

## ORIGINAL RESEARCH ARTICLE

# Cervical cancer screening services targeting adult women in Cross River State, Nigeria

DOI: 10.29063/ajrh2023/v27i4.4

Margaret I. Akpan<sup>1</sup>, Antor O. Ndep<sup>1</sup>, Bernadine N. Ekpenyong<sup>1</sup>, Inemesit A. Akpan<sup>5</sup>, Abasiofon I. Akpan<sup>3\*</sup>, Lilian E. Eyam<sup>1</sup>, Regina E. Ella<sup>4</sup> and Ekanem E. Ekanem<sup>2</sup>

Department of Public Health, University of Calabar, Calabar, Nigeria<sup>1</sup>; College of Medical Sciences, University of Lagos, Lagos, Nigeria<sup>2</sup>; Department of Sociology, University of Calabar, Calabar, Nigeria<sup>3</sup>; Department of Nursing Science, University of Calabar, Nigeria<sup>4</sup>

\*For Correspondence: Email: [akpanabasiofon@gmail.com](mailto:akpanabasiofon@gmail.com); Phone: 07036888479

## Abstract

This study employed a randomized controlled trial to investigate the rate of cervical cancer screening among adult women in Cross River State, Nigeria. For the collection of data, a semi-structured questionnaire was used. The women underwent a health education intervention; they were divided into an experimental group with incentives and one without, as well as a control group. At baseline, only 120 (19.6%) of women had adequate knowledge, 139 (22.7%) knew Human Papilloma Virus (HPV) is sexually transmitted, 289 (47.1%) knew that HPV causes cervical cancer and 46 (7.6%) had been screened. The intervention yielded a net gain of 14.2 in knowledge and 16.0 points in attitude. There was a 60.3% net gain in uptake screening post intervention. McNemar chi-square yielded a statistically significant difference in knowledge ( $p < 0.05$ ), attitude ( $p < 0.05$ ) and uptake ( $p < 0.05$ ) in the intervention groups compared to the control groups. Recommendations include mobile screening centers and Income-based subsidized tests. (*Afr J Reprod Health* 2023; 27 [4]: 34-42).

---

**Keywords:** Cervical cancer

---

## Résumé

Cette étude a utilisé un essai contrôlé randomisé pour étudier le taux de dépistage du cancer du col de l'utérus chez les femmes adultes dans l'État de Cross River, au Nigeria. Pour la collecte des données, un questionnaire semi-structuré a été utilisé. Les femmes ont subi une intervention d'éducation sanitaire; elles ont été divisées en un groupe expérimental avec incitations et un sans, ainsi qu'un groupe témoin. transmis, 289 (47,1 %) savaient que le VPH cause le cancer du col de l'utérus et 46 (7,6 %) avaient été dépistées. L'intervention a donné un gain net de 14,2 en connaissances et de 16,0 points en attitude. Il y a eu un gain net de 60,3 % dans l'adoption du dépistage après l'intervention. Le chi carré de McNemar a produit une différence statistiquement significative dans les connaissances ( $p < 0,05$ ), l'attitude ( $p < 0,05$ ) et l'assimilation ( $p < 0,05$ ) dans les groupes d'intervention par rapport aux groupes témoins. Les recommandations incluent des centres de dépistage mobiles et des tests subventionnés en fonction du revenu. (*Afr J Reprod Health* 2023; 27 [4]: 34-42).

---

**Mots-clés:** Cancer du col de l'utérus

---

## Introduction

Cervical cancer is a serious disease that affects many women. It is the leading cause of mortality and morbidity and the fourth most common cancer among women globally, with an estimated 604 000 new cases and 342 000 deaths in 2020<sup>1</sup>. About 90% of the new cases and deaths worldwide in 2020 occurred in low- and middle-income countries<sup>1</sup> Cervical cancer ranks second in incidence and mortality behind breast cancer in lower Human Development Index (HDI) settings; however, it is the most commonly diagnosed cancer in 28

countries and the leading cause of cancer death in 42 countries, the vast majority of which are in Sub-Saharan Africa and South Eastern Asia<sup>2</sup>. Nigeria has a population of 56.2 million women ages 15 years and older who are at risk of developing cervical cancer. Current estimates indicate that every year 12, 075 women are diagnosed with cervical cancer and 7, 968 die from the disease<sup>3</sup>. Cervical cancer ranks as the 2nd most frequent cancer among women in the country and the 2nd most frequent cancer among women between 15 and 44 years of age. About 3.5% of women in the general population are estimated to harbour cervical HPV-

