Perception of Childhood Routine Immunisation among Adults in Selected Communities of Ido Local Government Area, Ibadan, Oyo State, Nigeria

ABSTRACT

Aims: Immunisationis one of the medical achievements of the twentieth century;however, some vaccines are receiving less and less support. Increasing people's understanding of vaccination's direct advantages, beyond avoiding infectious diseases, may aid in regaining vaccine acceptance for children two years and below. The study determinesthe perception of childhood routine immunization among adults in selected communities of Ido Local Government Area, Ibadan, Oyo State.
Study design: Mixed method study design.
Methodology:A mixed-method study design thatadopted a multi-stage sampling technique to select 417 respondents for the study was used. Two instruments were used for data collection: a questionnaire and an in-depth interview guide. The questionnaire assessed perceived severity and benefits with 36 items each, and scores below < 19 and score ≥ 19 were categorized as low and high for each variable, respectively. Quantitative data was analyzed using descriptive and inferential (Chi-square) statistics at a significance level0.05. The qualitative data was analyzed using a thematic approach
Results: There were 41(9.8%) men and 376(90.2%) women, totaling 417 adults. The respondents 208 (49.9%) have a Secondary School Certificate, the highest educational qualification among the respondents. Results also revealed that 172(41.3%) of respondents had good knowledge about children's routine vaccinations. About 396(95.0%) had a high severity levelof vaccine-preventable diseases. Also, 409(98.1%) had high perceived benefits of immunization uptake.
Conclusion: This study showed a high level of perceived benefits of immunization uptake among the respondents. Since respondents perceptions of childhood routine immunization and education level were substantially correlated, the government should encourage and improve maternal education.

Keywords: Perception, Childhood routine immunization, adults.

1. INTRODUCTION

One of the less expensive and successful public responses to disease prevention is immunization;also,it hassignificantly improved health and decreased death (1). Although immunization of children has been very successful in low- and middle-income countries, within these countries, vaccine-preventable diseases havebeen a major health problem among children. Each year, immunization prevents 2 to 3 million infant deaths worldwide (2).

The World Health Organization estimated that due to the disruption of normal immunization services, 80 million children in 68 countries are indanger of contracting diseases like measles, diphtheria, and polio (3). This is partly attributable to vaccinations' success in preventing contagious diseases. However, due to the huge range of illnesses and ailments that exist today, many individuals are unaware of the crippling effects of this disease.The average population struggles to thoroughly understand all the many diseases, symptoms, and suggestions. People must be aware ofdiseases that vaccines can prevent to lower their prevalence. Serious illnesses were those that were life-threatening, chronic, or had long-lasting repercussions, according to moms who participated in this study. Most moms considered polio, diphtheria, tetanus, and meningitis to be potentially fatal diseases. All but meningitis were deemed unlikely to affect children.

Kazi et al. (4) describe the benefits of adopting healthy habits to lower your illness risk. People tend to adopt healthier behaviors when they believe the new behavior will reduce their chances of developing a disease(4). If they think getting the MMR vaccine will protect their body from the disease, some people might be persuaded to do so. Early immunization would avoid illnesses later in life, reducing productivity and increasing health care expenses for everyone. People may be aware of the protective effects that comprehensive vaccination can have on those who are vulnerable and their benefits (herd immunity).People may be able to see how their actions affect society as a whole. A person's impressions of the advantages of vaccination may be influenced by their awareness of their obligation to those in their immediate environment. However, this demand could probably decline as misunderstandings about vaccination and VPDs spread and are not addressed by immunization programs(5). They are delivering accurate information to enhance public awareness of the advantages and security of vaccinations. To provide a child with the greatest protection against diseases that can be prevented by vaccination, they must receive all their immunizations at the proper ages and intervals (6). Similar to earlier research where the majority felt that immunizing children was essential for illness prevention, in several studies, almost all participants disputed that vaccines are ineffective in preventing children from contracting diseases (7). According to a different survey, parents of kids between 0 and 6 agreed that immunizations shield their kids against sickness and that they risk contracting it otherwise. Parents disagreed on whether their child wouldexperience a major adverse effect from vaccination. Mothers' illiteracy and lack of knowledge of the advantages of vaccine-preventable diseases may contribute to low immunization rates (8).This study aims to determine the severity of children to vaccine-preventable diseases and the perceived benefits of immunization uptake of children among adults in selected communities of Ido Local Government Area on routine immunization.

2. METHODOLOGY

Study Design

The study used a mixed-method (i.e., quantitative and qualitative) descriptive approach.

Study setting

Some settlements in Ido, a local government area in Ibadan, Oyo State, were the subject of the study. Ido is a rural local government area (LGA) in the lesser city of Ibadan, Oyo State. Its corporate offices are located in Ido.

Target population

This comprises adults or caregivers withchildren under two and residents of the chosen communities in Ido Local Government Area (LGA), Ibadan, Oyo State.

Study population

Adults or caregivers of children under two and residents of the chosen communities comprise the study population (n=417).

