



## THE EFFECTIVENESS OF WASTE MANAGEMENT EDUCATION ON STUDENTS' KNOWLEDGE AND BEHAVIOR AT THE MINISTRY OF HEALTH POLYTECHNIC OF PADANG

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### Abstract

Waste management is an environmental issue that requires active community participation, including students as agents of change. One effective approach is the implementation of a Waste Bank, which not only reduces waste generation but also increases environmental awareness through the 3R practice. Good knowledge of waste management is believed to encourage more positive behavior, so this study aims to analyze the relationship between increased knowledge and waste management behavior among students majoring in Environmental Health at the Padang Ministry of Health Polytechnic. The study used a cross-sectional design with 140 students as samples through total sampling. Data were obtained using a questionnaire that was measured. knowledge before and after the educational intervention as well as waste management behavior. The analysis was performed univariately and bivariately using the Chi-Square test. The results showed that of the 78 students who experienced an increase in knowledge, 57 (73.1%) had good waste management behavior. Meanwhile, in the group of students whose knowledge level remained the same (62 students), only 35 people (56.5%) exhibited good behavior. This finding indicates that students who experienced an increase in knowledge tended to have better waste management behavior than those who did not experience any change in knowledge. The Chi-Square test showed a p-value of 0.040, which means there is a significant relationship between increased knowledge and waste management behavior. In conclusion, increased knowledge contributes positively to students' waste management behavior. It is recommended that educational institutions strengthen education and the practice of waste banks on an ongoing basis, as well as develop collaborative programs to raise environmental awareness

**Keywords:** Behavior; Knowledge; Waste Bank; Waste management

### INTRODUCTION

The waste problem is a global environmental issue that continues to grow due to population growth, urbanization, and changes in consumer behavior. The World Health Organization (WHO) asserts that untreated waste contributes to environmental degradation, an increase in the risk of diseases based on the environment, and a decline in the general public's health (Gebrekidan et al., 2024). Waste that is not handled properly has the potential to become a source of water, soil, and disease pollution, as well as to improve air quality, which will ultimately have a significant impact on human health (Abubakar et al., 2022).

The issue of trash in Indonesia It's still a big challenge. Information obtained via System Information Management from the Ministry of Environment and Forestry (KLHK) According to National Waste Management (SIPSN) data from 2024, the amount of embossed trash in the country has increased from 38 million tons annually. However, of the whole amount mentioned, about 33–34% were successfully managed through handling the proper ending standard, recycling repeatedly, and reducing effort. This indicates that there is a considerable discrepancy between the amount of waste generated and the capability of the system for managing it, while also reflecting the continued lack of sustainable trash management practices at the community level (Ministry of Environment and Forestry, 2023) (Akmal & Jamil, 2021).



Problems similar is also seen at the level region. West Sumatra Province recorded embossed rubbish around 960,000 tons in 2023, with contribution the biggest originate from Padang City, which contributes almost half of the total generation rubbish province (Sadaf & Prakash, 2025). Padang City produces around 640 tons of waste per day, however only around 466.49 tons per day coming in to Place Processing Rubbish Integrated Waste Disposal Site (TPST) and Place Final Processing (TPA) (Raharjo et al., 2019). Study show that composition Padang City's waste is very supportive subtraction landfill load through compost, recycling repeat dry, TPS 3R, TPST, and waste banks. However, the level of the implementation of 3R is still very low Because sorting from source Not yet running, limited facilities and fleet, and participation society and weak incentives (Raharjo & Ariska, 2022) Strengthening regulations, expansion of TPS 3R/TPST, schemes incentives (waste bank, “waste FUN”), as well as empowerment and education sustainable at the level community become key to portion trash that is not really enter the landfill managed through 3R, not still ends up in landfill.

In context mentioned, it is necessary approach management more trash integrated and participatory. One of the strategies that is developing and being promoted by the government is waste bank, namely system management rubbish based society that emphasizes sorting since from source as well as give mark economical on waste inorganic (Agbeni et al., 2025). By nationally, thousands of waste bank units have operational and proven capable reduce landfill load at once increase awareness environment community. In Padang City, strengthening waste banks become one of the strategic programs government area in effort lower amount discarded garbage to the landfill and support management targets rubbish sustainable (Raharjo et al., 2018).

However Thus, the success of a waste bank is very dependent on the level of knowledge, attitudes, and participation society, including group students (Zaikova et al., 2022). Student is group educated who have role strategic as agent changes, especially in build culture management rubbish sustainable in the environment Education and society (Dewantara & Syarief, 2025). Environment college tall health, such as Polytechnic of Health Padang Ministry of Health, has very important position because no only print power health, but also plays a role in formation behavior life clean and healthy with insight environment.

