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# Analysis of Community Knowledge and Awareness in Ngemplak Kidul Village, Margoyoso District, Pati Regency towards Hazardous and Toxic Waste

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**ABSTRACT**. Hazardous and Toxic Waste (B3) is a substance, energy, and other components which due to their nature, concentration, and amount, either directly or indirectly, can pollute and damage the environment, also endanger the health and survival of humans and other living things. B3 waste if not managed properly, can have a dangerous impact on the surrounding environment. Public knowledge and awareness of B3 waste are important in realizing good B3 waste management, especially for people in rural areas. Ngemplak Kidul Village is one of the villages where the level of knowledge of the community regarding B3 waste is still quite good. However, the awareness of the people of Ngemplak Kidul Village regarding B3 waste management is quite low. So it is necessary to conduct research that includes an analysis of the level of knowledge and public awareness of B3 waste. Where this study aims to determine the level of knowledge of the people of Ngemplak Kidul Village about B3 waste, as well as to determine the level of awareness of the people of Ngemplak Kidul Village about the dangers of B3 waste. This research was conducted using data collection methods through questionnaires and interviews with resource persons living in Ngemplak Kidul Village. From the research results, it is known that the knowledge of the people of Ngemplak Kidul Village regarding B3 waste is quite good. The desire to participate in the management and socialization of B3 waste is also quite good, but the implementation of management and self-awareness is still lacking.

***Keywords:*** Awareness, Hazardous and Toxic Waste, Knowledge, Ngemplak Kidul Village, Rural community

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## 1. Introduction

The environment is a space that is used by fellow living things to interact and interrelate for the sake of their survival. The environment is also characterized by the unity of the components that make up a life process such as living things, circumstances, forces that influence each other (Siregar and Nasution, 2020). However, nowadays there is a lot of environmental pollution caused by living things themselves. Environmental pollution can be defined as the entry of substances, energy, or other components into the environment. Environmental pollution itself can affect the order of life of living things. Humans are the main actors behind the occurrence of environmental pollution. This is inseparable from the nature of the human ego that wants to exploit the environment for personal satisfaction. One of the human behavior that destroys the environment is by disposing of waste carelessly. This direct disposal is the main cause of environmental pollution (Sunarsih, 2014). Seeing that environmental pollution is happening nowadays a lot, such as people who often throw waste into drainage streams or rivers which can eventually damage the waters until they flow into the sea. This makes the water quality degraded and the death of living things in it. Looking at the case in Jakarta Bay waters, which contain a lot of domestic waste, it has become the main cause of mass fish deaths in recent years. Seawater polluted by domestic wastewater has low levels of dissolved oxygen (DO) so that the population of phytoplankton of the toxic or toxic dinoflagellate species increases (Sachoemar and Wahjono, 2007). The waste that is usually disposed of by the community is household waste such as solid waste, liquid waste, gas waste, and even B3 waste. Business actors are also not spared from human delinquency who often dispose of B3 waste irresponsibly which ultimately endangers the surrounding environment.

In general, waste is the residue of a business and or activity that is not desired by the environment because it has no economic value. The resulting waste contains hazardous and toxic (B3) waste. Hazardous and Toxic Materials (B3) are substances, energy, and/or other components which due to their nature, concentration, and/or amount, either directly or indirectly, can pollute and/or damage the environment, and/or endanger the environment. environment, health, and survival of humans and other living things (Fajriyah and Wardhani, 2020). Hazardous waste is also classified as complex waste because of its inherent chemical and physical properties (Mereki et al., 2014). The industry is the biggest contributor to B3 waste, this is an oversight by the industry who is reluctant

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to manage it first, but other sectors such as households also often dispose of B3 waste arbitrarily. B3 waste includes heavy metals, cyanide, pesticides, paints and dyes, oils, solvents, and other hazardous chemicals. This if not managed properly can have a dangerous impact on the surrounding environment. The existence of B3 waste generated from various production activities requires special attention, because of the losses it will cause if the waste is not managed and not treated properly (Nurhidayanti and Arini, 2019). Even household waste containing B3 has the potential to threaten human health and the environment (Iswanto et al., 2016). Therefore, special handling is needed, namely by Government Regulation Number 101 of 2014. Procedures for B3 waste management can be carried out by reducing the quantity of B3 waste, internal processing for those that have complied with regulations, collection facilities, temporary storage that according to regulations, packaging, labeling, and symbols, internal transportation, utilization, while destruction and processing are carried out by third parties (Ratman and Syafrudin, 2010).

