
SOCIO-ECONOMIC FACTORS AFFECTING PREGNANT WOMEN'S ACCESS TO TETANUS TOXOID VACCINATION IN NIGERIA

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Abstract

In this study, we delved into the intricate web of socioeconomic factors impacting the accessibility of tetanus toxoid vaccination among pregnant women in Nigeria. Leveraging data extracted from the 2018 Nigeria Demographic Health Survey, our investigation harnessed the analytical power of the ordinary least square method. Unveiling the tapestry of results, our findings illuminated a compelling narrative. Maternal education, husband's education, wealth index, and the frequency of antenatal care visits emerged as robust pillars, showcasing a positive and statistically significant correlation with tetanus toxoid vaccination. On the flip side, residence exhibited a noteworthy negative but equally significant relationship with tetanus toxoid vaccination. In light of these revelations, our study proffers pragmatic recommendations. We advocate for targeted health promotion initiatives tailored for high-risk groups, with a special emphasis on pregnant women, particularly those residing in rural areas. Embedding such awareness campaigns within routine antenatal care visits can serve as a strategic intervention, enlightening individuals about the impact of tetanus toxoid vaccination on maternal health and pregnancy outcomes. This approach not only fosters awareness but also addresses the unique challenges faced by pregnant women in diverse socioeconomic contexts.

Keywords: Tetanus Toxoid Vaccination, Pregnant Women, Socioeconomic Factors, Access

INTRODUCTION

Amoh (2007) defines tetanus as a sudden, spastic paralysis caused by the neurotoxin of *Clostridium tetani*. While complete eradication is unattainable due to persistent tetanus spores in soil and animal waste, vaccination remains a powerful shield (WHO, 2006). The Maternal and Neonatal Tetanus Elimination (MNTE) initiative strives to reduce MNT to a negligible public health concern globally, with the goal of less than one case per 1000 live births. Pregnant women in high-risk areas should receive at least two tetanus toxoid vaccination doses (TT2), and all pregnant women require three doses (TT3), alongside clean delivery services and robust tetanus surveillance (WHO, 2018).

Tetanus is a significant contributor to maternal and infant mortality, claiming 180,000 lives worldwide (Owusu-Darko et al., 2015). Neonatal tetanus constitutes 14% of neonatal deaths in low-income countries, and maternal tetanus contributes to 5% of maternal mortality (WHO, 2002). An estimated 15,000 to 30,000 women succumb to

tetanus annually during or after pregnancy (WHO, UNICEF, World Bank, 2009). Women and neonates in underdeveloped nations face elevated risks due to insufficient tetanus immunization, unsafe birth practices, limited healthcare access, and unsanitary cord procedures (Thwates et al., 2015).

Many pregnant and postpartum women may be unaware of their vulnerability to tetanus infection (Donchin et al., 2018). Misconceptions about vaccine harshness and effectiveness contribute to reduced maternal tetanus vaccine uptake in underdeveloped regions (Mohd et al., 2017; Corben & Leask, 2017). Lack of awareness exposes infants to risks of tetanus, emphasizing the need for accurate information about the disease's severity (SAGE working group, 2014; Olander et al., 2016).

A study on maternal immunization revealed fear of infection as the primary predictor of vaccine intention (Bechini et al., 2019; Lason et al., 2019). Women's reproductive health, deeply influenced by socio-cultural constructs, reflects gender discrimination in education, nutrition, healthcare access, decision-making power, and employment. This contributes to poor reproductive health outcomes. The International Safe Motherhood Conference in 1987 highlighted the importance of improving women's health, reiterated by subsequent conferences and efforts, including the International Conference for Population and Development (ICPD) in 1994.

Despite governmental and health organizations' efforts, certain socioeconomic factors persistently impede pregnant women's access to tetanus toxoid vaccination. Hence, this study aims to identify and address these factors affecting vaccination accessibility for pregnant women in Nigeria.

