

THE IMPACT OF MATERNAL AND CHILD HEALTHCARE ON THE RATE OF MORTALITY AMONG WOMEN AND CHILDREN IN BAUCHI STATE, NIGERIA

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ABSTRACT

Background: This study investigated the socio-economic factors affecting maternal and child healthcare services and their impact on mortality rates in Bauchi State, Nigeria. **Methods:** A mixed-method research design was adopted, incorporating both qualitative and quantitative approaches. **Results:** Data were collected using structured questionnaires and in-depth interviews from healthcare personnel across selected Primary Healthcare Facilities. The reliability of the research instrument was confirmed using Cronbach's Alpha coefficient (0.844), indicating good internal consistency. Descriptive statistical analysis revealed that factors such as skilled birth attendance, immunization coverage, access to emergency obstetric care, and postnatal services significantly influence mortality rates. Correlation analysis further indicated a strong positive relationship between maternal and child healthcare and mortality ($r = 0.822$, $p < 0.01$), suggesting that poor healthcare conditions are associated with higher mortality rates. **Conclusion:** The study concludes that improving access to quality healthcare services and addressing socio-economic inequalities are essential for reducing maternal and child mortality. Recommendations include strengthening primary healthcare systems, increasing health education, and improving economic support for vulnerable populations.

KEYWORDS: Maternal, Child, Healthcare, Mortality rates, Bauchi, Nigeria.

1.0 INTRODUCTION

1.1 Background of the Study: Maternal and child health remains a central component of public health practice and is widely recognized as a key indicator of a nation's social and economic development. The well-being of mothers and children reflects not only access to healthcare services but also the broader socio-economic conditions in which they live. Factors such as education, income, employment, and access to quality healthcare significantly influence health outcomes. Globally, disparities in these determinants continue to drive inequalities in maternal and child health, particularly in low- and middle-income countries where healthcare systems often face significant resource limitations (Yeboah *et al.*, 2025).

Nigeria, the most populous country in Africa, continues to experience substantial challenges in achieving optimal maternal and child health outcomes. Although progress has been recorded in reducing mortality rates, these improvements remain insufficient when compared to global targets. Maternal mortality is still a major public health concern, with Nigeria accounting for a disproportionately high number of global maternal deaths (Kurjak *et al.*,

2020). In addition, under-five mortality remains high, reflecting persistent gaps in healthcare access and service delivery across the country (Ezeneme *et al.*, 2023).

Socio-economic disparities are a major determinant of maternal and child health outcomes in Nigeria. These disparities often result in unequal access to healthcare services, differences in health-seeking behaviors, and variations in the quality of care received. Women from lower socio-economic backgrounds frequently face barriers such as limited access to skilled birth attendants, inadequate antenatal care, and poor postnatal services. Such inequalities significantly contribute to preventable maternal and child morbidity and mortality (Rotimi *et al.*, 2024).

Education plays a critical role in improving maternal and child health service utilization. Women with higher levels of education are more likely to recognize the importance of antenatal care, skilled delivery, and child immunization, thereby improving health outcomes. Furthermore, economic status strongly influences access to healthcare services. Financial constraints often limit the ability of women to afford transportation, medications, and other related healthcare costs. Even in cases where healthcare services are subsidized, indirect costs can discourage utilization among low-income households (Okeke *et al.*, 2020; Lee *et al.*, 2022).

Despite ongoing interventions aimed at improving maternal and child healthcare in Nigeria, significant challenges persist, particularly in rural and low-income communities such as Bauchi Local Government Area. In these settings, socio-economic factors continue to hinder access to and utilization of essential healthcare services. Understanding the influence of these factors is crucial for developing targeted and effective interventions. Therefore, this study focuses on examining the socio-economic determinants affecting maternal and child healthcare services in low-income neighborhoods, with particular emphasis on their impact on maternal and child mortality in the study area.

1.2 Research Gap: There is limited context-specific evidence on how socio-economic factors collectively influence maternal and child healthcare utilization and outcomes in low-income communities at the local government level, particularly in Bauchi.

1.3 Literature Review: Existing literature shows that education, income, employment, and access to healthcare significantly influence maternal and child health service utilization and outcomes, with disparities contributing to higher morbidity and mortality in developing countries like Nigeria.

