the existence in managing solid medical waste product and formulating the strategy in managing medical waste product in RSUD Sanjiwani Gianyar.

**2. THEORIES****1. Existence:**

Existence comes from Greek word *existere* which means appear, exist, arise, and be here. This definitions then give four new explanations about existence; 1. Existence is about what is here, 2. Existence is what we have, 3. Existence is something that is experienced, emphasized that the thing is there, 4. Existence is perfection. (Wikipedia)

**2. Hospital Definition:**

Hospital as one of the health care facilities could be held by government, and or society. Undang-Undang Republik Indonesia Nomor 44 tahun 2009 about hospital, mentioned that hospital is the health care institution that could conduct personal health service completely that provides facilities in outpatient clinic, inpatient ward and emergency department.

**3. Hospital Waste Product:**

Health care waste products include all of the waste from the health services, research facilities, and laboratories. Hospital waste is the waste products in the form of solid, liquid, gel, and gas that could contain pathogenic microorganisms which tend to be infectious, toxic chemical substances, and some of them contain radioactive substances. (Depkes, 2006)

Based on Kepmenkes Republik Indonesia No. 1204/Menkes/SK/X/2004 hospital waste products are divided into three: 1) Liquid waste product is all of the water waste including faeces from hospital activities which could contain microorganism, toxic chemical substances and radioactive which could be harm to human, 2) Gas waste product is all of the waste products in the form of gas from the combustion process in the hospital in incinerator, kitchen, generator, and anesthesia, 3) Solid waste product is all of the hospital waste product which grouped into medical and non-medical solid waste product.

#### **a. Hospital Medical Solid Waste Products**

Hospital solid waste products are all of the hospital waste in the form of solid, produced by hospital activities which can be categorized as medical and non-medical. Solid waste products include infectious waste, pathological waste, sharp waste, pharmacological waste, cytotoxic waste, chemical waste, radioactive waste, pressure vessel waste, and heavy metal waste. Non-medical solid waste products are solid waste, produced by hospital activities outside the medical area, such as the kitchen, office, garden, and the yard. (Ditjen PP dan PL, 2006)

#### **4. Steps in managing solid waste product:**

##### **a. Sorting**

Sorting medical waste product in the hospital should be done starting from where the waste is produced. Sorting medical waste aims at lowering number of waste to be exterminated, to control the risk and to adapt with the current technology. Needles and syringes should be separated so that they could not be used anymore.

##### **b. Packing**

Packing hospital solid waste product means that medical and non-medical waste should be separated according to their place. Both of the contaminated and non-contaminated sharp waste should be mixed in one package. The package should leak-proof, non-puncturable, and hard to open. Each of the packing steps should meet the conditions for the package itself and the place, such as the colour and symbol according to the waste product category.

##### **c. Collecting**

Collecting solid medical waste product should pay attention to these rules: 1. Container should always be available in all of the source of the waste products, 2. Container's lid should be closed and should have plastic bag according to the type of the waste, 3. Waste products inside the bag should be collected to the disposal place which was determined before every day, if already filled about  $\frac{3}{4}$ , 4. Before collecting them, make sure that the containers have the information about date, weight, and the source of the waste product written on a label, 5. The used plastic bag should not be used anymore, so change the bag with the similar ones.

##### **d. Transporting**

Transporting hospital medical waste products were done after collecting process. This step was done by the janitor from solid waste product source. Transporting medical waste should use something like cart or trolley. Waste products were lifted using appropriate tool to reduce the risk faced by the worker. The fastest route for transporting waste products from the unit in the hospital to garbage disposal should be planned before the course started. (Pruss A, dkk., 2005)

##### **e. Storage**

According to Kepmenkes RI No. 1204/SK/X/2004 the hospital that provides incinerator should exterminate the waste no later than 24 hours, and for them who did not provide incinerator, the waste should be given to third party organization for combustion at no later than 24 hours. Hospital solid waste storage should follow the climate in tropical area, about 48 hours in rainy season and 24 hours in dry season. Temporary storage area should have strong floor with good drainage, easy to be cleaned and be disinfected. The place should not be located near the kitchen, should have good light source and easy to be accessed by waste management transportation.

