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Understanding the Socio-Economic and Demographic Factors Affecting Uptake of Second Dose Measles Vaccination (MCV2) among Children Under 5 in Ebonyi State, South-Eastern Nigeria

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Abstract

Measles is a highly contagious viral disease that poses a significant threat to children worldwide. Vaccination programs have been successful in reducing the burden of measles, but the complete protection against the disease requires two doses of the measles-containing vaccine (MCV 2). The study sought to identify the socio-economic and demographic factors that affect uptake of second dose of measles vaccine (MCV2) and explore the opportunities available to mitigate the challenges in Ebonyi state. Community-based cross-sectional study was conducted in the selected areas. One focal health facility was selected in each LGA, and the target population was the birth cohort of children born between 22nd March 2021 and 22nd February 2022. The adjusted sample size for this study is 409. Results/Factors identified are child got sick after first dose, no chance to go to facility, frequent cancellation of immunization sessions, caregivers not aware of the second dose, forgetfulness, assumption of first dose being adequate for the child, relocation, no vaccine at facility and 69% of mothers and caregivers are worried that vaccines can cause a child to be sick. Among socio-demographic characteristics; there are no significant association between MCV 2 and age of the mother, maternal educational status, family monthly income, family size, and number of children alive. However, the study showed significant association between maternal occupation and vaccine out of stock at the health facility with low uptake of MCV2. Therefore, health education on the importance of MCV2 should be intensified at all levels.

Keywords: *Demographic, Measles Vaccine Second Dose, Socio-Economic, Uptake.*

Introduction

Measles is a highly contagious viral disease that poses a significant threat to children worldwide [1, 2]. Vaccination programs have been successful in reducing the burden of measles, but the complete protection against the disease requires two doses of the measles-containing vaccine (MCV2) [3, 4]. However, the uptake of the second dose among children under 5 in Ebonyi State, Southeast Nigeria, remains low [5]. Identifying and analyzing the various factors that influence the low uptake of MCV 2, understanding these factors is crucial for developing effective strategies to improve vaccination rates and enhance the overall health outcomes of children in the region. Socio-economic and demographic factors proved to be crucial in improving uptake of MCV2 [6]. A total of 96 cases of Measles have been recorded in Ebonyi State within the first

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quarter of 2023, with 4 associated deaths and a case fatality rate of 4.1% by the Emergency Operations Centre (EOC) situation report on measles outbreak in the state. EOC Situation report, march, 2023). In Ethiopia, it was mentioned that in order to increase the utilization of the second dose of the measles vaccine, improved health education and service expansion to difficult-to-reach areas are required [2, 7, 8]. Other research effort further explained that low uptake of second dose of measles vaccine was associated with maternal age and birth order, [9, 10]. other socio-economic and demographic factors inhibiting adequate uptake of second dose measles vaccine was poverty level, and multiple twins [11-14].

The objective of the study is to identify the socio-economic and demographic factors that affect uptake of second dose of measles vaccine (MCV2) in Ebonyi state and to explore the opportunities available to mitigate the challenges faced by parents or caregivers in accessing the MCV2 in Ebonyi state.

Limitations

The study is limited by time and finance to including all eligible individuals in the target population. Possible recall bias, social desirability bias, and the generalizability of the findings to other populations, also constitute part of the limitations of the study.

Conceptual Framework

The Health Belief Framework suggests that the health-related behavior of people is associated with vulnerability of the health condition, perceived benefits of acting and barriers to the available actions. See figure below.

