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Effect of Educational Intervention on Knowledge of Cervical Cancer and Attitude towards Cervical Cancer Screening Services among Female Civil Servants in Delta State

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ABSTRACT
Cervical cancer is a major public health concern among women, particularly in low- and middle-income countries where inadequate knowledge and unfavourable attitudes towards screening continue to weaken prevention efforts. This study examined the effect of educational intervention on knowledge of cervical cancer and attitude towards cervical cancer screening services among female civil servants in Delta State. Two objectives and two research questions guided the study. A one-group pretest-posttest quasi-experimental research design was adopted. The population of the study comprised 1,680 female civil servants drawn from selected federal and state institutions across the three senatorial districts of Delta State. A sample of 336 respondents was used in the study. Data were collected using a structured questionnaire. Face and content validity of the instrument was established through expert review, while the reliability coefficients for the two clusters were established at 0.80 and 0.78, using Cronbach Alpha. Data were analysed using ANCOVA at the 0.05 level of significance. The study revealed that educational intervention significantly improved knowledge of cervical cancer among female civil servants ($p = .000$), with a mean increase from 19.84 to 27.84. The study also revealed that educational intervention significantly improved attitude towards cervical cancer screening services ($p = .000$), with a mean increase from 22.40 to 30.48. Educational qualification did not significantly influence either knowledge ($p = .936$), or attitude ($p = .743$). The study concludes that educational intervention is effective in improving knowledge of cervical cancer and attitude towards cervical cancer screening services among female civil servants in Delta State. The study recommends regular workplace-based cervical cancer education programmes for female civil servants.
Keywords: Educational Intervention, Knowledge, Attitude, Cervical Cancer, Screening, Civil Servants, Delta State, Nigeria.

INTRODUCTION
Cervical cancer is a major public health concern. It has continued to impose a disproportionate burden on women in low- and middle-income countries. The World Health Organization stated that cervical cancer was the fourth most common cancer among women globally in 2022, with about 660,000 new cases and 350,000 deaths, and nearly 94% of those deaths occurred in low- and middle-income countries (World Health Organization [WHO], 2025). Cervical cancer has been linked to persistent infection with high-risk human papillomavirus, most cases of which can be prevented through human papillomavirus vaccination, screening, and timely treatment of precancerous lesions (WHO, 2025). In Nigeria, the disease is a substantial source of morbidity and mortality. The International Agency for Research on Cancer estimated that 13,676 new cases of cervical cancer, and 7,093 deaths occurred in Nigeria in 2022, confirming that cervical cancer remains a serious threat to women's health in the country (International Agency for Research on Cancer [IARC], 2024). These alarming statistics provide

important justification for continued scholarly and practical attention to preventive strategies that can improve women's understanding of the disease and strengthen their disposition towards screening.

Knowledge of cervical cancer is a central part of prevention because women's understanding of the disease influences how they interpret related risk, recognise the value of early detection, and respond actively to preventive health information. Cervical cancer develops gradually, and can be detected before invasive disease occurs, particularly where screening is undertaken appropriately, and on time (WHO, 2025). When women do not understand the causes, risk factors, symptoms, or preventable nature of the disease, they may underestimate their vulnerability or delay engagement with screening opportunities. In Nigeria, an integrative review by Uchendu et al. (2021) established that knowledge of cervical cancer and cervical cancer screening was generally poor across many studies, while awareness gaps, cultural concerns, religious influences, and socioeconomic constraints have continued to affect women's preventive behaviour. This means that inadequate knowledge is a practical barrier to prevention, not merely an informational deficit. Knowledge of how cervical cancer operates is important and can provide the cognitive basis upon which women can evaluate health messages, assess personal relevance, and make more informed decisions about cervical cancer screening services.

Attitude towards cervical cancer screening services is equally important because favourable knowledge does not automatically produce favourable preventive behaviour. A woman may know that cervical cancer exists, and still remain unwilling to consider screening if fear, embarrassment, low perceived risk, mistrust, or fatalistic beliefs shape her response to the disease, and its preventive services. Uchendu et al. (2021) reported that perceptions, attitudes, and beliefs were recurrent influences on screening behaviour in Nigeria, whereas concerns about shame, discomfort, religion, and modesty have continued to weaken women's willingness to utilise screening services. Ogundipe et al. (2023) assessed the knowledge, awareness, and attitude of female staff in a Nigerian university, and concluded that important gaps still remained in awareness and attitude towards cervical cancer screening and vaccination, thereby reinforcing the need for sustained education and preventive care. Prevention depends not only on whether women possess information, but also on whether the information is well organized and conveyed to inspire action and empower the receivers to develop a disposition that supports screening acceptance and uptake (Ijezie et al., 2022; Ogundipe et al., 2023). This suggests that more studies on women's attitude towards screening remain necessary in any serious attempt to improve cervical cancer prevention among female populations.