##### **f. Processing/Exterminating**

Processing or exterminating harmful and toxic hospital medical waste product is a process to change type, amount, and their characteristic to be not harmful anymore and non-toxic before the dumping and sometimes making them useful again. Extermination and safe disposal is a key in reducing diseases or injury by contact with the potential risk for health and environmental pollution.

### **g. Final Disposal**

Final disposal of hospital medical waste product is the result of the process in the form of ash, is the last step of waste product management, usually in the form of landfill. The aim of the landfill is to collect and isolate medical waste which could not be used and to protect long-term human health and clean environment. The location which could specifically be used as secure landfill should meet the terms for dumping harmful and toxic waste products. The landfill itself has the collection and processing system of the waste product.

### **5. Strategic Management Concept:**

The definition of strategy first given by Chandler (1962) in which strategy is the long-term objective of a company, also utilization and allocation of all important resources for that objection (Fredy Rangkuti, 2017). John A. Byrne defined strategy as a basic pattern of objection which is running and planned, source development, Porter (1985) said that strategy is a very important tool to achieve advantage in a competition (Fredy Rangkuti, 2017). Strategy in general is commonly defined as a tool to achieve objective or to finish a problem. The word strategy is applied in various society or organization (in the level of workers until the leader in organization).

### **6. SWOT Situational Analysis**

SWOT Analysis (Strength, Weakness, Opportunity, Threat) is to identify various factors systematically to formulate company strategy (in this time the hospital). This analysis is based on logic that could maximize the strength and opportunities and in the same time to minimize the weakness and threat.

The process to take a strategic decision is related to mission development, objective, strategy and company (hospital) policy. So that is why strategic planner should analyse company strategic factors (strength, weakness, opportunities and threat) in current condition. SWOT analysis compares internal factors of strength and weakness with the external factors of opportunities and threat.

## **3. METHODS**

### **Study Design:**

This study is using qualitative descriptive method, aiming to analyze the existence and strategy in managing solid medical waste product in RSUD Sanjiwani Gianyar. The research objects were the board of directors and medical solid waste product management unit. The data were collected by using questionnaire, interview and observation according to KepMenkes RI No. 1204 year 2004, then analyzed by qualitative descriptive method, IFAS (Internal Factors Analysis Summary), EFAS (External Factors Analysis Summary), and SWOT (Strength, Weakness, Opportunities, Threat). This study was conducted in RSUD Sanjiwani Gianyar Jalan Ciung Wanara No. 2, Gianyar for two months from December 2017 to January 2018.

## **4. RESULTS AND DISCUSSION**

### **a. Overview:**

RSUD Sanjiwani Gianyar is a type B public hospital with 277 bed capacity and achieved a plenary accreditation by the hospital accreditation committee.

#### **1. Human Resources**

Total resources in RSUD Sanjiwani Gianyar is 750 people including 94 medical staff, 316 nurses, 124 paramedics and 216 non-medical staff.

#### **2. Facilities**

Emergency Department (IRD) was divided into two segments; the surgical and non-surgical area with 15 beds, 18 outpatients management unit, inpatients ward with 277 beds, medical surgical unit with 5 operating theaters, and specialized care unit such as Endoscopy, Colonoscopy, Haemodialysis, Electroencephalography, Intensive Care Unit, Radiology Department which have the facilities of ultrasound, radiodiagnostics and CT Scan. Central Sterile Supply Department in which equipments are sterilized, Hospital Facilities Care Management Unit which handles sanitation, electricity, water, and maintenance of hospital facilities and infrastructure.

**b. Waste Products Management Policy:**

1. Keputusan Menteri Kesehatan RI No. 1204/Menkes/SK/X/2004 about the requirements of hospital environmental issues.
2. Operational Procedure Standard (SPO).

In the effort to make the society healthy and to protect the environment from inappropriate medical waste product management there should be some regulations to be the reference to manage medical solid waste products in health care facilities (Ditjen PP dan PL, 2013),

According to Adisasmito in 2017, the effort of managing hospital solid waste products could be done by preparing the regulations, guidelines, and policy to organize the management and to improve the environmental health, because most hospital activities could produce various waste products in the form of liquid, solid, and gas which could become hazardous for environment.

