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Health Belief Model: Analysis of Maternal Perception on Completeness of Child Immunization Status in Manokwari, West Papua

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ABSTRACT

Background: Immunization can save millions of lives and is one of the most economical health interventions in the world. Parental perception is crucial in decision-making, but the mother's characteristics, family, beliefs, culture, and environment influence perception. The Health Bilieu Model theory can show evidence that supports predictions about parents' decisions to immunize their children.
Subjects and Method: The design of this study is observational analysis with a case-control design. The research was conducted in 3 working areas of the Puskesmas in the Manokwari district, namely the Prafi SP IV Health Center, the Pasir Putih Health Center, and the Sanggeg Health Center. The research was conducted from July to August 2023. The target population is mothers who have children >9 months old. A total of 96 samples were selected using the fixed disease sampling technique. The incomplete immunization case group was 24, and the complete immunization control group was 72. The dependent variable is the completeness of immunization status, and the independent variable is the maternal perception of threats, benefits, seriousness, obstacles, and vulnerabilities. The data were analyzed by PATH analysis.
Results: The completeness of basic immunization, as reviewed from the Health Belief Model during the Covid-19 Pandemic, was directly influenced by the perception of barriers to the completeness of immunization status (b= 0.99; 95% CI= -0.43 to 2.02; p= 0.060), the perception of benefits to the completeness of immunization status (b= 1.15; 95% CI= 0.11 to 2.19; p= 0.029) and the perception of threats to the completeness of immunization status (b= 1.36; 95% CI= 0.30 to 2.41; p= 0.012). Indirect influence through threat perception is: Vulnerability perception (b= 0.08; 95% CI= -0.87 to 1.04; p= 0.858) and Vulnerability perception (b= 0.25; 95% CI= -0.69 to 1.18; p= 0.606).
Conclusion: Maternal characteristics and maternal perception of obstacles, benefits, threats, seriousness, and vulnerability significantly affect the completeness of basic immunization for infants aged 0 months to 9 months.

Keywords: immunization, perception, Health Belief Model, health center, infant.

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BACKGROUND

Immunization is an effort to actively cause/ increase a person's immunity to a disease so that if one day they are exposed to the disease, they will not get sick or only experience mild illness. Basic immunizations are given to infants before 1 year of age. Complete basic immunization aims to achieve herd immunity, a condition in which most of the population has been protected from a disease. High and even vaccination coverage will form herd immunity to prevent the transmission of a disease that we can avoid. For complete basic immunization, infants less than 24 hours old are given Hepatitis B (HB-0) immunization, 1 month old is given (BCG and Polio 1), 2 months old is given (DPT-HB-Hib 1 and Polio 2), 3 months old is given (DPT-HB-Hib 2 and Polio 3), 4 months old is given (DPT-HB-Hib 3, Polio 4 and IPV or injectable polio), and 9 months old is given (Measles or MR). A survey by the Ministry of Health and UNICEF conducted in 2020 found that parents and caregivers who took the study did not bring their children to health facilities for fear of contracting COVID-19 or worried that there were no proper health protocols. This survey shows that approximately 84% of immunization service health facilities have experienced significant disruptions due to the COVID-19 outbreak and government policies in implementing physical distancing (Ministry of Health of the Republic of Indonesia, 2017; Ministry of Health of the Republic of Indonesia, 2018; Ministry of Health and UNICEF, 2020)

WHO revealed that the main reason for health service disruptions is the transfer of workers (66%) to provide COVID-19 service assistance. Global coverage is estimated to reach 70%. The coverage of the WHO region in the Americas is calculated from 100% to 90%, and the WHO Southeast Asia region's immunization coverage drops from 80% to 56% (Rusadi dan Bachtiar, 2022). West Papua Province's complete basic immunization coverage has also decreased since the COVID-19 Pandemic over the past 2 years, from 84.1% in 2019 to 66.4% in 2020 and 60.4% in 2021. Low vaccine coverage in the West Papua region is caused by technical problems, lack of manpower, and disruption of routine vaccine logistics. There is rejection because the main issue is that people think officers who come will carry COVID-19 vaccinations. Immunization coverage in Manokwari Regency as of December 2021 is HB0 62%, BCG 98%, DPT-Hb-HiB 3 59.2%, OPV 44.8%, IPV 62.1%, Measles Rubela 71.98%, IDL 56.1%, Measles Rubela Advanced 36.1%, DPT-Hb-HiB Advanced 26.2% (Syaufi, 2022; P2P West Papua Provincial Health Office and WHO West Papua, 2022)

