

Sexual Behavioral Pattern, Cervical Cancer Awareness and Screening Practices among Female Undergraduate Students of Public Universities in Anambra State, Nigeria

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Abstract Background: Risky sexual behavior, low level of awareness and poor screening uptake have been linked to the high prevalence of cervical cancer in our environment. **Objective:** To determine the sexual behavioral pattern, cervical cancer awareness and screening practices among female undergraduate students of public universities in Anambra state, Nigeria. **Materials and methods:** This was a descriptive cross sectional study of 342 female undergraduate students in Anambra state, Nigeria selected using a two stage sampling. Data was collected using a pre-tested semi-structured questionnaire and analysed using statistical package for social sciences version 22.0. Chi-square test was used to identify statistically significant associations between variables. A p value of ≤ 0.05 was considered significant. **Results:** The modal age at menarche, 215 (62.9%) was 13-15 years, while 18 (5.3%) first menstruated at ages below 10 years. Of the 311 (71.6%) that ever had sex, 289 (92.9%) had their coitarche at ages below 24 years, 209 (67.2%) were sexually active while 48 (15.4%) had multiple sex partners. About 310 (90.6%) have heard of cervical cancer, 269 (78.8%) were aware of cervical cancer screening, out of which 108 (40.2%) were aware of cervical cancer screening tests with Pap smear as the most mentioned screening test by 55 (51.0%). There were statistically significant associations between uptake of cervical cancer screening and [ever been pregnant ($p=0.005$), ever used contraceptives ($p=0.001$) and perceived need for cervical cancer screening ($p=0.000$) respectively. **Conclusions:** This study showed a good level of awareness of cervical cancer but cervical cancer screening practices was inadequate. We recommend educational programs and comprehensive cervical cancer screening strategy.

Keywords: cervical cancer, awareness, screening practices, sexual behavior, female undergraduates, Anambra state Nigeria

Cite This Article: Valentine C Ilika, Chinomnso C Nnebue, Ngozi N Ikechebelu, Chito P Anyanwu, Amobi L Ilika, and Joseph I Ikechebelu, "Sexual Behavioral Pattern, Cervical Cancer Awareness and Screening Practices among Female Undergraduate Students of Public Universities in Anambra State, Nigeria." *American Journal of Cancer Prevention*, vol. 4, no. 2 (2016): 26-32. doi: 10.12691/ajcp-4-2-2.

1. Introduction

Cancer of the cervix is the commonest genital tract malignancy in the female. [1] It accounts for nine percent of all female cancers. [2] In 2010, the global incidence of cervical cancer was 454,000 cases, of which about 50% resulted in death. [3] In Nigeria the national incidence by age standardized rate (ASR) per 100,000 across 10 age groups is 29.0, [4] (36.0 per 100,000 ASR at the Ibadan cancer registry and 30.3 per 100,000 at the Abuja cancer registry). [5] The mortality by ASR per 100,000 across 10

age groups is 17.5, the cumulative risk (number of newborn girls) expected to develop cervical cancer/out of 100 is 3.28, while the mortality – cumulative risk (number of newborn girls) expected to die of cervical cancer/out of 100) is 2.05. [4] In contrast, the cervical cancer incidence by ASR in the United States of America (USA) is 2.7/100,000 and in Japan it is 2.8/100,000. [2]

The etiology of cervical cancer is multifactorial. These factors include: risky sexual behaviors such as having multiple sexual partners or male partner with other female partners and early coitarche (sexual debut); high parity; cigarette smoking; use of barrier and oral contraceptives, use of immunosuppressant, certain dietary deficiencies

and poor personal hygiene. [6,7] Also reported are infection with human papilloma virus (HPV), co-infection with human immunodeficiency virus (HIV). Chlamydia trachomatis and herpes simplex virus type-2. [8,9] However, key factors linked to the disparity in incidence of cervical cancer between these populations in the developing and developed world include: lack of awareness and lack of access to effective cytological screening programs in developing countries. [10,11] Another reason in this double burden of disease is the focus on competing health priorities such as HIV/AIDS, tuberculosis and malaria. [12,13] No doubt more than 85% of global cervical cancer deaths occurs in less developed countries. [2,14]

Benefits of cervical cancer screening programs are well documented. [15,16] It is believed that widespread screening of women for precursor lesion and early detection of the invasive disease can greatly increase the chance of successful treatment. This results in approximately 40% reduction in incidence and mortality associated with invasive cancer. [17] Papanicolaou (Pap) test or cervical cytology screening is a reliable, inexpensive and the most widely recognized early detection test for cervical cancer [15,18]. Alternative screening approaches especially in resource-poor settings include: visual inspection with acetic acid (VIA), visual inspection with Lugol's iodine (VILI), cervicography and speculscopy.