16/18 infection at a given time, and 66.9% of invasive cervical cancers are attributed to HPVs 16 or 18<sup>3</sup>. A study on determinants of risky sexual behavior among secondary school adolescents in cross River State reported that among age groups, 33% of students within the ages of 14–16 years and 82.6% within the ages of 17–19 years were sexually exposed that increases the chances of people contacting Human Papilloma Virus (HPV) that sometimes leads to cervical cancer in women<sup>4</sup>. A number of risk factors for cervical cancer are linked to exposure to the HPV<sup>5</sup>. Invasive cancer development process could prolong up to 20 years from the precursor lesion caused by sexually transmitted HPV. However, there are also other numerous risk factors (such as reproductive and sexual factors, behavioral factors, etc.) for cervical cancers which include sexual intercourse at a young age (<16 years old), multiple sexual partners, smoking, high parity and low socio-economic level<sup>5</sup>. Findings from a study on knowledge and perceptions of women on risk factors associated with cancer of the cervix in Awka South Council area of Anambra State<sup>6</sup>, Nigeria reveal that knowledge about the risk factors of cervical cancer was generally low. Their low knowledge of risk factors negatively influenced their perception of the disease.

Cervical cancer is a disease that can be prevented and cured when detected and treated early in its precancerous stage. Medical science has provided a great deal of evidence based interventions for the prevention, early detection, and treatment of cervical cancer that are almost always successful. Unfortunately cervical cancer is still rampant and is affecting many women<sup>7</sup>. Comprehensive cervical cancer control includes primary prevention (vaccination against HPV), secondary prevention (screening and treatment of pre-cancerous lesions), tertiary prevention (diagnosis and treatment of invasive cervical cancer) and palliative care<sup>8</sup>. Despite the empirical evidence that cervical cancer screening has been a successful public health initiative to secondarily prevent the incidence and mortality from cervical cancer in developed nations, majority of women of sub-Saharan root, Nigeria inclusive, do not utilize this essential health service<sup>9</sup>. Therefore this study was carried out to determine the screening services carried out by adult women in Cross River State, Nigeria.

## Methods

### Study settings

Cross River State is a coastal State in Southern Nigeria, its capital is at Calabar, and it is named from the Cross River (Oyono), which passes through the State. Ejagham and Efik and Bekwara are the major languages in the State. Located in the Niger Delta, Cross River occupies 22,226.373 square kilometres with a population of 2,892,988 of which 1,471,967 are males and 1,421,021 are females<sup>10</sup>. It shares boundaries with Benue State to the north, Enugu and Abia to the west, to the east by Cameroon Republic and to the south by Akwa Ibom and the Atlantic Ocean. Cross River is administratively divided into three senatorial districts namely Southern, Central and Northern senatorial districts.

### Study design

Two study designs were adopted in this work, descriptive cross-sectional and randomised controlled trial (RCT).

### Population of study

The study population consisted of women aged 18–60 years in Cross River State.

### Sample size determination

In determining the sample size for this study, Cochran formula for determining sample size was used for the descriptive study<sup>11</sup>. It is given by  $n = \frac{z^2 pq}{e^2}$

### Sample size for the intervention

The formular by Lwanga and Lemeshow<sup>12</sup> given as  $n = \frac{(Z\alpha/2 + Z\beta)^2 * 2 * (\bar{p} - \bar{q})}{\delta^2}$  was used

$Z\alpha$  = alpha error at 95% level of confidence = 1.96

A design effect of 1.5 was effected to take care of attrition, loss of interest, and sickness and busy schedule.

### Data collection

A semi – structured interviewer administered questionnaire was used. It was divided into five sections; section ‘A’ was on the socio-demographic

data while section 'B' was to elicit information on knowledge of the cervix, section 'C' was on awareness and knowledge on cancer of the cervix and risk factors, section 'D' was on attitude towards cervical cancer and section 'E' was on uptake of cervical cancer screening.

### ***Instruments for clinical test***

Instruments used for clinical test for the intervention phase are cytobrush, cytomix, specimen bottles, disposable cuscus's vaginal bivalve speculum, pen torch, finger batteries, latex disposable hand gloves methylated spirit, cotton wool swabs, laboratory forms and a pair of surgical scissors.

### ***Validity of instrument***

To ensure the validity of the instrument, the researcher made sure that the instrument contained items that are related to the research questions under investigation and it attempts to measure the items correctly. Content and face validity were attested to by the supervisor.

### ***Reliability: Test of instrument reliability***

Reliability was determined using 10% of the sample size (61) who were not part of the study. These included female secondary school teachers and community women. Cronbach's alpha was used to ascertain the reliability of the research instrument. The reliability coefficient(r) for the four sub-scales measured 0.5 for knowledge of the cervix and 0.86 for awareness/knowledge on cancer of the cervix/risk factors. Attitude towards cervical cancer measured 0.5 while knowledge on availability of screening centres/screening test uptake measured 0.71.