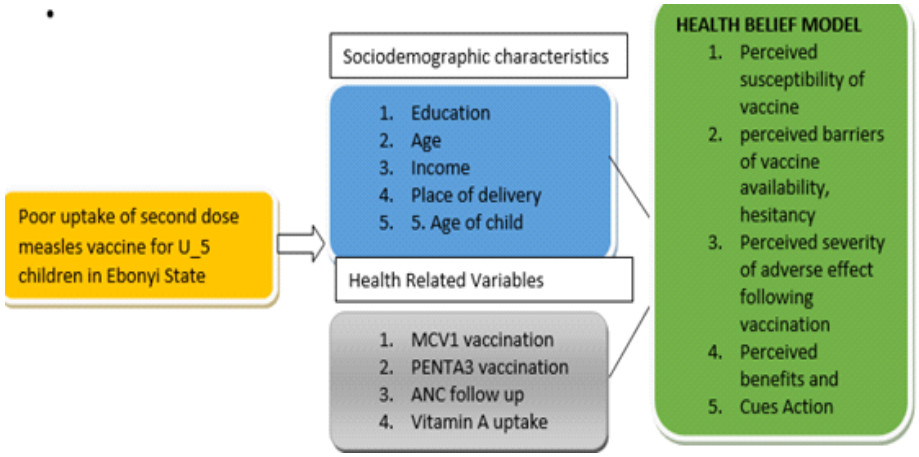

Figure 1. Health Belief Model for Poor uptake of Measles Vaccines

Novelty of the work: The study found limited empirical articles on the topic, especially for Nigeria context. Most of the reviewed papers were on the overall vaccination hesitancy and incompletion, while this study focused on the second dose of measles vaccination.

Literature Review

Studies evaluated different levels in the case finding and uptake of measles vaccine and revealed that the administration of first dose of measles vaccine increases immunity rates, with respect to the age of the children in that population, whereas second dose has a higher impact on increased immunity, leading to reduction in potential outbreaks. According to World Health Organization immunization has been adjudged a success story for global health and development, saving millions of children every year, and preventing tens of millions of deaths associated with Measles. 86% of all infants (over 116 Million) have reportedly been vaccinated annually [15]. The prevalence of MCV2 utilization among children aged 24–35 months and as well,

inconsistency in optimizing the opportunity of vaccination, as well as geographical location (residence) was assessed and seen to have played important roles in determining second dose of MCV2 coverage [10]. The authors identified socio-demographic characteristics of families as well as the communities, knowledge, perceptions, and attitudes towards vaccination, as significant variables associated with low uptake of MCV2. Health service availability and quality of care, inconsistency in optimizing the opportunity of vaccination, as well as geographical location (residence) played important roles in determining second dose of MCV2.

Furthermore, a work was carried out in India on the influence of socio-demographic factors on coverage of full vaccination among children aged 12–23 months between (2015-2016). Their result showed that educational attainment of the mother, the family's economic status, the size of the child at birth, and maternal healthcare services, significantly influence full vaccination coverage. Other socioeconomic factors, like, maternal age, sex of the household head, exposure to mass media, childbirth order, social status, religion, place of residence, and region also contributed to the coverage of full vaccination [16]. In the manner, it was discovered that maternal knowledge about child immunization is significantly associated with child immunization completion, meaning that poor knowledge about childhood immunization among mothers led to incomplete childhood immunization [17].

Millions of measles cases and deaths are reported on yearly basis in Africa [18, 19].

WHO introduced for inclusion, the second dose of measles vaccine (MCV2) into the routine immunization schedule in 2018 for children at 15 months. [20] Ebonyi State complied with that policy in 2018 with coverage at 38.1%. Subsequent annual assessments showed a significant decline in 2019 and 2021 (20.8% and 18.9%) respectively; increased a bit to 36% in 2022 [21]. The coverage improved to 55% in 2023, following collaborative efforts, yet still below the 80% target. Continuing, a research team estimated the coverage of measles vaccination and identified factors associated with low uptake in a cross-sectional study of 536 children 24-59 months in Kenya. The authors showed that MCV2 utilization improved through public health intervention by targeting rural residents, children of uneducated mothers, economically poor women, and other factors [22].

Another study analyzed the trends in the monthly number of children vaccinated with specific antigens and compared the changes in the first three months of the COVID-19 pandemic for 15 African countries between January 2018 to June 2020, Results showed that 87% of the countries that participated in the study had a significant decline in the average number of vaccine doses [23]. Nigeria among other African countries experienced a drop in the number of children that received DPT3 and Measles Containing Vaccine 1(MCV1) [23].

