

Assessing the Impact of Task-Shifting on Infant, Maternal and Child Health Outcomes in Rural Nigeria

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ABSTRACT

By using a longitudinal panel data approach, this study assesses how task-shifting affects maternal, infant, and child health outcomes in underdeveloped Nigeria. An analysis was done of data from administrative health records, national health surveys, and reports from the Federal Ministry of Health, UNICEF, and WHO. By means of a difference-in-differences (DiD) econometric technique, the study aims to estimate the impact of task-shifting by analyzing health results before and after implementation in institutions with and without the intervention. Key dependent variables are maternal mortality rate, infant mortality rate, under-five mortality rate, and immunization coverage. Independent variables include the degree of training given, the number of non-physician health care providers, and the status of task-shifting implementation. Regional fixed effects, facility characteristics, and socioeconomic variables are among the control variables. In facilities where task-shifting was applied, the outcomes show a statistically significant decrease in maternal and child death rates as well as an increase in immunization coverage. The validity of the results is confirmed by robustness checks including placebo tests and sensitivity analyses. Task-shifting is shown in the research to be a successful tactic for bettering health results in rural areas with limited resources. It recommends policies to strengthen training and support for non-physician healthcare workers and urges more widespread adoption of task-shifting initiatives to more effectively improve maternal and child health.

Keywords: Rural Healthcare, Task-Shifting, Maternal Health, Child Health, Difference-In-Differences.

Article Information

Received: January 24, 2025; Revised: June 7, 2025; Online June, 2025

INTRODUCTION

Limited access to medical services, inadequate health worker skills, inadequate infrastructural amenities, and hence constitute major challenges for the health care industry in rural Nigeria. While posing serious problems for both public authorities and healthcare service providers, the difficulties have had highly detrimental impacts on child and maternal and infant health outcomes. Task-shifting acts as a practical solution to transfer

medical care from trained health practitioners to healthcare staff with more basic qualifications. According to WHO (2018), this approach aims to enhance health outcomes by maximizing human resources in healthcare and improving quality of service. Particularly in rural areas where most severe health worker shortages exist (Cometto et al., 2019), task-shifting approaches have had encouraging results during their widespread implementation throughout low- and middle-income countries

(LMICs). Task-shifting has developed as a viable healthcare answer for Nigerian healthcare facilities to address ongoing system problems especially in areas where maternal and child health outcomes fall below national statistics (Okeke et al., 2020). A full evaluation is needed on the effectiveness of task-shifting in closing healthcare gaps and improving maternal-child health outcomes in rural Nigeria.

Health interventions carried out nationwide have not brought mortality rates among expectant mothers and newborns and young children in rural Nigeria down to acceptable levels. Insufficient medical personnel combined with economic and geographic restrictions gives individuals limited access to healthcare resources of acceptable quality and quick delivery (Adegoke et al., 2019). The implementation of task-shifting as a cost-effective solution to address healthcare issues lacks enough data on its outcome-based effect in rural Nigerian healthcare systems.

Concerns exist regarding the quality of healthcare delivery from untrained staff and doubts about the long-term viability of extended task-shifting programs because of Ogunleye et al. (2021). A thorough review of task-shifting effects on health outcomes concerning infants and mothers with children calls for urgent study. Knowledge about how well task-shifting works in addition to its challenges and areas that need improvement will deliver beneficial guidance to rural Nigerian healthcare providers and policymakers. This research evaluates the effect of task-shifting methods on significant health indicators throughout its assessment of success-determining factors.

The main aim of this research explores how task-shifting affects population health results for infants and mothers and children in rural portions of Nigeria. The research determines how well task-shifting strategies enhance access to healthcare services that serve

mothers and their children. The research explores both the effects of shifting tasks on maternal mortality rates and infant survival as well as child sickening patterns. The research will discover difficulties that face task-shifting implementation in rural healthcare facilities and propose sustainable evidence-driven solutions for rural Nigeria's task-shifting programs.

Three essential factors support the importance of this research study. This study gives practical data about task-shifting effectiveness for rural Nigerian health results which strengthens understanding of LMIC healthcare delivery approaches. The results will deliver important encounter-shifting knowledge to policy regulators as well as healthcare workers together with international development partners to assist them with task-shifting implementation. The study demonstrates how task-shifting improves clinical results regarding maternal and child health that serve as essential markers for assessing health care organization performance (Okeke et al., 2020). This research works to close active gaps in healthcare delivery because it seeks to advance universal health coverage goals for Nigeria.

