

Factors Affecting the Implementation of Immunization

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ABSTRACT Immunization coverage of vulnerable children is a critical indication of success in health development. This study aimed to determine the role of various factors in the basic immunization status of under five children. In Godean subdistrict, district of Sleman, Yogyakarta, interviews were conducted with 161 mothers of 14 to 59 months old children selected by stratified random sampling with the village as the unit of study and 27.3 per cent probability of being included in the study. Immunization status of children was recorded on an interval scale, with a value of 8 representing complete basic immunization status. We found that basic immunization status of children had significant relation to the level of mother's knowledge concerning immunization, the educational background of both mother and father, family income, and the number of children ($p < 0.05$). From the factors, the level of mother's knowledge about immunization had the most relation to immunization status (relative contribution was 73.9%). This factor was significantly influenced by the mother's formal educational background, the father's formal educational background, and family income ($p < 0.05$). Those factors necessarily should be included in the strategy of community education in order to increase the immunization coverage. [*Paediatr Indones* 1999; 39: 108-115]

Introduction

The Expanded Program on Immunization (EPI) is an important national program to reduce the infant morbidity and mortality in Indonesia because the incidence of the diseases that can be prevented by immunization is still quite high. The EPI that has

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been carried out since 1977 has made good progress but the coverage of immunization is not yet satisfactory, and significant morbidity and mortality from disease preventable with immunization continues to be prevalent.¹ Gunawan² reported immunization coverage in 1985 as follows: BCG 52%, DPT II 37%, DPT III 11%, measles 11%, OPV III 10%, and tetanus toxoid of the mother 24%.

Studies on immunization coverage was conducted by Sudaryat³ in urban Denpasar, Bali. The respondents were visitors to the outpatient clinic of Sanglah Hospital. The findings showed that the coverage of BCG, DPT I, and OPV I on children of 3-4 months or less was still low, i.e., 20%, 30%, and 30% respectively. Meanwhile, the coverage of BCG, DPT II, and OPV II vaccine in 4-9 month children is quite high. i.e., 79.7%, 79.7% and 76.3% respectively, while the coverage of BCG, DPT III, and OPV III immunization in 9-14 months children was 84%, 68%, and 66%. However, in some health centers the coverage of immunization was much lower. From the analyses of health center activities of Mother and Child Health Clinic in three provinces, Yogyakarta, South Sulawesi, and South Kalimantan, the coverage of the immunization program was much lower.⁴ In Yogyakarta, in accordance with a survey on the coverage of immunization in 1985/1986, the reasons for incomplete immunization were the sickness of the babies/children on the day of immunization (39%), and the lack of information / knowledge concerning the need for repetition of immunization (25%). This indicates that understanding of villagers regarding immunization is still low. Setiady¹ reported that those who play a major role in increasing the coverage of immunization are the health center doctors as well as community participation especially by village leaders and the members of woman organization because many mothers do not know much about immunization. The purpose of this study was to determine the role of some factors influencing basic immunization status of children in villages located in Yogyakarta. It is hoped that the result of this study can be usefully included in planning the strategy to increase immunization coverage.

Methods

This study was carried out in the subdistrict of Godean, district of Sleman, Yogyakarta with a sample of mothers who had children of 14 months to 5 years old, selected using a stratified random sampling method. Hamlets or villages were used as the research units with probability of 27.3% included in the sample. The data was collected through interview with the mothers carried out by trained interviewers. The interview covered child identity, parents identity, educational background of parents, number of children, family income, level of mother's knowledge concerning immunization, distance of immunization location, information sources, motivators, and the current immunization status of the child.

The formal education of parents was measured as years attending school, while the

level of mother's knowledge of immunization was assessed by 18 questions related to immunization and was classified with a total corrected score of 0-18. Child immunization status was measured using an interval scale with a value of 8 referring to complete basic immunization (once BCG, three times DPT, three times OPV and once measles vaccines). At the time of this study, hepatitis B vaccine was not yet available in some immunization posts, therefore this vaccine was not included in the evaluation of immunization status of the child.