Factors associated with low coverage of the second dose of MCV2 were examined in Kenya and the researchers established a relationship between the settlement types and the percentage coverage, a higher percentage (58%) of the children vaccinated coming from urban population. [24,25] Differently, a researcher, evaluated the association between access to a health facility and uptake of each vaccine, dropout, and impact of distance to the health facility on respondent’s vaccination behaviours. [26] The need for improved health education and service expansion to hard-to-reach areas, was suggested for increased uptake of MCV2. Low awareness of mothers on the importance of second dose of MCV, vaccines not being readily available in health institutions, poor accessibility of children for a second dose of measles vaccine, attitude of mothers towards vaccination were further

revealed as some of the factors contributing to low uptake of second dose vaccine [27].

In the same vein, the spatial variations were explored and the individual and contextual factors of uptake of measles-containing second dose vaccine among children aged 24 to 35 months in Ethiopia. The result showed that uptake of second dose of measles in Ethiopia was low, attributable to maternal age, and birth order, hence, special concern should be given to regions with lower second dose of measles vaccine uptake [28]. In another study, a scoping review to synthesize recent literature on risk factors and interventions for zero- and missed-dose children in Nigeria was conducted. However, this study is focused on the second dose of measles vaccine, hence, a gap in scope of the study [24]. In a different study, showed that more than half of the Under-5 children in MDC, Tanzania were not vaccinated with second dose of measles. This was associated with issues like, lack of caretaker knowledge about appropriate vaccination age, unavailability of vaccine, insufficient numbers of children waiting, to warrant multi-dose vial use, and long clinic waiting times [29]. The findings were obtained following their study that determined factors associated with non-uptake second dose of measles vaccine among children in Tanzania, using cluster sampling from January to April 2017. While their study was in Tanzania, our research will focus on Under-5 children in Nigeria.

Another study in Kenya for children aged 19-59 months, revealed that among other factors, education of the population of its catchment area on the measles-rubella second dose vaccination schedule and that all immunizing health facilities are always open, will enhance uptake of second dose of measles vaccine. Also, outreach services for hard-to-reach communities, is of good benefit [30]. A study in Ebonyi State, within the purview of discuss, investigated the factors associated with incomplete immunization among Under-5 children in Ebonyi State, Nigeria using ANOVA statistical analysis. The authors found that the location from home to health facility and inadequate health education were major factors for low uptake and incomplete vaccination [5]. In the same age category, another team assessed the factors associated and level of second dose measles vaccine uptake in Central Ethiopia among under five children. The authors indicated that the level of measles vaccine among Under-5 children is low. More so, waiting time, inadequate vaccination awareness and its recommended doses are factors inhibiting increase in the uptake of second dose of measles vaccine [27].

Evidence from another study showed that second dose measles vaccine was very low due to unawareness of second dose by caregivers, waiting time, and distance to health facility. The authors went ahead and recommended focus on demand creation, outreaches services to the hard to reach areas to increase uptake and reduce missed opportunities [24]. Another team assessed the acceptability of second dose measles vaccination services among caregivers/mothers with children less than 2 years of age in Zambia. Their result indicated that knowledge about uptake and acceptability of second dose of measles vaccine is associated with gender, marital status, employment, income level, socio-cultural beliefs, and educational level. Therefore, the authors suggested that health workers should continue to increase awareness in relation to the low acceptability of the second dose of measles vaccine [31].

Reasons for incomplete immunization and factors responsible for missed opportunities for immunization in children less than one year of age in rural areas in Nigeria were revealed [32]. The study used immunization cards, sampled mothers with children of target age and findings showed that parents' objection, disagreement or concern about immunization safety, long distance walking and long waiting time at the health facility are

the most common reasons for incomplete immunization. Following the discourse on second dose of measles vaccination among children [33]. Another study assessed the prevalence of second dose of measles vaccination among children aged 24–35 months and analyzed factors associated with it by using recent nationally representative surveys of Sub-Saharan Africa countries, using secondary data from Demographic and Health Surveys (DHS). The authors indicated that high community poverty, multiple twins negate uptake of second dose of measles vaccine, while health facility delivery, postnatal visit, ANC visit positively encouraged uptake of second dose of measles vaccine [10].

Gap in Literature

This study found limited published empirical articles on the topic of discourse. However, from the reviewed empirical works, gaps were found in terms of geographical areas, while the study focuses on Nigeria; most of the reviewed papers were works from African country and the shores. The study concentrated on the second dose of measles, but most of the reviewed empirical studies focused on overall vaccination hesitancy, incompletion, not specific to second dose measles vaccine.

