Study on Trend of Immunization Coverage inMutum Biyu Ward "B" From 2016-2019 in Gassol Local Government Area, Taraba State.

Abstract:
This study examines the trend of immunization coverage for Bacille Calmette-Guerin (BCG), Oral Polio Vaccine (OPV), Measles, and Yellow Fever in Mutum Biyu Ward 'B' of Gassol Local Government Area, Taraba State, Nigeria, from 2016 to 2019. Utilizing a quantitative, cross-sectional design, secondary data were collected from the DHIS2 Nigeria platform. The study analyzed the completion and non-completion rates of Routine Immunization (RI) schedules, with immunization histories primarily gathered from vaccination cards and caregiver recall. Data analysis included descriptive statistics and a one-way ANOVA test. Results indicated fluctuating trends in immunization coverage over the study period. BCG coverage showed significant variability, with peaks in 2017 and 2019. OPV coverage generally increased but experienced minor declines in 2018. Measles immunization remained stable initially but dropped in 2018 before a sharp recovery in 2019. Yellow Fever immunization coverage was low in 2016, saw slight improvements in 2017, dropped significantly in 2018, and then rose to its highest level in 2019.The study recommended the need for sustained public health efforts to address barriers such as vaccine supply, healthcare access, and community engagement.

Key words: Immunization coverage, Routine Immunization (RI), Public health, Vaccine trends and Healthcare

Background of the Study

Immunization is one of the most cost-effective public health interventions that has significantly reduced morbidity, mortality, and disability from vaccine-preventable diseases [10]. Over the years, efforts to expand immunization coverage have been intensified globally, especially in low- and middle-income countries where the burden of these diseases is higher. Despite these efforts, challenges persist in achieving optimal immunization coverage in many regions, particularly in rural areas [9].

Taraba State, located in the northeastern part of Nigeria, is one of the states grappling with low immunization coverage, which contributes to the high incidence of vaccine-preventable diseases among children [10]. Gassol Local Government Area (LGA), particularly Mutum Biyu Ward "B", is one such region where immunization coverage has fluctuated over the years. Understanding the trends in immunization coverage within this ward is crucial for developing targeted interventions that could help in increasing coverage rates and ultimately reducing the burden of vaccine-preventable diseases [9].

The period from 2016 to 2019 is particularly significant as it includes various health interventions and policies aimed at improving immunization coverage across Nigeria [10]. Analyzing the trend of immunization coverage for vaccines such as Bacille Calmette-Guérin (BCG), Oral Polio Vaccine (OPV), Measles, and Yellow Fever in Mutum Biyu Ward "B" provides valuable insights into the effectiveness of these interventions in this specific region. It also helps identify gaps in the immunization program that need to be addressed [9].

This study aims to examine the trends in BCG, OPV, Measles, and Yellow Fever immunization coverage in Mutum Biyu Ward "B" of Gassol LGA, Taraba State, from 2016 to 2019. By understanding these trends, the study seeks to inform policymakers and healthcare providers on the necessary steps to improve immunization coverage in the area [10].

In recent years, there has been growing concern about the stagnation or decline in immunization coverage in some parts of Nigeria, including Taraba State. Studies have shown that factors such as poor healthcare infrastructure, lack of awareness, socio-cultural beliefs, and geographical barriers contribute to the uneven distribution of immunization services [9,10]. These factors are particularly pronounced in rural areas like Mutum Biyu Ward "B", where access to healthcare services is limited [9].

Given the importance of immunization in preventing disease outbreaks, it is critical to monitor and analyze immunization coverage trends regularly. This study, therefore, contributes to the body of knowledge by providing data-driven insights into the immunization trends in Mutum Biyu Ward "B", which could serve as a basis for improving public health interventions in the region [9,10].

