VOLUME 39, NUMBER 10
October 2022

ISSN 0189 - 160X

WAJM

WEST AFRICAN JOURNAL OF MEDICINE

ORIGINALITY AND EXCELLENCE IN MEDICINE AND SURGERY

OFFICIAL PUBLICATION OF
THE WEST AFRICAN COLLEGE OF PHYSICIANS *AND*
WEST AFRICAN COLLEGE OF SURGEONS

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ORIGINAL ARTICLE

Effect of Health Education on the Knowledge of Cervical Cancer and Uptake of Papanicolaou Smear Test among Teachers in Uyo, Akwa Ibom State Nigeria: An Interventional Study

Effet de l'Éducation Sanitaire sur la Connaissance du Cancer du Col de l'Utérus et la Réalisation du Test de Frottis de Papanicolaou chez les Enseignants d'Uyo, dans l'État d'Akwa Ibom au Nigeria : Une Étude Interventionnelle

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ABSTRACT

BACKGROUND: Evidence exists that the uptake of cervical cancer screening is low in Nigeria despite the availability of effective tools. This study determined the effect of health education on the knowledge of cervical cancer and uptake of Papanicolaou (Pap) smear test among teachers in public secondary schools in Uyo, Nigeria.

METHODS: This was an interventional study among public secondary school teachers in Uyo, Akwa Ibom State, Nigeria. It entailed a baseline survey, administration of health education sessions on cervical cancer and its screening tests to the intervention group and a post-intervention evaluation. Data was captured using a semi-structured questionnaire and analyzed with Stata software Version 10.

RESULTS: There were 185 respondents each in the interventional and control groups. The mean ages of the teachers were 38.7 ± 8.1 years and 37.1 ± 7.7 years respectively. Post-intervention, knowledge of cervical cancer symptoms increased from 10.1% to 66.5% in the intervention group compared to an increase from 7.0% to 12.0% in the control group ($p< 0.001$). Similarly, risk factor knowledge improved from 6.1% to 59.5% in the intervention group compared to 4.9% to 7.2% in the control group ($p< 0.001$). Also, the uptake of the Pap smear test increased from 11.9% to 22.2% in the intervention group ($p = 0.01$) compared to an increase from 4.9% to 7.0% in the control group ($p=0.379$).

CONCLUSION: Health education brought about a significant increase in the knowledge of cervical cancer symptoms/risk factors and uptake of Pap smear test and should therefore, be encouraged among teachers in secondary schools. **WAJM 2022; 39(10): 1045–1056.**

Keywords: Cervical cancer, Symptoms, Risk factors, Uptake of Pap smear test, Teacher.

RÉSUMÉ

CONTEXTE: Il est prouvé que le dépistage du cancer du col de l'utérus est peu pratiqué au Nigeria malgré la disponibilité d'outils efficaces. Cette étude a déterminé l'effet de l'éducation sanitaire sur la connaissance du cancer du col de l'utérus et le recours au test de Papanicolaou (Pap) chez les enseignants des écoles secondaires publiques d'Uyo, au Nigeria.

MÉTHODES: Il s'agissait d'une étude interventionnelle parmi les enseignants des écoles secondaires publiques d'Uyo, Etat d'Akwa Ibom, Nigeria. Elle comportait une enquête de base, l'administration de séances d'éducation sanitaire sur le cancer du col de l'utérus et ses tests de dépistage au groupe d'intervention et une évaluation post-intervention. Les données ont été recueillies à l'aide d'un questionnaire semi-structuré et analysées avec le logiciel Stata version 10.

RÉSULTATS: Il y avait 185 répondants dans les groupes d'intervention et de contrôle. L'âge moyen des enseignants était respectivement de 38,7 ± 8,1 ans et 37,1 ± 7,7 ans. Après l'intervention, la connaissance des symptômes du cancer du col de l'utérus a augmenté de 10,1% à 66,5% dans le groupe d'intervention par rapport à une augmentation de 7,0% à 12,0% dans le groupe de contrôle ($p< 0,001$). De même, la connaissance des facteurs de risque s'est améliorée de 6,1 % à 59,5 % dans le groupe d'intervention, contre 4,9 % à 7,2 % dans le groupe témoin ($p< 0,001$). De même, le recours au test de Papanicolaou a augmenté de 11,9% à 22,2% dans le groupe d'intervention ($p = 0,01$) par rapport à une augmentation de 4,9% à 7,0% dans le groupe de contrôle ($p=0,379$).

CONCLUSION: L'éducation à la santé a entraîné une augmentation significative de la connaissance des symptômes/facteurs de risque du cancer du col de l'utérus et du recours au test de Papanicolaou et devrait donc être encouragée parmi les enseignants des écoles secondaires. **WAJM 2022; 39(10): 1045–1056.**

Mots clés: Cancer du col de l'utérus, symptômes, facteurs de risque, recours au test de Papanicolaou, enseignant.

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Abbreviations: ASIR, Age-standardized incidence rates; **HBM,** Health Belief Model; **IHREC,** Institutional Health Research Ethical Committee; **LEC,** Local Education Council; **LGA,** Local Government Area; **Pap Smear Test,** Papanicolaou Smear Test; **SSA,** Sub-Saharan Africa.

