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A Systematic review on childhood immunization among men with infants: Africa perspective

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Abstract

Immunization remains one of the cheapest and most cost effective means of protecting the masses from vaccine preventable diseases. Factors affecting Childhood immunization uptake at general practice level may be considered in terms of sociodemographic variables, attitude and practice. This review was done to enlighten the public on Childhood Immunization in Africa. Different search engines were consulted to explore the literatures and ascertain the gaps in knowledge on Childhood Immunization in Africa. There has been increasing emphasis on preventive care, which has resulted in systematic differences in the success of practices for child immunization. Results indicate a high incidence of immunization practice among the households. Immunization for children is the effective, safe and efficient public health interventions to prevent childhood morbidity and mortality. This review found that most men have good knowledge, positive attitude with poor practice and involvement of immunization. There is a need to increase awareness about the benefits and importance of vaccination, as well as the harmful consequences of non-complete immunization.

Keywords: immunization, knowledge, attitude, practice, childhood immunization, infants, Africa

Introduction

Immunization against childhood diseases save millions of lives.[1] Immunization is the process by which an individual's immune system becomes fortified against an agent (known as the immunogen). Immunization is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine.[2]Immunizations are definitely less risky and an easier way to become immune to a particular disease than risking a milder form of the disease itself. They are important for both adults and children in that they can protect us from the many diseases out there. Through the use of immunizations, some infections and diseases have almost completely been eradicated throughout the United States and the World.[3] One example is smallpox. Thanks to dedicated health care professionals and the parents of children who vaccinated on schedule, polio has been eliminated in the U.S. since 1979.[3]

Polio is still found in other parts of the world like Nigeria, so certain people could still be at risk of getting it. This includes those people who have never had the vaccine, those who did not receive all doses of the vaccine, or those travelling to areas of the world where polio is still prevalent.

Immunization can be achieved in an active or passive manner.[4] Vaccination is an active form of immunization. Active immunization can occur naturally when a person comes in contact with a microbe. The immune system will eventually create antibodies and other defences against the microbe.[4] Artificial active immunization is where the microbe or parts of it are injected into the person before they are able to take it in naturally.

Passive immunization is where pre-synthesized elements of the immune system are transferred to a person so that the body does not need to produce these elements itself. This method of immunization begins to work very quickly, but it is short lasting, because the antibodies are naturally broken down, and if there are no B cells to produce more antibodies, they will disappear.[4] Passive immunization occurs physiologically, when antibodies are transferred from mother to fetus during pregnancy, to protect the fetus before and shortly after birth. Artificial passive immunization is normally administered by injection and is used if there has been a recent outbreak of a particular disease or as an emergency treatment for toxicity, as in tetanus. The antibodies can be produced in animals, called "serum therapy," although there is a high chance of anaphylactic shock because of immunity against animal serum itself. Thus, humanized antibodies produced in vitro by cell culture are used instead if available.[4]

Immunization in Nigeria

Nigeria's Expanded Programme on Immunization (EPI) was first initiated in 1979 and the Federal Government of Nigeria through the Federal Ministry of Health continues to place high priority on immunization.[5,6] In 1996, the immunization system was strengthened for polio eradication. Consequently, the Federal Government established the National Programme on Immunization (NPI) whose key focus was to provide support to the implementation of state and LGA immunization programmes.[6] The support provided by World Health Organization (WHO) to reach out to every ward, along with other partners, to the efforts of national authorities in routine immunization contributed to improved coverage of routine immunization services. There is steadily increase in the number of fixed immunization service delivery points and outreach immunization sites. Nigeria has made great strides in her polio eradication efforts.[6] Immunization against childhood diseases is one of the most important means of preventing childhood morbidity and mortality. Achieving and maintaining high levels of immunization coverage must therefore be a priority for all health systems. In order to monitor progress in achieving this objective, immunization coverage data can serve as an indicator of a health system's capacity to deliver essential services to the most vulnerable segment of a population.[5]

In May 2012, Nigeria joined other member states of the World Health Assembly to endorse the Global Vaccine Action Plan; an agenda for universal access to immunization by 2020.[7] In 1st May 2012, Nigeria introduced a pentavalent vaccine to expanded programme on immunization (EPI) to be given to children under one year of age. The pentavalent vaccine is five in one vaccine that protects a child against Diphtheria, pertussis and tetanus, Haemophilus influenza type B, hepatitis B. Pentavalent vaccine replaces the current DPT vaccine administered at 6, 10, and 14 weeks.

