Nigerian Journal of Health Promotion
ISSN: 0995-3895
Vol. 11, 2018

HEPRAN

Utilization of Immunization Services by Childbearing Mothers in Enugu State, Nigeria: Implications for Health Communication

Lawreta Ijeoma Abugu
07067657007
Ijeoma.Abugu@Unn.Edu.Ng

Dorothy N. Eze
08063789397
Dorothy.Ezepg82586@Unn.Edu.Ng

Rita N. Ezema
08038756842
Rita.Ezemapg82581@Unn.Edu.Ng

Okoro Jane Nwanneka
08034957310
Janegeo16@Gmail.Com

Department of Human Kinetics and Health Education
University of Nigeria, Nsukka

Abstract
The study determined the utilization of immunization services among child bearing mothers in Nsukka Local Government Area of Enugu state. Three specific objectives with three corresponding research questions and three null hypotheses guided the study. Research design was descriptive survey. The study population comprised of 6,400 CBM in Nsukka LGA. A sample of 380 Child Bearing Mothers (CBMs) was drawn using Taro Yamane formula. The researchers designed questionnaire-Utilization of Immunization Services Among Child bearing Mothers Questionnaire (UISACBMQ) was the instrument used for data collection. The instrument was face validated by research experts. 279 copies of the instrument were correctly filled and used for data analysis using SPSS version 22 software. Frequencies and percentages were used to answer the research questions while chi-square statistic was used to test the null hypotheses at .05 level of significance and at appropriate degree of freedom. Results showed that there was effective utilization of all the immunization services by the childbearing mothers except for tetanus toxoid which showed low utilization especially among respondents with no formal education (43.3%) and those with parity status of seven and above (48.7%). However, there was no significant difference in the utilization of immunization services based on level of education ($\chi^2 = 9.140$, $p = .353 > .05$), age ($\chi^2 = 6.635$, $p = .344 > .05$) and parity ($\chi^2 = 5.693$; $p = .376 > .05$). This implies that there is need to make use of both traditional and modern means of communication to reach the target population so as to achieve immunization target of 80 per cent coverage. It was therefore recommended among other things that health education and communication on the need for adequate utilization of immunization should be conducted by health educators and other health professionals regularly at the health facilities and communities for childbearing mothers and other stakeholders in the community.
Key words; Utilization, Immunization, Childbearing Mothers

Introduction

Immunization is a key element of public health and a crucial element that enables every child to reach his or her full physical and intellectual potential. Immunization of infants and children against vaccine preventable diseases has therefore been regarded as an effective means of disease prevention and health maintenance. According to Sundar, Adarsh and Pankaj (2009), around the world, thirteen million people die from infectious diseases every year and over half of these people are children under the age of five. World Health Organization-WHO (2009) estimated that between two and three million child deaths are prevented annually through immunization and many more future deaths prevented in older groups. However, vaccine-preventable diseases are still responsible for about 25 percent of the 10 million deaths occurring annually among children under five years of age.

Communicable diseases are the significant causes of child morbidity and mortality and it is generally accepted that immunization against common specific infections represent a significant breakthrough in the control

and eventual eradication of these infections world-wide (Ogunmekan, 2007). Evidence provided by WHO (2015) maintained that routine immunization remains the cheapest, most cost effective, efficient and sustainable community-based way to reduce child morbidity and mortality (World Health Organization, 2015). Obionu (2007) opined that vaccine preventable diseases are indicators of the socio-economic and health status of a country and are responsible for the heavy toll of infant deaths in Nigeria and other developing countries of the world. The desire to provide immunization against the vaccine preventable diseases led to the launching of Expanded Program on Immunization (EPI) in Nigeria in 1978 and the implementation process in 1979.

Immunization coverage like most other Primary Health Care (PHC) program suffered a sharp decline to an all-time low level of less than 30 percent for all the antigens (National Programme on Immunization-NPI, 2007). This led to the renaming of the Expanded Programme on Immunization (EPI) as National Programme on Immunization (NPI) in 1996 to reflect Nigeria ownership and commitment to the Programme (Egwu, 2007). It aims at providing immunization services to all children under the age of five against the childhood killer diseases. The NPI in its effort has continued to implement sustainable strategies and interventions in collaboration with the states, local government areas and international agencies for example World Health Organization (WHO), United Nations Children's Fund (UNICEF) among others with the vision of making immunization a community owned, community driven and community operated service.

