By The Name Of Allah

University of Dongola

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RESEARCH PROPOSAL

Knowledge, Attitudes, and Practices Regarding Cervical Cancer Screening Among Women Attending Dongola Maternity Hospital, Sudan. 2026.

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1. Introduction

1.1 Background

Cervical cancer is a leading cause of female cancer mortality worldwide, despite being almost entirely preventable through HPV vaccination, early detection, and control of persistent High-Risk Human Papillomavirus (HPV) infection. Globally, women's knowledge, attitudes, and practices (KAP) regarding prevention vary widely by resource level: while high-income nations maintain high health literacy and routine screening uptake, low- and middle-income countries (LMICs)—where over 85% to 90% of global cervical cancer deaths occur—face limited awareness, lingering fatalistic attitudes, and screening coverage rates often below 10%. Meeting the World Health Organization (WHO) target of 70% screening coverage of women by 2030 hinges directly on transforming population health literacy and encouraging routine screening practices (1, 6).

Regionally, Africa carries a disproportionately high burden of cervical cancer, driven by widespread gaps in health literacy and structural barriers. Across African populations, general cancer awareness is relatively common, but specific knowledge regarding asymptomatic screening modalities—such as Papanicolaou (Pap) smears—remains limited. Favorable attitudes toward testing are frequently offset by embarrassment, fear of diagnosis, and financial constraints, leaving lifetime screening coverage in the region between 13% and 20%. However, regional studies consistently show that higher educational attainment and prior healthcare counseling strongly predict better knowledge and higher screening utilization (2, 7).

In Sudan, these challenges are compounded by the lack of an organized national screening program and limited local healthcare infrastructure. Studies among Sudanese women reveal a pronounced KAP gap: nearly half of women in a Khartoum study had never heard of the Pap smear test, and routine uptake remained exceptionally low. Nevertheless, Sudanese women demonstrate favorable attitudes when informed, with over two-thirds expressing willingness to undergo screening if properly informed about the test (4, 5).

1.2 Problem Statement

In Sudan, cervical cancer ranks among the most common gynecological malignancies and is a major contributor to female cancer-related mortality. The high burden of late-stage presentation in Sudanese hospitals is largely driven by the absence of a national, population-based screening program, limited healthcare infrastructure, economic constraints, and a widespread lack of health literacy regarding cervical cancer symptoms and screening benefits. Most women seek medical evaluation only after developing advanced clinical symptoms, at which point curative interventions are significantly limited (4, 5).

Dongola Maternity Hospital serves as the primary specialized tertiary referral facility for women's health in Northern State, serving a diverse female population from both urban centers and outlying rural agricultural localities. Despite its critical role, there is an absence of empirical baseline data evaluating what women attending this facility know, think, and practice regarding cervical cancer screening. Without local evidence detailing women's awareness and screening uptake, health managers cannot

formulate tailored educational strategies or justify establishing routine point-of-care screening units within the facility.

1.3 Justification

A KAP study was chosen because screening uptake depends not only on whether services exist, but on what women know, how they feel about the test, and what stops them from acting. By measuring all three, a KAP survey shows where the gaps lie, for example women who are aware of cervical cancer but have never been screened, and which factors, such as education or source of information, are linked to them. This allows health education and counseling to be aimed at the groups and barriers that matter most. It is also a quick and low-cost design to carry out in a hospital setting, and validated KAP tools from similar studies make the results comparable with existing evidence (3, 4).

Cervical cancer screening was chosen because cervical cancer is a leading cause of female cancer mortality worldwide, yet it is almost entirely preventable through early detection. In Sudan, where no organized national screening program exists and most women present with advanced disease, women's awareness of screening and willingness to use it are among the few points at which the burden can realistically be reduced (1, 5).

Dongola Maternity Hospital was chosen because it is the primary tertiary referral facility for women's health in Northern State, serving women from both Dongola and the surrounding rural Nile valley localities. No published KAP study exists for this region, and findings from central areas like Khartoum cannot be assumed to apply to this population. Baseline data from this hospital will help facility leadership and the Ministry of Health design targeted health promotion campaigns, train staff to offer screening counseling, and establish accessible, low-cost screening pathways (1, 4).

1.4 Research Question

What are the knowledge levels, attitudes, and utilization practices regarding cervical cancer screening among women attending Dongola Maternity Hospital, and which factors are associated with them?