**c. Medical Waste Products Characteristics:**

**1. Source and Types of Waste Products**

The result shows that the units which produced the waste products were outpatients unit, inpatients ward, maternity unit, emergency care unit, central medical surgical units, intensive care unit, radiology unit, and pharmacy. The waste products were disposable gloves, disposable masks, syringes, cottons, bandages, napkins contaminated with blood or body liquid, infusion set, ampoules, chemical products, used sanitary napkins, dressings, body parts, surgical gloves, used scalpels, urine catheters, and urine bags. And also classified by the units which produces the waste products as follows:

- 1) Outpatients Unit: Syringes, cottons/bandages/tissue papers/napkins contaminated by blood or body fluids, body parts, ampoules.
- 2) Inpatients Ward: disposable gloves, disposable masks, syringes, cotton/bandages/tissue paper/napkins contaminated by blood or body fluids, used sanitary napkins, catheters, ampoules
- 3) Maternity Unit: disposable gloves, disposable masks, syringes, cottons/bandages/tissue paper/napkins contaminated by blood or body fluid, infusion set, intravenous bottles, chemical products, used sanitary napkins, urinary catheters, ampoules.
- 4) Emergency Care Units: disposable gloves, disposable masks, scalpel, syringes, cottons/bandages/tissue papers/napkins contaminated with blood or body fluids, used sanitary napkins, urinary catheters, ampoules.
- 5) Operating Theatres: disposable gloves, disposable masks, syringes, cottons/bandages/tissue paper/napkins contaminated by blood or body fluids, infusion set, intravenous bottle, chemical products, urinary catheters, ampoules.
- 4) Radiology unit: radioactive waste, disposable gloves, disposable masks, syringes.
- 5) Pharmacy: medical ingredients remains, expired medicine.

**2. Medical Waste Products Weight:**

According to the documents made by Hospital Facilities Care Management Unit (IPSRS) in RSUD Sanjiwani Gianyar only medical waste products were being weighed, while non-medical waste products directly be collected in the shelter provided by hygiene department. The amount of medical waste products from July until December 2017 is described on table 1

**Table 1: The amount of medical waste products from July until December 2017 is described**

No	Month	Weight	Average/day	Each bed
1	July	3478 kg	112,19 kg	0,63
2	August	2958 kg	95,41 kg	0,54
3	September	2881 kg	96,03 kg	0,54
4	October	3024 kg	97,54 kg	0,55
5	November	3051 kg	101,70 kg	0,57
6	December	3726 kg	120,19 kg	0,68
	Total	19.148 kg	624.06 kg	3,52

Source: Summary of Facilities Care Management Unit (IPSRS) RSUD Sanjiwani Gianyar

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Vol. 5, Issue 3, pp: (37-50), Month: May - June 2018, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

The table shows that the average of the waste products produced by RSUD Sanjiwani Gianyar from July until December 2017 is 19,148 kg. From that amount, the average production per day is about 95 kg to 121 kg. The average waste products production is 0.54 kg until 0.68 kg per bed. Study by Aida and Sulistyorini in 2008 have concluded that the number of patients have significance in increase in hospital waste products amount.

**d. Waste products management resources:**

**1. Man power**

There were 50 cleaning service staff, 1 incinerator staff in RSUD Sanjiwani Gianyar. Based on the questionnaire and interview, there were no specified training conducted for them to learn about management of waste products.

Based on the study by Wicaksono (2016) good training regiments would make great improvement for the staff performance, because training would widen the knowledge, attitude, and job skills and staff’s moral value, so that workability and productivity could be improved and top quality products would be produced.

