

# The Influence of Mothers' Knowledge Towards Their Perceived Behavioral Control

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## Abstract

This research explores the environmental impact of baby formula production and its influence on breastfeeding rates, particularly in Asia. It highlights the role of the Breastfeeding Mother Community on Facebook in raising awareness among mothers, despite a lack of content on the environmental drawbacks of formula milk. The study aims to assess community members' knowledge of these impacts and its effect on their behavior. Using the TPB theory, it investigates the link between environmental knowledge and perceived behavioral control. The research uses a quantitative approach, using questionnaires, with a sample of 400 respondents from the community. This research employs various data analysis techniques, including descriptive analysis, normality test, simple linear regression analysis, hypothesis testing, and the coefficient of determination test. The findings reveal that the knowledge of the Breastfeeding Mother Community members on Facebook about the environmental impact of formula milk production influences their perceived behavioral control by 28.2%. The remaining percentage is influenced by variables not covered in this research. However, the results indicate no significant influence, as evidenced by the calculated T value being greater than the T table ( $-4.742 < 1.965$ ), leading to the rejection of H1 and acceptance of H0.

**Keywords:** *negative impact of baby formula milk production; environmental pollution; knowledge*

## Abstrak

Penelitian ini mengeksplorasi dampak lingkungan dari produksi susu formula bayi dan pengaruhnya terhadap tingkat menyusui, terutama di Asia. Penelitian ini menyoroti peran Komunitas Ibu Menyusui di Facebook dalam meningkatkan kesadaran di antara ibu, meskipun kurangnya konten tentang kerugian lingkungan dari susu formula. Studi ini bertujuan untuk menilai pengetahuan anggota komunitas tentang dampak ini dan efeknya terhadap perilaku mereka. Menggunakan Teori Perilaku Terencana, penelitian ini menyelidiki hubungan antara pengetahuan lingkungan dan kontrol perilaku yang dirasakan. Penelitian ini menggunakan pendekatan kuantitatif, menggunakan kuesioner, dengan sampel 400 responden dari komunitas. Penelitian ini menggunakan berbagai teknik analisis data, termasuk analisis deskriptif, uji normalitas, analisis regresi linier sederhana, pengujian hipotesis, dan uji koefisien determinasi. Temuan menunjukkan bahwa pengetahuan anggota Komunitas Ibu Menyusui di Facebook tentang dampak lingkungan produksi susu formula bayi mempengaruhi kontrol perilaku yang dirasakan mereka sebesar 28,2%. Persentase yang tersisa dipengaruhi oleh variabel yang tidak dicakup dalam penelitian ini. Namun, hasilnya menunjukkan tidak ada pengaruh yang signifikan, seperti yang dibuktikan oleh nilai T yang dihitung lebih besar dari tabel T ( $-4,742 < 1,965$ ), yang mengarah pada penolakan H1 dan penerimaan H0.

**Kata Kunci:** Dampak negatif produksi susu formula bayi; Pencemaran lingkungan; Pengetahuan

## INTRODUCTION

Formula milk as a common substitute for breast milk due to various factors such as health issues, restricted working hours, demanding lifestyle, inadequate breast milk production, or personal choice (Merry et al., 2023). However, it highlights the significant environmental impacts of formula milk production, including plastic waste, carbon dioxide (CO<sub>2</sub>) emission, and environmental pollution, with the production process generating various types of waste (Wagini et al., 2002). Alarming statistics about waste management in Indonesia, with 34.29% of the national waste stockpiles being unmanaged in 2022 (SIPSN, 2023). It further emphasizes the environmental cost of formula milk production, stating that the production of one kilogram of infant formula releases 4 kilograms of carbon dioxide (CO<sub>2</sub>) emission, a greenhouse gas that harms the environment (Smith, 2019).