### ***Sampling technique for the descriptive phase***

The sample size of 616 was also used for women in the community as the baseline data. Each senatorial district had approximately 206.

### ***Stage 1: Selection of local government areas (LGAs)***

Two local government areas (LGAs) were selected per senatorial district by simple random sampling.

### ***Stage 2: Selection of wards***

Four wards per LGA were selected using a simple random sampling making a total of eight wards per senatorial district.

### ***Stage 3: Selection of streets***

A Street was randomly selected in each ward and starting from the lowest numbered house, one eligible participant who was from 18 years of age was selected in a household using a simple random sampling. A piece of paper with 'YES' and 'NO' was written and put in a container and was used to select participants in a household until the required number of participants in the ward was reached. In the next ward the participants were selected from the highest numbered house until 26 participants were selected per ward giving a total of 208 respondents per senatorial district and a total of 624 community women in the state.

### ***Stage 4: Selection of households for intervention***

For the intervention group of community women, one wing of the intervention sample was used, that is 129. The intervention was conducted in two of the local government areas (LGAs) in the Southern Senatorial District of Cross River State due to availability of screening facilities. The two LGAs were randomized into control and intervention. Each randomised community had 43 as sample size per intervention community women giving a total of 86 women, and 43 in altogether giving a total of 129 participants. The participants were selected from the baseline group using the same method above to select participants from the households who were previously used for the baseline study.

### ***Implementation of intervention***

The intervention groups received one day group health education didactic lectures on knowledge, behaviour and uptake of cervical cancer screening with the following contents: general overview of the cervix, its functions, cancer of the cervix, causes and risk factors, signs and symptoms, screening methods/facilities/cost, treatment options, complications and prevention towards screening. Target audience were teachers and women in the community aged 18-60 years. The school hall was

used for health education of the teachers while a health centre was used for women in the community.

Lecture and discussion method were used with group interactions in delivering the message using posters (visual aids) and a flip chart. The duration of the lectures was one hour. Thereafter, participants were allowed sufficient time to interact with the trainers, asked questions and sought further clarifications on the presentation and training materials. Although the training was initially scheduled for one hour, the question and answer period was exceeded due to many questions and clarifications by both teachers and community women. On the average, about three hours was spent with the teachers while two hours was spent with women in the community.

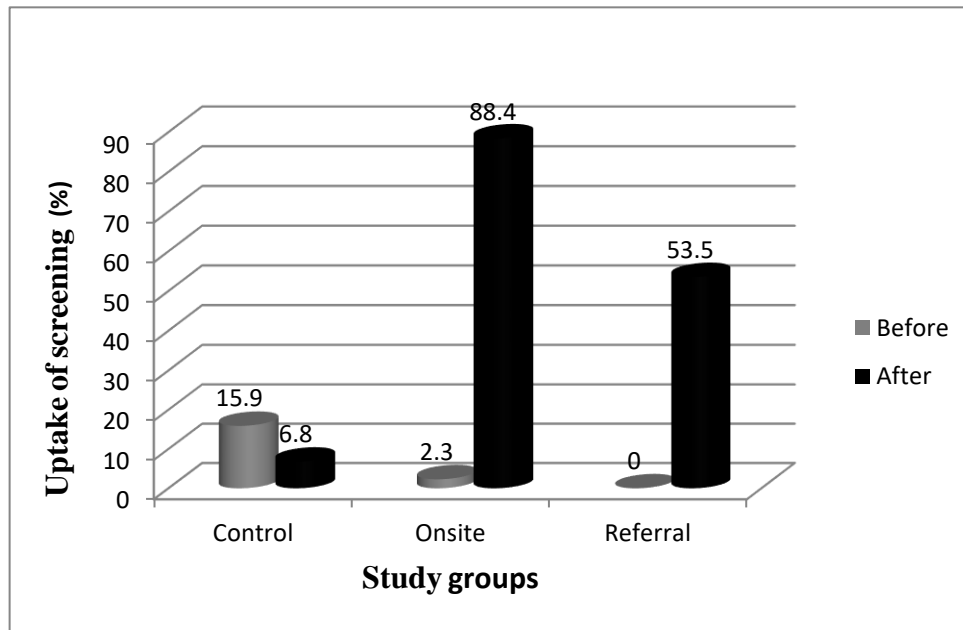
Following the intervention, there was a weekly reminder using text messages and phone calls for participants. A period of one month elapsed before the evaluation of its effects. Mobile cervical cancer screening facilities were made available to one arm of the intervention group for community women. The centre was strategically located in a health centre for the community women and was manned by Chief Nursing Officers with a Consultant Pathologist, Family Physician a Laboratory Scientist, Laboratory Technicians and a Staff Nurse.