LITERATURE REVIEW

Theoretical Framework

Health Belief Model

In the realm of studying health behaviors, researchers commonly turn to the Health Belief Model (HBM), a framework pioneered by Rosenstock, Strecher, and Becker in 1988. According to this model, an individual's health behavior hinges on their perception of the health condition's threat, the perceived benefits of adopting a health behavior to mitigate the threat, the perceived barriers to embracing the health behavior, and the perceived benefits of engaging in that behavior to counter the health threat (Stallis, Owen & Fisher, 2015). The initiation of action within this model necessitates a cue or trigger (Rosenstock, 1974). Later on, the concept of self-efficacy, denoting confidence in one's ability to effectively practice a specific health habit, was integrated into the Health Belief Model (HBM). Widely applied, the HBM serves as a predictive tool for various health-related behaviors, encompassing activities like immunization (Donaditi et al., 2014).

Empirical Literature

In Hai District, Kilimanjaro Region, Tanzania, Kipengele Laizer, Cyril, Mmbaga and Msoka (2021) investigated the attitudes of pregnant and postnatal women on getting Tetanus Toxoid vaccine. In 10 rural communities, a descriptive qualitative study was undertaken during the baseline assessment from October 2020 to May 2021. Pregnant women and postnatal mothers who attended antenatal and postnatal services were purposefully chosen for their accessibility and convenience. The interviews were guided by a semi-structured interview guide that was related to the aim of the study. Thematic analysis was performed to extract themes and subthemes from focus group discussions

(FGDs) and in-depth interviews (IDIs). A total of 15 moms, ranging in age from 18 to 40, were chosen to participate in the study. The majority of the mothers were Christians who were married with one to five children, according to the findings. The majority of the women have completed primary school and work in small-scale agriculture. Unreliable vaccine information, health care staff' attitudes toward patients, overworked with home tasks, adherence to vaccination appointment dates after delivery, and the significance of traditional medicine during pregnancy are the primary themes extracted. The roles that health care providers play is crucial for the proper conveyance of vaccine information to mothers and their spouses during clinical visits, eradicating vaccine myths, and thereby improving vaccine outcomes of tetanus vaccine uptake. Quality information from reputable sources is also a significant aspect in raising maternal immunization knowledge among pregnant women.

Yaguo and Bolum – Okolie (2015) investigated the socioeconomic issues associated with Post Neonatal Tetanus in Port Harcourt, Rivers State. In the teaching hospital of the University of Port Harcourt, a retrospective descriptive research was conducted. From February to April 2015, three consecutive cases of post neonatal tetanus were evaluated, with data coming from the patients' medical notes. There were three patients in total, two girls and one boy. They were 11 and 14 years old at the time. The children were not immunized against tetanus toxoid while their moms worked as petty traders, one of whom was unemployed, and only one of the mothers had completed secondary school. During her pregnancy, one of the mothers was vaccinated, while the other was married. Tetanus poses significant socioeconomic issues, but it can be avoided by taking basic steps such as educating girls, immunizing all school children, promoting community awareness, and strengthening the school health program, among other things.

Grebremedhin, Welay, Mengesha, Assefa, and Werid (2020) studied Tetanus Toxoid Vaccination Uptake and Associated Factors in Errer District, Somali Regional State, Eastern Ethiopia. The objective of the study was to investigate tetanus toxoid vaccine uptake and associated characteristics among mothers who gave birth in the previous 12 months in Errer district, Somali Regional State, Eastern Ethiopia. A community-based cross-sectional study design was used to analyze 440 mothers who had given birth within the previous 12 months. Following a preliminary survey, participants were chosen using stratified and systematic sampling techniques. A face-to-face interviewer-administered questionnaire was used to collect data. The data was entered into Epi Data 3.02 and exported to the Statistical Package for the Social Sciences (SPSS) version 20. Bivariate and multivariate logistic regressions were used to examine the relationship between variables at a p 0.05 level of confidence and a 95% confidence interval. Finally, frequencies, means, and tables were used to present the data.

The overall tetanus vaccination uptake (TT2) doses was 51.8%, 95% confidence interval (47.7%, 56.4%). About 31 (14.8%) of the mothers finished all five TT doses. Some of the factors that were significantly associated with tetanus toxoid vaccination uptake were urban residence [AOR = 6.1, 95% CI: (2.33, 10.43)], multiparity [AOR = 2.3, 95% CI: (1.7, 6.4)], and traveling less than 30 minutes from home to a health facility [AOR = 4.6, 95% CI: (1.34, 6.72)]. Despite the fact that TT vaccination is a scientifically confirmed strategy for maternal and newborn tetanus protection, barely half of the district women received TT2 doses. Furthermore, our research found that low vaccine uptake is due to long distance travel to a health facility, maternal illiteracy, and the pastoralist lifestyle of mothers in the district.

