**4.1 Socio-demographical characteristics of the participants**

Majority of the participants (35%) were in the age group 25-29 years, as more than half of them were female (53%), all of them were Nigerians. The mixed ethnic group like the Eggon, Idoma, Tiv, Igala and Igede were the most common (29%), followed by the Yoruba group (28%), most of them practiced Christianity (53.4%). Majority of them were married (51%), had tertiary education (41%) and unemployed (40%).

**Table 4.1 Socio-demographical characteristics of the participants**

| **Characteristic** | **N = 352** |
| --- | --- |
| **Age** |  |
| < 20 years | 5 (1.4%) |
| 20-24 years | 79 (22%) |
| 25-29 years | 124 (35%) |
| 30-34 years | 76 (22%) |
| 35-39 years | 54 (15%) |
| 40-44 years | 14 (4.0%) |
| **Gender** |  |
| Female | 188 (53%) |
| Male | 164 (47%) |
| **Nationality** |  |
| Nigerian | 352 (100%) |
| **Ethnicity** |  |
| Hausa | 85 (24%) |
| Ibo | 67 (19%) |
| Yoruba | 98 (28%) |
| Mixed tribes (eggon, idoma, Tiv, Igala and Igede) | 102 (29) |
| **Religion** |  |
| Christianity | 188 (53.4%) |
| Islam | 139 (39.5%) |
| Traditional | 25 (7.1%) |
| **Marital Status** |  |
| Divorced | 89 (26%) |
| Married | 178 (51%) |
| Separated | 14 (4.0%) |
| Single | 52 (15%) |
| Widowed | 14 (4.0%) |
| Unknown | 5 |
| **Level of Education** |  |
| Primary | 95 (27%) |
| Secondary | 104 (30%) |
| Tertiary | 143 (41%) |
| Others | 4 (2%) |
| Unknown | 6 |
| **Occupation** |  |
| Employed | 119 (34%) |
| Self-employed | 92 (26%) |
| Unemployed | 141 (40%) |

**4.2 Level of awareness among caregivers regarding Nigeria immunization**

More than half of the participants (58%) claimed they had heard of immunization, the three most common sources of information were the community (47%), family/friends (45%) and other sources (45%). Majority of the participants knew the following: that BCG is the vaccine given at birth (49%), 9 months is the recommended age for measles vaccination (45%). However, majority (49%) claimed they did not know the age children are expected to receive their first immunization. The assessment of the knowledge of available vaccine is shown in Figure 4.1 in a combination analysis chart, the top 5 common responses are as follows: IPV+ Bopv+Td+Mena+Penta+Rota (25, 7.1%), Measles+HPV+BCG (19, 5.4%), Td+MenA+BCG+Rota (17, 4.8%), IPV+BoPV+HPV+MenA+Penta+BCG+Rota (17, 4.8%) and Measles+Td+MenA+BCG+Rota (16, 4.5%).

**Table 4.2 Level of awareness among caregivers regarding Nigeria immunization**

| **Characteristic** | **N = 352** |
| --- | --- |
| **Awareness of immunization schedule** | 205 (58%) |
| **if yes to question 9, how did you get to know about Immunization schedule #** |  |
| The Community | 166 (47%) |
| Family/Friends | 157 (45%) |
| Media (television, radio) | 140 (40%) |
| Health personnel | 148 (42%) |
| Other | 157 (45%) |
| **Which vaccine is given at birth #** |  |
| BCG | 171 (49%) |
| Yellow fever | 129 (37%) |
| Rota | 134 (38%) |
| MenA | 135 (38%) |
| Measles | 154 (44%) |
| HPV | 151 (43%) |
| I don’t know | 160 (45%) |
| **What is the recommended age for measles vaccination** |  |
| 12 months | 50 (14%) |
| 22 months | 53 (15%) |
| 6 months | 92 (26%) |
| 9 months | 157 (45%) |
| **At what age are children expected to receive their first immunization** |  |
| 2 weeks after birth | 32 (9.1%) |
| 3 weeks | 46 (13%) |
| At birth | 103 (29%) |
| I dont know | 171 (49%) |

