

Public Intention to Use Reusable Menstrual Products and Their Impact on Menstrual Pads Waste Reduction in DKI Jakarta

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ABSTRACT

Single-use menstrual waste is a serious issue since they consist of ingredients that make it difficult to biodegrade and are contaminated with blood and other bodily fluids, that could possibly contaminate other waste. Most women in DKI Jakarta still use single-use menstrual pads despite the availability of reusable alternatives. With the Theory of Planned Behavior, this study analyzed factors that affects intention to use reusable menstrual products, as well as the possible waste generation from various menstrual products and recommendations for their management in DKI Jakarta. This study applied quantitative methods using online survey to 448 participants. Factors that positively influence intention to use reusable menstrual products are Subjective norm, Perceived behavioral control, and Attitude (sig. < 0.05), while Knowledge has no significant influence (sig. > 0.05). Attitude is the factor with most contribution (sig. < 0.001) with highest beta value of 0,415. DKI Jakarta could potentially generate 42,072,587.52 kg/year of menstrual pads waste; 73.91 kg/year of menstrual cups waste; and 4,909.08 kg/year of reusable pads waste. Recommendations given are the shifting of single-use menstrual products users to reusable menstrual products to reduce single-use menstrual products waste and improving the waste management system for single-use menstrual pads waste in DKI Jakarta

INTRODUCTION

Background

Every woman during her lifetime will experience the menstrual cycle, which is the process of the shedding of the uterine wall along with the ovum due to the absence of fertilization by sperm cells. Menstruation is not only related to women's health, but also to its impact on the environment. Menstrual product waste is waste produced by women during the menstrual cycle, generally disposable menstrual pads that are commonly used by women in Indonesia. This menstrual product waste can cause various impacts on the environment. Conventional disposable sanitary napkins are designed with a combination of cellulose, low-density polyolefin, as well as petrolatum as an absorbent gel, making the product difficult to decompose in landfills. (Stegmann et al, 1993). Disposable menstrual pads can take approximately 500-800 years to decompose (Potter, 2016) and the plastic in disposable menstrual products could potentially break down into microplastic fragments if disposed of into rivers or streams. Waste from used menstrual pads are also contaminated with blood and other body fluids, therefore they are classified as specific waste in the infectious hazardous waste category as they can cause more serious environmental pollution and health problems than general municipal waste, so according to PP No. 27 of 2020 concerning Specific Waste Management, hazardous waste management must be separated from ordinary waste in terms of containment and collection, and its handling must follow the hazardous waste regulations contained in PP No. 22 of 2021. Apparently, as of the management of menstrual pads waste in Indonesia, one of which is at Bantargebang Landfill, they are still incorporated with general municipal waste and still lacks treatment facilities (Siswanto, 2017). Consequently, disposable sanitary napkin waste may become the source of diseases and contaminate other materials during recycling (Bahraini, 2020).

Furthermore, a question arises as to why disposable menstrual pads are still the preferred alternative menstrual product for majority of women in Indonesia even though there are alternatives that cause less negative impact on the environment. In Indonesia alone, practical reasons and availability are still the most important factors for women in determining the choice of menstrual equipment (Rohmatin, 2021). This study aims to determine the factors that influence intention to use reusable menstrual products as an approach to overcome the problem of single-use menstrual products waste in DKI Jakarta. This research will also determine the estimated waste generated from various menstrual products in DKI Jakarta and its management recommendations.

Theory of Planned Behavior

In order to explore the factors that affect menstrual product choices, this study applied the Theory of Planned Behavior (TPB), a theory that emphasizes individual behavioral intention as a motivational variable that influences behavior and an indication of the extent of a person's effort to try (Ajzen, 1991). The TPB model can be properly used to explain pro-environmental behavior as shown in the study of Deng et al (2022), who used the TPB model to predict the intention to reduce the use of personal care cosmetic products containing microplastics and in Patrick and Regina (2022) for predicting the intention to use

menstrual cups in the Philippines as a way to reduce plastic waste. Therefore, this study will use the Theory of Planned Behavior (TPB) model with four independent predictors including knowledge (K), subjective norm (SN), perceived behavioral control (PBC), and attitude towards behavior (A).