1.5 Hypothesis

- **Null Hypothesis (H0):** There is no significant association between women's knowledge, attitudes, and practices regarding cervical cancer screening and the selected socio-demographic factors or the main source of information about cervical cancer.
- **Alternative Hypothesis (H1):** There is a significant association between women's knowledge, attitudes, and practices regarding cervical cancer screening and the selected socio-demographic factors or the main source of information about cervical cancer.

2. Research Objectives

2.1 Main Objective

To assess the knowledge, attitudes, and practices regarding cervical cancer screening among women attending Dongola Maternity Hospital.

2.2 Specific Objectives

1. To measure the level of knowledge regarding cervical cancer risk factors, symptoms, and screening methods among women attending Dongola Maternity Hospital.
2. To evaluate the attitudes of women toward undergoing cervical cancer screening procedures.
3. To identify the practices of women toward Cervical Cancer Screening (eg, Self-reported Screening.)
4. To identify the primary sources of information regarding cervical cancer screening.
5. To determine factors associated with knowledge, attitudes, and practices regarding cervical cancer screening among women attending Dongola Maternity Hospital.

3. Literature Review

3.1 International Evidence

Globally and across Middle Eastern and Arab nations, knowledge and uptake of cervical cancer screening vary widely across resource-constrained settings, with overall screening utilization remaining sub-optimal. An integrative review by Ali et al. (2017) of studies from Western Asian and Middle Eastern Arab countries found that few population-based screening programs had been implemented and that women had low knowledge of and limited perceptions about cervical screening. The factors it identified as affecting uptake included the absence of organized, systematic programs, low screening knowledge, healthcare professionals' attitudes toward screening, pain and embarrassment, stigma, and sociocultural beliefs. More recently, a systematic review and meta-analysis by Ahmed et al. (2024) synthesized cervical cancer screening uptake and the barriers reported by non-participants across Arab countries. Consistent with the wider literature, key reported barriers across these settings include a lack of physician recommendations, religious and cultural modesty considerations, fear of test procedures or a malignant diagnosis, financial constraints, and inadequate public health education campaigns (8, 9).

3.2 African Evidence

Across Sub-Saharan Africa, cervical cancer incidence remains disproportionately high, while public awareness and screening participation remain low. A community-based cross-sectional study conducted by Tsegay et al. among 617 women aged 15–49 years in Adigrat town, Northern Ethiopia, assessed cervical cancer screening KAP. The study revealed that 46.4% of participants demonstrated good knowledge of cervical cancer, 53.3% expressed a positive attitude toward screening, and 38.1% reported having ever undergone screening. Secondary or higher education, prior health information exposure, and history of health facility visits were identified as key independent predictors of adequate knowledge and screening utilization. Similarly, Endalew et al. observed in the Gurage zone, Southern Ethiopia, that 26.2% of women possessed good knowledge regarding cervical cancer screening, while only 3.8% had ever undergone screening, with lack of health education cited as a primary barrier (53.2%) (3, 7).

3.3 Sudanese Evidence

In Sudan, limited health literacy and structural healthcare constraints contribute to sub-optimal screening rates. A cross-sectional study conducted by Almobarak et al. among 500 married women aged

14–58 years, recruited from obstetric clinics, hospitals, and universities in Khartoum in 2014, evaluated knowledge, attitudes, and practices regarding the Pap smear test and cervical cancer. The authors found that 48% of participants had never heard of the Pap smear test and only 15.8% had ever undergone the test. Furthermore, only 46.6% knew that Human Papillomavirus (HPV) was the causative agent, and only 11.4% had received the HPV vaccine. However, 68% of respondents indicated a willingness to undergo a Pap smear if properly informed, and 75.4% expressed willingness to participate in an organized screening program. Notably, the sample was almost entirely urban (97.2%) and highly educated (78.8% university degree holders), which limits its applicability to more diverse populations (4, 5).

3.4 Research Gap

Despite documented findings from selected urban centers in Central Sudan, we are not aware of any published study assessing knowledge, attitudes, and practices regarding cervical cancer screening in Northern State, particularly at Dongola Maternity Hospital. Given the unique demographic distribution and healthcare access dynamics in Northern State, baseline data from other regions cannot be reliably generalized. This study addresses this regional literature gap by providing first-hand empirical evidence from Dongola in 2026 (4, 5).

4. Materials and Methods

4.1 Study Design

A hospital-based, descriptive cross-sectional study design will be used to assess knowledge, attitudes, and practices regarding cervical cancer screening and to examine their associated factors.