In Sekondi-Takoradi, Ghana, Orish *et, al;* (2015) evaluated the prevalence of intermittent preventive therapy with sulphadoxine-pyrimethamine (IPTp-SP) use during pregnancy and other associated factors. This cross-sectional study examined the prevalence of IPTp-SP use for malaria prevention among pregnant women as well as the factors related with IPTp-SP use during pregnancy in Ghana, Sekondi-Takoradi region. Pregnant women with clinical or ultrasound evidence of pregnancy who were attending prenatal care were recruited. The RAPID response antibody kit and Giemsa staining were used to screen venous blood for malaria. The cyanmethemoglobin method was used to estimate hemoglobin, whereas the national diagnostic algorithm of two fast antibody tests and western blot confirmation was used to screen for human immunodeficiency virus (HIV). In this study, 754 consenting pregnant women were questioned; 57.8% had received IPTp-SP, while 42.2% had not at the time of their initial contact with study personnel. Furthermore, 18.6% (81/436) of individuals who got IPTp-SP tested positive for malaria, while 81.4% (355/436) tested negative for malaria. The findings also revealed that 47.7% (51/107) of pregnant women in their third trimester who were supposed to receive at least two doses of SP received two doses, while 35.5% (38/107) received one dose. Pregnant women in their third trimester who got two doses of SP had a lower risk of malaria (adjusted OR, 0.042; 95% CI, 0.003-0.51; $P = 0.013$) in a multivariable logistic regression analysis. The use of IPTp-SP among pregnant women in Sekondi-Takoradi decreases malaria, and its use for malaria prevention should be expanded to include correct dosage completion and coverage.

Nozaki, Hachiya, and Kitamura, (2019) examined the factors influencing basic vaccination coverage in Myanmar: secondary analysis of 2015 Myanmar demographic and health survey data. This study examined factors that influenced complete vaccination status (one dose each for Bacillus Calmette-Guérin and measles, and three doses each for diphtheria-pertussis and polio). Data from 12 to 23-month-old children and their mothers were culled from the findings of a nationally representative survey. To investigate the associations between vaccination status and various sociodemographic and medical parameters, bivariate and multivariate analyses with survey-weighted logistic regression were done. Area of residence, economic status, maternal age, marital status, education, literacy, employment status, antenatal care attendance, tetanus vaccination, place of delivery, postnatal evaluations, child's sex, number of children, previous child death, decision maker(s) regarding child's health, frequency of healthcare visits, paternal education, and paternal occupation were the independent variables for the analyses. For the analysis, a representative sample of 904 instances was retrieved. The overall completion rate of vaccination was 55.4%. Complete vaccination was independently associated with middle or high economic status (adjusted odds ratio [AOR]: 2.64, 95% confidence interval [CI]: 1.85-3.78), older maternal age (AOR: 2.87, 95% CI: 1.62-5.10), 4 antenatal care visits (AOR: 1.87, 95% CI: 1.28-2.73), and maternal tetanus vaccination before delivery (AOR: 3.26, 95% CI: 1.82-5. According to Myanmar's first Demographic and Health Survey, only around half of 12-23-year-old children had received complete immunization, which was lower than the projected rate from normal administrative coverage. Inadequate immunization status was associated with poor socioeconomic level, younger maternal age, fewer antenatal care visits, and no maternal tetanus vaccine, according to our findings. These insights could help enhance the Expanded Programme on Immunization's targeting and strategic execution.

