

## Missed Opportunities for Immunization at The Out-Patient Clinic: Prevalence and Related Factors

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**ABSTRACT** From November 1992 through January 1993 a cross sectional study was conducted to determine the prevalence and related factors of missed opportunities for immunization (MOI). The study involved 280 babies aged less than 12 months. Interview was performed by using a questionnaire as the babies left the clinic after seeing the clinic personnel (exit interview). The primary source of information was the accompanying person and their immunization card. There were 149 (53%) male and 131 (47%) female babies. A total of 208 babies (74.3%) stated to have immunization card, although only 19 (9.1%) took it at the time of the study. Out of 234 babies (83.5%) with partial immunization status, 9 had contraindication to immunization. Among 225 babies without contraindication, only 88 babies were suggested to have immunization. MOI was found in 137 (48.8%) babies (95% confidence interval: 43%; 55%). Concerning the kind of vaccine, OPV was the most often missed. Of 88 babies (31.4%) suggested for immunization, 43 agreed and had been given various vaccines including simultaneous immunization at the Well-Child Clinic. Screening for immunization not consistently practiced, missed interpretation to contraindication was detected. Among babies suggested for immunization, significant relationships were found between the number of children in the family ( $p < 0.05$ ), father's ( $p < 0.05$ ) and mother's education ( $p < 0.001$ ) and acceptance to immunization. [*Paediatr Indones* 1996; 36:146-154]

### Introduction

The Expanded Programme on Immunization (EPI) has been conducted in Indonesia since 1977/1978, to give protection against six infectious diseases to all children.

Ideally the basic immunization should be given before the baby's first birthday.

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Eventhough Universal Child Immunization (UCI) achieved nationally in 1990,<sup>1</sup> and immunization services distributed in all health facilities, not all babies attend primary health care or other health facilities to get immunization;<sup>2</sup> so that the opportunity to get immunization is missed. Theoretically missed opportunities for immunization (MOI) may occur in two major settings. The first during visit for immunization and other preventive services. The second during visits for curative services. In both settings, eliminating missed opportunities will raise the overall immunization cover- age.<sup>3</sup> The purpose of this study is to know the prevalence and related factors of MOI at the out-patient clinic of Pirngadi Hospital Medan.

## Methods

The study was conducted at the out-patient clinic at the Pirngadi Hospital from November 1992 until January 1993. The population under study was all attending babies (aged less than 12 months). Babies who were not accompanied by parent or caretaker were excluded. By using the formula<sup>4</sup> sample size calculated were 280 (95% confidence interval, 0.7 estimated proportion of MOI and 0.1 bound of error). This study was performed cross-sectionally by using a prepared questionnaire after the subjects seeing the health worker (exit interview).<sup>5</sup> The source of information was the parent or caretaker and their immunization card. Data collected were age, sex, body weight, number of sibling, dates of previous immunization and age of the parents and their educational level. Body weight was measured by using baby scale (Tanita) with the precision of 10 g. Nutritional status was determined by plotting body weight in The Road To Health Card. After examination, if the parent or care- taker agreed we suggest to bring the baby to immunization services.

## Definitions

*Fully immunized* was defined if baby's immunization status has completed according to age and interval. *Partially immunized* refers to the condition of baby's immuniza- tion status has not fully accomplished to the age and interval. *Up to date for immuni- zation* means that the baby has already been given all the vaccines for which the baby eligible by age criteria. MOI means the baby with partially immunization status with- out contraindication, but does not receive vaccine according their requisites. Schedule and contraindication to immunization for all kind of vaccines consistently referred to the EPI.<sup>1</sup> The prevalence of MOI was calculated as the number of babies without con- traindication to immunization who visited a health care center and remained not fully immunized or up dated divided by the total number of babies in the study population.

## Statistical analysis

Computer statistical program (True Epistat) was used in data analysis. Associations between two nominal qualitative variables were tested by chi-squared between two

proportions; chi-square for trend was used to test trend among ordinal qualitative variables. The level of significance was  $p < 0.05$ .

## Results

The Pediatric Out-Patient Clinic of Pirngadi Hospital had 6 medical staffs consisted of two pediatricians, two residents of pediatric and two paramedical personnel. Immunization was provided at the Child Health Clinic. Every kind of vaccines could be given daily.

Out of 280 babies, 149 (53%) were male and 131 (47%) female. A total of 225 (77%) was in the age group of 2-8 months (Table 1). Despite 208 (74.3%) babies stated to have immunization or Health To Road Card, only 19 (9.1%) brought them at the time of study. Most babies (78%) were well-nourished, but 4% had severe malnutrition (Table 2). Two-hundred and seven (74%) babies had 1-2 siblings. There was a significant trend that the larger number of siblings, the greater rate for MOI (Table 3).