According to Egwu (2007), immunization is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of vaccine. Vaccines are drugs that stimulate the body system to protect the person against subsequent infection or disease. Immunization according to Ada (2012) is a process of protecting a person from a specific disease through the purposeful introduction into the body of small dose of germs that are killed or extremely weakened or attenuated by means of chemical process. Immunization in this study is a planned out vaccination program on children and pregnant women to provide antibodies to resist attack of disease causing organisms or to build immunity against these organisms. Immunity may be acquired naturally or artificially and both forms can be active or passive. Artificially acquired immunity is the type developed through immunization. Obionu (2007) reported that active immunization against some infectious diseases such as Diphtheria, Pertursis, tetanus, hepatitis B, heamophilus influenza, tuberculosis, poliomyelitis among others can go a long way in preventing the disease.

National Programme on Immunization (NPI) has prescribed the following immunization schedule for Nigerians: one dose of BCG (Bacilli Calmette Guerin) at birth against tuberculosis; four doses of OPV (Oral Polio Vaccine) at birth, six weeks, ten weeks and fourteen weeks against polio; three doses of pentavalent vaccine at six weeks, ten weeks and fourteen weeks against diphtheria, Pertursis, tetanus, hepatitis B and heamophilus influenza type B; three doses of PCV (pneumococcal conjugate vaccine) at six weeks, ten weeks and fourteen weeks against pneumococcal diseases; two doses of Rota vaccine at six weeks and ten weeks against rotavirus; and one dose each of measles and yellow fever vaccines at nine months against measles and yellow fever.

Though the importance of immunization has for a long time been emphasized, there are still reports of poor utilization of immunization services in Nigeria even in the areas where the services are made available. There was a steep decline in utilization of immunization in some part of Nigeria and the most recent data indicate that only one in four children is fully immunized and about eighteen percent of children not immunized at all (UNICEF, 2012).

Utilization is the extent to which a given group uses a particular service within a specific period (Babalola & Fatusi, 2009). Utilization according to Azubuike, (2014) is the use of something especially for practical purposes. Utilization in this present study is the extent to which immunization services are being put to use by childbearing mothers for themselves and their children. Studies have indicated that adequate utilization of immunization services is related to improved maternal and child health care (Babalola & Fatusi, 2009). Utilization of immunization services helps to access the effectiveness of these services and when they are effectively utilized they will be able to achieve their aim which is to eliminate child mortality resulting from child killer diseases (Azubuike, 2014). Fosu (2011) revealed that without effective utilization of maternal and child health (MCH) services which immunization is one of them, eradication of disease may be a "chasing of the wind" even when such facilities for eradication are provided. Fosu (2011) divided utilization into two; low utilization and effective utilization. Low utilization is when less than fifty percent women use the services and effective is when more than fifty percent use the services. In this study, utilization of immunization services is how far childbearing mothers are able to make use of the vaccines schedule provided for them for the purpose of preventing diseases. Fosu's division of utilization (low and effective) was used in this study to determine utilization of immunization services by childbearing mothers in Nsukka local government area of Enugu state.

Childbearing mothers are female parents of a child who are in the process of reproduction (Odoh, 2009). Childbearing mothers are women who are physiologically capable of reproducing young ones, or who are within their reproductive age (Azubuike, 2014). Childbearing however is defined as the period during pregnancy,

childbirth and early post partum phase (Azubuike, 2014). Pregnancy, child birth and child upbringing has become a thing of concern to this group of people. They are exposed to all sorts of responsibilities which include taking adequate care of the children, knowing the health needs of the children and taking adequate measures to prevent diseases in their children. It is also their responsibility to take full course of immunization for their children so as to prevent the child killer diseases.