## Results

Table 1 shows the demographic characteristics of the community women. Six hundred and fourteen (614) women were interviewed for baseline descriptive phase of the study. The ages of the respondents ranged from 18 to 60 years with a mean of 35.6 (SD=10.288) and a median of 35 years. Respondents were largely of the Christian faith with Catholics constituting the largest majority (47.4%). The majority of the respondents were women aged 20-29 and 40-59. Women with only primary education level of education constituted 39.4% of this group, Figure 1 showed uptake of cervical cancer screening among women in the community. This study revealed that screening uptake at baseline was very low with only 46 (7.5%) out of 614 respondents ever had taken up cervical cancer screening. There was a difference in the uptake of free cervical cancer screening before and after

**Table 1:** Shows the demographic characteristics of the community women

Characteristics	Number (%)
<b>Age</b>	
18-19	10 (1.6)
20-39	400 (65.2)
40-59	185 (30.1)
60 years and older	19 (3.1)
	<b>614 (100)</b>
<b>Religion</b>	
Orthodox	112 (18.2)
Catholic	291 (47.4)
Pentecostal	179 (29.2)
Spiritual	26 (4.2)
Islam	3 (0.5)
Others	3 (0.5)
	<b>614 (100)</b>
<b>Ethnic group</b>	
Efik	136 (22.1)
Bekwara	141 (23.0)
Ejagham	158 (25.2)
Ibo	59 (9.6)
Yoruba	23 (3.7)
Hausa	5 (0.8)
Others	92 (15.0)
	<b>614 (100)</b>
<b>Marital status</b>	
Single	184 (30.0)
Married	378 (61.5)
Divorced/Separated	3 (0.5)
Widowed	49 (8.0)
	<b>614 (100)</b>
<b>Educational qualification</b>	
None	171 (27.9)
FSLC	242 (39.4)
WASC	153 (24.9)
OND/NCE	25 (4.1)
B.sc/HND	18 (2.9)
Masters	3 (0.5)
Ph.D	2 (0.3)
	<b>614 (100)</b>
<b>Income per month</b>	
₦20, 000.00- ₦39, 000.00	19 (4.8)
₦40, 000.00- ₦59, 000.00	143 (23.8)
₦60, 000.00- ₦79, 000.00	150 (24.4)
₦80, 000.00- ₦99, 000.00	95 (15.4)
₦100, 000.00 and above	137 (22.2)
	<b>614 (100)</b>
<b>Occupation</b>	
Unemployed	223 (36.5)
Retiree	139 (22.7)
Civil servant	12 (2.0)
Petty trading	34 (5.6)
Sewing	81 (13.3)
Hair dressing	5 (0.8)
Business	2 (0.3)
Farming	108 (17.7)
Others	7 (1.2)
<b>TOTAL</b>	<b>611(100)</b>



**Figure 1:** Uptake of cervical cancer screening by community women before and after intervention

**Table 2:** Reasons for non-uptake of screening test and uptake if services are free and near

Reasons	Number (%)
Fear of result	54 (12.7)
Far distance to screening center	169 (39.6)
High cost of screening test	90 (21.1)
Cultural barrier	11 (2.6)
For women with promiscuous lifestyle	33 (7.7)
For women with symptoms of cervical cancer	49 (11.5)
No reason	21 (4.9)
TOTAL	427 (100)
SERVICES	
FREE:	
No	63 (15.4)
Yes	504 (84.6)
TOTAL	614 (100)
NEAR	
No	63 (11.1)
Yes	506 (88.9)
TOTAL	569 (100)

health education intervention in onsite screening (2.3% and 88.4% respectively) and those who were referred to a facility to be screened (0% and 53.0% respectively). The difference in the uptake of cervical cancer screening before and after intervention was 34.9% in those women who were screened onsite in their facility and those who were referred to a laboratory for the screening uptake. This shows that if services are brought nearer to the women, the screening uptake for cervical cancer will be high.

There was a difference in pre and post-test after intervention on knowledge of prevention of cervical cancer in all the variables showing a statistically significant difference in knowledge level on prevention of cervical cancer among women in the community after health education intervention with McNemar's Chi-square of  $p < 0.05$  and a net gain of  $p < 0.05$  in majority of the variable on prevention (Table 3).