Giles *et, al;* (2020) examined the antenatal care service delivery and factors affecting effective tetanus vaccine coverage in low- and middle-income countries: results of the maternal immunization and antenatal care situational analysis. The objective of the study

was to map the integration of existing maternal tetanus immunization programs into antenatal care (ANC) services for pregnant women in low- and middle-income countries (LMICs), as well as to identify and comprehend the challenges, barriers, and facilitators associated with high-performance maternal vaccine service delivery. Between 2016 and 2018, a mixed-method, cross-sectional study comprising four data collection phases, including a desk review, an online survey, telephone and face-to-face interviews, and in-country visits, was conducted. Associations were formed between various service delivery process components and protection at birth (PAB) and nation groups. PAB was defined as the proportion of newborns who were protected against neonatal tetanus at birth. To examine the relationships between several covariates and maternal tetanus immunization coverage, regression analysis and structural equation modeling were utilized. To solve the problem of multicollinearity, latent class analysis (LCA) was employed to categorize country performance for maternal immunization. The majority of LMICs had a policy on the recommended number of ANC visits; however, the WHO guidelines requiring eight ANC contacts had yet to be implemented in the majority of cases. Countries that suggested more than four ANC interactions were more likely to have a PAB of more than 90%. The most common type of disease surveillance was passive illness surveillance, however the maternal and neonatal morbidity and death indices reported varied by country. The prevalence of antenatal care and maternal immunization user fees was strongly associated with decreased PAB (90%). Implementing the current WHO ANC guideline to provide additional vaccination opportunities during each pregnancy is one of the recommendations. Improved utilization of ANC services can be achieved by increasing the demand side by improving service quality, lowering associated costs, and supporting user fee exemptions, or by increasing the supply side, which is positioned as an ideal platform for the delivery of maternal vaccines.

Owusu-Boateng and Anto (2017) examined the intermittent preventive treatment (IPT) of malaria in pregnancy: a cross-sectional survey to assess uptake of the new sulfadoxine-pyrimethamine five dose policy in Ghana. This study examined the level of sulfadoxine pyrimethamine (SP) uptake to serve as a baseline for monitoring progress, as well as reviewed SP stock levels, a critical aspect in program execution. A cross-sectional hospital-based study was conducted at Osu Government Maternity Home in Accra among nursing women who had delivered within the previous 12 weeks and were seeking postnatal care. The mothers' antenatal record books were checked, and data on the number of visits and receipt of IPTp-SP were obtained. Mothers were interviewed, and data on their background characteristics and obstetric history were obtained. Data on SP stock levels for the previous six months was also examined. Stata version 12 was used to do a logistic regression analysis to discover prenatal indicators of IPTp-SP absorption. Three-five doses of SP were consumed in the following proportions: IPT3 (87.5%), IPT4 (55.7%), and IPT5 (14.5%). The percentage of women who received their first dosage of SP at 16 weeks of pregnancy was 21.3%. Women who made four visits were more likely than those who did not to receive three doses of SP (AOR = 4.57, 95% CI 1.15-18.16, p 0.05). Women who received their first dose of SP in the third trimester were less likely than those who received the drug in the second trimester to receive three doses (AOR = 0.04, 95% CI 0.01-0.16, p 0.05). During the review period, SP stock levels were adequate to meet the demands of pregnant women at the Maternity Home. The research area had a high absorption of three doses of SP. To meet the new aim of five or more doses of SP, pregnant women must make frequent visits to the antenatal clinic and take the first dosage of SP as soon as possible.

Azizi (2018). Uptake of Intermittent Preventive Treatment for Malaria during Pregnancy with Sulphadoxine-Pyrimethamine (IPTp-SP) among Postpartum women in Zomba District, Malawi: A Cross-sectional Study. The study was carried out to determine the factors of IPTp-SP uptake during pregnancy among postpartum mothers in Zomba district following the implementation of a new IPTp-SP policy in 2014. A cross-sectional survey was conducted. Two public health facilities (HFs) were chosen at random from the Zomba district's urban and rural districts. Participants in the study were postpartum mothers chosen from HFs using the exit poll method. A systematic questionnaire was used to interview 463 postpartum women. The data was analyzed using bivariate and multiple logistic regression. about 92% of all enrolled women (n = 463) had complete information for analysis. Among the 426 women, 127 (29.8%, 95% CI: 25.6%-34.3%) received three or more doses of SP, while 299 (70.2%, 95% CI: 65.7%-74.4%) received two or fewer doses. Women receiving SP from rural HF were less likely than urban women to receive at least three doses of SP (AOR = 0.31, 95% CI 0.13-0.70); others less likely were those with three or fewer ANC visits versus four or more visits (AOR = 0.29, 95% CI 0.18-0.48); and those not receiving SP under direct observation therapy (DOT) (AOR = 0.18, 95% CI (0.05-0.63). This cohort has a poor usage of at least three doses of SP, which appears to be related to the frequency of ANC visits and use of DOTs. As a result, these characteristics may be relevant in developing interventions aimed at promoting IPTp uptake in this district. Furthermore, the rural-urban disparity underscores the need for additional research to understand the barriers and enhancers of uptake in each location in order to promote community health.

