

**ORIGINAL ARTICLE****Missed Opportunities for Immunization in Jimma Hospital**Samuel Girma, MD<sup>1</sup>, Sileshi Tekelemariam, MD, MPH<sup>2</sup>**ABSTRACT**

**Back ground:** *The six expanded programme on Immunization (EPI) target diseases cause the suffering and death of many children in our world. All these deaths and disabilities can be prevented maximally provided that children were appropriately immunized for their age. Increasing immunization coverage in developing countries will depend, in part, on immunizing children in the appropriate age at every available opportunity. However the two principal problems in the way of achieving effective immunization for all children are drop-outs and missed opportunities. This study was conducted to determine immunization status and proportion of missed opportunities for immunization and risk factors associated with it.*

**Methods:** *The study was cross sectional, conducted during October-November 1997, at Jimma Hospital paediatrics OPD. Data was collected using structured questionnaire addressed to mothers and health service record. The target population was infants of 0-11 months. Descriptive statistics was employed to examine findings. Chi-square tests were calculated and statistical associations were determined as significant as  $p < 0.05$  using manual scientific calculator.*

**Results:** *Missed opportunity for immunization was found to be 28.8% and the commonest reason given was child sick on day of immunization (27.8%). Literacy status, knowledge and attitude towards immunization and child's age are significantly associated with immunization status ( $p < 0.05$ ).*

**Conclusion:** *By increasing awareness and knowledge hence changing attitude of mothers and health workers, it is possible to increase the immunization coverage.*

**Key words:** Immunization, Immunization coverage, Child health.

**INTRODUCTION**

The six Expanded Programme on Immunization (EPI) target diseases cause the suffering and death of many children in our

world. Today, about three and a half million children are dying annually in developing countries from three of the EPI target

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diseases, namely, measles, pertussis and neonatal tetanus. More than a quarter of a million children are condemned to life long disability in the developing world due to poliomyelitis (1). All these deaths and disabilities can be prevented to a large extent if children were appropriately immunized for their age. Immunization is an economical way to keep children healthy. Because of the poor quality of information processing in most developing countries the magnitude of morbidity and mortality associated with EPI target diseases in these countries are not well known. Nevertheless, crude estimates from few studies done in sub Saharan Africa showed the extent of the problem is severe in this region (2).

The situation in Ethiopia might not be better than that of sub-Saharan Africa mentioned earlier (3). EPI was launched in Ethiopia in 1980, when the immunization coverage was estimated to be less than 1%, and the presumed goal was to provide immunization service to all children <2 years. It was thus believed that by increasing EPI coverage by 10% each year Ethiopia would attain 100% by 1990. That target was later revised to 75% and the target group changed to less than one year in 1986. However, in 1990 immunization coverage was reported to be 59% for DPT<sub>3</sub> and the drop out rate from the schedule was 36%. In 1992 DPT<sub>3</sub> coverage declined to 13%; and in 1994 to 37% (3-5).

New targets reset for the year 2000 included: Achievement of at least 90% immunization coverage in the context of comprehensive maternal & child health (MCH) services and global eradication of polio (5).

In the Ethiopian context, the low health service coverage, poor national health budget and lack of awareness by the community were few of the constraints identified (3). In the rural area, increase in immunization coverage was hindered by low level of access to health facility and by

operational constraints such as lack of transport and trained manpower. Even in the urban areas where access to immunization service is high and logistical challenges are more easily met, the majority of children are still not fully immunized. Increasing immunization coverage in developing countries will depend, in part, on immunizing children in the appropriate age at every available opportunity (6).

A study conducted in Addis Ababa revealed that 41% of those who require immunization missed the opportunity. The Missed Opportunity for Immunization (MOI) was greater for those children attending sick baby clinics aged 0-11 months as compared to the attendants of nutrition rehabilitation clinic aged 12-23 months (7). Thus, MOI was also identified as a principal problem and important limiting factor in achieving effective immunization for all children, and affecting immunization coverage of the country.

This study was, therefore, conducted with the objectives to obtain a baseline information examining the magnitude and associated risk factors of missed opportunities of immunization in Jimma hospital.

## MATERIALS AND METHODS

A cross-sectional study was conducted out in Pediatric OPD of Jimma Hospital during October-November 1997 to assess the extent of missed opportunities for immunization among children attending the service.

The source population included children-mother/ caretaker pairs attending the pediatric OPD of Jimma Hospital between October-November 1997. From these, all mother/ care-taker-infant (0-11 months) pairs were studied. Immunization status of the infants against each vaccine preventable diseases was assessed through interview of

mothers/ caretakers and by examining immunization cards.

