

## PRECEDE-PROCEED Model on the Determinants of Complete Basic Immunization Status in Bangkalan Regency, Madura

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### ABSTRACT

**Background:** Complete Basic Immunization or Imunisasi Dasar Lengkap (IDL) Program is conducted as a disease prevention effort among children, however the CBI in Indonesia does not yet achieve national target. Bangkalan Regency is one of the regencies in East Java with low immunization achievement. The study aimed to analyze determinants that influence complete basic immunization status using PRECEDE-PROCEED model.

**Subjects and Method:** The study was analytic observational study with cross sectional approach. The study was conducted at 10 community health centers, Bangkalan Regency, from August – October 2017. A total sample of 200 mothers who have infant age 9-12 months old were selected using cluster sampling technique and purposive sampling. The dependent variable was complete basic immunization status. The independent variables were education, knowledge, occupation, attitude, distance of health care facilities, information exposure, family support, and health workers support. The data were collected using questionnaires and MCH book. The data were analyzed by path analysis.

**Result:** Complete basic immunization status was influenced by attitude ( $b=0.82$ ; 95% CI= 0.10 to 1.55;  $p= 0.027$ ), health personnel support ( $b= 0.79$ ; 95% CI= -0.10 to 1.67;  $p= 0.081$ ), distance of healthcare facilities ( $b= -1.28$ ; 95% CI= -2.13 to -0.44;  $p= 0.003$ ), and information exposure ( $b= 1.52$ ; 95% CI= 0.75 to 2.29;  $p= 0.001$ ). Attitude was influenced by family support ( $b= 1.35$ ; 95% CI= 0.71 to 2.00;  $p= 0.001$ ) and knowledge ( $b= 2.29$ ; 95% CI= 1.06 to 3.54;  $p= 0.001$ ). Knowledge was influenced by information exposure ( $b= 1.54$ ; 95% CI= 0.58 to 2.51;  $p= 0.002$ ). Family support was influenced by occupation ( $b= 0.64$ ; 95% CI= 0.03 to 1.26;  $p= 0.040$ ). Occupation ( $b= 1.12$ ; 95% CI= 0.51 to 1.75;  $p= 0.001$ ) and knowledge ( $b= 1.27$ ; 95% CI= 0.42 to 2.13;  $p= 0.003$ ) were influenced by education.

**Conclusion:** There is a direct and positive influence of attitude, health worker support, and information exposure toward complete basic immunization status. There is direct and negative influence of distance of healthcare facilities toward complete basic immunization status. There is indirect and positive influence of education, knowledge, occupation and family support toward complete basic immunization status. PRECEDE-PROCEED model can be used to analyze factors that influence complete basic immunization status.

**Key words:** Basic Immunization Determinant, PRECEDE-PROCEED

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### BACKGROUND

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Immunization program is one of the preventive sector that has been conducted for a long time as the preventive effort which is

important in infant and children morbidity and mortality cases. Indonesia has been conducting immunization effort since 1959 as disease preventive effort among children

known as Complete Basic Immunization (IDL)

Immunization has been approved effective to protect infants and children from vaccine-preventable diseases. Immunization can reduce children mortality rate by 2.5 million per year in low and middle-income countries (Lakew et al., 2015).

Currently there are many people who do not give their babies complete basic immunization hence it needs serious attention to lower down children morbidity and mortality as the result of vaccine-preventable diseases.

Based on the data of World Health Organization (2017) there are about 19.4 million babies all over the world who do not obtain complete immunization and 60% of them live in 10 countries, and Indonesia is among the countries.

Health Ministry of Republic of Indonesia (2016) revealed that in 2015 the achievement of complete basic immunization was 86.5%, the achievement did not yet meet the target specified in Strategic Plan 2015 which was 91%, whereas the percentage of UCI village in Indonesia in 2015 was 82.2%, the achievement did not meet the target of Strategic Plan 2015 which was 84%.

Based on Bangkalan Regency Health Profile (2015) and preliminary study conducted in Health Office of Bangkalan Regency, showed that Bangkalan Regency's coverage achievement of complete basic immunization 2016 was 72%, the achievement declined from the previous year that was 77.57%. While the achievement of UCI (Universal Child Immunization) village in Bangkalan Regency was declining in the last 4 years, that was 71.9% in 2013, 71.5% in 2014, 65.1% in 2015, and 50.2% in 2016.