LITERATURE REVIEW

Considering the negative impacts of disposable menstrual pads, reusable menstrual products alternatives do exist but are not widely used by Indonesian women, one of which is the menstrual cup, which is a cup-like product to collect menstrual blood by inserting it into the vagina. Weir (2015) stated that menstrual cups cause the lowest environmental impact when compared to disposable menstrual pads. In addition, reusable pads can also be an alternative for repeated use because they are made of fabric that can absorb liquid and are washable.

METHODHOLOGY

Data Collection

This study used a survey method to collect primary data with the instrument of questionnaire by utilizing the Google Form online platform. The data collected were the amount of menstrual product used, data of the four TPB independent variables, and intention to use reusable menstrual products. In the introduction section of the research questionnaire, inclusion criteria and informed consent questions were asked to check the eligibility of participants to take part in the study. There were also pictures and descriptions of four menstrual products, including menstrual pads, tampons, menstrual cups, and reusable pads as references in answering the questions. Questions indicating the knowledge variable were multiple choice questions with true/false answers while other independent variables were questions on a Likert scale of 1-5. Data retrieval was conducted resulting in a total of 448 participants. SWOT analysis tool is used to formulate the recommended strategies based on the study results.

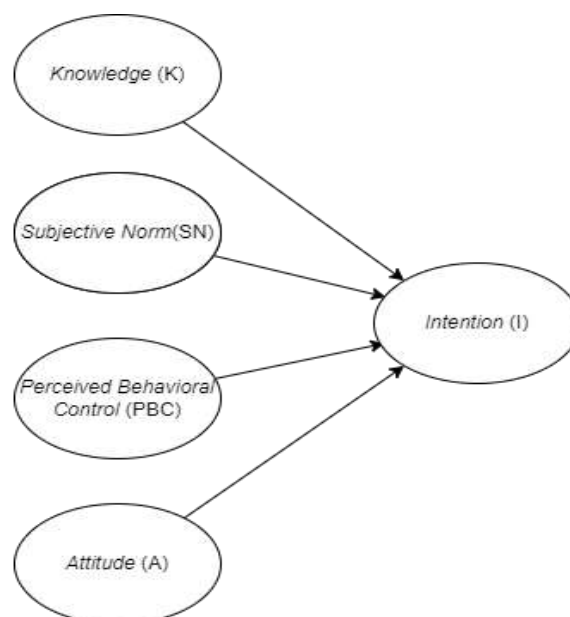


Figure 1. Study Design

Mass Standardization of Menstrual Product Waste

Mass standardization was conducted as a baseline in calculating the potential waste generation of menstrual products and was measured using analytical scales on three brands of menstrual pads. For each brand, two size variants were measured in three conditions, which were dry, moist, and wet. Based on the measurement results, the typical average mass of used menstrual product waste in various brands, sizes, and conditions were 49 grams.

Statistic Tests

Statistic test analysis conducted in the study were descriptive statistical analysis and multiple linear regression tests. Multiple linear regression test was conducted to determine the contribution significance of independent variables (knowledge, subjective norm, perceived behavioral control, and attitude) towards the dependent variable (intention to use reusable menstrual products).

SWOT Analysis

SWOT analysis was conducted to formulate recommendations for management strategies based on the results obtained in the study. SWOT analysis was conducted by analyzing the relationship between internal and external factors of the study.

RESULT AND DISCUSSION

Menstrual Product Choice Analysis

Table 1. Percentage of Participants' Menstrual Product Choice

Menstrual product used	Frequency	Percentage (%)
Menstrual pads	438	97.77
Reusable pads	4	0.89
Tampon	0	0.00
Menstrual cup	6	1.34
Total	448	100.00

Table 1 shows the percentage of participants' menstrual products of choice, with majority of the participants used menstrual pads (97.77%) and only a small percentage used menstrual cups (1.34%) and cloth pads (0.89%). Nearly all participants use disposable menstrual pads as their menstrual product of choice, only small percentage of them use other menstrual product, and none of the participants use menstrual tampons.