The increasing levels of carbon dioxide (CO<sub>2</sub>) emission, largely due to formula milk factories, contribute to soil degradation and greenhouse gas emissions, leading to decreased soil fertility, erosion, and other environmental problems (Mahcene et al., 2019). These negative impacts contribute to global warming, an ecological disruption on Earth caused by the ongoing rise in the average temperature of the Earth's atmosphere, oceans, and land (Utina, 2008). The drastic fall in breastfeeding rates in Asia, with millions of babies worldwide now consuming formula milk (Smith, 2019). In Indonesia, only 52.5% of the 2.3 million infants under six months old are breastfed, marking a 12 percent decline from 2019 statistics (RISKESDAS, 2021). Five provinces in Indonesia in 2021 had the highest spending on formula milk: West Java, East Java, North Sumatra, Central Java, and Banten (Kompas, 2022). This underscores the need for the Indonesian Breastfeeding Mother Community to share breastfeeding tips and discourage the use of formula milk as a substitute for breast milk.

The significant correlation between increased milk production levels and a prevalent trend of formula milk consumption in the community, indicating a substantial preference for formula milk but also raising concerns about potential environmental consequences (Setiawan & Setyawati, 2020). The importance of addressing these sustainability challenges by raising awareness about the environmental impact of everyday consumption choices, endorsing sustainable agricultural practices, and advocating for eco-friendly solutions (Hidayah, 2015). Even though the consumption of formula milk has become a sustainability challenge, the existence of a community of breastfeeding mothers can play an important role and help reduce the negative impact of this sustainable consumption of formula milk. The Indonesian Breastfeeding Mothers Community, with many active followers reaching 165 thousand on the Facebook platform, has become a valuable center of interaction for mothers who share experiences, receive positive support, and receive important education about breastfeeding. Despite providing positive support for breastfeeding, it is observed that education regarding the negative impacts of formula milk production on the environment still lacks depth, even though conveying this information is important for collective awareness.

The theoretical foundation of this research is based on the concept of knowledge as presented by Wahana (2016). They emphasize the importance of knowledge as the fundamental basis for understanding the development and interactions of individuals, societies, and civilizations with their environment. Knowledge, in this context, extends beyond mere information and facts; it involves a profound understanding of how this information is interconnected and applicable within specific contexts. Applying this concept to maternal knowledge about formula milk production and its negative impacts, such as carbon dioxide (CO<sub>2</sub>) emission and plastic waste, becomes crucial. Informed mothers, with a deeper understanding of the consequences of formula milk production on the environment, can make more environmentally conscious choices. Based on Bloom's division of domains in Notoatmodjo (2010), knowledge is broadly divided into six levels: Know, understanding (comprehension), application, analysis, synthesis, and evaluation. Each level represents a different depth and type of knowledge, from simple recall of information to the ability to justify or assess a particular object based on self-determined criteria or societal norms. This framework provides a comprehensive understanding of the dimensions of knowledge.

Knowledge measurement in this research is typically conducted through interviews or questionnaires that inquire about the content of the material being assessed from the research subjects. Budiman and Riyanto (2013) propose a framework for evaluating an individual's knowledge based on different stages, including knowing and understanding, application and analysis, and synthesis, analysis, and evaluation. Perceived Behavioral Control, as defined by Hendriawan and Ghina (2016) is the control of individual behavior regarding the perception of how easy or difficult it is to perform an action, which is a reflection of experience and a form of anticipation of the action. According to Ajzen and Fishbein (1977), perceived behavioral control is how an individual perceives their ability to influence or manage a situation describing behavior. It is a description of past experiences and a form of anticipation of an obstacle. In this study, perceived behavioral control can be used as an influenced variable, reflecting past experience and anticipation of obstacles that may occur. This control can be seen in a mother's habit of giving formula milk to her baby, which can be influenced by her past experience and information from someone as the basis of her knowledge. The community of social media that the researcher raised should be able to be one of the controls of a mother's behavior in giving formula milk. To measure perceptions about perceived behavioral control, indicators such as control of belief strength and perceived power are used.