Methodology

Study Area

Mutum Biyu, located in Gassol Local Government Area of Taraba State, Nigeria, lies at a latitude of 8° 38' 28" N and a longitude of 10° 46' 24" E, with decimal coordinates of 8.64138, 10.77355. As of 2016, the area had a population of 11,702 people, spread across 2,732 households. Mutum Biyu is strategically positioned, bordering Iware in Ardo-Kola LGA to the west and Dan-Anacha along the Wukari LGA road to the south.

The region experiences a tropical climate with two distinct seasons: the rainy season, which spans from April to October, and the dry season, which runs from November to March. During the day, temperatures can reach up to 36°C, while nighttime temperatures drop to around 21°C. December is particularly dry, with an average of just 0.40 mm of rainfall and nearly no rainy days.

Throughout the year, Mutum Biyu's climate is characterized by oppressive, overcast conditions during the wet season and partly cloudy skies in the dry season. The temperature typically ranges

from 62°F to 99°F (16°C to 37°C) and rarely falls below 56°F (13°C) or rises above 104°F (40°C).

Study Design

This study employed a quantitative, cross-sectional design to analyze the trend of immunization coverage, health system factors, and the utilization of Routine Immunization (RI) services in Mutum Biyu Ward "B" of Gassol Local Government Area, Taraba State, from 2016 to 2019. Secondary data were sourced from the DHIS2 Nigeria platform, focusing on the completion and non-completion of RI schedules for vaccines such as Bacille Calmette-Guérin (BCG), Oral Polio Vaccine (OPV), Measles, and Yellow Fever.

The data collected was analyzed to identify trends in the immunization coverage for BCG, OPV, Measles, and Yellow Fever vaccines, as represented in Figures 1 to 4. These trends were examined to understand the factors influencing RI service utilization in Mutum Biyu Ward "B" and to identify areas where immunization efforts could be improved.To assess the significance of differences in immunization coverage across the years, a one-way Analysis of Variance (ANOVA) test was conducted. This test was appropriate for comparing the means of immunization coverage rates across multiple years. Alphabetic indicators such as "a," "b," "c," and "d" were used to denote significant differences in the data. Similar alphabets indicate no significant difference between compared groups, while different alphabets indicate a significant difference. This method allowed for clear interpretation of the data, highlighting where significant changes in immunization coverage occurred over the four-year period.

Ethical Consideration

Ethical approval for this study was obtained from the relevant authorities. Permission to access and use secondary data from the DHIS2 Nigeria platform was granted by the data custodians. The study adhered to all ethical guidelines and principles governing research involving human subjects, ensuring that the dignity, rights, and welfare of all participants were respected.

Result Presentation and Interpretation

The trend of Bacille Calmette-Guérin (BCG) immunization coverage in Mutum Biyu Ward 'B' from 2016 to 2019 shows a fluctuating pattern (Figure 1). The coverage started at a moderate level in 2016, increased significantly in 2017, and then slightly declined in 2018 before experiencing a notable rise again in 2019. The observed fluctuations could be attributed to variations in vaccine supply, outreach activities, or community engagement efforts during these years. The increase in 2017 and 2019 suggests that specific interventions or improved healthcare delivery might have positively impacted BCG immunization coverage during those periods.

The trend of Oral Polio Vaccine (OPV) immunization coverage in Mutum Biyu Ward 'B' over the four years shows a generally upward trajectory, with some fluctuations (Figure 2). In 2016,

the coverage was relatively low, followed by a sharp increase in 2017. However, a slight decline was observed in 2018, with coverage stabilizing and slightly increasing again in 2019. This trend suggests that while efforts to improve OPV coverage have been largely successful, there are still challenges in maintaining consistent vaccination rates, possibly due to factors such as vaccine hesitancy or access to healthcare services in certain years.

The trend of Measles immunization coverage in Mutum Biyu Ward 'B' from 2016 to 2019 displays a pattern of initial stability followed by significant fluctuations (Figure 3). The coverage remained stable from 2016 to 2017, indicating consistent immunization efforts during these years. However, a marked decrease was observed in 2018, followed by a sharp recovery in 2019. This drop in 2018 could be due to challenges such as vaccine stockouts, reduced outreach activities, or socio-cultural barriers affecting immunization uptake. The subsequent recovery in 2019 indicates a possible reinforcement of immunization strategies or increased public health awareness campaigns.