**2. Tools/Facilities**

Hospital waste product shelter was using the fiberglass material with lid, 120 liter capacity, and the bucket with lid, approximately 50 liter capacity in the inpatients ward. These are the facilities used to manage waste products, as shown in table 2

**Tabel 2: The number of rubbish bin to collect waste products in 2017**

No	Facilities/Tools	Capacity	Number
1	Step rubbish bin with wheel	120 lt	31 pieces
2	Small rubbish bin with wheel	80 lt	38 pieces
3	Large bucket	80 lt	62 pieces
4	Small bucket	50 lt	78 pieces
	Total		209 pieces

Source: Inventory of infrastructure facilities

**Tabel 3: Budget for waste products plastic bag in 2017**

Name	Amount per month	Price per pieces (IDR)	Total (IDR)
Yellow plastic bag	100 pcs	36.000	3.600.000
Black plastic bag	100 pcs	30.000	3.000.000
Lightweight black plastic bag	150 pcs	41.000	6.150.000
Lightweight yellow plastic bag	150 pcs	41.000	6.150.000

Source: Inventory of infrastructure facilities

**3. Incinerator**

RSUD Sanjiwani Gianyar do not have specified trolley. Oxygen trolley or linen trolley were used to transport waste products. The trolleys were opened, not waterproof, and sharp.

According to WHO (1999) container or trolley to transport waste products should be given label according to types of waste products they carry, easy to be used and to be disassembled, no sharp parts that could break the plastic bag or container while collecting or disassembling, easy to be cleaned. Because the hospital did not meet the requirements, there could be some of the waste products scattered and contaminated. The hospital itself do not have any specified pathway to transport waste products, so air contamination could make hospital visitors uncomfortable.

**e. Implementation of waste product management:**

**1. Sorting/Separation**

According to our observation, sorting and separation of medical and non-medical product activities in RSUD Sanjiwani Gianyar were done in medical waste production units. Two bins were provided, covered by plastic bag which is black for non-medical waste and yellow for medical waste, also drum to collect sharp waste.

**2. Transporting**



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Vol. 5, Issue 3, pp: (37-50), Month: May - June 2018, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

Medical waste product transportation from each wards were done by *cleaning service* who worked in each ward, once a day every morning at 07.30-08.30 WITA. Some of them used oxygen trolley which have no partition, no lid, sharp and hard to be cleaned. This would result in mixing of medical and non-medical waste and scattering, later be carried directly with no trolley, and over capacity in the bucket.

### 3. Temporary waste product shelter

RSUD Sanjiwani Gianyar provided temporary waste products shelter for medical waste products. Medical waste products from the wards were transported in temporary waste product shelter. In the shelter waste products were collected inside a room but still opened. This situation is inappropriate according to Keputusan Menteri Kesehatan RI No. 1204 Menkes/SK/X/2004 in which temporary waste product shelter should be tightly closed.

### 4. Incineration

Combustion of the waste products were using regular schedule everyday after 11.00 WITA. Before the waste products were combusted, incinerator staff weighed the waste products to report to hospital facilities care management unit. Temperature for combustion is at least 1200°C, in at least 45 minutes. The capacity of the incinerator is 100 kg. This study have shown that combustion products still have odour so combustion was done according to wind direction to avoid the neighbourhood.

### f. Medical waste product management strategy:

#### 1. Formulation of Internal and External Factors

##### 1) Internal Factor

According to the calculation, it is known that the internal factor average or benchmark is 6.44. The internal factors then divided into two groups, with the value above the benchmark were grouped into strength, and with the value below the benchmark were grouped into weakness.

**Table 4: Summary of Internal Factor Grouping**

Responden number	STRENGTH	AVERAGE
2	Institutional performance of RSUD Sanjiwani in controlling pollution due to medical waste	6,68
3	The work ethic of medical waste management personnel of RSUD Sanjiwani	6,84
6	RSUD Sanjiwani as East Bali Referral center	6,56
7	Availability of operational standards of medical waste management services	7,60
8	Authority RSUD in preparation of medical waste management plan	7,28
11	Determining program / activities priority of RSUD Sanjiwani in supporting solid waste medical management	6,88
<b>WEAKNESS</b>		
1	Geographical position of RSUD Sanjiwani in residential area	5,36
4	Availability of information on the risk of solid medical waste	5,96
5	Quality and quantity of human resources in the management of medical waste	6,20
9	Availability of medical waste management facilities and infrastructure	6,08
10	Public participation of hospital in planning of hospital waste management	5,80
12	Feasibility of facilities and infrastructure supporting solid waste medical management in RSUD Sanjiwani	6,00

Source: Results of Respondents Analysis of SWOT Questionnaire.