4.2 Study Area

The study will be conducted at Dongola Maternity Hospital, located in Dongola, the capital city of Northern State, Sudan. Dongola Maternity Hospital is the primary specialized tertiary referral center for obstetrics and gynecology in Northern State, serving urban residents as well as referrals from surrounding rural localities along the Nile.

4.3 Study Population

All women of reproductive and post-reproductive age (18–65 years) attending Dongola Maternity Hospital during the data collection period.

4.4 Inclusion Criteria

- Women aged 18 to 65 years attending Dongola Maternity Hospital during the study period.
- Women who voluntarily provide informed consent to participate.

4.5 Exclusion Criteria

- Women with a prior history of diagnosed cervical cancer or total hysterectomy.
- Women who are critically ill, in active severe labor distress, or mentally unable to complete the interview.
- Women who decline to participate.

4.6 Sample Size Determination

Because the total population size of women attending Dongola Maternity Hospital during the specific data collection window is unknown, Cochran's formula for an unknown population size is applied:

$$n = (Z^2 \times p \times q) / e^2$$

Where: n = required sample size; Z = standard normal deviate at a 95% confidence level, which equals 1.96; p = estimated proportion of women with good knowledge of cervical cancer screening (assumed 0.50, in the absence of prior baseline data in Dongola, to obtain the maximum sample size); q = 1 − p = 0.50; e = margin of error, set at 0.05 (5%).

Calculation: $n = (1.96^2 \times 0.50 \times 0.50) / 0.05^2 = (3.8416 \times 0.25) / 0.0025 = 0.9604 / 0.0025 = 384.16$

Rounding up, the minimum sample size is 385 respondents. To compensate for a potential 10% non-response or incomplete questionnaire rate (10% of 385 ≈ 39), the final sample size is calculated as:

Final Sample Size = 385 + 39 = 424 participants

4.7 Sampling Technique

Consecutive (non-probability) sampling will be used. Every eligible woman attending Dongola Maternity Hospital during the daily data collection period who meets the inclusion criteria will be invited to participate sequentially until the required sample size of N = 424 is achieved. Data collection will be spread across all working days and, where feasible, across all service points, to reduce the over-representation of any single clinic or day of week.

4.8 Data Collection Tools

Data will be collected using a pre-tested, structured interviewer-administered questionnaire adapted from standardized World Health Organization (WHO) cervical cancer screening tools, the official WHO Eastern Mediterranean Regional Office (EMRO) Arabic modules, and validated KAP instruments from published literature (1, 4).

The instrument comprises four main sections:

1. **Section A: Sociodemographic and Reproductive History:** Age, residence (urban/rural), educational level, marital status, occupation, monthly income, parity, age at first marriage, and contraceptive history; for pregnant participants, gestational age and number of antenatal care visits.
2. **Section B: Knowledge of Cervical Cancer and Screening:** Awareness of cervical cancer, Human Papillomavirus (HPV), risk factors (e.g., early sexual initiation, multiple partners, smoking), warning signs (e.g., post-coital bleeding, intermenstrual bleeding), and knowledge of screening tests (Pap smear, VIA, HPV test), recommended screening frequencies, and primary sources of health information.
3. **Section C: Attitudes Toward Cervical Cancer Screening:** Likert-scale items measuring perceived susceptibility, perceived severity, perceived benefits of early detection, and personal willingness to undergo screening if offered.

4. **Section D: Practices and Barriers:** Self-reported lifetime uptake of cervical cancer screening, reasons for screening or non-screening (e.g., lack of symptom awareness, fear, embarrassment, cost, lack of doctor recommendation).

4.9 Study Variables

Independent Variables: Educational level (primary exposure variable), age, residence, employment status, family income, parity, and contraceptive history, all collected in Section A. For pregnant participants only, gestational age and number of antenatal care visits will also be collected. The primary source of health information, will also be examined as a possible predictor of knowledge, attitude, and practice.

Dependent Variables:

- **Knowledge Level:** A total knowledge score will be computed from the responses to Section B (one point for each correct answer). Respondents will be classified as "Good Knowledge" (score ≥ 60% of the maximum achievable score) or "Poor Knowledge" (score < 60%). This cut-off is fixed before data collection.
- **Attitude Score:** A total attitude score will be computed from the Likert-scale items in Section C, with negatively worded items reverse-coded. Respondents will be classified as "Favorable Attitude" (score ≥ 60% of the maximum achievable score) or "Unfavorable Attitude" (score < 60%). This cut-off is fixed before data collection.
- **Practice:** Categorized as "Ever Screened" (having undergone Pap smear, VIA, or HPV screening at least once) versus "Never Screened".

