



## Knowledge, Attitude and Practice towards Waste Management among Primary School Children

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### *Authors' contributions*

*This work was carried out in collaboration among all authors. Authors SS, SAM and SND designed the study. All authors participated on the data collection. Authors TWS and SS analyzed the data. Author SS wrote the first draft of manuscript. All authors read and approved final the manuscript.*

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### ABSTRACT

**Introduction:** Waste is becoming a problem until recently in many countries. Globally, the amount of wastes has increased with the growing population and the level of consumerism in society. One investment in the future to control waste production is by providing the value of waste treatment from an early age of children. The purpose of this study was to describe the knowledge, attitude, and practice regarding waste management among primary school children.

**Study Design:** Pre-experimental, with a one-shot case study design, was used in this study.

**Methodology:** Forty children in primary school, aged between 11 and-12 years, were sampled in this study. The intervention was delivered through an oral presentation and play video followed by a survey using tested questionnaires contained knowledge, attitude and practice towards waste management questions.

**Results:** More than 70% of respondents answered with a satisfying score in all questions. However, respondents had less than 70% in knowledge about waste type. Most of the respondents said there was no waste treatment facility in their schools. Respondents disliked the enactment of punishment for those who did not imbibe the spirit of waste disposal effectively and efficiently.

**Conclusion:** Our result implies respondent knowledge about waste management is sufficient, but it is essential to push them to practice the knowledge in their daily life.

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## 1. INTRODUCTION

Nowadays, the waste problem received serious attention globally. Waste is a useless material that results from human activity, and is directly or indiscriminately discharged without any treatment [1,2]. Waste production increased with the increase in the population and urbanization [3], leading to increased waste and high level of consumerism in society [4].

The problem of waste management can be categorized into three aspects: upstream, processing, and downstream. Upstream stage-related garbage production increases every year due to the increase in population. The processing stage is associated with the limited resources for performing waste management either by society or government. The downstream stage is related to the lack of system on waste management in society [5]. The community has a significant role to play in waste management based on community empowerment, particularly in the upstream stage. Society is responsible for reducing the volume of waste it produces [6]. In the process stage, a community can do waste management by treating the garbage by using a proper method such as recycling trash. Community empowerment and synergy among the stakeholders is often suggested to improve waste management in a particular region [7,8]. The community's role in waste management is still shallow, not only in Indonesia but also in other countries such as Myanmar [9]. This is because the level of public awareness regarding waste is still low [10]. Indicators for their little awareness can be seen from the emergence of many illegal waste disposals around the settlement. Illegal waste disposal can be found in the riverbed, empty yard, on the roadside, or road itself [11]. All the afore-mentioned improper attitude implies that knowledge and attitudes towards waste management are still low [4].

Neglected rubbish leads to a bigger problem that aids disease transmission [12], such as malaria and diarrhea [13]. Another impact of bad waste management is the contamination of ground-water sources, garbage landslides, floods and air pollution due to the garbage smell [14]. Efforts to involve the community on waste management need to start from an early age because it is not easy to change the behavior of human beings in a short time [15]. It can be seen from the ongoing

program of waste management that it is not running effectively and efficiently because of a lack of compliance from society [16]. Accordingly, the internalization of the waste management value needs to be started at an early stage [17]. Environmental care and education play a role as a provision for children growing into the adult phase, including reducing and managing waste.

In this research, we provide education followed by a survey among the children in primary school age regarding waste management. We provided knowledge about waste management through an oral presentation and showing a short film about waste management [18].

## 2. MATERIALS AND METHODS

### 2.1 Study Design and Procedure

This research was conducted in a state primary school of Ngoro-oro, Patuk, part of Gunungkidul, Yogyakarta, Indonesia. This school was chosen as a case study because this area is part of our project to develop healthy village tourism. In addition, this location is in a rural setting where there is no final landfill disposition on this site. We conducted this study through a pre-experimental research design with a one-shot case study design [19].

### 2.2 Study Participants and Sampling

We took total sampling, which means all the population was taken as samples [20]. Respondents were all students at 5<sup>th</sup> and 6<sup>th</sup> degrees in the State Primary School of Ngoro-oro, Patuk, Gunungkidul, Yogyakarta, Indonesia. These groups were selected for two reasons: 1) they have received subjects related to waste management in 4<sup>th</sup> grade, 2) they have sufficient maturity in assessing and perceiving items around them. Furthermore, this group should be having a proper practice of waste management and have adequate understanding of reading and answer questions.