The World Health Organization, recommends the commencement of cervical cancer screening with the age of 25 years. [19] This is the practice in Colombia, Jamaica, Singapore and Venezuela. [20] Other countries such as the Barbados [20] and South Africa [21] recommend to begin cervical cancer screening at the age of 21 years. In the USA, the United States Preventive Services Task Force [22] and the American Cancer Society [23] recommend that all women should begin cervical cancer screening at age 21 years, with repeat tests after every 3 years till the age of 30 years and thereafter, every 5 years with combined Human Papillomavirus test till the age of 65 years. In Nigeria, there is no organized government screening policy, screening being offered at the request of patients or the suggestion of health personnel.

Active participation of the target population is required for the success of the screening programs. [15] A study among female university students across 25 low and middle and emerging economy countries, found an overall low participation rate (0-7.1%) in cervical cancer screening. [24] Several other studies among female university students in developing countries corroborated this finding, e.g., (0-8.3%) in Nigeria, [25,26,27,28] 12% in Ghana [29] and 6% in Bhutan. [30] While studies among female university students in high income countries found a higher participation rate in screening for cervical cancer, e.g. 44.8% in Greece [31] and 41% in USA. [32]

Researchers have reported possible reasons for a low participation in cervical cancer screening among female university students. These include: lack of awareness of the existence of such a test, its importance, centers where such services are obtainable and risk factors to the development of cervical cancer. [25,26,28,29,33] Efforts need to be intensified to increase awareness of this condition among this population. The aim of this study

was to determine the sexual behavioral pattern, cervical cancer awareness and screening practices among female undergraduate students of public universities in Anambra state, Nigeria.

2. Methodology

2.1. Description of Study Area

Anambra State is one of the five states in the South Eastern part of Nigeria. It has located in it one Federal (Nnamdi Azikiwe University), one State (Chukwuemeka Odumegwu Ojukwu University) and three Missionary Universities. Nnamdi Azikiwe University has three campuses, with its main campus at Awka and the other two at Nnewi and Agulu. The Chukwuemeka Odumegwu Ojukwu University also has three campuses, with its main campus at Uli and the other two at Igbariam and Awka.

2.2. Study Design

The study design was a cross-sectional descriptive study.

2.3. Study Population

The study population comprises of female undergraduate students of the public Universities in Anambra State.

2.3.1. Inclusion Criteria

Female undergraduate students of the public Universities in Anambra State who consent to this study.

2.3.2. Exclusion Criteria

Female undergraduate students living in private hostels were excluded from the study as they would be difficult to track. This group may not be influenced by the way of life within the campus. Also, those who have had hysterectomies as well as students who were absent from school during the study period were excluded.

2.4. Sample Size Determination

The sample size was determined using the Leslie Kish's formula for single proportions which stated: [34]

$$n = Z^2 pq / d^2$$

where,

Z = standard normal deviate set at 1.96 which corresponds to 95% confidence interval.

p = percentage awareness of cervical screening in an Ibadan study by Ayinde *et al.*, = 33.5% = 0.335. [27]

q = complementary prevalence (1-p) = 1 - 0.335 = 0.665

d = level of precision usually set at 0.05

$$n = (1.96)^2 \times 0.335 \times 0.665 / 0.05^2 \\ = 342.33 = 343 \text{ students.}$$

Anticipating a response rate of 90%, an adjustment of the sample size estimate to cover for non-response rate was made by dividing the sample size estimate with a factor f, i.e. n/f, where f is the estimated response rate. [34] Thus the calculated sample size = 343/0.90 = 381 students. However out of the 384 questionnaires that were distributed, 342 were completely filled and returned.