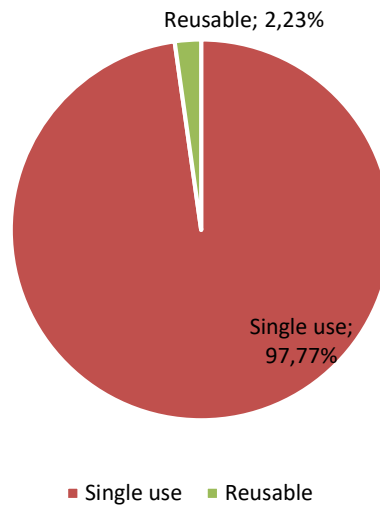


Figure 2. Percentage of Product Choice Based on Reusability

Figure 2 shows the percentage of participants based on the reusability of their products. Based on the reusability of their menstrual products, participants' products are categorized into single-use products (menstrual pads) and reusable products (menstrual cups and reusable pads).

Distribution of menstrual products choice based on participants' demographic attributes are shown in the following figure.

Estimated Menstrual Products Waste Generation

Based on the survey results, several characteristics of participants' menstrual cycles were obtained, including the average number of days in their menstrual period which is 6 days and the average interval between each period is 30 days. As for the menstrual pad users, the average number of menstrual pads used by the participants was 4 pads per day, while the menstrual cup users only used 1 product per period and the cloth pad users used 5 products per period. Table 3 shows the estimation of the waste generated from menstrual products and there was a highly visible difference between the waste generated from disposable menstrual pads compared to reusable menstrual products, as menstrual cups and reusable pads generated 0.1 pieces/person/year and 2.5 pieces/person/year, respectively, which are much lower than disposable menstrual pads (240 pieces/person/year). Therefore, switching the use of menstrual products from disposable to reusable could potentially be applied as a strategy to address the issue of disposable menstrual pads.

Table 2. Characteristics of Participants' Menstrual Cycle and Product Use

Product	Product life	Amount used per cycle	Typical mass (gram)	Estimated users (person)
Single use pads	Disposable	24	49	3,595,210
Menstrual cup	10 years	1	15	49,275
Reusable pads	2 years	5	60	32,727

Table 3. Estimated Menstrual Product Waste Generated in DKI Jakarta

Product	Estimated waste (unit/person/year)	Estimated waste (kg/person/year)	Estimated waste (unit/year)	Estimated waste (kg/year)
Single use pads	240	11.7024	862,850,441	42,072,587.52
Menstrual cup	0.1	0.0015	4,927	73.91
Reusable pads	2.5	0.15	81,818	4,909.08

Reason of Product Choice

Figure 3 shows the responses of single-use menstrual product users' reason of product choice, while Figure 4 shows the responses of reusable product users. Among single-use menstrual product users, questions with the most positive answers ("Strongly Agree" and "Agree") were question R3 (ease of obtaining the product) and R1 (effectiveness of the product in collecting menstrual blood). Meanwhile, for users of reusable menstrual products, the questions with the most positive answers were R1 (effectiveness in collecting blood) and R6 (comfort of use).

