Meta Analysis: Relationship Of Knowledge And Attitude With Behavior Of Health Worker In Medical Waste Management In Hospital

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Abstract- Hospital waste is all waste, both solid and liquid, originating from medical and non-medical activities which are likely to contain microorganisms, toxic chemicals, and radioactivity. The trend of increasing the amount of medical waste generation occurs in all countries in the world. The normal generation of medical waste is around 40 tons/day. Health workers in hospitals are vulnerable to risks associated with medical waste management. Unsafe behavior related to medical waste can occur due to lack of knowledge, awareness, and attitudes related to medical waste management, not complying with the use of PPE, not using facilities, and not being careful at work.

Aim: To know the relationship between knowledge and attitudes with the behavior of health workers in the management of medical waste in hospitals.

Method: This study uses a meta-analysis research design with a sample of 1,162. Dependent variable: Hospital Medical Waste Management, independent variable: Knowledge and attitude. The test used is the Effect Size test using Revman version 5.4.

Result: The results showed that the meta-analysis showed that the risk factors associated with the behavior of medical waste management, the largest of the 2 variables studied was knowledge with a p value <0.05, namely p = 0.01 and a pooled odds ratio value of 2.71 (95%). CI 1.26-5.82) and after that attitude with p value > 0.05, namely p = 0.07 and pooled odds ratio value of 6.55 (95% CI 0.84-50.92).

Conclusion: There is a relationship between knowledge with behavior in hospital medical waste management.

Index Terms- *Waste management behavior, knowledge, and attitude.*

I. INTRODUCTION

Hospital is a health service institution that provides complete individual health services that provide inpatient, outpatient, and emergency services (1). In providing services, hospitals produce hospital waste. Hospital waste is all waste, both solid and liquid, originating from medical and non-medical activities which are likely to contain microorganisms, toxic chemicals, and radioactivity. If not handled properly, hospital waste can cause problems, both in terms of service and aesthetics. This waste can also cause environmental pollution and become a source of disease transmission (nosocomial infections) (2).

The trend of increasing the amount of medical waste generated from medical activities occurs in all countries in the world. The normal amount of medical waste is around 40 tons/day. The occurrence of the Covid-19 pandemic at the end of 2019 to 2020 resulted in a significant increase in the output of medical waste in hospitals around the world. A study conducted during the Covid-19 pandemic in China showed that the medical waste disposal capacity which was originally 4,902.8 tons/day increased by 1,164 tons/day to 6,066.8 tons/day, with a yield of 14.3 kg/day of medical waste. Data from RSPI Sulianto Suroso shows an increase in medical waste and personal protective equipment (PPE) being destroyed by incinerators. In January 2020, the amount of medical waste was 2,750 kg, increasing to 4,500 kg in March 2020 (3).

Health workers in hospitals are vulnerable to risks associated with medical waste management. These health workers include medical personnel, pharmacists, nurses, midwives, environmental health workers, nutritionists, and other technical personnel.

Unsafe behavior related to medical waste can occur due to lack of knowledge, awareness, and attitudes related to medical waste management, not complying with the use of PPE, not utilizing facilities, and not being careful at work (4). with hospital waste management behaviors, including knowledge and attitudes. To prove this, it is necessary to do this research.

II. RESEARCH METHOD

The design of this research is meta-analysis. This literature review uses literature published in 2016-2020 which can be accessed in full text. The search engines used in the literature search are Pubmed, Google Scholar, Research Gate and Science Direct, using the key words "hospital waste management", "knowledge", "attitude", "behavior" or in English, "hospital". waste management", "knowledge', "attitude", "behavior". The criteria for the articles to be explored are research articles in Indonesian or English with the subject of health workers, published in 2016-2020, and can be accessed in full text. The

research taken in this meta-analysis is an analytical observational study with a cross-sectional design. The literature search and selection process in this study will be described in the form of a Flow diagram in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). After the literature search and selection process was carried out, data extraction was carried out, namely the name of the author, year of publication, variables studied, research subjects and the number of subjects, research results (according to SPIDER, namely sample, phenomenon of interest, design, evaluation, research type). The quality of research articles will be analyzed using Duffy's Research Appraisal Checklist Approach. This study will use Revman version 5.4. This study uses a spreadsheet and Kosinski's Time Reaction Software Program as a tool for data collection. The sample in this study amounted to 1,162 articles.