Existing research show that in various institutions health, knowledge student about management garbage and waste medical generally still at the level low – medium, (Owojori et al., 2022) temporary attitude and willingness participate tend positive and can enhanced (Essadki et al., 2025). Integrated environmental education in curriculum, campus programs such as waste banks, as well as intervention education structured and multi- component very effective For increase knowledge and practice (Mohammad Ahmed Qasim Aljunaid1, 2020). Study at Poltekkes Padang Ministry of Health will fill in emptiness special context education Indonesian health and provide base empirical strong for designing educational strategies and developing waste banks more campuses appropriate target.

## METHODS

Study This use design *quasi-experiment* with approach *one group pretest – posttest*, ie design research that provides intervention on one group without group control comparison. Research implemented on students Department of Environmental Health Polytechnic of Health Padang Ministry of Health. Population study is all over student Department of Environmental Health Polytechnic of Health Padang Ministry of Health which fulfills criteria inclusion. Data collection techniques sample use total sampling, so that all over population that meets criteria included as respondents with amount sample as much as 140 students.

Measurement knowledge done as much as twice, namely before intervention (*pretest*) and after intervention (*posttest*). The intervention given in the form of education management



waste and waste banks. Instruments study in the form of questionnaire knowledge and behavior management waste that has been through validity and reliability tests. Assessment behavior management rubbish done use instrument structured based *self-report*. Data analyzed use statistics descriptive and statistical analytics. Statistics analytic used for test difference knowledge before and after intervention based on data distribution, whereas connection between improvement knowledge and change behavior management rubbish analyzed use *Chi-Square* test with level meaning  $p < 0.05$ . Hypothesis study This is there is difference level knowledge student before and after education, as well as there is connection between improvement knowledge and change behavior management rubbish after intervention education.

## RESULTS AND DISSCUSSION

### Analysis Univariate

The distribution of students' knowledge before and after the intervention is as follows:

Table 1 Distribution of Student Knowledge

Variables	Category	%	n
Knowledge	Before	Low	52.1
		Tall	47.9
	Enter	Low	19.3
		Tall	80.7

Source: data proceed

The results of the analysis in Table 1 show that part big student is at in category knowledge low (52.1%) before intervention, with an average value of 462.14, standard deviation 127.210, and range value 200–800. However, after intervention, occurs a clear improvement, with category knowledge tall increase to 80.7%, and the category knowledge low decrease to 19.3%. The average knowledge score students also increased in a way significant to 794.29.

Table 2 Frequency Distribution of Increased Student Knowledge and Behavior

Variables	Percentage (%)	Total (n)
<b>Improvement Knowledge</b>		
Still	44.3	62
Increase	55.7	78
<b>Behavior</b>		
No Good	34.3	48
Good	65.7	92

Source: data proceed

Based on Table 2 regarding distribution frequency improvement knowledge and behavior students, it is known that of the total respondents, some big student experiences improvement knowledge, namely as many as 78 people (55.7%), while 62 people (44.3%) were in the category knowledge remains. This result show that more from half respondents' experience improvement knowledge after given intervention or activities carried out. In the variable behavior, some big student is in the category behavior good, that is as many as 92 people (65.7%), while 48 people (34.3%) are still is in the category behavior No good. Findings This show that majority student has shown positive behavior in accordance with objective intervention or learning provided.

In a way overall, results table This indicates that there is trend improvement knowledge that is followed with good behavior in students, so that can conclude that efforts made potential give impact positive to aspect cognitive and behavioral respondents.



### Analysis Bivariate

The results of the analysis of the relationship between increased knowledge and student behavior in waste management are shown in the following table:

Table 3 Relationship Window knowledge with Behavior student

Variables	Behavior student				Total n (%)	P-Value (Asymp. Sig)	OR (95% CI)
	Bad		Good				
	n	%	n	%			
Improvement still	27	43.5	35	56.5	62 (100)	0.04	2,094 (1,031- 4,254)
knowledge increase	21	26.9	57	73.1	78 (100)		
Total	48	34.3	92	65.7	140 (100)		

Source: data proceed

In Table 3 the results of the analysis bivariate show existence meaningful relationships between improvement knowledge with behavior students. In the group student with knowledge still, as many as 56.5% showed behavior good and 43.5% still behave bad. Meanwhile that, in students who experience improvement knowledge, proportion behavior good higher, namely 73.1%, while 26.9% showed behavior bad. Statistical test show mark  $p = 0.04$ , which means there is significant relationship in a way statistics between improvement knowledge and behavior students ( $p < 0.05$ ). The Odds Ratio (OR) value of 2.094 (95% CI: 1.031–4.254) indicates that students who experience improvement knowledge own opportunity about 2 times bigger for behave Good compared to students whose knowledge still.

