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CUES TO ACTION PREDICTORS OF THE COMPLETENESS POLIO VACCINATION IN SUB PIN POLIO IN BIREUEN DISTRICT

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ABSTRACT

Background: The finding of a single positive case of polio in Pidie District of Aceh Province at the end of 2022 alarmed Indonesia and globally, leading to increased attention to polio prevention and elimination. The government launched a mass polio vaccination program called Sub PIN Polio for all children aged 0-12 years with 2 doses of polio vaccine. In the first round of polio vaccination in Aceh Province, 1,179,441 or 96.8% of children were vaccinated and 1,153,413 or 94.7% of children were vaccinated with second dose. One of the districts with high polio vaccination outreach is Bireuen District with 96.9% in the first round and 96.0% in the second round. There are many factors underlying the high polio vaccination coverage in Bireuen district. This study aims to analyze factors associated with the completeness of Polio vaccination in Polio Sub NID in Bireuen District using Health Belief Model approach, which is known as cues to action.

Research Methods: The research was observational analytic with cross sectional design. The population in this study included all mothers with children were targeted for Polio vaccination at Polio Sub NID in 3 vaccine service posts / health centers in Bireuen District which called Puskesmas Juli, Juli 2, and Jeunib with a total sample 389 respondents. Statistical analysis used was Partial Least Square with SmartPLS 3.0 application.

Results: Hypothesis analysis showed the cues to action variable (t = 9.649, p = 0.000) had a direct significant relationship with polio vaccination completeness in Sub PIN Polio and education demographic factor also had a direct significant relationship with cues to action variable (t = 4.643, p = 0.000) and indirect significant relationship with polio vaccination completeness variable in Sub PIN Polio (t = 3.812, p = 0.000).

Conclusion: This study offers recommendations for the government in establishing public health policies related to the design of vaccination or other immunization program interventions.

KEYWORDS: Health Belief Model, Cues to action, Polio Vaccination Completion

INTRODUCTION

In late November of 2022, Indonesian and global was alarmed by the finding of a polio case in Pidie District, Aceh. A 7-year-old child was confirmed to be suffering from polio or poliomyelitis caused by Vaccine-Derived Polio Virus Type 2 (VDPV2) with symptoms of withering paralysis and the government declared this an Extraordinary Event (KLB) [1]

According to the World Health Organization (WHO) polio or poliomyelitis is an acute infectious disease caused by either of the 3 poliovirus serotypes (type 1, 2 or 3). In the pre-vaccine era, polio virus was a major cause of permanent disability in children. Polio virus is spread by faecal to oral and oral to oral transmission. In poor sanitation conditions, faecal to oral transmission is the most prevalent. For the treatment of polio, there is no specific anti-viral drug available [2]. However, preventive measures to minimize the spread of the polio virus are available through vaccines. There are two types of polio vaccines: Oral Polio Vaccine (OPV) and Inactivated Poliovirus Vaccine (IPV). The polio vaccine protects children by preparing their antibodies against the polio virus. Almost all children (more than 99 percent) who get the recommended full dose of inactivated polio vaccine will be protected against polio and it is very important to practice proper personal hygiene and to wash hands frequently with soap and water [3].

The Outbreak Response Immunization (ORI) status of Polio in Pidie district requires an active response from all stakeholders in order to overcome and to eliminate polio. The Ministry of Health launched mass polio immunization activities for children in Aceh Province with the implementation of the Polio National Immunization Week (PIN) in accordance with the recommendations of the Polio Eradication Expert Committee and the Indonesian Technical Advisory Group on Immunization. It was recommended to administer the novel Oral Polio Vaccine Type 2 (nOPV2) vaccine to all targeted children aged 0 months to 12 years. Polio vaccine administration is complete, with 2 doses of polio vaccine and 2 rounds starting from the fifth week of November 2022 with each round a month apart [1].