Inclusion Criteria
Adults or caregivers of undertwo living in the communities for at least 6 months.
Community members above 18 years living in the selected communities for at least 6 months

Exclusion Criteria
Adults or caregivers of under-two years who were sick and unfit at the time of the study.
Adults or caregivers of under-two years who were unwilling to participate during the data collection exercise.

Sample size determination
Using the Leslie Kish method, the sample size for this study was established, and it was found that the target level of dependability should not exceed 0.05 with a 95% confidence range. Using the proportion of children who had taken all basic vaccinations in the Ido Local Government Area of 41.3% by Fatiregun et al., (9) cited by Adedire et al., (10).
Using the Leslie Kish formula, the sample size for this investigation was established.

$$n = \frac{Z^2pq}{d^2}$$

Where, n = Sample size
Z = Standard normal deviation; 1.96
p = Prevalence of women who received post-natal care (Fatiregun et al., 2013)(9)
q = 1 – Prevalence d = Precision; 0.05
z = 1.96; p = 41.3% i.e., 41.3/100 = 0. 413
q = 1 – 0. 413 = 0.587
d^2 = 0.05 x 0.05 = 0.0025

$$= \frac{1.96 \times 1.96 \times 0.413 \times 0.587}{0.0025} = \frac{0.9313}{0.0025} = 372.5$$

10% non-response rate = 372.5/ (1-0.10) = 414 (approximately)
Hence, after accounting for the 10% attrition rate or non-response rate, 414 respondents were chosen to take part in the study.

Sampling Technique
For this investigation of 10 wards, a multi-stage sampling technique was used.
Stage 1: Out of ten (10) wards in the Ido Local Government Area, five (5) were chosen using a simple random sampling technique.
Stage 2: The community's homes were counted, and homes with children under two were chosen using a systematic sampling technique.
Stage 3: In cases where there was more than one qualified respondent in the household, balloting was used to choose one of them. Respondents were chosen from each household.

Validity of instruments
The researcher made sure that each question on the questionnaire correlated with the study's objectives to determine the instrument's content validity. The supervisor received a draft copy of the questionnaire, which she modified as needed. Expert recommendations were integrated into the questionnaire's final draft to improve the instrument's content validity.

Reliability of the Instrument

To evaluate the instrument reliability, 10% of the sample size (41 questionnaires) wasadministered in Oluyole Local Government Area of Ibadan, a similar population group. This setting was used for the reliability test because it shares traits with the setting used for the primary study population. Before the last version of the instrument was used, any necessary adjustments were performed. Forty-one adults were chosen at random. Using the Cronbach Alpha test, the reliability of the questionnaire was assessed from the pilot study, and it was found to be reliable with a reliability coefficient of 0.850.

Method of Data Analysis

Quantitative data Analysis

All completed questionnaires' consistency and accuracy were checked. The surveys were manually sorted and entered into the Statistical Program for the Social Sciences (SPSS) version 25. Descriptive statistics were used to assess the specific objectives. Pearson chi-square was used to determine the statistical significance of the hypotheses, and logistic regression was then used to forecast the variable with the most impact.

Qualitative data Analysis

Interviews were verbatim transcribed. Individual transcripts were checked to guarantee that the transcription was accurate and thorough. A computer program for qualitative data analysis was used to sort, categorize, and analyze the data (Nvivo). This included multiple overall surface readings of transcripts to capture context and meaning, followed by coding and categorization of recurring concepts/ideas. A master list of all categories was assembled and examined for common themes.

Ethical Consideration

Before the study began, the Oyo State Ministry of Health's Ethical Review Committee examined and authorized the study proposal in Ibadan (AD 13/479/44248B).

3. RESULTS AND DISCUSSION

Socio-demographic characteristics of respondents

Three-hundred and sixty-two (86.8%) of the respondents practice monogamy, 335(80.3%) were married, 208(49.9%) had secondary education, 368(88.2%) are Yorubas, and 274(65.7%) were Muslims (Table 1). According to the study's findings, 376 (90.2%) respondents were females (Figure 1).

Table 1: Socio-demographic characteristics of respondents

Variables	N	(%)
***Age (years)**		
15-30	108	25.9
31-45	204	48.9
46 and above	104	24.9
Marital Status		
Single	77	18.5
Married	335	80.3
Separated	4	1.0
Divorced	1	0.2
Ethnicity		
Yoruba	368	88.2
Igbo	45	10.8
Hausa	2	0.5
Others	2	0.5
Type of family		

Monogamous	362	86.8
Polygamous	55	13.2
Religion		
Christianity	274	65.7
Islamic	140	33.6
Traditional	3	0.7
Educational Background		
No formal education	28	6.7
Primary	43	10.3
Secondary	208	49.9
Tertiary	138	33.1
Occupation		
Unemployed	36	8.6
Trading	189	45.5
Artisan	68	16.3
Civil servant	19	4.6
Self-employed	105	25.2
Level of Income (#)		
0 – 200,000	409	98.1
201,000 – 400,000	4	1
401,000 – 1,000,000	4	1
Years of marriage		
0 – 20	319	76.5
21 – 30	75	18
31 – 70	23	5.5
Number of children		
0 - 3	105	25.2
4 – 6	201	48.2
7 and above	111	26.2
Sex of last-child		
Male	41	9.8
Female	376	90.2
Child's age (years)		
0 – 10	208	49.9
11 – 20	137	32.9
21 – 30	72	17.3