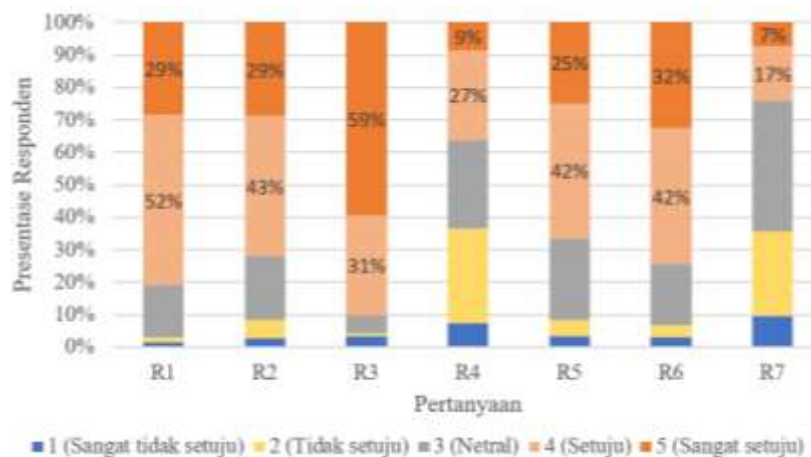


Figure 3. Single-Use Menstrual Product Users' Reason of Product Choice

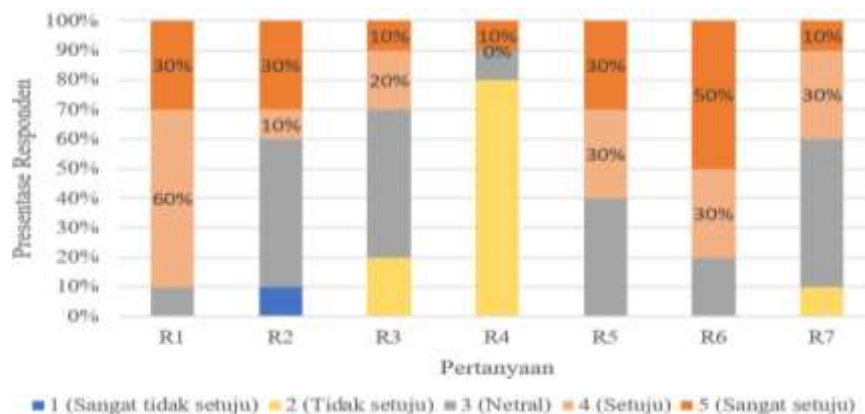


Figure 4. Reusable Menstrual Product Users' Reason for Product Choice (Keterangan : R1 = Effectiveness; R2 = Cost; R3 = Ease of obtaining; R4 = Lack of other alternatives; R5 = Amount of information; R6 = Convenience; R7 = Environmental impact)

Multiple Linear Regression Analysis

Multiple Linear Regression was used to see the influence of several independent variables on one dependent variable. The independent variables analyzed are knowledge, subjective norm, perceived behavioral control, and attitude.

Table 4. Multiple Linear Regression Analysis Result

Model	R	Adjusted R square	F test result	
			F	Sig.
TPB's Independent variable	0.733	0.533	128.542	< 0.001

Based on Table 4, it was found that the R-value, which is a multiple correlation coefficient of 0.733, means that the independent variables along with the dependent variable have a strong correlation. Also found in the adjusted R square (R²) value of 0.533, meaning that 53.3% of the intention to use reusable menstrual products variable can be explained by the four independent variables of knowledge, subjective norm, perceived behavioral control, and attitude. Meanwhile, the remaining 46.7% may be influenced by factors that are not examined in this study such as cultural stigma, habits, and self-identity.

Moreover, the significance value of the F test is <0.001, which means that the independent variables of knowledge, subjective norm, perceived behavioral control, and attitude simultaneously have a significant influence on the intention to use reusable menstrual products.

Table 5. Partial T-test Result

Independent variable*	Standardized Coefficients		Sig.
	Beta		
Knowledge (K)	0.055		0.105
Subjective Norm (SN)	0.098		0.005
Perceived Behavioral Control (PBC)	0.337		< 0.001
Attitude (A)	0.415		< 0.001

Based on Table 5, the significance value was found to be < 0.05 for subjective norm, perceived behavioral control, and attitude variables. This means that all three variables mentioned have a significant impact on the dependent variable of intention to use reusable menstrual products. Meanwhile, the knowledge variable has a significance value > 0.05, meaning that environmental knowledge does not significantly affect the intention to use reusable menstrual products if all other independent variables are in the model. The Independent variable with the largest standardized coefficient positive value is attitude (0.415), meaning that attitude is the most influential factor in positively affecting the intention to use reusable menstrual products.

