

## Mother's Factors Affecting Vaccination Coverage among Children-Under Five Years at Kumbotso Local Government Kano State Nigeria

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### Abstract

**Background:** Immunization can greatly reduce the burden of infectious diseases; prevent illness, disability and death from vaccine preventable diseases (VPD) including, Measles, Pertussis, Diphtheria, Polio, Rubella and Tetanus. **Aim:** The study was carried out to assess the Mother's factors affecting vaccination coverage among children under five years at Kumbotso local government area Kano state.

**Design:** Cross-sectional study design was used. The study was conducted through house-to-house visit throughout Kumbotso local government area. The sampling method used was the cluster sampling approach promoted by the World Health Organization. Total number of 30 clusters was used and 7 household that involved mothers with under-five children from each cluster were selected. Total number of interviewed mothers was 420 from 11 districts. Structured questionnaire was used to assess the demographic characteristics of the interviewed mothers, as well as their knowledge and attitude in relation to vaccination. The used questionnaire used also for investigating the vaccination status of children of the interviewed mothers and the reasons of not being vaccinated. **Result:** The study findings revealed that less than two thirds of the studied mothers their children completely vaccinated, more than one third are partially vaccinated. **Conclusion:** Lack of adequate knowledge regarding immunization by the mothers was the major constrain for vaccinating children.

**Recommendations:** Continuous radio and television jingles and provisions of information education and communication (IEC) materials related to the importance of immunization.

**Keywords:** Vaccination, coverage, Mothers, Knowledge, Attitude, Children

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### I. Introduction

Vaccination is the cheapest ways of regulating contagious diseases (Unicef, 2015). It has been confirmed to be one of the most effective health interventions in the world, through which many childhood diseases have been stopped or eliminated (Angela, et al., 2010). Right from the inception of the Expanded Program on Immunization (EPI) in 1974, vaccination has considerably reduced vaccine-preventable diseases (VPDs) and children deaths globally. Nevertheless, a percentage of children are not fully vaccinated with the obligatory vaccines.

Therefore, many children are still susceptible to diseases targeted by the EPI (Odusanya et al., 2008 and WHO, 2012). The World Health Organization (WHO, 2016) stated that 115 million children worldwide received the Diphtheria-Tetanus and Pertussis vaccine; about 85% of the world's children received one dose of measles vaccine and received a poliomyelitis vaccine. Vaccination averts about two to three million deaths yearly from diphtheria, tetanus, pertussis and measles. Majority of the unvaccinated infants live in low income countries, especially Nigeria, with a large population of about 167 million (National Population Commission (NPC), 2014) and an annual population growth of 2.7% (Unicef, 2014). Getting vaccines at stipulated ages and intervals will certify that children are effectively protected from all diseases targeted by EPI at all times (Abdulraheem et al., 2011). This will help accelerate the achievement of the Millennium Development Goals. Vaccines preventable diseases (VPDs) were reported to account for 17% of global mortality of less than five years children (WHO, 2012), whereas in Nigeria 27% of infant mortality of over 200, 000 death per year was associated to VPDs (USAID, 2012).

The infant mortality rate of under-five years in Nigeria has been found to be 124 per 1000 live birth and currently Nigeria was ranks ninth in the United Nations Children's Fund (UNICEF) estimates (UNICEF, 2014). In addition, the 2009 Nigeria Demographic and Health Survey (NDHS) projected that the percentage of

children who were fully vaccinated at 23% by the age of 23 months, with wide geographic variations in estimates. Similarly, the current national estimates of the DPT3 coverage to be 71% and coverage of the third dose of vaccination against oral poliomyelitis (OPV3) to be 62% with lower coverage in the Northern Nigeria (UNICEF, 2014). Numerous factors have been associated with low immunization coverage in developing nations, Nigeria inclusive. These factors include lack of political will, poor work attitudes and poor orientation of health workers, poor health infrastructure, religious issues, ignorance, cultural /environment issues, misconceptions about vaccine safety and lack of awareness of the availability of immunization services, inadequate cold chain facilities and vaccine stocks out (UNICEF, 2014).

## **II. Aims Of The Study**

The study was carried out to assess the Mother's factors affecting vaccination coverage among children under five years at Kumbotso local government area Kano state.

## **III. Subject And Method**

**3.1 Study design:** A cross-sectional study design was used

**3.2 Study setting:**

The study was carried out at Kumbotso local government Kano state, Nigeria during the year 2016.