B3 waste management is a very important thing to do. This is because B3 waste contains materials that are toxic and harmful to the health and survival of humans and their living creatures, even to the surrounding ecosystem. So that special management is needed to reduce the risk that B3 waste will be generated. In Government Regulation 101 of 2014 concerning the management of B3 waste, it is also stated that any activity or business that produces B3 waste must carry out management following existing provisions. In particular, the management of B3 waste is very important for industry players who produce B3 waste. However, as it is known that B3 waste is not only produced by industrial activities but in people's daily lives it is also inseparable from the problem of B3 waste generated from anthropogenic activities (Hasan et al., 2018). B3 waste generated from anthropogenic activities is relatively small, which is less than 2% of other domestic waste (Agustina et al., 2019). However, B3 waste management is also very important to be carried out by the general public. Public awareness to manage B3 waste is still very low. There are still many people who do not segregate B3 waste with other wastes because they do not care and do not have sufficient knowledge about B3 waste management. Low knowledge about B3 waste causes people's attitudes and behavior in managing B3 waste to also below (Prasetyaningrum et al., 2017).

Based on the explanation above, the knowledge possessed by the community and awareness of the dangers of B3 waste are important in realizing good B3 waste management resulting from anthropogenic activities, especially for people in rural areas. Ngemplak Kidul Village is located in Margoyoso District, Pati Regency, Central Java. Ngemplak Kidul Village is the largest village in the Margoyoso sub-district with the largest population of around 83000 people. This village has great potential as a producer of B3 waste because there is a tapioca flour industry close to community settlements. Every day, the tapioca flour industry can produce around 10.5 tons which are still often thrown away into the surrounding environment (Hayat and Kaltsum, 2021). Even so, the level of knowledge and awareness of the people of Ngemplak Kidul Village regarding the dangers of B3 waste is quite good. However, the knowledge and awareness of the people of Ngemplak Kidul Village regarding B3 waste management are still quite low. This can be seen from the large number of villagers who have not differentiated between B3 waste and other types of domestic waste that they produce. Therefore, it is necessary to conduct research that includes an analysis of the level of knowledge and public awareness of B3 waste. So that this study aims to determine the level of knowledge of the people of Ngemplak Kidul Village about B3 waste, and to determine the level of awareness of the people of Ngemplak Kidul Village about the dangers of B3 waste. After that, appropriate steps can be determined so that the community has a high level of knowledge and awareness regarding B3 waste management.

## 2. Literature Review

### *2.1 Definition and Characteristics of Hazardous and Toxic Waste*

According to Law Number 32 of 2009 concerning Environmental Protection and Management, B3 waste is a hazardous and toxic material originating from substances, energy, and/or other components which due to their nature, concentration, and/or amount either directly or indirectly can pollute and/or damage the environment, endanger the environment, health and survival of humans and other living creatures. Meanwhile, according to Dewi et al. in Ardiatma and Ariyanto (2019), B3 waste is a by-product of a business and or other activity which is directly or indirectly dangerous and toxic due to its quantity and nature. What is meant by dangerous and toxic is that it can pollute and damage the environment, health, as well as human life, and other living things. Based on the description of this definition, it can be concluded that B3 waste has two main characteristics, namely hazardous and toxic. Hazardous waste can poison humans in several ways, including ingestion, getting into the eyes, direct contact with the skin, and being inhaled by the respiratory system.

The characteristics of the B3 waste can be identified from three things, namely the source of the B3 waste process, the chemicals that make up B3 waste, and the character of the B3 waste itself which is recognized through a process (Setiawati et al., 2019). According to Brawijaya in Setiawati et al. (2019), the characteristics of B3 waste that distinguish B3 waste from other types of waste, namely explosive, for example, explosives; flammable, examples are fuels and organic solvents; reactive, examples are oxidizing agents; corrosive, for example, such as strong acids; infectious, examples are bacterial waste and medical waste; irritating, examples are strong bases; harmful (harmful), examples are heavy metals; toxic, for example, the chemical compound HCN; carcinogenic, mutagenic and teratogenic, eg mercury, benzene derivatives, radioactive materials (uranium and plutonium). In explosive characteristics, the explosion of B3 waste occurs due to physical and chemical reactions of the compounds that make up the B3 waste. Before the B3 waste explosion occurs, the B3 waste first undergoes two oxidation mechanisms, namely the mechanism for releasing heat or heat and the flammable mechanism when it comes into contact with other materials that trigger it.