INTRODUCTION

Cervical cancer is a major cause of morbidity and mortality among women. It is the second most common cancer among women in Sub-Saharan Africa (SSA)[1–3]and the fourth most common cancer among women worldwide.[2,4] It is estimated that women in middle and low-income countries account for 90.0% of annual worldwide cervical cancer deaths.[1,5] It is also estimated that 372.2 million women aged 15 years and older in Africa are at risk of developing cervical cancer, and every year, about 119,284 women in Africa are diagnosed with cervical cancer and 81,687 die from the disease.[3] Cervical cancer is a preventable disease when detected early but remains a major public health problem despite the availability of effective screening tools.[2,6,7]

Cervical cancer disproportionately affects women in less developed countries, such as Guinea-Bissau, Madagascar and Uganda, with age-standardized incidence rates (ASIRs) ranging from about 25 to 43 cases per 100,000 women.[3,6,8] The ASIR for Nigeria, where it is the commonest gynaecological cancer, is 27.2 per 100,000 women.[3] In more developed countries, the ASIR ranges from 7 to 16.3 cases per 100,000 women.[8] The disparity in prevalence between the developing and developed countries has been attributed to lack of awareness of cervical cancer.[6,9,10]

The detection of the pre-malignant form of cervical cancer is a key aspect of prevention and there is a long transition time of about ten years between the premalignant lesions to a full blown cancer of the cervix.[11,12] The uptake of the Papanicolaou (Pap) smear test, which is a screening tool for pre-malignant lesions, has been reported to be low by some studies in north-western Nigeria, north-central Nigeria and south-eastern Nigeria,[13–15] and there is a limited understanding of why some women in the age group mostly affected by cervical cancer (i.e. 35-50 years) do not participate in cervical screening programmes in Nigeria.

The target population for this interventional study were teachers in public secondary schools because they are in a strategic position to influence the attitude and behaviour of a large number of adolescents with whom they come in contact with. Adolescents constitute are a key target population for the prevention of cervical cancer. These students will also be in a position to educate others in the wider community. The objective of this study was to assess the effect of health education on the level of knowledge of cervical cancer and the uptake of the Papanicolaou (Pap) smear test among teachers in public secondary schools in Akwa Ibom state, Nigeria.

METHODS

Study Area

The study was conducted in Uyo and Abak Local Government Areas (LGAs) in Akwa Ibom State, Nigeria in 2016. Akwa Ibom State had an estimated population of 5,272,029 in 2016 and the State has 31 LGAs with Uyo as the state capital.[16] The major ethnic groups are Ibibio, Annang and Oron.[17] Christianity is the predominant religion with a mix of traditional religion and Islam. The major employer of labour in the state is the State government and many inhabitants are civil servants among whom are 3,948 teachers in public secondary schools. Furthermore, a significant proportion of inhabitants of the state engage in various small-scale businesses like farming, fishing and trading. There are 1,160 public primary schools, 230 public secondary schools and 4 public tertiary education institutions in the state. There are also a number of private primary, secondary and tertiary educational institutions.[18,19] Also, cervical cancer screening tests were available in two tertiary health facilities in Akwa Ibom State, one of which was in Uyo LGA and it had the capacity to conduct screening using the Pap smear test. Cervical cancer screening services were also available once every month in a clinic run by a non-profit organization in Uyo.

Study Design

The study was an interventional study with health education as the intervention. Uyo Local Education Council (LEC) (which is under Uyo LGA) served as the intervention site, while the controls were selected from Abak LEC (which is under Abak LGA). Abak LEC was randomly selected from eight (8) LECs that are contiguous to Uyo LEC using the Free web Quickcalcs of the Graphpad Prism software by Graphpad Software Incorporated, La Jolla Carlifornia, USA. Uyo LEC was chosen because of the proximity to the tertiary health facility that had capacity to conduct cervical cancer screening using the Pap smear test and within the geographical area of teachers who were the population under study. The two LECs are about 18km apart and 20 minutes by car drive.[20]

The study was done in three phases: phase one involved a baseline survey of the two groups; phase two was the administration of health education sessions on cervical cancer and its screening tests to the intervention group (Uyo LEC) at 4-week intervals, over a three-month period, thereby making a total of three (3) sessions in each school. The methods of health education included teaching with power point, discussions, and the use of posters/ leaflets. Phase three was the post-intervention survey, done 16 weeks after the baseline survey, to determine the outcome. Health education was thereafter given to the teachers in Abak LEC (control group) for ethical reasons.

A quantitative research method was used to determine the knowledge of cervical cancer, awareness and uptake of the Pap smear test among 185 female teachers in each study group. The conceptual framework for the study was the Health Belief Model (HBM) which is a psychological model that attempts to explain and predict health behaviours by focusing on beliefs and attitudes.[21] The HBM stipulates that the willingness of people to take health-related action depends on their attitudes and beliefs about threats posed by a health problem (susceptibility and severity), benefits of avoiding the threat, factors influencing the decision to act (barriers, cues to action, self-efficacy) with motivation being the central focus.[22] Polit and Beck explained that the Health Belief Model (HBM) postulates that health-seeking behaviour is influenced by a person's perception of a threat posed by a health problem and the value associated with actions aimed at reducing the threat.[23]

Study Population

The study population included consenting female teachers enrolled by the Akwa Ibom State Secondary Education Board and teaching in public secondary schools in Uyo and Abak Local Education Councils while those who did not give consent or has had total hysterectomies were excluded.