2.5. Sampling Technique

Our study participants were selected in two stages. The first stage involved the use of stratified sampling technique to get the proportion of 64 students each from the six campuses that would make up the total population of 384. The second stage involved simple random sampling technique using a table of random numbers with the hostel register as the sampling frame, to select the students that were studied until the required sample size was obtained.

2.6. Data Collection Technique

Data collection in this study was done using pre-tested, semi- structured questionnaires developed from review of relevant literatures. All questions were written in English language and pre-tested on similar set of respondents in Madonna University Okija, Anambra state. This was done, to check for the reliability, validity, appropriateness of format, wording and time needed to fill the questionnaire. Thereafter the instruments were reviewed by colleagues, necessary adjustments and corrections were effected before administering the questionnaire to the study participants.

The questionnaire is divided into three sections (A-C) to obtain data on A) the socio- demographic characteristics of the respondents; B) sexual and reproductive history of respondents and C) awareness of cervical cancer, its risks, screening tests and barriers to the screening tests.

To ensure data quality, training of data collection team and field monitoring of data collection were done. Timely availability of the study instruments, meeting of data collection team at the end of every day to share experiences and submit completed forms, and solving field problems were ensured.

2.7. Data Management and Analysis

The data were edited and entered into the computer. Data cleaning was done by carrying out range and consistency checks. Descriptive and analytical statistics of the data were carried out using statistical package for social sciences (SPSS) Windows version 22.0. [35] Tests of statistical significance were carried out using Chi square tests for proportions. A p value of < 0.05 was considered significant. Descriptive data were presented as simple frequencies and percentages.

2.8. Ethical Consideration

Approval was obtained from the appropriate authorities in the studied institutions. Verbal consent of the respondents was also solicited and obtained for the conduct and publication of this research study. Study participants were free to refuse or withdraw from the study at any time without any penalty. All authors hereby declare that the study has been examined and approved by the Department of Community Medicine Chukwuemeka Odumegwu Ojukwu University and University Teaching Hospital ethics committee, Nigeria and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

3. Results

Table 1 shows the socio- demographic characteristics of respondents. A total of 342 respondents participated in the study. The modal age group was 20-29 years, 300 (87.7%). Majority 287 (83.9%) were never married, 333 (97.4%) were Christians while 270 (78.9%) dwell in the urban areas.

Table 1. Distribution of respondents' socio-demographic characteristics

| Characteristics | Frequency N=342 | Percentage (%) |
|---------------------------|-----------------|----------------|
| Age group (years) | | |
| ≤19 | 27 | 7.9 |
| 20 -29 | 300 | 87.7 |
| 30 -39 | 10 | 2.9 |
| ≥40 | 5 | 1.5 |
| Total | 342 | 100.0 |
| Marital status | | |
| Never married | 287 | 83.9 |
| Married | 51 | 14.9 |
| Divorced/separated | 4 | 1.2 |
| Total | 342 | 100.0 |
| Tribe | | |
| Ibo | 335 | 97.9 |
| Hausa | 1 | 0.3 |
| Yoruba | 6 | 1.8 |
| Total | 342 | 100.0 |
| Religion | | |
| Christian | 333 | 97.4 |
| Moslem | 9 | 2.6 |
| Total | 342 | 100.0 |
| Year of study | | |
| First | 63 | 18.4 |
| Second | 98 | 27.2 |
| Third | 79 | 23.1 |
| Fourth | 64 | 18.7 |
| Fifth | 20 | 5.8 |
| Sixth | 23 | 6.7 |
| Total | 342 | 100.0 |
| Place of Residence | | |
| Urban | 270 | 78.9 |
| Rural | 72 | 21.1 |
| Total | 342 | 100.0 |

Table 2 highlights the distribution of sexual and reproductive history of respondents. The modal age at menarche, 215 (62.9%) was 13-15 years, while 18 (5.3%) of respondents first menstruated at ages below 10 years. Of the 311 (71.6%) that ever had sex, 289 (92.9%) had their sexual debut at the ages below 24 years, 209 (67.2%) were sexually active (had sex within three months prior to the study, while 48 (15.4%) had multiple sex partners. Thirty nine (12.5%) of them had been pregnant before, while 169 (54.3%) had ever used contraceptives with condoms as the contraceptive with the highest self-reported use by 167 (53.7%) of respondents. Twenty three (6.7%) of respondents had ever used tobacco.