Materials and Methods

In this section, describe the methods followed and responds to the question how the problem was studied. The order is as follows:

Description of the Site: The study was conducted in 13 local government areas (LGAs) of Ebonyi State, South Eastern Nigeria. Four (4) LGAs each in the North and Central senatorial zones with five (5) in the South zones.

Description of the Experiments done: Community-based cross-sectional purposeful study was conducted in the selected areas. One focal health facility was selected in each LGA, and the target population was the birth cohort of children born between 22nd March 2021 and 22nd February 2022. The adjusted sample size for this study is 409 following the sample size determination for cross-sectional studies. Socio-economic and demographic variables used are maternal education status, age, income, place of delivery, MCV1 vaccination, health facility, age of the child at vaccination. Children under the age of 5 residing in Ebonyi State and received first dose of measles vaccine were included in the study, whereas does not residing in the state were excluded. Parents or caregivers of children who signed or approved consent were included, while those who are unwilling to participate were excluded.

Description of statistical methods used.: Structured questionnaire was designed to collect data from parents or caregivers of children under 5 years and health facility workers using English and administered in Ebonyi local language for easy understanding and proper responses. Data collectors were recruited and trained. Data collected went through cleaning and quality checks prior to conducting a descriptive analysis to summarize the socio-economic and demographic characteristics of the participants.

Results

The results obtained from data analysis with their interpretations were presented in this chapter. Out of the four hundred and nine (409) copies of the questionnaire administered, four hundred and seven (407) of them were returned and were properly filled and fitted for analysis giving a response rate of 99.5%. The questionnaire that was not properly filled was a result of many fields in the questionnaire not being filled. The mean age and standard deviation of the students are 23.39±4.84years.

Table 1. Socio-Demographics Characteristics of the Mothers Involved in the Study of Mcv2 Vaccination and Associated Factors (N = 407)

Characteristics	Frequency	Percentage
Age of the mother in years		
20 - 25	91	22.4
26 - 30	149	36.6
31 - 35	112	27.5
> 36	55	13.5
Maternal educational status		
Unable to read and write	67	16.5
Primary	109	26.8
Secondary	145	35.6
College and above	86	21.1
Maternal Occupation		
Farmer/Housewife	124	30.5
Private business	202	49.6
Governmental profession	64	15.7
Casual labourer	17	4.2
Family monthly income		
<5000	134	32.9
>5000	273	67.1
Family size		
1-3	172	42.3
4-5	179	44.0
>-6	56	13.8
Number of children alive		
One	45	11.1
Two	134	32.9
Three and above	228	56.0

The result in table 1 shows the sociodemographic characteristics of the mothers. The majority of the mothers 149 (36.6%) and 112 (27.5%) aged between 26 – 30 years and 31 – 35 years, respectively. On their educational status, the majority of them 109 (26.8%) attained Primary educational level and 145 (35.6%) attained Secondary level. Almost half of the mothers 202 (49.6%) were doing private business as their occupation and 124 (30.5%) were farmers/housewives. Greater proportion of the mothers 273 (67.1%) earn more than 5,000 Naira. Almost equal proportion 172 (42.3%) and 179 (44.0%) have family size between 1 to 3, and 4 to 5 respectively. More than half of the mothers 228 (56.0%) have three and above children alive.

Table 2. Demographic Characteristics of Children Involved in the Study (N = 407)

Childs Demographic Characteristics	Frequency	Percentage
Child lives with both parents?		
Yes	367	90.2
No	40	9.8

Order of birth		
First	51	12.5
Second	117	28.7
Third	122	30.0
Fourth	72	17.7
Fifth	41	10.1
More than five	4	1.0
Age of child		
15-20months	244	60.0
21-24months	102	25.1
25-36months	37	9.1
37months and above	24	5.9

As shown in table 2 was the demographic characteristics of children involved in the study. Almost all the children 367 (90.2%) lives with both parents. The majority of the children 122 (30.0%) were the 3rd child according to birth order, 117 (28.7%) were the 2nd child. More so, the majority 244 (60.0%) and 102 (25.1%) aged between 15-20 months, and 21 – 24 months, respectively.