The TPB theory, developed from the Theory of Reasoned Action model by Ajzen in 1988, incorporates Perceived Behavior Control and predicts behavior that can be considered and planned (Nuay, 2010). According Wellington stated in Nuay (2010) The TPB is advantageous over other behavioral theories as it can identify a person's belief in control over outcomes, distinguishing between desired and undesired behavior. The theory posits that a person's behavior can influence intentions and perceived behavioral control, while intentions themselves influence attitudes, subjective norms, and perceived behavioral control (Santoso, 2018).

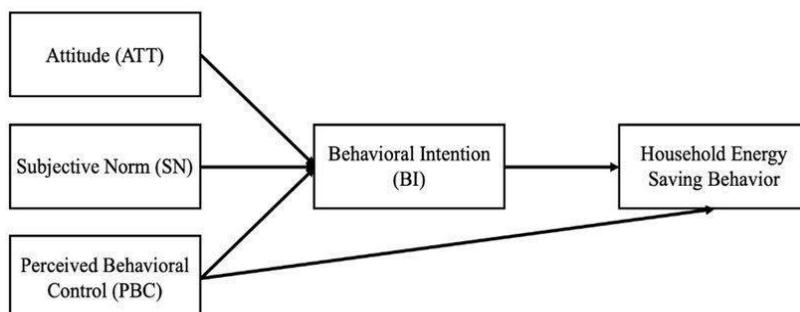


Figure 1. TPB Theory  
(Source: TPB book by Martin Fishbein and Icek Ajzen, 1977)

Based on figure 1, the TPB theory guides human actions through three types of beliefs: Behavioral beliefs, normative beliefs, and control beliefs. These beliefs are related to attitude, subjective norms, and perceived behavioral control respectively. The TPB explains that attitudes towards behavior, subjective norms, and perceived behavioral control can impact behavioral intention variables, which in turn will influence the behavioral variable (Ajzen & Fishbein, 1977). Although the TPB theory originated from social psychology and was developed by a professor in this field, its application has extended to many areas of study, including Communication Studies (Hermawan, 2017).

In this research, the author used the same variables and dimensions as previous studies such as those by Purusottama (2019), Purwanto et al. (2023), Pratama and JAR (2020), Mawardani et al. (2023) and Mardikaningsih (2019). These studies discuss similar themes and variables, and talk about the influence on someone's decision. The author also referenced international journals that highlight several negative impacts, including carbon dioxide (CO<sub>2</sub>) emissions, as shown in (Smith, 2019). The

research uses the same theory as the author, namely the TPB theory, even though the research objects are different. The author also uses the research of Alsahafi and Cheng (2016) as they have the same variables and dimensions. This research is distinguished from the previous study by a more focused exploration of how maternal knowledge influences perceived behavioral control regarding the negative environmental impacts of formula milk production.

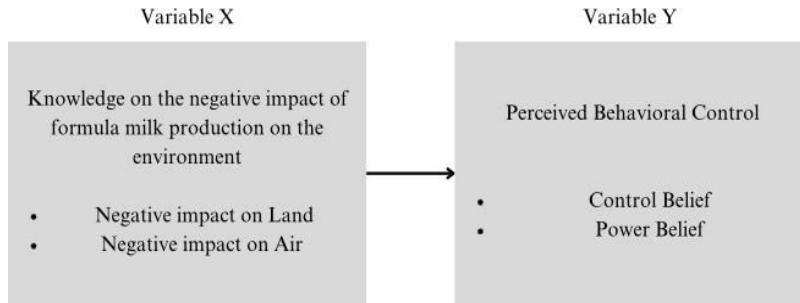


Figure 2. Research Framework

This study employs a research framework, a systematic strategy and set of guidelines for conducting research projects, to organize the work and ensure the validity and reliability of the findings. Based on Picture 2, the independent variables under study are knowledge and a mother's perceived behavioral control, which is the dependent variable. The research aims to understand the role of knowledge in influencing perceived behavioral control, based on the TPB theory. The researcher believes that knowledge is fundamental, with most knowledge indicators being background factors in the TPB theory. Therefore, this research conceptually underpins knowledge as a strong factor that can influence a mother's control over her behavior based on the information they gather as a source of knowledge.