##### 2) External Factor

Benchmark for external factor is 6.64. The factor with the value above the benchmark were grouped into opportunity, and the value below the benchmark were grouped into threat.

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Tabel 5 Summary of External Factor Grouping

Responden number	OPPORTUNITY	AVERAGE
1	The existence of Government policy of bed protection and environmental management	6,67
2	The existence of KepMenkes RI No 1204/2004 as a guideline for the implementation of solid waste medical management	6,70
6	The existence of green hospital program in support of solid medical waste management at Sanjiwani Hospital	6,96
10	Medical waste management trends tend to be of concern to the public at most	6,67
11	Competition between hospitals in improving quality including the quality of the hospital environment.	6,85
13	Rapid technological advances in support of solid medical waste management.	6,76
<b>THREAT</b>		
3	Central government support in the form of special allocation funds supports solid waste medical management	6,04
4	Private investment in supporting solid waste medical management in RSUD Sanjiwani	5,36
5	Effectiveness of policies in support of solid waste medical management	6,48
7	Social and political environment condition of Gianyar	6,24
8	Globalization and information disclosure in support of solid medical waste management in RSUD Sanjiwani	6,36
9	The existence of special financial assistance in the management of solid medical waste in RSUD Sanjiwani	6,08
12	Accountability of government performance in environmental protection and management especially solid waste medical management.	6,40

Source: Results of Respondents Analysis of SWOT Questionnaire.

Table 6: IFAS-EFAS Scoring result

		Rata-Rata	Penyesuaian	Bobot	Rating	Bobot x Rating
<b>Strength</b>	2	6,68	1,68	9,74	3,40	0,33
	3	6,84	1,84	10,67	3,36	0,36
	6	6,56	1,56	9,05	3,12	0,28
	7	7,60	2,60	15,08	3,32	0,50
	8	7,28	2,28	13,23	3,48	0,46
	11	6,88	1,88	10,90	3,32	0,36
	<b>Total S (Xsi)</b>		<b>11,84</b>			
<b>Weakness</b>	1	5,36	0,36	2,09	3,48	0,07
	4	5,96	0,96	5,57	3,32	0,18
	5	6,20	1,20	6,96	3,32	0,23
	9	6,08	1,08	6,26	3,68	0,23
	10	5,80	0,80	4,64	3,64	0,17
	12	6,00	1,00	5,80	3,52	0,20
	<b>Total W (Xwi)</b>		<b>5,40</b>		<b>100,00</b>	
<b>Xi = (Xsi + Xwi)</b>				<b>17,24</b>		
<b>Bs = (Xsi/Xi)*100%</b>				<b>68,68</b>		
<b>Bw = (Xwi/Xi)*100%</b>				<b>31,32</b>		
(Sambungan)						
		Rata-Rata	Penyesuaian	Bobot	Rating	Bobot x Rating
<b>Opportunit</b>	1	7,56	2,56	12,01	3,40	0,41
	2	7,80	2,80	13,13	3,28	0,43
	6	6,92	1,92	9,01	3,44	0,31
	10	6,80	1,80	8,44	3,48	0,29
	11	7,04	2,04	9,57	3,28	0,31
	13	7,24	2,24	10,51	3,56	0,37
<b>Total O (Xoi)</b>		<b>13,36</b>				<b>2,13</b>
<b>Threat</b>	3	6,04	1,04	4,88	3,32	0,16
	4	5,36	0,36	1,69	3,72	0,06
	5	6,48	1,48	6,94	3,24	0,22
	7	6,24	1,24	5,82	3,28	0,19
	8	6,36	1,36	6,38	3,36	0,21
	9	6,08	1,08	5,07	3,24	0,16
	12	6,40	1,40	6,57	3,40	0,22
<b>Total T (Xti)</b>		<b>7,96</b>		<b>100,00</b>		<b>1,24</b>
<b>Xi = (Xoi + Xti)</b>				<b>21,32</b>		
<b>Bs = (Xoi/Xi)*100%</b>				<b>62,66</b>		
<b>Bw = (Xti/Xi)*100%</b>				<b>37,34</b>		



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Vol. 5, Issue 3, pp: (37-50), Month: May - June 2018, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

According to IFAS and EFAS Scoring result, the total IFAS Score is 3.39 and the total EFAS Score is 3.37. The matrix comparing internal and external factors in managing medical waste products in RSUD Sanjiwani Gianyar is shown at the table below.