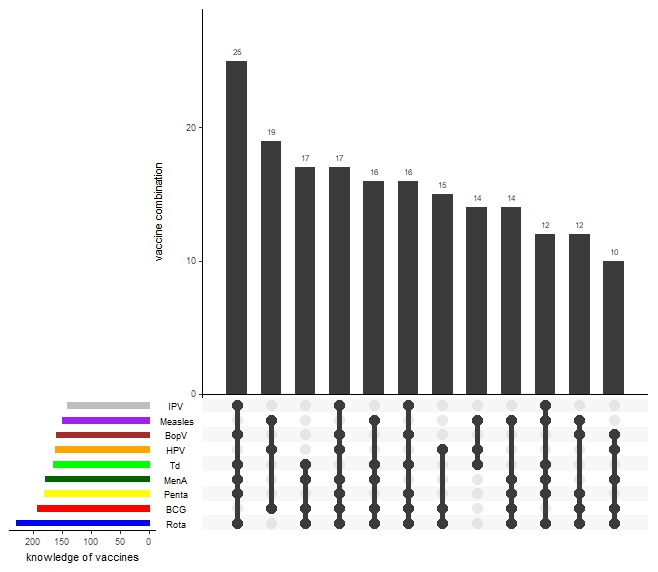


Figure 4.1 Knowledge of available vaccines among caregivers

**4.3 Frequency of missed opportunity for vaccination among eligible clients**

Most of the participants (50%) do not know their children’s last vaccination, many of the participants (63%) also claimed that their children have missed their vaccination schedules, hence the prevalence of missed opportunity for vaccination is 63% in this study. Majority (38.1%) claimed they had missed one vaccination schedule, most of them (59%) do not visit any other health facilities when they miss any vaccines and have not been referred to another health facility for missed vaccines. A larger proportion of the participants (63.6%) claimed there has not been any recall or reminder from their health facilities for missed vaccines. The top 5 commonly missed vaccines are Yf (52%), Rota (49.7%), Penta (46.9%), MenA (41.2%) and Measles (39.2%), see Figure 4.2.

The association of the missed opportunity for immunization (MOV) among with socio-demographic factors was determined using the Chi-square test of association, at significance level of p-value <0.05. It was observed that the following were significantly associated with the MOV: Age category (Chi-square = 32.402, p-value = 0.001), marital status (Chi-square = 30.653, p-value = 0.001), Education level (Chi-square = 10.886, p-value = 0.012) and awareness of immunization schedule (Chi-square = 14.759, p-value < 0.001).

Multivariate analysis was done using the logistic regression analysis to determine the predictors of the MOV, in reference to the 40-44 years’ age group, the age group 30-34 years were 2.6 times likely to have MOV (AOR = 2.607, P-value = 0.161). In reference to the separated category, the married group are 5.8 times likely to have MOV than the other groups (AOR = 5.836, p-value < 0.001). The tertiary education group are 0.1 times less likely to experience MOV than the other groups (AOR = 0.131, p-value = 0.012). The participants who were aware of their immunization schedules were 0.5 times less likely to MOV than those that were not aware (AOR = 0.535, p-value = 0.008). See table 4.2.3

**Table 4.3 Frequency of missed opportunity for vaccination among eligible clients**

| **Characteristic** | **N = 352** |
| --- | --- |
| **When was your child’s last vaccination** |  |
| < 1 month | 86 (24%) |
| > 1 year | 8 (2.6%) |
| 1-6 month ago | 50 (14%) |
| 7-12 months ago | 33 (9.4%) |
| I dont know | 175 (50%) |
| **Has your child missed any vaccination schedule (Yes)** | 223 (63%) |
| **If "yes" how many vaccination has your child missed** |  |
| 1 | 134 (38.1%) |
| 2 | 133 (37.8%) |
| 3 | 55 (15.6%) |
| 4 | 30 (8.5%) |
| **Do you visit other health facilities to received missed vaccines** |  |
| Yes | 144 (41%) |
| No | 208 (59%) |
| **Have you ever been referred to another health facility for missed vaccines** |  |
| Yes | 145 (41%) |
| No | 207 (59%) |
| **Has there been any recall or reminder for missed vaccinations from your Health facility** |  |
| Yes | 128 (36.4%) |
| No | 224 (63.6%) |

