Rural Women and Child Immunization in West Senatorial Districts of Kogi State, Nigeria

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Abstract

This study examines the pattern of child immunization among rural women in West Senatorial Districts of Kogi State in order to assess the coverage level and identifying factors influencing immunization uptake accordingly. Data were collected in nine rural communities (three each from the three selected Local Government Areas) from nursing mothers through questionnaire administration. 30% amounting to 427 samples out of the 1442 identified nursing mothers were selected randomly in the selected rural communities. The results of the analysis show that, 65% of the samples were fully immunized during the specified period. The step-wise regression result also shows that four variables, X_{11} (accessibility to health information), x_{12} (religious factor), x_3 (Economic status of parent and Income level), and x_1 (formal educational status of mothers), are the best predictors for effective participation in immunization in the different rural communities. Appropriate recommendations were given to ease future accessibility to and participation in immunization at specified times.

Keywords: Participation, Coverage, Infant-Mortality, Programme, Health

Introduction

Immunization is described as a form of health technology that is central on child health care practice that is aiming at reducing preventing or protecting an individual against epidemic Jegede (2005). Generally immunization comprises of a set of vaccines administered on an individual against epidemic to stimulate or boost man's immunity against specific diseases (Ogunmekan, 1985, cited in Shehu, 2008).

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As important as immunization is, modern immunization only began in 1974 when the World Health Organization (WHO) discovered that the problem of High Death Rate (HDR) prevalent in the developing countries(including Nigeria) could be prevented through administration of vaccines. Generally, experience has shown a disparity in immunization uptake between the developed and developing nations or countries. For instance, Haggett (1972) observed that some developed countries like Japan and Sweden have a low figure of 9 per 1000 Child Mortality Rate (CMR), whereas some developing countries like Nigeria, Ethiopia and Kenya, the CMR stood at 114, 116 and 74 respectively in the 80s (Falodun, 1984).

The wide gap in High Mortality Rate (HMR) between the developed and developing countries, therefore, prompted the international community which comprises the World Health Organization (WHO), United Nations Children's Education Fund (UNICEF), and United State Agency for International Development (USAID) among others. These organs established the Expanded Programme on Immunization (EPI) in 1974 for the developing countries, including Nigeria. With specific reference to Nigeria, the attempt to tackle the problem of HMR led to the adoption of the EPI in 1979 under the joint sponsorship of the Federal Government of Nigeria and the international organizations. The programme however, appeared not to have achieved its intended goal as evidenced by the low coverage of the exercise and the continued reported cases of high child mortality rate few years after the inception of the programme in the 1990s (DHS 1999).

Over the years, the importance of health-care, particularly in the area of modern immunization, has been appreciated by various agencies, scholars and the government under the Ministry of Health. However, child immunization has continued to suffer great neglect in the past. Therefore, the constant effects of the neglect have resulted to low coverage level of child immunization despite the relative campaign of the programme.

One of the major attempts made by the Federal Government to curtail High mortality rate (HMR) in the past was through formulating various policies whose ultimate goal was to improve the immunization coverage, especially in areas where persistent low coverage have been witnessed. A programme of aggressive immunization coverage was introduced in Nigeria in 2001 to facilitate rapid coverage of EPI.

Despite the ten rounds of National Immunization Days (NIDs) and four rounds of Special National Immunization Days (SNIDs) (Day designated for mobile distribution of Immunization) (FMOH, 2001) that Nigeria had in 2001, organized the Polio and Measles immunization coverage that reached 46% and 40% respectively, while the national children immunization coverage was 13% by the same year (Babalola and Aina, 2006).

As a consequence of the static immunization coverage level, the Federal government, through the Federal Ministry of Health set a new target for immunization coverage. Hence, BCG, OPV3, DPT3, Measles and Yellow fever were to attain 80% each by the end of 2005.In order to achieve the new target of coverage, five strategies, which include Strengthening immunization service delivery, Strengthening the logistic system, Strengthening disease control mechanism, Strengthening disease surveillance data collection and Advocating and social mobility were set out.