A press release from the West Papua Provincial Health Office and UNICEF to the media on April 22, 2022, expressed concern about measles, diphtheria, and polio in the West Papua region due to low immunization coverage. The study concluded that the achievement of complete basic immunization had decreased coverage during the COVID-19 Pandemic due to lack of manpower, limited information media in remote areas causing a lack of socialization, budget efficiency and lack of cooperation in each cluster, perception of halal in rural areas, busy parents in urban areas, non-compliance with health protocols in rural and remote regions, perception that there is no benefit in metropolitan and remote areas, worries and fear of contracting COVID-19 in each cluster (Nauly, 2022; Trianto et al., 2021).

Building a positive perception of immunization can allow mothers to make decisions so they can immunize their children.

Perception is the process by which a person knows several things through his senses, and it can also be interpreted as a direct response to something. Perception can influence individuals to view a situation negatively and critically, seeing it as worrying or inspiring, disturbing, or powerless, all leading to the individual's failure. On the other hand, perception can be a valuable, upbeat, motivating, calming, or encouraging instrument and focus attention (Murti, 2018; Sulaeman, 2016a). On social media and traditional media about parents who are hesitant about vaccines. The worrying thing is the emergence of a generation of parents who lack information about disease risk but focus on immunization risk. The Health Belief Model (HBM) theory is a social psychology theory about health promotion that states that a person's beliefs/ perceptions about a disease affect health behavior to prevent the disease, according to Rosenstock (1966). HBM explains the existence of a person's knowledge of health threats and recommended behaviors as prevention based on benefits and feasibility (Murti, 2018).

WHO defines vaccine hesitancy as a delay in receiving/rejecting a vaccine even though it is available in health services. Vaccination hesitancy is one of the 10 most important health threats in 2019. The Health Belief Model (HBM) theory was developed to get answers to health efforts that have been carried out optimally by various parties but have not been successful. The greater the risk that parents feel, the greater the desire to reduce the risk. The use of HBM in this study evaluated the relationship between parental beliefs about basic immunization, parents' decision to accept or reject the Vaccine, and its obstacles to completing essential immunization completeness in infants >9 months of age (Saitoh et al., 2020).

SUBJECTS AND METHOD

1. Study Design

The research design is an observational analytical study with a case-control study approach. This epidemiological study studies the relationship between exposure and disease by comparing the case and control groups based on their exposure status. Measurements of endogenous and exogenous variables were carried out simultaneously on respondents. Statistical models explain the relationship between direct and indirect variables with Path Analysis (Ayuninggrum and Murti, 2020).

2. Population and Sample

This study's target population is mothers with children under five > 9 months old. The affordable population is mothers with toddlers > 9 months old in 3 health centers (Sanggeng Health Center, Pasir Putih, Prafi Health Center) in Manokwari, West Papua Province. The sample determination technique uses the fixed disease sampling technique. The sample was calculated using the sample size formula according to Hair et al. (1998) in Murti (2013). For multivariate analysis, 15 to 20 subjects per variable are recommended (23). This study used five variables: perception of vulnerability, seriousness, benefits, obstacles, and threats. So, the estimated sample is 96 respondents. Case-control, with a ratio of 1 : 3, in cases of mothers whose children do not receive complete immunizations, totaling 24 people. The control is 72 mothers whose children have been fully immunized. Exogenous variables: threat perception, vulnerability, seriousness, benefits, and barriers. Endogenous variables: perception of severity and completeness of immunization status. The analysis used is Path Analysis.

3. Study Variables

The dependent variable is the completeness of immunization status. The independent

variables are the perception of seriousness, vulnerability, benefits, threats, and obstacles.

