

**Original Article****CAUSES OF DROPOUT FROM IMMUNIZATION AMONG CHILDREN IN TWO SELECTED SLUM AREA OF DHAKA CITY**Ahmed M¹, Parveen R², Billah I³, Dola TA⁴, Shormi A⁵**Article History:**

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Abstract:

This study will contribute information that can be used by policymakers in the Ministry of Health (MOH) to create policies that will encourage mothers to complete their immunization schedule among children in Bangladesh. It will benefit health workers like nurses, doctors or clinicians by giving useful data on the factors associated with immunization dropout among children of one month to 18 months of age in Bangladesh.

Materials and Methods: A cross-sectional household survey was conducted in two selected slum area in Dhaka city and 120 married women (60 from each slum area of Dhaka city) were interviewed through face -to-face by the researcher. The target population was the parents had children of age from 1 month to 18 month and had routine child vaccination card were interviewed. The total sample size was 120 in number and they were selected by using systematic sampling technique. The study was based on primary data. The instruments of the study were pretested semi-structured questionnaire. After editing and coding the coded data enter into the computer SPSS Version 16.0 was used to analyze the data. Immunization was categorized into 'complete' and 'drop-out'. Bivariate associations were then evaluate using Chi-square and spearman's correlation. Logistic regression was finally performed to evaluate the strength of the predictive variables to immunization dropout. A confidence interval of 0.05 was considered in this study.

Place and Period of the Study: Study was conducted from 8th January 2022 to 21th February 2022 in Tongi (Arshadnagar, Bank field, Hazi Mazar, Nishad Nagar slums -60 household) and Dhaka north City Corporation (korail slum from Banani -60 household).

Results: Among the 120 participants majority that is 84.2% represented the age group of 21-35 years followed by 15.0% of <20 years. Maximum and minimums age of the participant was 37 years & 14 years. Sex distribution of the children showed that out of 120 respondents, 59 (49.2%) were male & 61 (50.8%), were female. Male: Female ratio was 1:1.1. Opinion regarding importance of immunization status showed that 100% participants opinion were immunization was important for child. The study revealed that maximum 85.0% respondents told that immunization center distance is less than 1 km & 15.07% respondents stated it is 2-3 km. The study showed that, out of 100% children 74.2% were fully immunized & 25.8% were partially immunized.

Conclusion: According to study findings, out of 100% children 74.2% were fully immunized & 25.8% were partially immunized. It was found that there were no associated factors determined to causes dropout rate of immunization from chi-square test. From spearman correlation test, it was found that there was positive association between dropout rate and sex of the children, type of the family. There is a need for intensified engagement with communities through the reaching every child approach so that children are fully immunized.

Keywords:

Expanded Programme on Immunization, Vaccine preventable diseases, World Health Organization.

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1. Dr. Rehana Parveen, Assistant Professor, Department of Anatomy, Army Medical College, Bogura Cantonment, Bogura, Bangladesh.
2. Dr. Iren Billah, Lecturer, Department of Community Medicine and public Health, East West Medical College, Dhaka, Bangladesh.
3. Dr. Taslima Ahmed Dola, Lecturer, Dept. of Community Medicine and public Health, East West Medical College, Dhaka, Bangladesh.
4. Dr. Afsana Shormi, Senior Lecturer, Dept. of Community Medicine and public Health, East West Medical College, Dhaka, Bangladesh.

Address of Correspondence: Dr. Mahmuda Ahmed; Associate Professor,; Department of Community Medicine and public Health, East West Medical College, Uttara, Dhaka-1230, Bangladesh. Contact No.: (+88) 01715015025, E-Mail: drmahmudabd@gmail.com; Orcid ID: 0009-0002-4846-7796

Introduction:

Vaccine is an immuno-biological preparation which produces specific protection against a particular disease. It is a substance which stimulates the production of protective antibody and other immune mechanisms.¹ Immunization has eradicated smallpox and it has also helped in reducing morbidity and mortality from vaccine preventable diseases (VPD)⁴. It is estimated that each year about two million deaths occur globally due to VPDs with approximately around 1.5 million occurring in children under five years of age and constituting 15% of under five deaths.³

WHO officially launched a global immunization program in May 1974 which was known as Expanded Program of Immunization for prevention and control of 6 major killer diseases of children, namely tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis and measles, all over the world.⁴ In 2018, globally around 86% of infants (116.3 million infants) received three doses of diphtheria-pertussis-tetanus (DPT3) vaccine and 129 countries reached around 90% coverage of DPT3 vaccine.⁶ The drop-out rates of vaccines, for example between DPT1 and DPT3, are defined as the percentage of children that started a course, but couldn't finish the routine immunization for some reason. If the dropout rate of vaccines is low, it indicates good utilization and good service quality.⁷ Acceptance of complete doses of vaccines is highest among the middle class (75%), intermediate among the lower middle class (60%), and lowest among slum dwellers (48%).⁸ It is estimated that immunization averts 2 to 3 million deaths each year. In addition, childhood vaccination reduces mortality by 99% against most infectious diseases including smallpox, polio, diphtheria, and measles as well as incalculable economic savings.¹⁶

