Knowledge of Healthcare Workers on Immunization: New and Under-utilized and Perception towards Future Vaccines

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ABSTRACT

Nigeria is making effort to address the child mortality burden by increasing vaccine coverage rates, yet the vaccine coverage falls short of 90% target. Scaling up of new and under-used vaccines to 90% coverage could save more than 600,000 Nigerian children. Healthcare givers knowledge of vaccine used for immunization is essential to increase the vaccine uptake rates. This study assesses the knowledge of routine, underutilized and future vaccines among health workers. A cross sectional descriptive study was done among health care workers at a tertiary health facility in Nigeria. Using a pre-tested semi structured interviewer administered questionnaire, 220 respondents were selected by cluster sampling technique. The health workers' knowledge of these vaccines was assessed using a scale developed for the study. Data collected were analyzed using SPSS version 22. The mean age of the respondents was 31.9 ± 5.7 years. Doctors and nurses formed more than half of the respondents, 51.8% (n=114). About three quarters of respondents 72.3% (n=159) had good knowledge of vaccines used in routine immunizations. Knowledge of under-utilized and future vaccine was low with less than a fifth 18.6% (n=41) and one tenth 9.1% (n=20) having good knowledge scores respectively. Similarly, poor perception scores of future vaccines were observed in 90.1% (n=218) of the respondents. Only marital status was associated with knowledge of underutilized vaccines ($p < 0.05$) and no association was observed between other sociodemographic variables and knowledge of these vaccines ($P > 0.05$). The awareness level of health care workers on routine immunization is high. Their knowledge and perception of under-utilized and future vaccines were however low. There is, therefore, need for more training and retraining of health care workers on the vaccines.

Keywords: Health worker, Knowledge, Under-utilized, Vaccines

INTRODUCTION

One of the most important ways to improve immunization services is to have parents and health care workers that work towards the benefits of immunization to the growing child. The purpose of the immunization program is to achieve high coverage

among children so as to reduce morbidity and mortality that results from vaccine preventable diseases.¹ Although the benefit of preventing suffering and death from serious infectious diseases greatly outweighs the rare adverse effect following immunization,² disputes have arisen over the morality, ethics, cost, effectiveness and safety of

vaccination.² Some vaccination critics say that vaccines are ineffective against disease, or that vaccines safety studies are inadequate.³ Some religious groups do not allow vaccination and some political groups oppose mandatory vaccination on the grounds of individual liberty.^{4,5} In the first decade of 21st century, religious and political leaders with some health care workers (HCW) in northern Nigeria, suspicious of western medicine advised their followers not to have their children vaccinated with oral polio vaccine (OPV). The immunization was suspended for several months. Subsequently, Nigeria reported over 200,000 measles, polio and other vaccine preventable disease (VPD) cases and about 600 deaths from measles in the first quarter of 2008.⁶

Studies have shown that parents and healthcare workers play an essential role in playing improving the number of children reached and ensuring they are fully covered with antigens appropriate for their age.^{7,8} Lack of adequate knowledge on immunization could be a major cause of decline of the vaccine coverage rate, thus training of providers has been found to improve immunization uptake elsewhere.⁸ In a review of evidence on how health care workers determine uptake of immunization it was found that suboptimal vaccination rates resulted from inadequate knowledge among healthcare providers of vaccination schedules, as well as the benefits and side effects.⁹ In some cases, healthcare providers were even found to have misleading beliefs about immunisation and sent unclear or untrue messages to parents.⁹ Nigeria has taken important steps in recent years to address the child mortality burden by increasing vaccine coverage yet, the vaccine coverage fall short of 90% target,¹⁰ Scaling up of new and under-used vaccines to 90% coverage could save more than 600,000 Nigerian children from VPD in the next ten years, and eventually add an economic value equivalent to \$17 billion to the nation's economy.^{11,12} The study was done at a tertiary health facility in Kano. The state has an estimated maternal mortality ratio of 1600 per 100,000 live births, an under-five mortality of 157 deaths per 1000 births in 2008. About 13% of deliveries in the state were attended to by a skilled birth attendant and only 11% of these deliveries take place in a health care facility. Furthermore, only 6% of the population receives required vaccination and more than half of the children have not received their immunization. We therefore, assessed the knowledge of routine and under-utilized vaccine among HCW and their perception on future vaccines and how it relates to immunization services in the country.