Medical interns collected data using a pre-tested structured questionnaire. Mothers/ caretakers were interviewed at a common point as they leave the hospital after getting service. Interns also examined infant's vaccination and hospital cards, the later mainly for the diagnosis and possible contraindication to immunize. If immunization cards were not available, home visits were made to obtain the necessary information. Involvement into the study was on the basis of an informed consent. In the process of data collection, the study population was provided with health education on the importance of immunization and the possible dangers of the six vaccine preventable childhood diseases, and advised to immunize those who were about to miss their immunization.

In this study, missed opportunity was defined when a child's age was eligible for immunization and there was no

contraindication for receipt of that vaccine, but the vaccine was not given. Up-to-date vaccination was defined when the child is immunized according to the schedule but did not complete because of his age. Eligible visit was defined as visit when the child was age eligible for immunization, and there was no contraindication for receipt of that vaccine (8,9).

Descriptive statistics was employed to examine findings. In addition, Chi-square test were calculated and statistical associations were determined as significant at  $p < 0.05$ .

## RESULTS

A total of 250 infants were included in this study. Of the 250 children studied, 154 (61.6%) were males and the rest females. The male to female ratio was 1.6:1. The majority of the infants (82%) lie between 14-44 weeks age group (Table 1).

**Table 1.** Age and sex distribution of infants attending paediatric OPD of Jimma Hospital, October-November 1997.

Age (Weeks)	Sex		Total No (%)
	Male No (%)	Female No (%)	
< 6	10 (6.5)	11 (11.5)	21(8.4)
6 - 10	7 (4.5)	6 (6.3)	13(5.2)
10- 14	4 (2.6)	7 (7.3)	11(4.4)
14- 44	133 (86.4)	72 (75)	205(82.0)
Total	154(61.6)	96(38.4)	250(100)

Most of the infants, 203(81.2%), came from Jimma and the rest from near by towns such as Yebu (3.6%), Gembe (3.6%), Serbo (2.8%) and others (8.8%) from Haro, Seka, Asendabo and Agaro. As far as the mothers/ caretakers are concerned, most of them (36%) are in the age group 20-25 years, married (88%), literate (55.6) and house

wives (68%) by occupation. Most married mothers (36.4%) are in the age group 20 - 25 year and, 37.8% of illiterate mothers are between 26-30 years. Younger mothers tend to be students and daily laborers where as older ones are farmers and government employees (Table 2).

**Table 2.** Socio-demographic characteristics of mothers/ caretakers of infants attending paediatrics OPD of Jimma Hospital, Oct-Nov.1997.

Demographic Characteristics	<20		21-25		26-30		31-35		>35		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
<b>Marital Status</b>												
Married	16	7.3	80	36.4	65	29.5	41	18.6	18	8.2	220	88
Single	10	52.6	4	21.1	5	26.3					19	7.6
Widowed					2	100					2	0.8
Divorced	3	33.3	6	66.7							9	3.6
<b>Total</b>	<b>29</b>	<b>11.6</b>	<b>90</b>	<b>36</b>	<b>72</b>	<b>28.8</b>	<b>41</b>	<b>16.4</b>	<b>18</b>	<b>7.2</b>	<b>250</b>	<b>100</b>
<b>Literacy status</b>												
Illiterate	6	3.4	33	29.7	42	37.8	18	16.2	12	10.8	111	44.4
Read and Write			46		3	42.9	4	57.1			7	2.8
1-60	2	4.7	16	37.2	12	27.9	9	20.9	4	9.3	43	17.2
7-8	13	40.6	25	50.0	3	9.4					32	12.8
9-12	8	15.7		49.0	10	19.6	6	11.8	2	3.9	51	20.4
>12			90		2	33.3	4	66.7			6	2.4
<b>Total</b>	<b>29</b>	<b>11.6</b>	<b>73</b>	<b>36</b>	<b>72</b>	<b>28.8</b>	<b>41</b>	<b>16.4</b>	<b>18</b>	<b>7.2</b>	<b>250</b>	<b>100</b>
<b>Occupation</b>												
House Wife			2	42.9	53	31.2	21	12.4	9	5.3	170	68
Daily Laborer	5	50	4	20			3	30			10	4
Farmer			5	16	7	28	11	44	3	12	25	10
Student	10	52.6	2	26.3	4	21.1					19	7.6
Gov't Employee			2	12.5	5	31.2	6	37.5	3	18.7	16	6.4
Trader			2	33.3	1	16.7			3	50	6	2.4
Maid			2	50	2	50					4	1.6
<b>Total</b>	<b>29</b>	<b>11.6</b>	<b>90</b>	<b>36</b>	<b>72</b>	<b>28.8</b>	<b>41</b>	<b>16.4</b>	<b>18</b>	<b>7.2</b>	<b>250</b>	<b>100</b>

From the 250 children studied, 28.8% were either not immunized or not up-to-date, that is, missed the opportunity of being immunized, while 36.4% were fully immunized (Table 3).