However, the extent by which immunization services are being utilized by childbearing mothers is influenced by many factors which may enhance the use or inhibit its use. Several socio demographic factors such as age, educational level, parity, religion, culture and occupation can affect utilization of immunization services by the people (Tsawe, Moto, Netshivhera, Ralesego, Nyatti, & Susuman, 2015). George (2012) indicated that one of the factors accounting for the poor utilization of immunization is lack of knowledge about the benefits derived from complete immunization; the low priority given by the people to preventive health combined with lack of awareness of possible vaccination may prevent illiterate people from accepting it.

Nsukka Local Government is one of the local Government Areas in Enugu state, Nigeria. It has an area of 1,810 km² and a population of 309,633 as at the 2006 census (National Population Commission-NPC, 2010). The inhabitants are mostly farmers and traders and few civil servants. In Nsukka local government, record shows that there was low immunization coverage in 2012, 2013 and 2014 as contained in Monitoring and Evaluation Unit Report of Enugu State Ministry of Health. Statistics from this record showed that in 2012, the coverage were 39 percent while in 2013 and 2014 it was 44 percent and 47 percent respectively which was far below 80 percent target by NPI. Also, from this report it was observed that there was moderate immunization coverage in 2015 and 2016 of 55 and 59 percent respectively. One would therefore expect that more effort is needed to persuade families to bring their children to be immunized at the right time and complete the full course of immunization services.

Childhood immunization guarantees protection from major killer diseases of children and goes a long way in preventing neonates, infants, or children dying in their early years. The first five years of birth is the most dangerous in a child's life which therefore requires active immunization against the killer diseases of childhood.

Regrettably it seems that most of the childbearing mothers are not utilizing these services effectively. It therefore becomes necessary to study the utilization of immunization services in Nsukka LGA. The findings from this study will be of benefit to health care providers, community health workers, public health educators, curriculum planners, childbearing mothers, government and the general public. Consequently, the purpose of the study was to find out the utilization of immunization services among childbearing mothers in Nsukka LGA. Specifically, the study sought to;

1. ascertain the proportion of childbearing mothers that utilize immunization services based on level of education,
2. investigate the proportion of childbearing mothers that utilize immunization services based on age,
3. ascertain the proportion of childbearing mothers that utilize immunization based on parity status.

Research Questions

The following research question guided the study:

1. What is the proportion of childbearing mothers that utilize immunization services in Nsukka LGA based on level of education?
2. What is the proportion of childbearing mothers that utilize immunization services in Nsukka LGA based on age?
3. What is the proportion of childbearing mothers that utilize immunization services in Nsukka LGA based on parity status?

Hypotheses

The following null hypotheses were postulated to guide the study and were tested at .05 level of significance and at appropriate degree of freedom.

1. There is no significant difference in the proportion of childbearing mothers that utilize of immunization services in Nsukka LGA based on level of education.
2. There is no significant difference in the proportion of childbearing mothers that utilize of immunization services in Nsukka LGA based on age.
3. There is no significant difference in the proportion of childbearing mothers that utilize of immunization services in Nsukka LGA based on parity.

Methods

The study utilized descriptive survey research design. Descriptive survey design according to Gemson & Kyamru (2013) is structured to find, describe and interpret an existing environment and community health

phenomena. This study was carried out in Nsukka LGA. Nsukka LGA is one of the seventeen local government Areas in Enugu State, south-east Nigeria. Nsukka LGA has 20 political wards and 28 primary health centers. Nsukka LGA also has a district hospital and many private hospitals/ clinics. The population for this study consisted of all the CBMs attending antenatal and child welfare clinic at health facilities in Nsukka LGA during the period of the study. From the delivery and antenatal register, the population of childbearing mothers in Nsukka LGA at the period of the study was six thousand four hundred (6,400). The sample size consisted of three hundred and seventy-six (376) respondents. These were selected using Taro Yamane formula for sample size determination for a finite population. Four was added to make up for any error therefore the sample size became 380. A two - stage sampling procedure was employed to draw the sample for the study. The first stage involved the use of simple random sampling techniques of balloting without replacement to select 10 primary health care centers out of the 28 primary health centers in Nsukka LGA. The second stage involved the use of simple random sampling techniques of balloting without replacement to select 38 mothers from each of the 10 primary health centers that were sampled. Finally, three hundred and eighty (380) mothers were selected and were utilized for this study.