***Mean Age** 38.77 ±10.8 years

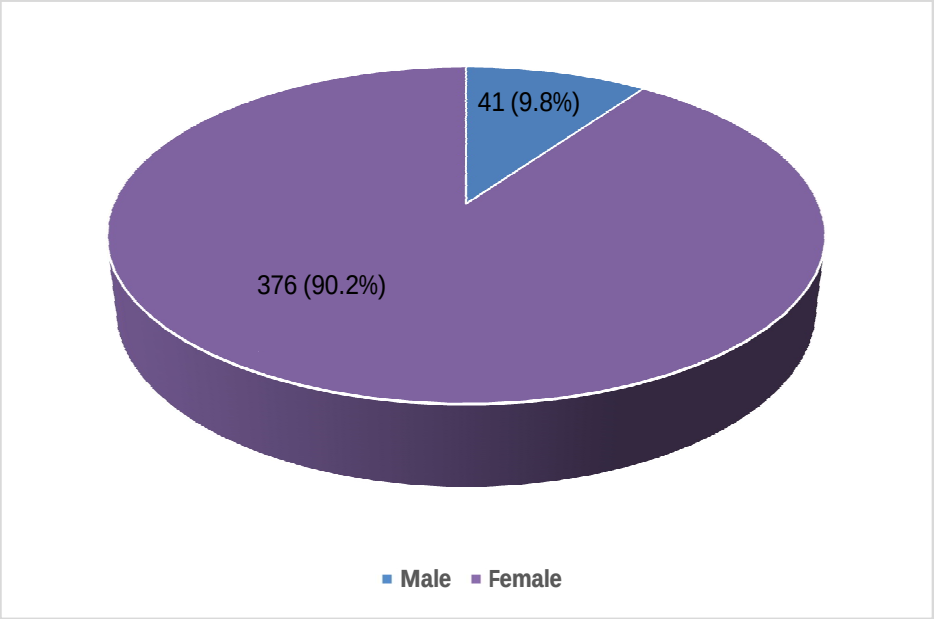

Figure 1: Respondents'Gender

Perceived severity of vaccine-preventable diseases

The level of perceived severity of vaccine-preventable diseases was measured on a 36-point perceived severity scale. For each statement, the appropriate response was given a score of strongly agree - 4, agree -3, undecided - 2, disagree - 1, strongly disagree- 0. Perceived severity (PS) of <19 was rated as low perceived severity, while PS of 19 – 36 was rated as high.The perceived severity of vaccine-preventable diseases among the respondentsis shown in Table 2. Two-hundred and nine (50.1%) of the respondents strongly agreed that children may be paralyzed if not given oral polio vaccine, 217 (60%) strongly agreed that children may have diphtheria, whooping cough, tetanus or hepatitis B if not given a pentavalent vaccine, 214 (51.3%) strongly agreed that children may be seriously sick if the vaccine is not accepted, and 214 (51.3%) strongly agreed that disease may later manifest in the worse form in adulthood if vaccination is not taken (Table 2). The study's findings showed that 396 (95.0%) respondents had a high level of perceived severity of diseases that could have been prevented by vaccination (Figure 2).

Table 2: Perceived severity of vaccine-preventable diseases

Statements	Strongly Agreed (%)	Agreed (%)	Strongly disagreed (%)	Disagreed (%)	Undecided (%)
Children may be paralyzed if not given oral polio vaccine	209(50.1)	180(43.1)	6(1.4)	16(3.8)	6(1.4)
Children may have diphtheria, whooping cough, tetanus, or hepatitis B if not given pentavalent vaccine	217(60.0)	185(39.6)	4(1.9)	13(3.1)	14(3.4)
Children may have eye deficiency if not given Vitamin A Supplement	219(52.5)	162(38.8)	6(1.4)	14(3.4)	16(3.8)
Children may have small greyish-white spots in the mouth, aches, and pains if not given measles vaccine	209(50.1)	161(38.6)	13(3.1)	18(4.3)	16(3.8)
Children may have aching muscles, particularly the back and knees, if not given the yellow fever vaccine	208(49.9)	156(37.4)	12(2.9)	17(4.1)	27(5.8)
Children may have blood and lung infections and brain damage if not given PCV	193(46.3)	165(39.6)	13(3.1)	18(4.3)	28(6.7)
Children may have bloody cough and /or permanent brain damage if not administered BCG	197(47.2)	173(41.5)	7(1.7)	15(3.6)	25(6.0)
Children may be seriously sick if the vaccine is not accepted	214(51.3)	166(39.8)	7(1.7)	22(5.3)	8(1.9)
Diseases may later manifest in worse form in adulthood if vaccination is not taken	214(51.3)	159(38.1)	6(1.4)	24(5.8)	14(3.4)