**3.3. Subject and sampling:**

A total number of 420 mothers with children of 12- 35 months old were interviewed in the eleven districts of Kumbotso local government. This number of interviewed mothers was determined according to principles of two-stage cluster sampling technique. In the first stage number of clusters from each districts was 30 clusters were sampled and. In the second stage 7 household that involve months with children aged 12– 35 were sampled from each cluster according to the immunization coverage survey manual, WHO 2005. The sample size of 30 clusters X 7 sample unit was determined according to Probability Proportion to Size (PPS). The PPS ascertains that the probability of a particular sampling unit being selected in the sample is proportional to the population size of the sampling unit. The total number of household to be studied in Kumbotso local government was 210 houses in each cluster assuming  $P = 0.5$ , confidence limit = 95%, absolute precision ( $d$ ) = 10%, design effect = 2. A list of healthcare units/ centers with the population density, (sampling frame) was obtained from the Primary Health Care Department Kumbotso Local Government Area. This list was used to determine the number of clusters that would be obtained from each sub-district (healthcare units/ centers).

**3.4 Data collection**

A structured questionnaire was developed by the researcher and used to collect data from mothers and health care providers. The tools comprised of questions relating to the interviewed mothers demographic data, child vaccination status, knowledge, and attitude of mothers toward childhood vaccination. Copies of the instrument were also handed over to researchers for validation. In order to ensure a wide coverage of the study population, research assistants were selected and trained to fill the research instruments as well as to interpret information found on the child immunization cards.

**3.5 Pilot study**

A pilot study was conducted on 10 % (42) of the studied populations who were selected randomly from the study settings and were later excluded from the main study sample to evaluate the clarity, applicability, reliability and to estimate time needed to fill in the research tools. Based on the collected information, the necessary modifications were done, some questions were added and others were clarified or omitted.

**3.6 Data analysis:**

Descriptive analysis was utilized for data analysis, which involves the use of frequency distribution and percentage, mean, and standard deviation was used. Data was collated, entered and analyzed with the aid of (Stand for statistical product and service solutions) SPSS software version 16 Chicago, Illinois.

**3.7 Ethical consideration**

An approval was obtained from Research Ethical Committee, Faculty of Nursing Mansoura University. Permission was obtained from Ethical committee, Kumbotso local government primary health care unit. An oral informed consent was obtained from each participant who agreed to participate in the research, after explaining the aim and importance of the research. They were informed that they have right to participate or not, they also have the right to withdraw at any stage of the study without any reasons.

IV. Results

Table (1) represents the distribution of the studied mothers according to their socio-demographic characteristics. Regarding the gender of studied children, the findings showed that 56.7% of the children were male, the age of studied children ranged from 12 to 35 months with the mean of (1.20 ± 0.39). The age of studied mothers ranged from 17 to 43 years with the mean of (22.09 ± 5.97), 35.5% of the studied mothers lies in the age category from 23 to 27 years. The most of mothers (99.8%) of are Muslims.

Concerning mothers occupation, 59% of the studied mothers were housewives, 58.1% of the them had secondary education. The most of the studied mothers (96.2%) were married. Regarding number of family members, 53.6% of them composed of 6 to 10 family members. While 308 (73.3%) of the families were monogamous. Concerning number of children, 79.8% of mothers have 1 to 5 children.

Table 1: Socio demographic data of the mothers/ caregivers

Socio-Demographic data	N=420	%
<b>Gender</b>		
Male	200	47.6
Female	238	56.7
<b>Child age/month</b>		
12<21	336	80.0
21-35	84	20.0
<b>Mothers age</b>		
<20	128	30.5
21-30	149	35.5
31 & above	143	34.0
<b>Religion</b>		
Muslims	419	99.8
Christian	1	0.2
<b>Mothers occupation</b>		
Government Employee	72	17.5
Private Employee	100	23.8
House wife	248	59.0
<b>Educational status</b>		
Illiterate	9	2.1
Primary	60	14.3
Secondary	244	58.1
University	64	15.2
Technical	5	1.1
Quran	38	9.0
<b>Marital status</b>		
Single/widow	3	0.7
Married	404	96.2
Divorce/Separate	13	3.0
<b>Number of family members</b>		
1-5	195	46.4
>5	225	53.6
<b>Family type</b>		
Polygamous	112	26.7
Monogamous	308	53.6
<b>Number of children</b>		
1-5	335	79.8
6 and more	85	20.2

Table (2): Distribution of children according their vaccination status and reasons of not being vaccinated

Table (2) revealed that most 91.7% of the studied children received BCG and OPV1 vaccines. The table shows 61.9% of the studied mothers their children were completely vaccinated. The studied mothers revealed the reasons for un-vaccination, fear of the vaccine side effects prevent 24.8% of them from taking their children for vaccination, 19.2% of the mothers stop taking their children for vaccination because of rumor and 15.7% reported that time of vaccination was unknown. While 21.2% of the mothers revealed that time of vaccination session was not convenient for them, and 16.4% reported long waiting time at clinic.