Educational intervention has increasingly been recognised as a practical strategy for improving both knowledge of cervical cancer and women's attitudes towards screening services. Educational intervention refers to organised and purposeful health education activities designed to provide accurate information, correct misconceptions, strengthen perception of risk, and promote positive orientation towards preventive services. Naz et al. (2018) observed that educational interventions generally improved women's cervical cancer screening behaviour, especially where programmes were structured and theory based. Adamu et al. (2012) conducted a quasi-experimental study among female teachers in Birnin Kebbi, and reported that health education significantly improved knowledge, attitude, and uptake of free Pap smear services in the intervention group. Similarly, Abiodun et al. (2014) found that a health education intervention improved knowledge and perception of cervical cancer and cervical screening uptake among adult women in rural Nigerian communities. In Uyo, Akwa Ibom State, Ijezie et al. (2022) also established that health education significantly improved knowledge of cervical cancer and increased Pap smear uptake among public secondary school teachers. These studies indicate that educational intervention can influence both cognitive and attitudinal outcomes, although the strength of that influence may depend on the population, context, and structure of the intervention.

Female civil servants in Delta State represent an important population for such investigation because they belong to an organised workforce that can be reached through institutional health education programmes. Yet the assumption that female civil servants will naturally possess adequate knowledge of cervical cancer or a favourable attitude towards screening cannot be accepted without empirical examination. Organised employment does not remove the influence of misinformation, personal fears, competing work demands, financial considerations, or broader social beliefs that may shape women's response to screening services. Moreover, workplace-based populations are especially important for public health intervention because structured educational exposure can be delivered more systematically within them than in many informal community settings. If educational intervention improves knowledge and attitude in this group, the findings can support the development of workplace-based

cancer prevention strategies that are both practical and scalable. If, however, knowledge remains incomplete or attitude remains unfavourable even within this relatively accessible population, then the design of health education programmes will need to be reconsidered more carefully.

Despite the availability of relevant literature, there is insufficient evidence on the effect of educational intervention on knowledge of cervical cancer and on attitude towards cervical cancer screening services among female civil servants in Delta State. Existing Nigerian studies have focused mainly on teachers, rural women, university staff, and other community-based populations rather than female civil servants in Delta State specifically (Abiodun et al., 2014; Adamu et al., 2012; Ijezie et al., 2022; Ogundipe et al., 2023). This has created a contextual gap, given that occupational setting, institutional culture, and social experiences of female civil servants may shape how they receive and respond to health education. In this regard, this study on educational intervention, knowledge of cervical cancer, and attitude towards cervical cancer screening services among female civil servants in Delta State is justified. This study aims to clarify whether structured educational exposure can improve women's understanding of cervical cancer, and encourage a more favourable attitude towards cervical cancer screening services within the population.

Objectives of the Study

The following objectives guided the study.

1. To assess the effect of educational intervention on knowledge of cervical cancer among female civil servants in Delta State.
2. To ascertain the effect of educational intervention on the attitude of female civil servants in Delta State towards cervical cancer screening services.

Research Questions

The following research questions guided the study

1. What is the effect of educational intervention on the knowledge of cervical cancer among female civil servants in Delta State?
2. What is the effect of educational intervention on the attitude of female civil servants in Delta State towards cervical cancer screening services?

METHODOLOGY

Design: This study adopted a one-group pretest-posttest quasi-experimental research design to assess the effect of educational intervention on knowledge of cervical cancer and attitude towards cervical cancer screening services among female civil servants in Delta State. The quasi-experimental design was appropriate because it enabled the collection of baseline data before the intervention, the administration of a structured educational programme, and the reassessment of the same participants after the intervention without random assignment, which was considered more suitable for a real workplace environment where full experimental control may not be feasible. The study was conducted in Delta State, Nigeria, a South-South state made up of twenty-five local government areas and characterised by a diverse female workforce distributed across federal and state institutions.