According to the Ministry of Health's Data and Information Center (Pusdatin), 1,217,939 children aged 0 months to 12 years in Aceh Province were targeted for polio vaccination during the Polio Immunization Week (PIN). Data updated on May 10, 2023, the first and second rounds of Sub PIN Polio in Aceh have been accomplished and 1,179,441 children or 96.8% of the target have received Polio vaccination during the first round of Sub PIN Polio in Aceh. Vaccination coverage in 0-59 months age group was 85.4%, 5-<7 years age group was 73.6%- and 7-12-years age group reached 117.7%. In the second round or dose of Sub PIN Polio which was held simultaneously in all districts in Aceh starting January 30, 2023, 1,153,413 children or 94.7% of the target have received polio vaccine in Sub PIN Polio in Aceh with coverage in the 0-59 months age group of 83.5%, 5-<7 years age group of 69.3%- and 7-12-years age group reached 116.1% [9-11].

The Health Belief Model (HBM) is the most widely used conceptual framework in health behavior research either to explain the alteration and maintenance associated with health behavior or as a guiding framework for intervention programs. The HBM consists of several key concepts that predict why people will act to prevent, screen for, or control disease conditions, including perceived susceptibility, perceived severity, perceived benefits and barriers, cues to action, and self-efficacy. Starting from Hochbaum's research in 1958 studying the things that influence the decision of a thoracic x-ray to detect tuberculosis (4). HBM continues to develop and has been widely used in research assessing health behavior including preventive behavior such as vaccination and behavior in the midst of the Covid-19 pandemic [5-7].

Vaccination is a main strategy to reduce the impact of the polio outbreak. Proper vaccination of children is an important step in shaping children's immunity to polio. Parents' behaviour or intention to vaccinate is the most important factor influencing how many children will be covered by the Polio vaccine campaign. Mallory J.Trent's (2021) study in Australia on adults obtaining Influenza vaccination where perceived benefits and cues to action from recommendations from doctors or health workers are the main predictors of their health behaviour so that they decide to vaccinate.

Perceived cues to action are triggers that make individuals need to act. Some of these cues can be internal (e.g. body condition) and external including advice from others, mass media campaigns, advice from doctors, sick family members or friends, government, religious leaders, newspaper or magazine articles. If the perceived vulnerability or perceived severity is low, then a very intense stimulus is needed as a cue to action. When perceived vulnerability or perceived severity is high, even a small stimulus to act is sufficient [8].

The implementation of Sub PIN Polio activities in Aceh to eliminate the polio virus outbreak has been successful based on the achievement of vaccination in Aceh Province reaching the target of above 95%. Bireuen District is one of the districts in Aceh Province that achieved the similar accomplishment in Polio vaccination in Sub PIN Polio with 96.9% in the first phase and 96.0% in the second phase. Therefore, this study aimed to analyze factors associated with predictors of cues to action and their relationship with polio vaccination completeness in Sub PIN Polio.

METHODS

This quantitative cross-sectional study was conducted in the working area of Puskesmas Jeunib, Juli, and Juli 2 in Bireuen district during January-February 2024. The sample was mothers with children who were targeted for Polio vaccination at Sub PIN Polio stage 1 or/and 2. The total sample size in this study was 389 respondents. The sample selection used probability sampling with stratified random sampling technique with different number of samples in each study location.

This study uses a questionnaire research instrument adopted from previous research and has been tested for validity and reliability. The questionnaire instrument was used to measure respondents' demographic variables (age, education, occupation) and the independent variable of cues to action. Furthermore, researchers made observations on polio vaccination reports owned by the puskesmas immunization team to assess the dependent variable of polio vaccination completeness at Sub PIN. Data analysis used Smart PLS software version 3.0.