Recommendation Analysis

In this research, the formulation of recommendations will be carried out with SWOT analysis tools. After identifying each of the four SWOT components, strategy formulation is done by analyzing the relationship between internal factors and external factors (Table 6).

Table 6. SWOT Analysis Result

Faktor	Strength	Weakness
	S-O Strategies	W-O Strategies
Opportunity	<ul style="list-style-type: none"> • Increase the public's intention to use reusable menstrual products through factors that positively influence intention. • Collaborate with manufacturers of reusable menstrual products to increase public awareness about the advantages of the product. 	<ul style="list-style-type: none"> • Provide sufficient information about menstrual products for prospective buyers. • Facilitate accessibility by increasing the number of products on the market. • Make products more accessible in terms of cost
	S-T Strategies	W-T Strategies
Threat	<ul style="list-style-type: none"> • Reduce the use of disposable menstrual products by switching to reusable menstrual products to reduce taboos as well as to reduce waste 	<ul style="list-style-type: none"> • Make reusable menstrual products more known and widely used by the public to reduce the taboo in purchasing menstrual products. • Improve the waste management of disposable menstrual pads to overcome the waste that is still generated

The expected mass balance scenario of menstrual product waste management was made with the target of accomplishment in 2043 as shown in Figure 5. After the recommendation, it is targeted that 30% of single-use menstrual pad users have switched to using reusable menstrual products, and 95% of all single-use menstrual pad waste generated is processed by incineration technology with energy recovery.

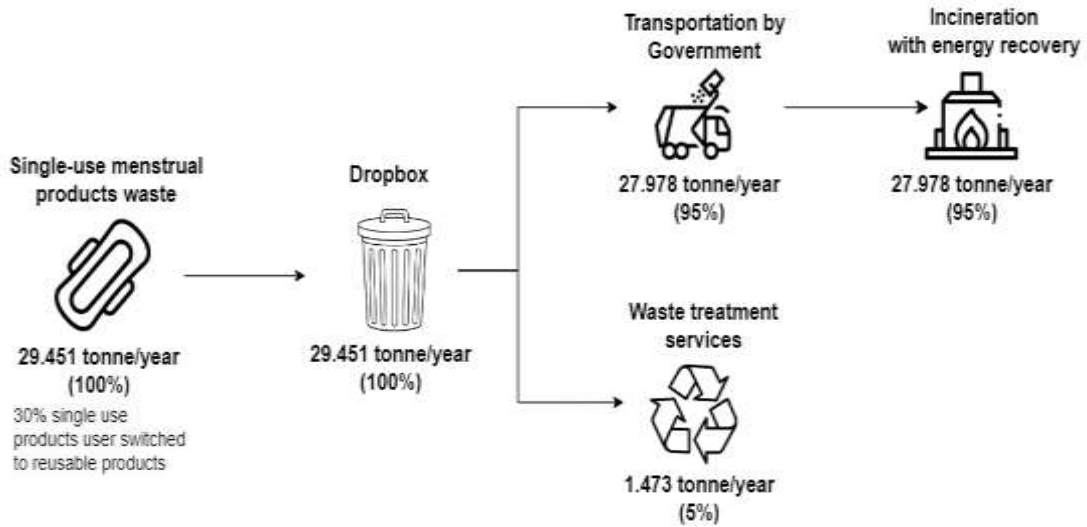


Figure 5. Mass Balance of Waste Management of Single-Use Menstrual Products in DKI Jakarta in 2043 After Recommendations

Potential Benefits Analysis

The transition of single-use menstrual products user to reusable menstrual products has the potential to reduce the overall waste generation of menstrual products and reduce the greenhouse gas (GHG) emissions produced by menstrual products. Greenhouse gas emission factors for each menstrual product were obtained based on secondary data in Table 7.