4.10 Operational Definitions

Term	Operational definition
Cervical cancer screening	Testing of asymptomatic women to detect pre-cancerous cervical lesions or HPV infection, using a Pap smear, Visual Inspection with Acetic Acid (VIA), or HPV DNA test.
Knowledge	Women's awareness and understanding of cervical cancer, HPV, its risk factors, warning signs, and available screening tests, measured by the total score of Section B.
Good / Poor knowledge	Total knowledge score ≥ 60% / < 60% of the maximum achievable score.
Attitude	Women's beliefs and feelings toward cervical cancer and screening (susceptibility, severity, benefits, willingness), measured on a Likert scale in Section C.
Favorable / Unfavorable attitude	Total attitude score ≥ 60% / < 60% of the maximum achievable score.
Practice (Ever screened)	Self-reported history of having undergone at least one Pap smear, VIA, or HPV test in her lifetime. Women who report never having had any of these tests are classified as "Never screened".
Barrier to screening	Any reason reported by a woman for not having been screened (e.g., fear, embarrassment, cost, lack of awareness, no doctor recommendation).
Source of information	The main channel through which the woman first learned about cervical cancer (e.g., health worker, family or friends, media, social media, school/university).

Term	Operational definition
Residence	Urban or rural, according to the woman's usual place of residence.
Educational level	Highest level of formal education completed: none/Khalwa, primary, secondary, or university and above.
Reproductive and post-reproductive age	Women aged 18–65 years.
Parity	Number of previous live births or births after 24 weeks of gestation.

4.11 Timeline and Work Plan

The study will be implemented according to the following schedule:

No.	Activity	Time Period
1	Submission of research proposal	September 20 – 24, 2026
2	Presentation of research proposal	September 27 – October 1, 2026
3	Data collection	October 4 – 22, 2026
4	Data analysis	October 25 – November 5, 2026
5	Writing and discussion of the results	November 8 – 19, 2026
6	Writing the final report	November 22 – December 3, 2026
7	Electronic submission of research to the Department of Community Medicine	December 6 – 10, 2026
8	Research review	December 13 – 24, 2026
9	Research editing	December 27 – 31, 2026
10	Research discussion	January 3 – 4, 2027

4.12 Budget Outline

The estimated budget required to carry out the study is summarized below:

No.	Expenses	Estimated Cost (SDG)
1	Printing of questionnaires	675,000
2	Printing and binding of proposal	30,000
3	Transportation for data collection	150,000
4	Internet/data bundles	50,000
5	Stationery and office supplies	30,000
6	Data entry, cleaning and related expenses	50,000
7	**Estimated total**	**985,000**

4.13 Data Management and Analysis

- **Descriptive Analysis:** Categorical variables will be summarized using frequencies and percentages. Continuous variables will be summarized using means and standard deviations (or medians and interquartile ranges if not normally distributed).
- **Inferential Analysis:** The Chi-square test (χ^2) will be used to test the association between each independent variable (including women's educational level, which is the primary exposure, and the main source of information) and each of the three outcomes: knowledge level, attitude, and screening practice. Variables with $p < 0.25$ in the bivariate analysis will be entered into a multivariable binary logistic regression model to identify independent predictors of good knowledge, favorable attitude, and ever-screened status while controlling for potential confounders; knowledge and attitude will also be considered as potential predictors of practice. A p-value of < 0.05 will be considered statistically significant.
- **Data Entry:** Completed questionnaires will be inspected daily for completeness and accuracy. Data will be coded and entered into the Statistical Package for the Social Sciences (SPSS) software.

4.14 Ethical Considerations

1. **Ethical Clearance:** Ethical approval will be obtained from the Health Research Ethics Committee at the Faculty of Medicine, University of Dongola. Official administrative permission will be secured from the administration of Dongola Maternity Hospital.
2. **Informed Consent:** Voluntary written or verbal informed consent will be obtained from all participants prior to commencing interviews.
3. **Voluntary Participation:** Participants will be informed that participation is entirely voluntary and that declining will not affect their medical care or access to facility services.
4. **Confidentiality:** Questionnaires will not contain participants' names or other direct identifiers; identification numbers will be used instead, and data files will be password-protected and accessible only to the research team. Interviews will be conducted in a private setting.

5. References

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