MATERIALS AND METHODS

The study was a hospital based cross sectional descriptive study. Kano state has a total of 44 local government areas, and eight of them are metropolitan. The 2018 projected population of the state is 11,401,847 (based on the 2006 National Population Census), with an almost equal distribution of male (51%) and female (49%). The health system is organized at three levels namely: primary, secondary and tertiary levels. There are three tertiary health institutions sited in the metropolis; Murtala Mohammed Specialist Hospital, Mohammed Abdullahi Wase Specialist Hospital and Aminu Kano Teaching Hospital. There are an estimated 161 private health facilities distributed across the state. Aminu Kano Teaching Hospital (AKTH) was established on 24th of August 1988. The facility is located along Zaria road in Tarauni Local government area in Kano metropolis. It is a five hundred beds hospital that provides specialized services to patients from Kano and neighbouring states, as well as West Africa countries. The hospital has about 17 departments, 15 wards, laboratory complexes and specialty clinics. The hospital has a staff strength of 2,600 comprising of both administrative and clinical staff. Apart from medical services, the hospital also provides training for medical students, interns, resident doctors and mid-level healthcare workers.

Our study population were health care staff working at health facilities offering immunization in services. The Leslie Fishers formula was used to calculate the minimum size for this study. A total of 220 respondents were selected by cluster sampling technique after meeting up the inclusion criteria. A semi-structured interviewer administered questionnaire was developed and pre-tested for the study. The questionnaire captures information on the socio-demography of the respondents, knowledge of health care workers on routine immunization, new and under-utilized vaccines as well as the perception of the health workers toward future vaccine. The knowledge of routine, underutilized and future vaccine was assessed based on a scoring system developed for the study. Each positive response has one mark score and a zero score for a wrong response. The maximum score obtainable was 21 for assessment of knowledge of routine vaccines (score of 0-10 considered as poor knowledge, and scores of 11-21 was considered good knowledge). Similarly, the maximum score obtainable for assessment of knowledge of underutilized vaccines was 52-point scale (score of 0-26 graded as poor

knowledge, and scores of 27-52 was considered good knowledge). Assessing the knowledge of future vaccines was a 7-point scale with scores of 0-3 considered as poor knowledge and scores of 4-7 good knowledge score. Perception towards future vaccine was analyzed using Likert's scale and also graded as good on a scale of 11- 20 score and poor perception if it is between 0-10 score. The maximum score on the perception scale was 20 points. Data were entered manually into a spreadsheet on Microsoft excel and analyzed using SPSS Version 22. Quantitative data were summarized using mean, standard deviation, while Qualitative data were presented using frequency tables. Tests of associations between categorical data was performed, Chi-square test of association was used to test for statistically significant associations. A P-value of 0.05 or less was considered significant.

Ethical approval for this study was obtained from ethical committee of Aminu Kano Teaching Hospital and Kano State Hospital Management Board ethical committee. All respondents were made to sign consent before participating and assurances were given on confidentiality of data collected.

RESULTS

Of the 220 respondents that participated, 124(56.36%) were males, and 96(43.64%) were females. The mean age of the respondents was 31.9 with a standard deviation of 5.7 years. All the respondents were drawn from a tertiary health facility.

Table 1: Sociodemographic characteristics of the respondents

Socio demographic features	Frequency N=220	Percentage
Age groups (years)		
15-24	10	4.6
25-34	146	66.4
35-44	56	25.5
45-54	8	3.6
Sex		
Male	124	56.4
Female	96	43.6
Ethnic group		
Hausa	128	58.2
Igbo	32	14.6
Yoruba	29	13.3
others	31	14.1
Marital Status		
single	76	34.5
married	143	65.0
widowed	1	0.5
Professional Qualification		
Doctor	60	27.3
Nurse	54	24.5
CHEW	53	24.1
Lab Scientist	26	11.8
Technician	12	5.5
Others	15	6.8
Years of Service		
Less than 5	104	47.3
5-10	70	31.8
11-15	39	17.7
16-20	7	3.2