Table 7. Emission Factor of Menstrual Products

Product	End Route	Potential GHG Emission	Unit	Source
Single-use pads	Incineration	0.72	kgCO ₂ Eq/kg waste	Blair, 2022
Single-use pads	Landfill	0.029	kgCO ₂ Eq/unit	
Menstrual cup	Landfill	0.42	kgCO ₂ Eq/unit	Hait dan Powers, 2019
Reusable pads	Landfill	0.11	kgCO ₂ Eq/unit	

Therefore, the total waste generation of menstrual products and the GHG generation that could potentially be reduced after the transition can be calculated and are shown in Figure 6.

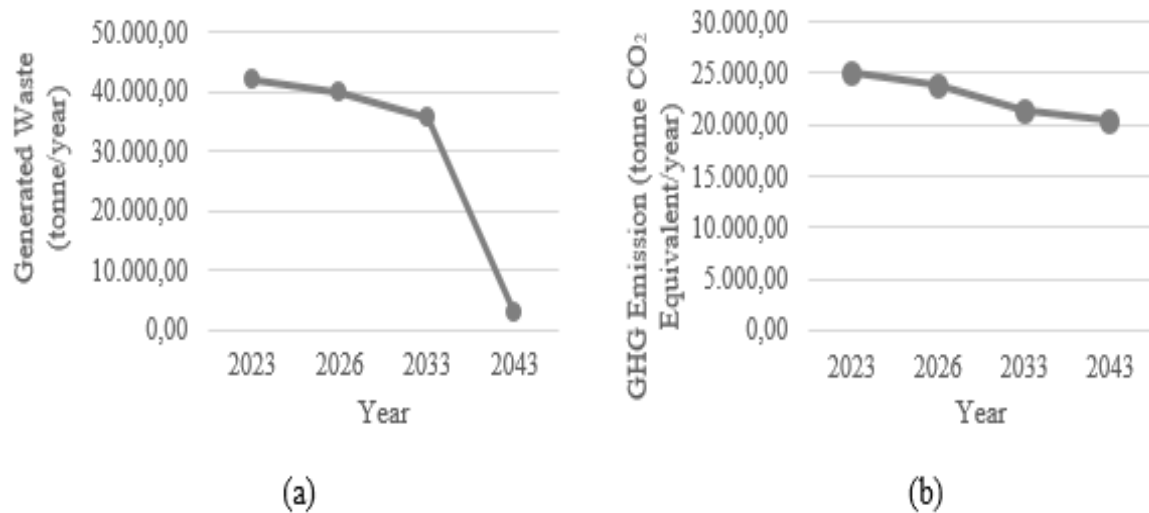


Figure 6. Potential Reduction of (a) Menstrual Products Waste and (b) GHG Emission

Therefore, it can be concluded that a 30% shift of single-use menstrual pad users to reusable menstrual products in DKI Jakarta has the potential to reduce GHG emissions by 4,706.09 tons of CO₂ Equivalent/year.

CONCLUSION AND RECOMENDATION

Based on the regression results, the variables that have a positive relationship with the intention to use reusable menstrual products are the subjective norm, perceived behavioral control, and attitude (sig. < 0,05). Meanwhile, knowledge did not significantly influence the intention to use reusable menstrual products (sig. > 0,05). The variable that has the most contribution to the intention to use reusable menstrual products is attitude (sig. < 0,001) with the largest beta value (0,415). The results of the estimation of menstrual waste generation in DKI Jakarta for menstrual pads waste is 42,072,587.52 kg/year; menstrual cups were 73.91 kg/year; and reusable pads were 4,909.08 kg/year. Recommendations given are the shifting of single-use menstrual product users to reusable menstrual products to reduce single-use menstrual product waste and improving the waste management system for single-use menstrual pad waste in DKI Jakarta.

FURTHER STUDY

This research still has related limitations so it is necessary to carry out further research on the topic Public Intention to Use Reusable Menstrual Products and Their Impact on Menstrual Pads Waste Reduction in order to perfect this research and increase the reader's insight

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