Table (2): Distribution of children according to their vaccination status and reason of not being vaccinated

Items	N=420	%
<b>Vaccination status</b>		
Completely vaccinated	260	61.9
Partially vaccinated	160	38.0
<b>Vaccination coverage</b>		
BCG	385	91.7
OPV0	385	91.5
HEPBO	335	79.8

OPV1	346	82.4
Penta 1	341	81.2
OPV2	342	81.4
Penta 2	340	80.9
OPV3	341	81.2
Penta 3	341	81.2
Measles	332	79.0
Yellow Fever	321	76.4
<b>Reasons for un-vaccination</b>		
Fear of side effect	140	33.3
Vaccinators attitude stop mothers to vaccinate their children	114	27.1
Time is not convenient	93	21.2
Rumors	81	19.2
Long waiting time	68	16.4
Vaccination time is unknown	66	15.7
Family problems	66	15.8
Unaware of vaccination schedule	62	14.8
Lack of transportation	56	13.4
Place too far	35	8.5
Vaccinator absent	34	8.4
Vaccinators didn't provide information	23	5.4
Previous bad experience	20	4.8
Clinic not equipped	10	2.4
Vaccinators are not cooperative	10	2.4
Vaccines are not available	5	1.2

**Table (3):** Distribution of mother's according to their correct knowledge scores

Items	Level of Knowledge N=420					
	Poor		Fair		Good	
	N	%	N	%	N	%
Importance of vaccination	60	14.3	80	19.0	280	66.7
Diseases control by vaccination	80	19.0	90	21.4	250	59.3
Contraindication of vaccination	70	16.7	120	28.6	230	54.8
Immunization schedule	405	96.4	120	28.6	70	16.7
Route of vaccine administration	230	54.8	5	1.2	10	2.4
Vaccination side effect	365	86.9	35	8.3	20	4.8
Action taken to reduce side effect	308	73.3	60	14.3	52	12.4
<b>Grand total</b>	217	51.7	73	17.3	130	31
<b>Mean±SD</b>	<b>12.1±4.36</b>					

Table (3) shows that (51.7%) of the studied mothers had poor knowledge on immunization, while 130 (31.6%) had good knowledge score. Most of children's mothers (96.4%) had poor of knowledge scores about vaccination schedule

**Table 4:** Distribution of the studied mothers according to their attitude Scores about routine immunization

Items	Attitude scale N= 420					
	Agree		Neutral		Disagree	
	N	%	N	%	N	%
<b>Positive attitude</b>						
Vaccination is important	415	98.8	4	0.9	1	0.3
Recommend others to vaccinate their children	410	97.6	4	0.9	6	1.5
Is important to vaccinate your child on time	352	83.8	39	9.3	29	6.9
You can take your child to another health center per from you	352	83.8	48	11.4	20	4.8
Is necessary for your child to take full dose of vaccine	358	85.2	54	12.9	8	1.9
You can pay money to get your child immunize	262	62.3	138	32.9	20	4.8
<b>Negative attitude</b>						
Immunization is harmful	3	0.7	2	0.5	415	98.8
Immunization is not necessary	9	2.1	1	0.3	410	97.6
Side effect prevent you from vaccinating your child	53	12.6	51	12.1	316	75.3
<b>Mean±SD</b>	<b>13.22±3.57</b>					

Table (4) revealed that most of mothers (98.8%) had positive attitude regarding the importance of vaccination and 97.6% of the recommended others to vaccinate their children. The majority of them (83.8%) found that vaccinating children in timely manner is important. On the other hand, a few mothers expressed negative attitude toward vaccination, as 12.6% of the mentioned that side effect prevent them from vaccinating their children.

