



Analysis of Reduce Waste Activity Across Generations in Medan City

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Abstract

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BACKGROUND: The condition of solid waste in Medan City is very worrying. 37.3% of waste in Indonesia comes from household activities. The residents of Medan city produce 5,616 m³/day or 2,000 tons/day of waste, the increasing of waste reaches 2%-4% annually and was not transferred to landfill. This condition created problems for the environment both in terms of esthetics, as well as public health problems. The government has issued regulations to limit household waste and reduce and recycle household waste. Community participation is very much needed in the waste problem.

AIM: The research aim was to analyze reduced activity across the generations.

METHODS: This research was an descriptive survey and used cross-sectional design to measure reuse actions. The data were collected from three generations X, Y, and Z, it was 600 respondents as sample. This study was located in Medan City with 15 sub-districts. The techniques of data collection were using cluster sampling. The techniques of data collection was using cluster sampling. The questionnaire used in this study consist of waste management knowledge and reduce action questions. The type of data is numeric and data analyzed by ANOVA test.

RESULTS: The study shown characteristics of the sample by sex; 30.5% male, 69.5% female. The level of education in this study was 18.2% primary education, 71.5% secondary education, and 10.3% higher education. Meanwhile the characteristics by age was 26.8% Gen X, 32.4% Gen Y and 40.8% Gen Z. Amount 42.8% of the sample had taken the reduced action. Generation Z has the most dominant percentage (41%), followed by Generation Y (32.3%) and Generation X (26.8%). The result of analyze reduce action in across generations using ANOVA Test shown $p = 0.001$.

CONCLUSIONS: The reduced action was dominated by Generation Z (42.8%). The most frequent reduce action was the used of towels and old bed linen which are cut into small pieces to be used as rags and the lest was preferred to buy second-hand clothes instead of buying new clothes. There were differences in reduced actions between generations. Each generation is expected to have awareness and cooperation in reducing actions, especially Generation Z, which is an agent of change in reducing the volume of waste. The understanding of each generation toward waste management needs to be improved through health promotion.

Introduction

Garbage is one of the biggest problems in all countries, especially in Indonesia. The composition of waste in Indonesia is getting closer to increasing industrial countries, namely by increasing the presentation of paper and plastic.

The Ministry of Environment and Forestry stated that the increase in landfill waste in Indonesia has reached 175,000 tons/day or the equivalent of 64 million tons/year. This means that there is an increase in waste per year and requires good management [1].

Medan City is one of the most densely populated cities in North Sumatra, the increase in population greatly affects the amount of waste. The residents of Medan city produce 5,616 m³/day or 2,000 tons/day of waste; the increase in waste generation reaches 2%-4% annually [2].

Not all waste is transported by officers from the Temporary Shelter. The amount of waste being dumped into the TPA is increasing, and it is necessary to make efforts to reduce the volume of waste seriously with efforts to manage waste at the household level [3]; this has resulted in the Final Shelter (TPA) being no longer able to accommodate waste and finally still left in the landfill household [4].

The waste problem is not only the responsibility of the government but also the responsibility of the entire community from all generations. Everyone's understanding of the waste problem varies depending on age or generation. Each generation will be different in thought, attitude, and action. Intergenerational involvement, namely Generation X with birth years 1965-1980, Generation Y with birth years 1981-1995, and Generation Z (millennials) with birth years 1996-2010, needs to be studied because differences in age levels cause different behavior [5].

Waste problems can be handled, among others, by implementing the 3R activity, reduce, reuse

and recycle. Reduce is an effort to reduce waste generation at the source and can even be done before waste is generated. Research results by Dewi [6] stated that Millennials channel their ideas and were directly involved in waste management, millennials in Daging Puri Village make small changes to reduce waste in the following six ways: Bringing town bags as a way to replace plastic bags when going shopping, bring your water bottle wherever you go, use cloth and handkerchiefs, bring small bags, refuse to use plastic straws, and use cloth sanitary napkins.

This study aims to analyze the types of reduce actions carried out between generations.

