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Factors Associated with the Uptake of Childhood Immunisation by Mothers of Children under Five Years in Ajeromi Ifelodun Local Government Area, Lagos State

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ABSTRACT

Factors associated with the uptake of childhood immunisation by mothers of children under five were investigated in Ajeromi Ifelodun Local Government Area, Lagos State. The aim was to examine the barriers to the uptake of childhood immunisation by mothers of children under five in Ajeromi-Ifelodun L.G.A., Lagos State. A cross-sectional descriptive survey was designed. Fisher's formula was used to determine the sample size of 801 respondents. The instrument used for data collection was a self-structured questionnaire; 801 were filled out and returned. The Statistical Package for Social Sciences (SPSS) version 25 aids in the data analysis. Results were presented in frequency count tables, percentages, and charts. The findings show overall satisfactory maternal knowledge and positive attitudes and perceptions regarding the childhood RI program. The female education campaign should strengthen information on health issues critical to implementing child survival interventions.

Keywords: Childhood immunization, mothers, children under five, campaign, female education.

INTRODUCTION

Immunisation is considered one of the most effective public health interventions to reduce under-five mortality. Vaccine-preventable diseases (VPDs) are still the most

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common causes of childhood mortality, with an estimated 3 million deaths every year, mainly in Africa and Asia (Galadima et al, 2021). In 2005, Nigeria adopted the Reach Every Ward strategy to improve vaccination coverage for children aged 0-23 months. By 2015, Ogun State had coverage in 12 of its 20 local government areas, but eight had pockets of unimmunised children, with the highest burden (37%) in Remo-North.

The work identifies factors in Remo-North influencing the use of immunisation services, to inform intervention approaches to tackle barriers to immunisation utilisation (Akwataghibe et al., 2019). Despite efforts to improve childhood immunisation coverage in Nigeria, it has remained below the acceptable level. An assessment conducted in December 2019 on missed vaccination in Ondo State, in South West Nigeria, revealed low immunisation coverage rates overall. The following barriers were negatively associated: needing to obtain permission, poor financing situations, and far distance to the clinic. These findings called for intervention to address inequitable access to routine immunisation in Nigeria (Fatiregun et al., 2019). The vision of the Expanded Programme on Immunisation (EPI) in Nigeria is to improve the health of Nigerian children by eradicating all six killer diseases, which are measles, Diphtheria, Whooping cough, Tuberculosis, Yellow Fever and Polio. Among the six killer diseases, polio has been declared free from Nigeria (WHO, 2020).

There are other programs introduced to reduce morbidity and mortality among children under five, such as the national program on immunisation for vaccine-preventable diseases, which account for 20% of morbidity and mortality in children. The Lagos State Ministry of Health has adopted various strategies, including the development and dissemination of Information, Education and Communication (IEC) materials, provision of cold chain equipment, procurement of generators, refresher training, and revitalisation of outreach programs, to strengthen routine immunisation (Cherian & Mantel, 2020).

Immunisation is one of the most effective strategies for reducing illness and death caused by common vaccine-preventable diseases. When a child does not receive the full schedule of vaccinations, they are left vulnerable to several sicknesses, including Hepatitis, Tuberculosis, Whooping Cough, and Diphtheria. In cases where a child contracts measles, complications such as diarrhoea, pneumonia, malnutrition, and even blindness are frequently observed. Delayed or incomplete immunisation not only puts the child at risk of severe illness but also increases the chances that other family members may contract these diseases (Amin & Sartini Saman, 2021). Moreover, unvaccinated children can contribute to the spread of outbreaks within their communities and place a financial burden on families due to the costs associated with treating preventable diseases and their complications.

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In addition to health-related consequences, incomplete immunisation may lead to a reduction in quality of life, a potential decrease in life expectancy, limitations on travel, and even barriers to school enrolment. Alarmingly, global immunisation coverage declined from 86% in 2019 to 83% in 2021. During this period, approximately 25 million children under the age of one missed essential vaccines, with the number of completely unvaccinated children increasing by five million since 2019 (WHO, 2022).