The trend of Yellow Fever immunization coverage in Mutum Biyu Ward 'B' from 2016 to 2019 shows significant variability (Figure 4). The coverage started at a low level in 2016, increased slightly in 2017, but then experienced a substantial drop in 2018. In 2019, the coverage surged to its highest level within the four-year period. The low coverage in 2016 and the significant drop in 2018 might reflect issues such as vaccine availability, public health outreach limitations, or local community factors. The sharp increase in 2019 suggests successful intervention efforts, possibly due to intensified vaccination campaigns or improved healthcare service delivery.

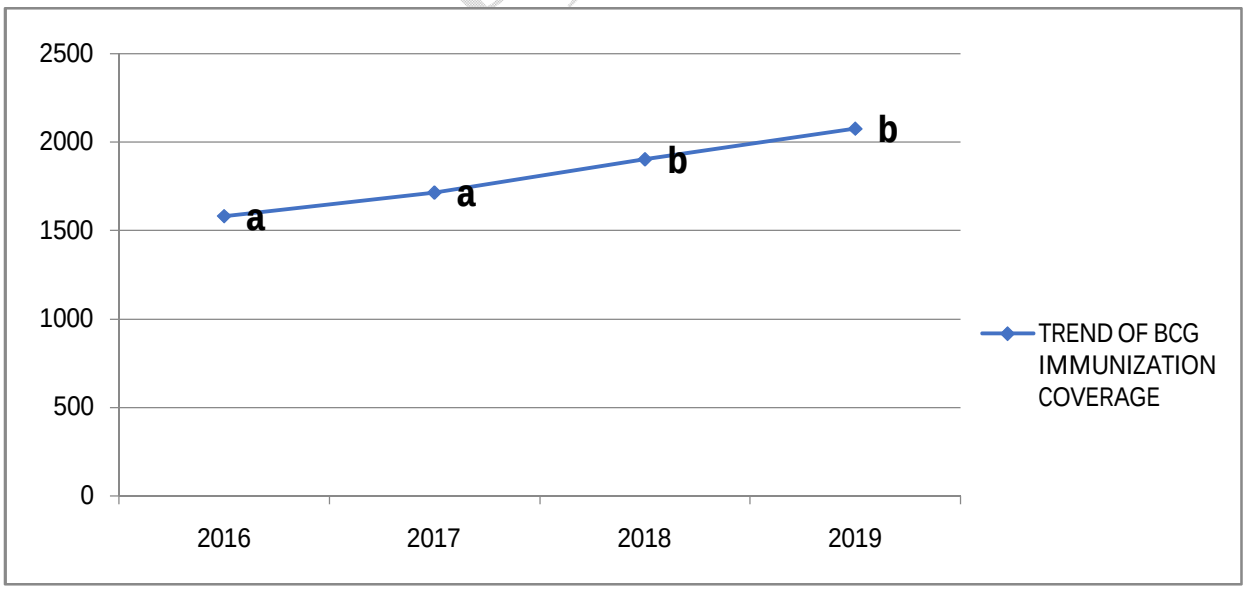

Figure 1: Trend of BCG Immunization Coverage in Mutum Biyu Ward ‘B’ from 2016-2019 in Gassol Local Government Area, Taraba State