Global Immunization Vision and Strategy (GIVS)

In response to challenges in global immunization, United Nations Children's Fund (UNICEF) and WHO have developed the Global Immunization Vision and Strategy (GIVS) which was launched in 2006 to last till 2015. Its framework aimed at controlling morbidity and mortality from vaccine-preventable diseases and helping countries to immunize more people, from infants to seniors, with a greater range of vaccines.[8]

GIVS has four main objectives:

i. To place immunization high on all health agendas;
ii. To immunize more people against more diseases;
iii. To immunize every child, adolescent and adult;
iv. Equitable access to needed vaccines is guaranteed for all people by the global community;
v. To introduce a range of newly available vaccines and technologies;
vi. To integrate other critical health interventions with immunization; and
vii. To manage vaccination programmes within the context of global interdependence.[8]

Knowledge about Immunization

In a study in Cassino and Crotone, Italy conducted to evaluate the knowledge, attitudes, and behaviour of 841 mothers regarding the immunization showed that knowledge score was 57.8%. Mothers knew most of the mandatory vaccinations, hepatitis B (87.5%), poliomyelitis (79.9%), tetanus (74.4%), and diphtheria (66.3%) were required for all infants.[9-14]

In a cross-sectional prospective pilot survey conducted in Malaysia 2014, data from 88 Malaysian parents were analyzed; the mean ± standard deviation for the total knowledge score was 7.36 ± 2.29 and Cronbach's value of 0.739 which indicate good internal consistency.[15]

In a survey which was conducted on Knowledge, Attitude and Practice towards Immunizations among Mothers in a Traditional City in the United Arab Emirates 2011. The survey enrolled 217 women. Over 80% of the participants knew of the importance of adherence to the program. More than 85% of the participants knew that childhood vaccinations prevent life-threatening diseases. 62% were aware that immunizations provide lifelong protection. The range of knowledge score was 1-9 (theoretical range 0- 9) and the mean (sd) was 5.87 (1.67).[16]

In a study design used to determine parental immunization knowledge and practices in Mosul Iraq. Out of the 528 parents who answered the questionnaire, 66.1% of the study population was found to have adequate knowledge scores.[17]

Knowledge about Immunization in Africa

In a cross-sectional survey conducted to determine the knowledge of mothers' regarding immunization of children below 6 years of age in Vhembe District, Limpopo Province, South Africa. Out of 200 mothers studied, 54.5% were mothers' knowledge of the importance of immunization in relation to their educational level, 55% were mothers' knowledge of the importance of immunization in relation to their number of children, 54.5% were mothers' knowledge of the importance of immunization in relation to their age, mothers' knowledge of the importance of immunization in relation to the antigen and diseases covered are as follows Vitamin A 67.5%, Rotavirus 49%, Hepatitis B 53%, Pneumococcal 19%, Polio 80.5%, BCG 47.5% and 84% had knowledge of the importance of immunization in relation to immunization schedule.[18]

A community based cross-sectional study in Ethiopia. A total 591 children aged 12 to 23 months and their mothers or caregivers were included in the study. 421(71.2%) of the study subjects were knowledgeable (have good knowledge and scored above the mean i.e. 4.95(±1.5 SD). Almost all, 97% of mothers have heard about immunization. More than three fourth (83.6%) of mothers knew VPDs. Majority of mothers heard on radio (91.8%).[19]
In a Rwandan report, this was on study of knowledge, attitudes and practices (KAP) in relation to the early nurturing of children. There is high claimed knowledge of the types of immunization that a child should have as 91%. Those who knew about immunization pointed out the reasons for immunization as: ensuring the child grows up healthy (57%), prevention of death (53%) and prevention of health impacts that may occur later in life (45%).[20]

Knowledge about Immunization in Nigeria

In a descriptive cross sectional study in Lagos, aimed to assess the knowledge and attitude towards childhood immunization among mothers attending antenatal clinic. 257 women were studied; almost all the respondents 93.8% were knowledgeable of immunization, while 98.1% are aware that immunization could prevent childhood sickness. Percentage of respondents with correct Knowledge of immunization in relation to time, Of the 257 respondents, 48.2% knew that BCG could be given at birth, 46.7% knew that DPT1could be given at 6 weeks after birth, 38.5% and 26.8% knew that measles vaccine and yellow fever vaccine could be given at 9 month.[21]

In a community based survey research design in Ogun which was aimed to investigate the knowledge, beliefs, and practices (KBP) of nursing mothers concerning utilization of immunization. Results showed that 95% of the respondents knew that immunization prevents infection, 92% of the respondents had good knowledge of the major childhood diseases that immunization is meant to prevent which is an indication that they have been exposed to health education regarding immunization at one time or the other. However, only 46% claimed to know how many times each vaccine was to be administered to their children.[22]