Leonard, Eric, Judith and Samuel (2016) examined the factors associated to the use of insecticide treated nets and intermittent preventive treatment for malaria control during pregnancy in Cameroon. The primary goal of this study was to analyze the coverage of ITN (Insecticide Treated Nets) and IPT (Intermittent Preventive Treatment) among pregnant women in the Buea Health District of Cameroon, as well as the characteristics related with its usage. A cross-sectional study was conducted in the Buea Health District from April to July 2014, with 292 pregnant women attending prenatal care clinics in the area. A standardized questionnaire was utilized to collect demographic information about participants as well as information about IPT and ITN use. IPT had an overall coverage rate of 88.7% and ITN had an overall coverage rate of 43.8%, whereas IPT and ITN had overall non-usage rates of 11.3% and 17.5%, respectively. Bivariate analyses found that occupation, educational level, trimester, and number of ANC were statistically related to ITN use, but being a student or jobless (OR = 0.25, 95% CI = 0.07-0.95) was adversely associated with ITN use. In bivariate analysis for IPTp-SP, participants' occupation, educational level, trimester of pregnancy, and number of ANC were statistically significant, whereas attending ANC just once (OR = 0.006, 95% CI = 0.00-0.04) was negatively associated with IPTp-SP use in multivariate models. This study found that while IPT was widely used, ITN use remained low despite its free distribution. As a result, frequent antenatal care visits and participation in a potential income-generating activity (company or salary) will boost IPT and ITN utilization.

Okafor (2019) investigated antenatal care and maternal sociocultural determinants of childhood immunization in Northern Nigeria. The goal of this study was to look at antenatal care and mother sociocultural factors that influence childhood immunization within the first two months of life in northern Nigeria. This retrospective correlational cross-sectional study of women aged 15 to 49 in northern Nigeria used social cognitive theory constructs. Univariate, bivariate, and multivariate logistic regression were used to examine

secondary data from the 2013 Nigeria Demographic and Health Survey. The person who delivered antenatal care, the number of antenatal care visits, the number of tetanus injections, maternal educational level, religion, wealth index, husband/partner educational level, and the person who decides on health care were all statistically significant ($p < 0.05$) predictors of childhood immunization uptake within 2 months of birth. Educated Christian women from middle-class or wealthy families, whose husbands or partners were also educated and who jointly decided on health care, made numerous contacts with health care professionals, and received at least one tetanus injection during antenatal care, were more likely to immunize their children within 2 months of birth. This study's positive social change implications include giving evidence of impediments to childhood immunization, which could lead to applicable policies and initiatives that result in healthier children, communities, and society.

RESEARCH METHOD

Data for the study will be sourced from the 2018 Nigeria Demographic Health Survey and analyzed using STATA 15 software package. Ordinary least square method was used to achieve the objectives of the study which is to examine the socioeconomic factors of the pregnant women that affect their uptake of Tetanus Toxoid vaccination. Ordinary Least Square is used in the regression analysis due to its simplicity and effectiveness in the analysis of survey data. The model for the study is specified below;

$$TT = \beta_0 + \beta_1Age + \beta_2Edu + \beta_3R + \beta_4W + \beta_5MS + \beta_6ANC + \beta_7HEdu + \epsilon$$

TT = Tetanus Toxoid;

ANC = Number of Antenatal Care Visits;

Age = Age of the woman

Edu = Maternal education

R = Residence;

W = Wealth Index;

MS = Marital Status;

HEdu = Husband's Education;

ϵ = Error term

RESULTS AND DISCUSSION

Table 1: Effect of the Socioeconomic Characteristics of the Pregnant Women on the Uptake Vaccination of Tetanus Toxoid