Population and Sample size: The target population comprised 1,680 federal and state female civil servants distributed across selected establishments in Delta North, Delta Central, and Delta South. This population was considered suitable because female civil servants constitute an organised and accessible workforce that can be reached through workplace-based health education, and they also reflect a diverse cross section of women across social, educational, and professional backgrounds. The sample size for the study was 336 respondents. Inclusion criteria comprised female civil servants in the selected federal and state establishments who were available during the study period, consented to participate, and completed both the pre-intervention and post-intervention assessments; exclusion criteria comprised male staff, female civil servants outside the selected establishments, those absent during either phase of data collection, and those who declined consent. A sample size of 323 was initially obtained using the Taro Yamane formula for finite populations, but an additional 13 respondents were added in order to improve statistical power, accommodate possible non response or unusable data, and ensure adequate population representation. The sample was selected through multistage technique. The stratified random sampling was first used to classify the population by senatorial district; simple random sampling was then used to identify 17 public institutions that took part in the study. The proportionate and random sampling techniques were further employed to **select** the 336 respondents that participated in the study.

Instrument for Data Collection: Data were collected with a structured questionnaire developed by the researchers titled "Educational Intervention, Knowledge of Cervical Cancer and Attitude towards Cervical Cancer Screening Services Questionnaire (EIKACCSQ)". It contained two sections. Section A elicited respondents' socio-demographic characteristics, namely age, marital status, educational qualification, location of residence, and personal income range. Section B contained items on knowledge of cervical cancer and attitude towards cervical cancer screening services administered before and after the intervention. The questionnaire was designed in simple English in order to ensure clarity and suitability for the participants. Face and content validity were established through expert review by specialists in Measurement and Evaluation and Midwifery, after which necessary corrections were made. Reliability was established through a pilot study involving 50 female civil servants who were not part of the main sample, and Cronbach Alpha analysis produced coefficients of 0.80 and 0.78 for the two clusters indicating satisfactory internal consistency of the items.

Procedure for Data Collection: Data collection was carried out in three phases, namely pre intervention, intervention, and post intervention. Formal permission was obtained from the heads of the selected institutions, and the study activities were scheduled with the administrative units of the establishments so that official duties would not be disrupted. Three female research assistants were recruited and trained on the objectives of the study, questionnaire administration, and ethical considerations. Eligible participants were notified two weeks in advance. During the pre-intervention phase, the questionnaire was administered in approved venues such as conference rooms, seminar halls, and staff meeting rooms within the selected institutions. The pretest administration lasted about 15 to 20 minutes, and only procedural clarification was allowed. The intervention phase was then implemented as a structured educational programme for the participants. The sessions were conducted in a workplace seminar format that suited the structured routine of female civil servants. At the end of the four-week intervention, the same questionnaire was re-administered as a post-test.

Educational Intervention: The educational intervention was a structured workplace-based health education programme designed for female civil servants in the selected establishments in Delta State. The intervention covered the meaning and nature of cervical cancer, causes and risk factors, signs and symptoms, preventive measures, available cervical cancer screening services, and the importance of participating in cervical cancer screening services. It was delivered in a workplace seminar format that encouraged participation and clarification of issues raised by the participants. The sessions were facilitated by three trained female research assistants under the supervision of the researcher. The intervention lasted four weeks, with one session conducted per week, and each session lasted approximately 40 to 45 minutes. The sessions were held in approved venues within the selected institutions, such as conference rooms, seminar halls, and staff meeting rooms. The intervention was delivered through oral presentation and guided explanation based on the study themes.

Method of Data Analysis: Completed instruments were checked for completeness and prepared for analysis. Data were analysed using Analysis of Covariance (ANCOVA) to determine the effect of the educational intervention on knowledge of cervical cancer and attitude towards cervical cancer screening services, using pre-intervention scores as covariates. Descriptive statistics, namely frequency, percentage, mean, and standard deviation, were used to summarise the demographic characteristics of respondents and the pretest and post-test scores. Ethical approval of this study was obtained from Ethical Committee of University of Port Harcourt. Participation in the study was voluntary, informed consent was obtained from all respondents, confidentiality was maintained through anonymisation of responses, and data security was ensured throughout the study.

RESULTS AND DISCUSSION

Table 1: Distribution of Participants by Demographic Characteristics and Pre-test/Post-test Mean Scores on Knowledge and Attitude.