The data were tabulated into Ms. Excel and for frequency data of respondent characteristics using the SPSS 25.0 software. Furthermore, this study uses the SEM (Structural Equation Modeling) approach of Smart PLS (Smart Partial Least Square) software. In analysing data using Partial Least Square - Smart Equation Model (PLS-SEM), two stages of measurement evaluation are carried out, such as measurement model (outer model) and structural model (inner model). The first step in model evaluation is the outer model which aims to assess the validity and reliability of a model between indicators and variables. Furthermore, the inner model is to assess the level of variation in changes in the independent variable on the dependent and the significance value [6].

Assessing the outer model for validity testing is evaluated by convergent validity, while the outer loading value is> 0.7 and the Average Variance Extracted (AVE) value must be> 0.5, and the discriminant validity value by looking at the cross-loading value> 0.7. For reliability testing, it was assessed by

composite reliability> 0.7 and Cronbach's Alpha value> 0.6. Furthermore, testing the inner model (structural model) with Smart PLS bootstrapping to test the hypothesis and R Square value. Hypothesis testing uses a significance value of p value <0.005 and t statistic value > t table (1.96). The R Square value is used to measure the degree of variation in changes in the independent variable on the dependent variable. R-Square values of 0.75, 0.50, and 0.25 indicate strong, moderate, and weak models, respectively [12].

RESULT

There were 389 respondents in this study and according to the data obtained and analyzed (Table 1), there were 232 respondents in the age category of 30-39 years (59.5%) who dominated the respondents. Based on the level of education, it shows that the majority of respondents in this study (224 people (57.6%)) are with high school level education and according to the employment status of respondents, the predominant status is unemployed or as a housewife (340 respondents (87.4%).

Table 1 *(Characteristic of Respondent.)*

Variables	Frequency (*f*)	(%)
Age		
20-29 years old	87	22,3
30-39 years old	232	59,5
>39 years old	70	17,9
Education		
Elementary School	13	3,3
Junior High School	71	18,3
Senior High School	224	57,6
University	81	20,8
Currently Working		
No	340	87,4
Yes	49	12,6
Total	**389**	**100**

The outer model values for all variables are shown in Table 2. Demographic variables (age, education and occupation) and polio vaccination completion variables at Sub PIN Polio are categorical variables, where the outer loading, AVE, CL, CR and CA values are 1. For each construction of the cues to action variable, the outer loading, AVE, CL, CR and CA values are greater than 0.7. In general, all data or variables are valid and reliable and are eligible to be analyzed in the structural model (inner model).

Table 2 *(Outer Model: Outer Loading, AVE, Cross Loading (CL), Composite Reability (CR), Cronbach's Alpha (CA).)*

Variables	*Outer Loading*	*AVE*	*Cross Loading*	*Composite Reability*	*Cronbach's Alpha*

Age	1.000	1.000	1.000	1.000	1.000
Education	1.000	1.000	1.000	1.000	1.000
Currently Working	1.000	1.000	1.000	1.000	1.000
Cues to Action			1.000		
I allow my children to get polio vaccine after getting complete information about vaccine.	0.843		0.843		
My family agree that my children will vaccinated.	0.873		0.873		
The religious leaders agree about polio vaccine.	0.804	0.708	0.804	0.924	0.897
The government suggest and facilitate vaccination for my children.	0.865		0.865		
The medical staff recommended me to allow my children to get vaccine.	0.822		0.822		
Completeness of Polio Vaccination	1.000	1.000	1.000	1.000	1.000

Based on the results of structural model analysis, we found that the variation value of polio vaccination completion in Sub PIN Polio is (R2= 0.097) 9.7%, which means the cues to action variable is influencing the polio vaccination completeness variable by 9.7% and the remaining is influenced by other factors. Likewise, the variation of cues to action (R2= 0.049) means the demographic variables (age, education and occupation) influenced the cues to action variable by 4.9% and the remaining was influenced by other factors. (Fig.1)