III. FINDINGS

Figure 4.2 shows the results of a meta-analysis of 6 studies that show a significant relationship between knowledge and behavior in medical waste management in hospitals (POR = 2.71, 95%CI 1.26 -5.82, p = 0.01, I2 = 85 %, p for heterogeneity < 0.00001), with high inter-study heterogeneity. Good knowledge of health workers is significantly associated with an increase in the behavior of health workers in managing medical waste in hospitals by 2.71 times compared to poor knowledge.

Figure 1. Forest Plot Analysis of the Relationship between Knowledge and Medical Waste Management Behavior
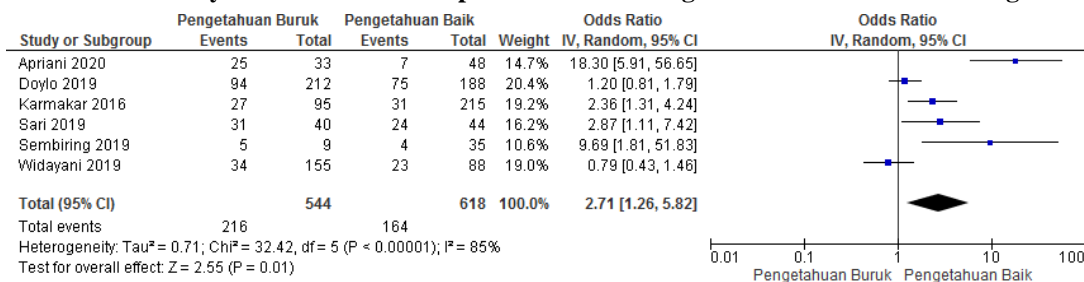

Figure 2. Funnel Plot Analysis of the Relationship of Knowledge with Medical Waste Management Behavior
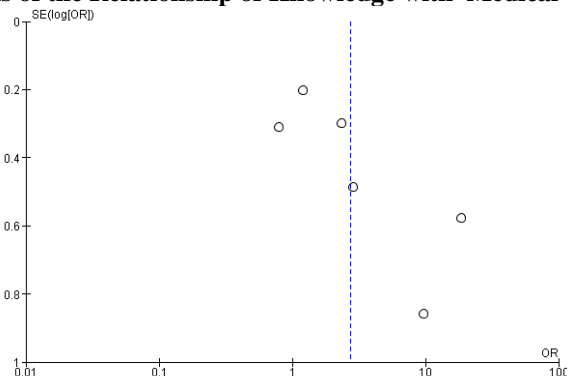

Figure 4.3 shows that there is no publication bias for studies examining the relationship between knowledge and behavior of medical waste management in hospitals.
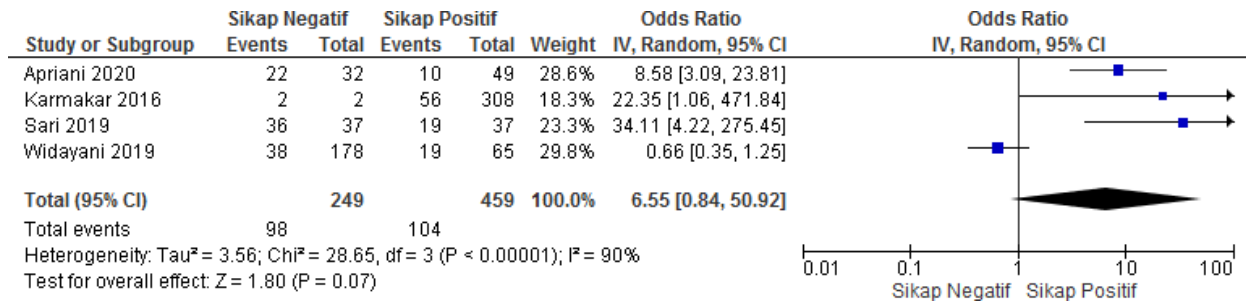
Table 4.6 The results of the meta-analysis of the subgroup analysis of the relationship between knowledge and waste management behavior in health workers