One of the results of the declining achievement of complete basic immunization I Bangkalan Regency was there are

many cases of vaccine-preventable diseases in Bangkalan Regency during 2015, namely 45 cases of measles, 3 cases of AFP (Acute Flaccid Paralysis), and even an outbreak of diphtheria as many as 19 cases (DINKES Kab. Bangkalan, 2015). Based on the preliminary study in 2016 there were cases of vaccine-preventable diseases namely 9 cases of diphtheria, 12 cases of neonatorum tetanus, 3 cases of AFP, and 171 cases of measles outbreak.

The insufficient supply of vaccine for immunization, healthcare access, people's lack of knowledge on the importance of immunization, insufficient political support and health workers support, the low economy status also influence the coverage disparity of complete basic immunization coverage (DEPKES RI, 2015).

According to Sulaeman (2016) behavior is an important determinant factor toward general health status. Green *et al.* (2005) quoted by Sulaeman (2016) dividing factors that influence one's health behavior into three namely predisposing factor, enabling factor, dan reinforcing factor.

Education is a conscious and planned effort to accomplish learning environment and education process so that students actively develop their personal potential to have religious spiritual capacity, self control, personality, intellectual, noble character, as well as skills essential for themselves, society, nation and state (UU RI No. 20 Tahun 2003).

Knowledge is a result of human sensory, or one's result toward a particular object through senses he/she has. Knowledge is not the fact of a reality being studied, instead it is one's cognitive toward object, experience, and his/her environment. Knowledge is continually shaped by someone who undergoes transformation at any time caused by new understanding (Budiman dan Riyanto, 2013).

Occupational status is one's type of position in performing a particular job in certain institution or at a business unit in order to obtain income or profit, whether as a labor, impermanent employee, or permanent employee (Badan Pusat Statistik, 2017).

Attitude represents one's feeling toward certain thing. Attitude is not yet an action or behavior, therefore it cannot be directly observed, however attitude is pre-disposition of an action or behavior hence it can only be initially interpreted from a closed behavior (Budiman dan Riyanto, 2013).

Distance to healthcare facilities is one of factors that influence someone to visit healthcare facility. The long distance between dwelling place of a family and healthcare facilities may reduce the seeking for and utilization of healthcare facilities (Kenny *et al.*, 2015).

Information is something that is possible to know or knowledge transfer. Information is obtained by means of data and observation and can be encountered in daily life, also can be forwarded by means of communication. Information includes text, image, data, code, voice, computer program and data base (Budiman dan Riyanto, 2013).

To actualize attitude to be a real behavior it requires supporting factor, one of them is family support, husband/parents/parents in law support. Family support may influence a mother to perform an action (Sulaeman, 2016).

Health workers support influence the attitude and behavior of the society to conduct vaccination. According to Yaqub *et al.*(2014) doubtful attitude toward the benefits and accomplishment of immunization can be the result of health workers' attitude who is less informative about the importance of immunization.

Immunization is an effort to actively raise/ improve one's immunity toward a certain disease, hence if one day he/she is exposed to the disease he/she will not be sick or only suffer from mild disease (Kemenkes RI, 2014). Complete basic immunization program is an activity of vaccine administration that is obliged and subsidized by the government given to infants of 0-1 year old (SATGAS Imunisasi PP IDAI, 2014).

PRECEDE-PROCEED model is a model introduced by Green and Kreuter (2000) to discover factors that influence a person to perform health behavior, namely predisposing factor, enabling factor, dan reinforcing factor.

The study aimed to analyze determinants that influence complete basic immunization status by using PRECEDE-PROCEED model.

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## SUBJECTS AND METHOD

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The study was analytic observational study. The design used was cross sectional. It was conducted in 10 Puskesmas in Bangkalan Regency, Madura with data collection time was in August – October 2017. The sampling technique used was cluster sampling and purposive sampling. There were a total of 200 mothers of 9-12 months infants as the sample.