2.0 METHODOLOGY

2.1 Study Area: The study is conducted in Bauchi State, located in the northeastern region of Nigeria. The state was created in 1976 from the former North-Eastern State and currently comprises 20 Local Government Areas. It lies between latitudes $9^{\circ}30'N$ and $12^{\circ}30'N$ and longitudes $8^{\circ}45'E$ and $11^{\circ}00'E$, covering a land area of approximately 49,259 square kilometers. Bauchi State is characterized by diverse ethnic groups including Hausa, Fulani, and Sayawa, and features two major vegetation zones: the Sudan Savannah and the Sahel Savannah. The state has a predominantly agrarian economy, with farming and livestock rearing as major occupations. Despite the presence of healthcare facilities such as primary healthcare centers, general hospitals, and private clinics, challenges related to access, quality of care, and socio-economic inequalities persist, particularly in rural and low-income communities.

2.2 Population of the Study Area: The population of Bauchi State is estimated to be between 7.5 and 10 million based on recent projections, reflecting significant growth over the years. The population is heterogeneous, consisting of multiple ethnic and socio-cultural groups, and is largely distributed across rural and semi-urban areas. The state operates a ward-based primary healthcare system, with efforts to establish at least one Primary Healthcare Centre (PHC) in each ward to improve access to healthcare services. However, disparities in healthcare access and utilization remain evident, particularly among low-income populations, making the area suitable for investigating socio-economic influences on maternal and child health.



Figure 1: Map of Bauchi State, Nigeria (NPC, 2023)

2.3 Research Design: Research design refers to the systematic plan adopted for collecting, analyzing, and interpreting data in order to answer research questions effectively. This study adopts a mixed-method research design, combining both qualitative and quantitative approaches to provide a comprehensive understanding of the socio-economic factors influencing maternal and child healthcare services. The integration of these two methods allows for triangulation of data, thereby enhancing the validity and reliability of the findings, as qualitative insights complement quantitative measurements.

2.3.1 Qualitative Method: The qualitative component of this study focuses on exploring the characteristics and experiences of the population in relation to maternal and child healthcare. It involves the use of in-depth interviews and focus group discussions with key stakeholders such as household heads, family members, and healthcare providers. Data collection instruments include open-ended interview guides, audio recorders, and field notes to capture detailed responses. The collected data are transcribed, coded, and analyzed thematically to identify recurring patterns, generate meaningful interpretations, and provide narrative explanations of how socio-economic factors influence healthcare utilization.

2.3.2 Quantitative Method: The quantitative aspect of the study involves the use of structured questionnaires to collect numerical data from a representative sample of the study population. This approach enables the measurement and analysis of variables such as income, education, employment status, and access to healthcare services. A suitable sampling technique is employed to select respondents, ensuring representativeness of the population. The collected data are analyzed using descriptive statistics, including measures of central tendency such as mean, median, and mode, as well as inferential statistics, particularly correlation analysis, to examine relationships between socio-economic factors and maternal and child healthcare outcomes.

2.4 Sample and Sampling Techniques: The study employs both qualitative and quantitative sampling techniques. For the qualitative component, purposive sampling is used to select key informants with relevant experience in maternal and child healthcare, including healthcare professionals such as doctors, nurses, and community health officers. Selection criteria include professional background, years of experience (minimum of 15 years), managerial role in a healthcare facility, and age above 30 years. For the quantitative component, a probability sampling technique is applied to select respondents from the study population, ensuring representativeness and generalizability of findings.

2.4.1 Qualitative Approach (In-Depth Interview): The qualitative approach utilizes in-depth interviews to achieve the first research objective, which focuses on identifying socio-

economic factors affecting maternal and child healthcare. Key informants, including the officer in charge of a Primary Healthcare Centre and a Community Health Officer, are interviewed to obtain detailed insights. The interviews are conducted until data saturation is reached, ensuring reliability and depth of information.

2.4.1.2 Method of Data Analysis for In-Depth Interviews: Data obtained from in-depth interviews are analyzed using thematic coding techniques. This involves recording and transcribing interviews verbatim, organizing the data into meaningful categories, coding emerging themes, and presenting findings in a narrative format. This method allows for a comprehensive understanding of participants' perspectives and experiences.

2.4.2 Quantitative Approach (Descriptive Survey and Correlation Analysis): The quantitative approach employs a descriptive survey design to address research objectives two and three, focusing on measuring and analyzing the relationship between socio-economic factors and maternal and child healthcare. Data are collected using structured questionnaires and analyzed using descriptive statistics to summarize responses and correlation analysis to examine associations between variables, thereby providing empirical evidence to support the study findings.