In contrast, recent research indicates that increased maternal knowledge about the environmental impact of infant formula production does not always lead to the expected behavioral changes. This study found that knowledge among members of the Indonesian Breastfeeding Community on Facebook regarding the environmental consequences of infant formula production influenced their perceived behavioral control by 28.2%. However, further analysis indicated no significant relationship between maternal knowledge, attitudes, intentions, and behavior. These findings suggest the presence of cognitive dissonance, where knowledge is not consistently translated into action. Therefore, this study underscores the importance of implementing more effective interventions to bridge the gap between knowledge and sustainable behavior, as well as the need for a deeper exploration of other factors influencing maternal behavior in this context.

The research hypotheses, as per Crano et al. (2023), are empirical specifications of the conceptual hypothesis and can be seen as predictions about what will be observed in the study. The null hypothesis ( $H_0$ ) posits that there is no influence of mothers' knowledge on their perceived behavioral control regarding the negative impact of formula milk production on the environment. The alternative hypothesis ( $H_1$ ) suggests that there is a positive influence between mothers' knowledge about the negative impact of formula milk production on the environment and the level of perceived behavioral control. These hypotheses are based on the assumption that the higher the mothers' knowledge about the negative impact of formula milk production on the environment, the higher the level of perceived behavioral control. The scope of this research focuses on the knowledge of the members of the Indonesian Breastfeeding Mother Community on Facebook regarding the negative effects of formula milk production on the environment and how this knowledge influences their behavioral intentions, which are mediated by perceived behavioral control.

## METHOD

This research employed a quantitative method, which measures behavior, knowledge, and

opinions, using numbers derived from data analysis. The study had descriptive and causal objectives, aiming to provide an objective picture of the situation and understand the relationship between variables. The research investigation was correlational, examining the relationship between variables related to a problem with the TPB method. The research was a field study, with no intervention in the data, and used a cross-sectional approach, collecting data within a single period, followed by processing, analysis, and conclusion drawing.

The operationalization of variables involved techniques and methods to measure and dissect the variables into components. The research focused on two variables: the knowledge of the negative impact of formula milk production on the environment (independent variable) and the Mother's Perceived Behavioral Control (dependent variable). The operationalization process involved assigning categories or delineating data characteristics within the study, facilitating the measurement of these variables. The research produced several dimensions and indicators from these two variables. This research utilized a quantitative method with an ordinal scale to measure behavior, knowledge, and opinions. The data was measured using a Likert scale, which gauges the attitudes, viewpoints, and perspectives of individuals or groups in relation to social phenomena. Respondents indicated their level of agreement or disagreement with each question or statement, with each statement in the questionnaire having five answers with a score of 1 to 5. The Likert scale was chosen for its ease of use, flexibility in measuring opinion intensity, and efficiency in data collection and analysis.

The population of this study was the members of the Indonesian Breastfeeding Mother Community on Facebook, with 165 thousand members. The research aimed to understand the community's knowledge regarding the negative effects of formula milk production on the environment and how this knowledge influences their behavioral intentions, mediated by perceived behavioral control. The sample, a subset of the population, consisted of members of the Indonesian Breastfeeding Mother Community on Facebook. The sample size was calculated using the Slovin formula, resulting in approximately 400. The researchers employed a non-probability sampling methodology, specifically Purposive Sampling, which is based on certain criteria. In this case, the sample was limited to female respondents who are members of the Indonesian breastfeeding mother community on Facebook.