The study employed primary and secondary data in data collection. The instruments of data collection were questionnaires and MCH books. Data analysis used were univariate, bivariate with chi-square and multivariate with path analysis.

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## RESULT

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The characteristics of study subjects observed from mother's age, number of children, child's age, mother's education,

mother's occupation, mother's religion, and family income.

**Table 1. Characteristics of respondents in Bangkalan Regency, Madura**

Characteristics	Category	N	%
<b>Mother's Age</b>	< 35 years	183	91.5
	≥ 35 years	17	8.5
<b>Number of Children</b>	< three	134	67.0
	≥ three	66	33.0
<b>Child's age</b>	9 months	79	39.5
	10 months	36	18.0
	11 months	40	20.0
	12 months	45	22.5
<b>Mother's education</b>	< SMA	108	54.0
	≥ SMA	92	46.0
<b>Mother's occupation</b>	Employed	64	32.0
	Unemployed (Housewife)	136	68.0
<b>Mother's religion</b>	Islam	200	100.0
	Non-islam	0	0.0
<b>Family income</b>	< Regional Minimum Wage	56	28.0
	≥ Regional Minimum Wage	144	72.0

Table 1 showed that the majority of study subjects with a total of 183 (91.5%) were <35 years old, 134 (67.0%) had <3 children, 39.5% had 9 months old infants, 54.0% had low educational level, 68.0%

were housewives, and all study subjects with a total of 200 (100.0%) were Muslim, and 72.0% were mothers with family income ≥ regional minimum wage.

**Table 2. Univariate analysis on variables of the study**

Variables	Category	Frequency	Percentage (%)
Education	Low	106	53.0
	High	94	47.0
Knowledge	Insufficient	158	79.0
	Good	42	21.0
Occupation	Housewife	136	68.0
	Employed	64	32.0
Attitude	Negative	70	35.0
	Positive	130	65.0
Distance of Healthcare Facilities	Close	162	81.0
	Far	38	19.0
Information exposure	Seldom	93	46.5
	Often	107	53.5
Family support	Insufficient	90	45.0
	Good	110	55.0
Health workers support	Insufficient	35	17.5
	Good	165	82.5
Complete Basic Immunization Status	Incomplete	64	32.0
	Complete	136	68.0

Table 2 showed descriptive analysis of the variables of the study, most of the study subjects had low educational level (53.0%)

and possessed insufficient knowledge about complete basic immunization (79.0%). Most of the study subjects were unemploy

ed (housewives) (68.0%). Most of the study subjects had positive attitude toward complete basic communication (65.0%). Majority of study subjects lived closely with healthcare facilities (81.0%) and were often exposed to information about complete basic immunization (53.5%).

Table 2 showed that most of the study subjects obtained good family support (55.0%) and obtain good health workers support (82.5%). Most of the study subjects had complete basic immunization status (68.0%).

**Table 3. Bivariate analysis on the determinants of complete basic immunization in Bangkalan Regency Madura**

Variables	Category	Basic Immunization Status				OR	CI 95%		p
		Incomplete		Complete			Lower Limit	Upper Limit	
		n	%	n	%				
Education	Low	51	25.5	55	27.5	5.77	2.87	11.62	0.001
	High	13	6.5	81	40.5				
Knowledge	Insufficient	59	29.5	99	49.5	4.41	1.64	11.84	0.002
	Good	5	2.5	37	18.5				
Occupation	Housewife	50	25.0	86	43.0	2.08	1.04	4.13	0.035
	Employed	14	7.0	50	25.0				
Attitude	Negative	36	18.0	34	17.0	3.86	2.06	7.23	0.001
	Positive	28	14.0	102	51.0				
Distance of Health Facilities	Close	40	20.0	122	61.0	0.19	0.09	0.41	0.001
	Far	24	12.0	14	7.0				
Information exposure	Seldom	50	25.0	43	21.5	7.72	3.86	15.46	0.001
	Often	14	7.0	93	46.5				
Family Support	Insufficient	37	18.5	53	26.5	2.15	1.17	3.93	0.012
	Good	27	13.5	83	41.5				
Health workers support	Insufficient	22	11.0	13	6.5	4.96	2.29	10.70	0.001
	Good	42	21.0	123	61.5				