4. Operational Definition of Variables

Immunization status was basic immunization information for newborns up to 12 months of age to achieve immunity levels above the protection threshold. Complete basic immunizations include infants less than 24 hours old are given Hepatitis B immunization (HB-0), 1 month old is given (BCG and Polio 1), 2 months given (DPT-HB-Hib 1 and Polio 2), 3 months given (DPT-HB-Hib 2 and Polio 3), 4 months old is given (DPT-HB-Hib 3, Polio 4 and IPV or Polio injection), and 9 months old is given (Measles or MR). Measurement with a category scale where the code 0 is complete, and 1 is incomplete.

The perception of seriousness was the medical consequence of illness (death, disability) and social consequences. The perception of seriousness helps mothers think critically that their babies are in danger if they are not immunized immediately. Measurement with a category scale where 0 is for serious, and 1 is for not serious.

Perception of vulnerability was the mother's perception that her baby is at risk of experiencing a disease so that the mother will take preventive measures. Measurement with a category scale where the code is 0 for vulnerable and 1 for not vulnerable.

The perception of benefits helps mothers realize that immunization was beneficial, so mothers are highly motivated to bring their babies to get immunizations—measurement with a category scale where the code is 0 for functional and 1 for not practical.

Perception of obstacles was an individual's perception of barriers (expensive, far) and disadvantages (pain, side effects) of the recommended healthy behaviors. This has an impact on the mother's unwillingness to immunize her baby. It is related to the completeness of the baby's immunization—measurement with a category scale where code 0 for no obstacle and 1 for no obstacle.

Threat perception was an individual's encouragement to prevent diseases caused by the perception of seriousness and vulnerability. Excessive threat perception forces individuals to take precautions. Measurement with a category scale where code 0 is for threatened and one is for not threatened.

5. Study Instruments

The data collected from the questionnaire uses a Likert scale, and then, for the sake of data processing, the data is converted into categorical data. The KIA Book is Pink, which allows you to see children under five's complete basic immunization status.

6. Data analysis

The categorical data obtained was re-examined using the STATA 17 program (editing, coding, processing, cleaning), and after data validation, data processing was continued. Utilizing a path analysis model, data analysis was univariate, bivariate, and multivariate.

7. Research Ethics

Research ethical issues, including informed consent, anonymity, and confidentiality, were addressed carefully during the study. The research ethical clearance approval letter was obtained from the Research Ethics Committee at Poltekes Kemenkes Sorong, Indonesia, No. DM.03.05/8/030/2023, on August 16, 2023.

RESULTS

1. Sample Characteristics

Table 1 explains the characteristics of respondents obtained from 3 health centers. The number of respondents in each health center was 32 respondents, based on the

status of immunization completeness. Complete immunization status was recorded in 75% of respondents, while the other 25% were incomplete. Most respondents worked as housewives 77.1%, Civil Servants (PNS) 15.6% and Entrepreneurs 7.3%. Respondents with primipara comprise 76% of the respondents, with the rest of the multipara mothers at 24%. Most respondents came from non-Papuan tribes, 59.4%, while the rest were indigenous Papuans, 40.6%. The final education of respondents was dominated by Senior High School 60%, followed by Higher Education 21%, Junior High School 13%, Elementary School 5%, and a small number did not attend school 1%. Most mothers' ages are not classified as 79.2% at risk maternal age, with the remaining 20.8% at risk.

Table 2. Sample respnden perception based on health bilive model theory

Perception	Category	Frequency	Percentage (%)
Threat	Yes	42	44
	Not	54	56
Vulnerability	Yes	51	53
	Not	45	47
Obstacles	Yes	36	74
	Not	60	63
Seriousness	Yes	59	61
	Not	37	39
Benefit	Yes	62	65
	Not	34	35

2. Bivariate analysis

Table 2 describes maternal perceptions when interviewed about the completeness of basic immunization for infants aged 0-9 months. The results of the analysis of maternal perceptions of complete essential vaccination in infants aged 0-9 months, using a theoretical framework Health Belief Model (HBM), show that the majority of mothers (65%) have a positive perception of the benefits of immunization and 61% understand the seriousness of the impact of not immunizing. However, only 44% of mothers feel threatened if their babies are not immunized, indicating a lack of understanding of the risk of disease that can be prevented by immunization. Although 53% of mothers are aware of their baby's susceptibility to disease if they are not immunized, there are still 47% who do not have an adequate perception of vulnerability. Most mothers (63%) feel no barriers to getting immunized, but 36% face barriers such as cost, access, and time. These findings point to the need for increased maternal understanding, especially concerning threats and vulnerabilities, through comprehensive and ongoing health education and promotion to improve complete basic immunization coverage in infants.