**Table 3.** Immunization status of infants attending paediatrics OPD of Jimma Hospital, October-November 1997.

Immunization status	No (%)
Up-to-date	87 (34.8)
Not up-to-date	13 (52.0)
Not Immunized	59 (23.6)
Fully immunized	91(36.4)
Total	250 (100)

The most common reason given by mothers for failure of immunization was child being sick on day of immunization (27.8%), followed by mother busy (20.8%) and unawareness of immunization (Table 4). Of those not immunized or not up-to-date, only 2 needed physicians decision for immunization (they were admitted).

**Table 4.** Reasons for immunization failure of infants attending paediatric OPD of Jimma, Oct.-Nov. 1997.

Reason for Immunization failure	No(%)
Child sick	20 (27.8)
Unaware of immunization	15 (20.8)
Mother busy	15 (20.8)
Vaccination site too far	11 (15.3)
Fear of side reaction	3 (4.1)
Mother ill	2 (2.8)
Rumors	2 (2.8)
Unaware of the need to return for 2 <sup>nd</sup> and 3 <sup>rd</sup> dose	2 (2.8)
Family problem	2 (2.8)
Total	72 (100.0)

Knowledge about immunization was determined by inquiring - "For what disease is immunization given?", and those who mention at least one of the six EPI target diseases were considered as knowledgeable. In addition, if their response to the question "Do you think immunization is useful?" is affirmative they were considered as having favorable attitude.

The study has shown that lack of knowledge, negative attitude towards immunization, older age of children and illiteracy were risk factors for the occurrence of missed opportunities of immunization ( $P < 0.05$ ). However, maternal age, marital status and employment were not significant risk factors for missed opportunities for immunization (Table 5).

**Table 5.** Missed opportunities for immunization and immunization status of children by socio-Demographic characteristics of their mothers caretakers, Jimma Hospital, Oct. - Nov.1997.

Characteristics	Immunization Status							
	Fully and up to date		Not up to date a		Total		$\chi^2$	P
	No	%	No	%	No	%		
<b>Literacy status</b>								
Illiterate	69	62.2	42	37.8	111	44.4	7.952	<0.005
Literate	109	78.4	30	21.6	139	55.6		
Total	178	71.2	72	28.8	250	100		
<b>Marital status</b>								
Married	159	72.3	61	27.7	220	88	1.029	>0.05
Not married	19	63.3	11	36.7	30	12		
Total	178	71.2	72	28.8	250	100		
<b>Knowledge of imm.</b>								
Yes	95	83.3	19	16.7	114	45.6	15	<0.005
No	83	61	53	39	136	54.4		
Total	178	71.2	72	28.8	250	100		
<b>Attitude towards imm.</b>								
Positive	176	73.9	62	26.1	238	95.2	18.28	<0.005
Negative	2	16.7	10	83.3	12	4.8		
Total	178	71.2	72	28.8	250	100		
<b>Employment status</b>								
Employed	18	90	2	10	20	8	3.747	>0.05
Non Employed	160	69.6	70	30.4	230	92		
Total	178	71.2	72	28.8	250	100		
<b>Maternal age</b>								
<30	135	70.3	57	29.7	192	76.8	3.747	>0.05
>30	43	74.1	15	25.9	58	23.2		
Total	178	71.2	72	28.8	250	100		
<b>Child Age</b>								
<3 1/2 mon.							11.23	<0.005
>3 1/2 mon.	22	23	51.1	45	18			
Total	156	49	23.9	205	82			
Total	178	71.2	72	28.8	250	100		
<b>Child sex</b>								
Male	109	70.8	45	29.2	154	61.6	0.0346	>0.05
Female	68	71.9	27	28.1	96	38.4		
Total	178	71.2	72	28.8	250	100		

## DISCUSSION

Unless permanent immunization delivery strategies are maintained one can not reach to a level where high proportion of children are immunized to sustain herd immunity of the population. The estimated (reported) health service coverage of Ethiopia was about 51% in 1997. 58.5% of the nation's population had access to immunization services in the same year (10). The situation seems to be improved after the expansion of out reach EPI sites and peripheral level health services (clinics & community health services).