Table 2. Distribution of respondents' sexual and reproductive history

| Characteristics | Frequency N=342 | Percentage (%) |
|---|-----------------|----------------|
| Age at menarche (years) | | |
| < 10 | 18 | 5.3 |
| 10-12 | 76 | 22.2 |
| 13-15 | 215 | 62.9 |
| >15 | 33 | 9.6 |
| Ever had sex | | |
| Yes | 311 | 71.6 |
| No | 31 | 28.4 |
| Age at sexual debut (coitarche), n=311 | | |
| 10-14 | 15 | 4.8 |
| 15-19 | 129 | 41.5 |
| 20-24 | 145 | 46.6 |
| 25-29 | 18 | 5.8 |
| ≥30 | 4 | 1.3 |
| Sexually active (had sex within three Months prior to the study, n=311) | | |
| Yes | 209 | 67.2 |
| No | 102 | 32.8 |
| Number of sexual partners three Months prior to the study, n=311 | | |
| 0 | 102 | 32.8 |
| 1 | 161 | 51.8 |
| ≥ 2 | 48 | 15.4 |
| Ever used contraceptives, n=311 | | |
| Yes | 169 | 54.3 |
| No | 142 | 45.7 |
| Type of contraceptives used* | | |
| Condoms | 167 | 53.7 |
| Pills | 17 | 5.5 |
| Injectable | 5 | 1.6 |
| Implants | 1 | 0.3 |
| Intra uterine contraceptive device | 1 | 0.3 |
| Ever been pregnant, n=311 | | |
| Yes | 39 | 12.5 |
| No | 272 | 87.5 |
| Number of children, n=39 | | |
| 0 | 15 | 38.5 |
| 1 | 10 | 25.6 |
| 2 | 8 | 20.5 |
| ≥3 | 6 | 15.8 |
| Ever used tobacco | | |
| Yes | 23 | 6.7 |
| No | 319 | 93.3 |

* Multiple responses applicable

Table 3 summarizes the awareness of cervical cancer, its risks, screening tests and barriers to the screening tests. Most of all the respondents, 310 (90.6%) have heard of cervical cancer with 198 (63.9%) of them reporting their source as Physician/health workers. human papilloma virus was the most self-reported risk factor of cervical cancer, by 103 (33.3%) of them. Two hundred and sixty nine (78.8%) were aware of cervical cancer screening, out of which 108 (40.2%) were aware of cervical cancer screening tests with PAP smear as the most mentioned screening test by 55 (51.0%). Self-reported barriers to cervical cancer screening include: 115 (42.8%) lack of awareness, 35 (13.0%) fear of positive result, 23 (8.6%) did not know where to do the screening, 20 (7.4%) fear of vaginal examination.

Table 3. Awareness of cervical cancer, its risks, screening tests and barriers to the screening tests