Results

Data analysis of 161 acceptable interviews was carried out. Table 1 shows the characteristics of the families sampled. This table shows that most mothers had a level of knowledge about immunization which was categorized as fair (54.0%) in spite of the fact that most of the mothers only had formal education of elementary school or less. It also can be seen that the majority of the mothers were non-working mothers (60.9%), had one child (36.0%), and the distance of the immunization location did not give any problem for most of the mothers.

To know the correlation between some variables and the basic immunization status of the child, a regression analysis was performed (Table 2). From Table 2, it can be concluded that the variables and the basic immunization status of child are significantly correlated ($p < 0.05$).

Table 3 shows how much each variable gives relative contribution. From Table 3 it can be seen that the mother's knowledge about immunization was the most contribution factor to the immunization status of child.

To know the correlation between mother's job and basic immunization status of child covariance analyses was used (Table 4). Table 4 shows that there was no correlation between mother's job and the quantity of child immunization ($p > 0.05$).

Based on the consideration that the level of mother's knowledge about immunization plays a major role in determining the status of child immunization, the relation between the level of mother's knowledge about immunization and some other variables was analyzed (Table 5). Table 5 shows that mother's education, father's education, and family income have a significant correlation with the level of mother's knowledge on immunization ($p < 0.05$).

This study found that there were 7 types of information sources concerning immunization. The most common source of information for the mothers was from the health workers (32.8%) (Table 6). Regarding motivation to obtain immunization most mothers brought their child to the immunization service location based on their own desire (36%), or because they were asked to come by the village headman (34.6%). See Table 7.

Table 1. Characteristics of the families (n = 161)

Characteristic	n	Percentage
Maternal knowledge of immunization		
▪ Poor (0-6)	51	31.7
▪ Fair (7-12)	87	54.0
▪ Good (13-18)	23	14.3
Maternal education (yr.)		
▪ 0	14	8.7
▪ 1-6	92	57.1
▪ 7-9	30	18.6
▪ 10-12	22	13.7
▪ 13 or more	3	1.9
Paternal education (yr.)		
▪ 0	6	3.7
▪ 1-6	71	44.1
▪ 7-9	38	23.6
▪ 10-12	41	25.5
▪ 13 or more	5	3.1
Mother's occupation		
▪ working	63	39.1
▪ not working	98	60.9
Number of children		
▪ 1	58	36.0
▪ 2	49	30.4
▪ 3 or more	54	33.6
Distance to immunization service location		
▪ very far (>2 km)	2	1.2
▪ far (1-2 km)	9	5.6
▪ close (0.5-1 km)	137	85.6
▪ very close (<0.5 km)	13	8.1
Immunization received		
▪ None	1	0.6
▪ BCG only	0	0.0
▪ BCG + incomplete DPT & OPV	37	23.0
▪ BCG + complete DPT & OPV	25	15.5
▪ BCG + incomplete OPV + Measles	26	16.1
▪ BCG + complete OPV + Measles	70	44.8

Table 2. Regression analysis of some variables* and basic immunization status

Source of variance	Sum of squares	df	Mean square	F	p
Regression	21.58	5	4.32	2.37	0.04
Residual	249.05	137	1.82	-	-
Total	270.63	142	-	-	-

*Level of mother's knowledge on immunization, mother's education, father's education, family income, number of children

Table 3. Correlation coefficient between immunization status of subjects with family characteristics

Variable	Correlation r _{xy}	Contribution r (%)
Mother's knowledge on immunization	0.26	73.9
Mother's education	0.15	11.4
Father's education	0.03	1.9
Family income	0.13	4.4
Number of children	0.09	8.5
Total		100.0

Table 4. Correlation between immunization status with mother's occupation*

Source of variance	Sum of squares	df	Mean squares	F	p
Between groups	1.18	1	1.18	0.65	0.57
Within groups	247.88	136	1.82	-	-
Total	249.05	137	-	-	-

Covariables: level of mother's knowledge on immunization, mother's education, father's education, family income, number of children.