The main innovation of this research centers around evaluating task-shifting effects on health results throughout rural Nigeria although little scholarly work has studied this area. This research targets infant, maternal, and child health outcomes from rural areas so it focuses specifically on task-shifting evaluation in such areas because health challenges there are most severe. The research design uses quantitative along with qualitative methods in a complete approach to better comprehend task-shifting effects. The comprehensive research design provides valuable insights regarding factors that drive the success and sustainability of task-shifting programs which creates substantial value to global health delivery systems in resource-limited areas.

LITERATURE REVIEW

Task-Shifting as a Strategy in Healthcare

The practice of transferring healthcare duties through task-shifting from professional medical personnel to less specialized healthcare providers has been commonly accepted as a workforce solution by low- and middle- income countries (LMICs) (World Health Organization, 2016; Cometto et al., 2018). The health care system in rural Nigeria faces poor maternal and child health results due to limited access to healthcare thus making task shifting an optimal solution. The worldwide support for task-shifting requires additional assessment of its effects on health outcomes when implemented in rural areas.

Healthcare Workforce Shortages in Nigeria

Nigeria experiences a severe healthcare worker deficit because its population has only 15 healthcare providers serving 10,000 people contrary to the WHO standard of 23 per 10,000 (World Health Organization, 2021). High maternal and child mortality rates within rural areas relate strongly to the lack of healthcare providers which worsens due to deficient healthcare delivery standards (Afolabi et al., 2019). Medical personnel prefer to work in urban areas where the healthcare provider shortage in rural communities remains critical (Federal Ministry of Health, Nigeria, 2020).

The nursing shortage in Nigeria stems from poor training facilities and inadequate pay along with challenging workplace conditions according to Adepoju et al. (2020). The workforce shortage continues to intensify because healthcare professionals leave their positions because of poor career advancement prospects and insufficient healthcare facilities (Ogunlesi et al., 2021). The healthcare system needs immediate resolution of these problems to develop a stronger medical system which will enhance rural healthcare delivery in Nigeria.

Maternal and Child Health Outcomes in Nigeria

The current statistics for maternal death rates in Nigeria stand at approximately 512 per 100,000 and child mortality rates come to 117 per 1000 live births according to UNICEF's 2022 assessment. The data demonstrates how essential it is to develop winning strategies that will enhance medical care accessibility and service quality immediately. The primary contributors to poor health results stem from insufficient medical facilities together with economic disparities and cultural traditions that block people from pursuing healthcare (Akinyemi et al., 2021).

Task-Shifting in Maternal and Child Health Services

Nigeria uses task-shifting strategies to expand its maternal and child health services through proper deployment of community health workers (CHWs) and midwives (Federal Ministry of Health, Nigeria, 2020). Medical task-shifting evidence demonstrates that it expands healthcare accessibility and function efficiency which results in enhanced health performance in limited resource areas (Lassi et al., 2016; Haines et al., 2018). Task-shifting must receive sufficient training as well as supervisory and support services for non-physician healthcare providers to succeed (Joshi

et al., 2019).

Challenges and Barriers to Task-Shifting

Task-shifting faces multiple obstacles preventing it from fully realizing its positive outcomes. Poor training or supervision of non-specialist health personnel compromises the quality of their medical treatment (Oladapo et al., 2019). Increased workloads that lead to burnout among healthcare workers provide sustainability problems for the ongoing execution of task-shifting initiatives (World Bank, 2021). Mullan and Frehywot (2020) argue that the effectiveness of task-shifting

relies on providing constant assistance, appropriate incentives, and correct integration with the larger healthcare system.

Advantages and Consequences of Task-Shifting

A cost-effective way to both increase healthcare access and lower pregnancy-related and childhood mortality rates throughout rural Nigeria is task-shifting. Studies demonstrate how task-shifting improves healthcare services by means of maximizing the existing human resource availability (Cometto et al., 2018; Lassi et al., 2016). These benefits need comprehensive strategies which focus on training resources and supervisor supervision challenges to achieve sustainability.

The practice of task-shifting presents significant potential for better outcomes related to maternal and childcare health in rural Nigeria. Task-shifting implementation reaches its best results when various obstacles to implementation become resolved. This paper examines task-shifting effects on rural Nigerian health results while offering proven strategies to boost the sustained impact of this method.

METHODOLOGY

Researchers apply a quantitative research method to determine how task-shifting affects maternal, infant, and child health results across rural Nigeria. The research design maintains a specific framework to execute a systematic econometric analysis.

Study Design and Data Collection

The research utilizes a longitudinal panel analysis which combines time-series findings with cross-sectional data measurement. Research draws information from both national health survey data and administrative health records as well as reports from the Federal Ministry of Health, Nigeria together with UNICEF and WHO international organizations.

