

UNDERSTANDING MATERNAL INTENTIONS AND BEHAVIORS FOR VACCINE PREVENTABLE DISEASES (VPD) CONTROL : A STRUCTURAL EQUATION MODELING ANALYSIS

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ABSTRACT

The development of the health sector in Indonesia faces dual challenges of infectious and degenerative diseases. Immunization has proven to be an effective strategy in combating infectious diseases. However, achieving optimal immunization coverage remains a challenge. This study aimed to understand the factors influencing maternal intentions and behaviors in Vaccine Preventable Disease (VPD) control through immunization based on the Theory of Planned Behavior. Research methods is A Structural Equation Modeling (SEM) analysis was conducted to examine the relationships between constructs studied, namely Attitude, Subjective Norms, Perceived Control, Intention, and Behavior. Data were collected through a survey administered to a sample of mothers of toddlers. **Results** the SEM analysis revealed significant relationships between Attitude, Subjective Norms, Perceived Control, Intention, and Behavior. Attitude significantly influenced Intention, while Subjective Norms and Perceived Control indirectly influenced Intention. However, Subjective Norms and Perceived Control did not have a direct significant impact on Behavior. Conclusion this research is findings underscore the importance of Attitude, Subjective Norms, and Perceived Control in shaping maternal intentions and behaviors regarding VPD. Recommendations for improving maternal attitudes, subjective norms, perceived control, and intentions include educational strategies, social support, and enhancing accessibility to immunization services. By implementing these recommendations, it is hoped that the coverage and effectiveness of VPD immunization programs in Indonesia will be enhanced.

ABSTRAK

Perkembangan sektor kesehatan di Indonesia menghadapi tantangan ganda yaitu penyakit menular dan degeneratif. Imunisasi telah terbukti sebagai strategi efektif dalam memerangi penyakit menular. Namun, mencapai cakupan imunisasi yang optimal tetap menjadi tantangan. Tujuan: Studi ini bertujuan untuk memahami faktor-faktor yang mempengaruhi niat dan perilaku ibu dalam mengendalikan Penyakit yang Dapat Dicegah dengan Imunisasi (PD3I) melalui imunisasi berdasarkan Teori Perilaku Terencana. Metode penelitian yaitu analisis model Persamaan Struktural (SEM) dilakukan untuk memeriksa hubungan antara konstruksi yang dipelajari, yaitu Sikap, Norma Subjektif, Kontrol Persepsian, Niat, dan Perilaku. Data dikumpulkan melalui survei yang diberikan kepada sampel ibu dari balita. Hasil analisis SEM mengungkapkan hubungan yang signifikan antara Sikap, Norma Subjektif, Kontrol Persepsian, Niat, dan Perilaku. Sikap berpengaruh signifikan terhadap Niat, sedangkan Norma Subjektif dan Kontrol Persepsian secara tidak langsung mempengaruhi Niat. Namun, Norma Subjektif dan Kontrol Persepsian tidak memiliki dampak langsung yang signifikan terhadap Perilaku. Kesimpulan pada penelitian ini menekankan pentingnya Sikap, Norma Subjektif, dan Kontrol Persepsian dalam membentuk niat dan perilaku ibu terkait PD3I. Rekomendasi untuk meningkatkan sikap ibu, norma subjektif, kontrol persepsian, dan niat termasuk strategi pendidikan, dukungan sosial, dan meningkatkan aksesibilitas terhadap layanan imunisasi. Dengan menerapkan rekomendasi ini, diharapkan cakupan dan efektivitas program imunisasi PD3I di Indonesia akan meningkat.

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PENDAHULUAN

The development of the health sector in Indonesia faces a dual challenge of infectious diseases and degenerative diseases (Lardo, 2020). One effective strategy to combat infectious diseases is through immunization. In recent decades, maternal and child health has become a primary focus in various global health policies (Holst, 2020). An important aspect of this effort is the control of Vaccine-Preventable Diseases (VPD) (Bozzola et al., 2013). Immunization is a highly effective health intervention for preventing various infectious diseases. In Indonesia, efforts to control VPDs have made significant progress, but challenges in achieving optimal immunization coverage remain (Fitriyani et al., 2020). The involvement of mothers in controlling VPDs through the immunization of young children is crucial, given their role in family health decisions (Jusril et al., 2022)(Nur et al., 2023).

