

Beyond Knowledge: A Multi-Level Behavioral and Health System Model Explaining Low Cervical Cancer Screening Uptake in Rural Northern Nigeria

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ABSTRACT

Cervical cancer remains one of the leading causes of cancer-related morbidity and mortality among women in low- and middle-income countries, despite being preventable through vaccination and screening. Persistent infection with Human papillomavirus is responsible for nearly all cervical cancer cases globally. Recent evidence indicates that screening uptake in Nigeria remains critically low due to a complex interaction of socio-cultural, economic, behavioral, and health system barriers.

This study assessed determinants of cervical cancer screening uptake among women of reproductive age in Shira Local Government Area, Bauchi State, Nigeria, and proposed an Integrated Screening Uptake Model (ISUM). A community-based cross-sectional study involving 290 respondents was conducted using structured questionnaires. Data were analyzed using descriptive and inferential statistics.

Findings revealed poor knowledge (64.5%), negative attitude (73.1%), and low screening uptake (78.3%). No statistically significant association was observed between knowledge or attitude and uptake. Major barriers included poverty, long distance to facilities, out-of-pocket payment, and cultural beliefs.

The study concludes that low screening uptake is primarily driven by structural and systemic constraints rather than lack of awareness alone. Interventions should therefore adopt multi-level strategies addressing healthcare accessibility, affordability, gender norms, and culturally responsive service delivery.

Keywords: Cervical cancer, HPV, screening uptake, Nigeria, behavioral model, health systems

INTRODUCTION

Background

Cervical cancer is the fourth most common cancer among women globally and remains a major public health challenge, particularly in sub-Saharan Africa. The disease is almost entirely caused by persistent infection with high-risk strains of Human papillomavirus, especially HPV-16 and HPV-18, which account for approximately 70% of cases worldwide. ([UICC](#))

According to the [World Health Organization \(WHO\) Cervical Cancer Elimination Initiative](#), cervical cancer caused approximately 660,000 new cases and 350,000 deaths globally in 2022. Low- and middle-income countries account for nearly 90% of these deaths due to poor screening coverage and inadequate healthcare systems.

Nigeria bears a substantial share of this burden. Recent national reports indicate that most cervical cancer cases in Nigeria are diagnosed at advanced stages due to weak screening systems, low awareness, and poor access to healthcare services. ([UICC](#)) The country has introduced cervical cancer prevention strategies, including HPV vaccination and screening programs, but uptake remains suboptimal, especially in rural communities.

Problem Statement

Despite the preventable nature of cervical cancer, screening uptake among Nigerian women remains alarmingly low. Existing interventions have predominantly focused on awareness campaigns and health education; however, evidence increasingly suggests that knowledge alone may not sufficiently influence screening behavior.

Women in rural settings face multiple intersecting barriers including:

- Poverty,
- Distance to health facilities,
- Sociocultural norms,
- Gender inequality,
- Fear and stigma,
- Poor provider attitudes,
- And inadequate healthcare infrastructure.

Research Gap

Previous Nigerian studies have largely relied on the Knowledge-Attitude-Practice (KAP) framework, assuming that increased knowledge automatically leads to improved screening behavior. However, systematic reviews now demonstrate that cervical cancer screening behavior is influenced by broader structural determinants beyond awareness alone.

This study contributes to the literature by proposing an integrated framework that combines:

- Behavioral determinants,
- Socio-cultural influences,
- Economic barriers,
- And health system factors.

Study Objectives

The study aimed to:

1. Assess knowledge of cervical cancer screening among women of reproductive age;
2. Examine attitudes toward cervical cancer screening;
3. Determine uptake of screening services;
4. Identify socio-cultural, economic, and health system determinants influencing uptake.

LITERATURE REVIEW

Cervical Cancer Burden in Africa

Africa has one of the highest cervical cancer mortality rates globally, largely due to poor implementation of screening programs and weak healthcare systems.