No	Subgroup	POR, 95%CI, p	Heterogeneity
1	Study location		
	Indonesia (n = 4 studies)	POR = 4.14, 95%CI = 0.91-18.93, p = 0.07	I2 = 89%, p <0.00001
	Overseas (n = 2 studies)	POR = 1.62, 95%CI = 0.84-3.13, p = 0.15	I2 = 71%, p = 0.06
2	Subject		
	Nurses (n = 3 studies)	POR = 7.59, 95%CI = 2.18-26.37, p = 0.001	I2 = 68%, p = 0.04

Health workers in general (n = 3 studies)	POR = 1.31, 95%CI = 0.75-2.27, p = 0.34	I2 = 70%, p = 0.04

Based on Table 4.6, the subgroup analysis based on study location did not significantly reduce the heterogeneity of the study compared to the overall heterogeneity, so that the study location was not a source of heterogeneity in this meta-analysis. Subgroup analysis by subject was also found to only slightly reduce study heterogeneity, so study subjects may not be the source of heterogeneity in this meta-analysis.

Subgroup analysis based on study quality could not be carried out because most of the studies included lower quality.

Figure 3. Forest Plot Analysis of the Relationship between Attitudes and Medical Waste Management Behavior

Based on Figure 4.4, the results of meta-analysis of data from 4 studies showed that there was no significant relationship between attitudes and behavior in managing medical waste in hospitals (POR = 6.55, 95%CI 0.84-50.92, p = 0.07, I2 = 90%, p for heterogeneity < 0.00001) with high heterogeneity between studies.

Figure 4. Funnel Plot Analysis of the Relationship between Attitudes and Behavior of Medical Waste Management
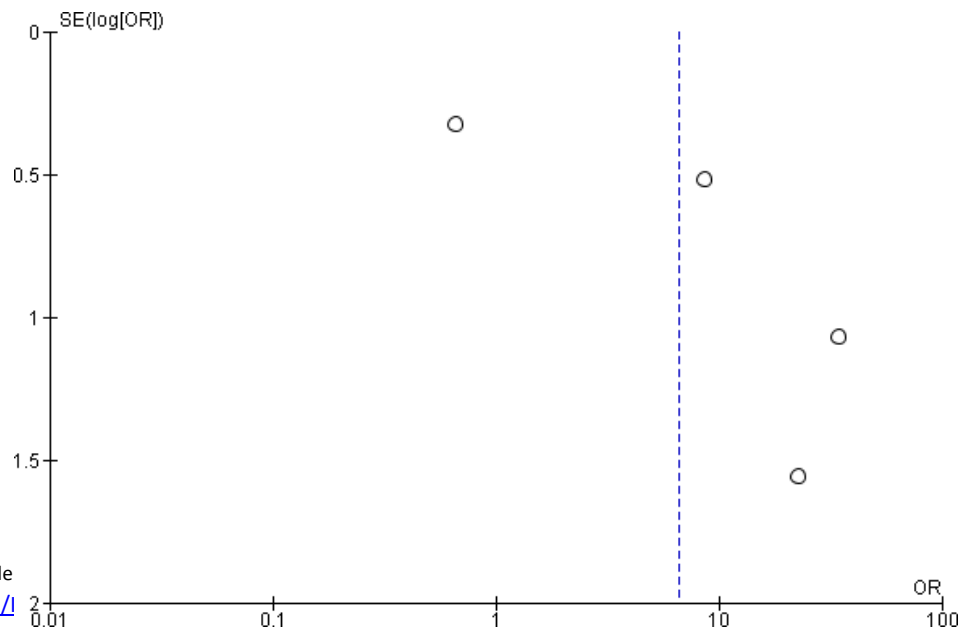
Figure 4.5 shows that there is a publication bias for studies examining the relationship between attitudes and behavior in the management of medical waste in hospitals.