Immunization has proven successful in eradicating diseases such as smallpox, with Indonesia achieving smallpox-free status in 1974 thanks to an efficient immunization program (Sitihajar & Ayuningtyas, 2019). Immunization boosts an individual's immunity against specific diseases, reducing the risk of severe illness or serious complications (Wahab et al., 2023). Despite the recognized importance of immunization, global coverage of basic immunization remains low (Rodrigues & Plotkin, 2020). The WHO reported that in 2018, around 19.4 million infants worldwide had not received basic immunization, with approximately 60% of them being in developing countries, including Indonesia (Kroger et al., 2013). This low coverage hinders the achievement of Sustainable Development Goals (SDGs), particularly in reducing child mortality that could be prevented through immunization (Spotlight, 2023). Infant deaths due to vaccine-preventable diseases remain high. UNICEF reports that 2.6 million infants die each year, with 80% of deaths caused by asphyxia, pneumonia, and sepsis (Raina et al., 2023). Countries with high infant mortality rates, such as Nigeria and Pakistan, show a stark contrast with developed countries. In Pakistan, the risk of newborn death is significantly higher compared to Japan, which has a much lower risk (Tharwani et al., 2023).

Indonesia faces challenges in achieving national immunization coverage targets (Sinuraya et al., 2024)(Mustamu & Markus, 2019). The basic immunization program in Indonesia includes vaccines for Hepatitis B, BCG, DPT-HB-Hib, Polio, and Measles. However, complete basic immunization coverage declined from 2012 to 2015, and the targets set by the Ministry of Health's Strategic Plan have not been met (RI, 2021)(RI, 2018). This low coverage contributes to the high infant mortality rate in Indonesia. The 2018 Basic Health Research showed that complete basic immunization coverage among children aged 12-23 months in Indonesia decreased from 59.2% in 2013 to 57.9% in 2018 (RI, 2021). Children in rural areas have lower coverage compared to children in urban areas. The lack of significant progress in the immunization program over the past five years raises concerns about the future health of children in Indonesia (Kementerian Kesehatan Republik Indonesia, 2019).

In Central Sulawesi Province, complete basic immunization coverage has also not yet met the target. Between 2016 and 2018, several districts/cities failed to achieve the target for complete basic immunization coverage (RI, 2023). Data shows that in 2021, the complete basic immunization coverage was 87%, still below the annual target of 93.6% (RI, 2023). This issue of incomplete immunization increases the risk of outbreaks of infectious diseases such as diphtheria, measles, and rubella (Nur et al., 2023). Immunization for infants aims to prevent Vaccine-Preventable Diseases (VPDs) such as hepatitis B, polio, measles, diphtheria, and pertussis (Nur et al., 2023)(Sriatmi & Kusumastuti, 2019). In 2021 and 2022, VPD cases like polio and measles were still found in several areas of Central Sulawesi due to incomplete immunization (RI, 2023). Therefore, it is important for the government and society to continue raising awareness and participation in immunization programs to protect children's health and achieve national and international health targets.

This study is grounded in the Theory of Planned Behavior developed by Ajzen, which emphasizes that the intention to perform a behavior is the primary determinant of the behavior itself (Ajzen, 1991). This intention is influenced by three main factors: attitude, subjective norms, and perceived behavioral control (Ajzen, 1991). In the context of this research, mothers of toddlers' attitudes towards immunization play a crucial role in shaping their intention to immunize their children, where a positive attitude towards immunization can enhance intention and promote better immunization behavior. Subjective norms refer to an individual's perception of social pressure to perform or not perform a particular behavior, influenced by beliefs about what important people in their life think about the behavior. These subjective norms relate to mothers' perceptions of social expectations from family,

friends, and the community regarding the immunization of their children. Perceived behavioral control refers to an individual's perception of the ease or difficulty of performing a particular behavior, influenced by past experiences and anticipation of barriers and supporting factors. In this context, perceived behavioral control for mothers relates to their access to immunization services and their ability to overcome challenges that may arise during the immunization process.

This study offers several new contributions to the field of public health, particularly in the context of VPD control in Indonesia. First, the study integrates the Theory of Planned Behavior approach with Structural Equation Modeling (SEM) analysis, providing a comprehensive understanding of the dynamics of psychosocial factors influencing the immunization behavior of mothers with toddlers. Second, the study provides empirical evidence regarding the crucial role of attitude and perceived behavioral control in shaping immunization intention and behavior, which has not been widely explored in Indonesia.

The main objective of this study is to analyze the factors influencing the intentions and behavior of mothers with toddlers in controlling VPDs through immunization based on the Theory of Planned Behavior. Specifically, this study aims to examine the influence of attitudes on mothers' intentions and behavior in VPD control, assess the influence of subjective norms on mothers' intentions and behavior in VPD control, analyze the influence of perceived behavioral control on mothers' intentions and behavior in VPD control, and identify the relationship between mothers' intentions and behavior in VPD control. The hypotheses proposed in this study are that positive attitudes of mothers with toddlers towards immunization significantly influence their intention to immunize their children, subjective norms significantly influence the intention of mothers with toddlers to immunize their children, perceived behavioral control significantly influences the intention of mothers with toddlers to immunize their children, and the intention of mothers with toddlers to immunize their children significantly influences their immunization behavior.