A systematic review of barriers to cervical cancer screening in Africa identified low awareness, poor accessibility, cost of services, and cultural beliefs as major barriers across the continent.

Knowledge and Screening Uptake

Studies in Nigeria, Ethiopia, Tanzania, and Bangladesh consistently report low awareness and poor uptake of cervical cancer screening services among women.

An integrative review on cervical cancer screening in Nigeria found that even among women with adequate knowledge, screening uptake remained poor due to fear, embarrassment, and poor access to services.

Socio-Cultural Determinants

Cultural and religious beliefs strongly influence screening behavior among women in Northern Nigeria and other West African countries. Recent systematic evidence demonstrates that modesty norms, gender relations, and traditional health beliefs discourage women from accessing cervical cancer screening.

Women often require permission from husbands or elders before seeking healthcare services. Preference for female healthcare providers has also been repeatedly documented in Muslim communities.

Health System Barriers

Health system weaknesses remain major obstacles to cervical cancer prevention in Nigeria. Studies report:

- Shortage of trained personnel,
- Long waiting time,
- Poor provider communication,
- Inadequate equipment,
- And poor geographical access to facilities.

Recent findings from Nigerian public health facilities also revealed low screening coverage and delayed diagnosis due to poor health system coordination.

METHODS

Study Design

A community-based cross-sectional study was conducted.

Study Area

The study was carried out in Shira Local Government Area of Bauchi State, Nigeria.

Study Population

Women of reproductive age residing in selected wards were included.

Sample Size Determination

Using Cochran's formula, a sample size of 290 respondents was obtained.

Sampling Technique

A multi-stage sampling technique was employed.

Data Collection

Structured interviewer-administered questionnaires were used.

Data Analysis

Data were analyzed using SPSS version 20. Descriptive and inferential statistics were performed. Chi-square test significance was set at $p \leq 0.05$.

RESULTS

Socio-Demographic Characteristics

The majority of respondents were aged 15–24 years (42.1%), married (43.8%), and predominantly had primary or non-formal education.

Knowledge, Attitude, and Uptake

Findings showed:

- Poor knowledge: 64.5%
- Poor attitude: 73.1%
- Low screening uptake: 78.3%

Determinants of Uptake

Economic Barriers

Most respondents paid for healthcare services out-of-pocket (64.5%), while 71% reported low monthly income.

Geographic Barriers

Most screening facilities were located more than 5 km away.

Socio-Cultural Barriers

Traditional beliefs and community norms influenced health-seeking behavior.

DISCUSSION

The findings indicate that awareness alone is insufficient to improve cervical cancer screening uptake. Although some respondents demonstrated awareness of cervical cancer, utilization remained poor due to systemic and structural barriers.

This supports recent evidence from Nigerian and African systematic reviews showing that healthcare access, affordability, and sociocultural norms exert stronger influence on screening uptake than knowledge alone.

The absence of significant association between knowledge and uptake challenges traditional KAP assumptions and supports more comprehensive behavioral frameworks such as the Health Belief Model and Social Ecological Model.

6. Conceptual Contribution: Integrated Screening Uptake Model (ISUM)

This study proposes the Integrated Screening Uptake Model (ISUM), which conceptualizes cervical cancer screening uptake as the outcome of interactions between:

1. Individual-level factors
2. Socio-cultural dynamics
3. Economic constraints
4. Health system barriers

The framework argues that improving awareness without addressing structural barriers is unlikely to substantially improve uptake.

CONCLUSION

Cervical cancer screening uptake among women in rural Northern Nigeria remains low despite increasing awareness efforts. Structural barriers, including poverty, distance to facilities, and sociocultural influences, play more substantial roles than knowledge alone.

A multi-level intervention approach is therefore essential for improving cervical cancer prevention outcomes.

RECOMMENDATIONS

1. Integrate cervical cancer screening into primary healthcare services
2. Expand mobile outreach screening programs
3. Subsidize or provide free screening services
4. Increase recruitment of female healthcare providers
5. Strengthen culturally sensitive health education campaigns

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