In terms of toxic characteristics, some B3 wastes are not only toxic to living things but also to the environment and ecosystems, for example, Chlorofluorocarbons (CFCs) from refrigerator waste which causes the depletion of the ozone layer in the atmosphere. In terms of corrosive characteristics, B3 waste with these characteristics has the characteristics of being able to irritate the skin, causing rusting of iron and steel, and has a pH of 2 (acidic) and pH 12.5 (alkaline). Meanwhile, in terms of carcinogenic, mutagenic, and teratogenic characteristics, B3 waste can cause the growth of cancer cells, chromosomal changes or mutations, to abnormalities in the embryo formation process. From the characteristics of the B3 waste, it can be used as a requirement or reference in the

storage and transportation of B3 waste. The storage and transportation of B3 waste are carried out by looking at the existing characteristics and potential hazards of each B3 waste (Anggraini et al., 2014). According to the Decree of the Minister of Manpower on Control of Hazardous Chemicals in the Workplace in Anggraini et al. (2014), the character of each B3 waste will be used to distinguish the treatment given to each B3 waste in the process of temporary storage and packaging during the transportation process.

### *2.2 Classification and Sources of Hazardous and Toxic Waste*

Referring to Government Regulation Number 74 of 2001 concerning Management of Hazardous and Toxic Materials, it is stated that B3 is classified into three categories, namely B3 which can be used, B3 which is prohibited from being used, and B3 which can be used limitedly. The types of B3 waste that can be used include chemicals such as ammonia, acetic acid, sulfuric acid, hydrochloric acid, acetylene, formalin, methanol, sodium hydroxide, including nitrogen gas. Meanwhile, B3 waste that is prohibited from being used includes Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, Mirex, Toxaphene, Hexachlorobenzene, and PCBs. And the limited use of B3 waste includes Mercury, Mercury Compounds, Lindane, Parathion, and several types of CFCs. B3 waste can also be categorized based on its characteristics, namely B3 which is explosive, oxidizing, highly flammable, toxic, dangerous, corrosive, irritating, harmful to the environment, and carcinogenic. By seeing that B3 waste has a dangerous nature, therefore special handling is needed in its management. Every producer of B3 waste must be responsible for the B3 waste it has produced. If you look at the producers of industrial B3 waste, they are the largest contributors to waste products. This is the result of the rest of industrial activities in the form of hazardous chemical substances. Therefore, the industry is required to be responsible for the B3 waste produced by careful processing of B3 waste. However, households are also a source of B3 waste. We often find types of B3 waste daily such as used batteries/oil, used batteries, used lamps, used cartridges, detergents, used medicines. This is still often considered trivial by the community. Considering that currently, environmental pollution due to household waste has covered all elements, namely air, water, and soil (Sunarsih, 2014). Therefore, household B3 waste must be considered so as not to damage the health of the environment and the community by treating waste either independently or by disposing of B3 waste to a special place for B3 waste disposal.

### *2.3 Stages of Hazardous and Toxic Waste Management*

In the management of B3 waste, several stages must be carried out following existing regulations. The first stage is the reduction stage, where at this stage efforts are made to reduce the quantity and nature of the hazards and toxicities produced by B3 waste. The reduction stage in each industry can be different, including installing filters, reducing the use of B3, sorting waste based on its properties and characteristics, and so on. The second stage is internal processing that can be carried out by parties who have complied with regulations. At this stage, every industry can treat B3 solid waste that meets regulations such as using tools to burn solid waste to reduce or even eliminate B3 content. The third stage is storage, where the storage is carried out in each waste generating unit. Hazardous waste is put into a container or collection bag which is then closed or sealed. B3 waste must be put into a drum that has been cleaned before use. B3 waste containers are put into different drums according to each type and characteristic of the waste. Containers or packaging will be maintained in good condition so that they are not damaged, rusted, or leaked so they must be checked regularly. The volume of the B3 waste container is also adjusted so that it is not filled, which is of the container. This is done to prevent the possibility of excess pressure so that the waste overflows and leaves the container.