Table 3 showed that the result of bivariate analysis on the influence of independent variables toward dependent variable, analyzed by using Chi-Square. The result of bivariate analysis showed that there was the influence of education (OR= 5.77; 95% CI= 2.87 to 11.62; p= 0.001), knowledge (OR= 4.41; 95% CI= 1.64 to 11.84; p= 0.002), occupation (OR= 2.08; 95% CI= 1.04 to 4.13; p= 0.035), attitude (OR= 3.86; 95% CI= 2.06 to 7.23; p= 0.001), distance of healthcare facilities (OR= 0.19; 95% CI= 0.09 to 0.41; p= 0.001), information exposure (OR= 7.72; 95% CI= 3.86 to 15.46; p= 0.001), family support (OR= 2.15; 95% CI= 1.17 to 3.93; p= 0.012), and health workers support (OR= 4.96; 95% CI= 2.29 to 10.70; p=

0.001) toward the complete basic immunization status.

Figure 1 showed variable model fit after an estimation of path analysis parameter was conducted by using the assistance of IBM SPSS STATA 13. There was positive direct influence of mother's attitude toward complete basic immunization status and statistically significant (b= 0.82; 95% CI= 0.10 to 1.55; p= 0.027). There was positive direct influence of family support toward complete basic immunization status and statistically significant (b= 0.79; 95% CI= -0.10 to 1.67; p= 0.081).

There was positive direct influence of distance of healthcare facilities toward complete basic immunization status and statistically significant (b= -1.28; 95% CI= -2.13 to 0.44; p= 0.003). There was positive

direct influence of information exposure toward complete basic immunization status and statistically significant ( $b= 1.52$ ; 95% CI= 0.75 to 2.29;  $p= 0.001$ ).

There was positive direct influence of information exposure toward knowledge and statistically significant ( $b= 1.54$ ; 95% CI= 0.58 to 2.51;  $p= 0.002$ ). There was positive direct influence of education toward knowledge and statistically significant ( $b= 1.27$ ; 95% CI= 0.42 to 2.13;  $p= 0.003$ ). There was positive direct influence of family support toward attitude and

statistically significant ( $b= 1.35$ ; 95% CI= 0.71 to 2.00;  $p= 0.001$ ).

There was positive direct influence of knowledge toward attitude and statistically significant ( $b= 2.29$ ; 95% CI= 1.06 to 3.54;  $p= 0.001$ ). There was positive direct influence of occupation toward family support and statistically significant ( $b= 0.64$ ; 95% CI= 0.03 to 1.26;  $p= 0.040$ ). There was positive direct influence of education toward occupation and statistically significant ( $b= 1.12$ ; 95% CI= 0.51 to 1.75;  $p= 0.001$ ).

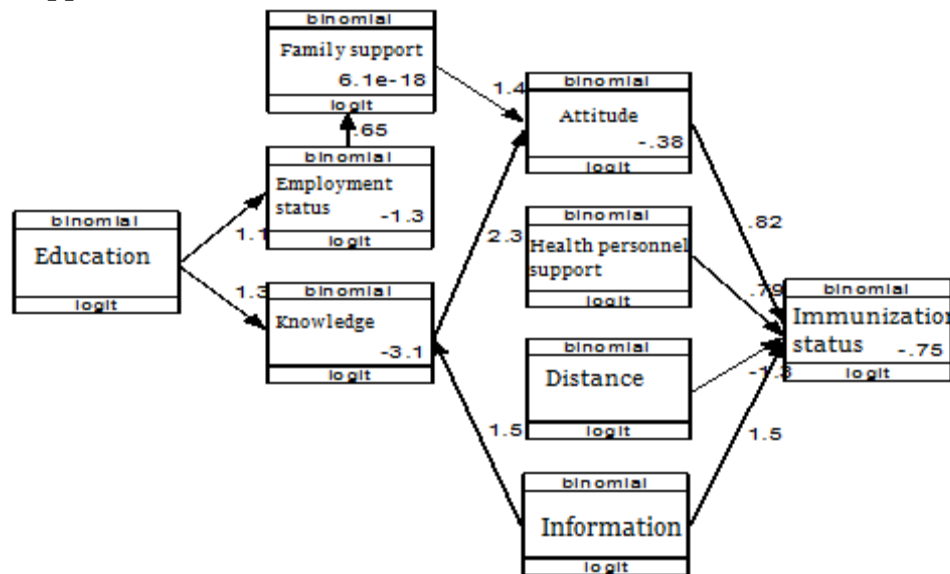


Figure 1. Model fit and parameter estimation of path analysis

Table 4. Path analysis on the determinants of complete basic immunization status in Bangkalan Regency, Madura