Sample Size Determination

The minimum sample size was determined using the formula for intervention studies to compare two independent proportions from two equal sized groups: $N = 2 \times (Z_\alpha + Z_\beta)^2 \times [P_1(1-P_1) + P_2(1-P_2)] / (P_1 - P_2)^2$,[24] where N is the minimum sample size required in each group, Z_α is the standard normal deviate for the desired confidence level (1.96 for $\alpha = 0.05$, two tailed), Z_β is the standard normal deviate for the desired statistical power (1.28 for $\beta = 0.10$ i.e. power of 90%), P_1 is the proportion of female teachers with appropriate cervical screening behaviour before intervention (which was 9% from a previous study in Uyo, Nigeria),[25] P_2 is the proportion of female teachers with appropriate cervical screening behaviour after intervention and $P_1 - P_2$ is the minimum expected difference between the two proportions set at 20%. The estimated sample size, including 20% overestimation to accommodate for non-response, was 181.4 participants per study group. Therefore, the minimum sample size of 181 participants was required for each of the groups.

Sampling Technique

A proportionate sampling process was used to determine the number of teachers enrolled from each school and the sampling frame was obtained from the Principals of all the public secondary schools in Uyo LEC (13 schools) and Abak LEC (10 schools). There were 649 female teachers in Uyo LEC and 581 female teachers in Abak LEC and the Free web Quickcalcs of the Graphpad Prism software was used to select the teachers from each of the schools by simple random sampling.

Study Instrument

A semi-structured questionnaire designed by the researchers, and based on the literature review, was the study instrument. The Cronbach's alpha (0.98) was used to estimate the internal consistency for the items in the questionnaire. The questionnaire had three sections that included the sociodemographic characteristics of participants, knowledge of cervical cancer symptoms and its risk factors, awareness and uptake of the Pap smear test. It was self-administered and was pre-tested on a convenience sample of 36 teachers from Ikot Ekpene LEC that was similar in setting to the study sites. Four research assistants, who were medical doctors, were trained to assist in data collection and data was collected over four months.

There were fourteen (14) knowledge questions on risk factors for cervical cancer. Each correct answer was scored one (1) point; each incorrect answer was scored zero (0) while the 'don't know' responses were also scored zero. Scores less than 50% were categorized as poor knowledge of risk factors, scores between 50–74% were categorized as good knowledge and scores 75% or more were considered very good knowledge.

In the assessment of the knowledge of symptoms of cervical cancer, respondents were asked to list eight (8) symptoms they knew. Each correct symptom listed was awarded one (1) point. Scores of three or less (≤ 3) were considered poor, scores of four to five were considered fair, while scores of six or more (≥ 6) were considered good.

In the assessment of the knowledge of preventive measures of cervical cancer, six (6) responses were expected and each correct response was scored one (1) point with a maximum of six (6) points; scores of two or less (≤ 2) were considered poor, scores of three to four were considered fair while scores of five or more (≥ 5) were considered good knowledge.

Responses to open ended questions were analysed for similarities and key words and common groups were then created and assigned numerical codes for easy analyses.

Data Analysis

Data was analyzed using Stata Data Analysis and Statistical software Version 10 by StataCorp. LLC, College Station, Texas, USA. Frequencies were used for categorical variables and the measure of association was determined using chi-square. The level of significance was set at 5%.

Ethical Approval

Ethical approval was obtained from Institutional Health Research Ethical Committee (IHREC) of the University of Uyo Teaching Hospital, Uyo, Akwa Ibom State, while permission to conduct the study was obtained from the Akwa Ibom State Secondary Education Board as well as the head of each school. An informed written consent was obtained from each participant and they were assured of their anonymity as well as freedom to withdraw from the study at any time. Anonymity of participants was ensured by assigning numbers, as identifiers. The benefits of this study to the participants were an increased knowledge of cervical cancer, awareness of the importance of cervical cancer screening and where to access screening services. The individuals who declined to participate, but were present at the designated venues, also received the educational materials and were allowed to listen and ask questions during the health education sessions. No intentional harm was done to any participants of the study.

RESULTS

Three hundred and ninety-seven (397) questionnaires were distributed to participants at the baseline survey, 201 to the intervention group (Uyo LEC) and 196 to the control group (Abak LEC). One hundred and ninety-two (192) respondents from the intervention group, and one hundred and eighty-five (185) respondents from the control group were available for the post intervention survey thereby giving a response rate of 95.5% and 94.4% for the intervention group and control group respectively. Seven (7) questionnaires in the intervention group were excluded from the analysis because of incomplete information. One hundred and eighty-five (185) respondents in each group were therefore analysed.

The mean ages of respondents in the intervention group and control groups were 38.7 ± 8.1 years and 37.1 ±

7.7 years respectively. A large proportion, 135 (72.9%) in the intervention group and 117 (63.3%) in the control group were married. Majority, 146 (78.9%) in the intervention group and 154 (83.2%) in the control group had first degree (Table 1).

Most of the respondents in both groups were aware of cervical cancer at baseline [148 (80.0%) of the respondents in the intervention group and 142 (76.8%) of respondents in the control group] with the commonest source of information being the media. Post-intervention, 185 (100.0%) of the respondents in the intervention group and 167 (90.3%) in the control group were aware of cervical cancer and this was significant at p <0.001 (Table 2).