Table 2 presents the bivariate analysis results with the Chi-Square test to identify factors related to the completeness of infant basic immunization. Parity did not significantly correlate with immunization completeness (p= 1.000). Although primipara mothers had a 1.1 times greater chance of having a fully immunized baby than multipara mothers, this difference was not statistically significant. The influence of ethnicity significantly correlated with immunization completeness (p = 0.041). Papuan mothers have a 0.4 times lower chance (or 60% smaller) of having a fully

immunized baby than non-Papuan mothers. The mother's employment status was not significantly related to the completeness of infant immunization (p = 0.055). Although working mothers have a 4.2 times greater chance of having a fully immunized baby, this difference is close to the significance threshold.

Maternal education significantly correlated with immunization completeness (p < 0.001). Mothers with a high school ≥ education have a 6.8 times greater chance of having a fully immunized baby than mothers with a high school < education. Maternal age did not significantly correlate with immunization completeness (p= 0.570). Mothers of at-risk age had a 0.7 times lower chance of having a fully immunized baby than mothers of non-at-risk age, but this difference was not statistically significant. Overall, this analysis shows that ethnicity and maternal education are the two factors most related to the completeness of basic infant immunization. Mothers from non-Papuan tribes and mothers with higher education (≥ high school) have a greater chance of having a baby with complete immunization.

Table 2. Characteristics of respondents that affect the completeness of infant immunization

Variable	Complete Basic Immunization Coverage				OR	p
	Yes		Not			
	N	%	N	%		
Parity						
Primipara	17	74	6	26	1.1	1.000
Multipara	55	75	18	25		
Tribe						
Papua	25	64	14	36	0.4	0.041
Non-Papua	47	82	10	18		
Work						
Yes	20	91	2	9	4.2	0.055
Not	52	70	22	30		
Education						
< High School	8	42	11	58	6.8	<0.001
≥ High School	64	83	13	17		
Mother's Age						
Risky	14	70	6	30	0.7	0.570
No Risk	58	76	18	24		

3. Multivariate analysis

Figure 3 and Table 3 shows the magnitude of the influence of perception of barriers on the completeness of immunization status (b= 0.99; CI 95% -0.43 to 2.02; p= 0.060). So, it can be concluded that there is a direct positive influence between the perception of barriers and the completeness of immunization status with a pathway coefficient of 0.99. It means that mothers who perceive barriers to accessing immunization services are 0.99 more likely to complete their baby's immunization than mothers who do not.

The direct effect of the perception of

benefits on the completeness of immunization status (b=1.15; CI 95% 0.11 to 2.19; p=0.029). So, it can be concluded that there is a direct positive influence between the perception of benefits and the completeness of immunization status with a pathway coefficient of 1.15. means that mothers who perceive immunization as having many benefits for their baby's health are 1.15 times more likely to complete their baby's immunization than mothers who do not have a strong perception of benefits. The effect of threat perception on the completeness of immunization status (b=1.36; CI 95% 0.30 to 2.41; p=0.012). So, it can be concluded that there is a direct positive influence between the perception of threats and the completeness of immunization status with a pathway coefficient of 1.36. means that mothers who perceive diseases that can be prevented by immunization as a serious threat to their baby's health are 1.36 times more likely to complete their baby's immunization than mothers who do not have a threat perception.