Table 5. Regression analysis * and variance analysis** of some variables and level of mother's knowledge on immunization

Variable	F	p
Mother's education	29.86	0.000
Father's education	9.09	0.6
Family income	19.04	0.000
Number of children	0.3	0.28
Mother's occupation	1.3	0.25

* Variables: mother's education, father's education, family income, number of children.

** Mother's occupation

Table 6. Sources of information on immunization

Source	n	Percentage
Health worker	83	32.8
Village headman	66	26.1
Health cadre	45	17.8
Mass media	24	9.5
School subjects	22	8.7
Friends	8	3.2
Other sources	5	1.9
Total	253	100.0

Table 7. Motivator for obtaining child immunization

Motivator	n	Percentage
Own desire	58	36.0
Village headman	56	34.8
Health worker	28	17.4v
Health cadre	9	5.4
Family member	4	2.5
Friends	2	1.2
Others	4	2.5
Total	161	100.0

Discussion

One of the measures of the success of an immunization program is its coverage achievement. Children of 14 months of age and older should have been vaccinated completely. This study found that only 44.2 per cent of the subjects had received complete immunization. Further analysis showed that the completeness of immunization was related to the level of mother's knowledge about immunization. It is no wonder that mothers who have high level of knowledge about immunization will pay more attention to their children's health more than those who have less knowledge.

conducted research in Honduras and the result showed that only a few mothers knew immunization well. The majority of the mothers in Honduras perceived that the function of vaccine was not preventing but curing diseases, vaccine was not recommended for mildly sick children, side-effects such as the increased body temperature were taken seriously, and they did not know the ages at which a child must be vaccinated.

According to a study in the Kulonprogo district, Yogyakarta, Singarimbun et al⁷ reported that knowledge of mothers about immunization function was still poor, only a few mothers had adequate knowledge of DPT vaccine (10.6%), of BCG (10.0%), of OPV (43.0%). However, knowledge on how long vaccine will function was quite good. One third to three fourth of respondents knew at what age a child must receive immunization. It was found that there was a relation between level of mother's knowledge immunization, mother's formal education, family income, and father's education. It that the better the formal education a mother had, the more easily she gets can be easily understood information about immunization, and the higher the family income, the better the child's health will be taken care of. Our study found that 65.8% of the respondents were low educated mothers, having only elementary school education or no formal education at all.

Singarimbun et al⁷ reported that there was a relation between mother's formal education and knowledge of the prevented diseases, the ages at which a child should be immunized, and how many times a child should be vaccinated. Mother's formal education and family income cannot be manipulated in the short term, hence programs must seek to improve mother's knowledge about immunization in order to achieve higher coverage. But, for any attempt to conduct the health education in the community, the material and the methods should be in conformity with the local conditions and the educator must be interesting and understandable, Singarimbun et al⁷ emphasized the importance of using easy words/terms for educating the mothers.

Father's formal education, in this study, had a unique position: even though it did not have a direct relation to the status of immunization of the child, it was significantly related to the level of mother's knowledge on immunization. Therefore, father should be included or involved in improving the coverage of immunization. Information about immunization should not only be given to the mothers but to the fathers as well.

There were two important information sources who could help to improve the implementation of immunization: the village headman and the health worker. They should encourage mothers to bring their babies or children to the place of immunization. Singarimbun et al. reported the same thing⁷, finding that mothers get immunization information from the village headman (66.1%), health workers (50.7%), immunization workers (13.9%), and about 10% from other sources.

The function of health cadres in giving the information about immunization to the village mothers was still low (17.8%) and their activities in motivating the mothers to bring their babies to the immunization post was weak also (5.6%). Further research on the role of health cadre in supporting the immunization program is strongly suggested because health cadres are directly in contact with the community.

The level of mother's knowledge about immunization plays a major role in accelerating immunization coverage. Knowledge improvement is therefore needed but the local conditions of the respondents should be taken into consideration in providing such information. Further study on the potential role and effectiveness of cadres in increasing immunization coverage is needed.

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