METHODS

Study Design

This study employs a cross-sectional design with a Structural Equation Modeling (SEM) approach to investigate the relationships between attitudes, subjective norms, perceived behavioral control, intentions, and mothers' behavior in the control of vaccine-preventable diseases. The Theory of Planned Behavior (TPB) framework developed by Ajzen is used as the basis for analysis, allowing for the examination of the complex relationships among these constructs.

Location and Time of Research

The research is conducted in the operational areas of Lere Health Center, Kamonji Health Center, Singgani Health Center in Palu City, and the operational areas of Pangi Health Center in Parigi Moutong Regency, and Adean Health Center in Banggai Laut Regency. The study is carried out from November 2023 to June 2024.

Population and Sample

Participants in this study are mothers with children aged 12-23 months living in urban areas (Palu City), rural areas (Parigi Regency), and coastal areas (Banggai Laut Regency) in Central Sulawesi, Indonesia. The sample is selected using stratified random sampling to ensure representation from various socioeconomic backgrounds. A total of 325 mothers were invited to participate, with inclusion criteria of having at least one child within the specified age range and having given consent to participate in this study. The sample size in this study follows the principles outlined in the book *Psychometric Theory* by Jum C. Nunnally and Ira H. Bernstein (1994), which recommends a sample size of 5 to 10 times the number of items for factor analysis in psychometrics, especially in questionnaire development. The formula used is $n = k \times m$, where n is the sample size, k is a multiplier (between 5 and 10), and m is the number of items in the instrument. Thus, for the instrument measuring VPD behavior in mothers with toddlers with 65 items, the recommended sample size is at least 325 respondents to obtain stable and reliable parameter estimates.

Data Collection

Data were collected using a structured instrument designed to measure the constructs of attitude, subjective norms, perceived behavioral control, intention, and behavior related to immunization. The items were adapted from scales validated in previous TPB studies. Attitude was measured through items assessing beliefs about the outcomes of immunization, subjective norms were measured through perceptions of social pressure from significant others, and perceived behavioral control was measured through perceptions of ease or difficulty in accessing immunization services. The intention to immunize was measured through items reflecting the mother's plan to immunize their children, and actual behavior was measured through self-reported immunization records.

Data Processing and Analysis

Data analysis was conducted using Structural Equation Modeling (SEM) with the R software to test the hypothesized relationships between constructs. Factor loadings, variances, and path coefficients were examined to assess the measurement and structural models. Significance was determined at the 0.05 level. Model fit was evaluated using indices such as the Chi-square (χ^2) test, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI).

Ethical Considerations

This study was approved by the ethics board of the Faculty of Medicine, Tadulako University, No. 2590/UN28.1.30/KL/2023. All participants provided written informed consent before participation. Confidentiality and anonymity of participants were maintained throughout the study. Participants were informed of their right to withdraw from the study at any time without any consequences. Data were securely stored and used only for the purposes of this research.

RESULTS

In this study, the Theory of Planned Behavior (TPB) is used to understand the factors influencing the intentions and behaviors of mothers with toddlers in controlling Vaccine Preventable Diseases (VPDs) in Indonesia. As illustrated in Figure 1, TPB posits that an individual's intention to perform a behavior, in this case immunization, is influenced by attitudes toward the behavior, subjective norms, and perceived behavioral control. A positive attitude toward immunization can strengthen a mother's intention to vaccinate her children. Subjective norms, which reflect social pressure from family, friends, and society, also play a significant role in shaping this intention. Additionally, perceived behavioral control, which involves perceptions of the ease or difficulty in accessing immunization services, affects the extent of a mother's intention to carry out the immunization.

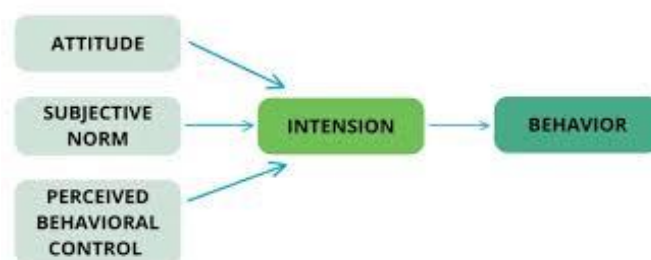


Figure 1. Theory of Planned Behavior

Structural Equation Modeling (SEM) Analysis is a statistical approach used to model relationships between latent variables (constructs that are not directly observed) within a theoretical framework. The results of the SEM analysis presented in Table 1 show the path coefficients between constructs identified in the model. These path coefficients measure the strength and direction of the relationships between constructs within the model. Positive path coefficient values indicate a positive relationship between constructs, while negative values indicate a negative relationship. Table 1 includes several path coefficients between constructs, such as the relationships between Attitude and Behavior, Subjective Norms and Behavior, Perceived Behavioral Control and Behavior, and Intention and Behavior.