Table 2: Knowledge of routine immunization vaccines

Knowledge Assessed (n=220)	Correct knowledge F (%)	Incorrect knowledge F (%)
Ever heard of routine Immunization vaccines	220 (100.0)	0 (0.0)
Facility offers vaccine for Immunization	220 (100.0)	0 (0.0)
Knows RI vaccine Schedule	173 (78.6)	47 (21.4)
Knows appropriate vaccine for age	175 (79.5)	45 (20.5)
Knows Vaccine preventable diseases	218 (99.1)	2 (0.9)
Knows when to start child Immunization	220 (100.0)	0 (0.0)
Knows Adverse events following Immunization	131 (59.5)	89 (40.5)
Knows Contraindications to Immunization	115 (52.3)	105 (47.7)

Table 3: Knowledge of Underutilized Vaccine among HCW

Knowledge Assessed (n=220)	Correct Knowledge Freq (%)	In Correct Knowledge Freq (%)
Aware of Underutilized vaccines	119 (54.1)	101(45.9)
Vaccines Identified as Under Utilized		
Pneumococcal conjugate vaccine	62 (28.2)	158 (71.8)
Typhoid Vaccine	57 (25.9)	163 (74.1)
Influenza vaccine	48 (21.8)	172 (78.2)
Hepatitis A vaccine	42 (19.1)	178 (80.9)
Hepatitis B vaccine	77 (35.0)	143 (65.0)
Yellow fever vaccine	30 (13.6)	190 (86.4)
Rubella	23 (10.5)	197 (89.6)
Rotavirus vaccine	23 (10.5)	197 (89.6)
Cholera Vaccine	40 (18.1)	180 (81.8)
Meningococcal conjugate vaccine	69 (31.4)	151 (68.6)
Hemophilus Influenza type b vaccine	58 (26.4)	162 (73.6)
Human papilloma Virus Vaccine	75 (34.1)	145 (65.9)
Pneumococcal Vaccine		
Knows target population	75 (65.9)	145 (34.1)
Knows disease conditions it protects	59 (26.8)	161 (73.2)
Knows number of doses required for protection	2 (0.9)	218 (99.1)
Knows availability	47 (21.4)	173 (78.6)
Typhoid Vaccine		
Knows target population	6 (2.7)	214 (97.3)
Knows disease conditions it protects	54 (24.4)	166 (75.5)
Knows number of doses required for protection	3 (1.4)	217 (98.6)
Knows availability	28 (12.7)	192 (87.3)
Influenza Vaccine		
Knows target population	44 (20.0)	176 (80.0)
Knows disease conditions it protects	50 (22.7)	170 (77.3)
Knows number of doses required for protection	5 (2.3)	215 (97.7)
Knows availability	45 (20.5)	175 (79.5)
Hepatitis A Vaccine		
Knows target population	80 (36.4)	140 (63.6)
Knows disease conditions it protects	76 (34.5)	144 (65.5)
Knows number of doses required for protection	10 (4.5)	210 (95.5)
Knows availability	40 (18.2)	180 (81.8)
Hepatitis B Vaccine		
Knows target population	110 (50.0)	110 (50.0)
Knows disease conditions it protects	105 (47.7)	115 (52.3)
Knows number of doses required for protection	60 (27.3)	160 (72.7)
Knows availability	95 (43.2)	125 (56.8)
Rota virus Vaccine		
Knows target population	26 (11.8)	194 (88.2)
Knows disease conditions it protects	39 (17.7)	181 (82.3)
Knows number of doses required for protection	7 (3.2)	213 (96.8)
Knows availability	7 (3.2)	173 (96.8)
Cholera Vaccine		
Knows target population	77 (35.0)	143 (65.1)
Knows disease conditions it protects	76 (34.5)	144 (65.5)
Knows number of doses required for protection	13 (5.9)	218 (94.1)
Knows availability	30 (13.6)	190 (86.4)
Meningococcal Vaccine		
Knows target population	32 (14.5)	188 (85.5)
Knows disease conditions it protects	84 (38.2)	136 (61.8)
Knows number of doses required for protection	7 (3.2)	203 (96.8)
Knows availability	63 (28.6)	157 (71.4)
Hib Vaccine		
Knows target population	67 (30.5)	153 (69.5)
Knows disease conditions it protects	56 (25.5)	164 (74.6)
Knows number of doses required for protection	13 (5.9)	207 (94.1)
Knows availability	43 (19.6)	177 (80.4)
HPV Vaccine		
Knows target population	76 (34.6)	144 (65.4)
Knows disease conditions it protects	85 (38.6)	135 (61.4)
Knows number of doses required for protection	11 (5.0)	209 (95.0)
Knows availability	43 (19.6)	177 (80.5)

All the healthcare workers studied are aware of vaccines used in routine immunization and know when a child should start receiving vaccines. More than half of the respondents 131 (59.5) were able to mention at least three adverse events that could follow immunization in a child.