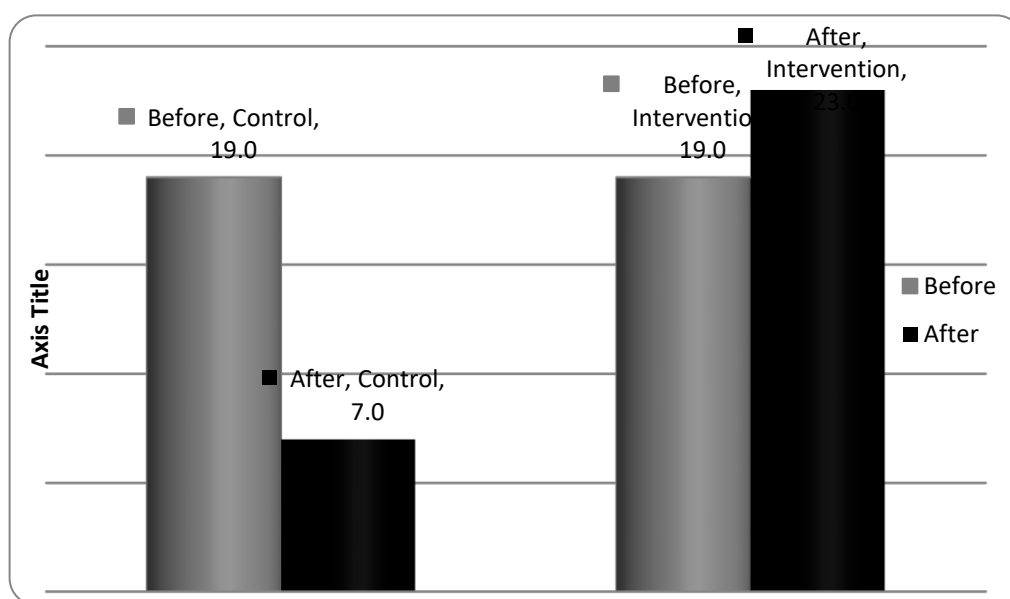
Figure 2 showed that there was a significance difference in the median score of the attitude of women before and after in the intervention group, indicating that there was a change in their attitude. There was no difference in the control group.

#### ***Uptake of cervical cancer screening among women in the community***

This study revealed that screening uptake at baseline was very low with only 46 (7.5%) out of 614 respondents ever had taken up cervical cancer screening. There was a difference in the uptake of free cervical cancer screening before and after health education intervention in onsite screening (2.3% and 88.4% respectively) and those who were referred to a facility to be screened (0% and 53.0% respectively). Therefore the null hypothesis that there is no statistically significant influence of health education on cervical cancer screening

**Table 3:** Paired comparison of knowledge on prevention of cancer of the cervix of women

Method of prevention	INTERVENTION					CONTROL					Net Gain	P-Value
	Pre	Post	Diff	Mc Nemar $\chi^2$	Sig. Diff	Pre	Post	Diff	Mc Nemar $\chi^2$	Sig. Diff		
By use of antibiotics	2.3	96.4	94.1	76.013	P<0.001	27.3	26.8	-0.5	-	P= 1.000	94.6	<0.001
By having multiple sexual partners	52.3	98.8	46.5	31.610	P<0.001	59.1	7.3	-51.8	-	P< 0.001	98.3	0.557
By taking pain relieving tablets	36.0	97.0	61.6	43.472	P<0.001	61.4	12.2	-41.2	15.750	P<0.001	110.8	0.505
Vaccination with HPV	9.3	97.6	88.3	71.014	P<0.001	9.8	-90.2	-90.2	-	P=0.125	1.9	0.005
Early screening for Cervical cancer	51.2	97.6	46.4	30.625	P<0.001	70.5	70.7	0.2	-	P=0.815	46.2	<0.001
Use of condom	37.2	84.3	47.1	28.521	P<0.001	54.5	7.3	-47.2	-	P<0.001	94.3	<0.001
By having sex early in life	50.0	97.6	47.6	31.114	P<0.001	56.8	9.8	-47.0	-	P<0.001	94.6	<0.001
By smoking	50.0	98.8	48.8	-	-	63.0	17.1	-46.5	-	-	95.3	<0.001
By drinking alcohol	51.2	97.6	46.4	31.610	P<0.001	63.6	92.7	29.1	-	P<0.021	17.3	<0.001

**Figure 2:** Median score on attitude towards cervical cancer screening before and after intervention among community women in cross river state

uptake among women in rural communities of Cross River State was rejected. In the same vein, Lyimo and Beran in a cross sectional study to assessed the demographic, knowledge attitudinal and accessibility factors associated with uptake of cervical cancer screening among women in a rural district of Tanzania found out that only 22.6% of 354 participants had obtained cervical cancer screening<sup>13</sup>. Also, Nwozor and Oragudosi investigated the knowledge of cervical cancer screening and uptake among women in Onitsha, Anambra state, Nigeria, and results showed that uptake of cervical cancer poor<sup>14</sup>.