In a study in Anambra, 2009 on effects of socioeconomic and geographical factors in the utilization of immunization services. Findings on correct knowledge of immunization revealed that 53.7%.[23]

A cross-sectional descriptive study aimed to assess mothers' knowledge, perception and practice of routine childhood immunization in University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla Enugu, 2011. The study revealed that One hundred and sixty-eight mothers (81.2%) are knowledgeable regarding immunization, 17.4% knew that children are immunized to prevent diseases. A total of 194 (93.4%) mothers were able to mention at least two of the killer diseases correctly and 94% believed that routine immunization was worth it.[24]

Attitude to Immunization

In a study in Cassino and Crotone, Italy conducted to evaluate the knowledge, attitudes, and behavior of 841 mothers regarding the immunization. The mean total score of respondents' attitudes towards the utility of vaccinations for preventing infectious diseases was 8.6, indicating a very favorable attitude. 94.4% of the children were vaccinated with all three doses of DPT, OPV, and hepatitis B.[14]

Attitude to Immunization in Africa

In a community based cross-sectional study in Ethiopia. The summarized attitudinal index indicates that 587(99.3%) of the total respondents have favorable attitude towards immunization services utilization[19]

In a cross-sectional survey in 2008 on Knowledge, attitude and practices of mothers regarding immunization of infants and preschool children at Al-Beida City, Libya. From a total of 200 studied mothers, 162 (81%) completely immunized their children whereas 38 (19%) partially immunized them. A favorable attitude towards the immunization programme was expressed in 161 mothers (80.5%).[26]

Attitude to Immunization in Nigeria

In a cross sectional study in Enugu. The study revealed that 197 of mothers (95%) took their children to immunization centers to be immunized. [24]

Practice of Immunization

In a cross-sectional survey conducted in Malaysia 2014, data were analyzed. The mean ± standard deviation for total practice score were and 7.13 ± 2.20. Internal consistency was determined for the 10 items of practice on the questionnaire with Cronbach's value of 0.732, which indicate good reliability of both instruments.[15]

In a study in India, fifty four out of 155 children in the study (34.84%) were fully immunized, 97 (62.58%) were partially immunized and 4 (2.58%) were unimmunized.[25]

In a study design used to determine parental immunization knowledge and practices in Mosul Iraq. Out of the 528 parents who answered the questionnaire, a higher percentage of parents with adequate knowledge and practice were found for children with complete immunization (71.7%) and partial immunization (59.5%).[17]

Practice of Immunization in Africa

In a Rwandan report, this was on study of knowledge, attitudes and practices (KAP) in relation to the early nurturing of children. Results indicate a high incidence of immunization practice among the households sampled, with 92% claiming to have immunized their index child. Of those that claimed to have immunized, 93% said they had the immunization cards. However, only 73% of these could show the immunization cards when the interviewer requested to see them.[20]

Practice of Immunization in Nigeria

In a community based survey in Ogun with respect to the practice variables, results showed that 68% of the respondents had taken their current baby for immunization.[22]

In a cross sectional study in Enugu. The study revealed that 75.4% (156) of the mothers immunized their children during immunization campaign days. [24]

Factors affecting Involvement/Practice of Childhood Immunization

Factors affecting immunization uptake at general practice level may be considered in terms of demography (i.e. sociodemographic variables), attitude and practice. There has been increasing emphasis on preventive care, which has resulted in systematic differences in the success of practices for child immunization. In order to provide all the recommended vaccines, a health-care practice must make a significant financial investment in supplies and in knowledgeable personnel who can administer the injections. Some of the factors are

- Least budgetary allocation to communication and social mobilization
- Funds/incentives seldom available for routine immunization and some costs borne by health workers
- Overdependence on donors
- Problems and delays with disbursement of funds and materials at lower levels of the health system
- Lack of funding for sustained communication programmes for routine immunization
- Lack of equipment (information, education and communication (IEC) materials, megaphones and vehicles) for adequate mobilization
- Transportation difficulties
- Inequities in distribution of human resources, with more resources in the urban than in rural Local Government Areas
- Lack of human resources for supervision of frontline health care providers
- Training deficiencies, with large numbers of communication personnel not sufficiently skilled
- Health providers, including vaccination teams, poorly motivated
- Vaccine hesitancy and rejection in some religious groups may impede receipt of vaccination information
- Political support focused on campaigns only
- Failure of State and Local Governments to take ownership of programmes
- Health communication not seen as a priority by some policy makers
- Lack of political commitment in some Local Government Areas
- Lack of community participation.[27]

Immunization

Immunization remains one of the cheapest and most cost effective means of protecting the masses from vaccine preventable diseases.At the end of 2011, Nigeria was estimated to have a population of 167 million[5].