The fourth stage is carried out where each package is given a label and symbol that has been adjusted to the type and characteristics of the waste packaged in each container. If the temporarily placed B3 waste is full before the time for collection, the B3 waste will be immediately taken to the Hazardous TPS. The fifth stage is internal transportation, where packaged B3 waste will be transported by internal industry parties from the waste generating unit to the temporary storage area for B3 waste in the industrial environment. Then enter the sixth stage, namely temporary storage, where this stage is carried out after transportation from the waste-producing source. B3 waste is stored in drums which are also covered with different types of waste. The placement of the drums brought to the B3 waste TPS is placed on pallets that can accommodate 2 to 3 drums per pallet. Drums containing B3 waste must be placed properly so that they do not roll over and spill. The B3 waste TPS building is built according to regulations and has adequate ventilation and natural lighting. Utilization or processing of B3 waste can be carried out if the B3 waste-producing industry has been able and fulfill the regulatory requirements to treat the B3 waste. If it is considered capable, then the utilization that can be done is to reuse the former B3 storage container and not just throw it away. The last stage is destruction and processing carried out by a third party. The B3 waste that has been stored in the B3 waste TPS located in the B3 waste-producing environment, is then transported by the B3 waste collector or storage or destroyer who already has an official permit from the government. To supervise the process of transporting B3 waste from the producer to the processing site, the industry as a producer of B3 waste can use the third and seventh waste manifest sheets obtained from the waste carrier and given to each transporter to take the B3 waste it will carry.

### *2.4 Challenges in The Management of Hazardous and Toxic Waste*

This B3 waste is generated along with the increase in technology and human civilization. The more diverse the products produced, the more diverse the B3 waste produced. The higher the amount and type of B3 waste produced, the more damage and pollution that will harm life. In actual conditions, the problem of B3 waste management is not only related to the development of technology and human resources but other challenges must be resolved together. The challenge is to balance the knowledge and actions of the community to manage B3 waste properly and correctly. In particular, the village community has not been educated on the characteristics of B3 waste, both from its source, type, and management. If there is a violation in the management of B3 waste in their immediate environment, they are not aware of it. There are even people who are also not aware that they have committed a violation. The next challenge is the lack of public information about B3 waste, when there are people who understand that there has been a violation of B3 waste management the government does not yet have a clear and evenly distributed complaint flow in each region. This is what should be a concern

to socialize and instill principles in each individual so that the environment can be maintained.

Another challenge is the insufficient number and capacity of supervisory agencies. This is because monitoring activities should be dynamic according to the conditions of B3 waste problems that exist in a place. Referring to the 2015-2019 KLHK Strategic Plan, there is an increase in the budget allocation for the B3 waste management monitoring program. However, to achieve the effectiveness of B3 waste management supervision, the plan to increase the budget allocation alone is not enough without being balanced with supporting human resources. Then the number of perpetrators of disposing of B3 waste who do not have a permit, where supervision can run well if the community who manages B3 waste has obtained a permit from the government. However, this problem becomes an obstacle because the licensing process requires a certain amount of money and is considered complicated. This is a serious challenge because the number of small industries in Indonesia is quite large. Therefore, the issue of licensing is also an important thing to pay attention to support a better B3 waste control function. And the last challenge is policies that have weaknesses, such as regulatory policies which can still be manipulated. Although this is not always done by every industry, it shows that there is a form of vulnerability that exists in this type of instrument and this deserves attention. If this deviation continues to occur, it will further weaken the supervisory function (Kurniawan, 2019).

In terms of hazardous and toxic waste management, it must be carried out following government regulations, this aims to reduce the risks that can be caused to the environment, human health, and other living creatures. Efforts to reduce the potential impact of industrial B3 waste can be carried out from two aspects, namely reducing sources of waste accumulation and optimizing the use of industrial waste. The first aspect is to reduce sources of landfill waste which refers to the principle of generating waste from the smallest product that can be produced. Therefore, this process is called zero waste and has been extended to most industries or lean manufacturing. The second aspect is optimizing the utilization of industrial waste. If the source of the waste cannot be reduced, because it depends on the type of product and the manufacturing process, the industry's last hope is to optimize the waste generated. This process involves processing waste in the manufacturing process so that the result of waste treatment is waste (Nursabrina et al., 2021).