**Table 7: Comparison Internal Factor and Exsternal Factor**

Internal Factor	VS	Eksternal Factor
<b>Strength</b>		<b>Opportunities</b>
1. Institutional performance of RSUD Sanjiwani in controlling pollution due to medical waste		1. The existence of Government policy of bed protection and environmental management
2. The work ethic of medical waste management personnel of RSUD Sanjiwani		2. The existence of KepMenkes RI No 1204/2004 as a guideline for the implementation of solid waste medical management
3. RSUD Sanjiwani as East Bali Referral center		3. The existence of green hospital program in support of solid medical waste management at Sanjiwani Hospital
4. Availability of operational standards of medical waste management services		4. Medical waste management trends tend to be of concern to the public at most
5. Authority RSUD in preparation of medical waste management plan		5. Competition between hospitals in improving quality including the quality of the hospital environment.
6. Determining program / activities priority of RSUD Sanjiwani in supporting solid waste medical management		6. Rapid technological advances in support of solid medical waste management.
<b>Weakness</b>	VS	<b>Threaths</b>
1. Geographical position of RSUD Sanjiwani in residential area		1. Central government support in the form of special allocation funds supports solid waste medical management
2. Availability of information on the risk of solid medical waste		2. Private investment in supporting solid waste medical management in RSUD Sanjiwani
3. Quality and quantity of human resources in the management of medical waste		3. Effectiveness of policies in support of solid waste medical management
4. Availability of medical waste management facilities and infrastructure		4. Social and political environment condition of Gianyar
5. Public participation of hospital in planning of hospital waste management		5. Globalization and information disclosure in support of solid medical waste management in RSUD Sanjiwani
6. Feasibility of facilities and infrastructure supporting solid waste medical management in RSUD Sanjiwani		6. The existence of special financial assistance in the management of solid medical waste in RSUD Sanjiwani
		7. Accountability of government performance in environmental protection and management especially solid waste medical management.

**Strategy Formulation:**

Strategy formulation were done by using SWOT matrix and IFAS-EFAS Matrix. Referring to the external environmental analysis and the conditions in RSUD Sanjiwani Gianyar, with the score of 3.39 in IFAS and 3.37 in EFAS, so the medical solid waste product strategy is by using SWOT matrix, S-O were shown in table 8

**Table 8 SWOT Matrix to determine the strategy in managing medical solid waste products**

IFAS	<b>Strengths (S)/ Kekuatan (Skor IFAS : &gt;2)</b>	<b>Weaknesses (W)/ Kelemahan (Skor IFAS : &lt;=2)</b>
EFAS	<b>Opportunities (O)/ Peluang (Skor EFAS : &gt;2)</b>	<b>Treaths (T)/ Ancaman Skor EFAS : &lt;=2)</b>
	Strategi S – O	Strategi W – O
	Strategi S – T	Strategi W – T

Note :  = Solid waste product management position

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By looking at the formulation of interaction of IFAS-EFAS matrix, we got the strategy of SO, ST, WO and WT. To determine the next priority scale, we did score the assessment about the known strategy. The arrangement of alternative strategy according to the priority we got using interaction of SWOT matrix, as shown in the table below.

**Table 9: Interaction Scoring result IFAS-EFAS**

	S = 2,30	W = 1,09
O = 2,13	SO = 4,43	WO = 3,22
T = 1,24	ST = 3,54	WT = 2,33

Resource: data processing

The highest score is Strength-Opportunity (SO), that could be explained as strategy to use strength to take the advantage of known opportunities and possibilities. This condition could be a benefit for RSUD Sanjiwani Gianyar, because in the internal factor side, RSUD Sanjiwani Gianyar had bigger strength than weakness, from the external factor, the opportunities is bigger than the threat.