Despite the above targeted programmes, available record revealed that immunization uptake is as low as 12.7% in some States of the Federation like Kano, Jigawa and Borno (Babalola and Aina 2006; FMOH 2005). The coverage rate was as low as 0.4% towards the end of year 2008. The UNICEF reveals that six of Nigerian states including Kogi State were observed to have the lowest immunization coverage. However, the persistence low level of immunization courage has been observed to have resulted from several problems which include inaccessibility, inadequate infrastructure, lack of proper planning and others. The basic questions still remain: "what is the coverage of immunization, particularly, in West Senatorial District in Kogi State? How much of the services are available? What is the level of acceptability of the immunization programme? The aim of this study is thus two fold. Firstlty, it is to assess the spread and coverage of child immunization in some selected rural communities in West senatorial districts of Kogi State. Secondly, it is to isolate the basic factors determining the spread and levels of child immunization in the study area.

Therefore, this study focuses on Kogi State the West Senatorial District which comprises of seven Local Government Areas, namely Kogi, Lokoja, Yagba West, Yagba East, Mopamuro, Ijumu and Kabba/Bunu LGAs. However, Yagba West, Ijumu and Kabba/Bunu LGAs were selected for the study with the intention to identify the pattern and coverage of child immunization in the area.

Impacts of Immunization and Primary Health Care on Diseases

Health issues are fundamental and a major concern of Nigerian government. However, there are three tiers of healthcare where the federal government is directly responsible. The first tier is the Tertiary Health Institutions which comprises all the 14 teaching hospitals and all the specialist hospitals. The second tier comprises the State owned general hospitals and the third tier comprises, the Primary Health Care (PHC) which is under the control of the local government authority (Adeyemi, 2001).

Since the focus of this study is centered on the LGAs, our discussion would be restricted to primary health care centre (PHC). Nigeria has 774 local governments (L.G's) with numerous human settlements that depend on their various headquarters for provision of health care services. According to Adeyemi (2001), the numbers of PHC centres available to provide this functions for settlements under each LG area are still far from being adequate. In addition, the functional ones are not readily accessible to a large number of the population, particularly the rural dwellers. Consequently, a large number of people from such areas are not opportune to vaccinate against many preventable killer diseases (Adeyemi, 2001:.246). Inadequate PHC centres in the rural areas could be the major consequence of low immunization uptake which has led to high child mortality rate of about 210 per 1000 population in Nigeria (NPC,2004).

Generally, the major causes of death have been classified into two, the degenerative causes and the environmental causes. The former is concerned with degenerative of human body organs or depreciation of human body due to age advancement. However, the probable cause of death results from infectious diseases, catastrophes, accidents, floods and tsunamis among others. Among the environmental causes of death is infirmity resulting from some diseases such as; measles and chicken pox and other contagious diseases that are prevalent in the climatic regions of northern Nigeria. Apart from the above, some diseases are restricted tocertain climates.

For instance, malaria and other water borne diseases are confined to the tropical climate and these have been the killer diseases responsible for a large numbers of deaths recorded in such area. For instance, Chakara-vorty (2008) observed that between 70-80% of children's deaths are caused by malaria, diarrhea and respiratory infection combined with inadequate nourishment (see Table1). Generally, each of these diseases accounts for high number of deaths particularly among children from the developing countries in the tropical region.

Table 1. Causes of Morbidity from Noticeable Diseases in Nigeria, 1991 and 1993

Noticeable Diseases	1991 number rate per100,000 population		1993 Number Rate per 100.000 population	
Malaria	909,656	1027.7	981,913	1045.68
Dysentery (all types)	462,993	532.1	487,331	518.96
Pneumonia	136,983	154.8	161,957	171.51
Measles	41,026	49.7	54,734	58.29
Gonorrhea	43,757	49.4	33,302	35.46
Whooping cough	21.1	18,685	23,800	25.34
Filiarisis	7,080	8.0	16,776	17.86
Leprosy	18,685	15.4	14,706	15.66
Chicken-pox	7,080	9.9	13,243	14.01
Schistosomasis	13,641	15.2	11,983	12.76
Typhoid parat	8,737	9.9	11,957	12.76
Tuberculoses	19,616	22.2	11,601	12.35
Food poisoning	8,347	9.4	11,544	12.30
Hepatitis	8,897	10.4	6.312	6.72
Guinea worm	5,479	6.2	5.356	5.70

Source: Federal Ministry of Health, (1996) .