In United States of America, national immunization survey reported that among children aged 19-35 months coverage of PCV (Pneumococcal Vaccine) was 82.8%, 91.5% MMR coverage while the rest if the other vaccines coverage ranges from 90.7% to 62.9% among different states. The European and pacific regions rank highest with immunization coverage estimated at 96% in those regions while at 75% coverage, the African continent ranks with the lowest coverage followed by South-East Asia with 77% immunization coverage.¹⁷ To benefit from the direct and indirect effects of immunization, the WHO came up with the Global Vaccine Action Plan (GVAP), which

set country targets of 90% coverage for all antigens at the national level and at least 80% coverage for all antigens in 80% of districts by the year 2020. Bangladesh has made significant progress in recent times in many of its social development indicators particularly in health. This country has made important gains in providing primary health care since the Alma Ata Declaration in 1977. All health indicators show steady gains and the health status of the population has improved. Immunization has been one of Bangladesh's greatest public health success stories.²¹ As a result of outstanding performance in improving the child immunization status, Bangladesh achieved Global Alliance for Vaccines and Immunization (GAVI) Alliance Award in 2009 and 2012, which is given as a recognition to achieving the Millennium Development Goals (MDG), particularly in reducing child mortality.²² Dropout rate is the rate difference between the first and the last dose or the rate difference between the initial vaccine and the last vaccine. It is an indicator of immunization program performance and estimated to be 5% in 2016 for the 3-dose DTP series, with dropout highest in the African Region (11%) and lowest in the Western Pacific Region (0.4%). In routine expanded Program on immunization (EPI) programs, drop out rate higher than 5% usually indicates quality problem with the program and need to be addressed.²³

Dropout rate is used to measure program continuity and follow up. The dropout between the first and third doses of DPT HepB Hib, in particular is the best indicator as this vaccine is not typically given during campaigns.²⁴ To achieve maximal protection against vaccine-preventable diseases, a child should receive all vaccines within recommended intervals.²⁵

Materials and Methods:

This cross-sectional study was carried out on parents who had children of age from 1 month to 18 month and had routine child vaccination card. A cross-sectional household survey was conducted in two selected slum area in Dhaka city and 120 married women (60 from each slum area of Dhaka city) were interviewed through face-to-face by the researcher. Among these in case of Gazipur city corporation slum were selected from Tongi (Arshadnagar, Bank field, Hazi Mazar, Nishad Nagar slums (60 household) and Dhaka north City Corporation, korail slum from Banani (60 household). The slums were selected purposively from households and the study includes those who

were willing to participate. Study was conducted from 8th January 2022 to 21st February 2022.

Total 120 participants were interviewed. A semi-structured questionnaire was prepared after pretesting. This questionnaire was used for collection of information by interviewing respondents.

After collection of information, these data were checked and verified for consistency and edit for finalize result. After editing and coding the coded data enter into the computer SPSS Version 16.0 was use to analyzed the data. A baseline characteristic of the respondents was summarized in tables, graphs and pie-charts. Immunization was categorized into 'complete' and 'drop-out'. Bivariate associations were then evaluate using Chi-square and spearman's correlation. A confidence interval of 0.05 was considered in this study. There were some inclusion criteria and exclusion criteria. Inclusion criteria were- age of the children within 1 to 18 months, participants were mentally well, not severely ill. Exclusion criteria were- age of the children was less than 1 month, the participants who were not willing to participate.

Results:

The diagnosis was completed mainly based on immunization status of the children. Some were fully immunized & others were partially immunized i.e. drop-out case. Bivariate association was then evaluate using chi-square test and also spearman correlation test.

Among the participants majority that is 84.2% represented the age group of 21-35 years followed by 15.0% of <20 years. Maximum and minimums age of the participant was 37 years & 14 years. (Table I)

Table-I
Distribution of the study respondents by age (n=120)

Age group	Frequency	Percentag
<20 years	18	15.0
21-35 years	101	84.2
Above 35 years	1	.8
Total	120	100.0
Mean±SD Range (min - max)	26.1±5.3(14 – 37)	

Sex distribution of the children showed that out of 120 respondents, 59 (49.2%) were male & 61 (50.8%), were female. Male: Female ratio was 1:1.1 (Table II)

Table-II

Distribution of the sex of the children (n=120)

Gender	Frequency	Percentage
Male	59	49.2
Female	61	50.8
Total	120	100.0

Regarding Educational status of father, it is stated that 37.5% was secondary level, 28.3% was primary level, 24.2% was below primary level, 6.7% was higher secondary level and 3.3% was graduated and above. (Figure -1)