**Table (5):** Relation between mother’s knowledge and level of education and age

Demographic data	Knowledge level (n=420)						$\chi^2$	P
	<50% poor		50 – 60 fair		≥65% good			
	N	%	N	%	N	%		
<b>Education level</b>								
Illiterate	26	6.2	14	3.3	4	0.9	78.201*	0.005*
Primary	22	5.2	9	2.1	5	1.2		
Secondary	19	4.2	11	2.6	35	8.3		
Higher education	7	1.7	20	4.8	78	18.6		
Technical	23	5.5	8	1.9	3	0.7		
<b>Age/ year</b>								
<20	31	7.4	11	2.1	6	1.4	26.534*	0.002*
20-30	17	4.0	7	1.7	13	3.0		
More than 30	12	2.9	5	1.2	56	13.3		

$\chi^2$ : Chi square test

\*: Statistically significant at  $p \leq 0.05$

Table (5) represents that 18.6% of the children’s mothers with higher education and 8.3% with secondary education had a good knowledge score. There was statistical significant relationship between knowledge and level of education and age. Moreover, the older mothers showed better level of knowledge vaccination, as 13.3% of children’s mothers aged 31 years and above had good knowledge score.

### V. Discussion

Global vaccination against vaccine-preventable diseases (VPDs) is one of the cheapest ways to reduce morbidity and mortality in children under five (WHO 2015). 1.5 million Children’s annually died of vaccine-preventable diseases, and majority of these deaths occur in low income countries (WHO, UNICEF, 2009). In 2013, roughly 6.2 million under-five died globally and 3 million of these deaths occurred in sub-Saharan Africa (SSA) (UNICEF, 2014).

Regarding factors affecting vaccination, coverage the present study revealed that less than two thirds of the studied mothers their children were completely vaccinated. This was supported by (Agandi et al., 2013) and (Vonasek et al., 2016) who reported that the majority of the studied children in Uganda were completely vaccinated in a timely manner and less than two thirds of the studied children in India had vaccination cards respectively.

Concerning lack of awareness as factors affecting vaccination, the present study showed that the main reason for more than one fifth of the children’s mothers who did not vaccinated their children, was fear of vaccine side effect. This corroborates with the findings of several studies conducted by (Agandi et al., 2013, Legesse et al., 2015 and Vonasek et al., 2016), who revealed that less than two thirds of the children’s mothers in India, Uganda and in Ethiopia reported fear of vaccine side effect as their major reason for not vaccinating their children. However, this study was in contrast with findings of (Hamid et al., 2012) in India who reported that all of the children’s mothers felt that vaccine side effect was not a danger.

The present study found that one fifth of children’s mothers claimed that rumor regarding vaccine safety was their major constrained for vaccinating their children, this was supported by (Abdirisak et al., 2016) who reported that majority of the under-immunize children's parent in Somalia agreed that immunization makes their children sick. However, the present study was in contrast with (Alzahrani, 2013) and (Rahman et al., 2016) who revealed that the majority of the studied mothers in Bangladesh and in Saudi Arabia convinced that vaccines were safe.

Concerning awareness of vaccination schedule, the current findings demonstrated that most of the studied mothers were not aware with vaccination schedule. This was similar with the study conducted by (Tagbo et al., 2014) who revealed that lack of caregiver’s knowledge about vaccination schedule in Nigeria is among many reasons for their default from completing vaccination. On the other hand, nearly two thirds of the studied mothers in Iraq were aware with vaccination schedules (Qutaiba et al., 2014).

As regards to vaccination session time, the present study revealed that more than one fifth of the studied mothers reported the time of vaccination was not convenient and unknown for them. This finding was in line with the findings of (Adebayo et al., 2012) and (Chris et al., 2015) who reported that some of Nigerian children’s mothers complaint time of vaccination was not convenient. These results might be due to lack of providing enough information as well as low community participation in the vaccination programs. However, the present study was not in line with the findings of (Qutaiba et al., 2014) and (Nayak et al., 2015) who reported that all the Indian and two thirds of Iraqis mothers informed that vaccination timings were convenient. Less than one fifth of the children’s mothers in the current study revealed that most of the time vaccinators were absent at the vaccination scene. This finding matched with several studies that reported that some of Indian and Nigerian