According to Goffery's (2008) report, 150,000 Nigerian children die of diarrhea annually, while Chakara-Vorty, (2008:.43) observes that 1440 Nigerian children die monthly of preventable diseases. This is one of the highest mortality rates found in developing countries of the world (Goffery, 2008). Evidently, experience has revealed that high death rate is synonymous with the developing countries.

For instance Obiechina (1985) observes that in Nigeria, Crude Death Rate (CDR) is 17 persons per 1000. Where Falodun's (1985) account reveals that infant and child mortality rate are 84.5 and 144.5 persons per 1000 between 1975 and 1979 respectively. Also the UNFPS, (2003), UNICEF, (2003 and 2004) noted that the infant mortality for Nigeria was 112. Today, the NPB's (2007) report shows that the Nigeria infant and child mortality are 100 and 210 persons per 1000 respectively.

These high figures eventually formed the basis on which the United Nation Children's Education Fund (UNICEF 2004) rated Nigeria as the fifteenth nations with highest under-five mortality rate in 2004. narrowing the mortality rate to the experience of some states in Nigeria. The Federation, available records show that about 229 per thousand of child mortality came from Kogi State, a figure higher than the identified national average (NPB, 2007).

Unfortunately most of babies who lost their lives before the first birth day, die of six preventable childhood killer diseases like measles, tuberculosis, diphtheria, whooping cough, tetanus and poliomyelitis, while many others who survived are either maimed for life, blind or deaf, or weakened as a result of heart and lung diseases (Nakajima, 1995).

To contain the scourge of HDR, major efforts were put by in 1970s in Nigeria. However, the proper immunization programme began in 1979 upon the establishment of Expanded Programme on Immunization (EPI). Despite this immunization programme, no significant success was recorded.

According to the Federal Ministry of Health (FMOH) immunization records, the schedule for immunization programme reveals that children are expected to receive a single dose of Bacilli Calmette Guerin (BCG) at birth, three doses of Hepatitis (HBV), Diphtheria, Pertusis, Tetanus (DPT) and Oral-polio Vaccines (OPV) at 6 weeks, 10 weeks and 14 weeks respectively. Finally, every child is expected to receive a dose of measles/yellow fever at 9 months. Also a dose of tetanus (TT) vaccine is given to both pregnant women and children. Despite the efforts of NPI, the intended goal of the programme appeared not to have been achieved, because the coverage level of the immunization programme which seems unsatisfactory, following the result for routine immunization coverage for 1995-1999 shows that BCG has 30%, DPT3, 23.6% OPV3.25% and measles, 38.6% (FMOH, 2001).

In this part of the world several problems hinder immunization uptake. However, Jegede (2005) itemizes a number of factors affecting child immunization particularly in rural areas. According to him, mother's occupation is one of predominant factors affecting children immunization uptake. Generally, many mothers of low income status consider their occupation more important than their children's health. They often prefer to attend their various occupational activities such as market each time the immunization day clashes with their economic activities.

Similarly in this part of the country, women are usually itinerant traders shuttling between the various communities that are nearby. They therefore have little or no time to immunize their children. Apart from this, it has been noted, that mothers' educational background greatly influenced their children's immunization uptake (Shehu 2008). According to him, substantial numbers of those who patronize the services are educated. This is also in line with the findings of Kassie and Kloos, (1993). They observed that education played an important role in child immunization up take in various parts of Africa, particularly in Ethiopia. In their study, they observed that some substantial migrant educated parents still ensure they immunized their children.

Apart from the aforementioned, Yahya (2006), Babalola and Aina (2005) stressed the importance of religion to immunization's acceptability. According to Yahya, religious factor appears to be responsible for low immunization coverage in the northern part of Nigeria. The negative impact of religion factors may not be unconnected with the high level of illiteracy in the region which has a stronger way of influencing the peoples' life styles or decisions. Therefore, the region is characterized by unusually low immunization uptake, and consequently high infant and child mortality rates. On the contrary, recently it was noted from a personal pilot study conducted by the authors in Yagba west of Kogi State. This shows that Immunization day is communicated to the inhabitants of the area through their churches. Apart from the above, some other factors identified include culture, myths and traditional method of immunization uptake (David et al, 2000). All the above factors, in addition to the financial status of parents probably determine whether or not individual mother would seek for immunization for their children and their relation.