Childhood immunisation is considered one of the most effective interventions in reducing under-five mortality. Despite efforts to improve childhood immunisation coverage in Nigeria, it has remained below the acceptable level. The attention of stakeholders in the health sector is focused on making policies that will improve the acceptance and uptake of childhood immunisation. This necessitated this study to assess the factors associated with childhood immunisation uptake by mothers of children under five in the Ajeromi-Ifelodun Local Government Area, Lagos State.

Objectives of the Study

1. To determine the prevalence of completion of childhood immunisation among mothers of children under five in Ajeromi-Ifelodun L.G.A.
2. To examine the barriers to the uptake of childhood immunisation by mothers of children under five in Ajeromi-Ifelodun L.G.A., Lagos State

Research Questions

1. What is the prevalence of the completion of childhood immunisation by mothers of children under five in Ajeromi-Ifelodun L.G.A?
2. What are the barriers to the uptake of childhood immunisation by mothers of children under five in Ajeromi-Ifelodun L.G.A?

LITERATURE REVIEW

Immunisation is one of the components of the child survival strategies with clearly defined target groups. Delivering immunisation also offers an opportunity for other preventive services, for example, vitamin A supplements, deworming medications, and insecticide-treated mosquito nets. It is believed that immunisation is one of the highest achievements of the 20th century (Centers for Disease Control and Prevention). Edward Jenner demonstrated the value of immunisation in his work with smallpox in 1796, which led to the eradication of smallpox from the world (WHO, 2017). Due to the success of smallpox eradication, the WHO in 1974 initiated the Expanded Program on Immunisation (EPI) with the objective of vaccinating children (WHO, 1976). Through the 1980s, the United Nations Children's Fund (UNICEF)

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worked with the World Health Organization (WHO) to achieve universal childhood immunization of the six EPI vaccines (BCG (Bacillus Calmette-Guérin), Oral Polio Vaccine, diphtheria, tetanus, pertussis, and measles), to immunize 80% of all children by 1990 (WHO, 1976).

Vaccine-preventable diseases are known to account for approximately 22% of child deaths in Nigeria, amounting to over 200,000 deaths per year. In 2009, Nigeria accounted for about 3.5 million (14%) of the 23.2 million children worldwide who did not receive 3 doses of the DPT vaccine during the first year of life (World Immunisation Week, 2013). It is observed that some postnatal women have developed a bad habit towards immunisation for their children. Although it is free for children between 0-5years, despite policy on immunisation and success of expanded programme on immunisation (EPI), many vaccine-preventable diseases remain prevalent, especially in developing countries like Nigeria, because the choice of some parents not to immunise their children significantly increases the risk of infection for other children who are immunised. There is an urgent need to communicate the health benefits of vaccination and the dangers of not immunising children to parents, as well as identify the factors that hinder the completion of immunisation among mothers of children under 5.

Moreover, Immunisation offers a multitude of benefits that extend far beyond individual protection. For children, in particular, the advantages of vaccination are profound, playing a pivotal role in safeguarding their health, preventing diseases, and fostering overall well-being (Rodrigues & Plotkin, 2020). Its benefits include Disease Prevention and Control (Laupèze et al, 2021). Protection Against Serious Health Complications (Rodrigues & Plotkin, 2020). Herd Immunity and Community Protection (Bullen, Heriot & Jamrozik, 2023). Cost-Effectiveness and Economic Benefits (Rodrigues & Plotkin, 2020). Long-Term Health Benefits and Lifelong Immunity (WHO, 2024). Prevention of Outbreaks and Public Health Emergencies (Rodrigues & Plotkin, 2020). Enhancing Quality of Life and Well-being (WHO, 2024).