Methods

This research is analytical survey research [7] located in Medan city with 21 sub-districts and carried out in July 2021. The population of this research were people in Medan City; the sample was 600 respondents, and the sampling consists of 2 stages, namely cluster sampling and proportional samples based on age from three generations, namely Generation X (>40 years), Y (26–39 years), and Z (<25 years). Data were collected by using a reduce reduced questionnaire in the KoboToolbox application. Analysis of the data used ANOVA test to see differences in knowledge, attitudes, and actions between generations.

Results

Characteristics of respondents

Characteristics respondent of research in the management of plastic waste across generations including age groups, gender, and education

Based on Table 1, the age distribution was dominated by Generation Z, with 40.8% of respondents, 69.5% female, and 71.5% with middle education.

Table 1 : Characteristics of respondents

Characteristics	n (%)
Age group (years)	
>40 (Generation X)	161 (26.8)
26–40 (Generation Y)	194 (32.4)
<25 (Generation Z)	245 (40.8)
Gender	
Male	183 (30.5)
Female	417 (69.5)
Qualification	
Primary education	109 (18.2)
Middle education	429 (71.5)
Higher education	62 (10.3)

Base on table 2, the three generations that have the highest level of higher education there was Generation Y (14.5%), and the lowest education was Generation X (25.5%), according to Table 2.

Table 2: Characteristics across generation

Characteristics	Generation X, n (%)	Generation Y, n (%)	Generation Z, n (%)
Qualification			
Primary	41 (25.5)	16 (8.2)	52 (21.2)
Middle	104 (64.6)	150 (77.3)	175 (71.5)
Higher	16 (9.9)	28 (14.5)	18 (7.3)
Gender			
Male	38 (23.6)	57 (29.4)	88 (35.9)
Female	126 (76.4)	137 (70.6)	158 (64.1)

Action reduces

The results in Table 3 below describe reduce activity across generations as follows:

Table 3: Reduce actions in plastic waste management with reduce, reuse, recycle principles across generations

Actions	Yes, n (%)	No, n (%)
Reduce the amount of waste at home such as carrying a basket when shopping, and not receiving plastic wrap	327 (54.5)	273 (45.5)
Reducing the use of single-use materials	365 (60.8)	235 (39.2)
Prefer to use your container (foldable cup) when buying drinks	338 (56.3)	262 (43.7)
Saving and reusing the plastic containers of the items you buy	361 (60.2)	239 (39.8)
Using unused/misprinted paper as notes	345 (57.5)	255 (42.5)
Using old towels and old sheets that are cut into small pieces to be used as washcloths	571 (95.2)	29 (4.8)
Avoid buying unnecessary products or items	482 (80.3)	118 (19.7)
Prefer buying used clothes over buying new ones?	233 (38.8)	367 (61.2)
Prefer to use a handkerchief instead of a tissue	323 (53.8)	277 (46.2)
Refuse plastic bags when shopping	241 (40.2)	359 (59.8)

Based on the results of the table above, a statement from 600 samples of cross-generations who carried out the most frequent reduced action was using used towels and old bed linen which were cut into small pieces to be used as rags by 95.5%, and the least reduce action was choosing to buy used clothes rather than buying new by 38.8%.

The conclusions of reducing actions in plastic waste management with the 3R principle across generations are shown in Table 4:

Table 4: Action reduce across generations

Reduce actions	n (%)
Implementing	257 (42.8)
Not implementing	343 (57.2)
Total	600 (100.0)

The results of the study of 600 samples were 42.8% from across generations who did reduce. The actions that are commonly taken are to used towels and old bed linen that are cut into small pieces to be used as washcloths (95.2%), followed by avoiding the purchase of products or items that are less necessary (80.3%) and the least common is buying used clothes compared to new clothes.

Differences introduced actions across generations by age

The results of statistical data analysis of differences in reduce actions according to age groups (across generations) are shown in Table 5.