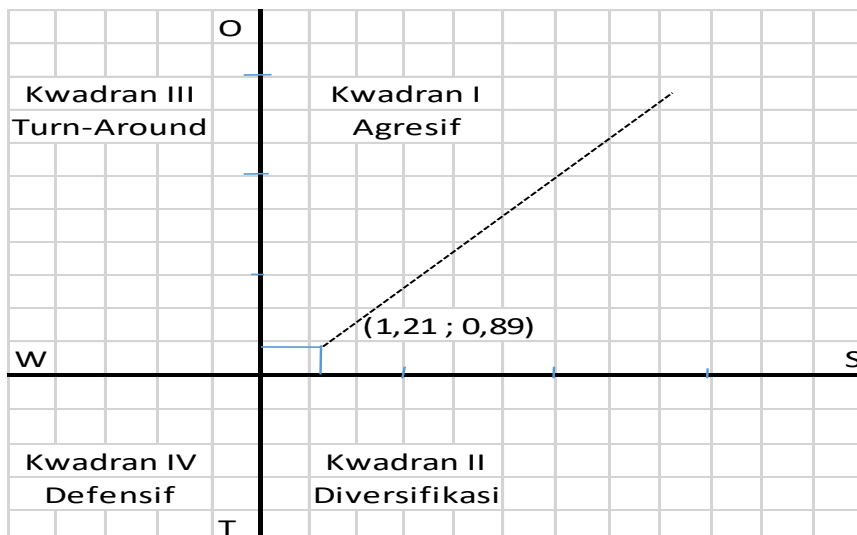
In the IFAS and EFAS analysis, we also got the total score for each internal and external environment to determine x and y in SWOT quadrant, as shown below.

$$\begin{aligned} \text{Total internal (x)} &= \text{total strength} - \text{total weakness} \\ &= 2,30 - 1,09 \\ &= 1,21 \end{aligned}$$

$$\begin{aligned} \text{Total external (y)} &= \text{total opportunities score} - \text{total threat score} \\ &= 2,13 - 1,24 \\ &= 0,89 \end{aligned}$$

Both x and y variable is positive, which is located in the first quadrant with the strategies to be applied in this conditions is to take advantage of every opportunities by optimizing every strength and benefits available.

The SWOT score quadrant is shown in figure 9.



**Figure 9: SWOT analysis quadrant**

Formulation of strategy in managing medical solid waste products in RSUD Sanjiwani Gianyar could also be formulated by IFAS-EFAS Matrix. By looking at the total IFAS of 3.39 and EFAS of 3.37, so the strategy we got at first quadrant had the characteristic of growth power, so the strategy could be done aggressively. In this first quadrant, the position is strong, may be a benefit in every opportunities. (S-O)

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By analysing the external factor, we could anticipate every challenge for every external changes, even transform challenges into new opportunities.

Table 4.10 IFAS and EFAS Matrix

T O T A L S C O R E C T I O N		Strong	Moderate	Weak
		4,0	3,0	2,0
	High 3,0	I (3,37; 3,39)	II	III
	Moderate 2,0	IV	V	VI
Low	1,0	VII	VIII	IX

Resource: Freddy Rangkuti, 2017

In table 4.10, it is shown that the management of waste products in RSUD Sanjiwani Gianyar sits at the first cell, means that RSUD Sanjiwani is in the strong position with the average score of 3.37-3.39. The strategy to be implemented in RSUD Sanjiwani Gianyar is: to grow and nurture, a profitable strategy, means to maintain and control community support and to maintain this current condition and to make small changes in contributing factors of waste management.

There is also alternative in formulating strategy with the biggest score which is Strength-opportunity (SO), the interaction of IFAS-EFAS shown in this table.

Table 4.11 First Priority Strategy S-O

Strenght (S)	Opportunitis (O)
2 Institutional performance of RSUD Sanjiwani in controlling pollution due to medical waste	1 Geographical position of RSUD Sanjiwani in residential area
3 The work ethic of medical waste management personnel of RSUD Sanjiwani	4 Availability of information on the risk of solid medical waste
6 RSUD Sanjiwani as East Bali Referral center	5 Quality and quantity of human resources in the management of medical waste
7 Availability of operational standards of medical waste management services	9 Availability of medical waste management facilities and infrastructure
8 Authority RSUD in preparation of medical waste management plan	10 Public participation of hospital in planning of hospital waste management
11 Determining program / activities priority of RSUD Sanjiwani in supporting solid waste medical management	12 Feasibility of facilities and infrastructure supporting solid waste medical management in RSUD Sanjiwani

The explanation of table 4.11, the number 2,3,6,7,8,11 in the strength column is the question from the recapitulation of internal factor questionnaire, while 1,2,6,10,13 in opportunities column is the list of question that could be the possibilities according to the recapitulation in external factor questionnaire.