The fundamental issues behind the low level of vaccination uptake in Nigeria are a consequence of ignorance, prejudice, and misconceptions about vaccines. The mother's education was pointed out by several studies to be one of the most influential factors in determining the likelihood of an infant receiving the complete infant vaccination protocol (Adedokun et al, 2017). A thorough analysis of the literature showed that a higher level of maternal education was linked with a higher rate of vaccine completion. Adedokun et al. argued that children born to mothers with little to no education had a higher tendency to be incompletely vaccinated in contrast to children of mothers with higher levels of education (Adedokun et al, 2017). Higher

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education increased the chances of getting a child fully vaccinated by up to eight times (Itimi, Dienye, Ordinioha, 2012).

More so, politically, Christian-Muslim tensions in Nigeria, as well as ignorance about the aggressive polio-vaccination campaigns at the time (Babalola, 2011). Moreover, the aforementioned was based on indications that the polio vaccines were contaminated with drugs meant to sterilise Muslim women. As a result of the ban, the polio outbreak spread to twenty countries and three continents (Patterson & Wood, 2019).

Nevertheless, polio has since been eradicated from Nigeria (United Nations). Moreover, there is the issue of favouritism in appointments to the health organisations (Ophori, 2014). Corruption is endemic in Nigeria; there are political appointments and a change in leadership (Ophori, 2014). Considering the health system factor as a barrier, the availability of vaccines is the bedrock of any immunisation program; as such, vaccine shortages hamper efforts to reduce vaccine hesitancy in Nigeria. Shortages in vaccine supply may lead to distrust in the target communities because they portray an image of the unpreparedness and seriousness of a vaccination program (Tobin-West CI, Alex-Hart, 2011)

Many studies point to several institutional, contextual, and individual-level factors as deterring factors to the uptake and implementation of immunisation programmes in Nigeria. Some of the institutional factors include inadequate government funding, over-dependence on donor funds, ad-hoc campaigns sponsored by donors, weak health structure and systems, lack of community ownership, vaccine stock-out, distribution challenges, non-maintenance of Cold Chain Equipment (CCE), and poor staff performance at state and local government levels (Gooding, Spiliotopoulou & Yadav, 2019; National Primary Health Care Development Agency, 2012). The individual-level and contextual factors include the place of delivery, mother's level of education, distance to a health facility, mother's knowledge of vaccine-preventable diseases, household wealth, among others (Babalola, 2011; Akwataghibe et al, 2019; Tagbo, 2014).

The Theory of Planned Behaviour (TPB) is a psychological framework that explains how individual intentions influence behaviour. It proposes that a person's behaviour is guided by three key components: attitude toward the behaviour, subjective norms, and perceived behavioural control. These factors shape an individual's intention to perform a behaviour, which in turn influences actual behaviour (Ajzen, 1991). In the context of childhood immunisation uptake among mothers of under-five children in Ajeromi-Ifelodun Local Government Area, Lagos State, and each component of the TPB plays a critical role in shaping maternal decisions regarding vaccination. Attitude toward the Behaviour refers to a mother's overall evaluation of childhood immunisation, including her beliefs about the benefits

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and drawbacks of vaccinating her child. If a mother perceives immunisation as beneficial in preventing diseases, ensuring child survival, and promoting long-term health, she is more likely to have a positive attitude and follow through with the immunisation schedule. Conversely, if she harbours negative beliefs, such as concerns about vaccine side effects, fear of adverse reactions, or doubts about vaccine efficacy, she may develop a negative attitude toward immunisation and hesitate to vaccinate her child (Almutairi, 2021; Adjzen, 1991)

Subjective norms refer to the perceived social pressure to engage in or avoid a behaviour. A mother's decision to immunise her child is often influenced by the expectations and opinions of people around her, including family members, healthcare providers, religious leaders, and community members (Finlay, Trafimow & Moroi, 2006). More so, perceived behavioural control refers to the extent to which a mother feels she has the ability and resources to get her child vaccinated. This includes factors such as access to healthcare facilities, financial ability to cover transportation costs, time availability, and confidence in navigating the immunisation process. Mothers who feel they have control over the situation are more likely to ensure their child receives all necessary vaccinations; those who perceive significant obstacles may delay or forgo immunisation (Cooper et al, 2021).