## 3. Materials and Methods

### *3.1 Time and Research Location*

This research was conducted in Ngemplak Kidul Village, Margoyoso District, Pati Regency, Central Java, Indonesia, with coordinates 6°36'48.2"S 111°03'07.3"E. The area to the north of this village is bordered by Kajen Village and Waturoyo Village, in the south by Sidomukti Village, in the west by Soneyan Village, and in the east by Sekarjalak Village. The research was conducted in the first week of November 2021.

### *3.2 Materials*

The tools and materials used include writing instruments, field notes, voice recorders, questionnaires and interview questions, and informants.

### *3.3 Methods and Data Collection*

The research method used is qualitative descriptive analysis. With the method of collecting data through questionnaires and in-depth interviews with resource persons who live in the research location. There are two data in the study, namely primary data and secondary data. Primary data was conducted through in-depth interviews and distributing questionnaires to the people of Ngemplak Kidul Village related to the level of knowledge and awareness of B3 waste in the area. While secondary data is data in the form of journals, or literature, documents, or other sources of information. The influence variable that becomes the research benchmark on knowledge and awareness of B3 waste is the level of education of each respondent. Analysis of the data used in this study is to transcribe the results of interviews with informants and 30 questionnaires to respondents. It aims to categorize information that is relevant to the research focus. Secondary data is used to combine interview data with theories and concepts in the literature study of books and journals.

## 4. Results and Discussion

Based on the results of the study in the form of distributing questionnaires to respondents, there was found that the educational background grouping of respondent's data and the results of the answers to the level of knowledge and awareness of the people of Ngemplak Kidul Village were as in the following chart.

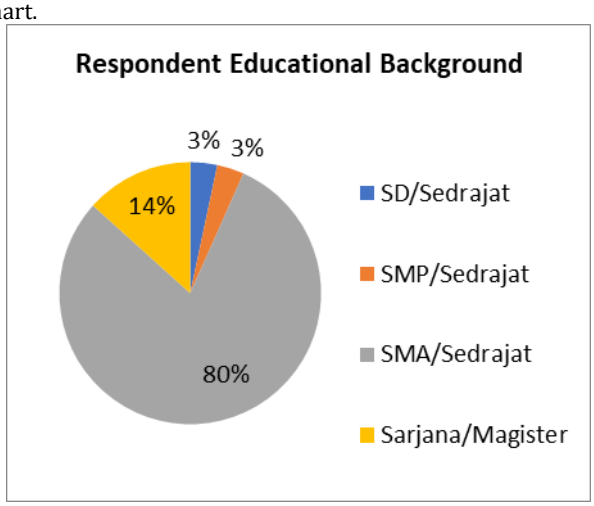


**Fig. 1** Provide Respondents Educational Background

### *4.1 Respondent Characteristics*

This research was carried out in Ngemplak Kidul Village which has 4 citizens association and 22 neighborhood associations, with an estimate that each citizen's association consists of 4-5 neighborhood associations. The population of this village is dominated by productive age, of which 37.4% work as students, followed by 32.6% civil servants, 20.1% retirees, 4.7% traders, and the rest have other professions. When viewed from the level of education, there are still many people in Ngemplak Kidul Village who only graduate from elementary school, namely with a percentage of 42.1%, then the second most are high school graduates with a percentage of 28.8%, junior high school graduates as many as 19.6%, bachelor degree graduates as many as 5 %, and the rest are people who are not or not yet in school and have not finished elementary school.

From Figure 1, the percentage of respondents' educational

backgrounds who fill out the questionnaire and interview sources is obtained. It was found that the educational background of the respondents was 80% high school, 14% bachelor or master, 3.3% junior high school, and 3.3% elementary school.

*4.2 The Relationship between Education Background and Knowledge and Awareness of Hazardous and Toxic Waste Management*

The results of observations from the level of education, there is a relationship between this and the level of understanding and awareness in the management of hazardous and toxic waste. All respondents with a bachelor's level of education have better knowledge of hazardous and toxic waste than other levels of education. For respondents with high school education, it can be seen that the answers obtained varied. Some already know about hazardous and toxic waste and some don't know anything at all. Not so different from respondents with junior high school and elementary school education, the answers are given also varied. With an undergraduate education level, they gain knowledge about hazardous and toxic waste through information sources such as books, seminars, and electronic media. Meanwhile, respondents with education other than undergraduates, get information about hazardous and toxic waste through electronic media such as TV and also information media such as the internet. This is in line with the research conducted by Putri (2017), which found that there was a positive relationship between education level and knowledge about hazardous and toxic waste. If it is associated with awareness in the management of hazardous and toxic waste, the level of education also still influences, but not so much as the level of knowledge. Respondents with a bachelor's level of education are more aware of the dangers of B3 waste and they are willing to participate in socialization and participate B3 waste management.