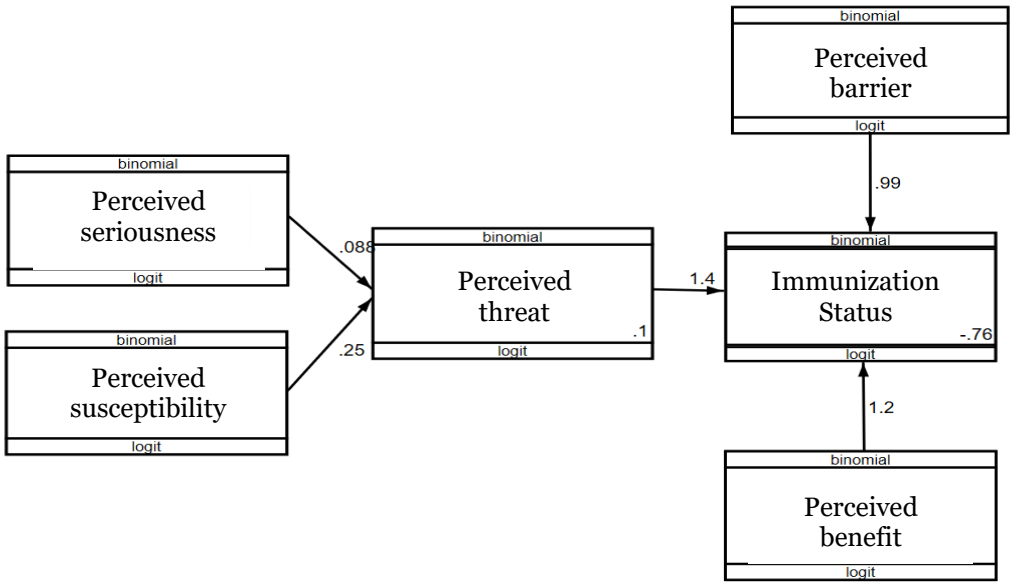

Figure 3. Path analysis health belief model of maternal perception on completeness of child immunization status In Manokwari, West Papua

The indirect influence of the perception of seriousness on immunization completeness through threat perception as seen in Table 3 and figure 3, although there was no significant effect, the pathway analysis showed a positive relationship between the perception of vulnerability to immunization completeness through the perception of seriousness (b=0.08; CI95% -0.87 to 1.04; p= 0.858). The pathway coefficient of 0.08 indicates that an increase in vulnerability perception will be followed by a slight rise in immunization completeness through the perception of seriousness. However, this association is very weak and not statistically significant, indicating that the mother's perception of susceptibility to disease risk has no significant effect on the completeness of her baby's immunization through the pathway of perception of the seriousness of the disease. Likewise, the indirect influence of the perception of vulnerability and completeness of immunization through threat perception remains interesting to

study. A pathway coefficient of 0.25 (CI 95% -0.69 to 1.18; p=0.606) indicates that, although weak, there is a tendency for a positive relationship. This means that mothers who feel more vulnerable to disease risk tend to have a higher threat perception, which in turn can increase their likelihood of completing the baby's immunization. Although this influence is not significant in this model, it is worth noting in future studies as it could be an essential pathway in influencing immunization behavior.

Table 3. The results of path analysis health belief model of maternal perception on completeness of child immunization status In Manokwari, West Papua

Dependent variables		Independent variables	b	CI 95%		p
				Lower Limit	Upper Limit	
Direct Effect						
Immunization Status	←	Perceived barrier	0.99	-0.43	2.02	0.060
	←	Perceived benefit	1.15	0.11	2.19	0.029
	←	Perceived threat	1.36	0.30	2.41	0.012
Indirect Effect						
Perceived threat	←	Perceived seriousness	0.88	-0.87	1.04	0.858
	←	Perceived susceptibility	0.25	-0.69	1.18	0.606
N observation = 96						
df = 17						
AIC = 234.2486						
BIC = 252.1991						
Log likelihood = -110.12432						

DISCUSSION

This study aims to analyze the factors that affect the completeness of basic immunization in infants in Manokwari, West Papua, using the Health Belief Model (HBM) theoretical framework. The study results show that maternal perception, ethnicity, and maternal education are essential factors that affect the completeness of basic immunization in infants aged 0-9 months. The most prominent finding is the dominant role of maternal perception of the benefits, threats, and barriers of complete basic immunization. Mothers who view immunization as beneficial and are worried about the threat of disease that immunization can prevent tend to ensure that their child gets fully immunized. It aligns with the Health Belief Model (HBM) principles, which emphasize that an individual's beliefs about a disease and their perception of the benefits of preventive measures will shape their health behavior. This study uses a path analysis model to see the direct and indirect influence of maternal perception based on the Health Belief Model (HBM) theory to further understand the impact of various factors on immunization completeness.