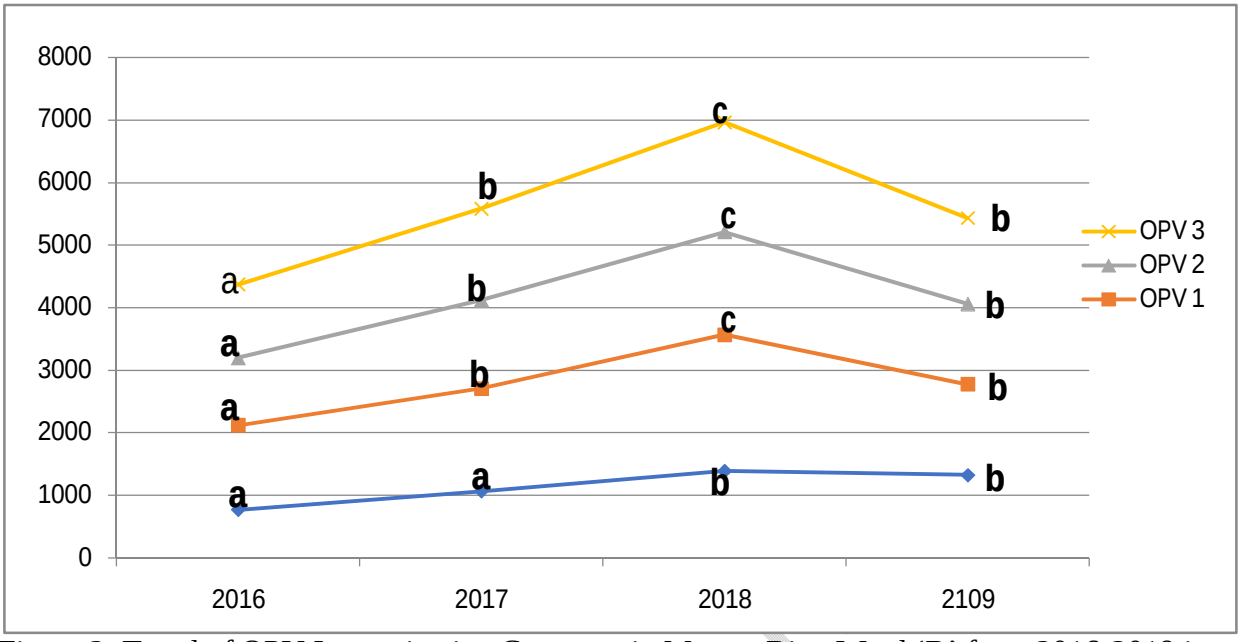

Figure 2: Trend of OPV Immunization Coverage in Mutum Biyu Ward 'B' from 2016-2019 in Gassol Local Government Area, Taraba State.