2.4.2.1 Sampling Frame and Sample Size: The sampling frame for this study comprises all 323 Primary Healthcare Facilities (PHCFs) distributed across the three senatorial zones of Bauchi State. To determine an appropriate sample size, Taro Yamane's formula for finite populations was applied: $n = N / [1 + N(e^2)]$, where n represents the sample size, N is the population size (323), and e is the margin of error set at 5% (0.05), corresponding to a 95% confidence level. Substituting the values gives $n = 323 / [1 + 323(0.05^2)] = 323 / 1.8075 \approx 179$, indicating that 179 PHCFs were selected for the study. These facilities were proportionally allocated across the senatorial zones as follows: Bauchi South (70 PHCFs), Bauchi North (58 PHCFs), and Bauchi Central (51 PHCFs). Two healthcare personnel were selected from each facility, resulting in 140 participants from Bauchi South, 116 from Bauchi North, and 102 from Bauchi Central, giving a total sample size of 358 respondents.

2.4.2.2 Criteria for Selection of Participants: Participants for this study were selected based on clearly defined inclusion criteria to ensure the relevance and reliability of the data collected. Eligible respondents were required to be healthcare professionals working within Primary Healthcare Facilities, including doctors, nurses, community health officers, and public health officers. In addition, participants were expected to have a minimum of 15 years of professional experience in managing or delivering healthcare services within PHCFs, hold a managerial or supervisory position such as officer-in-charge, and be at least 30 years of age.

These criteria ensured that respondents possessed adequate knowledge, experience, and authority to provide informed and credible insights relevant to the study objectives.

2.5 Test for Reliability of Scale: The reliability of the research instrument used to achieve objectives two and three was assessed using the internal consistency method, specifically Cronbach's Alpha coefficient. A pilot study was conducted, and the data obtained were analyzed using Statistical Package for the Social Sciences (SPSS) version 28. The reliability analysis yielded a Cronbach's Alpha value of 0.844 across 20 items, indicating a high level of internal consistency and confirming that the instrument is reliable for measuring the constructs under investigation. This value exceeds the commonly accepted threshold of 0.70, thereby demonstrating that the items used in the questionnaire are well correlated and suitable for the main study.

2.6 Result of Descriptive Statistics for Pilot Study (Objective Two): Descriptive statistical analysis was employed to examine respondents' perceptions regarding the impact of maternal and child healthcare factors on mortality rates. The findings indicate strong agreement among respondents that the availability of skilled birth attendants significantly influences neonatal mortality (mean = 4.82). Respondents also agreed that immunization coverage is closely associated with under-five mortality (mean = 4.45), while barriers to accessing emergency obstetric care contribute to maternal mortality (mean = 4.45). Similarly, postnatal care services were perceived to have a notable impact on maternal and infant survival (mean = 4.45). Moderate agreement was observed regarding the influence of distance to healthcare facilities (mean = 3.91), maternal education (mean = 3.91), and household income (mean = 4.27) on healthcare access and outcomes. However, respondents expressed uncertainty regarding the role of exclusive breastfeeding (mean = 3.18). Overall, the results suggest that multiple dimensions of maternal and child healthcare significantly affect mortality outcomes.

2.8 Achieving Research Objective Three for Pilot Study: To examine the relationship between maternal and child healthcare and mortality rates, Spearman's rank correlation coefficient was employed. The analysis revealed strong positive correlations, with coefficients of 0.822 and 0.762, both statistically significant at the 0.01 level ($p < 0.01$), indicating a meaningful association between the variables. This implies that poor maternal and child healthcare conditions are strongly linked to higher mortality rates. Preliminary diagnostic checks confirmed that assumptions of normality, linearity, and homoscedasticity were not violated. The findings demonstrate a significant and direct relationship between maternal and child healthcare indicators and mortality outcomes, reinforcing the importance of improving healthcare services to reduce maternal and child deaths.

2.9 Data Analysis: Data analysis in this study integrates both qualitative and quantitative techniques to achieve the research objectives. Qualitative data obtained from interviews are analyzed using thematic coding procedures, which involve recording, transcription, coding, and development of themes that are presented in narrative form. Quantitative data, on the other hand, are analyzed using descriptive statistics to summarize the data and correlation analysis to determine the strength and direction of relationships between socio-economic variables and maternal and child healthcare utilization. This combined approach ensures a robust interpretation of findings.

