

Factors related to missed opportunities for immunization at urban and suburban primary health centers in Medan

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Abstract

Background Missed opportunities for immunization is one of the important causes of low immunization coverage that should be prevented.

Objective To investigate missed opportunities for immunization and related factors at urban and suburban primary health centers in Medan.

Methods A cross sectional study was conducted between January-March 2004. Primary health centers in Medan were divided into urban (20 primary health centers) and suburban (19 primary health centers) groups. The sample size was 109 children who visited primary health centers for immunization. Study was done by a questionnaire taken after infants received immunization (exit interview).

Results The proportion of missed opportunities in urban and suburban area was 22.3% (95% CI 16.9%;27.7%) and 29.9% (95% CI 24.0%;35.2%) (P=0.191), respectively. Factors such as age of starting immunization, number of children more than 4, and low parental attitude about immunization (P=0.001) were related to missed opportunities for immunization.

Conclusions There is no difference between proportion of missed opportunities at primary health centers in urban and suburban area. Related factors to missed opportunities for immunization are age of starting immunization older than 3 months, number of children more than 4, and low parental attitude about immunization. [Paediatr Indones 2007;47:21-26].

Keywords: missed opportunities for immunization, urban primary health center, suburban primary health center

Immunization is the most effective mean to prevent the morbidity and mortality associated with a number of infectious diseases.¹ Through its expanded program on immunization (EPI) that has been started since 1977/1978, Indonesian Government has coordinated efforts to reach universal child immunization (UCI) at the end of 1990.^{2,3} Despite the efforts being made, there are still enclaves of low vaccination coverage that threaten the disease eradication and increase the risks of epidemics.⁴ The possible causes of low vaccination coverage are numerous but an important contribution that should be prevented arises from missed opportunities for immunization in children.⁵⁻⁷ These are defined as any visit to healthcare centers by a child with incomplete immunization schedule and no contraindications to immunization without administration of the necessary doses(s) of vaccine.⁸ In general, studies have found that

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if missed opportunities were eliminated, coverage rates would be substantially higher (increased approximately 20%).⁹

Missed opportunities for immunization commonly occur in preventive medical centers such as primary health centers and in curative medical centers such as hospitals.^{4,8,10} Primary health care is one of the medical center that is mostly attended by people (5.67% in urban and 10.58% in suburban area).¹¹ Studies done in many countries including Indonesia showed that the proportion of missed opportunities for immunization was 74% (1986).¹² In Medan, Lubis *et al*¹³ (1993) found 56% (95% CI 50%;62%) and Abu Bakar *et al*¹⁴ (1996) found 48.8% (95% CI 43%;55%). Szilagyi *et al*⁵ (New York, 1993) found that missed opportunities contributed for 24% of the total undervaccination time in the urban and 38% in the suburban practice. Factors that associated with missed opportunities for immunization consist of parental, provider and system factors.^{5,6} Luman *et al*¹⁵ found that parents/mothers have direct responsibility for ensuring their children to receive proper immunization. The aim of this study was to investigate proportion and related factors of missed opportunities for immunization at urban and suburban primary health centers in Medan.

Methods

A cross sectional study was conducted at different primary health centers in Medan, North Sumatera from January to March 2004. Subjects were parents and children attending the primary health centers. A minimal sample size estimation was based on two proportion formula, yielding 109 respondents visiting primary health centers for immunization.¹⁶ Inclusion criteria were parents having children aged 0-1 year old, parents agreed to participate in this study, and brought along a health card. Respondents were excluded if they were absent during interview.

An interview was performed using a questionnaire taken after visiting the health center (exit interview). The interviewers were trained and the questionnaire was tried out before the study. Parents were interviewed using a questionnaire comprising characteristics of the respondents e.g. socioeconomic status, age of starting immunization, number of children, parental education, parental knowledge, attitude and psychomotor about immunization. Socioeconomic status was classified based

on the criteria of the National Coordination Board on Family Planning.¹⁷ Age of starting immunization was classified as before or after three months old. The number of children was classified as less and more than four children.¹⁸ Parental education was classified as low (not graduated from primary school), moderate (graduated from junior high school) and high (graduated from senior high school, academy, or faculty).¹¹ Questionnaire about knowledge, attitude and psychomotor on immunization was based on protection motivation theory.^{19,20} Good knowledge, attitude and psychomotor on immunization was defined as total scored ≥ 30 and low if < 30 .