Variables	Group	F	%
Age	18 - 30 years	33	9.8
	31 – 40 years	35	10.4
	41 - 50 years	236	70.2
	Above 50 years	32	9.5
	Total	336	100.0
Marital status	Married	61	18.2
	Single	237	70.5
	Divorced	38	11.3
	Total	336	100.0
Educational qualification	FSLC	33	9.8
	SSCE	30	8.9
	B.Sc.	243	72.3
	Masters & above	30	8.9
	Total	336	100.0
Location of residence	Urban	225	67.0
	Rural	111	33.0
	Total	336	100.0
Personal income range	₦50,000 – ₦100,000 monthly	27	8.0
	₦101,000 – ₦150,000 monthly	36	10.7
	₦151,000 – ₦200,000 monthly	34	10.1
	₦201,000 and above monthly	239	71.1
	Total	336	100.0

		Pre-test		Post-test		Mean difference
	N	X_1	SD_1	X_2	SD_2	$\overline{X}_2 - \overline{X}_1$
The level of knowledge of cervical cancer	336	19.84	3.014	27.84	3.56	8.00
The attitude towards cervical cancer	336	22.40	2.828	30.48	3.45	8.08

Source: Field Survey 2025

Table 1 indicates that the participants were predominantly middle-aged, single, degree-holding urban residents with relatively high monthly incomes. Specifically, the majority of respondents were between 41 and 50 years of age (70.2%), single (70.5%), and held a B.Sc. degree (72.3%). Furthermore, 67.0% resided in urban areas, and 71.1% reported a monthly income of ₦201,000 or above. This demographic profile suggests a fairly educated and economically stable cohort, which is relevant for interpreting the intervention's outcomes. Despite this relatively advantaged profile, substantial improvements were observed following the intervention. Mean knowledge scores for cervical cancer increased from 19.84 at pretest to 27.84 at posttest (mean difference = 8.00), while mean attitude scores improved from 22.40 to 30.48 (mean difference = 8.08). These results indicate that the intervention produced meaningful gains in both knowledge and attitude.

Research Question One: *What is the effect of educational intervention on the knowledge of cervical cancer among female civil servants in Delta State?*

Table 2: Summary of ANCOVA for the main effect of the intervention program on knowledge of cervical cancer among female civil servants (N = 336)

Source	Type III Sum of Squares	Df	Mean Square	F-ratio	Sig.
Corrected Model	2105.611	4	526.403	185.949	.000
Intercept	0.413	1	0.413	0.146	.703
Pret-test knowledge scores	2084.560	1	2084.560	736.359	.000
Educational qualification	1.183	3	0.394	0.139	.936
Error	937.029	331	2.831		
Total	135331.000	336			
Corrected Total	3042.640	335			

a. R Squared = .692 (Adjusted R Squared = .688)

Table 2 reveals that the educational intervention produced a robust and statistically significant improvement in knowledge of cervical cancer among female civil servants in Delta State. The corrected model was significant, F(4, 331) = 185.949, p = .000, indicating that the intervention meaningfully influenced knowledge outcomes. Pretest knowledge scores were a significant covariate in the model, F(1, 331) = 736.359, p = .000. Educational qualification did not significantly affect the outcome, F(3, 331) = 0.139, p = .936, suggesting that the intervention remained effective across all qualification levels. The model explained 69.2% of the variance, demonstrating strong explanatory power.

Research Question Two: *What is the effect of educational intervention on the attitude of female civil servants in Delta State towards cervical cancer screening services?*

Table 3: Summary of ANCOVA for the main effect of the intervention program on the attitude of female civil servants towards cervical cancer screening services (N = 336)

Source	Type III Sum of Squares	Df	Mean Square	F-ratio	Sig.
Corrected Model	1815.200	4	453.800	173.901	.000
Intercept	11.614	1	11.614	4.451	.036
Pret-test attitude scores	1803.062	1	1803.062	690.954	.000
Educational qualification	3.241	3	1.080	0.414	.743
Error	863.752	331	2.610		
Total	171342.000	336			
Corrected Total	2678.952	335			

a. R Squared = .678 (Adjusted R Squared = .674)

Table 3 reveals that the educational intervention exerted a strong and statistically significant effect on the attitudes of female civil servants in Delta State toward cervical cancer screening services. The corrected model was significant, F(4, 331) = 173.901, p = .000, indicating that the intervention meaningfully improved participants' attitudes. Pretest attitude scores were a significant covariate in the model, F(1, 331) = 690.954, p = .000. Educational qualification did not significantly influence the outcome, F(3, 331) = 0.414, p = .743, suggesting that the intervention's effect was consistent across educational levels. The model explained 67.8% of the variance in attitude scores, reflecting strong explanatory power.