Based on Table 5, the average reduced action in the age group >40 years (Generation X) is 6.73 with a

Table 5: Distribution of average reduce actions in plastic waste management with reduce, reuse, recycle principles across generations

Age group (years) (across generations)	n (%)	Mean	SD	p
> 40 (Generation X)	161 (26.8)	6.73	1.900	0.001
26–39 (Generation Y)	194 (32.3)	5.83	1.989	
< 25 (Generation Z)	246 (41.0)	5.60	2.109	
Total	600	5.98	2.066	

SD: Standard deviation.

standard deviation of 1,900. The age group 26–39 years (Generation Y) is 5.83 with a standard deviation of 1.989. The age group <25 years (Generation Z) is 5.60, with a standard deviation of 2.109. The results of statistical tests obtained $p = 0.001$, meaning that there are differences in reduced actions between generations

Generation X (age 40 years and over)

Table 6 describes reduce actions by Generation X in Medan City.

Table 6: Action reduce Generation X

Question	Yes, n (%)	No, n (%)
Reducing the amount of waste at home such as carrying a basket when shopping, and not receiving plastic wrap	103 (64.0)	58 (36.0)
Reducing the use of single-use materials	111 (68.9)	50 (31.1)
Prefer to use your container (foldable cup) when buying drinks	103 (64.0)	58 (36.0)
Saving and reusing the plastic containers of the items you buy	97 (60.2)	64 (39.8)
Using unused/misprinted paper as notes	91 (56.5)	70 (43.5)
Using old towels and old sheets that are cut into small pieces to be used as washcloths	158 (98.1)	3 (1.9)
avoiding buying unnecessary products or items	138 (85.7)	23 (14.3)
Prefer to buy second-hand clothes instead of buying new ones	75 (46.6)	86 (53.4)
Prefer to use a handkerchief instead of a tissue	115 (71.4)	46 (28.6)
Refuse plastic bags when shopping	93 (57.8)	68 (42.2)

Based on Table 6, the most reduced action taken by Generation X (Age >40 years) is to use used towels and old bed linen which are cut into small pieces to be used as rags (98.1%), followed by the second one to avoid buying products or goods that are less necessary (85.7%) and the least reduce action taken is choosing to buy used clothes rather than buying new ones by 46.6%.

Reducing actions in plastic waste management with the 3R principle in Generation X (Age >40 years) is shown in Table 7.

Table 7: Actions to reduce Generation X in waste management

Reduce actions	n (%)
Implementing	94 (58.4)
Not implementing	67 (41.6)
Total	161 (100.0)

The results of the research from 161 generation X were 58.4% who took the reduce action.

Generation Y (Years 26-39 Age)

Statement of Generation Y (Age 26–39 Years) Medan City in managing plastic waste by reducing actions is as follows:

Based on the results Table 8, the reduced action statement in Generation Y (Age 26–39 Years)

that is most often done is to use used towels and old bed linen which are cut into small pieces to be used as rags by 95.4%, and reduce actions are the least carried out. Generation Y is refusing plastic bags when shopping (35.1%).

Table 8: Actions reduce Generation Y

Actions	Yes, n (%)	No, n (%)
Reducing the amount of waste at home such as carrying a basket when shopping, and not receiving plastic wrap	107 (55.2)	87 (44.8)
Reducing the use of single-use materials	104 (53.6)	90 (46.4)
Prefer to use your container (foldable cup) when buying drinks	105 (54.1)	89 (45.9)
Saving and reusing the plastic containers of the items you buy	114 (58.8)	80 (41.2)
Using unused/misprinted paper as notes	109 (56.2)	85 (43.8)
Using old towels and old sheets that are cut into small pieces to be used as washcloths	185 (95.4)	9 (4.6)
Avoid buying unnecessary products or items	156 (80.4)	38 (19.6)
Prefer to buy second-hand clothes instead of buying new ones	73 (37.6)	121 (62.4)
Prefer to use a handkerchief instead of a tissue	110 (56.7)	84 (43.3)
Refuse plastic bags when shopping	68 (35.1)	126 (64.9)

Reduce actions in plastic waste management with the 3R principle in Generation Y (Age 26–39 Years) are shown in following Table 9.

Table 9: Conclusion of actions to reduce Generation Y

Reduce actions	n (%)
Implementing	71 (36.6)
Not implementing	123 (63.4)
Total	194 (100.0)

The results of the study from 194 samples were 36.6% of Generation Y who did Reduce.