According to the TPB, the combination of attitude, subjective norms, and perceived behavioural control influences a mother's intention to vaccinate her child. A mother who has a positive attitude toward immunisation, strong social support, and a high level of perceived control is more likely to form a strong intention to vaccinate, which increases the likelihood of actual immunisation uptake. However, if any of these factors weaken her intention, she may delay or skip vaccinations (Badran, 2024).

Empirically, Findings from a study in Ekiti State, Nigeria, revealed that a majority of the mothers (72.3%) demonstrated a high level of compliance, having obtained between 9 and 12 (70–100%) of the appropriate immunisations for their children. Additionally, 19.7% of the mothers had a moderate level of compliance, securing between 6 and 8 (50–69%) of the necessary immunisations. Conversely, 8% of the participants had a low level of compliance, completing less than 50% (0–5) of the recommended immunisations for their children (Konwea, David & Ogunsile, 2018).

Findings revealed that the overall prevalence of complete basic childhood vaccination among children aged 12–23 months in East Africa was 69.21% (95% CI: 69.20, 69.21%). This figure, however, varied significantly among the countries studied. The highest completion rate was observed in Burundi, where 85% of children had received the full schedule of basic childhood vaccinations (Tesema, 2020). Conversely, Ethiopia had the lowest rate, with only 39.5% of children fully immunised. The proportion of partially vaccinated children ranged from 13.4% in

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Zimbabwe to 56.1% in Rwanda, indicating that a substantial number of children did not complete the required immunisation schedule. Similarly, the percentage of children who were entirely unvaccinated ranged from as low as 0.4% in Burundi to as high as 16% in Ethiopia (Mekonnen, 2020). These disparities highlight the influence of various socio-economic and health system factors on immunisation uptake and completion. Specific vaccine coverage also exhibited significant variation, with Rwanda achieving the highest coverage for BCG (99.1%) and polio 3 (97.1%), while Ethiopia had the lowest coverage for BCG (70.5%) and polio 3 (57.7%). These findings suggest that while overall immunisation rates are relatively high, gaps still exist in achieving complete vaccination coverage, particularly in low-income communities (Tesema, 2020).

METHOD

A cross-sectional descriptive survey was designed for the study, while Fisher's formula was used to determine the sample size of 801 respondents who participated in the study. The instrument used for data collection was a self-structured questionnaire, which was administered to respondents; 801 were filled out, returned, and analysed, using the Statistical Package for Social Sciences (SPSS) version 25. Results of the data analysis were presented in frequency count tables, percentages, and charts.

Analysis and Interpretation of Data

The prevalence of the completion of childhood immunization by mothers of children under five in Ajeromi-Ifelodun L.G.A

The data collected revealed the socio-demographic characteristics of the mothers/caregivers residing in Ajeromi-Ifelodun Local Government Area, June 2024. Among the respondents, those within the group of 25-29 years were 281 (35.1%), and those less than 20 years of age were 13 (1.6%). Among the respondents, 688 (86.0%) were married, and 398 (49.7%) were Christians. The data collected from the participants shows that 232 (29.0%) were skilled. The study also revealed that 402 (50.2%) of the respondents were secondary school graduates, 330 (41.2%) were tertiary institution graduates, and only 17 (1.7%) had no formal education. Similarly, as reported, 309 (38.6%) of the respondents earn more than 50,000 monthly. The result further reveals that 461 (57.6%) of the respondents had partners who were graduates of tertiary institutions, while 284 (35.5%) were employed. In all, 413 (51.6%) of the children were within the first six months of birth, and 444 (55.4%)

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were female. As reported, 255 (31.8%) of the babies were firstborn in the family's birth order. Figure 1 below shows the prevalence of immunization completion among children under 5 in the study population. The report indicates 83 (55.7%) did not complete their vaccination, while 66 (44.3%) completed their immunization.