The research employed a systematic data collection process, as described by Taherdoost (2021), using Google Forms due to its ease of use, flexibility, and efficient data management. Primary data, defined by Hardani et al (2020) as information directly obtained from the source, was collected through a questionnaire distributed to respondents via social media. The questionnaire was designed in three parts: screening questions, demographic characteristics, and statements related to the research variables. Secondary data, characterized as previously collected or generated information obtained indirectly Hardani et al., (2020), was sourced from literature studies, reputable journals, scientific publications, previous research, book references, and other relevant written works. Government-owned written sources were also utilized.

A validity test, which is an examination of the precision of a measurement instrument Jaya (2020) was conducted in this research. The test aimed to determine the extent to which a measurement instrument could carry out measurements (Abdullah, 2015). The validity of the questionnaire items was determined by comparing the observed correlation coefficient ( $r$  count) with the critical table value ( $r$  table). A pretest was conducted with a sample of around 30 people (Sugiyono & Lestari, 2021) to carry out validity and reliability tests. The validity test was carried out using product moment correlation, and data collection analysis was conducted using the SPSS 25 software package. The research also conducted a reliability test to evaluate the stability and consistency of a measuring instrument (Jaya, 2020). Based on Table 1, the reliability of the questionnaire items was determined by the Cronbach's Alpha reliability coefficient. If the Cronbach's Alpha value for a questionnaire is greater than 0.60, the questionnaire is considered reliable. The reliability test results obtained for variable X and Y were 0.829 and 0.889 respectively, indicating that the instruments for both variables were reliable.

Table 1. Reliability Variables

Variable Test	Cronbach's Alpha	N of Items
X	0,829	9
Y	0,889	6

The research utilized descriptive techniques for data analysis, which are used to examine data rather than draw conclusions from it (Sugiyono & Lestari, 2021). The scores for each statement were added to determine a cumulative grade, and the percentage was calculated by dividing the cumulative value by the frequency value and multiplying the result by 100. The normality test was conducted using IBM SPSS 25 software with the Kolmogorov-Smirnov normality test to ascertain whether confounding variables within the regression model exhibit a normal distribution. The research employed correlation analysis to assess the degree of the linear association between two variables and calculate their relationship strength (Miot, 2018). The correlation value ranges from 0 to 1 or 0 to -1, with the direction of the relationship indicated by positive and negative signs.

Data from the research's simple linear regression examination were used to determine how independent factors influence the dependent variable. Hypothesis testing, a systematic process for determining whether the findings of a research study align with a specific theory that applies to a population Turner, M. (2023) was conducted to test whether there is a positive influence on variable X on variable Y. The test was carried out with an error rate of 5%, using the T-test for hypothesis testing criteria. The coefficient of determination test was employed to ascertain the magnitude of the influence of the relationship. The values of this coefficient of determination range from 0 to 1. When  $R^2$  is close to 0, it suggests that the variable has little to no influence. Conversely, when  $R^2$  is approaching 1, it indicates a significant influence between the independent variable and the dependent variable.

## RESULT AND DISCUSSION

This research applies the TPB theory as a framework to understand the relationship between knowledge and perceived behavioral control among mothers regarding the environmental impacts of formula milk production. TPB suggests that individual behavior is driven by behavioral intentions, influenced by attitudes, subjective norms, and perceived behavioral control. The study reveals that although knowledge of the negative environmental impacts can influence a mother's perceived behavioral control, there remains a disconnect between knowledge and actual behavioral intentions, with mothers showing moderate awareness of environmental issues yet maintaining high confidence in their ability to make a change a sign of cognitive dissonance. Using a quantitative methodology with data from 400 respondents distributed via Google Form to members of the Indonesian Breastfeeding Mother Community on Facebook. The questionnaire was divided into several sections. The first section screened respondents to confirm their membership in the community. The following sections contained statements related to two variables: (X) Knowledge of the negative impact of formula milk production on the environment, and (Y) Perceived Behavioral Control. Variable X was further divided into two dimensions: Negative Impact on Land and Negative Impact on Air, with respective indicators of plastic waste and carbon dioxide (CO2) emission. Variable Y was divided into Control Belief and Power Belief dimensions, with respective indicators of Steps on Minimizing Consumption and Affecting Other People/Mothers' Perception. The final section collected respondent identity information. The research aimed to understand the community's awareness of the environmental impact of formula milk and their perceived control over minimizing consumption.