1. Maternal Characteristics

The results of this study show that maternal characteristics and maternal perceptions of the benefits, threats, and barriers to immunization are essential factors that affect the completeness of basic immunization in infants. Most mothers (65%) have a positive perception of the benefits of immunization, but only 44% feel threatened if their babies are not immunized. Suggests that although many mothers understand the benefits of immunization, they may not be fully aware of the serious risks of diseases that can be prevented. Mothers who feel that there are obstacles in accessing immunization services show a higher tendency to

complete their baby's immunization. This may indicate that these mothers are strongly motivated to immunize their children despite the various challenges. In addition, ethnicity and maternal education are also significantly related to immunization completeness. Mothers from non-Papuan tribes and mothers with higher education (≥ high school) have a greater chance of having a baby with complete immunization. These findings underscore the importance of improving mothers' understanding of the benefits and risks of immunization and overcoming barriers to accessing immunization services. Comprehensive and sustainable health promotion efforts and increased access to immunization services need to be undertaken to ensure that all babies receive complete basic immunizations. In addition, it is necessary to pay attention to social and cultural factors that may affect maternal perceptions and behaviors related to immunization, such as ethnicity and education level.

2. The direct influence of perceived barrier on the completeness of immunization status.

Perception of barriers in the context of immunization refers to how individuals perceive the challenges or difficulties they may face in accessing and utilizing immunization services. This study found an interesting positive relationship between the perception of barriers and immunization completeness. Mothers who feel there are barriers to accessing immunization services, such as cost, distance, or time, show a higher tendency to complete their baby's immunization. Statistically, they were 0.99 more likely to complete immunization than mothers who did not feel the barrier, although this result was not yet statistically significant (b = 0.99; 95% CI = -0.43 to 2.02; p = 0.060). Another finding in this study on the perception of obstacles that cause not completing complete basic immunization is the low knowledge of mothers and families about the side effects of immunization that cause mothers to worry that their babies will get sick and die when they get immunized. Other research concluded that parent/ caregiver barriers include lack of knowledge about immunizations, distance to access points, financial support, partner support, and distrust of vaccines and immunization programs (Bangura et al., 2020; Garbin et al., 2023).

3. The direct effect of perceived benefit on the completeness of immunization.

Perception of benefits refers to an individual's belief in the effectiveness of recommended measures to reduce the threat of a disease or health condition. This research found that mothers who positively perceive the benefits of completing basic immunization from 0-9 months tend to complete their baby's immunization. Statistically, mothers who viewed immunization as beneficial were 1.15 times more likely to complete their baby's immunization than mothers who did not have a strong perception of benefit (b = 1.15; 95% CI = 0.11 to 2.19; p = 0.029). This study found that health workers, midwives, and posyandu cadres have a role in providing information about the benefits of complete basic immunization in babies to mothers and families, encouraging mothers to immunize. The study also found the same results: mothers with a high perception of immunization's benefits tended to give their children basic immunizations (Hidayah and Febianto, 2018; Putri et al, 2022).

Vaccination decision-making is very complex and influenced by the mother's perception of the benefits of immunization. The study confirms that parents' perception of the benefits of vaccines plays a crucial role in their decision to immunize their children.

Parents who are confident in the effectiveness and safety of the Vaccine tend to be more proactive in completing their child's immunization. Factors such as trust in the information conveyed by the vaccination program and the recommendations of health professionals also shape the perception of these benefits. Thus, increasing confidence and providing accurate and comprehensive information is key to encouraging higher vaccine uptake (McNeil et al., 2019; Sharif-Nia et al. , 2024).

4. The direct influence of perceived threat on immunization completeness

Threat perception refers to an individual's belief in the severity and likelihood of developing a disease that can be prevented with complete basic immunization. Pathway analysis showed that threat perception significantly positively influenced the completeness of immunization status (b=1.36; 95% CI 0.30 to 2.41; p=0.012). This indicates that mothers who consider these diseases a serious threat to their baby's health tend to be more proactive in completing immunizations, with a 1.36 times greater likelihood than mothers who do not have a threat perception. Information about the dangers of the disease is positively obtained from midwife's health cadres. However, negative information, according to the results of interviews, is usually obtained from social media and the community around the place of residence, which chooses not to immunize their children.