### 2.3 Study Instruments and Measures

We surveyed the respondents after delivering information about proper waste management by performing an oral presentation and playing a video. Presentation and video contained

information about how to maintain school cleanness, waste management: collect organic waste for selling, the effect does not manage waste: dirty river, flood, and unhealthy environment.

The survey was managed using a tested questionnaire in terms of validity and reliability. Testing was conducted in different schools among 30 respondents who were not included in this study. The questionnaire was divided into four sections: respondent information, knowledge, perception of waste treatment facility, and practice.

**2.4 Data Analysis**

All responses were checked and inputted to excel spreadsheets for descriptive statistic purposes. The favorable answer was scored as one, and the non-favorable response was scored as zero.

**3. RESULTS AND DISCUSSION**

Based on our observations, in the selected school, toilet facility has been provided for the student. However, it has insufficient hygiene, such as dirty and smell. We reported knowledge, attitude, perception of waste facilities in the school and behavior on waste management. Our respondents, most of them were male (60%) and the rest was female. Fifty five percent of the

respondents came from the 5<sup>th</sup> degrees in primary school (Table 1).

**Table 1. Characteristics of participants**

Item	n	%
<b>Sex</b>		
Male	24	60.0
Female	16	40.0
<b>School-level</b>		
5 <sup>th</sup>	22	55.0
6 <sup>th</sup>	18	45.0

Based on the knowledge assessment, in each question, most of the respondents >70% answered correctly. An item that needs attention is the respondents' knowledge about rubbish type: organic and inorganic, as presented in Table 2.

Table 3 reports respondents' attitude towards waste management; most of them performed an excellent attitude regarding waste management. The only item that requires attention is about their perception of the bad impact of improper waste practice, such as the possibility of getting diarrheal infection (Table 3).

Most of the respondents (> 70%) answered that the facility is proper, but there is a statement that needs to be highlighted, that is about the presence of waste treatment facility at the school (Table 4).

**Table 2. Knowledge regarding waste behavior**

Study population	N = 40
Knowledge item	Correct answer N (%)
All stuff that is not used and disposed of called trash	30 (75.0)
Disposed rubbish not in the proper place that constitutes dirt and flood	39 (97.5)
Disposed rubbish carelessly that can raise a diarrheal	38 (95.0)
Trash should be thrown in the trash place	39 (97.5)
The example of organic waste/rubbish is junk food scraps, vegetables, fruits, and leaves	27 (67.5)
Garbage sorting separates between wet and dry wastes	36 (90.0)
The good dump trash should have a cover	38 (95.0)
Types of waste that are easily biodegradable/destroyed by the soil called as organic waste	22 (55.0)
When we throw garbage in the ditch or gutter school, it will lead to clogged gutters and makes flood	38 (95.0)
If the garbage bins were not equipped with a cover, there would be a lot of flies	37 (92.5)
Recycling is reusing goods that are still useable	36 (90.0)

**Table 3. Attitude towards waste management**

<b>Study population</b>	<b>N = 40</b>
<b>Attitude</b>	<b>Proper answer N (%)</b>
I will keep trash until I find the trash bins	37 (92.5)
In my opinion, throw rubbish to the trash bins will make the environment clean and healthy	39 (97.5)
If I am littering in the ditch/sewer in the schools can cause flooding	37 (92.5)
In my opinion, garbage should be disposed of based on the type: organic and inorganic	40 (100)
I dis-agree that disposing of garbage in the open yard is a good attitude	34 (85.0)
In my opinion, throw garbage in the closed garbage bin is a good attitude	38 (95.0)
In my opinion, throw garbage carelessly can pollute the school's environment	37 (92.5)
In dis-agree that disposing of garbage can do everywhere, not must be in the trash bin	37 (92.5)
In my opinion, throw garbage in the trash bin is a pleasant activity	35 (87.5)
I will clean up the littered garbage in my classroom	36 (90.0)
I agree that throw rubbish carelessly will lead diarrhea	23 (57.5)
I will not let my friends throw garbage in the classroom or the schoolyard	37 (92.5)
I will not put trash in my desk drawer instead of throwing in the trash bin	36 (90.0)