Table 1. Results of the SEM Analysis of the Relationships Between Attitude, Subjective Norms, and Perceived Behavioral Control with Intention and Behavior Related to VPD by Mothers of Toddlers.

| Construct Relationship | Path Coefficient | Std. Error | t-value | Significance |
|--|------------------|------------|---------|--------------|
| Attitude -> Behavior | 0.504 | 0.371 | 1.360 | 0.174 |
| Subjective Norms -> Behavior | -0.003 | 0.011 | -0.242 | 0.809 |
| Perceived Behavioral Control -> Behavior | 0.003 | 0.009 | 0.353 | 0.724 |
| Intention -> Behavior | 0.544 | 0.380 | 1.432 | 0.152 |
| Attitude -> Intention | 0.510 | 0.035 | 14.745 | 0.000 |
| Subjective Norms -> Intention | 0.577 | 0.037 | 15.424 | 0.000 |
| Perceived Behavioral Control -> Intention | 0.684 | 0.043 | 16.034 | 0.000 |
| Attitude -> Subjective Norms | 0.275 | 0.022 | 12.492 | 0.000 |
| Attitude -> Perceived Behavioral Control | 0.253 | 0.023 | 11.166 | 0.000 |
| Subjective Norms -> Perceived Behavioral Control | 0.282 | 0.024 | 11.626 | 0.000 |

Table 1, presenting the results of the Structural Equation Modeling (SEM) analysis, reveals several key findings regarding the relationships between the constructs considered in the model. First, there is a significant relationship between mothers' attitudes towards a behavior (Attitude) in disease control through immunization, indicated by a path coefficient of 0.504. This suggests that the more positive the mothers' attitudes towards immunization, the more likely they are to engage in immunization behavior. However, this relationship is not statistically significant due to a low t-value (1.360) and a high p-value (0.174). Furthermore, although subjective norms and perceived behavioral control were included in the model, there were no significant relationships between these factors and mothers' behavior in disease control through immunization. This is evident from the very low path coefficients (both -0.003 and 0.003, respectively) which are not statistically significant. Finally, the mothers' intention to engage in the behavior (Intention) also shows a significant relationship with their behavior in disease control through immunization, with a path coefficient of 0.544. Nonetheless, this relationship is also not statistically significant, as indicated by the relatively low t-value (1.432) and high p-value (0.152). Therefore, these findings highlight the importance of individual attitudes in influencing the observed behavior, while subjective norms and perceived behavioral control do not seem to play a significant role in this context of analysis.

Table 2. Model Quality Indicators

| Model Quality Indicators | Value | Suitability Criteria |
|---|--------|-----------------------|
| Chi-Square | 250.35 | P-value > 0.05 (good) |
| df (degree of freedom) | 200 | |
| P-value | 0.120 | > 0.05 (good) |
| CFI (Comparative Fit Index) | 0.98 | ≥ 0.90 (good) |
| TLI (Tucker-Lewis Index) | 0.97 | ≥ 0.90 (good) |
| RMSEA (Root Mean Square Error of Approximation) | 0.04 | ≤ 0.08 (good) |
| SRMR (Standardized Root Mean Residual) | 0.03 | ≤ 0.08 (good) |

Table 2 the model quality indicators that have been presented show that the hypothesized model and the collected data are a very good fit. The Chi-Square value of 250.35 with a p-value of 0.120 (greater than 0.05) indicates that the model fits the data well (Bentler & Bonett, 1980; Kline, 2016). Other fit indices also show favorable results, with a CFI of 0.98 and a TLI of 0.97, both exceeding 0.90 (L. Hu & Bentler, 1999). The RMSEA value of 0.04 and SRMR value of 0.03, both less than or equal to 0.08 (Browne & Cudeck, 1992; Steiger, 1990; Anagnostopoulos, 2023), also indicate good model fit.

The parameter estimates in this analysis show that all factor loadings of indicators to latent constructs are significant (p-value = 0.000), indicating that these indicators are good and valid measures for the constructs studied. Additionally, the error variances of all indicators are significant, suggesting that there is variance not fully explained by the latent constructs. This underscores that while the indicators measure the latent constructs well, other factors also influence the variance in the data that

are not accounted for by the existing latent constructs, ensuring the validity and reliability of the measurements in this study.