Table 1. Age and sex distribution

Age (mo)	Sex		Total	%
	Male	Female		
0-1	6	9	15	6
2-8	120	95	215	77
9-12	23	27	50	18
Total	149	131	280	100

Most parents were young; 162 (58%) fathers were in the 25-34 years age group, while 168 (61%) mothers in the 20-29 years age group (Tables 3 and 4). There was no relationship between either father's and mother's age and MOI. Only 17% of all fathers and 22% of all mothers had low educational level (9 years or less). Most parents had more than 9 educational years, 83% for fathers and 78% for mothers. The greatest proportion of MOI was found in low educated group (Table 6). There was significant relationship between both parents education and the rate of MOI ( $p < 0.05$ ).

Fully immunization status was found in 46 (16.5%) of the subjects. Two hundred and twenty-five (96%) of 234 partially immunized babies had no contraindication for immunization. Of 9 babies who had contraindication, 3 had history of seizures and 6 got fever with body temperature higher than 38.8°C. Eighty-eight (31.4%) babies were offered for immunization by health providers, and 43 (49%) of them agreed. The remaining 45 (51%) rejected to be immunized.

Table 2. Nutritional status

Nutritional status	Total	%
Well-nourished	218	78
Mild/moderate malnutrition	51	18
Severe malnutrition	11	4

Table 3. Number of siblings in the family

Number of siblings	MOI				Odds ratio
	Yes		No		
	Total	%	Total	%	
1-2	118	57	89	43	1.0000
3-4	45	88.2	6	11.8	4.1472
>4	19	86.4	3	13.6	4.6694

Table 4. Father's age

Age (years)	Total	%
< 25	18	6.0
25-34	162	58.0
35-44	91	33.0
> 45	9	3.0
Total	280	100.0

Table 5. Mother's age

Age (years)	Total	%
Less than 20	4	1.0
20-29	168	61.0
30-39	101	37.0
more than 40	4	1.0
Total	280	100.0

Table 6. Parents' education

Education (yr)	Father's				Mother's			
	MOI				MOI			
	Yes		No		Yes		No	
	Total	%	Total	%	Total	%	Total	%
<9	43	81.1	10	18.9	74	71.8	29	28.2
>9	139	61.2	88	38.8	105	59.3	72	40.7

In this study we found 137 (48.8%) babies without contraindication but did not offer for immunization. Almost of them come to the clinic for the illness with fever as the main complaint. For some vaccines fever is not contraindication. It means the prevalence of MOI was 48.8% (SE 3%; 95% confidence interval: 43%; 55%). Ninety-six (70%) of 137 MOI babies, the parents or caretakers agreed if their baby immunized in the visiting day.

There was no significant relationship between age, sex, and nutritional status and parents or caretakers acceptance to immunization. There was significant relationship between the number of siblings and parents or caretakers acceptance to immunization in offered group babies ( $p < 0.05$ ). We also found a significant relationship between either father's education ( $p < 0.05$ ) or mother's to parents or caretakers acceptance to immunization. The characteristics of 88 babies offered for immunization and their parents or caretakers acceptance to immunization is shown in Table 7.

In all 137 babies experienced MOI, according to vaccine or pair of vaccines missed DTP+OPV was the highest proportion (44%), followed by OPV, BCG+DTP+OPV and BCG (Table 8). OPV was the most often missed, followed by DTP, BCG and Measles (Table 9). All of the 43 babies agree to immunized, received all kind of vaccines needed at the Well Child Clinic.

## Discussion

Most of the babies (74.3%) as stated by the parents or caretakers had Immunization or Road to Health Card, but only 19 (9.1%) brought it during health care visit. It shows that taking the Immunization or Health Card in every health care visit has not a habit yet. All of parents or caretakers attend the out-patient clinic to seek help for their sick babies. Maybe it was the reason they did not take the Immunization Card. Actually in every health care visit, it should be taken since card monitoring may be used as one of some actions to reduce MOI.<sup>3,6</sup>

Most parents had well-nourished babies with 1-2 children in the family. It is possible as positive impact of Family Planning Program. However, malnourished babies are

Table 7. The characteristic of 88 babies were offered for immunization and parent or caretaker acceptance to immunization

Characteristics of baby and parent		Acceptance of Parents or caretakers		p*
		Accept	Reject	
<b>Baby</b>				
Age (mo)	0-1	3	2	NS
	2-8	33	40	
	9-12	7	3	
Sex	Male	23	27	NS
	Female	20	18	
Nutritional status	Well-nourished	25	32	NS
	Mild malnutrition	16	12	
	Severe malnutrition	2	1	
Number of siblings	1-2	21	10	<0.05
	3-4	14	21	
	>4	8	14	
<b>Parents:</b>				
Father's age (yr)	<25	5	5	NS
	25-34	23	29	
	35-44	13	9	
	>45	2	2	
Mother's age (yr)	<20	0	1	NS
	21-29	19	23	
	30-39	23	21	
	>40	1	0	
Father's education (yr)	0-6	2	9	<0.05
	7-9	8	15	
	10-12	27	19	
	>12	6	2	
Mother's education (yr)	0-6	2	8	<0.001
	7-9	2	14	
	10-12	32	21	
	>12	7	2	