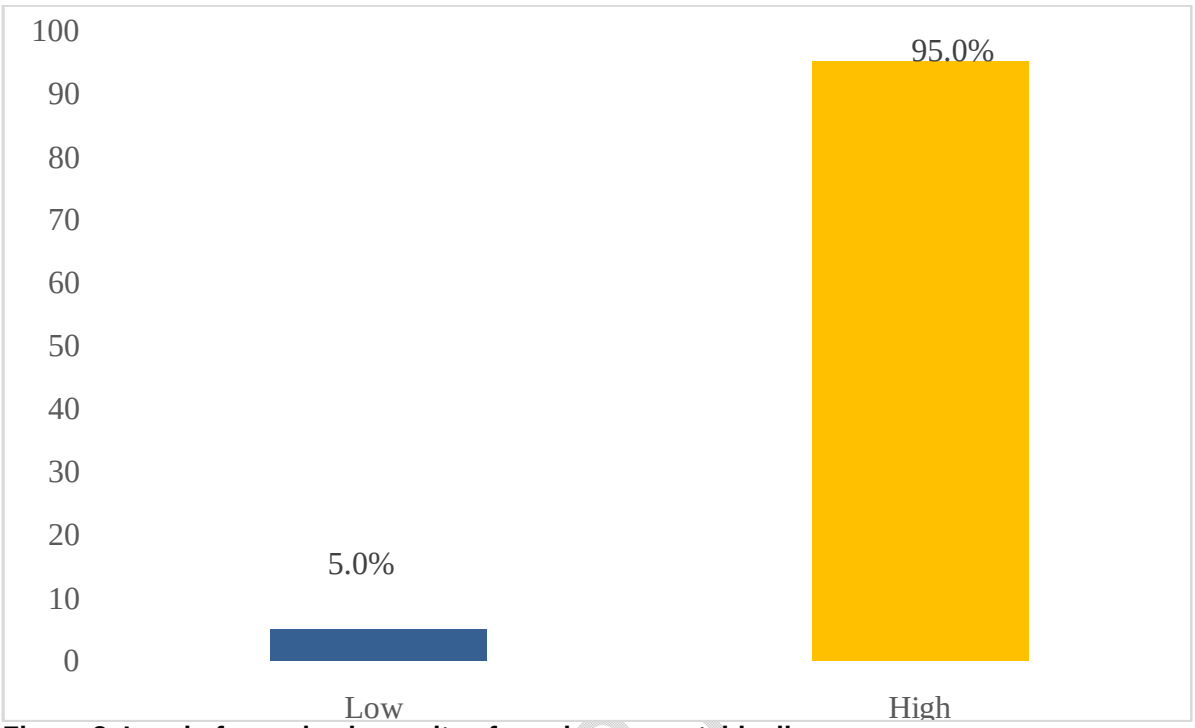

Figure 2: Level of perceived severity of vaccine-preventable diseases

Perceived benefits of immunization uptake

The benefits of immunization uptake were measured on a 36-point perceived benefit of immunization uptake scale. For each statement, the appropriate response was given a score ofstrongly agree- 4, agree -3, undecided - 2, disagree - 1, strongly disagree - 0. Perceived benefits (PB) of <19was rated low perceived benefits, and PB of 19 – 36 was rated high.The perceived benefits of immunization uptake among the respondents are shown in Table 3. Two-hundred and sixty-one (62.6%) of the respondents strongly agreed that vaccinations may prevent diseases in children, 242 (58.0%) strongly agreed that vaccines may help to prevent paralysis of children, 224 (53.8%) strongly agreed that vaccines may prevent brain damage and increase child cognitive functions, and 214 (51.3%) strongly agreed that vaccines may help prevent lung infection, other details are presented in Table 3. The study's findings showed that 409 (98.1%) respondents had high perceived benefits of immunization uptake (Figure 3)as above.

Table 3:**Respondents'perceived benefits of immunization uptake**

Statements	**Strongly Agreed (%)**	**Agreed (%)**	**Strongly Disagreed (%)**	**Disagreed (%)**	**Undecided (%)**
Vaccinations may prevent diseases in children	261(62.6)	149(35.7)	1(0.2)	5(1.2)	1(0.2)
Vaccinations may strengthen the baby's immune system	252(60.0)	151(36.0)	6(1.4)	8(1.9)	0(0.0)
Vaccines may help to prevent paralysis of children	242(58.0)	164(39.3)	3(0.7)	7(1.7)	1(0.2)
It prevents illness later on in life	236(56.6)	167(40.0)	5(1.2)	6(1.4)	3(0.7)