The instrument used for data collection was a structured questionnaire titled Utilization of Immunization Services Among Childbearing Mothers Questionnaire (UISACBMQ). The UISACBMQ consisted of two sections (A&B). Section A elicited information on respondent's personal data while section B was on utilization of immunization services among CBMs rated as follows; Always (3), rarely (2), Never (1). The respondents were requested to tick (√) as it applied to them. Face validity of the instrument was established by three experts from the Department of Human Kinetics and Health Education, University of Nigeria Nsukka. The distribution and collection of the questionnaire was facilitated by the assistance of the health workers in the facilities sampled. Completed copies of the questionnaire were collected on the spot to ensure maximum return rate. The returned copies of the completed questionnaire were scrutinized thoroughly to determine the adequacy of the responses. Uncompleted copies of UISACBMQ were discarded while properly completed copies of UISACBMQ were coded and analyzed using Statistical Package for Social Sciences-(SPSS Batch System) version 22.

A total of 279 correctly completed copies were used for analysis. The CBMs that utilized always represent "utilization" while those that utilized rarely and never were collapsed to represent "Non utilization". Thereafter, frequencies and percentages were used to find out proportion of CBMs that utilized immunization. A proportion of less than 50 percent was interpreted as low utilization while a proportion of 50 percent and above was interpreted as effective utilization. The null hypotheses were tested using chi-square statistic at .05 level of significant and appropriate degree of freedom.

Results

Table 1: Proportion of Childbearing Mothers that Utilize Immunization Services in Nsukka Local Government Area Based on Level of Education (n=279)

S/N Item	Level of Education				χ^2	p-value	df	Decision
	NFE (n=30) F(%)	PE (n=29) F(%)	SE (n=126) F (%)	TE (n=94) F(%)				
1. Bacilli calmetter Guerin	26(86.7)	21(72.4)	92(73)	75(79.8)	4.972	.547	6	*
2. Oral polio vaccine	20(66.7)	17(58.6)	92(73)	71(75.5)	9.115	.167	6	*
3. Pneumoccocal conjugate vaccine	20(66.7)	19(65.5)	90(71.4)	71(75.5)	2.421	.877	6	*
4. Pentavalent vaccine	14(46.7)	19(65.5)	96(76.2)	72(76.6)	16.945	.009	6	**
5. Measles vaccine	16(53.3)	17(58.6)	95(75.4)	73(77.7)	12.024	.061	6	*
6. Yellow fever vaccine	18(60)	17(58.6)	97(77)	71(75.5)	8.323	.215	6	*
7. Rota vaccine	18(60)	19(65.5)	82(65.1)	56(59.6)	1.793	.938	6	*
8. Tetanus toxoid	13(43.3)	19(65.5)	82(65.1)	56(59.6)	17.524	.008	6	**
Overall percentage	**60.4**	**63.7**	**72**	**72.5**	**9.140**	**.353**	**6**	*

Key: NFE=No formal education, PE= Primary education, SE=Secondary education, TE=Tertiary education
*not significant, **significant at p<.05

Table 1 shows that in Nsukka LGA, childbearing mothers with tertiary education utilize immunization most (72.5%) followed by those with secondary education (72%) and the least are those with no formal education (60.4%). However, no significant difference existed in utilization of immunization services (χ^2 = 9.140, p =

.353>.05) except for pentavalent vaccine (χ^2=16.945; p=.009< .05) and tetanus toxoid (χ^2=17.524; p = .008<.05) that showed significant difference.

Table 2: Proportion of childbearing mothers that utilize immunization services in Nsukka Local Government Area based on age (n=279)