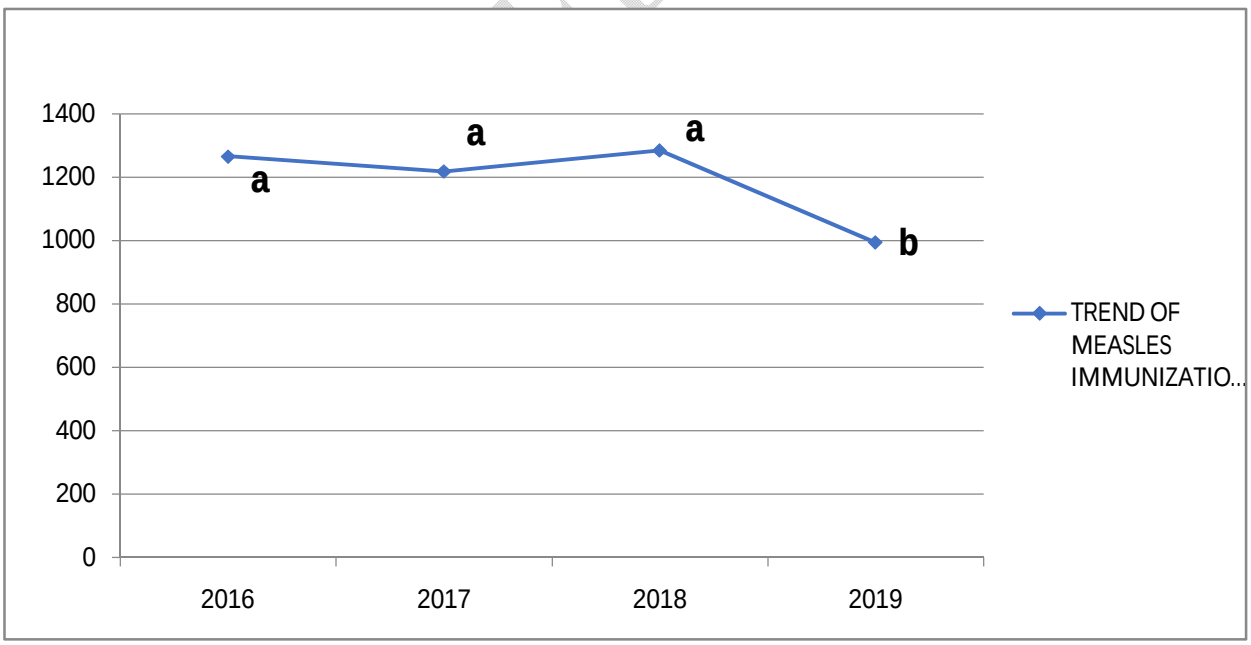

Figure 3: Trend of Measles Immunization Coverage in Mutum Biyu Ward 'B' from 2016-2019 in Gassol Local Government Area, Taraba State.

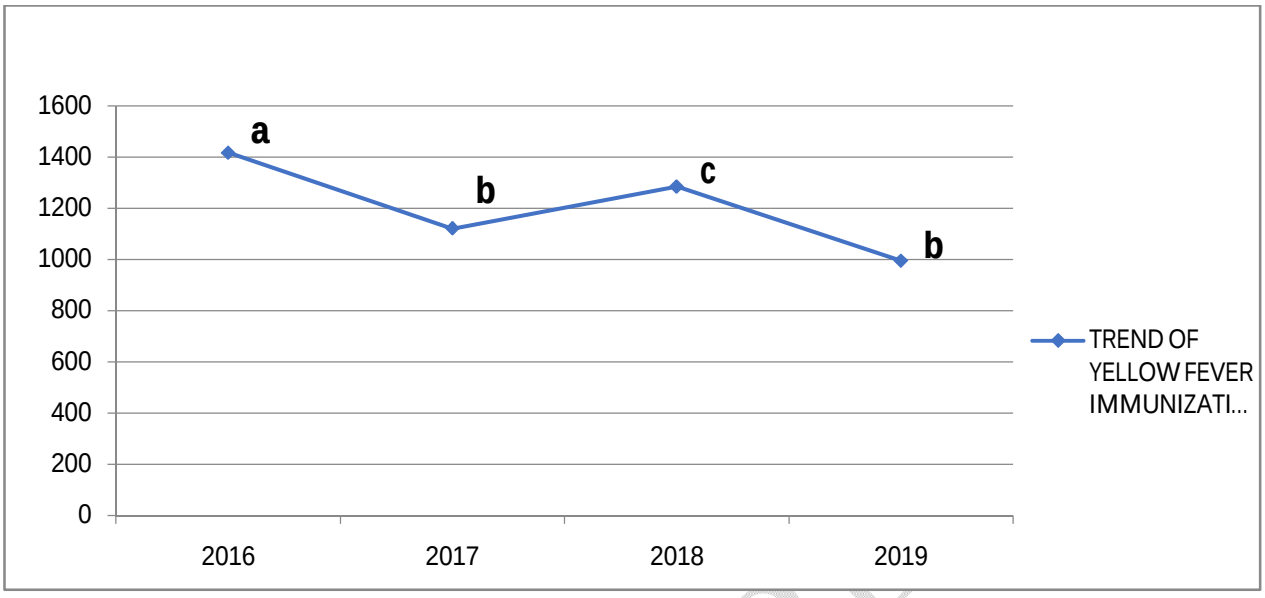

Figure 4: Trend of Yellow Fever Immunization Coverage in Mutum Biyu Ward 'B' from 2016-2019 in Gassol Local Government Area, Taraba State.