Table 3 shows that at baseline, both groups were comparable in the knowledge of risk factors for cervical cancer, knowledge of symptoms of cervical cancer, and the knowledge of methods of prevention. After 4 months (post-intervention), the proportion of respondents within the intervention group, with very good knowledge of the risk factors for cervical cancer, increased from 6.1% at baseline to 59.5% while there was only a marginal change from 4.9% to 7.2% in the control group. This finding was statistically significant (p <0.001). Also, there was a statistically significant increase in the level of knowledge of symptoms in the intervention group (p < 0.001) and the proportion with good knowledge of symptoms increased from 10.1% at baseline to 66.5% after the intervention but the control group marginally increased from 7.0% to 12.0% (Table 3).

Regarding the knowledge of cervical cancer prevention methods, the proportion of respondents within the intervention group who had good knowledge increased from 31.4% at baseline to 91.3% after the intervention compared to the control group which was 25.7% at baseline and increased to 38.5% post-intervention and this difference was statistically significant at p <0.001 (Table 3).

Awareness of the Pap smear test was about average among the respondents in this study at baseline, as displayed in Table 4, but differed in both groups with more respondents in the intervention group 97 (52.4%) being aware compared to the control group 59 (31.9%). The respondents in both groups were similar in their sources of information concerning the Pap smear test. However, there was a statistically significant difference in the awareness of the Pap smear test among respondents in the intervention group and control groups after 4 months (p <0.001), with all 185 (100.0%) respondents in the intervention group being aware of the Pap smear test compared to 87 (47.0%) of respondents in the control group.

Table 1: Sociodemographic Characteristics of Respondents by Study Group

Variables	Study Group		Statistical indices
	Intervention n=185 n (%)	Control n=185 n (%)	
Age group (years)			DF =3
20 – 29	27 (14.6)	41 (22.2)	χ^2=6.9903
30 – 39	58 (31.3)	68 (36.8)	p =0.072
40 – 49	79 (42.7)	61 (33.0)	
50 and above	21 (11.4)	15 (8.0)	DF=368
			T test = –1.9185
Mean (SD)	38.7 (8.1)	37.1 (7.7)	p =0.055
Marital Status			
Single	39 (21.1)	48 (25.9)	DF=3
Married/cohabiting	135 (72.9)	117 (63.3)	χ^2=5.733
Divorced/separated	4 (2.2)	11 (5.9)	p =0.125
Widowed	7 (3.8)	9 (4.9)	
Level of Education			
NCE/OND	10 (5.4)	18 (9.8)	DF =2
B Sc/HND	146 (78.9)	154 (83.2)	χ^2=8.5943
Postgraduate	29 (15.7)	13 (7.0)	p =0.014*
Ethnicity			
Ibibio	135 (72.9)	37 (20.0)	Fisher's exact
Annang	26 (14.1)	124 (67.0)	p <0.001*
Oron	5 (2.7)	1 (0.6)	
Others	19 (10.3)	23 (12.4)	

**p < 0.05.*

Table 2: Awareness of Cervical Cancer among Respondents by Study Groups

Study Phase	Variables	Study Group		Statistical Indices
		Intervention n (%)	Control n (%)	
Baseline	**Awareness of Cervical Cancer**			
	Yes	148 (80.0)	142 (76.8)	χ^2=0.5741
	No	37 (20.0)	43 (23.2)	p =0.449
	Sources of Information†			
	Media	115 (77.7)	99 (65.7)	χ^2= 7.583
	Clinic	19 (12.8)	18 (11.9)	p =0.108
	Friend	9 (6.1)	20 (12.2)	
	Family	7 (4.7)	9 (5.7)	
	Others	11(7.4)	5 (3.3)	
Post-Intervention	**Awareness of Cervical Cancer**			
	Yes	185 (100.0)	167 (90.3)	χ^2=18.920
	No	0 (0.0)	18 (9.7)	p =<0.001*

**p < 0.05; †, Multiple responses.*

Table 3: Overall Level of Knowledge of Cervical Cancer Risk Factors, Symptoms and Prevention Methods among Respondents by Study Groups

Study Phase	Variables	Study Group		Statistical Indices
		Intervention n (%)	Control n (%)	
Baseline‡	**Level of Risk Factor Knowledge**			
	Poor (< 50%)	112 (75.7)	94 (66.2)	DF = 2
	Good (50–74%)	27 (18.2)	41 (28.9)	χ^2=4.583
	Very Good (≥75%)	9 (6.1)	7 (4.9)	p =0.101
Post-Intervention§	**Level of Risk Factor Knowledge**			
	Poor (< 50%)	12 (6.5)	103 (61.7)	DF = 2
	Good (50–74%)	63 (34.0)	52 (31.1)	χ^2=151.257
	Very Good (≥75%)	110 (59.5)	12 (7.2)	p =<0.001*
Baseline	**Knowledge of Symptoms**			
	Poor (≤3)	83 (56.1)	85 (59.9)	DF = 2
	Fair (4–5)	50 (33.8)	47 (33.1)	χ^2=0.993
	Good (≥6)	15 (10.1)	10 (7.0)	p =0.609
Post-Intervention	**Knowledge of Symptoms**			
	Poor (≤3)	4 (2.2)	98 (58.7)	DF = 2
	Fair (4–5)	58 (31.3)	49 (29.3)	χ^2=161.074
	Good (≥6)	123 (66.5)	20 (12.0)	p =<0.001*
Baseline¶	**Knowledge Level of Cervical Cancer Prevention Methods**	n =121	n = 105	
	Poor (≤2)	38 (31.4)	43 (41.0)	DF=2
	Fair (3–4)	45 (37.2)	35 (33.3)	χ^2=2.299
	Good (≥5)	38 (31.4)	27 (25.7)	p = 0.317
Post-Intervention¶	**Knowledge Level of Cervical Cancer Prevention Methods**	n =184		n = 122
	Poor (≤2)	3 (1.6)	41 (33.6)	DF=2
	Fair (3–4)	13 (7.1)	34 (27.9)	χ^2=101.921
	Good (≥5)	168 (91.3)	47 (38.5)	p = <0.001*