Figure 4.2 Frequency of missed vaccines

**Table 4.3.2 The association of the MOV among participants with socio-demographic factors**

| Sociodemographic | Yes | No | Chi-square | P-value |
| --- | --- | --- | --- | --- |
| **Age category** |  |  | 32.402 | 0.001\* |
| < 20 years | 3 (60%) | 2 (40%) |  |  |
| 20-24 years | 47 (59.5%) | 32 (40.5%) |  |  |
| 25-29 years | 81 (65.3%) | 43 (34.7%) |  |  |
| 30-34 years | 60 (78.9%) | 16 (21.1%) |  |  |
| 35-39 years | 19 (35.2%) | 35 (64.8%) |  |  |
| 40-44 years | 13 (92.9%) | 1 (7.1%) |  |  |
| **Gender** |  |  | 1.180 | 0.165 |
| Male | 99 (60.4%) | 65 (39.6%) |  |  |
| Female | 124 (66.0%) | 64 (34.0%) |  |  |
| **Religion** |  |  |  |  |
| Christianity | 120 (63.8%) | 68 (36.2%) | 5.747 | 0.057 |
| Islam | 82 (59.0%) | 57 (41.0%) |  |  |
| Traditional | 21 (84%) | 4 (16%) |  |  |
| **Marital status** |  |  | 30.653 | <0.001\* |
| Single | 44 (84.6%) | 8 (15.4%) |  |  |
| Married | 93 (52.2%) | 85 (47.8%) |  |  |
| Divorced | 58 (65.2%) | 31 (34.8%) |  |  |
| Widowed | 12 (85.7) | 2 (14.3%) |  |  |
| Separated | 14 (100%) | 0 (0%) |  |  |
| **Education level** |  |  | 10.886 | 0.012\* |
| Primary | 65 (68.4%) | 30 (31.6%) |  |  |
| Secondary | 41 (39.4%) | 63 (60.6%) |  |  |
| Tertiary | 115 (80.4%) | 28 (19.6%) |  |  |
| Others | 2 (50%) | 2 (50%) |  |  |
| **Occupation** |  |  | 1.935 | 0.380 |
| Employed | 80 (67.2%) | 39 (32.8%) |  |  |
| Unemployed | 83 (58.9%) | 58 (41.1%) |  |  |
| Self-employed | 58 (63.0%) | 34 (37.0%) |  |  |
| **Awareness of immunization schedules** |  |  | 14.759 | <0.001\* |
| Yes | 147 (71.7%) | 58 (28.3%) |  |  |
| No | 76 (51.7%) | 71 (48.3%) |  |  |
|  |  |  |  |  |