In a study among women on knowledge, attitude, practice and perceived barriers towards premalignant cervical lesions found out that uptake of cervical screening was low with 14.2% of 309 respondents ever had been screened<sup>15</sup>. Uptake of cervical screening among Africans was also shown to be poor as shown in a study done in South Africa, in spite of knowledge of cervical cancer screening and the availability of such services, majority of the women (87.0%) from higher social and educational background did not undergo cervical screening<sup>16</sup>. In another related study, Udigwe reported that out of 144 respondents, only 5.7% had ever undergone a pap smear<sup>17</sup>.

### ***Reasons for non-uptake of cervical cancer screening uptake***

Respondents from this study gave various reasons for not being screened. The highest reason given by female teachers was high cost of screening followed by far distance to screening centre and the least response was no reason while highest reason given by women in the community was far distance to screening centre followed by high cost of screening test and the least was cultural barrier with 11 (2.6%). Both category of respondents also mentioned fear of result outcome, and that it was for those with promiscuous lifestyle, for women with symptoms of cervical cancer, cultural beliefs and no reason. Reasons and barriers for non-uptake were also revealed by various studies. Nwozor and Oragudosi found out in their study that 70 (15.84%) of respondents did not screen due to cost, and another 70 (15.84%) respondents was due to lack of facility and lack of awareness 228 (51.58%), distance 13 (2.94%) 52 (11.76%) do not think that it is necessary<sup>14</sup>. Isa, Gani and McFubara observed that 98 (41.4%) of respondents considered themselves healthy and did not see any reason to subject themselves to any form of cervical screening. These reasons were statistically significant between students and staff with  $p < 0.001$  and  $p = 0.046$  respectively<sup>18</sup>. Similarly, it was revealed in a Somalian study by Abdullahi, Copping, Kessel, Luck and Bonell that poor perception of cervical screening was a barrier to uptake of screening among Somali women in Camden. In this study it was also observed that cultural barrier was one of the reasons for none uptake as shown among Somali women<sup>19</sup>. Yang and Chou found out that barriers to uptake were psychological fear (36.8%), physiological pain (30.2%) and worry of family misunderstandings because some husbands were against it, and the fear of cancer being a dreadful condition among primary school teachers (15.3%)<sup>20</sup>. A descriptive cross-sectional study design was used to assess the factors influencing the uptake of available cervical cancer screening services in Calabar, Cross River State. The study results were that poor awareness about the availability of screening services (45.3%), low-risk perception (6.0%), poor knowledge of where to access services (18.5%), and financial constraints (11.6%) were factors that influenced the use of cervical cancer screening services. Age, marital status and

occupation were found to be significantly associated with screening service utilization ( $p < 0.05$ ) at bivariate level but only age was significant in the multivariate model<sup>21</sup>. The results on a study on Utilization of cervical cancer screening services by women of child bearing age in Uyo metropolis, Akwa Ibom State showed that majority of the respondents which amounted to 65%, were aware of the services, while 35% were not aware. There was a significant relationship between awareness and utilization of cervical cancer screening when r-value of 0.36 was greater than the critical r-value of 0.167 with 208 degree of freedom<sup>22</sup>. The Health Belief Model explains that cultural beliefs can affect the way one perceives a threat to health and this can lead to low screening uptake among the women as seen in the study by Thomas, Saleem and Abraham<sup>23</sup>.

### ***Women's willingness to screen if screening services are free and near to them.***

Table 2 shows willingness to screen if services are free/near to them. About 504(84.6%) respondents were willing to be screened if the services are free while 506(88.9%) respondents were willing to be screened if the services are near to them. Long distances to the cervical cancer screening services reduce the likelihood of women accessing screening<sup>24</sup>. According to three quantitative and two qualitative studies, women found it challenging to show up for screening when health facilities were far away. According to Waiswa and colleagues' research, 32.9% of the women who had never had screening said that their lack of access to a facility was to blame<sup>25</sup>. Women who resided within a 5 km radius of a health institution where cervical cancer screening was provided had a higher intention to screen, according to Ndejjo, Amissah-Essel, Asiedu, Akaba, and Pereko<sup>26</sup>. According to Ojong *et al*, factors identified as obstacles to utilization of the services were lack of government policy, lack of information and health education, unfriendly attitude of health providers, fear of unknown causing social stigma and high cost of the services<sup>22</sup>.