The Study Area

West Senatorial District in Kogi State is located in longitudes of 05^0 21'E - 7^0 00E and latitudes of 07^0 30'N - 8^0 50'N. The study area shares common boundaries with Kwara and Niger States to the North, Okehi LGA to the east, Ogori/Magongo LGA to the South, Ondo and Ekiti States to the West. The study area comprises of seven Local Government Areas namely, Yagba West, Yagba East, Mopamuro, Ijumu, Kotokarfi, Lokoja and Kabba/ Banu LGAs. However, only Yagba West, Ijumu and Kabba/Bunu LGAs were selected from the seven LGAs.

In the study area, the primary economic activity which includes farming and mining are the predominant work of the people in the area. This is favoured by the presence of huge natural resources such as vast savanna grass land which has encouraged farming activities among large number of the inhabitants. Other economic activities are agro-based. These include traditional craft industries such as cloth weaving, tie and dye, basket weaving among others.

Methodology

In this study, a substantial proportion of the required data were collected from primary sources, while others information were collected from secondary sources particularly from the EPI and journals/magazines. In selecting the sampling representative, a total number of nine settlements were randomly selected from three local government areas namely: Yagba west LGA, Ijumu LGA and Kabba/Bunu LGA out of the seven LGA in Kogi West Senatorial District. From each of the selected local government areas, three settlements were randomly selected and about 10% of the target populations of children under the age of five were sampled. Some of the selected rural communities are Igbaruku, Okoloke ,Ogbe, Ogale, and Odokoro. Others are   Ikoyi, Iluke ,Akutupa , and Otu Egunbe).

In order to measure the factors that are affecting the success of immunization in the study area, a Stepwise regression analysis was used. Babalola and Aina (2005) used this method to carry out investigation on importance of religion to immunization acceptability in the northern parts of Nigeria in 2005.In the model adopted for this study, thirteen (13) variables numbering from x_1 to x_{13} were examined. These were based on past studies and the peculiarity of the study area.

In order to do this, the dependent variable (Y) stands as the average number of children immunized over time in the locality, while the (X) independent variables are those variables identified and listed as:

X_1= Formal education status of mother
X_2= Parental occupational status
X_3= Parental income level/Economic status
X_4= Nearness to health care facilities
X_5= Alternative source to modern immunization
X_6= Age of mother of first birth

X_7= Supply related problems/availability of vaccines

X_8= Migratory status of fathers

X_9= Migratory status of mother

X_{10}= Number of children immunized per family

X_{11}= Accessibility to health information

X_{12}= Religious believe /cultural values

X_{13}= Attitude of health workers

In order to obtain a linear relationship, our regression equation proposed would be Y= a + b_1 x_1 + $b_1 x_2$ + $b_3 x_3$ + ………….. b_n x_n + e, where Y is the average number of children immunized $x_{1…..}$ x_n are the factors that determine spread differential. **E** is the standard error respectively and **b_1----bn** are regression coefficients and **a** is constant.

Analysis and Discussion

I. Awareness of Immunization

During the survey, respondents were asked to indicate whether or not they heard about immunization prior to the time of its execution. Their responses on Table 2 are interesting. Generally (77%) of respondents in the selected rural communities have heard about the National Programme on Immunization (NPI) in one way or the other, while about (23%) of the respondents claimed that they were not aware of the programme until recently.

Table 2: Level of Awareness of Immunization (NPI)

	Yagba West LGA	Ijumu LGA	Kabba/Bunu		
Awareness	No	No	No	Total	%
Very Much Aware	106 (70)	102 (72)	122 (92)	330	77
Not Aware	46 (30)	40 (28)	11 (8)	97	23
Total	152	142	133	427	100

Source: Authors' field work.

Apart from the general awareness discussed and based on table 2, 70%, 72% and 92% of nursing mothers in the rural communities in Yagba west, Ijumu and Kabba/Bunu are aware respectively. Among these three LGAs, Kabba/Bunu has the highest awareness coverage (92%) while Yagba west has the least of 72%. Whereas, table 3 shows the distribution of respondents' sources of NPI information. As reflected from this table again, (48%) of the respondents from Kabba/Bunu LG are aware of routine immunization via public campaign.