The indication and contraindication for immunization followed those of Ministry of Health.²¹ An infant was judged as fully immunized if he or she has completed all vaccine doses recommended by Health Ministry. Partially immunized infants referred to the condition of an infant who was not being fully immunized yet. Updated for immunization meant that the infant had already been given all the vaccine doses for which the infant was eligible previously. Missed opportunities for immunization referred to any visit to the health facility by the infant who is partially immunized and not updated or immunized.⁸ This study was proved by Research Ethics Committee, Medical School, North Sumatera University.

Statistical analyses were done by chi-square test and multivariate analysis using the SPSS program version 11.0. Associations between two nominal qualitative variables were tested by chi square. Multiple logistic regression was used to control confounding factors and get independent factors. The level of significance was $P < 0.05$.

Results

From 122 children in suburban and 116 children in urban primary health centers, 9 children were excluded from the study, because they were not taken by parents/caretakers. They consisted of 5 children in suburban and 4 children in urban primary health centers. Totally there were 229 children consisted of 117 children in suburban and 112 children in urban primary health centers. Based on location of primary health centers, children with fully immunized in urban area were more than those in suburban area (Table 1).

Table 1. Association of immunization status with location of primary health centers

Primary health centers	Immunization status				P
	Fully		Partial		
	n	%	n	%	
Suburban	16	14	101	86	0.06
Urban	26	23	86	77	

Table 2. Respondents characteristics

Characteristics	Suburban		Urban		P
	n	%	n	%	
Children's sex					0.823
Male	62	53	61	55	
Female	55	47	51	45	
Children's age					0.483
0-6 months	51	44	54	48	
7-12 months	66	56	58	52	
Father's education					0.001
Low	17	15	0	0	
Moderate	26	22	25	22	
High	74	63	87	78	
Mother's education					0.001
Low	16	14	6	5	
Moderate	38	23	16	14	
High	63	53	90	80	
Father's job					0.001
Private	62	53	16	14	
Civil servant	2	2	13	12	
Others	53	45	83	74	
Mother's profession					0.03
House wives	83	70	93	83	
Employee	34	30	19	17	
Age of starting immunization					0.610
≤3 months	93	79	92	82	
>3 months	24	21	20	18	
Social economic status					0.005
Low	23	20	14	13	
Moderate	81	69	67	60	
High	13	11	31	27	
Number of children					0.070
<4	29	25	17	15	
≥4	88	75	95	85	

Table 3. Multiple logistic regression analysis to show associations between variables

Variables	B	df	P
Lower mothers education	0.921	1	0.230
Lower social economic status	0.478	1	0.672
Number of children (≥4 person)	4.948	1	0.001
Age of starting immunization (>3 months)	5.405	1	0.001
Lower parental knowledge	0.148	1	0.905
Lower parental attitude	4.774	1	0.001
Lower parental psychomotor	-3.541	1	0.948

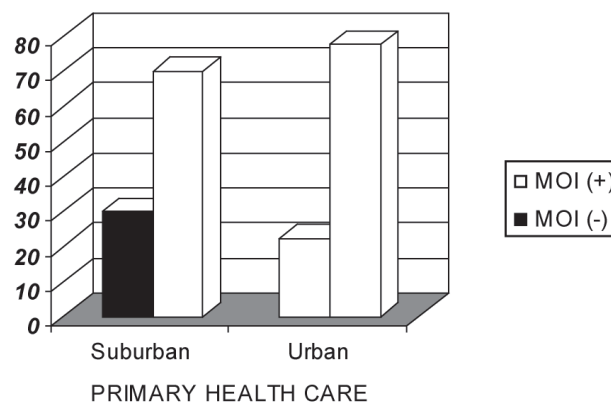


Figure 1. Association between location and proportion of missed opportunities for immunization

There was no significant difference between respondents' characteristics in suburban and urban area except for parental education, parental occupation and social economic status (Table 2).

Also, there was no significant difference in term of parental knowledge, attitude, and psychomotor on immunization between respondents who lived in suburban and urban area (Table 2).

Proportion of missed opportunities for immunization in suburban was 29.9% (95% CI 24%;35.2%) and in urban was 22.3% (95% CI 16.9%;27.7%). That difference was statistically not significant (P=0.191) (Figure 1). Although in bivariate analysis there were significant association between mothers education, social economic status, age of starting immunization, number of children, parental knowledge, attitude, psychomotor and proportion of missed opportunities for immunization (data not shown), but after multiple logistic regression analysis, factors that significantly related to missed opportunities for immunization were age of starting immunization, number of children, and parental attitude (Table 3).