Table 4.7 The results of the meta-analysis of the subgroup analysis of the relationship between attitudes and waste management behavior in health workers

No	Subgroup	POR, 95%CI, p	Heterogeneity
1		Study location	
	Indonesia (n = 3 studies)	POR = 4.99, 95%CI = 0.51-49.25, p = 0.17	I2 = 92%, p = 0.00001
	Abroad (n = 1 study)	POR = 22.35, 95%CI = 1.06-471.84, p = 0.05	-
2		Subject	
	Nurses (n = 2 studies)	POR = 11.19, 95%CI = 4.47-28.00, p = 0.00001	I2 = 26%, p = *0.24.*
	Health workers in general (n = 2 studies)	POR = 2.76, 95%CI = 0.09-82.34, p = 0.56	I2 = 80%, p = *0.03*

Table 4.7 shows that the subgroup analysis based on study location and subject type did not reduce the heterogeneity of the study, except for the nurse subject whose heterogeneity between studies was low.

IV. DISCUSSION

Based on the analysis of 6 articles, it was found that there was a significant relationship between knowledge and behavior in managing medical waste in hospitals with p value = 0.01 and POR of 2.71, but with high heterogeneity between studies (I2 = 85%). The analyzed studies have a large variation of data, where there is a large effect size range, starting from the highest effect size is 18.30 (95% CI 5.91-56.65) and the lowest is 0.79 (95% CI 0.43-1.46). The results of subgroup analysis based on study location and research subject type were not able to reduce heterogeneity between studies in this meta-analysis. There is no publication bias of studies examining the relationship of knowledge with medical waste management behavior in this hospital, however, Most of the studies that meet the inclusion criteria in this meta-analysis have lower quality. The results of this meta-analysis of the relationship between knowledge and hospital medical waste management need to consider these limitations.

Based on the analysis of 6 articles, it was found that there is a significant relationship between knowledge and behavior in managing medical waste in hospitals. To increase the knowledge of health workers so that medical waste management in this hospital can run better, specific counseling activities can be carried out on a regular basis about proper medical waste management. such as counseling on the correct sorting of medical waste. In addition, educational media can also be procured such as posters related to medical waste management.

Based on the analysis of 4 articles, it was found that there was no significant relationship between attitudes and behavior in managing medical waste in hospitals with p value = 0.07 and POR of 6.55, but with high heterogeneity between studies. The analyzed studies have a large variation of data, where there is a large effect size range, starting from the highest effect size is 34.11 (95% CI 4.22-275.45) and the lowest is

0.66 (95% CI 0.35-1.25). Subgroup analysis by location did not reduce heterogeneity between studies in this meta-analysis, but analysis of studies in the nurse-only group showed a decrease in heterogeneity. The studies that are included in the meta-analysis of the relationship between attitudes and waste management also mostly have lower quality,

The results of the meta-analysis showed that there was no significant relationship between attitudes and behavior in managing medical waste in hospitals. This is in line with the results of Widayani's research (2019) which proves that attitudes have no relationship with medical waste management behavior (5). Attitudes are not related to waste management behavior because there are other factors that have a stronger influence, for example personal experience. One's attitude is marked when giving opinions, and judging known objects. Attitude is a form of closed response that is only limited to emotions, beliefs, feelings, beliefs and opinions of individuals or known as the syndrome of response consistency with regard to object.

Limitations in this study, such as the lack of articles that meet the inclusion criteria (perhaps the period is too short, only 5 years, because the issue of waste management has been around for a long time, so there are many old studies). Another limitation is the large number of studies that did not meet the criteria for a good cross-sectional study. Then it is difficult to find studies that fully include the statistical results carried out.

V. CONCLUSION

1. There is a significant relationship between knowledge and behavior of health workers in the management of medical waste in hospitals (POR = 2.71, 95%CI 1.26 - 5.82, p = 0.01, I2 = 85%, p for heterogeneity < 0, 00001).

2. There is no relationship between attitude and behavior of health workers in the management of medical waste in hospitals.

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