Ijumu LG which is next to Kabba/Bunu LG in ranking with (45%) of the respondents who were aware of the programme through public campaigns. However, 35% of rural women in Yagba West were aware about it through this means. In the second source of information, 47%, 44% and 21% are aware of it in Kabba/Bunu, Ijumu and Yagba West LGAs respectively. In the third district, 42%, 2% and 0% heard of the programme through electronic media in Yagba West, Ijumu and Kabba/Bunu LGAs respectively.

Table 3. Sources of NPI Information

	Yagba West LGA	Ijumu LGA	Kabba/Bunu		
Source of information	No	No	No	Total	%
Public campaign	53 (35)	64 (45)	64 (48)	181	42
Electronic Media	32 (21)	63 (44)	63 (47)	158	37
Religious Centers	65 (42)	4 (2)	6 (0)	91	5
Others	2 (2)	11 (9)	6 (5)	19	6
Total	**152**	**142**	**133**	**427**	**100**

Source: Authors' field work.

Rural Women Accessibility to Health Care Facilities

In order to assess nursing mothers' accessibility to health care facilities, respondents were asked to identify the nearest health care facilities in their locality.

Even though a large proportion of them were able to mention General hospitals and Health centers like those in Iyamoye, Kabba , Isanlu, Ayetoro and Amuro, immunization facilities are still far from the reach of a substantial number of them. This is because the local clinics and health centers nearest to them were not participating in the Expanded Immunization Programme. Infact, some of the women had to travel outside their communities in search of the opportunity to vaccinate their children. Our respondents also indicated that from 2008 to date ,some health workers were coming to their communities, and where they were not found, they were usually traced to the nearest immunization post.

Table 4: **Respondents' Health Care Accessibility**

	Yagba West LGA	Ijumu LGA	Kabba/Bunu		
Distance traveled	No	No	No	Total	%
3km below	6 (4)	53 (37)	114 (86)	173	41
4-6km	14 (9)	60 (42)	19 (14)	93	21
7km above	132 (89)	29 (21)	0 (0)	161	38
Total	152	142	133	427	100

Source: Authors' field work.

In Table 4, (41%) of respondents indicated that they often travel about 3km before they could access immunization services, where (38%) and (21%) of the respondents travel between 4-6km and 7km respectively. It means generally, accessibility to public goods and services is poor among the rural communities in the region. Looking through table again, it reveals that 65% children were immunized. This agrees with Ullman (1956) who observed that only few people travel over longer distance and vice versa for information. Apart from this, 38% of people who traveled over seven km is against WHO' recommended maximum 5km.

Table 5. Status of Vaccines Availability

Vaccines Availability	Yagba West LGA	Ijumu LGA	Kabba/Bunu		
	No	No	No	Total	%
Always Available	106 (70)	104 (73)	79 (59)	289	68
Not Available always	40 (26)	10 (7)	5 (4)	55	13
No idea	6 (4)	28 (20)	49 (37)	83	19
Total	152	142	133	427	100

Source: Authors' field work.

One of the major constraints in modern immunization is non-availability of vaccines on demand (Jegede 2005). Our findings also revealed that supply related problem encountered by respondents in Table 5. For instance, 73% nursing mothers from Ijumu LG indicated that vaccines meant for immunization were always available. Similarly, 70% and 59% of the respondents from Yagba west and Kabba/Bunu indicated that vaccines were always and sufficiently available. Generally, 68% respondents indicated that, they did not witness any failure in the immunization programme to them, the programme is very successful.

Pattern and Spread of Immunization among Rural Women

Efforts were made during this survey to assess the level of spread and pattern of child immunization among the rural women. Invariably, table 6 also shows the distribution of five (5) years (2006 - 2010) comprehensive summary of children vaccinated against preventable diseases of the three selected local Government Areas namely, Yagba west, Ijumu, and Kabba/Bunu. The Table covers the average immunization coverage of the BCG, OPV, DPT3, HBV3 measles and Yellow Fever (YF) respectively.

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Table 6 Pattern of Child Immunization

Year	Yagba west	Ijumu	Kabba/Bunu	%
2006	40	26	32	33
2007	33	30	29	31
2008	48	40	43	44
2009	69	80	69	74
2010	63	62	64	63
Av. For 5yrs	50.6%	47.6%	47.4%	49

Source: Authors' computation from Kogi State NPI 5yrs Annual report, 2006 – 2010.