Based on the research results Putra et al. (2019), the level of education also affects the contribution to B3 waste management. Those with higher education will be willing to pay a levy if the government provides facilities and facilities for B3 waste management. This is acceptable because, in general, the higher a person's education, the level of knowledge and desire for a healthy life also increases. In addition, they also understand more about government regulations and are likely to comply with these policies. In this case, the level of education has a positive effect on people's attitudes in managing hazardous and toxic waste. From the results of respondents with high school education, which one has the highest percentage, the answers vary. Some are willing to participate in the socialization and participate in B3 waste management, but some are willing to answer no. This has a variety of other influencing factors. When asked about whether they are willing to pay a levy for B3 waste management, many of them answered no, with a record that the costs incurred were high. From this, it can be seen that they are aware of the dangers of B3 waste and are willing to contribute, but when it involves costs, most will answer otherwise.

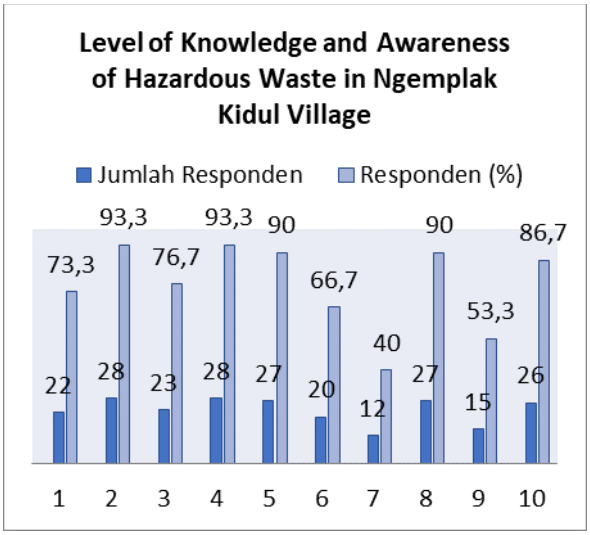


**Fig. 2** Provide Level of Knowledge and Awareness of Hazardous Waste in Ngemplak Kidul Village

Description :

1. Do you know what B3 waste is?
2. Do you agree that B3 waste can be produced by the industrial, tourism, health services, and household sectors?
3. Are detergents, light bulbs, batteries, and medical masks considered B3 waste?
4. In your opinion, does B3 waste have a dangerous impact?
5. In your opinion, does B3 waste need to be managed specifically?
6. Do you know how to manage B3 waste?
7. Have you been separating B3 waste from other types of waste?
8. If you already know how to manage B3 waste, are you willing to apply it?
9. Have you received any socialization/knowledge about B3 waste?
10. If there is socialization regarding B3 waste, are you willing to participate?

*4.3 Comunity Knowledge Towards Hazardous and Toxic Waste*

The results of data collection carried out can be seen in Figures 1 and 2. In Figure 2, it can be seen the percentage of answers from the questionnaire given. Based on the results of the questionnaire, it can be seen that an average of 73.3% know what B3 waste is which can be seen in the first graph as a representation of the first question. In the second question, as many as 93.3% of respondents agree that B3 waste comes from not only the industrial sector, but also from the tourism sector, health services, and also households.

This means that when viewed from the results of the questionnaire, in general, respondents already know what B3 waste is and where it comes from. However, the respondents' answers to the questionnaire questions cannot be concluded that the understanding and awareness of the people of Ngemplak Kidul Village towards B3 waste is also high. This is found in the results of interviews. In interviews with several people who also filled out questionnaires, some only knew or had heard of the term B3 waste, but did not know about the actual B3 waste. Therefore, in the questionnaire, they answered that they knew what B3 waste was in the first and second questions even though they did not know for sure what

B3 waste was. Hazardous and Toxic Materials (B3) are substances, energy, and/or other components which due to their nature, concentration, and/or amount, either directly or indirectly, can pollute and/or damage the Environment, and/or endanger the environment, health, and the survival of humans and other living creatures (Paragraph 1 Section 1 Government Regulation No. 101 of 2014). Thus, B3 waste can be interpreted as waste containing hazardous and toxic materials that have the potential to damage and endanger the environment and human health. This is because B3 waste has the characteristics of being explosive, flammable, reactive, infectious, corrosive, and toxic (Kurniawan, 2019).