Table 3. Description of Access and Service-Related Factors (N = 407)

Description	**Frequency**	**Percentage**
Distance of the nearest facility		
5mins	17	4.2
6-10mins	91	22.4
11-15mins	72	17.7
16-20mins	94	23.1
21mins and above	133	32.7
How long do you wait before accessing services?		
10-20mins	173	42.5
21-25mins	50	12.3
26-30mins	71	17.4
31-40mins	48	11.8
41mins and above	65	16.0
Have you ever returned without receiving immunization services?		
Yes	55	13.5
No	352	86.5
If yes, why?		
Due to vaccine stock out at the health facility	44	80.0
It was not the immunization day	2	3.6
Number of children to give MCV were too small for the day	7	12.7
The child fever above 37 degrees	1	1.8
Vaccine is always available	1	1.8

On the participants' access and service-related factors as shown in table 3. The majority of the participants 133 (32.7%) spent 21 minutes and above. Result shows that the majority 173 (42.5%) spends minimum waiting time to access services between 10 –

20 minutes, and 71 (17.4%) spends between 26 – 30 minutes. More than three-quarters of the participants 352 (86.5%) have never returned without receiving immunization services. Out of the 55 participants that have ever returned from a facility without receiving immunization services, the majority 44 (80.0%) were due to vaccine out of stock at the health facility.

Table 4. Association between Socio-Demographic Factors, with the Low Uptake of MCV 2 Vaccination Among Children under 5 in Ebonyi State (N = 407)

	Uptake of MCV 2 Vaccine					
Characteristics	**Poor Uptake n (%)**	**Good Uptake n (%)**	**Total n (%)**	**□2 ,P**	**aOR**	**95% C.I.**
Age of the mother in years						
20<-25	53 (21.9)	38 (23.0)	91 (22.4)	3.032,	1.199	0.67 - 2.13
26-30	80 (33.1)	69 (41.8)	149 (36.6)	0.082	0.759	0.40 - 1.45
31-35	73 (30.2)	39 (23.6)	112 (27.5)		0.793	0.35 - 1.81
>-36	36 (14.9)	19 (11.5)	55 (13.5)			
Maternal educational status						
Unable to read and write	47 (19.4)	20 (12.1)	67 (16.5)	4.291	0.232	0.72 - 3.08
Primary	62 (25.6)	47 (28.5)	109 (26.8)	0.232		0.75 - 3.12
Secondary	81 (33.5)	64 (38.8)	145 (35.6)			0.66 - 3.45
College and above	52 (21.5)	34 (20.6)	86 (21.1)			
Maternal Occupation						
Farmer/Housewife	84 (34.7)	40 (24.2)	124 (30.5)	10.503	0.015	1.01 - 2.97
Private business	105 (43.4)	97 (58.8)	202 (49.6)	0.015		0.54 - 2.49
Governmental profession	40 (16.5)	24 (14.5)	64 (15.7)			0.18 - 2.07
Casual laborer	13 (5.4)	4 (2.4)	17 (4.2)			
Family monthly income						
<5000	86 (35.5)	48 (29.1)	134 (32.4)	1.846	0.174	0.63 - 1.71
>-5000	156 (64.5)	117 (70.9)	273 (67.1)	0.174		
Family size						
1-3	110 (45.5)	62 (37.6)	172 (42.3)	4.505	0.105	1.45 - 4.10
4-5	96 (39.7)	83 (50.3)	179 (44.0)	0.105		0.89 - 3.90
>-6	36 (14.9)	20 (12.1)	56 (133.8)			
Number of children alive						
One	26 (10.7)	19 (11.5)	45 (11.1)	3.171	0.205	0.33 - 1.49
Two	72 (29.8)	62 (37.6)	134 (32.9)	0.205		0.20 - 0.98
Three and above	144 (59.5)	84 (50.9)	228 (56.0)			

As shown in Table 4, was results of the association between sociodemographic characteristics and uptake of MCV 2 vaccine. The sociodemographic characteristics that significantly has no association with MCV 2 vaccine uptake include age of the mother, (Chi-Square = 3.032; P = 0.082 > 0.05), maternal educational status (Chi-Square = 4.291; P = 0.232 > 0.05), family monthly income (Chi-Square = 1.846; P = 0.174 > 0.05), family size (Chi-Square = 4.505; P = 0.082 > 0.05), and number of children alive

(Chi-Square = 3.171; P = 0.205 > 0.05).