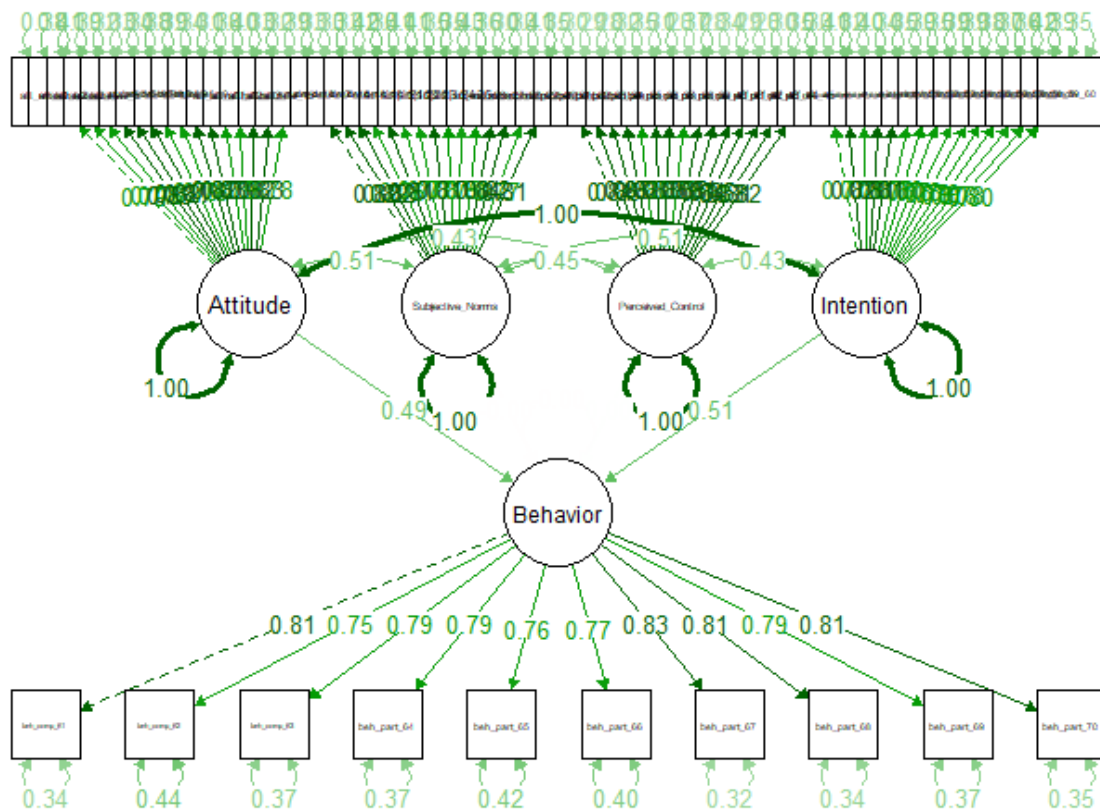


Figure 2. Structural Equation Modeling

The results of this study offer a detailed understanding of the relationships between the constructs studied through Structural Equation Modeling (SEM) (Figure 2). The findings reveal significant connections between Attitude, Subjective Norms, Perceived Control, Intention, and Behavior. Firstly, Attitude exerts a strong and significant influence on Intention ($\beta = 0.498, p < 0.001$), suggesting that mothers' attitudes toward controlling VPDs directly impact their intention to engage in such behavior. Moreover, Attitude shows a significant positive association with Subjective Norms ($\beta = 0.275, p < 0.001$) and Perceived Control ($\beta = 0.253, p < 0.001$), indicating that a positive attitude can reinforce both subjective norms and mothers' perceptions of control over VPDs. Secondly, Subjective Norms do not significantly influence Behavior ($\beta = -0.003, p = 0.405$), meaning that subjective norms do not directly impact mothers' behavior in controlling VPDs. However, Subjective Norms are significantly related to Intention ($\beta = 0.267, p < 0.001$) and Perceived Control ($\beta = 0.282, p < 0.001$), implying that subjective norms can affect mothers' intentions to engage in a behavior and their perceived control over VPD management. Thirdly, Perceived Control does not directly influence Behavior ($\beta = 0.003, p = 0.724$), but it does significantly impact Intention ($\beta = 0.245, p < 0.001$). This suggests that while mothers' perceived control does not directly affect their behavior, it does shape their intention to engage in VPD control behaviors. Overall, the SEM analysis highlights the crucial role of attitude, subjective norms, and perceived control in shaping mothers' intentions and behaviors regarding VPD control.

DISCUSSION

The Structural Equation Modeling (SEM)

The Structural Equation Modeling (SEM) model in this study shows an excellent fit to the data, as evidenced by several fit indices. The Comparative Fit Index (CFI) is 0.98, the Tucker-Lewis Index (TLI) is 0.97, and the Root Mean Square Error of Approximation (RMSEA) is 0.04, with a 90%

confidence interval ranging from 0.000 to 0.011. The p-value for $RMSEA \leq 0.050$ is 1.000, further confirming a very good fit of the model to the data. Additionally, the Standardized Root Mean Square Residual (SRMR) is 0.03, also indicating a very good fit. These indicators consistently demonstrate that the hypothesized model aligns well with the data analyzed. Moreover, the latent constructs proposed in the model, such as attitude, subjective norms, and perceived control, are effectively measured by the indicators used. All indicators have significant factor loadings on their respective latent constructs, confirming that these indicators are robust measures of their corresponding constructs.