The respondents were assessed on underutilized vaccine. The responses are shown in table 2 above.

Table 4: Perception of Future Vaccines Amongst Health care workers

Perception	Incorrect F (%)	Correct F (%)	Undecided F (%)
When planning to introduce new vaccine we consider:			
Vaccine efficacy	220 (100.0)		
Vaccine effectiveness	218 (99.9)	0 (0)	2 (0.1)
Severity of disease	209 (95.0)	7 (3.2)	4 (1.8)
Burden of disease	206 (93.6)	12 (5.5)	2 (0.9)
Risk to contacts	202 (91.8)	16 (6.8)	3 (1.4)
Public concerns	193 (87.7)	25 (11.4)	2 (0.1)
Coverage	211 (95.9)	6 (2.7)	3 (1.4)
When introducing a vaccine in to community consider:			
Supply issues	216 (98.2)	4 (1.8)	-
logistics associated with the new vaccine.	208 (94.6)	10 (4.5)	2 (0.9)
economic and financial issues	211 (95.9)	8 (3.6)	1 (0.4)
Introducing a new vaccine means you have to:			
Revise the practice guidelines	163 (74.1)	48 (21.8)	9 (4.1)
Revise of Road-to-Health charts	151 (68.6)	59 (26.8)	10 (4.6)
Training of health workers	169 (76.8)	51 (23.2)	
Cold chain Logistics and Manuals,	189 (85.9)	25 (11.4)	6 (2.7)
Information, Education and Communication for the public	207 (94.1)	12 (5.5)	1 (0.4)
Monitoring of Adverse Events	210 (95.5)	8 (3.6)	2 (0.9)
Surveillance of the disease in question.	204 (92.7)	12 (5.5)	4 (1.8)
You can monitor the success of a new vaccine by:			
Estimating the burden of the disease,	205 (93.2)	12 (5.5)	3 (1.4)
Determining the Effectiveness of the vaccine,	211 (95.9)	8 (3.6)	1 (0.4)
Determining the Coverage achieved	213 (96.8)	7 (3.2)	

Table 5: Knowledge and Perception of the respondent on Vaccines

Assessment	Frequency	Percentage
Knowledge of Routine Vaccine		
Good (score 11-21)	159	72.3
Poor (score 0-10)	61	27.7
Knowledge of Underutilized vaccine		
Good (score 27-52)		
Poor (score 0-26)	41	18.6
	179	81.4
Knowledge of Future Vaccines		
Good (score 4-7)	20	9.1
Poor (score 0-3)	200	90.9
Perception of FutureVaccines		
Good Perception (score 11-20)	2	0.9
Poor Perception (score 0-10)	218	90.1

Fewer respondents have been observed to have good perception 0.9% (n=20), knowledge of future 9.1% (n=20) and underutilized vaccines 18.6% (n=41) from the study.

Table 6: Relationship between Sociodemographic features and Knowledge of Vaccines