Generation Z (under 25 years old)

Statement of Generation Z (Age <25 Years) Medan City in managing plastic waste with reducing actions as follows:

Based on the results of the statement of Generation Z (Age <25 Years), the most frequent reduce action carried out are the same as Generations X and Y, namely using used towels and old bed linen which are cut into small pieces to be used as rags by 93.1%, and reduce actions. The least they do is the same as Generation Y, which is refusing plastic bags when shopping by 32.7%.

The results of the study were from 245 samples (37.6%) who took the Reduce action.

Table 10: Action reduce Generation Z

Actions	Yes, n (%)	No, n (%)
Reducing the amount of waste at home such as carrying a basket when shopping, and not receiving plastic wrap	117 (47.8)	128 (52.2)
Reducing the use of single-use materials	150 (61.2)	95 (38.8)
Prefer to use your container (foldable cup) when buying drinks	130 (53.1)	115 (46.9)
Saving and reusing the plastic containers of the items you buy	150 (61.2)	95 (38.8)
Using unused/misprinted paper as notes	145 (59.2)	100 (40.8)
Using old towels and old sheets that are cut into small pieces to be used as washcloths	228 (93.1)	17 (6.9)
Avoid buying unnecessary products or items	188 (76.7)	57 (23.3)
Prefer buying used clothes over buying new ones	85 (34.7)	160 (65.3)
Prefer using a handkerchief instead of a tissue	98 (40.0)	147 (60.0)
Refuse plastic bags when shopping	80 (32.7)	165 (67.3)

Base on table 10, reduce action on Gen Z the most action was using old towels and old sheets that

are cut into small pieces to be used as washclothes (93.1%).

Base on table 11, Gen Z had implementing reduce action only 37.6%.

Table 11: Action reduce Generation Z

Reduce actions	n (%)
Implementing	92 (37.6)
Not implementing	153 (62.4)
Total	245 (100.0)

Based on table 9, 10, and 11 the comparison. When viewed from the comparison of reducing actions from the three generations was the activity of using used towels and old bed linen which are cut into small pieces to be used as rags is the dominant action carried out by the three generations, in this study comparison of the number who had implemented the reduce action, was Generation X by 58.4%, follow by Generation Z (37.6%) and then Generation Y (36.6%).

Discussion

In general, reduce actions have not been maximally implemented across generations. Generation X (58.4%) was the largest group who have been implemented the reduced actions compared to Generations Y and Z. The three generations have the same reducing action. The most action they carried out was the using of used towels and old bed linen cut into small pieces. The results of statistical analysis show that there are differences in reducing actions between generations, this is supported by the fact that age differences cause behavioral differences, where age is a predisposing factor for health behavior [8], [9].

Generation X tends to like risk and mature decision-making as a result of parenting from the previous generation (Baby Boomers), so the teaching values of the baby boom generation are still attached to Generation X [10].

The reduction action, which has the lowest percentage carried out between generations, was buying used clothes instead of new clothes. This action was dominated by Generations X and Y. In Generation Z, the percentage that was lacking in reducing actions is that they still receive plastic bags when shopping for the reason that they are given, and also when shopping, there is no plastic bag.

The millennial generation (Generation Z) greatly affects the amount of waste in society because they are an agent of change [11]). One form of the participation of the millennial generation in efforts to improve the environment was by donating labor in the form of community service and participating in the management of plastic waste and has a way of reducing waste. Waste reduction was focused on sorting waste and was considered to be able to

reduce the amount of existing waste volume [12]. The previous research on basic sanitation conducted in Binjai, shown that waste management which is one of the basic sanitation management models can be improved based on participatory family empowerment by employing assistance and the division of tasks to family members [13].

Conclusions

The most dominant type of reduced action taken across generations was to use used towels and old bed linen that are cut into small pieces to be used as rags. Only 42.8% of the cross-generations take reduced actions and 58.4% of them are in Generation X. The results of statistical tests obtained $p = 0.001$, meaning that there are differences in reduced actions between generations.

Each generation is expected to have awareness and cooperation in reducing actions, especially Generation Z, which is an agent of change in reducing the volume of waste.

The understanding of each generation toward waste management needs to be improved through health promotion, especially in reducing waste; thus, this action can reduce the volume of waste that reaches the landfill.

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