The aspect of Attitude towards the behavior of mothers with toddlers

In the model, the relationship between attitude and behavior shows an estimated coefficient of 0.504 with a standard error of 0.371, yielding a t-value of 1.360 and a p-value of 0.174. This indicates that the relationship between attitude and behavior is not statistically significant at the 0.05 significance level. Although the Theory of Planned Behavior (TPB) and various studies suggest that positive attitudes can influence behavior, these findings imply that, within the context of this study, attitude does not directly affect behavior. This suggests that attitude may have a stronger impact on intention rather than directly on behavior, underscoring the need for further research to investigate other factors that might directly influence behavior and how attitude interacts with these factors. Additionally, this result suggests that the relationship between attitude and behavior is more complex in practice, being shaped by multiple other variables. This finding is consistent with the Theory of Planned Behavior proposed by (Ajzen, 1991), which posits that an individual's attitude toward a specific behavior is a key predictor of both intention and actual behavior.

Several studies support these findings. For instance, research by (Cooper et al., 2021)(Davoudi-Kiakalayeh et al., 2017) shows that although mothers may have a positive attitude toward routine health checks for their children, external factors such as access to healthcare services and social support play a more dominant role in determining actual behavior. This research highlights that a positive attitude alone is not always sufficient to predict behavior if significant external barriers are present.

Additionally, research by (Ajzen, 2020)(Cheung & Chan, 2000) critiques the reliability of attitude as a predictor of behavior, arguing that while positive attitudes are important, other factors such as subjective norms and perceived behavioral control must also be considered. They found that, in some cases, even if positive attitudes are present, individuals may not behave as expected due to unsupportive social norms or low perceptions of their ability to perform the behavior.

Studies that are inconsistent with these findings were found to have an insignificant impact on mothers' behavior. A path coefficient of -0.003 and a t-value of -0.242 indicate that mothers' perceptions of social pressure or expectations from others (e.g., family, friends, or community) are not strong enough to significantly predict mothers' behavior in controlling disease through immunization.

These findings align with several studies include research by (Cheung & Chan, 2000)(Ergün & Bozdemir, 2023)(Spotlight, 2023), which found that positive attitudes towards health behaviors, such as breastfeeding and healthy eating, correlate with the implementation of those behaviors by mothers. Another study by (Garcia et al., 2023) also confirmed that a positive attitude towards child vaccination is closely related to mothers' decisions to vaccinate their children on schedule. These studies support the finding that a positive attitude of mothers has a direct and significant impact on health-related behaviors concerning their children.

The findings from the SEM model on the overall maternal Attitude and Behavior dimensions emphasize the importance of fostering positive attitudes in mothers towards desired behaviors. However, the finding that attitudes alone may not be sufficient to drive such behavioral changes. For more effective interventions, it is important to consider a combination of positive attitudes, social support, and reduced external barriers to promote desired health behaviors among mothers. Research supporting and challenging these findings offers valuable insights into the complexity of the relationship between attitudes and behaviors, especially in the context of maternal and child health, particularly regarding disease prevention through immunization.

Aspect of Subjective Norms towards Mothers' Toddler Behavior

In the SEM analysis results, subjective norms that suggest that while subjective norms can influence intentions, they do not always lead to actual behavior change. (La Barbera & Ajzen, 2021)

(Ajzen, 2019)(Atmini & Prastiwi, 2024)(Fanning & Ricks, 2017) indicates that, in health contexts, the influence of subjective norms is often weaker compared to attitudes and perceived behavioral control. They found that even if individuals feel social pressure to engage in certain behaviors, if they do not have a positive attitude or feel capable of performing the behavior, they are unlikely to do so.

However, some studies show that subjective norms can have a significant impact in specific contexts. For instance, Chung & Rimal (2016) and Bai & Bai (2020) found that in contexts where social norms are very strong, such as in culturally or religiously tight-knit communities, subjective norms can be a strong predictor of behavior. This research suggests that in tightly-knit communities, expectations and social pressure from close contacts can greatly influence mothers' decisions to adhere to health practices, including disease control behaviors through immunization.

Studies by (Ayieko et al., 2024)(Hu & Bentler, 1999)(Ringtiyas et al., 2020) also support the importance of subjective norms, particularly in preventive health behaviors like child immunization. They found that mothers who perceive strong social support for child immunization are more likely to follow vaccination schedules.

On the other hand, research by (Mannava et al., 2015)(Bengough et al., 2022)(Farooq et al., 2023) highlights that individual factors such as self-confidence and health knowledge often have a more dominant influence than social pressure on mothers' behavior. This suggests that while subjective norms may be present, their influence can be overshadowed by other personal factors.