A study with similar results reported that threat perception significantly positively influenced the completeness of immunization status (b= 1.88; 95% CI= 0.71 to 3.04; p= 0.002). This means that mothers who have the perception that diseases that can be prevented by immunization are diseases that threaten the health of their babies are 1.88 times more likely to immunize their babies than mothers who have the perception that diseases that can be prevented by immunization are not diseases that threaten the health of their babies. Mothers with a high perception of the threat of disease tend to consider immunization a critical measure to protect their children. They are worried that if their children are not immunized, they will easily contract dangerous diseases. These concerns prompted them to bring their children to get a full immunization as scheduled (Puri et al., 2016).

The study also found that 56% of mothers in this study still feel that the threat of disease does not encourage immunization of their babies. This is due to insufficient knowledge and information about the dangers of diseases that can be prevented by immunization (PD3I). They may not be aware of these diseases' risks and profound impacts on their child's health. Mothers who have personal experiences or have heard of other people's experiences who are not immunized but are still healthy.

5. An indirect influence of perceived seriousness on the completeness of immunization through the perceived of threat.

The perception of seriousness refers to the mother's belief about the negative impact that may occur if her baby is not immunized. The pathway analysis in this study shows that threat perception indirectly influences the perception of the seriousness of the completeness of immunization. Although the pathway coefficient was positive (b= 0.08), this association was not statistically significant (95% CI -0.87 to 1.04; p=0.858). The same study also showed that the perception of disease seriousness indirectly influenced the completeness of immunization status through threat perception (b = 1.10; 95% CI = 0.34 to 1.86; p = 0.005). This

means that mothers who have the perception that diseases that can be prevented by immunization are serious tend to feel more threatened and are ultimately more likely to immunize their babies (Puri et al., 2016).

The interpretation of the results of this study shows that the mother's perception of the seriousness of the disease that can be prevented by immunization does not significantly affect their perception of the threat and, in the end, does not have a significant impact on the completeness of the child's immunization. Although a mother considers a serious illness severe, this does not necessarily increase the sense of threat to parents and encourage parents to complete their child's immunizations. There are several possible explanations for this result. First, other factors, such as the perception of benefits or obstacles, are more dominant in influencing the perception of threats and immunization behavior. Second, other factors outside the HBM model influence the relationship between the perception of seriousness, threat perception, and immunization completeness, such as maternal characteristics, including age, parity, education, occupation, and ethnicity. Although not statistically significant, these findings still provide valuable information. These results suggest that interventions focusing only on improving the perception of disease severity may not be compelling enough to improve immunization coverage.

6. Indirect influence of perceived susceptibility on immunization completeness through perceived threat.

Vulnerability perception refers to a mother's belief about how likely her baby is to contract a disease that immunization can prevent. The relationship between vulnerability perception and immunization completeness through threat perception mediation variables obtained from the results of pathway analysis showed a coefficient of 0.25 (CI 95% = 0.69 to 1.18; p=0.606), meaning that there was a positive relationship, although weak. Suggests that mothers with higher perceptions of vulnerability tend to have higher threat perceptions as well, which can further increase their likelihood of completing infant immunizations. Remembering immunization may be significant and prioritized in some societies is essential. Hence, mothers have a higher perception of vulnerability to diseases that immunization can prevent. However, in other cultures, immunization may be considered less important or even avoided due to certain cultural factors or beliefs, so mothers have a lower perception of vulnerability.

The perception of vulnerability to disease can vary depending on the type of disease, the source of information the mother receives, and cultural and social factors in the community. Mothers may have different perceptions of diseases such as polio, measles, or COVID-19, influenced by information from health workers, social media, and personal experiences. In addition, the norms and beliefs that apply in society can also shape the perception of a mother's vulnerability to disease (Limbu, Gautam, and Pham, 2022).

AUTHOR CONTRIBUTION

Priscilla Jessica Pihahey, designed and conducted the research and processed, interpreted the data and published the research results.

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

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