Discussions of findings

The trend of BCG immunization coverage in Mutum Biyu Ward 'B' shows significant fluctuations over the study period. The initial moderate coverage in 2016, followed by a peak in 2017 and a subsequent decline in 2018, indicates that while there were periods of increased coverage, consistency was an issue. The resurgence in 2019 suggests that targeted interventions or improvements in health service delivery may have been effective. Similar patterns have been observed in other studies, such as those by [5], which noted fluctuations in BCG coverage due to changes in vaccine availability and health system challenges. Additionally, research by[6] highlights how interruptions in vaccination programs can affect coverage rates and disease prevention outcomes. The observed variability could be attributed to factors such as intermittent vaccine supply, periodic health campaigns, or fluctuations in community outreach efforts [10]. The public health implication is that sustained and consistent BCG immunization efforts are critical in preventing tuberculosis, particularly in rural settings where healthcare delivery might be intermittent.

The results for Oral Polio Vaccine (OPV) coverage reveal a generally upward trend with minor declines. The sharp increase in 2017 indicates successful vaccination campaigns or improved

access to immunization services. However, the slight drop in 2018 suggests potential disruptions in vaccine delivery or public hesitancy, which aligns with findings from [2], which highlighted challenges in maintaining high OPV coverage rates due to logistic and socio-cultural factors. Similarly, [1] found that variations in OPV coverage can result from both logistical challenges and community resistance. The stabilization and subsequent increase in 2019 suggest recovery and possibly enhanced vaccination strategies. This underscores the importance of maintaining robust and continuous polio vaccination programs to prevent outbreaks and achieve herd immunity, especially in regions with fluctuating vaccine coverage [9].

Measles immunization coverage in Mutum Biyu Ward 'B' displayed initial stability, a significant drop in 2018, and a sharp recovery in 2019. The decline in 2018 could be due to factors such as vaccine stockouts, reduced outreach efforts, or socio-cultural barriers, similar to findings by [3], which noted that disruptions in vaccination programs can lead to increased disease incidence. Furthermore, research by [7] has documented how stockouts and coverage gaps can contribute to outbreaks of measles. The subsequent recovery in 2019 may reflect reinvigorated immunization campaigns or improved healthcare delivery. This variability highlights the need for consistent measles vaccination efforts to prevent outbreaks and ensure high coverage rates. Public health implications include the necessity for continuous monitoring and reinforcement of vaccination programs to maintain coverage and prevent resurgence of measles [10].

The trend in Yellow Fever immunization coverage shows an initial low coverage, slight improvement in 2017, a significant drop in 2018, and a peak in 2019. The low coverage in 2016 and the drop in 2018 may reflect challenges such as vaccine shortages, lack of awareness, or logistical issues, consistent with observations from Monath(2012), which reported similar issues in vaccination programs. Additionally, studies by [8] have highlighted how logistical and awareness challenges can affect vaccine coverage. The sharp increase in 2019 suggests that intensified vaccination campaigns or improved health system responses were effective. This variability emphasizes the importance of sustained and well-coordinated vaccination efforts to maintain high coverage and prevent yellow fever outbreaks. Public health implications include the need for continuous vigilance, adequate vaccine stock, and effective communication strategies to ensure high vaccination rates, particularly in areas with fluctuating coverage [9].

Conclusion and Recommendation

This study provides valuable insights into the trends of immunization coverage for BCG, OPV, Measles, and Yellow Fever vaccines in Mutum Biyu Ward 'B' from 2016 to 2019. The analysis revealed significant fluctuations in vaccine coverage, highlighting periods of both improvement and decline. These trends underscore the challenges faced in maintaining consistent immunization rates, including issues related to vaccine supply, healthcare delivery, and

community engagement. The observed variability in coverage rates suggests that while certain interventions may have been successful, ongoing efforts are necessary to address underlying barriers and ensure sustained high immunization rates.The study recommended the need for sustained public health efforts to address barriers such as vaccine supply, healthcare access, and community engagement.

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