\*-significant at p-value < 0.05

**Table 4.3.3 Multivariate analysis of the MOV among participants with socio-demographic factors**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **Odd ratio** | **p-value** | **95%CI** | **Adj. OR** | **p-value** | **95%CI** |
| **Age category** |  |  |  |  |  |  |
| < 20 years | 1.700 | 0.353 | 0.332-21.97 | 1.408 | 0.095 | 0.708-7.741 |
| 20-24 years | 0.883 | 0.838 | 0.269-2.90 | 1.742 | 0.419 | 0.456-6.697 |
| 25-29 years | 1.176 | 0.782 | 0.372-3.71 | 1.925 | 0.353 | 0.483-7.678 |
| 30-34 years | 2.000 | 0.251 | 0.613-6.52 | 2.607 | 0.161 | 0.683-9.941 |
| 35-39 years | 0.313 | 0.086 | 0.083-1.179 | 0.439 | 0.282 | 0.098-1.970 |
| 40-44 years | 1 (ref) |  |  | 1 (ref) |  |  |
| **Marital status** |  |  |  |  |  |  |
| Single | 2.202 | <0.001\* | 0.881-4.352 | 3.953 | <0.001\* | 0.532-5.111 |
| Married | 3.311 | <0.001\* | 1.367-10.251 | 5.836 | <0.001\* | 2.850-13.866 |
| Divorced | 1.318 | <0.001\* | 0.038-4.991 | 1.849 | <0.001\* | 0.687-9.008 |
| Widowed | 2.907 | <0.001\* | 1.912-8.762 | 3.967 | <0.001\* | 1.802- 12.551 |
| Separated | 1 (ref) |  |  | 1 (ref) |  |  |
| **Education level** |  |  |  |  |  |  |
| Primary | 1.833 | 0.857 | 0.484-3.602 | 2.446 | 0.157 | 0.008-2.185 |
| Secondary | 0.651 | 0.467 | 0.351-2.613 | 0.108 | 0.121 | 0.006-1.797 |
| Tertiary | 0.351 | 0.036\* | 0.833-1.801 | 0.131 | 0.012\* | 0.028-1.019 |
| Others | 1 (ref) |  |  | 1 (ref) |  |  |
| **Awareness of Immunisation** |  |  |  |  |  |  |
| Yes | 0.911 | 0.012\* | 0.442-2.189 | 0.535 | 0.008\* | 0.285-2.203 |
| No | 1 (ref) |  |  | 1 (ref) |  |  |

**4.4 Drivers for missed opportunity for vaccination**

The 5 top common drivers for missed opportunity for vaccination were Stock outs/unavailability of some vaccines (65%), Lack of awareness about vaccination schedules (63%), Long waiting hours (58%), No reminder/recall from health centre (54%), inconvenient clinic hours (46%) and cultural Beliefs (46%). Many of the participant (55%) claimed the health facility conducts health talks on the importance of immunization. About half of the participants (51%) claimed they are satisfied with the services at the primary health care, majority claimed that the primary health center is more than 30mins far from their homes.

**Table 4.4 Drivers for missed opportunity for vaccination**

| **Characteristic** | **N = 352** |
| --- | --- |
| **What are challenges you face in assessing vaccination services** |  |
| I. Lack of awareness about vaccination schedules | 221 (63%) |
| II. Stock outs/unavailability of some vaccines | 230 (65%) |
| III. Long waiting hours | 205 (58%) |
| IV. No communication from health workers | 137 (39%) |
| V. Long distance to Health centre | 153 (43%) |
| VI. Cultural believe | 161 (46%) |
| VII Religious beliefs | 128 (36%) |
| VIII No reminder/recall from health centre | 191 (54%) |
| IX Misconception about vaccines | 138 (39%) |
| X Lack of transportation | 136 (39%) |
| XI inconvenient clinic hours | 161 (46%) |
| XII No felt need | 117 (33%) |
| **Does the health facility conducts health talk/ health education on the importance of immunization and other health matters** |  |
| I dont know | 79 (22%) |
| No | 78 (22%) |
| Yes | 195 (55%) |
| **Are you satisfied with the service you receive at the Primary health care center** |  |
| I dont know | 51 (14%) |
| No | 120 (34%) |
| Yes | 181 (51%) |
| **How far is the Primary health center from your home** |  |
| > 30mins from home | 121 (36%) |
| I dont know | 125 (34%) |
| within 30mins from home | 106 (30%) |

**Figure 4.3 challenges of assessing vaccination services**

**CHAPTER FIVE**

**DISCUSSION, CONCLUSION AND RECOMMENDATION**

**5.0 SUMMARY**

This study aimed to assess the missed opportunity for vaccination (MOV) among infants in PHCs in Makurdi LGA of Benue State. The findings revealed a 63% prevalence of MOV. The study did not highlight the significant impact of MOV on the baby’s health but it provided the main drivers and challenges associated with immunization schedules. Several predictors were identified, including age-group, marital status, level of education and awareness of immunization schedule. These findings emphasize the complex interplay of awareness, cultural and religious beliefs, accessibility and availability, health seeking as the causes of missed vaccinations.