Vaccines may prevent brain damage and increase child cognitive functions	224(53.8)	64(39.4)	6(1.4)	11(2.6)	11(2.6)
Vaccine may help child to grow and develop well	237(56.8)	169(40.5)	4(1.0)	7(1.7)	0(0.0)
Vaccine may help prevent lung infection	214(51.3)	180(43.2)	6(1.4)	4(1.0)	13(3.1)
Vaccines may help to improve the sight of children	213(51.1)	176(42.2)	6(1.4)	12(2.9)	10(2.4)
The risk of spending money on hospitals may be reduced	233(55.9)	163(39.1)	5(1.2)	13(3.1)	3(0.7)

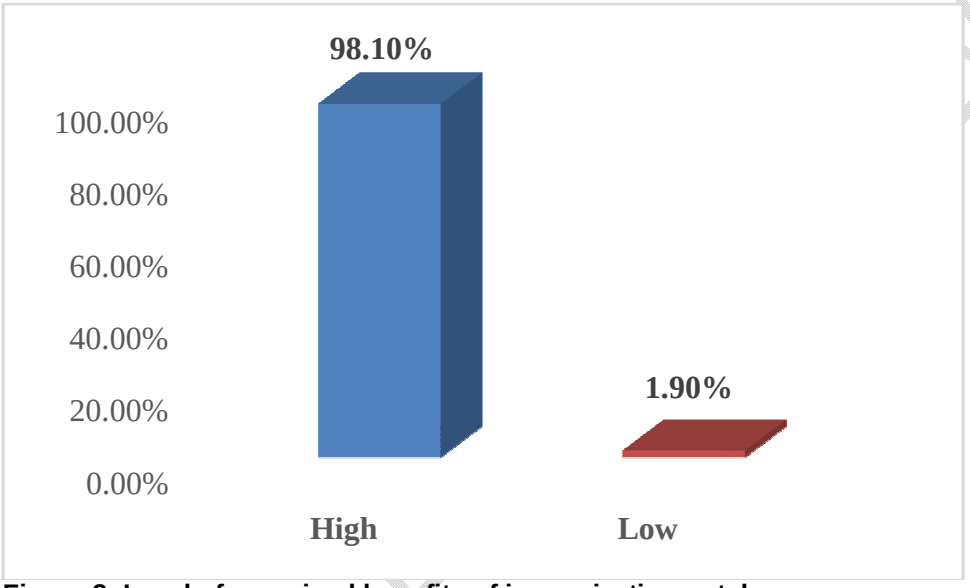

Figure 3: Level of perceived benefits of immunization uptake

Results of In-Depth Interview

Fifteen (15) participants were interviewed. The interviews were completed with participants from five communities in Ido Local Government Area, Oyo State. The age range of the participants was 26 to 44 years. Their educational status ranged from no formal to tertiary education, and the majority had secondary education as their highest academic qualification. All the IDI participants were married, and over three-quarters were Yoruba. The majority had four childrenand were engaged intrading as their occupation. They were Muslims and Christians.

Perceived severity of vaccine-preventable diseases

The majority,13(86.7%) of the 15 IDI respondents, indicated that the severity of these diseases can also be serious and hard on the parents. Respondents mentioned different severity ofthe mentioned diseases, among which are shortage of blood for a child suffering from malaria, loss of strength and stamina in case of diarrhea and high temperature, disability, and paralysis for measles-affected children. One of the respondents said,

> *"The stooling, immediately the child will not have strength, and if it is measles, the body will be hot, and also if there is catarrh, the parent will not be able to sleep self because the child we are disturbed" (NG, 33 years, primary education)*

Benefits of immunization uptake

Prevention of sicknesses and diseases: Almost all 14(93.3%) of the 15 IDI respondents also reported that routine immunization is beneficial in preventingillness and diseases like measles, whooping cough, pertussis, and paralysis in children. One of the respondents said,

> *"The benefits there are, for instance, if they get a measles vaccine, we were made to understand that it prevents measles for the child. So, if an adult that has measles carries the child, the child may not be easily infected because of the immunization received beforehand." (RS, 29 years, tertiary education)*

Another respondent said;

> *"The benefits there are that, even if a child should want to get sick, once the immunization is already in their body, it will reduce the extent of the disease. When children fall sick, an immunized child will respond to that sickness differently than one that has not been immunized." (BA, 39 years, primary education)*

Majority, 14(93.3%) of the 15 respondents, agreed that immunization is very beneficial to health as it improves children's health and prevents sickness and diseases. One of the respondents said,

> *"The benefits are much. If the child collected all the immunization injections, there is nothing for the child to feel hot when the child wants to grow teeth; the body will not be hot unnecessarily. There will be no form of sickness that is peculiar to a child that will be affecting them"(AK, 36 years, SSCE)*

Two (13.3%) of the 15 respondents responded that a child's immune system might have a negative effect if the child did not take the multiple vaccines given during routine immunization as the child might be prone to different diseases and sickness. One of the respondents specifically said;

> *"If the child did not take the injection, it wouldaffect the child;the child might be sick at any time because there is no resistance to stop the disease from entering the body" (OM, 43 years, primary education)*

Almost all 14(93.3%) of the 15 respondents said their opinion as regards the multiple vaccines collected by the children during routine immunization is good as it prevents all sorts of sickness in children. One of the respondents specifically said;