The study examined two variables, (X) Knowledge on the negative impact of formula milk production on the environment, and (Y) Perceived Behavioral Control. The variable X was divided into two dimensions: Negative Impact on Land and Negative Impact on Air. The results showed that the overall knowledge of the negative impact of formula milk production on the environment was in the medium category (56.5%). The Negative Impact on Land dimension scored the lowest (56%) in the medium category, while the Negative Impact on Air dimension scored slightly higher (57%) in the

medium category. The variable Y was divided into two dimensions: Control Belief and Power Belief. The results showed that the overall Perceived Behavioral Control was in the high category (85.5%). The Control Belief dimension scored in the high category (85%), while the Power Belief dimension scored slightly higher (86%) in the high category. In conclusion, the members of the Indonesian Breastfeeding Mother Community on Facebook have a medium level of knowledge regarding the negative impact of formula milk production on the environment. However, they have a high level of Perceived Behavioral Control, reflecting their awareness and willingness to manage individual behavior related to the perception of how easy or difficult it is to carry out a certain action. This could be a key point for members of the Indonesian Breastfeeding Mother Community in influencing or managing situations that reflect behavior.

The research conducted a normality test to assess whether the residual data indicates that the residual value is not normally distributed. A correlation analysis was also conducted to determine the relationship between Knowledge on the negative impact of formula milk production on the environment (X) and Perceived Behavioral Control (Y). The Pearson correlation test based on table 2 is revealed a correlation coefficient of -0.231 between these variables, indicating a low, negative relationship. This means that as Mothers' Knowledge (X) increases, Perceived Behavioral Control (Y) decreases, and vice versa. The p-value obtained is 0.000, which is less than the alpha level (5%), signifying that the correlation between the variables is statistically significant. In summary, the research concludes that there is a low, negative, and statistically significant relationship between Mothers' Knowledge on the negative impact of formula milk production on the environment and their Perceived Behavioral Control.

Table 2. Simple Linear Regression Test Results

Model	Unstandardized B	Coefficients		t	Sig.
		Coefficients Std. Error	Standardized Coefficients Beta		
1	(Constant)	27,153	0,395	68,719	0,000
	Knowledge	-0,069	0,015	-0,231	-4,742

Source: IBM SPSS 25 Processed by Researchers, 2023

Table 3. Coefficient of Determination Test Results

Model Summary			
R	R. Square	Adjusted R Square	Std. Error of the Estimate
0,535	0,286	0,282	2,612

Source: IBM SPSS 25 Processed by Researchers, 2023

A correlation test and a simple linear regression test were conducted to determine the relationship and influence between X and Y. The regression equation derived was  $Y = 27.153 - 0.069X$ , indicating a negative relationship between X and Y.

Hypothesis testing showed that the significance value of the regression coefficient is less than 0.05, concluding that Knowledge on the negative impact of formula milk production on the environment has a significant effect on Perceived Behavioral Control. However, the T-test results led to the rejection of the alternative hypothesis (H1) and acceptance of the null hypothesis (H0), meaning there is no influence of mothers' knowledge (X) on their perceived behavioral control (Y) regarding the negative impact of formula milk production on the environment. Based on table 3, the coefficient of determination test showed that X contributes 28.2% to Y, with the remaining influenced

by other variables. In summary, the research concludes that while mothers' knowledge increases, their perceived behavioral control decreases, indicating a negative correlation between the two variables.