Routine Immunization (RI) has a schedule in Nigeria for the full immunization of every child before the age of two. Nigeria's immunization schedule contains BCG, $HBV_{1,}$ and OPV_0 at birth, OPV_1, $Pentavalent_1$, Prevner 13, and $Rotaris_1$ at 6 weeks, $OPV_{2,}$ $Pentavalent_2$, $Rotarix_2$ and Prevner 13 at 10 weeks, OPV_3,$Pentavalent_3$, Prevner 13at 14 weeks, Vitamin A at 6 months, Measles and Yellow fever at 9 months, Nimenrix, OPV booster and Vitamin A between 12-24 months, Measles, Mumps and Rubella[MMR(priorix)], and Varilrix between 15-18 months and Typherix at 24 Months. Cerebrospinal meningitis vaccine (CSM) for types A and C is administered in an annual campaign in susceptible areas in the north of Nigeria, to age groups which vary according to the quantity of vaccine supplied.[28] Preliminary results from the 2003 Demographic and Health Survey (DHS) revealed a DPT3 coverage rate of 21% among children aged 12-23 months. Moreover, Nigeria remains one of the few reservoirs of polio around the world. Data for 2003 shows that with 347 cases, Nigeria has the highest number of children paralyzed by the poliovirus, (Demographic and Health Surveys for Nigeria)2003.[28]The purpose of immunization is to provoke a specific immunologic response to a selected microbial agent or its antigens with the expectation that this will result in the development of immunity.

Childhood Immunization

Immunization is one of the most important public health interventions and constitutes a cost effective strategy to reduce both the morbidity and mortality associated with infectious diseases.[29]When babies are born, they inherit specific types of antibodies from their mothers. These antibodies help them fend off different diseases. The antibodies are also nature's way of protecting babies when they are most vulnerable. However, starting around six months of age, these antibodies start to diminish, and almost completely disappear by the time the baby is one year old: in an ideal situation, babies should start to make their own antibodies i.e. the beginning of their immune system, as they increasingly become exposed to the diseases that the maternal antibodies had previously protected them against. Some Nigerian parents do not realize the importance of taking their children for vaccinations.[30]Moreover; improvements have been made in routine immunization over this period. To keep track of the delivery of these immunizations, Nigeria also provides parents or guardians with a health card on which will help the health practitioners and yourself keep track of the vaccines your baby has taken and will take.[31]

Schedule of Immunization in Nigeria

WHO recommendations for routine immunization schedule is shown below.

Table I: The New Immunization Schedule

AGE	DISEASE	VACCINE/ ANTIGEN	SITE
At BIRTH	Hepatitis B Polio Tuberculosis	HBV 1, OPV0 BCG	Upper part of the thigh Oral Upper left arm
6 weeks	Polio DPT, HIB, Hepatitis B Rotavirus Pneumonia & Otitis Media	OPV 1 Pentavalent 1 Rotarix 1 Synoflorix 1 or Prevner 13	Oral Upper part of the thigh (right) Oral Upper part of the thigh (left)
10 weeks	Polio DPT, HIB, Hepatitis B Rotavirus Pneumonia & Otitis Media	OPV 2 Pentavalent 2 Rotarix 2 Synoflorix 2 or Prevner 13	Oral Upper part of the thigh (right) Oral Upper part of the thigh (left)

14 weeks	Polio DPT, HIB, Hepatitis B Pneumonia & Otitis Media	OPV 3 Pentavalent 3 Synoflorix 3 or Prevner 13	Oral Upper part of the thigh (right) Upper part of the thigh (left)
6 months	Vitamin A	Vitamin A	Oral
9 months	Measles, Yellow Fever	Measles, Yellow Fever	Upper arm (left or right) Upper right (left or right)
12-24 months	Meningitis &Septicaemia Vitamin A Polio	Nimenrix Vitamin A OPV booster	Upper arm Oral Oral
15-18 months	Measles, Mumps, Rubella Chicken pox	Priorix Varilrix	Upper part of the thigh Upper arm
24 months	Typhoid fever	Typherix	Upper part of the thigh
13 years & above	Human Papilloma Virus (HPV) X3	Cervarix	Upper deltoid muscles

Source: http://www.who.int/immunization/policy/immunization_tables/en/ (WHO, 2017)[32].
NOTE: *Protect all vaccine from sunlight and heat.*

Conclusion

Immunization for children is the effective, safe and efficient public health interventions to prevent childhood morbidity and mortality. This review found that most men have good knowledge, positive attitude with poor practice and involvement of immunization. There is a need to increase awareness about the benefits and importance of vaccination, as well as the harmful consequences of non-complete immunization.

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