### ***Comparison of knowledge on prevention of cancer of the cervix of women***

There was a difference in pre and post-test after intervention on knowledge of prevention of cervical cancer in all the variables showing a statistically

significant difference in knowledge level on prevention of cervical cancer among women in the community after health education intervention with McNemar's Chi-square of  $p < 0.001$  and a net gain of  $p < 0.001$  in majority of the variable on prevention (Table 3). A comparison of the mean differences between the pre-post-test scores for the intervention and control groups showed a statistically significant difference for knowledge of cervical cancer ( $t = 6.22$ ,  $df = 780$ ,  $p = 0.001$ ), knowledge of cervical cancer screening ( $t = 5.96$ ,  $df = 780$ ,  $p = 0.001$ ), perceived seriousness ( $t = 3.36$ ,  $df = 780$ ,  $p = 0.001$ ), perceived benefits ( $t = 9.19$ ,  $df = 780$ ,  $p = 0.001$ ), and perceived barriers ( $t = 3.19$ ,  $df = 780$ ,  $p = 0.001$ ) in study conducted in Ghana on Impact of health education intervention on knowledge and perception of cervical cancer and screening for women<sup>27</sup>. Also Abiodun, Olu-Abiodun, Sotunsa, and Oluwole investigated Impact of health education intervention on knowledge and perception of cervical cancer and cervical screening uptake among adult women in rural communities in Nigeria and the results indicated that lack of knowledge about cervical cancer and screening was the main reason given by the women for not having had a cervical screening done. After the intervention, there was a statistically significant difference between the intervention and control groups in terms of their knowledge, attitude, and practice about cervical screening ( $p < 0.05$ )<sup>28</sup>. The result of a present study showed that the total knowledge mean score was improved from  $(11.33 \pm 7.28)$  at pre intervention to  $(21.20 \pm 4.7)$  at post intervention phase. In addition there was 0.0% of the studied women had positive attitude to pre intervention meanwhile, after intervention 30.8% of them have positive attitude<sup>29</sup>.

## Conclusion

Cervical cancer is a disease of inequality with high morbidity and mortality that have ravaged women especially in developing countries like Nigeria due to lack of knowledge, poor attitude to screening uptake, high cost of screening test, and long distance to screening centres. Results from this study has shown that with massive health education in creating awareness is a major way out of saving women from cervical cancer, followed by free screening and follow up for subsequent screening after first screening depending on the woman's age.

Immunization of our boys and girls aged 9-11 years will go a long way in preventing future infections with HPV16 and 18 strains.

## Conflict of interest

There is no conflict of interest.

## Acknowledgement

I acknowledge Itoro Ibia (MD) and Nsa Henshaw (MD) of Ekopimo Ibia Foundation in the US who used this study to immunize girls age 9 – 14 years against HPV in Cross River and Akwa Ibom State, Nigeria. This research was personally funded.

## References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A and Bray F. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*. 2021 May;71(3):209-49.
2. Ferlay J, Colombet M, Soerjomataram I., Siegel R, Torre L and Jemal A. Global and regional estimates of the incidence and mortality for 38 cancers: GLOBOCAN 2018. Lyon: International Agency for Research on Cancer. *World Health Organization*, 2018, 394-424.
3. Bruni L, Albero G, Serrano B, Mena M, Gómez D, Muñoz J, Bosch FX and de Sanjosé S. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human papillomavirus and related diseases in the world. Summary Report 22 October 2021. *WXX*. pdf. 2021.
4. Eyam LE, Eyam SE, Ekpeyong BN, Ndep AO, Akpan MI and Ekanem EE. Determinants of risky sexual behavior among secondary school adolescents in Cross River State, Nigeria. *Nigerian Journal of Medicine*. 2021;30(6):658-64.
5. Zhang S, Xu H, Zhang L and Qiao Y. Cervical cancer: Epidemiology, risk factors and screening. *Chinese Journal of Cancer Research*. 2020 Dec 12;32(6):720.
6. Akpan AI and Nwankwo IU. Knowledge and perceptions of women on risk factors associated with cancer of the cervix in Awka South council area of Anambra state, Nigeria. *Global Journal of Applied, Management and Social Sciences (GOJAMSS)*. 2021; 23: 8 – 17 (ISSN: 2276 – 9013)
7. Okunowo AA, Daramola ES, Soibi-Harry AP, Ezenwankwo FC, Kuku JO, Okunade KS and Anorlu RI. Women's knowledge of cervical cancer and uptake of Pap smear testing and the factors influencing it in a Nigerian tertiary hospital. *Journal of cancer Research and Practice*. 2018 Sep 1;5(3):105-11.
8. World Health Organization. Cervical Cancer. 2022 <https://www.who.int/news-room/fact-sheets/detail/cervical-cancer>
9. Ilevbare OE, Adegoke AA and Adelowo CM. Drivers of cervical cancer screening uptake in Ibadan, Nigeria. *Heliyon*. 2020 Mar 1;6(3):e03505.