The research reveals that members of the Indonesian Breastfeeding Mother Community on Facebook have a moderate level of knowledge about the negative environmental impacts of formula milk production. However, they exhibit a high level of Perceived Behavioral Control, indicating a strong belief in their ability to enact behavioral changes. The study identifies a disparity between these two variables, suggesting cognitive dissonance between awareness levels and perceived control over behaviors. Despite their knowledge about the environmental consequences of formula milk production, this does not significantly influence their perceptions of behavioral control. This highlights the need for interventions to address this cognitive dissonance and promote alignment between awareness and behavioral intentions within this community.

The results of this study provide an exploration of research novelty that is more focused on how maternal knowledge influences perceptions of behavioral control regarding the negative impact of formula milk production on the environment. This adds a new dimension to the understanding of perceived behavioral control, which was previously more commonly studied in the context of child health or education. Although several previous studies have explored the relationship between environmental knowledge and environmentally friendly behavior in general, this study specifically focuses on mothers' knowledge about the negative impacts of formula milk production on the environment. Based on the TPB theory (Ajzen & Fishbein, 1977), which shows that knowledge and attitudes significantly influence individual intentions and behavior, this research expands the application of the theory by exploring new contexts that have not been widely researched before.

### **Research Results Compared to the Theory Used With Previous**

The study titled "The Influence of Mothers' Knowledge Towards Their Perceived Behavioral Control" investigates the relationship between mothers' awareness of the environmental impacts of formula milk production and their perceived ability to control their behavior on this issue. Key findings reveal that members of the Indonesian Breastfeeding Mother Community on Facebook have a moderate understanding of the environmental impacts, yet exhibit a high level of perceived behavioral control, suggesting a strong belief in their ability to enact changes. Interestingly, the research indicates a negative correlation where increased knowledge does not correspond to higher perceived behavioral control, pointing to cognitive dissonance among mothers. Statistically, the coefficient of determination shows that knowledge contributes 28.2% to perceived behavioral control, with other factors accounting for the remainder. Hypothesis testing further supports this, as the study rejects the alternative hypothesis (H1) and accepts the null hypothesis (H0), concluding that mothers' knowledge has no significant influence on perceived behavioral control regarding formula milk's environmental impact. The study employs the TPB theory as a theoretical foundation, which posits that knowledge and attitudes significantly impact behavioral intentions. In alignment with TPB, these findings support prior research where knowledge is viewed as a key influencer of behavioral intentions, referencing studies such as Alsahafi and Cheng (2016) while introducing a new dimension by examining environmental impacts within the context of formula milk production, an area less explored. The findings further underscore cognitive dissonance, where despite environmental awareness, mothers face challenges translating this into behavioral change. Consequently, the study recommends targeted interventions to address this dissonance and empower community members toward more sustainable behaviors. These results imply a need for future research to explore additional variables influencing behavioral control, examine barriers that prevent mothers from acting on their knowledge, and develop community empowerment strategies to foster environmentally sustainable practices. This research reinforces TPB principles and calls for a deeper investigation of factors impacting behavioral control, particularly within the context of environmental awareness among mothers.

## CONCLUSION

In summary, this study examined the understanding of the Indonesian Breastfeeding Mother Community on Facebook about the negative impacts of formula milk production and their perceived ability to influence behaviors. Despite a moderate understanding of the environmental impacts, there was a high belief in their ability to enact changes, indicating a disconnect between awareness and action. The findings suggest the need for interventions to address this cognitive dissonance and empower community members with strategies for environmentally sustainable behaviors. Further research is recommended to explore the variables not included in this study and the barriers to translating knowledge into action. Practical suggestions include strengthening the community's knowledge about the negative impacts of formula milk production and using the community as a platform for sharing this information. Government interventions to disseminate information about the adverse effects of formula milk production are also suggested. These steps aim to promote more sustainable practices within the breastfeeding community and contribute to positive environmental outcomes.

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