**Formulation of strategy in managing medical solid waste product in RSUD Sanjiwani Gianyar is the Strength-Opportunity (SO) Strategy**

1. With the government policy about environmental protection and management, RSUD Sanjiwani Gianyar could take the advantage of authorized capital like institutional performance, work ethics and the tenacity of waste management staff, availability of standard operating procedure, to maximalize the implementation of KepMenkes RI No. 1204/Menkes/SK/X/2004 as the guide in hospital waste product management. (O1+S2+S3+S7+O2).

- 
2. As the government establish a program known as Green Hospital in supporting medical solid waste product management, RSUD Sanjiwani could use their authority to arrange planning document to determine program priority in facing competition with other hospitals, to improve service quality including hospital environment quality (O6+S8+S11+O11)
  3. To improve the RSUD Sanjiwani potential as East Bali referral center could be synergized with environmental protection and management in Gianyar in utilizing technology for supporting environmental management, especially in medical waste management. It could be strengthened by using trend in medical waste management which tends to be concern to the public at most. (S6+O13+O11+O10)
- 

## 5. CONCLUSION

1. The existence of medical solid waste management in RSUD Sanjiwani Gianyar is not yet optimal according to Kepmenkes RI No, 1204/Menkes/SK/X/2004 about hospital health requirements, because there were still less accurate sorting between infectious and non-infectious waste, transportation by using oxygen trolley, limited temporary waste shelter, and incineration permit and giving some of the waste to third parties (PT IBU).
2. The appropriate strategy in managing waste products is SO, is to apply every strength to gain and make use of every known opportunities as in:
  - a. With the government policy about environmental protection and management, RSUD Sanjiwani Gianyar could take the advantage of authorized capital like institutional performance, work ethics and the tenacity of waste management staff, availability of standard operating procedure, to maximalize the implementation of KepMenkes RI No. 1204/Menkes/SK/X/2004 as the guide in hospital waste product management. (O1+S2+S3+S7+O2).
  - b. As the government establish a program known as Green Hospital in supporting medical solid waste product management, RSUD Sanjiwani could use their authority to arrange planning document to determine program priority in facing competition with other hospitals, to improve service quality including hospital environment quality (O6+S8+S11+O11)
  - c. To improve the RSUD Sanjiwani potential as East Bali referral center could be synergized with environmental protection and management in Gianyar in utilizing technology for supporting environmental management, especially in medical waste management. It could be strengthened by using trend in medical waste management which tends to be concern to the public at most. (S6+O13+O11+O10)

## 6. SUGGESTION

1. To give training to the staff and socialization of each policy in managing medical waste in RSUD Sanjiwani Gianyar
2. To add extra staff in medical waste management/combustion in RSUD Sanjiwani Gianyar
3. To provide adequate transportation and temporary closed shelter in RSUD Sanjiwani Gianyar

## 7. IMPLICATION

1. RSUD Sanjiwani Gianyar immediately implement the incinerator operating license for the management of solid medical waste
2. Medical waste management in RSUD Sanjiwani Gianyar must be integrated since planning of evaluation implementation and follow up is according to KepMenkes RI No.1204 / Menkes / SK / X / 2004 About Health Requirement of Hospital Environment
3. RSUD Sanjiwani Gianyar shall conduct supervision and evaluation in sorting, transportation container, shelter and destruction of medical waste
4. The right future strategy in solid medical waste management that can be used by RSUD Sanjiwani Gianyar is (SO) that is utilizing all existing strengths in RSUD Sanjiwani Gianyar from the elements of directors, management of all functional and non functional ranks to seize and take advantage of opportunities as big as the magnitude for medical waste management still exist in accordance with Kepmenkes RI No. 1204/Menkes/SK/X/2004

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