> *"I've said earlier that immunization is very good for children. And it does not cause any harm. There is nothing else to say other than to advise whoever has not vaccinated their children to go and do so because it does a lot of good work in the body. It fights all sorts of diseases in the body. Maybe there is any disease that wants to show up in the child's body;the immunization will fight it quickly before it becomes obvious in the child or even affects the mother of the child herself."(OE, 36 years, no formal education)*

Almost half 7(46.7%) of the 15 respondents said they believe that multiple vaccines given to children during immunization prevent future development of chronic diseases and sickness. One of the respondents specifically said;

> *"In my opinion, when it is time for a child to get multiple injections, one will have to take the child to get it, regardless of the pain it may cause. One must not use the temporary pain and discomfort caused by the injections as a reason not to get the immunization. After all, the immunization will benefit the future of the child. And it is good;I don't think it negatively affects their future." (RL, 32 years, SSCE)*

Cognitive function: Two other respondents (13.3%) added that not only is immunization good

for children's health, but it's also beneficial to their academic pursuits. One of the respondents specifically said;

> *"The benefits of immunization, according to what we were told, are that it is good for children. Secondly, it is needed if they want to travel out or gain admission into schools. Lastly, it is very good for their health."(BA, 39 years, Primary education)*

Two (13.3%) of the 15 respondents reported that giving multiple vaccines during routine immunization gives a child good brain and makes a child sharp and fervent. One of the respondents said;

> *"It is because immunization prevents future diseases and also makes them smart why we let them take it." (AK, 36 years, SSCE)*

Additionally, one (6.7%) of the 15 respondents reported that immunization vaccination makes a child's brain sharp and smart in their education. Some 10(66.7%) of the 15 respondents reported that it is educative for the parents as they were also given health talks on how to care for their children during routine immunization. One of the respondents said;

> *"The benefits there are many. We are usually given health talks, awareness, and even fun activities when we go for immunizations. From there, we usually even get other benefits that we receive for free from there."(OM, 43 years, Primary education)*

However, a respondent had a negative opinion on the multiple vaccines given as she said some people believed it would affect the children in the future (RS, 29 years, tertiary education).

4. DISCUSSION

Evidently, from the present study, over two-thirds of the respondents had a high level of perceived severity. This might be attributed to the fact that infectious diseases such as measles, tetanus, mumpsvaccine-preventable diseases, rubella, etc, were a greater risk for children, so if vaccines were not given to these children, it could result inthem being infected by these diseases (11).The finding from this study revealed that children mightbe paralyzed if not given the oral polio vaccine; children may have diphtheria, whooping cough, tetanus, and hepatitis B if not given pentavalent vaccine; children may have eye deficiency if not given Vitamin A Supplement; children may have small greyish-white spots in the mouth, aches, and pains if not given measles vaccine; children may have aching muscles, particularly the back, and knees if not given yellow fever vaccine; children may have blood and lung infections and brain damage if not given PCV; children may have bloody cough and /or permanent brain damage if not administered BCG; children may be seriously sick if vaccine is not accepted; and diseases may later manifest in worse form in adulthood if vaccination is not taken. This finding is similar to that of the IDI in which a respondent added that immunization was given to a child at one month, three months, six months, nine months, and one year. In addition, one of the respondents specifically said; *"What I know about it is that it is good for children, right from birth, or by the 8th day. It prevents the child from falling sick. When a child is not immunized, it can cause the child to cough or have many other diseases. It is very good for children to be immunized."*Thesefindings concur with Enwonwu et al. (12), who reported that vaccines stimulate the body's immune system to protect the person against subsequent infections or diseases. Vaccines can protect more children than most other strategies (12). Matta et al. (13) state that high immunization uptake is critical for protecting people from infectious diseases, but barriers to immunization are complex. Ashbaugh and Brooke (14) highlighted that the benefits ofvaccines and vaccination

programs go beyond preventing infections. One of the best and most affordable public health interventions for illness prevention, according to Mantel and Cherian (1), is vaccination and immunization. Also, vaccines have substantially improved health and reduced mortality. World Health Organization (2) reported that the universal BCG vaccination at birth is recommended in countries or settings with a high incidence of TB and/or high leprosy burden. Findingsfrom a study conducted by Williams et al. (15) revealed that less than a quarter of the respondents correctly stated the purpose of immunization, which is to prevent infectious disease,while findings from Mvundura et al. (16) showed that the majority of the respondents mentioned the purpose of immunization correctly. The findingsof Holipah and Kuroda (2018)(17) also revealed that the majority of them knew that routine vaccination prevents children from some serious infectious diseases and their complications. Habib et al. (18) also reported that more than 85% of the participants knew the role of childhood.Findingsfrom the study revealed that most respondents have a high level of perceived benefits of immunization uptake. This corroborates the finding of Stone Jr. et al. (19), who reported that taking children for immunization and vaccination uptake providesa golden opportunity to curb and prevent infectious diseases such as diphtheria, pertussis, and tetanus.