S/N	Item	Age				χ^2	p-value	df	decision
		15–20 (n=70) F(%)	21–30 (n=120) F(%)	31–40 (n=52) F(%)	≥41 (n=37) F(%)				
1.	Bacilli calmetter Guerin	52(74.3)	95(79.2)	43(82.7)	24(76.7)	5.970	.427	6	*
2.	Oral polio vaccine	42(60)	92(76.6)	40(76.9)	26(70.3)	8.180	.225	6	*
3.	Pneumoccocal conjugate vaccine	49(70)	86(71.7)	41(78.8)	24(64.9)	6.867	.333	6	*
4.	Pentavalent vaccine	43(61.4)	89(74.2)	41(78.8)	28(75.7)	6.252	.396	6	*
5.	Measles vaccine	49(70)	85(70.8)	40(76.9)	27(73)	3.730	.289	6	*
6.	Yellow fever vaccine	50(71.4)	86(71.7)	40(76.9)	27(73)	3.236	.779	6	*
7.	Rota vaccine	46(65.7)	67(55.8)	39(75)	23(62.2)	9.206	.162	6	*
8.	Tetanus toxoid	37(52.9)	82(68.3)	35(67.3)	22(59.5)	9.637	.141	6	*
Overall percentage		**65.5**	**71**	**76.7**	**69.4**	**6.635**	**.344**	**6**	*

Key: *not significant at p<.05

Table 2 shows that the childbearing mothers between age 31-40 utilized immunization services most (76.6%), followed by those between age 21- 30 (71%) and the least are those between age 15- 20 (65.7%). However, no significant difference existed in the utilization of all the immunization services based on age (x^2=6.635, p=.344> .05).

Table 3: Proportion of childbearing mothers that utilize immunization services in Nsukka Local Government Area based on parity status (n=279)

S/N	Item	Parity status			χ^2	p-val	df	dec
		0–3 (n=127) F (%)	4-6 (n=113) F(%)	≥7 (n=39) F(%)				
1.	Bacilli calmetter Guerin	98(77.2)	91(80.5)	25(64.1)	5.390	.250	4	*
2.	Oral polio vaccine	93(73.2)	84(74.3)	23(59)	4.286	.369	4	*
3.	Pneumoccocal conjugate vaccine	97(76.4)	81(71.7)	22(56.4)	7.330	.119	4	*
4.	Pentavalent vaccine	95(74.8)	79(69.9)	27(69.2)	1.870	.760	4	*
5.	Measles vaccine	92(72.4)	83(73.5)	26(66.7)	5.840	.211	4	*
6.	Yellow fever vaccine	92(72.4)	82(72.6)	29(74.4)	.523	.971	4	*
7.	Rota vaccine	75(59.1)	75(66.4)	25(64.1)	4.695	.320	4	*
8.	Tetanus toxoid	85(66.9)	72(63.7)	19(48.7)	15.608	.004	4	**
	Overall percentage	**71.6**	**71.6**	**62.8**	**5.693**	**.376**	**4**	*

Key: *not significant, **significant at p<.05.

Table 3 shows that in Nsukka LGA, childbearing mothers with parity status 0-3 and those with parity status 4-6 has equal utilization of immunization services (71.6%) while those with parity status 7 and above are the least that utilize immunization services (62.8%). No significant difference existed in the utilization of all the immunization services based on parity (χ^2 =5.693; p=.376 >.05). However, significant difference existed in the utilization of tetanus toxoid based on parity (χ^2 =15.608; p=.004<.05).

Discussion

Result in Table 1 indicated that childbearing mothers with tertiary education utilized immunization services most (72.5%) followed by those with secondary education (72%) and the least are those with no formal education (60.4%). This is expected because education exposes mothers to the importance of immunization and helps to correct misconceptions about immunization. The findings agree with Muiru (2009) who reported that maternal education was found to positively and significantly influence utilization of immunization services in Kenya but disagrees with Edward (2013) who reported that maternal education was not positively associated with their awareness or compliance of the immunization schedule.

The table equally shows that respondents with primary education utilize Rota virus vaccine and tetanus toxoid most (65.5%) each while higher proportion of those with no formal education utilize BCG (86.7%). The high proportion of BCG utilization among respondents with no formal education could be because BCG is given immediately after birth, providing children delivered in health facilities opportunities for BCG immunization after birth. However, significant difference existed in utilization of pentavalent vaccine (χ^2=16.945; p=.009< .05) and tetanus toxoid (χ^2=17.524; p= .008<.05) based on education. The finding is at variance with Edward (2013) who reported that maternal education was not positively associated with their awareness or compliance of the immunization schedule. The difference in the finding could be attributed to difference in study settings. Therefore, it is recommended that health education is of utmost necessity to inform mothers on the need of immunization.