**Table 4. Perception about waste management facility in their school**

<b>Study population</b>	<b>N = 40 (100%)</b>
	<b>YES Answer</b>
<b>Disposing of waste facility</b>	
The trash bin in my school distinguished between organic and inorganic	37 (92.5)
There are trash bins in every classroom	35 (87.4)
The trash bin my school is less than ten pieces	10 (25.0)
The trash bin my school is appropriate	31 (77.5)
There is a trash bin in the bathroom/WC	22 (55.0)
There are trash bins in the school cafeteria	39 (97.5)
There are trash bins in the infirmary	23 (57.5)
There is a waste treatment facility in the school	13 (32.5)
There are bins in the school library	38 (95.0)
The trash bins in my school have a cover trash	35 (87.5)

**Table 5. Practice towards waste management**

<b>Study population</b>	<b>N = 40</b>
<b>Practice item on waste treatment</b>	<b>N (%)</b>
I never throw rubbish carelessly in the school	31 (77.5)
I am not littering my schoolyards	37 (92.5)
When I am in picket class, I collected the trash and put it in the trash bin	31 (77.5)
At school, a lot of friends throw garbage in the trash bin	33 (82.5)
There is a punishment at school for who carelessly dispose of the waste	29 (72.5)
I am happy there is a punishment at school for those who dispose of the waste carelessly	25 (62.5)
I never throw waste carelessly in my class	36 (90.0)

Most of the respondents stated already engage in waste management in their daily life. However, there is one statement about respondent disagreement about the enforcement of punishment to those who dispose of the waste carelessly (Table 5).

Some populous developing countries such as Indonesia and India remain struggling with the waste problem. Waste growth is observed with an abundant population. Indonesia and India are two countries that are shifting from an agricultural state to an industrial one [21], which triggers waste from industrial sectors. On the other hand, it is not accompanied by an increase in the community's understanding of waste management [22]. In Indonesia, waste is categorized as an emergency because of the overloading of the trash in some final disposal [23]. Until recently, the problem is not totally solved. A conflict between the community and the government was rising, related to the impact of the final landfill on the surrounding community [24]. Besides, it requires a fast response, an effort that emphasizes sustainability needs to be initiated.

Improving knowledge on waste management should be delivered from an early age, for instance, in children, including the content on the school syllabus or in extracurricular activities. This activity aimed to familiarize children with waste management to reduce the amount of waste generated. The simple education of waste management in children, for example, disposal of waste such as plastic, paper or organic waste, needs to be strengthened [25].

In this study, our results revealed that our intervention influenced the understanding of the children in the primary school under investigation about waste management. It is indicated by the mean score of more than 75, meaning that respondents' knowledge, attitude, and behavior are acceptable. The mean score of knowledge was more than 90, which is considered as very high. Ideally, knowledge will be translated into attitude and practice [26,27].

In some cases, knowledge is still lacking, efforts to improve it can be completed by providing training or counseling [28]. Counseling through interesting media such as film animation attracts the children's attention and improves understanding. In general, children fancy visual and audio-visual such as cartoon animation [29], because it avoids boredom. Each section on the visual will affect the vision, send it to the brain, and influence memory. A combination of visual and audio is considered influencing the children in a good way [30].

Excellent knowledge, attitudes and behaviors about waste management that internalized in an early stage can reduce the waste amount of

waste in the future [31]. When children understand the waste problem early, it is expected that they will be more concerned with the waste problem when they become adults. The same method is applied in Japan and Taiwan. They educate their children on waste management at an early stage, as well as providing insight that waste is not only the government's responsibility but a shared responsibility among the stakeholders [32].

Moreover, an effort to resolve the waste problem needs another action: strengthening the regulation about how to use the waste, organic and inorganic, more useful, such as changing it to the energy source [33]. For stakeholders in the education sectors, it is essential to include the value of waste management for safe earth in children in the early phase, such as in primary school. This effort will not be successful without the government's support as an educational regulator and the community itself.

#### **4. CONCLUSION**

In conclusion, knowledge, attitude, and practice among primary school children are sufficient. However, some aspects should be improved, such as the school facility on waste management. The proper facility will support the school children in practicing their waste management knowledge and attitude. In addition, strengthening the school curricula with waste management content is required as part of our investment for future generation.

#### **CONSENT**

Informed consent was obtained before the commencement of the data collection.

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#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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