*Nigerian Journal of Paediatrics* 2005; 32: (4) 73-76

# *Missed Immunization Opportunities among Children in Enugu*

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**Summary**

**Tagbo BN, Onwuasigwe C. Missed Immunization Opportunities among Children in Enugu.** *Nigerian Journal of Paediatrics* 2006; 32:73

**Objectives:** The aims of the studywere to determine the overall rate of missed immunization opportunities at the University of Nigeria Teaching Hospital (UNTH), Enugu and to compare the rate in the preventive section of the institution with that in the curative section.

**Patients and Methods:** A total of 398 children were studied; 200 from the preventive section and 198 from the curative section of the hospital. Exit interviews were conducted using a WHO protocol.

**Results:** Sixty (15.1 percent) of the 398 children studied missed immunization opportunities. The 60 consisted of 11 (5.6 percent) of 200 seen in the preventive section and 49 (24.5 percent) of 198 seen in the curative section of the hospital.

**Conclusion:** The rate of missed immunization opportunities is still unacceptably high, especially in the curative section of our institution. This is probably true of other health institutions in the country. In order to achieve significant reductions in the level of missed immunization opportunities among our children and thereby increase immunization coverage, we recommend that routine immunization should be introduced in the curative sections of health institutions.

**Key words:** Missed, Immunization, Opportunities, Children

## Introduction

MISSED opportunities for immunization constitute an obstacle to raising immunization coverage among children. An opportunity for immunization is missed when a child who is eligible for immunization and who has no contraindication to immunization visits a health service and does not receive all the needed vaccines.[1] Studies have shown that immunization coverage in Nigeria is on the decline.[2] Various types of missed immunization opportunities contribute to this trend. These include failure to assess immunization status of children during visits to health facilities, failure to administer needed vaccines because of the presence of a medical condition inaccurately perceived as a contraindication, and failure to administer all the needed vaccines simultaneously. A direct approach to increasing immunization coverage is to provide immunization to all eligible persons at every opportunity. This is one of the cheapest ways of increasing immunization coverage.[3] This strategy has been recommended by the Global Advisory Group of the WHO Expanded Programme on Immunization (EPI ) since 1983.[2] Immunization should be offered at every contact point, including preventive and curative health services. Missed immunization opportunities occur in two major settings namely, (i) during visits for preventive services such as immunization, growth monitoring nutrition assessment and oral rehydration training sessions, and (ii) during visits for curative services. In both settings, eliminating missed opportunities will raise the overall immunization coverage in the population. The World Health Organization has developed a module[4] for assessing the causes of missed opportunities and determining effective strategies for their elimination. The aims of the present studywere to determine the overall rate of missed immunization opportunities (MIO) at the University of Nigeria Teaching Hospital, Enugu and to compare the rate obtained in the curative section with that obtained in the preventive section of the institution.

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## Materials and Methods

Data were collected at two sections of the University

of Nigeria Teaching Hospital, Enugu. These sections consisted of a curative section for sick children - Children's Outpatients Clinic (CHOP), and a preventive section for well children - Institute of Child Health (ICH). In each section, mothers/care givers who visited the hospital with their children aged one day – 11 years for whatever reason, were interviewed at exit point, using the WHO/EPI protocol.[4] Information was obtained during oral interviews, from the children's immunization cards and from immunization registers in each section. Highlights of the information obtained from mothers included the child's age, possession of immunization card, immunization received so far with dates, immunizations missed on the day of interview, reasons for missed immunizations, past medical history of any of the 'six preventable childhood diseases' and parents' educational attainments.

## Results

Three hundred and ninety eight children were studied. Three hundred and eight (77.4 percent) of this number were less than one year, 80 (20 percent) were aged 1-4 years, while 10 (2.5 percent) were aged five years and above. Sixty of the 398 children studied had missed immunization opportunities. Missed immunization opportunity rate for all the vaccines was 14.9 percent in the <one-year age group, 17.5 percent in the 1-4 year age group and 0 percent in those aged five years and above, resulting in a total missed opportunity rate of 15.1 percent (60 children; Table I). Among infants aged less than one year, the rate declined with increasing level of mother's education from 20.9 percent for infants whose mothers had only primary education to 10.9 percent in infants whose mothers had tertiary education. However, the differences were not statistically significant (p= 0.07).

**Table I**

*Missed Opportunities for Immunization in Various Age Groups*

| *Age group (months)* | *Frequency* | *% of Total* |
|---|---|---|
| 0-11 (n=308) | 46 | 14.9 |
| 12-59 (n=80) | 14 | 17.5 |
| >59 (n=10) | 0 | 0.0 |
| Total (n=398) | 60 | 15.1 |

This trend was also observed in relation to father's education where such differences were however, significant (p=0.04; Tables II-III).

Table IV shows the frequencies/percentages of missed opportunities for each antigen. Only three (five percent) of the 60 children missed the opportunity of receiving BCG, followed by six (10 percent) who missed $OPV_0$. At the other extreme, 42 (70 percent) missed measles immunization, followed by $DPT_3$ which was missed by 29 (48.3 percent). On the whole, missed opportunity rate was lower with $OPV_{1-3}$ than with $DPT_{1-3}$, a difference that was statistically significant (p=0.0). Immunization coverage for the various vaccines (Table V) was highest at 96.7 percent for BCG, followed by $OPV_0$ while measles had the lowest coverage of 32.7 percent. Percentage coverages for $OPV_{1-3}$ were higher than those of $DPT_{1-3}$; these differences were highly significant (p=0.0).