However, there is a significant association between maternal occupation and uptake of MCV 2 vaccine (Chi-Square = 10.503; P = 0.015 > 0.05). This implies that greater proportion of those that have good uptake 58.8% were private business women while the majority of the housewife/farmers 34.7% have poor uptake of MCV 2 vaccine.

Table 5. Logistics Regression on Association between Socio-demographic Factors, with the Low Uptake of MCV 2 Vaccination among Children under 5 in Ebonyi State (N = 407)

Socio-Demographic Characteristics	**B**	**S.E.**	**Wald**	**df**	**P-Value**	**Odd Ratio**	**95% C. I. for EXP(B)**
Age of mother in years							
20 – 25	*Ref*						
26 – 30	0.181	0.293	0.381	1	0.537	1.199	0.67 - 2.13
31 – 35	-0.276	0.329	0.700	1	0.403	0.759	0.40 - 1.45
>36	-0.232	0.422	0.303	1	0.582	0.793	0.35 - 1.81
Maternal educational status							
Unable to read and write	*Ref*						
Primary	0.397	0.371	1.145	1	0.285	1.487	0.72 - 3.08
Secondary	0.425	0.364	1.359	1	0.244	1.529	0.75 - 3.12
College and above	0.406	0.423	0.919	1	0.338	1.500	0.66 - 3.45
Maternal Occupation							
Farmer/Housewife	*Ref*						
Private business	0.547	0.276	3.947	1	0.047	1.729	1.01 - 2.97
Governmental profession	0.145	0.392	0.136	1	0.712	1.156	0.54 - 2.49
Casual laborer	-0.505	0.630	0.642	1	0.423	0.604	0.18 - 2.07
Family monthly income							
<5000	*Ref*						
>5000	0.036	0.254	0.021	1	0.886	1.037	0.63 - 1.71
Family size	Ref						
1-3							
4-5	0.892	0.264	11.380	1	0.001	2.440	1.45 - 4.10
>-6	0.621	0.378	2.710	1	0.100	1.862	0.89 - 3.90
Number of children alive							
One	*Ref*						
Two	-0.357	0.385	0.862	1	0.353	0.700	0.33 - 1.49
Three and above	-0.817	0.406	4.054	1	0.044	0.442	0.20 - 0.98

Furthermore, findings subjected to Logistics Regression as shown in table 5, revealed that there was a significant association between maternal occupation (Private business) of the mothers and uptake of the vaccine among children under 5 in Ebonyi State (OR = 1.729, CI = 1.01 – 2.97, P = 0.047 < 0.05). This implies that the mothers who do private business were 2 times more like to have good uptake of MCV 2 vaccine compared to the farmers/housewives.

Discussion

The objective of this research is to identify the socio-demographic factors affecting the uptake of second dose of measles vaccine (MCV2) in Ebonyi state as well as explore the available opportunities of mitigating the challenges faced by parents or caregivers in accessing the MCV2 in Ebonyi state. The results show that majority of the caregivers that participated in the study fell within 26 and 35 years of age.

Chi square and Logistics Regression analysis as shown in table 5 confirmed that majority of the socioeconomic and demographic factors do not have significant association with uptake of the vaccine among children under 5 in Ebonyi State, however result presented in table 5 has revealed a significant association between maternal occupation (Private business) of the mothers and uptake of the vaccine among children under 5 in Ebonyi State (OR = 1.729, CI = 1.01 – 2.97, P = 0.047 < 0.05). This implies that the mothers who do private business were 2 times more like to have good uptake of MCV 2 vaccine compared to the farmers/housewives. This result is consistent with a study in Ghana that examined the Socioeconomic and demographic characteristics influencing the hesitancy and refusal of COVID-19 vaccine, [39] the team discovered that there was higher odds of vaccine hesitancy and refusal among people the unemployed. Among other factors.