**p < 0.05; ‡, Baseline values are based on 290 respondents who were aware of cervical cancer; §, Post-intervention values are based on the 352 respondents who were aware of cervical cancer; ¶, values based on the number of respondents that correctly reported that cervical cancer is preventable.*

With regards to the awareness of the frequency of the Pap smear test at baseline, Table 4 further demonstrates that, among the respondents who were aware of the Pap smear test, 79 (81.4%) of respondents in the intervention group and 43 (72.9%) in the control group knew that the Pap smear test should be done at least once every three years, though the difference was not significant. After the intervention, all the respondents in the intervention group (185, 100%) knew the recommended frequency of the test compared to 67 (77.0%) in the control group (p <0.05).

Uptake of the Pap smear test was low at baseline (Table 4), 22 (11.9%) of respondents in the intervention group had done the test compared with 9 (4.9%) in the control group and this was significant (p = 0.015). After the intervention, 41 (22.2%) of respondents in the intervention group had done the Pap smear test compared with 13 (7.0%) in the control group and this difference was statistically significant (p <0.001).

Figure 1 displays the reasons for the non-uptake of the Pap smear test at baseline. These included: lack of awareness (34.5% in the intervention group; 58.6% control group), non-recommendation by health worker (10.0% in the intervention group; 13.0% in the control group), lack of time (12.0% in the intervention group; 2.0% in the control group), reluctance to do the test (9.0% in the intervention group: 4.0% in the control group) and not knowing where to do the test (7.0% in the intervention group; 4.0% in the control group).

Post-intervention, the commonest reason for not doing the Pap smear test among respondents in the intervention group was mainly due to lack of time (43.8%), while the commonest reason among the respondents in control group was that they were not aware of the test (53.0%) (Figure 2).

Tables 5 demonstrates that no relationships were identified between the sociodemographic characteristics and uptake of the Pap smear test either at baseline or at the post-intervention stage in the intervention group.

Tables 6 shows that, in the intervention group, no relationships were identified between the knowledge of risk factors and uptake of the Pap smear test, knowledge of symptoms and uptake of the Pap smear test and knowledge of prevention and the uptake of the Pap smear test either at baseline or at the post-intervention phase.

DISCUSSION

This study assessed the effect of health education on the knowledge of cervical cancer symptoms and risk factors as well as the awareness and utilization of Pap smear test among teachers in public secondary schools in Uyo, Akwa Ibom State, Nigeria.

No relationships were identified between sociodemographic characteristics and uptake of the Pap smear test either at baseline or after 4 months (post-intervention period) in this study. Some studies in Ethiopia, Turkey, Tanzania, Ibadan and Malawi have reported that women between the ages of 30–39 years or who were married were likely to screen compared with young (in their 20s) and single women. Also, a study in Jos, Nigeria reported that married or widowed women were likely to screen compared to single women.[26–30] This difference in finding may be that participants in the previous studies may be part of a stable community that had received continuous health education from the institutions involved, over a long period, compared

Table 4: Awareness, Sources of Information, Knowledge of Frequency and Uptake of Pap Smear Test, by Study Groups

Study Phase	Variables	Study Group		Statistical Indices
		Intervention n (%)	Control n (%)	
Baseline	**Awareness of the Pap Smear Test**			DF=1
	Yes	97 (52.4)	59 (31.9)	χ^2=16.004
	No	88 (47.6)	126 (68.1)	p <0.001*
Baseline	**Sources of Information†**			
	Media	59 (49.6)	34 (54.8)	DF=4
	Clinic	31 (26.1)	16 (25.8)	χ^2=3.241
	Family	5 (4.2)	5 (8.1)	p =0.518
	Friend	16 (13.5)	5 (8.1)	
	Others	8 (6.7)	2 (3.2)	
Post-Intervention	**Awareness of the Pap Smear Test**	n = 185	n = 185	DF=1
	Yes	185 (100.0)	87 (47.0)	χ^2=133.309
	No	0 (0.0)	98 (53.0)	p <0.001*
Baseline	**Knowledge of Frequency of the Pap Test**	n = 97	n = 59	
	Correct	79 (81.4)	43 (72.9)	Fisher's exact
	Not correct	2 (2.1)	4 (6.8)	p =0.248
	I don't know	16 (16.5)	12 (20.3)	
Post-Intervention	**Knowledge of Frequency of the Pap Test**	n = 185	n =87	
	Correct	185 (100.0)	67 (77.0)	Fisher's exact
	Not correct	0 (0.0)	3 (3.5)	<0.001*
	I don't know	0 (0.0)	17 (19.5)	
Baseline	**Uptake of Pap Smear Test**			DF=1
	Yes	22 (11.9)	9 (4.9)	χ^2=5.950
	No	163 (88.1)	176 (95.1)	p =0.015*
Post-Intervention	**Uptake of Pap Smear Test**			DF=1
	Yes	41 (22.2)	13 (7.0)	χ^2=17.000
	No	144 (77.8)	172 (93.0)	p =<0.001*

**p < 0.05, †Multiple response.*

to the participants in the current study in Uyo LEC.