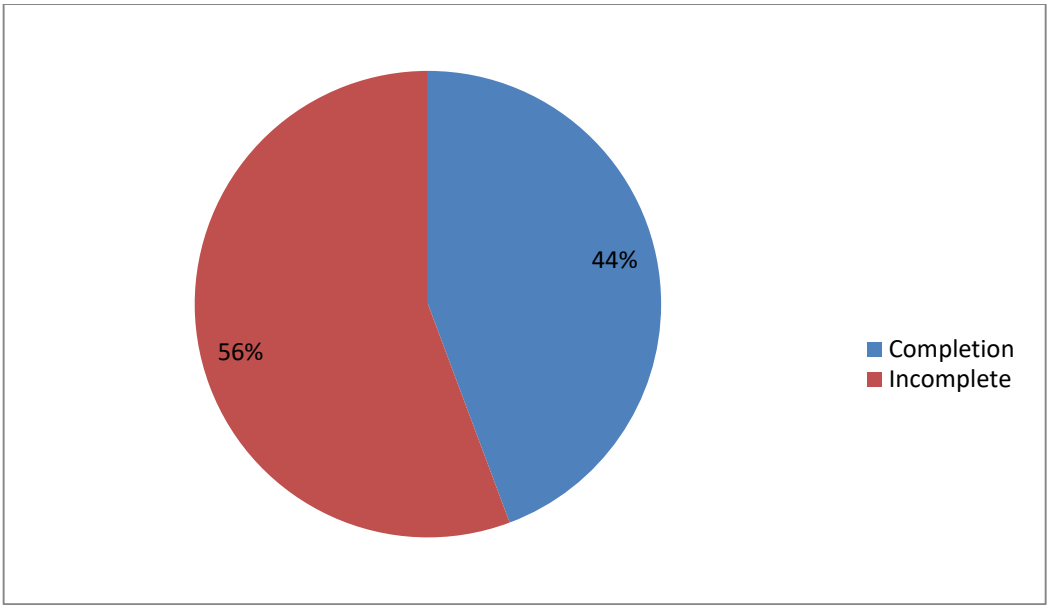

Figure 1: Prevalence of immunization completion among under-5 Children in Ajeromi-Ifelodun LGA, June 2024.

Table 1 shows the Immunisation completion and other variables. The result shows that (18.2%) of respondents who were singles completed their immunisation compared to others. The respondents practise Christianity (10.6%), as well as 10.0% of mothers are skilled workers, while 12.4% of respondents were university graduates who completed their vaccination. Also, the association between immunisation completion and child age was very significant. 35.9% of babies 12 months and above completed their vaccination ($p<0.001$). Furthermore, the place of birth was significantly associated with immunisation completion ($p=0.003$); 5.9% of babies born in public hospitals completed their vaccination, while 9.1% of babies whose mothers earn 50,000 or above completed their vaccination.

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Table 1: Socio-demographic characteristics and completion of immunizations among mothers/caregivers of children under five in Ajeromi-Ifelodun LGA, June 2024.