From Table 6, Yagba west LG accounts for the highest coverage in 2006–2010, this shows that the general coverage was low in 2006. Within the 5 years of study, Ijumu LGA had the highest coverage of 80% in 2009. This figure comfortably places Ijumu LGA first from other two LGAs who had 69% immunization coverage each. Generally, there was a noticeable decline in the coverage in year 2009 from 74% to 63% in 2010. The table clearly showed that 65% were immunized in 2008. This implies that as at March 2009, there exists some remarkable improvement compared to 2007 coverage level which shows the area has witnessed about 2% increase in coverage. The table also shows that 65% of respondents were immunized. However in Kabba/Bunu LG, about 68% of her respondents were immunized where Yagba West has 63%, figure less than the total average.

Table 7: Respondents Immunization Status

Immunization status	Yagba West LGA				Ijumu LGA				Kabba/Bunu LGA				G/total	%
	*1	*2	*3		*4	*5	*6		*7	*8	*9		G/total	%
Fully immunized	50	34	12	96 (63)	40	12	40	92 (65)	20	19	52	91 (68)	279	65
Partially immunized	20	18	6	44 (29)	14	10	14	38 (27)	5	8	81	31 (23)	113	27
Not immunized	4	5	3	12 (8)	6	5	1	12 (9)	2	3	6	11 (8)	35	8
	74	57	21	-	60	27	55	-	27	30	76	-	-	-
				152				142				133	427	100

Source: Authors' field work.

*Selected settlements (1. Igbaruku 2. Okoloke 3. Ogbe 4. Ogale 5. Odokoro 6. Ikoyi 7. Iluke 8. Akutupa 9.Otu Egunbe).

Apart from these, about, 8% of the children in study areas were not immunized at all. Among the 3 LGAs, Ijumu has the highest number of un-immunized children of 9% where Yagba west and Kabba/Bunu have 8% of un-immunized respondents children each. Lastly, 27% of the total respondents are partially immunized (people that did not complete their immunization package).

Factors affecting the levels and Spread of Immunization uptakes

In order to explain the probable factors contributing to the spread of child immunization in the study areas, thirteen variables were assessed based on past studies and evidences from the literature. A stepwise multiple regression analysis was applied to isolate those salient factors as predictors. Thus, dependent variable (Y) was the cumulative numbers of children immunized in each local communities selected, while the independent variables were the thirteen factors already identified. In all thirteen cases, four variables were found to be significant at the specified level of 0.5 % entry into the model.

These are X_{11} (accessibility to health information),x_{12} (religious/cultural values), x_3 (Economic Status of parent), and x_1 (formal educational status of mothers). The Stepwise Multiple Regressions on Table 7 suggest several findings. First, accessibility of mothers to health information appears to be the best predictor immunization spread in the study area, with a correlation co efficient of 0.8433 and a co efficient determination of 0.7111 This indicates that about 71.11% difference in the spread of immunization is associated with differences in accessibility of mothers to health information. A good understanding of this hypothesis is that women that are closer to locations where hospitals, schools and government presence are common would have better understanding than those women that are farther away.

Table 7: Multiple Regression of Factors Determining Child Immunization

Variable	Parameter/estimates	Std/Error	R	R²	%	Additional %	T-test
Intercept	1.3615	2.1400	-	-	-	-	-
X_{11}	4.3214	0.1090	0.8433	0.7111	71.11	-	1.635
X_{12}	0.0422	1.4220	0.8724	0.7610	76.10	4.99	0.654
X_3	0.8912	0.3116	0.8860	0.7849	78.49	2.39	0.782
X_1	0.9821	0.2974	0.8894	0.7910	79.10	0.61	0.604

Source: Authors' field work/computation output.

Comparing this result with table 3, there is strong correlation between them since about 94% of the respondents got information concerning immunization dates through religious centers, electronic media and public campaign in all the sampled LGAs. The variable x_{11} simply shows the importance of information particularly on health issue. If everyone has access to NPI information, the desired 100% total coverage would be achieved within the stipulated target, all thing being equal. Similarly, $x_{12,}$ the religious/Cultural values is the second best predictor with a joint correlation co efficient of 0.8724 and a co efficient determination of 0.7610 with the first variable. This also indicates that about 76.10 % variation in the coverage of child immunization in the study area is jointly explained by these variables. Variable 12 however added about 4.99% to the joint variance. The issue of religion and cultural values are important determinants in the local areas in most of Kogi State generally.