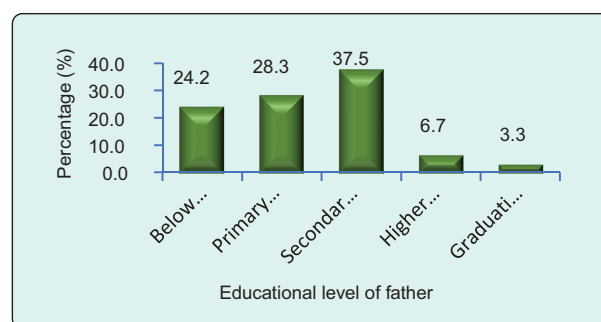


Figure-1: Bar diagram showing the distribution of the educational level of father (n=120)

In case of Educational status of the mother, where 45.8% was secondary level, 30% was primary level, 12.5% was below primary level, 8.3% was higher secondary level and 3.3% was graduation and above. (Table-3)

Table-III
Distribution of the educational level of mother (n=120)

Educational level of mother	Frequency	Percentage
Below primary level	15	12.5
Primary level	36	30.0
Secondary level	55	45.8
Higher secondary level	10	8.3
Graduation and above	4	3.3
Total	120	100.0

Regarding monthly family income it is stated that 49.2% earned 5000-10000 taka per month, 35.8% earned 10000-15000 taka, 15% earned 15000-20000 taka. (Table IV)

Table-IV

Distribution of the study respondents by monthly family income (n=120)

Monthly income (Taka)	Frequency	Percentage
5000-10000	59	49.2
10000-15000	43	35.8
15000-20000	18	15.0
Total	120	100.0

Among the respondents 80% belonged to Nuclear family and 20% belonged to Joint or extended family. (Figure 2)

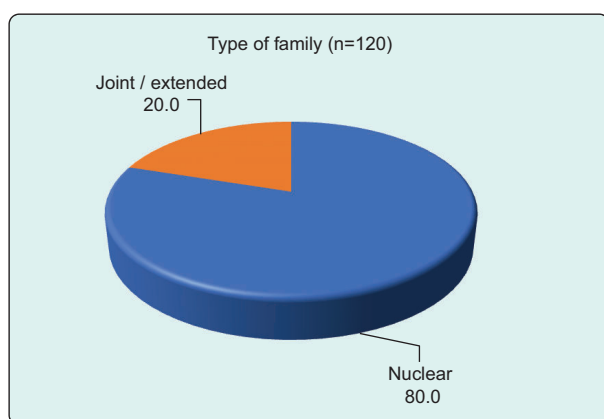


Figure-2: Distribution of the study respondents by types of family (n=120)

Among the respondents 95.8% had knowledge about the complete immunization schedules for child and 4.2% had no knowledge about the complete immunization schedules for child. (Table-V)

Table-V

Distribution of the study respondents by knowledge about the complete immunization schedules for your child (n=120)

Do you know about the complete immunization schedules for your child?	Frequency	Percentage
Yes	115	95.8
No	5	4.2
Total	120	100.0

Regarding immunization status, 74.2% child was fully immunized and 25.8% child was partially immunized. (Figure-3)

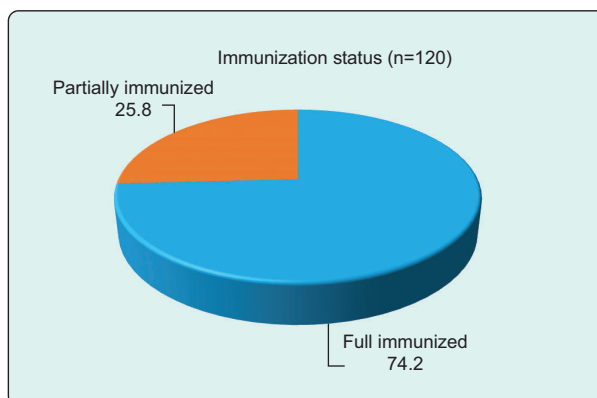


Figure-3: Distribution of the children by immunization status (n=120)

In respect of distance from the immunization center 85% respondents stayed from less than 1 Km and 15% stayed from 2-3 Km.