Socio-demographic characteristics	Immunization		X^2	P-value
	Not completed	Completed		
Mothers' Age (group)				
< 30 years	386(91.9%)	34(8.1%)	1.86	0.39
30-39 years	310(91.4%)	29(8.6%)		
40 years and above	36(85.7%)	6(14.3%)		
Marital status				
Single	54(81.8%)	12(18.2%)	8.75	0.01
Married	636(92.4%)	52(7.6%)		
Once married	38(90.5%)	4(9.5%)		
Religion				
Christianity	356(89.4%)	42(10.6%)	3.61	0.06
Others	372(93.2%)	27(6.8%)		
Occupation				
Skilled	287(90.0%)	32(10.0%)	1.57	0.46
Employed	384(92.1%)	33(7.9%)		
Unemployed	61(93.8%)	4(6.2%)		
Level of education				
University graduate	290(87.6%)	41(12.4%)	10.90	0.001
None university graduate	441(94.2%)	27(5.8%)		
Income				
No income	32(97.0%)	1(3.0%)	1.41	0.495
<50,000	409(91.1%)	40(8.9%)		
50,000 and above	281(90.9%)	28(9.1%)		
Place of birth				
Public hospital	399(94.1%)	25(5.9%)	8.67	0.003
Others	330(88.2%)	44(11.8%)		
Delivery type				
Vaginal delivery	616(91.7%)	56(8.3%)	0.45	0.501
Others	115(89.8%)	13(10.2%)		
Birth Order				
1st - 3rd born	603(91.8%)	54(8.2%)	0.39	0.54
4th - 6th born	99(90.0%)	11(10.0%)		
Child Age				
0-5 months	275(100.0%)	0(0.0%)	239.490	0.00
6-11 months	334(100.0%)	0(0.0%)		
12 months and above	123(64.1%)	69(35.9%)		

The barriers to the uptake of childhood immunization by mothers of children under five years in Ajeromi-Ifelodun L.G.A

Figure 2 shows the percentage distribution of the respondents' perceived barriers to the uptake of childhood immunisation. The chart reveals that 67.8% identified inadequate staffing as a perceived barrier to the uptake and completion of childhood immunisation among children under 5, while lack of trained staff is the least (1.1%).

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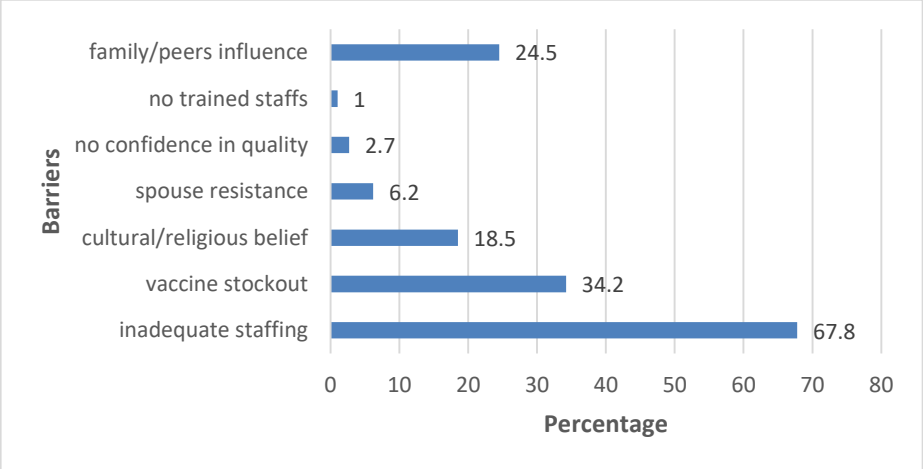

Figure 2: Perceived Barriers to the Uptake of Childhood Immunization among mothers/caregivers in Ajeromi-Ifelodun LGA, June 2024

Table 2 shows the factors associated with complete childhood immunisation. According to the findings, 144 (96.6%) of the mothers are aware of the importance of immunisation and its benefits, which was the main factor associated with their child's completion of childhood immunisation. This was followed by the absence of a health worker, 81(54.4%), forgetting the appointment date, 37 (22.8%), and financial constraints were 18 (12.1%), as the least factor.

Table 2: Barriers to the uptake of childhood immunization by mothers of children under five years in Ajeromi-Ifelodun L.G.A., Lagos State, June 2024

Barriers to the uptake of childhood immunization	**n**	**%**
Awareness		
Yes	144	96.6
No	50	3.3
Forget appointment		
Yes	34	22.8
No	115	77.2
Absence of health workers		
Yes	81	54.4
No	68	45.7
Financial constraints		
Yes	18	12.1
No	130	87.2

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Table 3 below displays the possible suggestions from mothers that could enable them to complete their vaccination. The respondents, 30(20.1%), confessed to forgetting vaccination appointments. (46.6%). Of these, they do not receive reminders from the health facility, while 80 (80%) reportedly said they would love the clinic to send them a reminder about their next appointment.