**Table II**

*Missed Opportunities in Infants aged 11 months and below in relation to Mother's Education*

| *Education* | *Number Studied* | *frequency* | *% of Total* |
|---|---|---|---|
| Primary | 62 | 13 | 20.9 |
| Secondary | 123 | 22 | 17.9 |
| Tertiary | 101 | 11 | 10.9 |
| Total | 286* | 46 | 16.1 |

*Some mothers did not respond p = 0.07

**Table III**

*Missed Opportunities in Infants aged 11 Months and Below in Relation to Father's Education*

| *Education* | *Number Studied* | *Frequency* | *% of Total* |
|---|---|---|---|
| No formal | 5 | 2 | 40.0 |
| Primary | 83 | 17 | 20.5 |
| Secondary | 95 | 14 | 14.7 |
| Tertiary | 104 | 12 | 11.5 |
| Total | 287* | 45 | 15.7 |

*Unknown with respect to some fathers p = 0.04

**Table IV**

*Vaccine-Specific Missed Opportunities*

| *Vaccine* | *Number who Missed* | *% of Total* |
|---|---|---|
| BCG | 3 | 5.0 |
| OPVo | 6 | 10.0 |
| $OPV_1$ | 10 | 16.7 |
| $OPV_2$ | 19 | 31.7 |
| $OPV_3$ | 28 | 46.7 |
| $DPT_1$ | 13 | 21.7 |
| $DPT_2$ | 21 | 35.0 |
| $DPT_3$ | 29 | 48.3 |
| Measles | 42 | 70.0 |

Of the 200 children seen in the preventive section of the hospital, 11 (5. 6 percent) had missed immunization opportunities, compared to 49 (24.5 percent) of the 198 children seen in the curative section (Table VI), a difference that was significant (p=0.02).

**Table V**

*Immunization Coverage for Various Vaccines in 398 Children*

| *Vaccine* | *Number Immunized* | *Percentage Coverage* |
|---|---|---|
| BCG | 385 | 96.7 |
| OPVo | 373 | 93.7 |
| $OPV_1$ | 349 | 87.7 |
| $OPV_2$ | 283 | 71.1 |
| $OPV_3$ | 214 | 53.8 |
| $DPT_1$ | 336 | 84.4 |
| $DPT_2$ | 274 | 68.8 |
| $DPT_3$ | 213 | 53.5 |
| Measles | 130 | 32.7 |

**Table VI**

*Missed Opportunities in the Preventive and Curative Sections of the Institution*

| *Section* | *Number Seen* | *Missed Immunization* | *% of Total* |
|---|---|---|---|
| Preventive (ICH) | 198 | 11 | 5.6 |
| Curative (CHOP) | 200 | 49 | 24.5 |
| Total | 398 | 60 | 15.1 |

(p=0.02)

## Discussion

Missed immunization opportunity rate in this study was 15.1 percent; this was lower than that obtained in a previous study carried out in the same centre three years earlier by Ngini *et al*,[5] when the rate was 21.6 percent. However, this apparent improvement may be false because, while the earlier study recruited only children from the curative section of the institution, current study recruited almost equal numbers of children from the curative and preventive sections. Whereas the missed immunization opportunity rate in the preventive section in the present study was only 5.6 percent, that in the curative section was 24.5 percent, a rate that fell within the range 21.6 – 29 percent obtained in previous studies in Nigeria and elsewhere.[5-8] This suggests that there has been no improvement in coverage over the period of time and that significant improvement can be achieved only if immunization services are also made available at curative sections and/or if screening of children is introduced at curative sections.[9] The finding of a higher rate of missed immunization opportunity in the curative than preventive sections is in keeping with several studies elsewhere,[5-7] but is at variance with the findings in Central African Republic [10] and Mexico [11] where the rate of missed opportunity was higher during immunization services, indicating a problem with the routine immunization delivery system.

The difference between the missed opportunity rates at the curative and preventive sections of 18.9 percent was highly significant. A study in Sudan demonstrated the importance of using screening at curative services.[9] "Never immunized" children were identified at curative services but were less likely to be seen at preventive services. In the Cameroons,[12] persons who attended curative services missed opportunities only when there was no routine screening to determine their immunization status.

Missed immunization opportunity rate was higher in the older than in the younger age group. Although the difference was not significant, this could be due to the fact that with respect to the older child, health workers are more likely to forget to ask and mothers are equally more unlikely to request for immunization during visits to health facilities where routine screening is not done. In the present series, missed opportunity rate decreased with increasing level of both mother's and father's education among children less than one year old, but followed no specific pattern in those aged 12-59 months. This suggests that parental level of education may be important in the first year of life.

The present study has shown that (a) the rate of missed immunization opportunity was still high at UNTH, Enugu suggesting that the reasons for this high level have not been adequately addressed, (b) the greater percentage of this high rate was due to missed opportunity in the curative section, (c) missed immunization opportunity was higher in older ones among children aged, 0-59 months and (d) low parental education was an important contributing factor to high levels of MIO. In view of the above, we recommend the following: (i)routine immunization services should be provided at curative sections of health facilities, (ii) routine screening of all children at curative sections should be introduced and (iii) appropriate policies should be put in place and implemented to ensure that basic education is affordable and available to all citizens.

## Acknowledgements

The authors wish to thank the following people for their contributions: Mrs EE Madu, Mrs BC Okpala (Chief Health Educator), the students of the Institute of Child Health, University of Nigeria Teaching Hospital, Enugu and Ogechukwu Hagan.

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