Table-VI

Distribution of the respondent's distance from the immunization center (n=120)

How far did you stay from the immunization center?	Frequency	Percentage
Less than 1 km	102	85.0
2-3 km	18	15.0
Total	120	100.0

Regarding immunization status in relation with sex of the children, it is stated that 51.7% male and 48.3% female were fully immunized. In case of partial immunization 41.9% male and 58.1% female were partially immunized. (Figure 4)

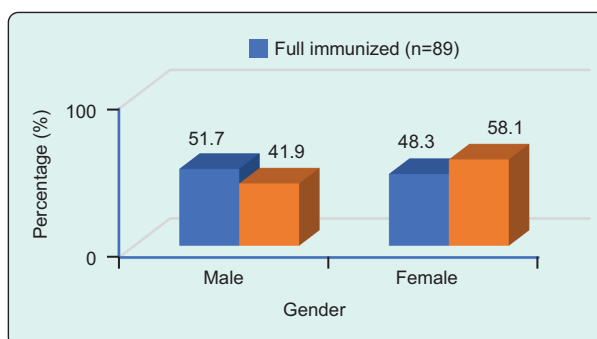


Figure-4: Bar diagram showing the immunization status relation with sex of the children (n=120)

In respect of correlation of fully or partially immunization with demographic variables, it showed that there was a weak negative correlation of fully or partially immunization status with age, parent's

education, parent's occupation, monthly family income. Weak positive correlation of fully or partially immunization status with sex of the children and type of family. (Table VII)

Table-VII

Correlation of fully or partially immunization with demographic variables (n=120)

Demographic variables	Spearman's rho correlation test	
	R-value	p-value
Age	-0.089	0.332
Sex of the children	0.085	0.354
Education level of the father	-0.184*	0.044
Education level of the mother	-0.040	0.665
Occupation of father	-0.039	0.669
Occupation mother	-0.099	0.284
Monthly Income	-0.023	0.804
Types of family	0.086	0.352

Discussion:

This cross-sectional study entitled "Causes of dropout from immunization among children in two selected slum area of Dhaka city" was carried out among 120 participants. The sample was selected purposively & the study includes those who were willing to participate. Data was collected with the help of semi-structured questionnaire by face to face interview and necessary clarification was given where needed.

The aim of the study was to find out the proportion of dropout rate from immunization & its associated risk factors causing dropout among children & to identify the socio-demographic characteristics of the participants.

Among the participants majority that is 84.2% represented the age group of 21-35 years followed by 15.0% of <20 years. Maximum and minimums age of the participant was 37 years & 14 years. Sex distribution of the children showed that out of 120 respondents, 59 (49.2%) were male & 61 (50.8%), were female. Male: Female ratio was 1:1.1. These findings were different from the finding of a study conducted in India from 1996 - 2006 showed that girls were found to have significantly lower immunization coverage than boys for BCG, DPT & measles. Opinion regarding importance of immunization status showed that 100% participants stated that immunization was important for child. This finding was similar to a study conducted in Ethiopia, India & Kenya.

The study revealed that maximum 85.0% respondents told that immunization center distance is less than 1 km & 15.0% respondents stated it is 2-3 km. The findings was similar to a cohort study that sought to establish determinants of third dose DPT completion among children who received DPTI at rural EPI center in Pakistan revealed that participants who stayed nearer to the EPI centers were more likely to complete immunization as compare to those who resided more 10 minutes away distance from the EPI center.

According to literature review there are several factors known that are associated to immunization dropout or incomplete immunization schedule of children either directly or indirectly.

In low income countries, immunization dropout has been associated with various factors such as parental socio-demographic factors like bigger number of people in household, lower education levels & health facility related factors such as distance to EPI centers. Individual factors like mother/ care givers knowledge on immunization.

Meanwhile, from Spearman's correlation interpretation we found that there was positive association between dropout rate and sex of the children, type of the family. A review done in India from 1996- 2006 showed that girls were found to have significantly lower immunization coverage than boys for BCG, DPT, and measles (Daniel JC at el 2009). In Bangladesh females were 0.84 times less likely to be fully vaccinated than male children^{9,10}.

The study showed that, out of 100% children 74.2% was fully immunized & 25.8% was partially immunized. The results of this study should be interpreted with caution.

Conclusion:

This cross-sectional study entitled "Cause of dropout from immunization among children in two selected slum area of Dhaka City" was carried out among 120 participants. The sample was selected purposively & the study includes those who were willing to participate. Data was collected with the help of semi-structured questionnaire by face to face interview and necessary clarification was given where needed. Majority of the participants were 21-35 years old & among all participants most of them were housewife by occupation.

According to study findings, out of 100% children 74.2% were fully immunized & 25.8% were partially

immunized. It was found that there were no associated factors determined to causes dropout rate of immunization from chi-square test. These findings might not reveal the true picture regarding identify the proportion of “Dropout” rate among children. But from spearman correlation test, it was we found that there was positive association between dropout rate and sex of the children, type of the family. Immunization coverages for most of antigens are high & the dropout rate over the last 10 years is lower than the WHO’s recommended cut-off point. Effective intervention is needed to improve full immunization coverage in slum areas by strengthening the EPI programs and mobilizing the community, modifying the EPI session schedule, opening additional and more convenient outreach sites, community involvement and improved training for healthcare providers.

Conflict of Interest: None to Disclose

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