DISCUSSION OF FINDINGS

The study findings showed that educational intervention significantly improved knowledge of cervical cancer among female civil servants in Delta State. Mean scores increased from 19.84 (pre-test) to 27.84 (post-test), and ANCOVA confirmed statistical significance, F(4, 331) = 185.949, p = .000, with the model explaining 69.2% of the variance. The substantial rise in the post-test mean score for knowledge showed that the intervention improved participants' understanding of cervical cancer among female civil servants in Delta State. This position agrees with the study background, which had already established that poor knowledge, fear, embarrassment, mistrust, and low perceived risk often weaken women's willingness to use screening services, while educational intervention can correct misconceptions and promote a more favourable orientation towards prevention. This finding aligns with the study's premise that knowledge is central to prevention, as women's understanding influences risk

recognition, symptom assessment, and response to screening messages. It also agrees with the report of Al Oseely et al. (2025), who found that educational intervention improved cervical cancer knowledge and screening outcomes. Similarly, Verma et al. (2024) reported a substantial improvement in knowledge and attitude among female healthcare students; while Wang et al. (2024) noted that knowledge of cervical precancerous lesions was inadequate at baseline but significantly associated with attitude and practice. Although improved knowledge does not automatically translate into screening uptake due to some structural barriers, the result establishes that educational intervention effectively improves the cognitive basis for prevention among female civil servants in Delta State.

Educational intervention also significantly improved attitude towards cervical cancer screening services. The post-test mean score for attitude increased from 22.40 to 30.48, and ANCOVA confirmed statistical significance, $F(4, 331) = 173.901$, $p = .000$, with the model explaining 67.8% of the variance. The intervention not only improved knowledge but also fostered more positive views of screening. This aligns with previous studies, which noted that fear, embarrassment, modesty, mistrust, and low perceived risk weaken attitudes (Naz et al., 2018; Ijezie et al., 2022), while education corrects misconceptions and promotes favourable orientations (Idowu et al., 2016; Lemma et al., 2022; Akpan et al., 2023; Delie et al., 2024). The result is also consistent with the report of Öztaş and Işik (2025), that cervical cancer education improved knowledge, attitudes, and health beliefs; Verma et al. (2024) reported significant attitude improvement after education. Muhammad et al. (2024) similarly found that positive willingness towards screening can coexist with knowledge gaps, suggesting that attitude improves more effectively when education addresses women's perceptions and concerns. In contrast, Wang et al. (2024) reported only moderate attitude and practice despite ongoing awareness, indicating that awareness alone is insufficient. The finding supports workplace-based educational programmes as a useful strategy for strengthening cervical cancer prevention among female civil servants in Delta State.

The study also showed that educational qualification did not significantly influence the knowledge or attitude outcomes. This means that the benefit of the intervention was not restricted to participants with higher academic attainment, but was broadly shared across qualification levels. That result is important in the context of public health education because it shows that a well-designed intervention can reduce informational and attitudinal gaps without assuming that formal education alone guarantees preventive understanding or favourable screening disposition. Consequently, the present study establishes that educational intervention can substantially improve women's knowledge of cervical cancer and their attitude towards screening, even though additional measures may still be required to translate that positive change into routine screening practice. In practical terms, the result of this study supports the use of workplace-based cervical cancer education programmes among female civil servants in Delta State as a viable strategy for strengthening prevention at scale.

CONCLUSION

This study has shown that educational intervention is an important health education strategy that has a positive effect on both knowledge of cervical cancer and attitude towards cervical cancer screening services among female civil servants in Delta State. Based on this, the study concludes that educational intervention significantly improved participants' understanding of cervical cancer and also strengthened their disposition towards screening services. The study further concludes that the effectiveness of the intervention was consistent across educational levels, which shows that structured workplace-based education can serve as a useful approach to cervical cancer prevention.

RECOMMENDATIONS

In line with the findings, the following recommendations were made:

1. The Delta State Government, through the Ministry of Health and relevant workplace health units, should organise regular educational intervention programmes for female civil servants in order to improve their knowledge of cervical cancer and strengthen their attitude towards cervical cancer screening services.
2. Ministries, departments, and agencies in Delta State should incorporate periodic cervical cancer education into workplace health promotion activities so that female civil servants will receive sustained information, clarification, and motivation regarding screening services.
3. Health authorities and programme planners should ensure that cervical cancer education programmes are designed in clear, practical, and accessible forms that can benefit women across

different educational levels, since the intervention was effective irrespective of educational qualification.

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