Ignorance of the second dose is the most significant barrier affecting the uptake of second dose of measles vaccine in addition to forgetfulness, unavailability of the vaccine in the facility, assumption that the first dose is adequate for the child, relocation, frequent cancellation of immunization sessions, being indisposed to go the facility and children getting sick after the first dose.

Owing to the fact that ignorance has been observed to be the most dominant factor, a vice that can only be overcome with knowledge, efforts should be channeled into putting out relevant information about the availability and necessity of the vaccine (MCV2) through direct communication. The ability to present relevant and available information to people, ensuring that the right information reaches the end user will help in militating ignorance of the second dose of the measles vaccine. In a review, certain aspects of community engagement itself, such as conducting stakeholder consultations, holding community dialogues or involving community leaders were associated with better immunization outcomes [34]. The team proved that community engagement interventions hold promise for improving child immunization coverage in LMICs. Involving communities in decision-making processes, fostering trust in vaccines, and addressing local barriers to immunization, are interventions that can contribute to achieving equitable immunization coverage and reducing vaccine-preventable diseases in vulnerable populations. In conclusion, they stated that community engagement interventions are successful in improving outcomes related to routine child immunization [34].

This analysis also shows forgetfulness, children getting sick after the first dose and assumption that the first dose is enough for the child as factors that affect the uptake of (MCV2). Many parents and caregivers tend to forget immunization schedules and assume that the first dose is sufficient for the child due

to busy work schedules while some tend to develop apathy because the child got sick after the first dose. Health care workers have been recognized as the primary source of vaccine information [17]. Parents need reassurance and information about the addition of any new vaccines to the schedule, the likelihood of developing post – immunization fever and post-immunization management [17]. Emerging evidences suggest that provider-parent communication is important to achieving childhood vaccine coverage. A child's provider is consistently cited as a key factor in parental vaccine decision-making and is a trusted source of vaccine information [35]. The team also discovered that many health care providers did not give a rational for the vaccine(s) recommended neither did they discuss the potential side effects of the recommended vaccines and how to manage it. Therefore, the need to train healthcare providers on how to effectively communicate with patients about the vaccine (relevance and schedules), addressing concerns and providing evidence-based information to help individuals make informed decisions about vaccination.

Unavailability of the vaccine at health care facilities is interestingly, a barrier that affects the uptake of (MCV2). This is due to poor stock management, delay in stock delivery and poor communication between the depot and the facilities. Suggestion about certain interventions such as ensuring regular and timely delivery of vaccine stocks at facilities; notifying facilities timely in case of delays in deliveries or when there are expected; providing clear guidelines to facilities and officials responsible for stock management; visits by the district or sub-district managers to the health facilities; effective supportive supervision and refresher training for health workers in the facilities and their managers on vaccine stock management [36].

Relocation has been identified as a socio-demographic factor that significantly disrupts the continuity and timely administration of vaccines such as the measles vaccine especially the MCV2. Addressing relocation as a barrier to vaccine uptake encourage the use of national or regional Immunization Information System (IIS) registries that can track and retrieve vaccination records regardless of where patients move [37]. In a thesis done by Bryant "Electronic Health Records and Immunization Information Systems Interoperability: Measuring Impact on Immunization Outcomes" also corroborates the fact that Electronic Health Records (EHRs) improves vaccine coverage and timelines [38]. Stating succinctly that interoperability between EHRs and IIS leads to higher vaccination rates, better adherence to vaccination schedules and patients also receive timely reminders and follow-ups, to ensure they complete their vaccine series. It will also aid in transferring health records when patients move to another place and in ensuring that patients receive the appropriate vaccinations at the right time, reducing the risk of missed doses and improving overall vaccination rates.

Conclusion

The sociodemographic characteristics that significantly has no association with MCV 2 vaccine uptake include age of the mother. maternal educational status, family monthly income, family size, and number of children alive. The study produced results that showed significant association between maternal occupation and vaccine out of stock at the health facility with low uptake of MCV2. It is pertinent that health education on the importance of MCV2 be intensified.

Conflict of Interest

None of the authors declared any conflict of interest.

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