Dependent Variable	Independent Variables	Path Coefficient	CI 95%		p
			Batas Bawah	Batas Atas	
<b>Direct Influence</b>					
Complete Basic Immunization Status	← Attitude	0.82	0.10	1.55	0.027
	← Health workers support	0.79	-0.10	1.67	0.081
	← Distance of healthcare facilities	-1.28	-2.13	-0.44	0.003
	← Information exposure	1.52	0.75	2.29	0.001
<b>Indirect influence</b>					
Knowledge	← Information exposure	1.54	0.58	2.51	0.002
Knowledge	← Education	1.27	0.42	2.13	0.003
Attitude	← Family support	1.35	0.71	2.00	0.001
Attitude	← Knowledge	2.29	1.06	3.54	0.001
Family support	← Occupation	0.64	0.03	1.26	0.040
Occupation	← Education	1.12	0.51	1.75	0.001

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## DISCUSSION

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### **1. The influence of education toward complete basic immunization status**

There was an influence of education toward complete basic immunization status through knowledge and attitude, also there was the influence of education toward complete basic immunization status through occupation, family support, and attitude. The influence was positive and statistically significant.

Education is a social process in which a person is influenced by a guided environment (especially at school) hence it may achieve one's proficiency in the form of attitude and behavior that apply in the society (Good, 1997).

Education indirectly influences the process of maternal understanding on information and knowledge she acquires. Mothers with high education understand more easily new information and knowledge and is also more aware of the importance of immunization, it indirectly influences maternal attitude in performing something in accordance with the understanding acquired by a mother.

Rahmawati and Umbul (2014) stated that education has an influence toward immunization status, mothers whose educational level <9 years have 14 times bigger risk for generating immunization incompleteness compare to mothers whose educational level  $\geq 9$  years.

### **2. The influence of knowledge toward complete basic immunization status**

There was an influence of knowledge toward complete basic immunization status through attitude. The influence was positive and statistically significant. Knowledge on immunization possessed by a mother is a factor that influence mother's attitude in deciding whether or not her infant will

obtain complete basic immunization, which later influences her behavior to give complete basic immunization to her infant.

According to Green and Kreuter (2000) knowledge is a predisposing factor that influence one's behavior toward health since knowledge influences one's decision in performing health behavior, in addition one's knowledge on health is needed before health behavior transformation occurs.

A mother who has good knowledge on the benefits of complete basic immunization, the side effects that may occur, and the next immunization schedule has 4.41 times bigger possibility to give complete basic immunization to her infant compare to a mother who has insufficient knowledge.

Vonasek *et al.* (2016) stated that mother's knowledge on immunization influences the complete basic immunization status. A mother who has knowledge that immunization can protect children from diseases is likely to give complete immunization to her infant.

### **3. The influence of occupation toward complete basic immunization status**

There was an influence of occupation toward complete basic immunization status through family support and attitude. The influence was positive and statistically significant. Occupation is a predisposing factor which indirectly influence complete basic immunization status. A mother who is employed has 2.08 times bigger possibility to give her infant complete immunization compares to a mother who is unemployed.

An employed mother is likely to have higher educational level. High educational level will turn a mother to be more aware and understands the importance of complete basic immunization hence she will give her mother complete basic immunization. Working mothers are likely to

have limited time to take their infants to integrated healthcare post thus they will earn more family support to give their infant immunization in particular instrumental support which is taking the infants to immunization facilities.

According to Bbaale (2013) in his study mother's and father's occupation is an important point in the completeness of basic immunization status.