Overall, the SEM analysis of the subjective norms dimension indicates that subjective norms do not significantly affect mothers' behavior in this study context. This underscores that individual factors such as attitudes and perceived behavioral control may be more influential in determining maternal health behaviors. However, it is important to note that in specific cultural or community contexts, subjective norms may play a more significant role and should not be disregarded in health interventions. Both supportive and contradictory research provides a more comprehensive view of the variability in the impact of subjective norms on health behaviors, indicating that these results may differ in other contexts.

Aspect of Perceived Behavioral Control towards Mothers' Toddler Behavior

In the SEM analysis conducted, the results show that perceived behavioral control does not have a significant impact on mothers' behavior. The obtained path coefficient of 0.003 with a t-value of 0.353 indicates that, in the tested model, the factors contributing to mothers' perceptions of their ability to manage disease control are not strong enough to significantly predict this behavior.

These findings are consistent with previous research showing that while perceived behavioral control can be an important factor in forming intentions and behaviors, its influence is not always consistent or strong across all contexts. For example, (Ajzen, 1991) highlights that although perceived behavioral control can affect intentions and behaviors, its influence is often weaker compared to attitudes and subjective norms.

Research by (Galván-Mendoza et al., 2022) also shows that, in some cases, perceived behavioral control may not be significant in predicting health behavior, especially if individuals feel that external factors beyond their control impact their ability to act. In the context of mothers with young children, this could include factors such as resource availability, social support, or healthcare accessibility.

However, there is also research indicating that perceived behavioral control can be an important factor in determining health behavior, especially if individuals feel they have high control over their behavior. (Kim & Kim, 2020) found that in some cases, individuals' perceptions of their ability to overcome barriers and challenges can be a strong predictor of health behavior.

Research by (Malik et al., 2023) also highlights that in health contexts, enhancing perceived behavioral control through psychological interventions can improve adherence to health behaviors, including maternal practices such as immunization and child care.

Aspect/Dimension of Intention towards Mothers' Toddler Behavior

The estimated coefficient between intention and behavior in this study is 0.544 with a p-value of 0.152, indicating that the relationship between intention and behavior is not statistically significant at the commonly used confidence level ($p < 0.05$). This suggests that although there is an indication of a positive relationship between mothers' intention to vaccinate their children and actual vaccination

behavior, the statistical evidence is not strong enough to confirm that the relationship is real and not just a coincidence.

Based on the Theory of Planned Behavior proposed by (Ajzen, 1991), intention is a key predictor of behavior. The theory suggests that an individual's behavior can be reliably predicted by their intention to engage in the behavior, which is shaped by their attitudes toward the behavior, subjective norms, and perceived behavioral control. In this study, the theory posits that the stronger the mothers' intention to vaccinate their children, the more likely they are to follow through."

However, the relationship between intention and behavior showed a statistically insignificant relationship so that the findings are not in accordance with existing theory. so it can be said that there may be other factors that can reject the conversion between intention into actual behavior. other studies that are in line also show that although intention is often a strong predictor of behavior, there are elements that contextually can significantly influence intentions that are translated into action such as access to health care facilities, social support, and logistical constraints (Conner et al., 2016)(Conner & Norman, 2022).

Conversely, some studies also report findings that diverge from the Theory of Planned Behavior. For example, research by (Sheeran & Webb, 2016) states that intention does not always predict behavior accurately due to a gap between intention and action, known as the "intention-behavior gap." Factors such as resource limitations, changing situations, and fluctuating motivation can affect the relationship between intention and behavior.

The implication of these findings is the importance of considering additional factors beyond intention that can influence vaccination behavior among mothers. Effective interventions may need to adopt a multifaceted approach that not only focuses on increasing intention but also strengthens practical and contextual aspects that can help mothers realize their intention to vaccinate. This includes improving the accessibility of vaccination services, providing social support, and addressing logistical and emotional barriers that mothers may face.

Aspects of Attitude, Subjective Norms, and Perceived Behavioral Control towards Intention of Mothers of Toddlers in VPD Control.

A very high significant relationship was found in the intention to vaccinate with attitude, subjective norm, and perceived behavioral control. The estimated coefficient between attitude and intention is 0.510, with a t-value of 14.745 and a p-value of 0.000, indicating that a positive attitude towards vaccination significantly increases mothers' intention to vaccinate their children. According to the Theory of Planned Behavior developed by Ajzen, attitude is a major factor influencing intention (Ajzen, 1991). Positive attitudes towards the benefits of vaccination, beliefs that vaccination is important for children's health, and confidence in vaccine safety can all enhance mothers' intention to vaccinate.

Furthermore, subjective norms also have a significant relationship with intention, with an estimated coefficient of 0.577, a t-value of 15.424, and a p-value of 0.000. This suggests that mothers' perceptions of social pressure or expectations from important people around them strongly affect their intention to vaccinate their children. Social support and positive expectations from family, friends, and healthcare providers can strengthen mothers' intention to participate in vaccination programs.