The awareness of cervical cancer was relatively high at baseline and this may be a function of the intensity of previous information from the media or other interactions that both groups of respondents had received prior to this study, particularly since Uyo and Abak are urban areas. This finding of relatively high levels of awareness of cervical cancer at baseline, in the general population, has been reported by other studies.[28,31–35] Despite the relatively high level of awareness of cervical cancer in both groups at baseline, more than two-thirds of the respondents had poor knowledge of specific risk factors for cervical cancer, and more than half of the respondents had poor knowledge of symptoms of the disease. Studies in Nigeria and Ghana have also documented similar poor knowledge of risk factors,[13,14,36,37] while other studies in North-central Nigeria, in Ogun State, and in Osun State, Nigeria have also reported poor knowledge of symptoms of cervical cancer.[36,38,39]

The poor knowledge of risk factors and symptoms identified at baseline may be related to the content of the information received before the study, in that the different media messages that had been received over the course of time had raised awareness, but were neither regular nor had enough details of the risk factors or symptoms of cervical cancer. Akintayo and Bello reported that despite a high level of awareness of cervical cancer, most of the respondents in the study in Ikenne, Ogun State, Nigeria, had a poor knowledge regarding the symptoms.[40]

The media was the commonest source of information among both groups of respondents in this study. This is consistent with reports from previous studies in Ethiopia, Uganda, Gabon, Tanzania and Kenya.[29,32,34,41,42] The media is an important source of information as demonstrated by Perkins, *et al,* who conducted a community-based cervical cancer education programme among a group of women in Honduras and concluded that radio programmes can serve as an intervention tool and a channel to improve knowledge and screening behaviour.[43]

This study identified statistically significant improvement in the awareness of cervical cancer in both groups post-intervention, and this suggests that the observed difference in the intervention group was unlikely due to the intervention alone but there may have been some other exposure raising awareness within the time interval. However, there was a statistically significant difference between the awareness in the intervention group compared to the control group after the intervention, a difference that was not observed at baseline. This suggests that the health education intervention played a positive role in raising awareness. Similarly, health education has been reported to have a positive effect on awareness of cervical cancer in Lagos, Nigeria, Anambra State, Nigeria, in India and Jamaica.[14,44–46] Indeed, Abiodun et al in Ogun State, Nigeria, reported that the health education intervention raised the level of awareness of cervical cancer to 100%.[47]

With the intervention, there was an improved level of knowledge of the risk factors for cervical cancer among the respondents in the intervention group with more than half of the respondents having very good knowledge compared to 7.2% in the control group. This positive effect of health education on knowledge of risk factors has been demonstrated in studies in North-Western Nigeria, Ogun State and Anambra State, which reported a marked increase in the proportion of respondents with correct answers to specific

Table 5: Association between Sociodemographic Characteristics and the Uptake of the Pap Smear Test among Respondents in the Intervention Group by Study Phases

Variable	Uptake of the Pap smear test in Intervention Group n (%)							
	Baseline				Post-Intervention			
	Yes (n=22)	No (n=75)	χ^2	p-value	Yes (n=41)	No (n=144)	χ^2	p-value
Age(years)								
20–29	2 (22.2)	7 (77.8)	Fisher's exact	1.000	7 (25.9)	20 (74.1)	1.604	0.658
30–39	6 (23.1)	20(76.9)			15(25.9)	43 (74.1)		
40–49	11(22.9)	37(77.1)			16(20.3)	63 (79.7)		
≥50	3 (21.4)	11(78.6)			3(14.3)	18 (85.7)		
Marital Status								
Single	1(11.1)	8 (88 .9)	Fisher's exact	0.190	6 (15.4)	33 (84.6)	Fisher's	0.442
Married/Cohabiting	18(22.0)	64(78.0)			32 (23.7)	103(76.3)	exact	
Divorced/Separated	1(100.0)	0 (0.0)			1 (50.0)	1 (50.0)		
Widowed	2 (40.0)	3 (60.0)			2 (22.2)	7 (77.8)		
Level of Education								
NCE/OND	1 (20.0)	4 (80.0)	Fisher's exact	0.209	3 (30.0)	7 (70.0)	1.071	0.585
B.Sc/HND	13(18.6)	57(81.4)			30 (20.5)	116(79.5)		
Master and above	8 (36.4)	14(63.6)			8 (27.6)	21 (72.4)		

Table 6: Association between Knowledge and Uptake of the Pap Smear Test Among Respondents in the Intervention Group by Study Phases

Variable	Uptake of the Pap smear test in Intervention Group n (%)							
	Baseline				Post-Intervention			
	Yes (n=22)	No (n=75)	χ^2	p-value	Yes (n=41)	No (n=144)	χ^2	p-value
Knowledge of Risk Factors								
Poor	4 (11.1)	32(88.9)	4.494	0.106	23(19.2)	97 (80.8)	2.136	0.344
Good	14(28.6)	35(71.4)			13(26.0)	37 (74.0)		
Very Good	4(33.3)	8(66.7)			5(33.3)	10 (66.7)		
Knowledge of Symptoms								
Poor	8 (16.3)	41 (83.7)	2.885	0.236	1 (50.0)	1 (50.0)	Fischer's	0.421
Fair	12(31.6)	26(68.4)			9 (19.1)	38(80.9)	exact	
Good	2 (20.0)	8(80.0)			31(22.8)	105(77.2)		
Knowledge of Prevention								
Poor	5(14.7)	29(85.3)	3.215	0.200	1 (25.0)	3(75.0)	Fischer's	0.452
Fair	7(21.2)	26(78.8)			1 (7.7)	12 (92.3)	exact	
Good	10(33.3)	20(66.7)			39(23.2)	129(76.8)		