#### **4. The influence of attitude toward complete basic immunization status**

There was an influence of attitude toward complete basic immunization status. The influence was positive and statistically significant. Mother's attitude is a predisposing factor that influence mother's decision to give complete basic immunization. Green and Kreuter (2000) stated that behavior is one of the faint factors however it influences one's behavior change

Mothers with positive attitude generally understand that immunization is not something to concern about since the side effect is only temporary, to make their children not easily sick when they have grown up. Mother with negative attitude toward immunization have the opposite understanding instead, that immunization will make children restless and sick, immunization is also considered to be less beneficial since despite getting immunization the children are still possible to become sick when they have grown up. There are also some who have misled understanding that immunization is forbidden by religion since it carries lard hence those mothers are reluctant to give complete basic immunization to their infants.

According to Amin *et al.* (2013) parental attitude toward complete basic immunization influence infants' complete basic immunization status. Mothers who have unpleasant experience when they gave

their infant immunization in healthcare facilities are likely to have negative attitude toward the subsequent immunization, thus they are not coming back to the health facilities to give immunization to their children.

#### **5. The influence of distance of health-care facilities toward complete basic immunization status**

There was an influence of attitude toward complete basic immunization status. The influence was negative and statistically significant. The further the distance of health facilities are, the smaller possibility for mothers to give their children complete immunization.

Mothers whose dwelling place is far from healthcare facilities are unlikely to give basic immunization to their children, furthermore if the transportation access is insufficient to reach healthcare facilities.

Green and Kreuter (2000) stated that environmental condition, healthcare facilities availability, accessibility to healthcare facilities, and transportation availability are the enabling factors.

Short distance enables mothers to give their infants immunization, in contrast long distance sometimes hinders mother to give their infants complete basic immunization. It is in line with Kenny *et al.* (2015) that the long distance between dwelling place of a family and healthcare facilities may reduce the seek for and utilization of healthcare facilities moreover if accessing healthcare facility is costly.

#### **6. The influence of information exposure toward complete basic immunization status**

There was an influence of information exposure toward complete basic immunization status. The influence was positive and statistically significant. Information exposure is an enabling factor that influences maternal decision to give complete basic



immunization. Mothers who are often exposed to information have 7.72 times bigger possibility to give complete basic immunization to their infants.

Mothers who are often exposed to information will improve their knowledge in order to bring up the positive attitude on immunization and in the end deciding to give immunization to their infants that is demonstrated by behavior.

Abadura *et al.* (2015) stated that exposure of information media also influences children's complete basic immunization status. Family who is exposed to media (the utilization of television or radio once in a week at the minimum) has higher possibility to complete their children immunization compares to family who are less exposed to media.

### **7. The influence of family support toward complete basic immunization status**

There was an influence family support toward complete basic immunization status through attitude. The influence is positive and statistically significant. Family support is a reinforcing factor that influence maternal attitude and indirectly influence maternal decision to give complete basic immunization.

Green and Kreuter (2000) state that the reinforcing factors of behavior among others are family support, social support, peer support, government support, also recognition and punishment from both society and (governmental) organization

Family is mother's closest persons who will give information and/or suggestion as well as assistances to a mother thus family support greatly influences mother in making decision, therefore if the family supports the mother to give immunization to her infant, then the mother will be likely to have positive attitude and behave

positively in giving complete immunization to her infant.

Based on a study by Rahmawati and Umbul(2014) family support influences the completeness of basic immunization on infants. Family who does not give support to mother to give complete basic immunization to her infant has 193.5 times bigger risk compare to family who gives support to mother to give complete basic immunization to her infant.

### **8. The influence of health workers' support toward complete basic immunization status**

There was an influence of health workers' support toward complete basic immunization status. The influence was positive and statistically approaching significant. Health workers' support is the reinforcing factor that influence complete basic immunization status.

A study conducted by Ningsih *et al.*, (2016) and Hafid, Martini and Devy (2016) also showed the similar result, that health workers' support influence the completeness of infants' immunization status.

Health workers who give explanation about benefits, revisiting time, and side effect along with the management of the side effect will improve mothers' confidence to give immunization to their infants. The education from health workers on immunization is also needed to improve maternal knowledge as well as control the wrong perception on immunization among the society.

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