These are forums through which health care information is mostly disseminated especially in the churches, mosques, community association and market locations, especially in the grassroots. This finding is supported by Yahya (2006) and Gazali (2007) whose earlier studies demonstrated that negative religious believe actually precipitated low immunization coverage in 2004 and 2005 among the Northern states. But with this positive attitude, it does not only encourage the worshipers to accept immunization for their children but also support parental dissemination to other villages within their vicinity.

Apart from x_{11} and $x_{12,}$ x_3 (the economic status of parent and income levels also affects the spread of immunization positively in the rural communities. This variable with the first two variable above has a correlation co efficient of 0.8860, and a co efficient determination of 0.7849. This also means that about 78.49% variation spread in the levels of child immunization is explained by accessibility to health information, religious and cultural values of the people , and economic status and income levels of parent respectively. Economic status and income levels of parent however added a meager 2.39% to the total variance. Thus, x_{11}, x_{12} and x_3 factors contributed a total of 78.49% to immunization spread. Lastly, x_1 (formal educational status of mothers) is the fourth significant predictor. It has a joint correlation coefficient of 0.8894, and a coefficient determination of 0. 7910. with the three earlier discussed variables.

Hence, the educational status of mother added a meager 0.61% to the total variance. This is so because education is very important with mothers' acceptability of immunization principles especially in the rural communities.

It was observed that a large proportion of women who had formal education are more aware of the repercussions of immunization; acceptability is therefore higher in these groups of mothers than those who do not have formal education   and variance of 0.02. In all, the four variables X_{11} (accessibility to health information),x_{12} (religious/cultural values), x_3 (Economic Status of parent), and x_1 (formal educational status of mothers) together could be said to be the best predictors of the level of spread and coverage of child immunization among rural women in the study area. Therefore, about 79.10% variation in the coverage of immunization is jointly explained by these variables. The remaining variables in this study have co-efficient which are too low to offer meaningful explanation of the total variances in rural communities in West Senatorial districts of Kogi State, Nigeria.. Hence, the regression equation could thus be written as:

$$Y = 1.3615 + 4.3214x11 + 0.0422x12 + 0.8912x_{3+}0.9821x1.$$

RES=79.10, SE=2.140

This means that an improvement in rural women accessibility to health information, religious involvement, economic status and education of women would help to project further spread and success of immunization in the rural areas. Thus, a strong emphasis paced on these and other related moves in our rural communities would definitely improve the health status of children and subsequently reduce infant mortality over time.

Conclusion

The effort of this research was to investigate the pattern of child immunization among rural women in some selected communities in the study area. The findings showed a wide acceptability with variations in the communities, and this could be taken to be a reflection of health behavior of nursing mothers towards modern immunization. The investigation further shows that a large proportion of nursing mothers received full immunization for their children within the stipulated time, although the coverage is still far from the desired level.

The results of 2010 immunization has shown that, there was 63% coverage whereas as at March 2010, the data collected and presented in Table 6 reveals about 65% coverage. This level of coverage observed for the year 2010 was the consequent of the improvement achieved on certain factors which include accessibility of mothers to health information and high publicity through the two religions (Christianity & Islam) particularly in the rural areas. The issues economic status/income levels and formal education of nursing mothers were also found to be positively related to the variation in immunization spread.

Despite the above factors that have contributed positively to child immunization uptake, it was observed that there are inadequate distributions of health centers, particularly in the rural communities in Yagba West, where a large proportion of women need to travel up to 6km-20km before their children could be immunized.

It is, therefore, suggested, that there should be adequate distribution of health centers so as to alleviate rural people's suffering from getting access to immunization posts; this could be through the establishment of mobile clinics to penetrate the rural communities. Adequate publicity of health care services, particularly on immunization programme, in the local dialects and the styles the indigenes understand could also be encouraged among the rural communities. In conclusion generally, efforts should be made to improve accessibility to public goods and services in the rural communities. By so doing, the set goal of eliminating the killer diseases would be met within a short period to meet the targeted Vision 20- 2020.

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