*4.4 Comunity Knowledge Towards Classification and Sources of Hazardous and Toxic Waste*

Concerning the B3 waste sample, the results of the questionnaire show that 76.7% of respondents answered correctly. The answer to the third question can indicate the community's knowledge and understanding of the examples as well as the types and sources of B3 waste. This is because in the question given several examples of B3 waste which have different types and come from different sources. The percentage of respondents who answered correctly on the third question seemed to decrease from the number of respondents who answered correctly on the second question. The second question leads to the source of B3 waste, in which examples of waste from each source are asked in the third question. However, from the results obtained, there are still people who do not understand examples of B3 waste based on the source. From the results of the interviews, it was found that some respondents were fooled by the examples given. Some respondents just found out that light bulbs, batteries, detergents, and medical masks are B3 waste. Most of the respondents will be more confident in choosing the example of B3 waste which is clearly in the form of waste such as waste generated by industrial activities.

Considering that Ngemplak Kidul Village is one of the centers for tapioca flour production, only a small number of respondents are aware that the liquid waste produced by this production activity is included in the waste containing hazardous and toxic materials. Others know that the waste is indeed dangerous and pollutes the environment, but do not know that the waste is classified as B3 waste. From this, it is found that the public's understanding of the sources and examples of B3 waste is not deep. This is evidenced by the respondent's ignorance about examples of goods or substances that are classified as B3 waste and are often found around them. According to research conducted by Sidik et al. (2018), most of the general public are not aware that the waste around them, especially household waste, contains B3 waste. The accumulation of household waste is no less large than the waste generated by industry.

*4.5 Community Awareness Towards the Dangers of Hazardous and Toxic Waste*

Based on the answers to the questionnaires in points 4 and 5, it can be seen that 93.3% or 28 of the 30 respondents know that B3 waste is hazardous waste. In addition, 90% or 27 out of 30 respondents know that B3 waste requires special handling in its management. The two points (4 and 5) indicate that almost all respondents have the correct knowledge about the dangers of B3 waste and the urgency in its management. However, only 66.7% or 20 out of 30 respondents know how to properly manage B3 waste. B3 waste management activities carried out by respondents from the highest to the lowest percentage in a row, namely sorting B3 waste and placing it in a separate place to be transported by the authorities, burning or burying B3 waste together with other types of waste without being sorted, mixing B3 waste with other types of waste and landfilled, dumping B3 waste into rivers together with other types of waste, burning B3 waste by sorting it from other types of waste, not doing all of the things above, and some others don't know at all how to manage B3 waste.

From these results, it can be understood that the community needs knowledge about how to properly manage B3 waste and requires supervision in managing it because most people know that B3 waste is dangerous and needs special handling, but do not know how to manage it or just know how to do it without implementing it. . One of the factors that influence people's knowledge about proper B3 waste management is the level of education. According to Putra et al. (2013), the level of education affects the attitude of the family in managing household waste, including B3 waste. If the level of public education is higher, the knowledge and attitudes of the community regarding B3 waste management will also improve.

*4.6 Community Management of Hazardous and Toxic Waste*

Concerning the question of the previous point questionnaire, in point 7 it is asked whether the respondent has separated their B3 waste from other types of waste or not. The results obtained are that only 40% of respondents have separated their B3 waste from other types of waste. This is if it is associated with the results of the previous point, there is another percentage decrease. On the point that asked whether the respondent knew the dangers of B3 waste, 90% answered that they knew. Then in the next point which asks whether the respondent knows how to manage B3 waste, the percentage obtained decreases to 66.7%. At point 7, there was another decline, namely only 40% who separated B3 waste from other types of waste. This can be caused by several factors.