In health institutions where children are seen for various medical problems they usually miss the opportunity of being immunized. In this study, this accounted for 28.8%, however a study done in Addis Ababa in 1987 revealed that 41% have missed the opportunity (7). The difference was found to be statistically significant ( $P < 0.05$ ).

Though the methodologies and duration of the two studies were similar, the size and target population was different. This difference may also be attributed to the social mobilization activities carried out for polio immunization. Thus, the campaign might have acted as a reminder for health workers to assess immunization status of children & to immunize those in need; however this needs further investigation. Mothers in this study were of similar age group, less illiterate 44.5% Vs 55.1% ( $Z = 5.54$ ,  $p < 0.05$ ); more knowledgeable of EPI target diseases 45.6% Vs 29.9% ( $Z = 9.76$ ,  $P < 0.05$ ) and had similar attitude towards immunization with those studied in Addis Ababa (7). The commonest reason given by mothers for failure of immunization was child sick on day of immunization, however, only two children need decision by doctor and the rest could have been safely immunized. This implies the necessity of refreshing hospital staffs

about indications and contraindications of immunization.

Among the few studies that were done in this country the following were identified as main constraints in the management of national program; - inadequate health service coverage, and poor access to health facilities (11). Another study done in south western Ethiopia revealed that reasons for non immunization of children as related to lack of information in 25% of the cases, poor motivation of parents or caretakers in 11% and obstacles related to immunization in 63% of the cases. Lack of awareness by parents on the need to immunize their children and the need to return for 2nd and 3rd doses are some of the problems identified related to lack of information. Lack of faith in immunization or wrong ideas about immunization were also factors related to poor motivation of guardians in postponing immunization till another time.

Inconvenient immunization sessions and places are among the obstacles related to immunization. Coverage is found out to be better for those served by static sites than those served by out reach sites. Socioeconomic factors of parents or caretakers by and large affects participation in immunization program. This study also reported that the proportion of immunized children were higher for educated caretakers than those uneducated or illiterate. Illiteracy has been shown to be associated with MOI. Unemployed caretakers are also less likely to comply to get their children immunized. When the nearest guardian or caretaker is female the proportion of immunized children is higher (3). In a developing country fully immunizing a child against the six EPI target diseases costs between 5-15 dollars. Costs of immunizing a child varies according to such factors as whether the population is mostly urban or rural, the diseases targeted, the delivery strategies used and the size of the population to be immunized. It is easily

understood the cost will be higher for remote rural areas as compared to urban static service (12).

It is of interest to see that missed opportunities of immunization are not primarily problems of developing countries. A study done in Maryland, USA showed missed opportunities in more than 1/3 of cases (8). This study has identified certain risk factors associated with missed opportunities for immunization, namely illiteracy, lack of knowledge of EPI target diseases, and negative attitude towards immunization.

Considering missed opportunities of immunization as major problem, WHO recommends the following:

Review the national immunization schedule to ensure that it provides optimal protection at the earliest age.

Review the national immunization policy on contraindications. Most sick children and pregnant women can be safely immunized.

Make immunization available at all clinics for sick children and maternal and child health clinics.

Make sure all eligible women and children have an immunization card and they bring the card to every clinic visit.

Check the card of every woman and child at every clinic visit.

Ensure that all-eligible women and children receive all vaccines that

they are eligible to receive.

Immunize on admission and discharge from hospital (13,14).

Therefore, missed opportunities for immunization can be decreased significantly by improving the level of education of mothers through collaborative efforts of all relevant sectors (education, health, and media). Reminders for health workers working in EPI, and raising the awareness of mothers in places like waiting areas of hospitals may be useful to improve the situation.

### **Conclusions and Recommendation**

Missed opportunities for immunization of 28.8% indicates that a good opportunity is being missed. As shown in the study, missed opportunity for immunization is associated with illiteracy, lack of knowledge negative attitude towards immunization and older age of children. The commonest reason given for failure of immunization was child sickness on day of immunization, but mostly children with various illnesses could be vaccinated safely.

Hence it is recommended to educate mothers about benefits of immunization to increase their knowledge on EPI target diseases and change their attitudes, encourage mothers to continue formal education, having clear guidelines on indications/ contraindications of immunization posted at health facilities, and refresh health workers on indications/ contraindications of immunization.



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