Table 3: Barriers to the uptake of childhood immunization by mothers of children under five years in Ajeromi-Ifelodun L.G.A., Lagos State, June 2024

Barriers to the uptake of childhood immunization	**n**	**%**
Needs to be reminded		
Yes	80	80.0
No	20	20.0
Not receiving reminders from the health facility		
Yes	16	53.3
No	14	46.7

Discussion

The study aimed to assess the factors associated with childhood immunisation uptake by mothers of children under five in Ajeromi-Ifelodun Local Government Area, Lagos State. The effective public health intervention currently available for reducing the mortality and morbidity from infectious diseases is Childhood immunisation (Bangura, 2020).

The barriers to the uptake of childhood immunisation

The result revealed several perceived barriers to the uptake of childhood immunisation. The most perceived barrier is inadequate staffing. The next perceived barrier is vaccine stockout, which aligns with findings from a study in Rwanda where caregivers stated vaccine stockout is a barrier to the completion of childhood RI (Nwankwo & Elizabeth, 2020). Family or peer influence is another perceived barrier, while cultural and religious beliefs were not left out; this corroborates the findings of Omobowale et al. (2024) that the education by religious organisations on immunisation impacts the full vaccination of children by their mothers. However, spouse resistance, lack of confidence in the vaccine, and untrained staff were the lowest at 1%.

The perceived factors associated with the completion of childhood immunization

There are factors in the completion of childhood immunisation. However, the few considered in this study are very relevant to the subject. Most mothers revealed that a

lack of awareness was a factor in their failure to complete their child's immunisation schedule. This corroborates the findings that poor knowledge of childhood immunisation is strongly associated with incompletion of childhood immunisation (Asnake et al., 2021). Thus, limited knowledge or awareness among mothers about routine immunisation, its significance, and the vaccination schedule has been closely associated with incomplete vaccination and, in some cases, the failure to vaccinate altogether (Mulugeta, 2024). It is therefore essential to raise awareness about the routine immunisation of children, educate mothers on its importance, and persuade them to ensure their child's timely completion of the vaccination schedule as recommended. The absence of health workers was reported as a factor by a large proportion of mothers. This could be due to regular strikes in the health sector to protest for their entitlements or request better wages, and could lead to vaccination postponement, which is a factor in childhood immunisation completion (Asnake et al., 2021). Hence, the government should ensure that health workers are paid all their dues and on time to prevent strikes, which disrupt the immunisation of the children, thus endangering their health and development.

The factors influencing the completion of childhood immunization

The finding of this study shows that several factors influenced the completion of childhood immunisation in the study area, including maternal marital status, maternal educational level, place of delivery, child age, paternal educational level, paternal occupation, and those whose immunisation card was seen, all of which were significantly associated with childhood immunisation completion. This aligns with previous studies in sub-Saharan Africa, which found that maternal educational level, marital status, place of delivery, distance from health facility, and partner's educational level were all significantly associated with the full completion of childhood immunisation in the sub-Saharan African countries (Fenta, 2021).

CONCLUSION

The findings of this study show overall satisfactory maternal knowledge and positive attitudes and perceptions regarding the childhood RI program. Attendance of antenatal care, health facility delivery of the child, and a higher level of education were positively associated with having good knowledge of the immunisation program and VPDs. Future efforts are needed to improve maternal knowledge and address misconceptions that may limit vaccination coverage rates in Osun, Nigeria.

RECOMMENDATION

A campaign of female education will help to strengthen knowledge of health issues critical to implementing child survival interventions. There is a need to reinforce

health education on routine immunisation among mothers during all health facilities and RI outreach sessions. There is a need to explore the role of potential influencers in the low uptake of routine immunisation in Osun State. Furthermore, health facilities should be encouraged to send reminders to caregivers before the next RI to prompt them about their child's next vaccination schedule.

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