Based on the interviews conducted, some respondents did not separate their B3 waste because they did not know the proper and correct B3 waste management procedures. Other respondents also said that they did not know where to distribute their B3 waste and to whom. Therefore, in general, the reason for respondents who have not separated their B3 waste from other types of waste is because they do not know the procedures for managing and distributing B3 waste in Ngemplak Kidul Village, so they choose to make one of their household waste and then dispose of it in a Temporary Disposal Site. Meanwhile, respondents who have separated some of their waste said that most of the waste they have separated and is included in B3 waste is in the form of electronic B3 waste such as batteries, used cellphones and chargers, used cables, and other electronic devices that are no longer used. They separate the used goods and then resell them to collectors who are willing to buy the electronic waste. As for other waste, such as expired medicine at home, cosmetic waste, disposable medical mask waste, and other B3 waste, they have not been separated from other types of waste and have not been managed properly.

*4.7 Community Awareness to Participate in The Management of Hazardous and Toxic Waste*

From the results above, it is also found that 90% or 27 of 30 respondents are willing to implement B3 waste treatment when they already know how to properly manage B3 waste. Meanwhile, 53.3% or 15 of the 30 respondents had received

socialization related to B3 waste, while 86.7% or 26 of 30 respondents were willing to participate in the socialization related to B3 waste if the socialization was held. Most of the respondents who have participated in the socialization related to B3 waste received it from the school or campus where they studied, while other respondents participated in the socialization related to B3 waste from where they work; seminars; and events or forums other than those already mentioned. Meanwhile, half of the total respondents have never received socialization related to B3 waste. This is in line with the respondent's lack of knowledge regarding how to properly manage B3 waste. Therefore, schools or campuses, and workplaces need to hold socialization and assistance related to B3 waste because most of the respondents received socialization related to B3 waste from these places.

In addition, within the village environment, it is also necessary to carry out socialization and guidance to residents regarding B3 waste management. The target of the socialization carried out in the village is prioritized for housewives, and a government regulation is needed that regulates household B3 waste management (Putra et al., 2019). Socialization to the community needs to be emphasized to housewives because housewives generally do not go out of the house much like workers and students, and housewives are generally responsible for household waste. According to Suhadi (2012), socialization about B3 waste to the public and other parties or sectors that produce B3 waste is the most effective and possible preventive measure to do to prevent the adverse effects of B3 waste. Knowledge and understanding of B3 waste and its management is an urgency for all parties, be it the government or the community (Robot et al., 2019).

## 5. Conclusion and Recommendation

The level of knowledge of the people of Ngemplak Kidul Village regarding B3 waste can be seen in the questionnaire questions points 1, 2, 3, 4, 5, 6, and 9, respectively, 73.3% of respondents know what B3 waste is; 93.3% of respondents agree that the source of B3 waste is not only the industrial sector; 76.7% of respondents answered B3 waste samples correctly; 93.3% of respondents know that B3 waste is a hazardous waste; 90% of respondents know that B3 waste requires special handling, and 53.3% of respondents have received socialization related to B3 waste. Meanwhile, the level of awareness of the people of Ngemplak Kidul Village on the dangers of B3 waste can be seen in the questionnaire questions related to whether the respondents are willing or have taken action about the dangers of B3 waste, namely points 7, 8, and 10. The results are 40% of respondents respectively. have separated B3 waste from other types of waste, 90% of respondents are willing to implement B3 waste management when they already know how to properly manage B3 waste, and 86.7% of respondents are willing to participate in socialization related to B3 waste if the socialization is held.

From these results, it can be concluded that the knowledge of the people of Ngemplak Kidul Village on B3 waste is quite good. The desire to participate in the management and socialization of B3 waste is also quite good, but the implementation of independent management and awareness is still lacking. This can be seen from the decrease in the percentage of respondents who have separated their B3 waste from other waste, even though they already know the dangers of B3 waste. This is influenced by the education level of the respondents which affects the level of knowledge and awareness of B3 waste management. In addition, it is also influenced by the lack of socialization and B3 waste management facilities in the area. For this reason, it is hoped that the village government or related parties will provide socialization and provide B3 waste management facilities in Ngemplak Kidul Village. In addition, the government should also supervise the process of managing hazardous and toxic waste so that it runs as it should. In this case, the advice to the community is to increase their awareness of the dangers of hazardous and toxic waste as well as awareness of the importance of managing hazardous and toxic waste.

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