VARIABLES	COEFFICIENT	STANDARD ERROR	T- STATISTICS	P- VALUES
CONSTANT	.876515	.0722116	12.14	0.000
AGE	.0008914	.0011069	0.81	0.421
RESIDENCE	-.0743594	.0195046	-3.81	0.000
MATERNAL EDUCATION	.2342038	.0104641	22.38	0.000
HUSBAND'S EDUCATION	.0784613	.0070446	11.14	0.000
WEALTH INDEX	.07960689	.0083336	9.49	0.000
ANTENATAL CARE VISIT	.0144293	.0006738	21.42	0.000
MARITAL STATUS	-.0047105	.0433611	-0.11	0.913
F – STATISTICS	563.44			
PROB > F	0.0000			
R SQUARED	0.1619			
ADJ. R SQUARED	0.1617			

Source: Author's Compilation, 2021

Table 1 reveals the effect of the socioeconomic characteristics of the women on the uptake of Tetanus Toxoid vaccination. Age has a positive but insignificant relationship with TT vaccination. Residence of the women was found to have a negative and significant relationship with TT vaccination. This means that the greater the number of women living in rural areas the less the intake of TT. This finding is in accordance with the research work carried out by Grebremedhin, Welay, Mengesha, Assefa & Werid (2020) in Ethiopia. They were of the opinion that a walking distance of more than 30 minutes to reach a health facility decreases a woman's chance in accessing antenatal clinic for TT vaccine. Maternal education is positive and has a significant relationship with TT vaccination. The more educated a woman, the higher the chances of taking TT vaccine as compared to those with no formal education. This result is in line with the findings of a previous work done in Ghana, in which high maternal education was found to be significantly associated with high uptake of IPTp – Sp drug (Intermittent preventive treatment in pregnancy (IPTp) with sulphadoxine-pyrimethamine (SP), (Orish, *et, al;* 2015). Husband's education was positive and significantly associated with the uptake of TT vaccine. The more educated the husband/partner the more likelihood of his involvement in the antenatal care of the pregnant partner.

Wealth has a positive and statistically significant impact on the uptake of TT vaccine. This suggests that the wealthier a woman is, the more likelihood of affording antenatal care services for TT vaccine uptake. The findings of similar works done in Africa, likewise indicates a similar statistical relationship between the level of income of a woman and the uptake of TT vaccine (Okafor, 2019), (Nozaki, Hachiya & Kitamura, 2019) and (Giles, Mason, Munoz, Lambach & Merten, 2020). Number of antenatal care visits was found to be positive and significant. This suggests that women who have attended antenatal care 8 times or more have a higher chance of receiving the adequate dosage of TT vaccine as compared to those who attended less than 8 times. Based on WHO guideline on antenatal care (2016), the minimum number of antenatal care visit is 8. The finding of this research is similar to the studies carried out in Ghana (Owusu – Boateng & Anto, 2016), Malawi (Azizi *et, al;* 2017) and Cameroon (Leonard, Eric, Judith & Samuel, 2017). They were of the opinion that women who attended antenatal care 4 times or more are most likely to be well informed of the importance of TT vaccination and the dosage and therefore received it more than those who attended less. Marital status was found to be negative and has an insignificant impact on tetanus toxoid vaccination.

CONCLUSION AND RECOMMENDATION

The study underscores the pivotal role of socioeconomic factors in shaping the tetanus immunization decisions of pregnant women in Nigeria. In response, the recommendations advocate for a strategic approach to health promotion, specifically targeting high-risk groups, particularly pregnant women in rural areas. Integrating these awareness initiatives within antenatal care visits becomes paramount, serving as a crucial platform to enlighten individuals about the profound impact of this morbidity on pregnancies.

Furthermore, recognizing the influential position of midwives and healthcare workers, the study emphasizes their active involvement in educating pregnant women. This collaborative effort aims to significantly contribute to the reduction of infant and maternal mortality ratios. Beyond awareness and education, the recommendations call for proactive measures to bridge existing health service gaps. This involves the establishment of more community-based facilities and the implementation of financial subsidies, ensuring

enhanced accessibility to essential healthcare services for pregnant women across diverse socioeconomic backgrounds.

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