questions about the risk factors for cervical cancer.[14,47,48] In spite of the improved level of knowledge of risk factors for cervical cancer at the post-intervention stage, there were some misconceptions that sharing toilets, repeated vaginal examinations, poor vaginal hygiene, use of antibiotics and abortion were risk factors for the illness. Similar findings have been reported by Assoumou, *et al* in Ghana, Ushadevi, *et al* in India, and Moore and Driver in Togo.[34,48,49]

Health education also significantly improved the knowledge of symptoms among respondents in the intervention group, from 10.1% at baseline to 66.5% after intervention, compared with 7.0% at baseline to 12.0% in the control group after 4 months. This shows that comprehensive and consistent messages go a long way to improve knowledge. Mazor, *et al* reported that the effectiveness of public health campaigns may be limited by the variability in the ability of the public to understand the spoken media messages, as these messages are very often misunderstood.[50] Furthermore, De Vito and associates suggested that it is important that these messages be repeated regularly to prevent having only a short-term effect.[51]

The high level of awareness of cervical cancer may account for over two-thirds of respondents in both groups reporting that cervical cancer was preventable at baseline, but this did not reflect good knowledge of the prevention

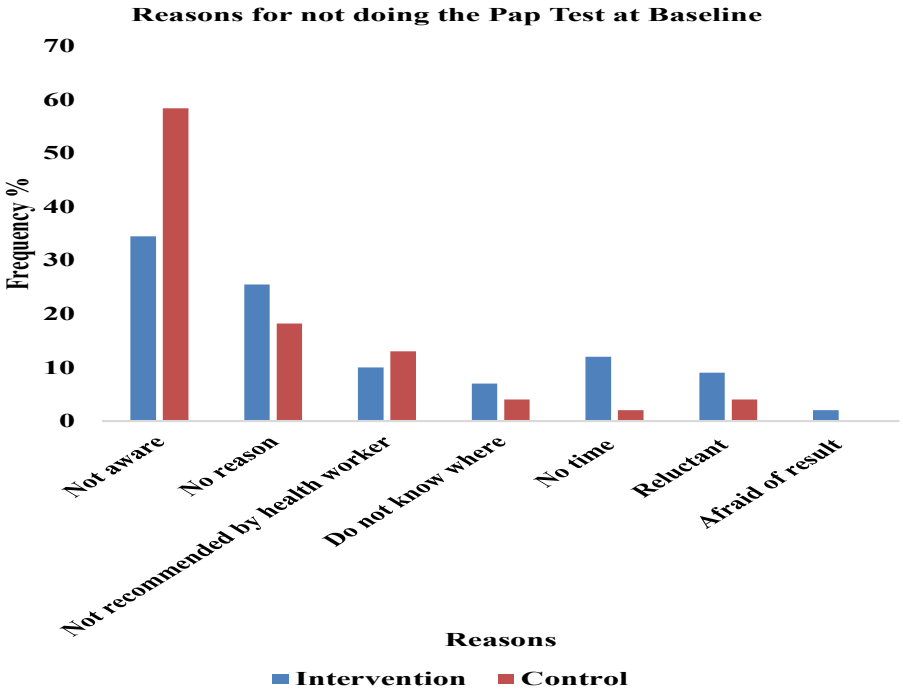

Fig. 1: Reasons for not doing the Pap Smear Test at Baseline.

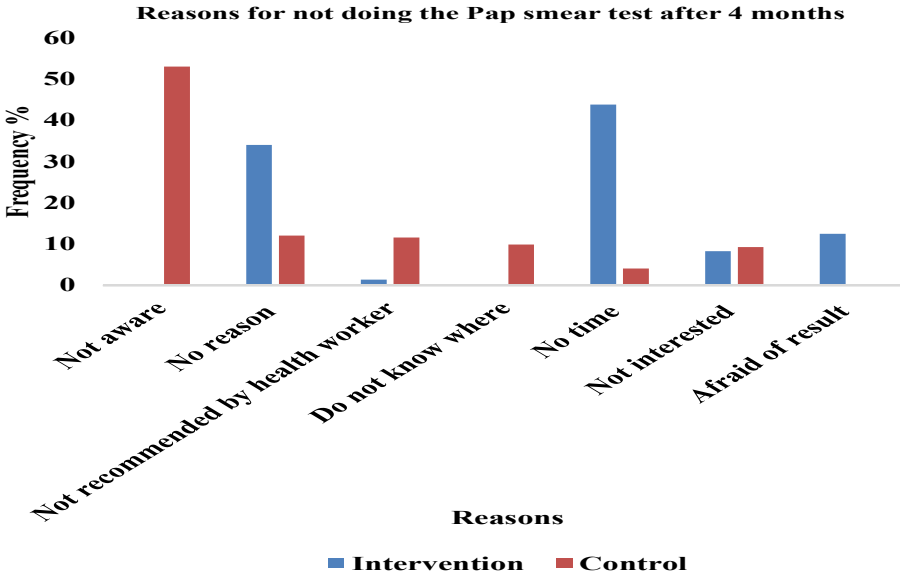

Fig. 2: Reasons for not doing the Pap Smear Test 4 months later.