| Characteristics | Frequency | Percentage |
|---|------------|--------------|
| Heard of cervical cancer? n=342. | | |
| Yes | 310 | 90.6 |
| No | 32 | 9.4 |
| Total | 342 | 100.0 |
| Source of information for cervical cancer* (For those that demonstrated awareness) n=310 | | |
| Physician/health workers | 198 | 63.9 |
| Seminar/workshop | 32 | 10.3 |
| Radio /TV | 30 | 9.7 |
| Journals | 21 | 6.8 |
| Newspaper | 21 | 6.8 |
| Friends | 15 | 4.8 |
| Religious forum | 3 | 1.0 |
| Self-reported risk factors of cervical cancer*, n=310 | | |
| Human Papilloma Virus infection | 103 | 33.2 |
| Long term hormonal contraceptive use | 7 | 2.3 |
| Family history of cervical cancer | 6 | 2.0 |
| Chlamydia infection | 4 | 1.3 |
| Human Immuno-deficiency Virus infection | 1 | 0.3 |
| Herpes simplex virus type 2 infection | 1 | 0.3 |
| Heard of cervical cancer screening? n=342. | | |
| Yes | 269 | 78.8 |
| No | 73 | 21.2 |
| Total | 342 | 100.0 |
| Heard of cervical cancer screening tests? n=269. | | |
| Yes | 108 | 40.2 |
| No | 161 | 59.8 |
| Cervical cancer screening tests mentioned by respondents, n=108 | | |
| Pap smear | 55 | 51.0 |
| High vaginal swab | 19 | 18.5 |
| Vaginal examination | 14 | 13.0 |
| Endocervical swab | 7 | 6.5 |
| Visual inspection with acetic acid | 4 | 3.7 |
| No response | 9 | 8.3 |
| Self-reported barriers to cervical cancer screening, n=269 | | |
| Lack of awareness | 115 | 42.8 |
| Fear of positive result | 35 | 13.0 |
| Did not know where to do the screening | 23 | 8.6 |
| Fear of vaginal examination | 20 | 7.4 |
| Fear of false positive screening results | 15 | 5.6 |
| Assumed Pap smear to be harmful | 11 | 4.1 |
| Lack of finances | 10 | 3.7 |
| Had no reason | 40 | 14.9 |

* Multiple response applicable.

Table 4 shows the association of socio-demographic and subject variables with uptake of cervical cancer screening. There were statistically significant associations between uptake of cervical cancer screening and [ever been pregnant ($\chi^2=7.905$, $p=0.005$), ever used contraceptives ($\chi^2=11.047$, $p=0.001$) and self-reported need for cervical cancer screening ($\chi^2=166.105$, $p=0.000$) respectively.

Table 4. Association of socio-demographic and subject variables with uptake of cervical cancer screening

| Variables | Uptake of cervical cancer screening Frequency N=342 Percentage (%) | | | Chi square | p value |
|---|--|-------------------|--------------------|---------------|---------|
| Age group (years) | | | | | |
| ≥19 | 4 (1.2) | 23 (6.7) | 27 (7.9) | 0.020, df=3 | 0.887 |
| 20 -29 | 55 (16.1) | 245 (71.6) | 300 (87.7) | | |
| 30 -39 | 3 (0.9) | 7 (2.0) | 10 (2.9) | | |
| ≥ 40 | 1 (0.3) | 4 (1.2) | 5 (1.5) | | |
| Total | 63 (18.4) | 279 (81.6) | 342 (100.0) | | |
| Marital status | | | | | |
| Single | 51 (14.9) | 236 (69.0) | 287 (83.9) | 0.270, df=1 | 0.603 |
| Married | 11 (3.2) | 40 (11.7) | 51 (14.9) | | |
| Divorced/separated | 1 (0.3) | 3 (0.9) | 4 (1.2) | | |
| Total | 63 (18.4) | 279 (81.6) | 342 (100.0) | | |
| Place of Residence | | | | | |
| Urban | 50 (14.6) | 220 (64.3) | 270 (78.9) | 0.007, df=1 | 0.935 |
| Rural | 13 (3.8) | 59 (17.3) | 72 (21.1) | | |
| Total | 63 (18.4) | 279 (81.6) | 342 (100.0) | | |
| Age at menarche (years) | | | | | |
| < 10 | 7 (2.1) | 11 (3.1) | 18 (5.3) | 0.602, df=1 | 0.438 |
| 10-12 | 12 (3.5) | 64 (18.7) | 76 (22.2) | | |
| 13-15 | 38 (11.1) | 177 (51.8) | 215 (62.9) | | |
| >15 | 6 (1.8) | 27 (7.8) | 33 (9.6) | | |
| Total | 63 (18.4) | 279 (81.6) | 342 (100.0) | | |
| Number of sexual partners three months prior to the study, n=311 | | | | | |
| 0 | 21 (6.8) | 81 (26.0) | 102 (32.8) | 0.870, df=2 | 0.351 |
| 1 | 30 (9.7) | 131 (38.3) | 161 (51.8) | | |
| ≥2 | 12 (3.9) | 36 (11.5) | 48 (15.4) | | |
| Ever been pregnant, n=311 | | | | | |
| Yes | 15 (4.8) | 24 (7.7) | 39 (12.5) | 7.905, df=1 | 0.005* |
| No | 48 (15.4) | 224 (72.1) | 272 (87.5) | | |
| Ever used contraceptives, n=311 | | | | | |
| Yes | 22 (7.0) | 147 (47.3) | 169 (54.3) | 11.047, df=1 | 0.001* |
| No | 41(13.2) | 101 (32.5) | 142 (45.7) | | |
| Ever used tobacco | | | | | |
| Yes | 7 (2.0) | 16 (4.7) | 23 (6.7) | 1.588, df=1 | 0.208 |
| No | 56 (16.4) | 263 (76.9) | 319 (93.3) | | |
| Total | 63 (18.4) | 279 (81.6) | 342 (100.0) | | |
| Self- reported need for cervical cancer screening, n=311 | | | | | |
| Yes | 57 (18.3) | 24 (7.7) | 81 (26.0) | 166.105, df=1 | 0.000* |
| No | 6 (1.9) | 224 (72.1) | 230 (74.0) | | |