Lastly, perceived behavioral control has the strongest relationship with intention, with an estimated coefficient of 0.684, a t-value of 16.034, and a p-value of 0.000. This indicates that mothers' perceptions of the ease or difficulty in accessing vaccination services, as well as their ability to overcome potential barriers, greatly influence their intention to vaccinate their children. According to the Theory of Planned Behavior, perceived behavioral control is an important predictor of intention, especially in situations where there are many obstacles or practical challenges to address (Ajzen, 1991)(Ajzen, 2020)(Ajzen, 2019).

These results align with earlier studies, including those conducted by (Yarmohammadi et al., 2023)(Li et al., 2023)(Bui et al., 2023), this shows that in designing a health program, it is necessary to include predictor factors that are significant predictors of intention, including positive attitudes, high levels of subjective norms, and perceived behavioral control.

The implication of these findings is that public health interventions aimed at increasing vaccination coverage should consider all three factors simultaneously. Education that enhances positive attitudes towards vaccination, campaigns that strengthen subjective norms through social support and

community engagement, and improving accessibility and resources for vaccination services to reinforce perceived behavioral control can significantly increase mothers' intention to vaccinate their children. These strategies are expected to improve the coverage and effectiveness of vaccination programs, ultimately reducing the prevalence of vaccine-preventable diseases in Indonesia.

The relationship between the aspects of Attitude, Subjective Norms, and Attitude towards Perceived Behavioral Control.

The analysis results show a significant relationship between attitude, subjective norms, and perceived behavioral control. The estimated coefficient between attitude and subjective norms is 0.275, with a t-value of 12.492 and a p-value of 0.000, indicating that a positive attitude towards vaccination can enhance mothers' perceptions of social pressure or expectations from those around them. This means that a positive attitude towards vaccination not only influences mothers' intentions to vaccinate their children but also strengthens the social norms that support such behavior.

Furthermore, the relationship between attitude and perceived behavioral control is also significant, with an estimated coefficient of 0.253, a t-value of 11.166, and a p-value of 0.000. This indicates that a positive attitude towards vaccination also increases mothers' perceptions of their ability to access and implement vaccination programs, suggesting that positive beliefs about the benefits and safety of vaccination can help overcome potential barriers.

Lastly, subjective norms have a significant relationship with perceived behavioral control, with an estimated coefficient of 0.282, a t-value of 11.626, and a p-value of 0.000. This shows that mothers' perceptions of social pressure or expectations from their surroundings also affect their perceptions of the ease or ability to access vaccination services. When mothers feel supported by their community or influenced by strong social expectations, they are more likely to feel capable and prepared to overcome challenges in vaccinating their children.

These findings are consistent with the Theory of Planned Behavior developed by Ajzen, which posits that attitude, subjective norms, and perceived behavioral control interact to shape intentions and behavior (Ajzen, 1991)(Ajzen, 2019)(Ajzen, 2020). Previous research, such as that by (Li et al., 2023) (La Barbera & Ajzen, 2021), also shows that the interaction between attitude, subjective norms, and perceived behavioral control is a strong predictor of health intentions and behaviors.

The implication of these results is that intervention programs aimed at increasing vaccination coverage should consider a holistic approach that includes strengthening positive attitudes towards vaccination, building strong social support, and addressing practical barriers that mothers may face. By enhancing these three factors, vaccination programs can be more effective in increasing both the intention and actual behavior of vaccination among mothers, ultimately improving children's health and reducing the prevalence of vaccine-preventable diseases.

CONCLUSION

The results of this study, utilizing Structural Equation Modeling (SEM), provide an in-depth understanding of the relationships among attitude, subjective norms, perceived control, intention, and behavior of mothers of toddlers regarding the prevention of vaccine-preventable diseases through immunization (PD3I). The findings confirm that the attitude of mothers significantly influences their intention to immunize their children, and it strengthens subjective norms and perceived control related to immunization practices. However, the direct role of subjective norms on behavior and the direct impact of perceived control on behavior were found to be statistically insignificant.

Recommendations to enhance attitudes, subjective norms, perceived control, and intentions of mothers can be implemented through educational strategies, social support, and improving accessibility to immunization services. To improve positive attitudes among mothers, accurate and easily understandable education about the benefits of immunization is suggested, along with strengthening subjective norms through community support and involvement. Additionally, enhancing perceived control by improving accessibility and resources for immunization services can be an effective strategy. Effective communication is also essential to strengthen the intentions of mothers, while regular monitoring and evaluation of immunization programs are necessary to ensure effectiveness and sustainability. By implementing these recommendations, it is expected to improve the coverage and effectiveness of PD3I immunization programs in Indonesia.

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