Figure 2 shows that the most kind of vaccine that were not given by providers to a child when he/she visited primary health care centers caused by any reasons and not by contraindications to immunizations was DTP (42%). This percentage was both for urban and suburban area. This number was for DTP alone (not combination with measles, hepatitis B or BCG) because many children did not get DTP when he/she visited primary health care centers although immunization status was not complete.

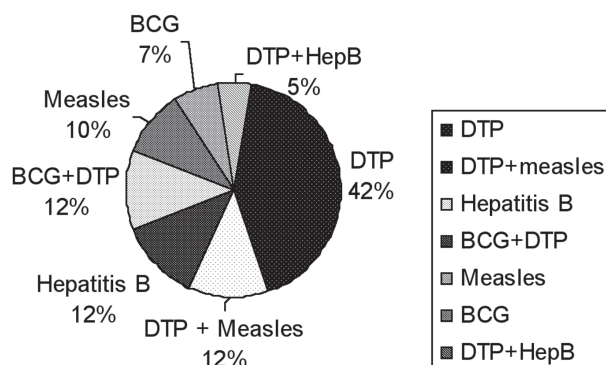


Figure 2. Percentage of vaccine most missed in primary health centers.

Discussion

This study found that there was insignificant difference of proportion of missed opportunities for immunization between urban and suburban primary health centers. Immunization is one of main program at every primary health center in Medan. Results of this study is similar with data of SUSENAS 2001 which found that percentage of fully immunization in urban is higher than that in suburban, but there is no data about missed opportunities in urban and suburban area.²²

Parental attitudes include health beliefs about the safety and efficacy of vaccines, the severity of vaccine-preventable diseases, and the priority parents place upon giving immunization to their children.^{23,24} A survey reported that parental forgetfulness and not knowing when immunization were barriers to immunization.⁹ In this study, we found that low parental attitude was associated with missed opportunities for immunization. Parental knowledge plays a role in immunization but it does not specifically indicate parental attitudes. Lubis *et al*¹³ found that proportion of missed opportunities for immunization was highest in low parental education but Ali *et al*²⁵ found that good parental knowledge was not always parallel with good parental attitudes either.

Santoli *et al*⁹ found that infants who were late in starting their immunization series by 3 months of age were at risk for not completing the recommended series by 24 months of age. In this study we found that children who started their immunization series by 3 months of

age had tendency to have missed opportunities for immunization. Dietz *et al*¹⁸ found that children who didn't receive first doses of DTP and OPV by 3 months of age were at increased risk of not completing the recommended immunization series on time. Children who begin their immunization series late must be considered as a marker for high risk and parents of such children should be targeted for intensive education.

This study found that number of children in family associated with missed opportunities for immunization. Maybe this is also the case that the higher the number of infants, the rarer the infants are taken to the clinic for immunization. Lubis *et al*¹³ found that there were significant trends between the birth order of the infant in the family with the rate of missed opportunities. Abu Bakar *et al*¹⁴ also found the association between number of children with missed opportunities for immunization.

In this study, we found DPT vaccine was the almost missed. This data is similar with Lubis *et al*¹³ and Gust *et al*.²⁶ Relative contraindications to immunization such as fever, common cold, otitis media, are common and difficult to manage.²⁷ This issue is complex because in primary care setting many factors affect the decision to vaccinate. Some parents are reluctant to accept immunizations when their children have an illness, but after having given accurate information about the benefits and risks of immunization, most parents would probably desire to immunize their children despite the present of minor acute illness. Therefore, it is important to improve parental knowledge, attitude and behavior about safety of vaccination and true contraindications.

There are several efforts to reduce proportion of missed opportunities for immunization, as follows:^{1,9}

- Parents are given factual information of vaccination to counteract misconceptions and misinformation about immunization. We also implement community education program on the importance of immunization to clarify misconceptions about adverse effects and erroneous contraindications.
- Providers always investigate the need for vaccination during every visit of a child to the health care centers. Therefore, parents always remember to immunize their children.
- Providers always use combined or simultaneous immunization so parents do not need go to health centers repeatedly.

- Primary health centers must be easily accessible to the public with extended opening times and short waiting period and also have adequate supplies of vaccines.

The limitation of the study is that we did not evaluate the role of providers. There is a bias because parents have met with the providers. Their knowledge seems justified. The continuing study about missed opportunities for immunization should be carried out.

We conclude that proportion of missed opportunities in urban area was 22.3% and suburban area was 29.9%. There is no difference between proportion of missed opportunities for immunization at public health centers in urban and that in suburban area. Related factors to under-immunized are age of starting immunization older than 3 months, number of children more than 4, and low of parental attitude about immunization while parents are prominent target for information.

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