methods because just above a quarter of the respondents in both groups had good knowledge of the preventive methods. The finding was lower than that reported by Tefera, *et al* in the Bale zone of Ethiopia.[41] Hoque, *et al* in South Africa and Getahun, *et al* in Ethiopia also reported that significant proportions of the respondents (57% and 63.9% respectively) knew that cervical cancer could be prevented, however, various proportions of respondents who know about prevention of cervical cancer have been reported in North-central Nigeria, South-east Nigeria and southern Ghana (45.6%–92%).[32,36,37,52,53] The contrasts in some of these findings may be explained by the fact that some of these studies were among rural and semi-urban dwellers who do not have access to adequate information on cervical cancer and absence of health facilities that render screening services.[37,54] Health education led to a significant improvement in the knowledge of methods of cervical cancer prevention in the intervention group, thus it is deductible that a well-packaged health education intervention can improve the knowledge of preventive measures towards cervical cancer and this has similarly been suggested by Njelita, *et al*.[14]

Cervical cancer is a preventable disease and the Pap smear test is a recognized screening tool for the early detection of the illness[2,7] and there is a 90% risk reduction if cervical screening is done once every three years.[55] It has been reported that the uptake of the Pap smear test is low in Nigeria even among populations with high levels of awareness.[56,57] The current study identified that the awareness of the Pap smear test was about average at baseline and the uptake was low at baseline (11.9% in the intervention group and 4.9% in the control group) but higher than the 0.4% reported in Anambra State, Nigeria and 1.1% reported in north-western Nigeria.[13,14] The poor knowledge of risk factors and symptoms of cervical cancer identified at baseline in the study may have accounted for the low uptake of the screening test. Also, at baseline, about three-quarters of respondents in both groups knew the recommended interval for the Pap smear test and this was higher than the 42.1% reported in Ilorin, Nigeria.[58]

After 4 months, awareness of the Pap smear test significantly increased in the intervention and control groups indicating that the increase may not be due to the intervention alone. The increase in the proportions of respondents in the control group who were aware of the test or had done the test may have been due to exposure to the questionnaire which may have prompted some to find out more about the topic from different sources out of curiosity.

With intervention, all the respondents in the intervention group could correctly identify the recommended interval for the Pap smear test, but there was no significant difference in the control group. There was also a

significant increase in the proportion of respondents within the intervention group who had done the Pap smear test post-intervention (an increase from 11.9% at the pre-intervention stage to 22.2%) while the increase within the control group was not significant (increased from 4.9% at the pre-intervention stage to 7.0%). More than half of respondents in the control group did not do the test due to lack of awareness and this has been similarly reported in Anambra State and north-western Nigeria.[13,14] Studies in Nigeria and the USA have reported significant increase in the proportions of respondents that had cervical screening post-intervention while none in the control group took the screening test.[14,59] Despite the increased knowledge (through health education) of risk factors for and symptoms of cervical cancer, improved knowledge that cervical cancer is preventable and increased awareness of the Pap smear test, many respondents within the intervention group still did not do the test. Reasons given for not doing the Pap smear test, after the intervention, by the respondents in the intervention group, included lack of time (43.8%), fear of the result (12.5%), reluctance to do the test (8.3%) and 34.0% of respondents did not give any reason. Furthermore, this study found no relationship between knowledge of risk factors for cervical cancer and uptake of the Pap smear test, as well as between knowledge of symptoms of the diseases and uptake of the Pap smear test. No relationship was also identified between knowledge of cervical cancer prevention methods and uptake of the Pap smear test. However, the Bayu, *et al* study in Ethiopia and the Chidyaonga-Maseko, *et al* study in Malawi, reported that knowledge of cervical cancer and its risk factors influenced the uptake of the Pap test while the Arulogun and Maxwell study in Nigeria and the Gebreegziabher, *et al* study in Ethiopia reported the contrary.[28,30,60,61] This may be an indication that there is more to the low uptake of the Pap smear test among women and should be further researched.

CONCLUSION

This study provides information on teachers' knowledge of cervical cancer symptoms and risk factors, its prevention and the effect of health education on the uptake of the Pap smear test. There was a relatively high level of awareness of cervical cancer among the respondents in the intervention and control groups at the baseline of this study, with the media being the commonest source of information in both groups.

Despite the relatively high level of awareness of cervical cancer, there were poor levels of knowledge of the risk factors and symptoms of the illness among respondents in this study at the pre-intervention stage. Furthermore, despite the good knowledge that cervical cancer is preventable, there was poor knowledge of the methods of prevention at the pre-intervention stage. However, all these improved in the intervention group with health education.

At baseline, the uptake of the Pap smear test was low, with some of the identified reasons being lack of awareness, not being recommended by a health professional and lack of time. With the intervention, uptake of the Pap smear test significantly increased.

RECOMMENDATIONS

Comprehensive and regular health promotional education concerning cervical cancer and its prevention will improve knowledge and uptake of the Pap smear test. Also, health workers should be re-orientated to implement opportunistic counselling aimed towards increasing the awareness of cervical cancer and the Pap smear test. Furthermore, since lack of time was identified as a reason for the non-uptake of the Pap smear test in this study, it would be prudent for the health facilities to commence after-hour clinics to encourage the women to come for the test even after close of work.

Duality of Interest

None.

Financial Support

None.

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