3.0 RESULTS

3.1 Maternal and Child Healthcare Factors Affecting Mortality Rate in Bauchi State: The first objective focused on identifying maternal and child healthcare factors that influence mortality rates in Bauchi State. To ensure the reliability of the research instrument, an internal consistency test was conducted using Cronbach's Alpha coefficient, which ranges from 0 to 1. The pilot study produced a Cronbach's Alpha value of 0.844 across 20 items, indicating good reliability of the instrument. This value falls within the accepted range of 0.70–0.90, suggesting that the items used in the questionnaire are consistent and suitable for measuring the study variables. Therefore, the instrument was considered reliable for assessing maternal and child healthcare factors affecting mortality in the study area.

3.2 Impact of Maternal and Child Healthcare on Mortality Rate: The second objective examined the impact of maternal and child healthcare on mortality rates using descriptive statistical analysis. The results showed strong agreement among respondents that the availability of skilled birth attendants significantly influences neonatal mortality (mean = 4.82). Other important factors identified include immunization coverage and its relationship with under-five mortality (mean = 4.45), barriers to accessing emergency obstetric care (mean = 4.45), and the role of postnatal care services (mean = 4.45). Additionally, household income (mean = 4.27) and maternal deaths associated with inadequate prenatal care (mean = 4.09) were also recognized as significant contributors. Moderate agreement was observed for distance to health facilities (mean = 3.91) and maternal education level (mean = 3.91), while respondents were uncertain about the influence of exclusive breastfeeding (mean = 3.18). Overall, the findings indicate that maternal and child healthcare services have a substantial impact on mortality rates in the study area.

3.3 Relationship Between Maternal and Child Healthcare and Mortality Rate: The third objective assessed the relationship between maternal and child healthcare and mortality rates using Spearman's rank correlation analysis. The results revealed strong positive correlation coefficients of 0.822 and 0.762, both statistically significant at the 0.01 level ($p < 0.01$). This indicates a strong association between maternal and child healthcare and mortality outcomes, suggesting that poor healthcare conditions are linked to higher mortality rates. Preliminary tests confirmed that key assumptions, including normality, linearity, and homoscedasticity, were not violated. The findings therefore establish a significant relationship between maternal and child healthcare factors and mortality rates in the study area, emphasizing the importance of improving healthcare services to reduce maternal and child deaths.

4. DISCUSSION

The findings of this study highlight the significant role of maternal and child healthcare services in influencing mortality rates in Bauchi State, particularly within low-income communities. The high reliability of the research instrument (Cronbach's Alpha = 0.844) confirms the consistency of the data collected, strengthening the validity of the results. Descriptive analysis revealed that key healthcare factors such as the availability of skilled birth attendants, immunization coverage, access to emergency obstetric care, and postnatal services have a strong impact on reducing maternal and child mortality. Socio-economic variables, including household income, maternal education, and distance to healthcare facilities, were also found to influence healthcare utilization and outcomes. Furthermore, the strong positive correlation identified between maternal and child healthcare and mortality rates indicates that inadequate healthcare services are directly associated with increased mortality. These findings are consistent with existing literature, emphasizing that improving access, affordability, and quality of healthcare services is essential for reducing mortality rates in developing regions.

4.1 SUMMARY

This study examined the socio-economic factors affecting maternal and child healthcare services and their impact on mortality rates in Bauchi State. Using a mixed-method approach, both qualitative and quantitative data were collected and analyzed to address the study objectives. The results showed that maternal and child healthcare services significantly influence mortality outcomes, with factors such as skilled birth attendance, immunization, access to healthcare, and socio-economic status playing critical roles. The study also

established a strong positive relationship between poor healthcare conditions and increased mortality rates. The overall, the findings underscore the importance of strengthening healthcare systems and addressing socio-economic disparities to improve maternal and child health outcomes.

4.2 CONCLUSION

The study concludes that maternal and child healthcare services are critical determinants of mortality rates in Bauchi State, and that socio-economic factors such as income, education, and access to healthcare significantly influence service utilization and health outcomes. Poor access to quality healthcare services is strongly associated with higher maternal and child mortality rates. Based on these findings, it is recommended that government and relevant stakeholders prioritize the improvement of primary healthcare infrastructure, particularly in rural and low-income areas, and ensure the availability of skilled healthcare personnel. Efforts should also be made to enhance community-based health education, expand immunization programs, and reduce financial barriers to healthcare access through subsidies or health insurance schemes. Additionally, policies aimed at improving women's education and economic empowerment should be strengthened, as these have a direct impact on healthcare utilization and outcomes.

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