In a way overall, findings This indicates that improvement knowledge play a role as related factors positive to behavior students, where increasingly Good the knowledge possessed, the bigger possibility student show good behavior.

### Discussion

Research result show that intervention education management garbage and garbage banks give real impact to improvement knowledge student Department of Environmental Health Polytechnic of Health Padang Ministry of Health. Based on Table 1, before intervention, partly big student is in the category knowledge low (52.1%), whereas category knowledge tall only by 47.9%. Condition This indicates that although student originate from field health environment, understanding related management garbage and garbage banks Not yet formed optimally before given education. After the intervention, there was very clear changes in distribution level knowledge students. Proportion student with knowledge tall increase to 80.7%, while category knowledge low decrease drastic to 19.3%. Increase This is also reflected in the average value of knowledge experienced increase significant after intervention. Findings the show that education provided effective in increase understanding student about draft management waste, 3R principles, and mechanisms and benefits of waste banks as part from management rubbish sustainable. Table 1.2 shows that more from half respondents (55.7%) experienced improvement knowledge after intervention, while 44.3% of respondents show permanent knowledge. In aspect behavior, majority students (65.7%) have is in the category behavior good in management waste, while 34.3% is still show inappropriate behavior good. Findings This indicates that although improvement knowledge has occurred in some big students, changes behavior No fully follow improvement knowledge in a way evenly, so that show existence other contributing factors influence behavior management rubbish.

Analysis results bivariate in Table 1.3 shows existence meaningful relationships between improvement knowledge and behavior management rubbish students ( $p = 0.04$ ). Students who experience improvement knowledge after intervention own proportion behavior better than better high (73.1%) compared to with students whose knowledge remained (56.5%). The Odds Ratio value of 2.094 (95% CI: 1.031–4.254) indicates that student with improvement



knowledge own opportunity around twice as much big for behave Good in management rubbish compared to with students who do not experience improvement knowledge.

Findings This strengthen theory *Knowledge–Attitude–Practice* (KAP) which states that knowledge is stage beginning in the process of change behavior. Improvement knowledge gained through education give base cognitive for student for understand importance management the right trash, so that push formation more behavior positive. However so, no all over student with improvement knowledge show good behavior, which indicates that change behavior is also influenced by factors supporters others, such as availability facility sorting trash, habits environment campus, as well as support sustainable waste bank system (Owojori et al., 2022).

Research result This in line with Putri and Hidayani's research (2021) which shows existence connection significant between level knowledge with practice management waste in the environment campus (Aisyah et al., 2024), where respondents with more knowledge Good tend apply behavior management more trash appropriate compared to with respondents who level his knowledge low. And no all study find connection significant, Research conducted in Prenggan Kotagede Yogyakarta stated No There is significant relationship between attitude with management rubbish family. Conclusion: No There is connection knowledge and attitudes head family with management rubbish family (Amyati & Endartiwi, 2022).

Student as group educated own role strategic as agent change (*agent of change*) (Nisa et al., 2025). Increase knowledge and behavior student No only impact on the environment campus, but also has the potential influence public wide through knowledge transfer and application practice management good waste in the environment place stay they. Therefore that, the result study this confirm importance strengthening education programs and implementing waste banks in a way structured and sustainable in the environment Polytechnic of Health Padang Ministry of Health. In general, overall, discussion This show that intervention education capable increase knowledge student in a way significant and has meaningful relationships with behavior management trash. However, for reach change more optimal and sustainable behavior, education need integrated with support environment and policy institutions, such as provision facility sorting waste and reinforcement waste bank system in the environment campus.

## CONCLUSION

Based on results research that has been done, can concluded that intervention education management garbage and garbage banks influential to improvement knowledge student Department of Environmental Health Polytechnic of Health Padang Ministry of Health. The majority respondents experience improvement level knowledge after given education, which shows that materials and methods counseling used effective in increase understanding student about management waste and the concept of waste banks. Analysis results bivariate show existence meaningful relationships between improvement knowledge with behavior management rubbish students. Students with level increased knowledge own opportunity bigger for show behavior management good trash compared to with students who do not experience improvement knowledge. This is confirmed that knowledge is factor important in form behavior management responsible waste answer. In overall, research This show that education management waste and implementation waste bank concept can be an effective strategy in increase knowledge and behavior management waste in the environment campus. Therefore, that is, strengthening education programs and developing waste banks in a way sustainable need Keep going done as effort support management friendly trash environmental and sustainable.

## Suggestion

Future research is recommended to use a design with a control group and a longer follow-up period to assess the sustainability of changes in waste management behavior.



Furthermore, the use of direct observation instruments can be considered to complement self-report data and increase the validity of research results.

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