The study revealed that the perceived benefits of immunization uptake of children include the prevention of diseases,strengtheningof the baby's immune system,preventionof paralysis of children,preventionof illness later on in life,prevention of brain damage, and increase child cognitive functions; help child to grow and develop well; help prevent lung infection; help to improve the sight of children; and the risk of spending money on a hospital may be reduced. Findings in the IDI agree with this as a significant percentage of respondents said,*"What I know about it is that it is good for children, right from birth, or by the 8th day. It prevents the child from falling sick. When a child is not immunized, it can make the child to cough or have many other diseases. It is sha very good for children to be immunized."*These findings corroborate Matta et al. (13), who reported that high immunization uptake is critical for protecting people from infectious diseases. Hayden (2014), cited by Kazi et al. (4), observed that early immunization would prevent illness later in life, leading to a loss in individual productivity and additional healthcare costs.
Besides, immunization will strengthen an individual's immune system. Ashbaugh and Brooke (14) highlighted that the benefits ofvaccines and vaccination programs go beyond preventing infections. Mantel & Cherian (2020) (1) explained that vaccination and immunization are among the most effective and affordable public health measures for illness prevention. Also, vaccines have substantially improved health and reduced mortality. Kaufman et al. (6) reiteratedthat a child should receive all immunizations at the appropriate ages and intervals to ensure maximal protection from vaccine-preventable diseases. Enwonwu et al. (12) submitted that vaccines stimulate the body's immune system to protect the person against subsequent infections or diseases. Vaccines can protect more children than most other strategies (12). Kagoné et al. (8) also supported the finding of this present study as the researchers revealed that,ingeneral, parents of children aged 0 to 6 agreed that immunizations protect their children from disease and that, in the absence of immunizations, their children may contract a disease.The present study also revealed that vaccinations may prevent diseases in children. The IDI also supported this finding; a respondent specifically said; *"What I know about it is that it is good for children, right from birth, or by the 8th day. It prevents the child from falling sick. When a child is not immunized, it can make the child to cough or have many other diseases. It is sha very good for children to be immunized."* This finding corresponds with Matta et al. (13), who reported that high immunization uptake is critical for protecting people from infectious diseases. A similar study conducted by Mantel and Cherian (1) revealed that vaccination and immunization are among the most effective and affordable public health measures for illness prevention.

The study also revealed that vaccines may help children to grow and develop well. Findings from the IDI also supported this finding as the majority of the respondents acknowledged that their opinion as regards the multiple vaccines collected by the children during routine immunization is good as it prevents all sorts of sickness in children. This agrees with the finding of Mohapatra et al. (20), who reported that few caregivers felt that routine immunization improves the growth and intelligence of children. Mantel and Cherian (1) reported that vaccines have substantially improved health and reduced mortality.

Limitation to study

Only individuals in the Ido local government area of Oyo State were used for the study; thus, the result cannot be generalized. The smallsample size of four-hundred and seventeen (417) was used in this research because only a single Local Government Area was used;hence, the result cannot be generalized. It was not easy obtaining ethical approval from the Oyo State Ethics Committee. Therefore, the researcher was constrained to wait and consistently contact workers in the committee's office until final approval was secured.

CONCLUSION

This study examined how residents (adults) in a few communities in Ido local government area,Ibadan, Oyo State, felt about and accepted routine childhood immunization. In conclusion, the qualitative finding has corroborated with the quantitative finding. More so, respondents' level of education was significantly associated with knowledge ofchildhood routine immunization ($p<0.05$). Therefore, maternal education should be improved since increasing childhood immunization and vaccination uptake is important.

Recommendations

Since immunization benefits children, all stakeholders should work together to increase vaccination rates. Also, public health administrators and vaccination providers (pediatricians, nurses, health visitors, etc.) should work together to ensure children receive all vaccinations at the appropriate times and intervals specified by the national vaccination schedule.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) to publish this case report and accompanying images. A copy of the written consent is available for review by this journal's Editorial office/Chief Editor/Editorial Board members.

ETHICAL APPROVAL

All authors declare that all experiments have been examined and approved by the appropriate ethics committee and have, therefore, been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1.

2.

3.