**5.0 DISCUSSION**

The study, conducted at selected PHCs in Makurdi LGA of Benue State, Nigeria to examine the level of awareness of the caregivers and identify the drivers of missed vaccination in the population. The research revealed insightful sociodemographic trends among the participants. The majority of the women fell within the 25-29 years’ age bracket, constituting 35% of the study population, this is consistent with the study of Adamu et al., (2019b) were majority of the caregiver were aged 25-31 years in Kano. However, most other studies conducted in and within Nigeria reported the age of the babies in place of the caregivers has was done in this study, Fatiregun et al., (2021) and reported the age 0-11 months has the modal age 79% in Ondo state. Meanwhile, Wagai et al., (2021) reported 12-23 months in a nationwide study conducted in Nigeria. A significant proportion of the participants identified as Christians (53.4%) and were married (51%), reflecting the dominant religious and marital norms within the Makurdi community, this is consistent with the cultural and religious belief of the Benue State people (Ogbeyi et al., 2021). Educational attainment was also moderate, with 41% of the participants having received tertiary education, this was higher than the study of Fatiregun et al., (2021), where the majority (48.6%) had secondary education. This finding suggests that missed opportunity for vaccination is not limited to population with lower levels of education, as might be assumed due to potential socioeconomic disparities. Interestingly, a large portion of the participants were unemployed (40%), indicating a degree of financial dependence and perhaps low decision-making power. These sociodemographic characteristics are consistent with other studies on vaccination in Nigeria, which have also found that younger age, being married, having higher education, and being employed are associated with a higher risk of missing vaccination schedules for their babies.

This study has shown that the caregivers had a fair knowledge of immunization as many of them could mention most of the available vaccines. However, less than half of the population know the vaccines given at birth. The community, family and friends, and other sources played the most vital role in the dissemination of information about immunization, this is not surprising as only a fair number of the participants had heard of immunization schedule. This lack of information about vaccination from healthcare workers has become a commonplace in many studies as reported in the studies of Kabore et al., (2020), Wagai et al., (2021) and Borras-Bermejo et al., (2022), The health care facilities should be charged with the responsibility of disseminating accurate information and creating awareness about immunisation.

The estimated pooled prevalence of MOV in Africa is 27.2% (Adamu et al., 2019). In Nigeria, various studies have been conducted to determine the level of MOV. Studies conducted in tertiary hospitals in Benin, Anambra and Enugu (Ubajaka et al., 2012) reported low prevalence MOV prevalence of 27.6%, 17% and 15.1% respectively. Likewise, in the previous study that was conducted by Ogbeyi et al., (2021), a very high immunization coverage rate of 92% was reported in Okpokwu LGA, Benue translating to a low prevalence of MOV of 8% this may be due to selection bias that was introduced in their convenience sampling method or errors due to self-reporting by the participants. This study's findings revealed a prevalence of 63% MOV among the participants. This figure is considerably higher than the pooled African prevalence of 27.2% (Adamu et al., 2019b). This discrepancy highlights the potential influence of region-specific factors on the occurrence of MOV. Several factors may contribute to the elevated prevalence of MOV in Makurdi, Benue State. These include the low awareness, which can deter the access to information and healthcare; poor knowledge of the vaccines given at birth (49%); and a lack of referral system to alternative health care facility. The study identified the MOV for the top 5 vaccines; Yf (52%), Rota (49.7%), Penta (46.9%), MenA (41.2%) and Measles (39.2%), whereas, YF (19.6%) had the least MOV in the study of Wagai et al., (2021). Meanwhile IPV (45.1%) was the most identified MOV (Adamu et al., 2019).