Note: \*Chi-square test; NS=Not significant

Table 8. Pair of vaccine(s) missed in babies with MOI

VACCINE(S)	TOTAL	%
DTP+OPV	61	44
OPV	30	22
BCG+DTP+OPV	14	10
BCG	13	10
Measles	10	7
DTP+OPV+Measles	8	6
BCG+DTP+OPV+Measles	1	1
Total	137	100

Table 9. Kind of vaccine missed

VACCINE	TOTAL	%
OPV	114	83
DTP	84	61
BCG	28	20
Measles	19	14

still found, even though the number was small. With a few number of children, more attention could be given including attention to their health. The smallest rate of MOI was found in small number of baby's siblings (see Table 3). The table also shows that there was significant trend of MOI by increasing number of children. This was consistent to Lubis<sup>7</sup> finding, that the higher the order the infant, the greater the rate for MOI. Another study from Lubis<sup>8</sup> also found that the highest proportion of clinical attendants was the first. Proportion of clinical attendance decrease steadily with the increase birth order in the family.

Another impact of Family Planning Program was seen in the parent's age. Only 6% of fathers and 1% of mothers came from younger age group. We did not found significant relationship between either father's and mother's age and MOI (Tables 4 and 5).

Nine out of 234 babies with partially immunization status had contraindication, 3 had history of seizure and 6 presented high temperature. In fact 225 babies have no contraindication for specific vaccine, and 88 of them offered for immunization. It indicated the screening for immunization had been practiced. Only 43 (49%) agreed and the remaining 45 (51%) disagreed to be immunized.

In 43 offered and immunized babies, all of them receive all kind of vaccines needed. They included single vaccine and combine of two or more kind vaccines (simultaneously). This result different to Lubis found, where simultaneous immunization had never been practiced at Primary Health Center.

Forty five out of 88 offered for immunization the parents or caretakers disagree to immunized their babies, even though contraindication not detected. Almost all parents or caretakers explained their babies were sick and need not any vaccine at the day. It means that lack of knowledge about immunization is still found. This is a form of challenge when we wish to maintain high immunization coverage. According to WHO, those conditions not belong to MOI.<sup>9</sup>

In offered immunization-group babies, there was significant relationship between number of child in the family (sibling number) and parent or caretaker acceptance to immunization ( $p < 0.05$ ). The higher proportion rate were presented in smallest number of children. We also found significant relationship between father's education and parent or caretaker acceptance to immunization ( $p < 0.05$ ) and highly significant between mother's education and parent or caretaker acceptance to immunization ( $p < 0.001$ ). Lubis from his study also found highly significant correlation between parent education and their knowledge, awareness or attitude to immunization.<sup>10</sup>

Screening for immunization was not consistently practiced. There were 137 (48.8%) babies who did not screened or advised for immunization even though there was no contraindication. Thus the rate of MOI in this study is 48.8% (SE=3%; 95% confidence interval = 43%-55%). According to Guerin,<sup>11</sup> MOI rates vary from 0-76% during visit the health facility. Study's MOI in 10 developing countries in curative health services reveal the rate among 0-99% (median 41%).<sup>3</sup>

Ordinary screening in health facility was found to be important in ensuring that eligible persons were immunized during visit for services other than immunization. A study from Loevinsohn<sup>12</sup> shows the importance of using screening at curative services. In that study, two interventions approaches were investigated. The first, the place for vaccination moved very close to the consulting room. The second, the doctor seeing the infant, wrote prescription recommending vaccination for the child. No difference found between the two approaches. Thus, screening and immunizing before or after the physician's consultations were equally effective.

Another possibility of MOI is caused by misinterpretation of health worker to contraindication. The fact is that none of health worker in the clinic had specially trained about immunization. To avoid this type of missed opportunity, health workers should have in-service training and be remained periodically through posters and supervisory visits about the true contra indications to immunization.<sup>3</sup>

There were 114 (83%) of 137 MOI on OPV vaccine. Most of them visit the clinic with fever that were not contraindication for OPV immunization. It is the warning for Poliomyelitis Eradication Program in our country.<sup>13</sup> This result was different to other studies in developing countries, that shows BCG and Measles were the most often missed.<sup>3</sup>

Ironically most of MOI cases (70%), the parent or caretaker claimed that they agreed their babies immunized in the visiting day. If that was the case, the majority of MOI can be avoided. This result also indicated as in other countries that parental refusal to immunize that child was a reason for missed opportunities.

The prevalence of MOI was high (48.8%, 95% confidence interval = 43%-55%), and OPV was the most often missed. Screening for immunization was not continuously and consistently practiced. The factors influence the MOI were number of sibling in family, and both parents education.

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