Sociodemographic Characteristics Knowledge Assessment (n=220)				
	Good knowledge	Poor Knowledge	Test Statistics	P value
	F (%)	F (%)		
Sex				
Male	84 (39.5)	40 (18.2)	$\chi^2=2.91$	0.09**
Female	75 (34.1)	21 (9.5)		
Marital status				
Single	50 (22.7)	26 (11.8)	$\chi^2=2.43$	0.12**
Married	109 (49.5)	39 (17.7)		
Professional qualification				
Less than 10years	43 (19.5)	17 (7.7)	$\chi^2=0.02$	0.92**
More than 10 years	116 (52.7)	44 (20.0)		
Years of service				
Less than 10years	123 (55.9)	51 (23.2)	$\chi^2=1.04$	0.31**
More than 10 years	36 (16.4)	10 (4.5)		
Underutilized Vaccines				
	Good knowledge	Poor Knowledge		
	F (%)	F (%)		
Sex				
Male	25 (11.4)	99 (45.0)	$\chi^2=0.44$	0.51**
Female	16 (7.3)	80 (36.4)		
Marital status				
Single	20 (9.0)	56 (25.5)	$\chi^2=4.51$	0.03*
Married	21 (9.5)	123 (55.9)		
Professional qualification				
Less than 10years	15 (6.8)	45 (20.5)	$\chi^2=2.20$	0.14**
More than 10 years	26 (11.8)	134 (60.9)		
Years of service				
Less than 10years	33 (15.0)	141 (64.1)	$\chi^2=0.05$	0.81**
More than 10 years	8 (3.6)	38 (17.3)		
Future vaccines				
	Good knowledge	Poor Knowledge		
	F (%)	F (%)		
Sex				
Male	11 (5.0)	113 (51.4)	$\chi^2=0.02$	0.89**
Female	9 (4.1)	87 (39.5)		
Marital status				
Single	13 (5.9)	63 (28.6)	$\chi^2=9.02$	0.003*
Married	7 (3.2)	137 (62.3)		
Professional qualification				
Less than 10years	7 (3.2)	53 (24.1)	$\chi^2=0.66$	0.42**
More than 10 years	13 (5.9)	147 (66.8)		
Years of service				
Less than 10years	19 (8.6)	145 (65.9)	$\chi^2=3.37$	0.07**
More than 10 years	1 (0.4)	45 (20.5)		

DISCUSSION

Good knowledge of vaccines used in routine immunizations was observed among the respondents, however knowledge of underutilized as well as future vaccine was poor. Awareness of routine immunization was high similar to what was

reported by other studies,^{12,13} however differs from findings here because caregivers were used as study population in these studies. Inadequate parental knowledge and information and that of healthcare workers could grossly affect the uptake and utilization of childhood immunization as reported by many studies.^{14,15} If the main problem among healthcare providers is lack of knowledge, in most cases, suboptimal vaccination rates result from this inadequate knowledge and will affect vaccination schedules and benefits. Vaccines against hepatitis B, Hemophilus influenza type b, yellow fever, rubella, typhoid and cholera have been widely available in industrialized countries for years, but are underutilized effectively in developing countries. New formulations or combination vaccines that decrease the number of injections, overcome vaccine wastage, and improve actual and perceived adverse event profile of the vaccines are available. Our study demonstrated poor knowledge of future and underutilized vaccines. Where the healthcare worker does not have adequate information on the vaccines used, it will undoubtedly affect uptake, coverage and utilization. Healthcare providers ranked first among most used and most trusted sources of information on vaccines as reported from studies in western Europe.¹⁷⁻¹⁹

Healthcare workers routinely provide information about recommended vaccinations to their patients and informed them about benefits and risks. When the healthcare providers sounded vague, some parents may interpret this as concern that the vaccine was unsafe.²⁰ Furthermore, if healthcare workers' knowledge was found to be inadequate, vaccination coverage in the general population may decrease. The same happens when healthcare workers were reported to have a relaxed attitude towards immunization, which is itself a consequence of lack of knowledge and may lead to more problems.⁹ We observed a very low perception to future vaccines. This differs to what was reported from Netherland,²¹ where 43% of the respondents were reported to have positive perception and attitudes towards all vaccinations including the new vaccines. Perhaps because the caregivers were used as the respondents in Netherland study. An extensive range of vaccines are in the development pipeline against many diseases of public health importance. Only marital status was found to be positively associated with Knowledge of vaccines ($p < 0.05$). Contrary to what was reported by other studies where years of service and professional qualification plays a major role in the knowledge of health worker.

CONCLUSION

Healthcare workers were found to have a high knowledge of routine immunization vaccine but poor knowledge of future and underutilized vaccine. The perception of future vaccine was also observed to be low. The need to have training and more information on future and underutilized vaccine will go a long way in improving the utilization of some of these new and utilized vaccines in our community.

Recommendation

It is recommended from this study that healthcare workers that work in immunization units of our health facilities should have regular training and skills updates to enable them tackle the challenges of immunization in Nigeria. This will improve uptake, utilization and coverage of immunization services among the population.

Limitation

Our study has been limited by the fact that the health workers were drawn from the same facility but their selection followed a clearly laid down scientific procedure to eliminate any form of bias.

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Conflict of Interest

None declared.

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