As for the drivers for MOV identified in this study, the most common challenges faced by the participants were: stock outs/unavailability of some vaccines, lack of awareness about vaccination schedules and long waiting time. The satisfaction to the level of health care in the primary health care center was moderate as only half of the participants claimed they were satisfied, also awareness and health education seems to be fair, a fair number of the participant (55%) claimed their health facility conducted health talk about the importance of immunization. More than a third of the participants, lived more than 30 minutes away from the primary health centre, this may a reason for missing vaccines as cited in the earlier study by Ogbeyi et al., (2021).

Several predictors for MOV were identified in this study such as age-group, marital status, educational level and awareness of immunization schedule of the caregivers. The age group 30-34 are more likely to experience MOV this may be due to the fact that this group believe that they are more experienced with child birth, where most of them are multiparous. The more advanced a caregiver is in terms of education, the lower the likelihood of experiencing MOV, this is consistent with the earlier study by Ogbeyi et al., (2021) in Benue. The married category was more susceptible to MOV; this may be due to lack of support from their spouse, this was contrary a similar study conducted by Otoo et al., (2024) in Ghana, where the unmarried experienced MOV more the other groups. Poor awareness about immunization was a predictor for MOV in this study, caregivers that did not know about the immunization were more likely to experience MOV

**5.1.5 Conclusion**

The findings of this study highlight the high prevalence of MOV among the caregivers in Makurdi, Benue State Nigeria. The study also identified a number of predictors for MOV, including sociodemographic factors and awareness related factors. The study's findings are consistent with other research conducted in Nigeria, such as the studies by Ogbeyi et al., (2021) which also found that awareness of immunization, having a higher level of education were associated with an increased risk of experiencing MOV. The study's findings suggest that there is a need for increased awareness of immunization in Nigeria and for the development of prevention and intervention strategies that address the risk factors identified in this study. The high prevalence of MOV observed in this study underscores the urgent need for increased awareness and comprehensive intervention strategies. The identification of various risk factors, including some sociodemographic factors and awareness related factors, and drivers for MOV, offers a roadmap for developing targeted prevention and intervention programs. Addressing the risk factors identified in this study, such as educating the age group that is more prone to MOV, awareness about immunization schedules, level of education and marital status, is crucial to reducing the burden of MOV and promoting the infant health and the ultimate well-being of new mothers.

The MOV assessment in Benue State has shown that two in three children eligible for one or more vaccines and who visited the health facilities on the day of the assessment experienced a MOV. The proportion of MOV was higher among children whose house were more than 30 minutes away from the health care facility. These MOV may have occurred due to a lack of institutionalized screening of vaccination documentation and follow up by health workers, especially those providing non-vaccination services, caregivers not bringing their children, misconceptions about vaccines, non-availability of vaccination services on all days of the week, lack of an appropriate referral system between non-vaccination and vaccination services within the same facility, shortage and misdistribution of health workers and gaps in knowledge among available health workers on proper screening of vaccination documentation, multi-dose vial policy, their concern on vaccine wastage rates, and attitudes to clients.

**5.3 RECOMMENDATION**

Based on the study findings, the following recommendations are made:

* Increase awareness about the importance of immunization: Healthcare providers should routinely create awareness during antenatal and postnatal care visits to mothers about the need for immunization.
* Strengthen logistics systems: Encourage methods and policy that will see to the adequate provision and availability of essential vaccines.
* Address misconceptions and cultural belief: Through a targeted health education to caregivers, many misconceptions can be dissolved especially those relating to cultural and religious belief.
* Provide accessible vaccination services: Ensuring access to affordable and culturally sensitive vaccination services for mothers experiencing will reduce MOV.
* Target interventions for high-risk groups: Develop tailored interventions for mothers with identified risk factors, such as those with low education levels or limited family support.
* Further research: More research should be conducted to explore the cultural and social factors contributing MOV in the specific context of Makurdi LGA, Benue State.

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