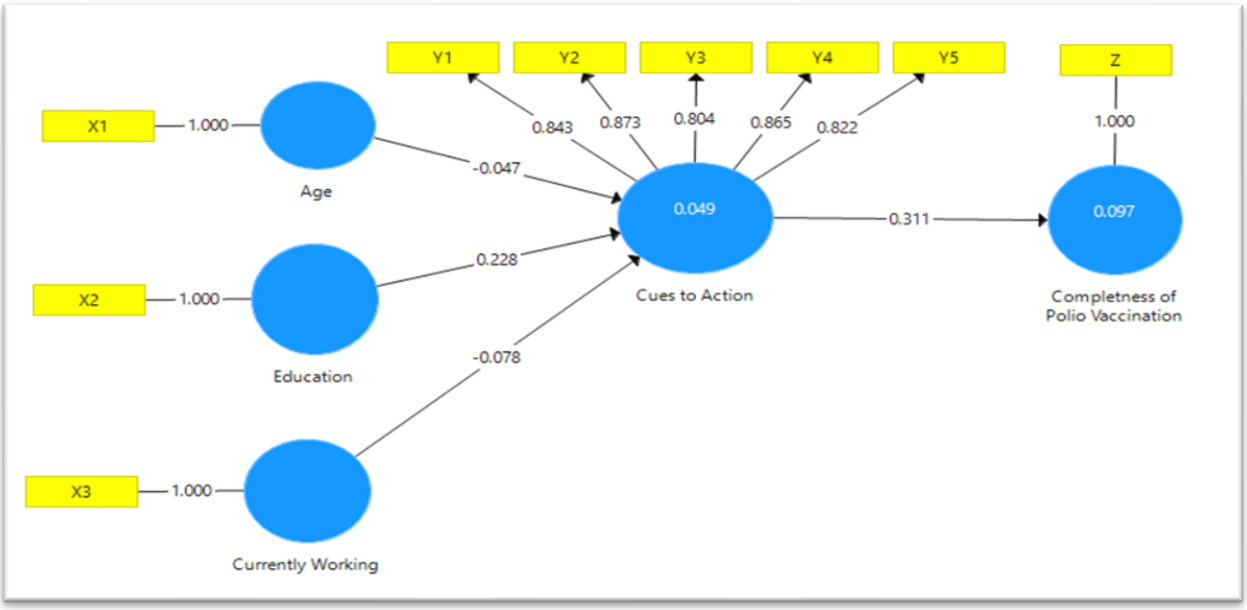

Figure 1 *(Inner Model.P)*

Statistically (Table 3.), demographic factors such as age were not significantly associated with cues to action variable (t = 0.924, p = 0.356) and indirect effect was not significantly associated with polio vaccination completeness variable in Sub PIN Polio (t = 0.909, p = 0.364). Similarly, occupational demographic variable has no significant relationship with cues to action variable (t = 1.521, p = 0.129) and indirect effect has no significant relationship with polio vaccination completeness variable in Sub PIN Polio (t = 1.451, p = 0.148). On the other hand, education variable has direct significant relationship with cues to action variable (t = 4.643, p = 0.000) and indirect significant relationship with polio vaccination completeness variable in Sub PIN Polio (t = 3.812, p = 0.000).

For the Health Belief Model predictor, the cues to action variable has a significant direct relationship with the completeness of polio vaccination at the Sub PIN Polio (t = 9.649, p = 0.000), which means that cues to action has the potential to be a predictor of mothers/parents in completing polio vaccination at the Sub PIN Polio.