REFERENCES

1. Mantel C, Cherian T. New immunization strategies: adapting to global challenges. Bundesgesundheitsblatt-Gesundheitsforschung-Gesundheitsschutz.2020;Jan;63(1):25-31.
2. World Health Organization. Immunization coverage: Fact sheet. Geneva: WHO; 2018. Available at http://www.who.int/mediacentre/factsheets/fs378/en/
3. World Health Organization. World health statistics 2023: monitoring health for the SDGs, sustainable development goals. World Health Organization; 2023 May 19.
4. Kazi AM, Ahsan N, Mughis W, Jamal S, Allana R, Raza M, Muneer S, Mughal MA, Kaleemuddin H, Sameen F, Ahmed RM. Usability and acceptability of a mobile app for behavior change and to improve immunization coverage among children in pakistan: A mixed-methods study. International Journal of Environmental Research and Public Health. 2021 Sep 9;18(18):9527.
5. Butt M, Mohammed R, Butt E, Butt S, Xiang J. Why have immunization efforts in Pakistan failed to achieve global standards of vaccination uptake and infectious disease control?. Risk management and healthcare policy. 2020 Feb 12:111-24.
6. Kaufman J, Tuckerman J, Bonner C, Durrheim DN, Costa D, Trevena L, Thomas S, Danchin M. Parent-level barriers to uptake of childhood vaccination: a global overview of systematic reviews. BMJ global health. 2021 Sep 1;6(9):e006860. *https://doi.org/10.2147/RMHP.S211170 health*, *6*(9), e006860.
7. Adefolalu OA, Kanma-Okafor OJ, Balogun MR. Maternal knowledge, attitude and compliance regarding immunisation of under-five children in primary health care centers in Ikorodu local government area, Lagos state. https://doi.org/10.4103/jcls.jcls
8. Kagoné M, Yé M, Nébié E, Sié A, Müller O, Beiersmann C. Community perception regarding childhood vaccinations and its implications for effectiveness: a qualitative study in rural Burkina Faso. BMC public health. 2018 Dec;18:1-0.

9. Fatiregun AA, Adebowale AS, Ayoka RO, Fagbamigbe AF. Assessing full immunisation coverage using lot quality assurance sampling in urban and rural districts of southwest Nigeria. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2013 Nov 1;107(11):731-40.

10. Adedire EB, Ajayi I, Fawole OI, Ajumobi O, Kasasa S, Wasswa P, Nguku P. Immunisation coverage and its determinants among children aged 12-23 months in Atakumosa-west district, Osun State Nigeria: a cross-sectional study. BMC public health. 2016 Dec;16:1-8.
11. Betsch C, Rossmann C, Pletz MW, Vollmar HC, Freytag A, Wichmann O, Hanke R, Hanke W, Heinemeier D, Schmid P, Eitze S. Increasing influenza and pneumococcal vaccine uptake in the elderly: study protocol for the multi-methods prospective intervention study Vaccination60+. BMC Public Health. 2018 Dec;18(1):1-3.
12. Enwonwu KG, Ilika A, Ifeadike C, Aniemena C, Egeonu RO. Perception of childhood immunization among mothers of under-five children in Onitsha, Anambra State. Afrimedic Journal. 2018 Apr 24;6(1):59-64.

13. Matta P, El Mouallem R, Akel M, Hallit S, FadousKhalife MC. Parents'knowledge, attitude and practice towards children's vaccination in Lebanon: role of the parent-physician communication. BMC Public Health. 2020 Dec;20:1-9.
14. Chevalier-Cottin EP, Ashbaugh H, Brooke N, Gavazzi G, Santillana M, Burlet N, Tin TinHtar M. Communicating benefits from vaccines beyond preventing infectious diseases. Infectious Diseases and Therapy. 2020 Sep;9:467-80. https://doi.org/10.1007/s40121-020-00312-7
15. Williams S, Endacott I, Ekiri AB, Kichuki M, Dineva M, Galipo E, Alexeenko V, Alafiatayo R, Mijten E, Varga G, Cook AJ. Barriers to vaccine use in small ruminants and poultry in Tanzania. Onderstepoort Journal of Veterinary Research. 2022;89(1):1-1.
16. Mvundura M, Frivold C, Osborne AJ, Soni P, Robertson J, Kumar S, Anena J, Gueye A, Menozzi-Arnaud M, Giersing B, Kahn AL. Vaccine innovation prioritisation strategy: Findings from three country-stakeholder consultations on vaccine product innovations. Vaccine. 2021 Dec 3;39(49):7195-207.
17. Holipah, Maharani A, Kuroda Y. Determinants of immunization status among 12-to 23-month-old children in Indonesia (2008–2013): a multilevel analysis. BMC public health. 2018 Dec;18:1-1.
18. Saleh A, Alrashidi AA, Bukhari MA, Habib RF, Alsubhi RA, Saadawi DW, Hatim RF. Assessment of knowledge, attitude and practice of parents towards immunization of children in Saudi Arabia, 2018. The Egyptian Journal of Hospital Medicine. 2018 Apr 1;71(2):2585-9.
19. Stone Jr CA, Rukasin CR, Beachkofsky TM, Phillips EJ. Immune-mediated adverse reactions to vaccines. British journal of clinical pharmacology. 2019 Dec;85(12):2694-706
20. Mohapatra I, Kumar A, Mishra K. A study on awareness and utilization of Mission Indradhanush in an urban slum of Bhubaneswar. Journal of Family Medicine and Primary Care. 2018 Nov;7(6):1294.
21. Almutairi WM, Alsharif F, Khamis F, Sallam LA, Sharif L, Alsufyani A, Alshulah FN, Alqasimi R. Assessment of mothers'knowledge, attitudes, and practices regarding childhood vaccination during the first five years of life in Saudi Arabia. Nursing Reports. 2021 Jul 5;11(3):506-16. https://doi.org/10.3390/ nursrep11030047