Sampling

The study focuses on rural health facilities across several Nigerian states where task-shifting has been implemented. Stratified random sampling is utilized to ensure a representative sample based on region, facility size, and the duration of task-shifting programs.

Variables and Measurement

- **Dependent Variables:** Maternal mortality rate, infant mortality rate, under-five mortality rate, and immunization coverage.
- **Independent Variables:** Implementation of task-shifting (binary: 1 for implemented, 0 otherwise), number of non-physician healthcare workers, and the level of training and support provided.
- **Control Variables:** Socioeconomic factors (e.g., poverty rate, education level), facility characteristics, and regional fixed effects.

Econometric Model

A difference-in-differences (DiD) approach is used to estimate the impact of task-shifting. This method compares changes in health outcomes before and after the implementation of task-shifting in facilities with and without the intervention.

The DiD regression model is specified as:

$$Y_{it} = \alpha + \beta_1 \text{TaskShifting}_{it} + \beta_2 \text{Post}_t + \beta_3 (\text{TaskShifting}_{it} \times \text{Post}_t) + \gamma X_{it} + \epsilon_{it} \dots \dots \dots 1$$

Where:

- Y_{it} represents health outcomes for facility iii at time ttt .
- TaskShifting_{it} indicates task-shifting implementation.
- Post_t represents the post-implementation period.
- X_{it} includes control variables.

Data Analysis and Results

The data analysis involves a series of econometric tests and regressions to assess the impact of task-shifting on maternal, infant, and

child health outcomes. The analysis was conducted using STATA 17, ensuring rigorous statistical evaluation. Below are the key steps and results:

1. Descriptive Statistics

Table 1: Descriptive statistics provide an overview of the data, summarizing the main characteristics of the variables.

Variable	Mean	Standard Deviation	Min	Max
Maternal Mortality Rate	480	150	320	650
Infant Mortality Rate	75	20	50	120
Under-Five Mortality Rate	95	25	70	150
Immunization Coverage (%)	60	15	30	85
Task-Shifting Implementation	0.55	0.49	0	1

Source: Author's computation using STATA 17.

2. Difference-in-Differences (DiD) Regression Results

Table 2: The DiD model estimates the impact of task-shifting on health outcomes by comparing the pre- and post-implementation periods across facilities with and without task-shifting.

Dependent Variable	Maternal Mortality	Infant Mortality	Under-Five Mortality	Immunization Coverage
Task-Shifting (Post)	-50.8***	-12.5***	-15.6***	7.2***
Time (Post)	-20.3	-5.6	-6.9	3.5
Task-Shifting × Post	-45.7***	-10.9***	-13.8***	6.4***
Control Variables	Included	Included	Included	Included
R-squared	0.85	0.72	0.74	0.68
Observations	300	300	300	300

*Significance levels: *** $p < 0.01$, ** $p < 0.05$, $p < 0.1$.

Source: Author's computation using STATA 17.

3. Robustness Checks

a. Placebo Test

Table 3: A placebo test was conducted by applying the DiD model to a period before the actual task-shifting implementation to check for pre-treatment trends.

Variable	Maternal Mortality	Infant Mortality	Under-Five Mortality	Immunization Coverage
Task-Shifting × Pre-Period	5.1	1.3	1.5	-0.8

Source: Author's computation using STATA 17.

The placebo test shows no significant effect in the pre-implementation period, confirming that the observed effects are due to task-shifting.

b. Sensitivity Analysis

The model was re-estimated with different sets of control variables, yielding consistent results, thereby confirming the robustness of the findings.

4. Heterogeneity Analysis

Table 4: The impact of task-shifting was analyzed across different subgroups to identify variations.

Subgroup	Maternal Mortality	Infant Mortality	Under-Five Mortality	Immunization Coverage
Small Facilities	-60.2***	-15.4***	-18.5***	8.5***
Large Facilities	-30.4***	-8.6***	-10.7***	5.3***

Source: Author's computation using STATA 17.

Health outcomes showed better improvement at smaller healthcare facilities compared to larger ones due to task-shifting effectiveness in constrained environments.

DISCUSSION

These research findings strongly support how task-shifting initiatives deliver positive health outcomes to mothers and infants and children in rural Nigeria. Healthcare performance created major improvements as physicians transferred specific medical duties to non-physician health providers which ultimately led to lower mortality numbers and superior coverage of immunizations. This section interprets obtained data through existing research and investigates potential policy improvements.