Table 3 *(Structural Model Result.)*

Hypotheses	Effect	Original Sample	Sample Mean	t-statistic	p-value	Result
Age → Cues to action		-0.047	-0.048	0.924	**0.356**	**Not Supported**
Age → Completeness of Polio Vaccination	Indirect	-0.015	-0.015	0.909	**0.364**	**Not Supported**
Education → Cues to action		0.228	0.230	4.643	**0.000**	**Supported**
Education → Completeness of Polio Vaccination	Indirect	0.071	0.072	3.812	**0.000**	**Supported**
Currently Working → Cues to action		-0.078	-0.078	1.521	**0.129**	**Not Supported**
Currently Working → Completeness of Polio Vaccination	Indirect	-0.024	-0.025	1.451	**0.148**	**Not Supported**
Cues to action → Completeness of Polio Vaccination		0.311	0.313	9.649	**0.000**	**Supported**

DISCUSSION

This study analyzes the predictive factors of parents' acceptance of polio vaccination completeness in Sub PIN Polio as an emergency mass response in polio outbreak using one of the predictors in Health Belief Model which is cues to action variable including demographic factors such as age, education and occupation.

Age and occupation factors were not significantly associated with perceptions of cues to action and completeness of polio vaccination at the Sub PIN Polio, but education factors had a significant association with perceptions of cues to action and completeness of polio vaccination at the Sub PIN,

similar to previous research (13) the mother's education level was also associated with complete polio vaccination. Mothers with secondary education were less likely to vaccinate their children. Educated mothers have a better access to knowledge provided by health workers or other sources of information. Educated mothers tend to be more aware of health issues, have better knowledge, and are more likely to vaccinate their children.

Based on the hypothesis testing value, the perception of cues to action was significantly associated with the completeness of polio vaccination in Sub PIN Polio. This perception refers to the motivation leading a person to adopt a health-related behavior. Some of these cues are internal (e.g. body condition) and external including advice from others, mass media campaigns, advice from doctors, government and/or sick family members or friends, newspaper or magazine articles.

Cues to action were an effective predictor of intention to use the Covid-19 vaccine in Indonesia in the results of Adiyoso et, al.'s study. The current study is concordant with the findings in the previous study that the more famous people who received the vaccine (in that study was the Covid-19 vaccine), the more people were convinced to get vaccinated. In developing countries such as Indonesia, socio-cultural factors play an important role in determining individual behavior (14).

The results of this study also showed that cues to action from health workers' recommendation for parents to vaccinate their children against polio were the highest (76.6%), people accepted the vaccine because they had received information related to the vaccine (76.2%), advice from the government to vaccinate (75.9%), support from family especially husbands (75.2%) and the lowest was advice from religious leaders (74.8%). Based on the researcher's observation, there is still a mistrust of the halalness of vaccines and a perception that vaccines are incompatible with religious values or beliefs.

From the results of this study, the researcher assumes that the influence of the government as a vaccination service provider is significant in promoting public acceptance and action towards polio vaccination in the Sub PIN Polio. These include the accessibility and vaccination outreach by the government through health workers to provide vaccination services directly to the community in collaboration with stakeholders such as village officials through posyandu and the education office through visits to every PAUD, kindergarten and elementary school as well as reaching vaccine targets directly to community homes with home visit activities.

In addition, there are authorities and policies or rules issued by the government related to the massive polio vaccination program at the Sub PIN Polio in the context of Polio outbreak response to health workers or Puskesmas to encourage health workers to reach the vaccination coverage target. According to the researchers, there are also external cues from individuals or communities that motivate them to participate in polio vaccination at Sub PIN Polio for their children, including the role of influential or trusted family members, including religious leaders or scholars, community leaders and government officials and family members.

CONCLUSION

The results of this study confirm that perceived cues to action is a predictor associated with parents' intention to complete polio vaccination at Sub PIN Polio for their children. Other results showed that demographic factors of age and occupation were not significantly associated with perceived cues to action but education factor had significant association with perceived cues to action and indirect significant association with polio vaccination completeness in Sub PIN Polio.

The findings of this study are suggested as a guideline for the local government in launching intervention and promotion programs related to vaccination and immunization in building public trust related to the halalness of vaccines and public acceptance of vaccination thus creating motivation and enthusiasm for the community to participate in the immunization program. The participation of community leaders and religious leaders must be further enhanced in the immunization program campaign.

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