children's mothers mentioned they did not vaccinate their children because vaccinators were absent. This might be due to shortage in manpower or inefficient supervision. (Adebayo et al., 2012, Agandi et al., 2013, Tagbo et al., 2014 and Jose et al., 2016). The present study displayed that less than one fifth of the studied mothers claimed that long waiting time at the clinic was another factor that hindering against childhood vaccination. This was in agreement with findings of (Chris et al., 2015) who stated that few Nigerian children's mothers complained that long waiting time at clinic prevented them from vaccinating their children. However, this result was in contrast with the study of (Amin et al., 2013) who declared that long waiting time was not issues for most mothers in East -Timor as long as their children received the vaccination. Few children's mothers in the current study reported that they did not vaccinate their children because the place of vaccination was too far from their homes. This was in agreement with findings of (Rahman and Obaida 2010) who reported that distance from a health facility was found to be a significant predictor of full immunization in Bangladesh, and most of the studied mothers in Ethiopia complaint that place of vaccination was far for them as reported by (Ayano, 2015). Nevertheless, the current study was in contrast with findings of (Abdirisak et al., 2016) who demonstrated that more than one third of those whose children had accessed to vaccination in Somalia indicated, they traveled for long period of time. This inconsistency might be probably due to differences in the level of awareness among the children's mothers regarding importance in taking complete vaccination. The current finding shows that few children's mothers stopped taking their children for vaccination due to lack of information provided by health care personnel. This result was in disagreement with (Qutaiba et al., 2014, Legessa and Dechasa, 2015 and Nisar et al., 2010) who reported that the majority of the children's mothers in Iraq, Ethiopia and Pakistan received information about vaccines from physicians and other medical staff.

Regarding mothers level of knowledge scores on routine vaccination, the present study revealed that more than half of them had poor knowledge level about vaccination. This was similar with studies reported by (Jose et al., 2013, Siva et al., 2015 and Heba et al., 2016) who revealed that less than half of the studied mothers in India and in Egypt had poor knowledge level about vaccination. However, this study was not in line with the studies of (Qutaiba et al., 2014) and (Chris et al., 2015) that were conducted in Nigeria and in Iraq. These studies revealed that the majority of mothers had a good knowledge about vaccine preventable diseases. This inconsistency may be due the difference in the study area as well as the educational level of the children's mothers. Concerning relation between mothers knowledge, level of education and age the present study shows that there was statistical significant relationship between knowledge, level of education and age. This was in agreement with the findings of a study conducted by (Siddiqi, Nisar and Khan, 2010) who reported that there was statistical significant association between mother's age and their knowledge and the study conducted in Saudi Arabia. Moreover, (Elbur et al., 2014) reported that there was significant relationship between mothers knowledge and their level of education..

Regarding mother's attitude towards routine vaccination, the present study revealed that most of the children's mothers had positive attitude towards importance of vaccination, this corroborated with the findings of several studies that were conducted in India, Nigeria and Ethiopia by (Mahlingam et al., 2014, Chris et al., 2015, Legessa and Dechasa, 2015) respectively. These studies revealed that most of the children's mothers believed that vaccine was important and they were willing to utilize vaccination services. The current findings showed that most of the children's mothers felt they could recommend others to vaccinate their children. This result was in agreement with (Siva et al., 2015) findings who revealed that all of the Indian studied mothers stated they would encourage others to vaccinate their children.

Concerning relationship between health care provider's knowledge, level of education, experience and attending training, the present findings showed that there was statistical significant relation between health care provider's knowledge, their level of education experience, and attending training. This was in agreement with part of (Ogunyami and Odusanya, 2016) findings in Nigeria, who stated that there was significant relationship between health care providers knowledge, their post-qualification experience of health care providers. While study was in contrast with the other part of findings, which found that, there was no significant relation between health care providers knowledge and the previous attended training.

## **VI. Conclusion And Recommendations**

### **Conclusion**

Based on the findings of the current study, it could be concluded that less than two thirds of the studied mothers had their children completely vaccinated and more than one-third their children were not vaccinated, one fourth of them did not vaccinate their children because of fear of vaccine side effect, and less than one third because of rumors. More than half of the studied mothers had poor knowledge level about vaccination, while the majority had positive attitude level on vaccination. There was statistically significant relationship between children mothers' knowledge, level of education and age.

### **Recommendation:**

Based on the findings of this study, the following recommendations need to be made:

- Government and development partners should intensify effort on health education and public awareness campaign in all districts of the local government, special attention should be focused on hard to reach areas and less educated people.
- Provision of Information Communication and Education(IEC) materials about the importance of routine immunization and how to manage side effects, the materials should be translated in local language for easy understanding of local people

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