Discussion of Findings

The experiment shows that delegating medical responsibilities between healthcare workers delivers substantial enhancements to healthcare results. After task-shifting entered

into practice the maternal mortality rate decreased by 50.8 deaths for every 100,000 live births and infant mortality decreased by 12.5 deaths per 1,000 live births and under-five mortality decreased by 15.6 deaths per 1,000 live births. The vaccination rate among the population rose through an additional 7.2 percentage points. The research shows that properly trained and backed medical personnel can manage specific healthcare responsibilities to free physicians who face overwhelming workloads while enhancing delivery outcomes.

Both Haines et al. (2013) and Lassi et al. (2014) supported the finding that task-shifting methods promise better health results in locations where resources are scant. The investigation expands current evidence bases by delivering localized statistics about rural Nigerian settings to resolve an essential

information void. The heterogeneity results show task-shifting delivers greater benefits to smaller medical facilities because it works best in situations where resources are scarce and medical staff is scarce.

The study results stand apart from research which demonstrates possible negative aspects of task-shifting including reduced care quality and increased workloads for healthcare staff (Kassebaum et al., 2014). Proper training along with organizational support and system-level integration demonstrated success in effectiveness and sustainability through the current study's viability checks and adjustments.

Policy Implications

The obtained findings create direct implications for national healthcare policies. This research demonstrates that proper investment needs to expand and sustain task-shifting approaches because they create effective health improvements in rural communities. Government officials need to expand educational programs which teach non-doctor staff in healthcare the right competencies and provide them sufficient tools for their work. Ongoing support together with supervisory systems must receive increased attention to ensure maintenance of high-quality care standards.

Infrastructure problems need focused attention due to their potential impact on limiting task-shifting program effectiveness. The development of healthcare facilities particularly in rural regions represents an essential factor for achieving operational excellence among non-physician healthcare providers.

Healthcare facilities need distinct task-shifting policies due to the different outcome results obtained between large-scale and small-scale clinics. Task-shifting policies need specific tailored support for small healthcare facilities that demonstrated maximum performance enhancement.

Summary of Findings

Research results show that shifting medical tasks increases important health results for mothers and newborns and children residing in rural Nigeria. The examined strategy successfully decreased mortality rates while simultaneously improving immunization coverage numbers according to statistical analysis. Additional tests that include robustness checks combined with heterogeneity analysis establish the reliability of detected results.

The identifiable evidence from this research leads policy makers to support continued expansion of task-shifting approaches particularly in settings where healthcare personnel shortages exist.

CONCLUSION

The researchers examined how task-shifting affected maternal child infant health outcomes in rural Nigeria based on their analysis through a reliable econometric methodology. Research data point to the fact that task-shifting strategies produce a substantial reduction in maternal and child death rates together with better immunization outcomes. The study demonstrates that task-shifting represents a strong solution to diminish healthcare worker deficits found in low-resource environments. The analysis establishes that task-shifting solutions with sufficient training along with enough resources contribute to improved healthcare delivery along with better rural health indicators.

RECOMMENDATIONS

- i. **Strengthening Training and Support for Non-Physician Healthcare Workers** To maximize the benefits of task-shifting, it is essential to provide continuous training and adequate support for non-physician healthcare workers. This will enhance their capacity to manage maternal and child health services effectively, contributing

- to sustained reductions in mortality rates.
- ii. Given the favourable effect seen, the government ought to look into increasing task-shifting initiatives to more remote medical facilities. To guarantee fair health benefits across the country, this expansion should give priority areas with highest maternal and child mortality rates.
 - iii. Strong monitoring and evaluation systems ought to be introduced to guarantee the efficacy and sustainability of task-shifting. These systems ought to monitor health outcomes, spot issues, and support prompt program changes so as to guarantee ongoing enhancement.
 - iv. Addressing Socioeconomic Determinants of Health: The research emphasizes how socioeconomic elements affect health outcomes. Policies targeting poverty reduction and rural education improvement should be combined with health interventions to produce a more comprehensive approach to enhancement of maternal and child health.
 - v. Encouragement of community involvement: Community involvement is essential for the success of task-shifting initiatives. Engaging local communities in planning and execution will increase program acceptance, usage, and sustainability, therefore enhancing health outcomes.
 - vi. Policymakers who put these suggestions into practice will be able to successfully use task-shifting to solve important health problems in rural Nigeria, therefore improving maternal and child health results.

Limitations and Directions for Future Study

Although the study offers useful information, it has limitations. The scope is restricted to rural Nigeria, which may influence the generalizability of the results and the reliance on secondary data may bring in biases. Future research should investigate the efficacy of task-shifting in various environments, including metropolitan areas, and consider longitudinal studies to monitor long-term effects.

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