Result in Table 2 revealed that Childbearing mothers between age 31-40 utilized immunization services most (76.6%), followed by those between age 21- 30 (71%) and the least are those between age 15- 20 (65.7%). This is surprising and not expected. Immunization services was expected to be mostly utilized by CBM between ages 15-20 because this age group are more likely to be experiencing their first order births and are more enthusiastic to use the services than the older ones who have had enough experience about the services. The result agrees with (Ajegbu, 2013) who reported that women of older age are more likely to utilize immunization services than the younger ones in Nigeria. His study identified that from 45 percent for under 20 to 55 percent for age 35-49 utilize immunization services. The finding equally agrees with the finding of Tsawe et. al., (2015) who reported that non-use of immunization is high among children whose mothers are aged 20-24 years in Swaziland. The reason for non-use could be attributed to shyness and inexperience of the younger mothers. The mothers that had the lowest utilization in this study are those aged 15-20(65.7%) who are at their teen age and may not feel comfortable with the use of maternal and child health services (MCH) including immunization. Therefore, younger mothers should be targeted for health education on the importance of MCH services including immunization. However, despite these findings, no significant difference existed in the utilization of all the immunization services based on age (χ^2= 6.635, p= .344 >.05).

Result in Table 3 showed that Childbearing mothers with parity status 0-3 and those with parity status 4-6 has equal utilization of immunization services (71.6%) while those with parity status 7 and above are the least that utilize immunization services (62.8%). This is expected because women with few children are more likely to seek health care services more than those with large number of children who believed they can handle diseases in children due to their accumulated experience. This is in line with Azubuike (2014) who opined that women with large number of children underutilize available immunization services because many demands on their time force them to forgo such services. Tsawe et. al., (2015) also reported that children whose mothers have six or more children are less likely to be immunized [OR = 0.20, 95% (0.0-0.9)] than those who have one to two children. This situation is worrisome considering the benefit of immunization to children irrespective of the birth order. The practice of underutilization of immunization services among women with higher number of children exposes those children to childhood diseases which could have been prevented by adequate immunization. This calls for more information and education to childbearing mothers on the necessity of immunization of all children.

Significant difference existed in only the utilization of tetanus toxoid based on parity (χ^2 =15.608; p=.004<.05). From the table, only 48.7 per cent of childbearing mothers with parity of 7 and above utilize tetanus toxoid. This is equally worrisome because TT is the only immunization service that benefits both the mother and the baby. There is need for efforts that will improve the utilization of all the immunization services by childbearing mothers irrespective of parity.

Implication of the Study for Health Communication

Health communication is a vital strategic component of health promotion programmes. Immunization is a tool for disease prevention and consequently health promotion. Effective communication of the need for immunization is vital especially in the current era of disease prevention and health promotion. The use of several means of communication like the media including social media, internet, and radio among others can have the potential of improving utilization of immunization services especially among childbearing mothers of high parity, younger mothers and those of low educational status. It therefore implies that to achieve the immunization

coverage of 80 per cent which is the NPI target, there is the need to make use of both the traditional and modern communication means to maximally reach the target population. This will in turn increase immunization utilization, reduction in childhood morbidity and mortality and a healthier future generation.

Conclusion and Recommendations

The present study revealed effective utilization of all the immunization services by the childbearing mothers except tetanus toxoid which showed low utilization among respondents with no formal education (43.3%) and those with parity status of 7 and above (48.7%). Significant difference existed in utilization of pentavalent vaccine (χ^2=16.945; p=.009< .05) and tetanus toxoid (χ^2=17.524; p= .008<.05) based on level of education and in tetanus toxoid (χ^2 =15.608; p=.004<.05) based on parity. Following from the findings and conclusion of the study, the following recommendations are made;

1. There is need for continuous community health communication and education in order to reinforce and sustain the effective utilization of the immunization services revealed in this study.
2. Health education and communication on the need for adequate utilization of immunization should be conducted by health educators and other health professionals regularly at the health centers for childbearing mothers.
3. The health workers should enlighten all mothers during antenatal visits on the need for proper utilization of all the immunization services irrespective of number of children one has, age or educational level.
4. Modern communication means like the internet and social media should be harnessed by care givers in order to ensure maximum utilization of health services including immunization.

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