10. National Population Commission. Nigeria population census report. National Population Commission. 2006.
11. Cochran WG. Sampling Techniques. 1963 2nd Ed., New York: John Wiley and Sons, Inc.
12. Lwanga SK and Lemeshow S. World Health Organization. Sample size determination in health studies: a practical manual. World Health Organization; 1991.
13. Lyimo FS and Beran TN. Demographic, knowledge, attitudinal, and accessibility factors associated with uptake of cervical cancer screening among women in a rural district of Tanzania: three public policy implications. BMC public health. 2012 Dec;12(1):1-8.
14. Nwozor CM and Oragudosi AL. Awareness and Uptake of Cervical Cancer Screening among Women in Onitsha, South-East, Nigeria. Greener Journal of Medical Sciences. 2013;3(8):283-288.
15. John J. The knowledge, attitude, practice and perceived barriers towards screening for premalignant cervical lesions among women aged 18years and above, in Songea urban, Ruvuma (Doctoral dissertation, Muhimbili University of Health and Allied Sciences). 2011
16. Wellensiek N, Moodley M, Moodley J and Nkwanyana N. Knowledge of cervical cancer screening and use of cervical screening facilities among women from various socioeconomic backgrounds in Durban, KwaZulu Natal, South Africa. International Journal of Gynecologic Cancer. 2002 Jul 1;12(4).
17. Udigwe GO. Knowledge, attitude and practice of cervical cancer screening (pap smear) among female nurses in Nnewi South Eastern Nigeria. Nigerian journal of clinical practice. 2006;9(1):40-3.
18. Isa IA, Gani OO and McFubara K. Cervical cancer screening among female undergraduates and staff in the Niger delta region of Nigeria. Open Journal of Obstetrics and Gynecology. 2013;1(1) Article ID:26890,6 pages DOI:10.4236/ojog.2013.31014
19. Abdullahi A, Copping J, Kessel A, Luck M and Bonell C. Cervical screening: perceptions and barriers to uptake among Somali women in Camden. Public health. 2009 Oct 1;123(10):680-5.
20. Yang NP and Chou P. The knowledge attitude and practice of cancer prevention among primary school teachers. Zhonghua yi xue za zhi= Chinese Medical Journal; Free China ed. 1991 Apr 1;47(4):271-9.
21. Iwara PE, Akpan MI, Ndep AO, Onwusaka O, Peter A, Okon A, Eyam L and Ekpenyong BN. Factors Influencing Utilization of Cervical Cancer Screening Services Among Women of Reproductive Age in Calabar Municipality, Cross River State, Nigeria. Journal of Epidemiological Society of Nigeria. 2021;4(2):49-59.
22. Ojong IN, Etim PP and Samson-Akpan PE. Utilization of cervical cancer screening services by women of child bearing age in Uyo metropolis, Akwa Ibom State. Mary Slessor Journal of Medicine. 2013;12(1):24-32.
23. Thomas VN, Saleem T and Abraham R. Barriers to effective uptake of cancer screening among Black and minority ethnic groups. International journal of palliative nursing. 2005 Nov;11(11):562-71
24. Jo W, Bartosze M, Marlow L and Wardel J: Barriers to cervical cancer screening attendance in England: a population-based survey Journal of Medical Screening. 2009, 16: 199-204.
25. Waiswa A, Nsubuga R, Muwasi M, Kimera I, Ndikabona G, Tusingwire PD, Mshilla M, Ovuga E and Akera P. Knowledge and attitude towards cervical cancer screening among females attending out patient department in health Centre IIIs in Oyam District. Open J Prev Med. 2017;7(04):55.
26. Ndejjo R, Mukama T, Musinguzi G, Halage AA, Ssempebwa JC and Musoke D. Women's intention to screen and willingness to vaccinate their daughters against cervical cancer—a cross sectional study in eastern Uganda. BMC Public Health. 2017;17(1):255.
27. Ebu NI, Amissah-Essel S, Asiedu C, Akaba S and Pereko KA. Impact of health education intervention on knowledge and perception of cervical cancer and screening for women in Ghana. BMC public health. 2019 Dec;19(1):1-1.
28. Abiodun OA, Olu-Abiodun OO, Sotunsa JO and Oluwole FA. Impact of health education intervention on knowledge and perception of cervical cancer and cervical screening uptake among adult women in rural communities in Nigeria. BMC public health. 2014 Dec;14(1):1-9.
29. Said S, Hassan H and Sarhan A. Effect of an educational intervention on women's knowledge and attitude regarding cervical cancer. American Journal of Nursing Research. 2018 Mar 10;6(2):59-66.