* Statistically significant association - $p \leq 0.05$.

4. Discussion

The results of our study showed sexual and reproductive history depicting of high prevalence of the major risk factors for cervical cancer among the respondents. This included early coitarche, multiple sexual partners, ever used contraceptives. This finding agrees with the results of another study. [25]

Awareness of a disease or health related condition often results in improved specific health indices. For instance, the incidence of cervical cancer in developed countries has decreased due to high awareness, increased uptake of screening, early detection and treatment of the disease. However, in developing countries, 80% of the cervical cancers are at their advanced stage when they are incurable at the time of detection due to lack of awareness. [36] In the current research, we assessed the awareness of cervical cancer, its risks, screening tests and barriers to the screening tests. The level of awareness of 90.6% found in

the index study is higher than figures reported in other studies. [33,37,38] The differences in the levels of awareness may be partly explained by educational status as highest levels of awareness have been documented in studies where participants were undergraduates and health care professionals. [[36]]

Physician/health workers (63.9%) was the major source of information in this study. This is similar to the result of another study. [10] It is however, different from other studies where the mass media (radio and television) was the main source of information. [15,39,40]

Our study findings showed that (78.8%) were aware of cervical cancer screening. Again, this finding is higher than (26.85%) reported elsewhere. [41] Also, our study found that (40.2%) were aware of cervical cancer screening tests with Pap smear as the most mentioned screening test. This is in concordance with about (33.3-47.4%) reported by some studies. [15,25,38,41] It is however higher than 12.6% and 23.1% reported elsewhere. [10,30]

In addition, our study results showed that cervical cancer screening uptake rate was 18.4%. Pap smear test utilization rate of 10.2% has been documented, with routine ANC as the major reason for getting screened. [15] This level of uptake of screening is clearly unsatisfactory and self-reported barriers to cervical cancer screening from our study include: lack of awareness, fear of positive result, did not know where to do the screening and fear of vaginal examination. These have been cited as the major reasons for not accessing the test by respondents in other studies. [10,25,30,38] This reveals poor appreciation of the disease, and the failure of the health system to effectively disseminate information. Fear and anxiety associated with a positive result stems from the poor understanding of the basis for cervical screening. Opportunistic screening, mass media campaigns and antenatal care (ANC) education have thus been suggested as ways of improving awareness and utilization of cervical cancer screening services. [15]

The present study, examined the relationship between participants' socio-demographic and subject variables with uptake of cervical cancer screening. There were statistically significant associations between uptake of cervical cancer screening and [ever been pregnant, ever used contraceptives and perceived need for cervical cancer screening respectively. Previous studies have found that women who rated cervical cancer screening as more important had uptake more often. [25,26,29] This finding may have implications for cervical cancer awareness and screening programs.

Limitation of the study: This study is based on self-reports and is subject to social desirability bias due to the sensitive nature of some of the questions.

5. Conclusions

This study demonstrated a sexual and reproductive history indicating high prevalence of the major risk factors for cervical cancer among the respondents. There was good level of awareness of cervical cancer among the female undergraduates but cervical cancer screening practices was inadequate. However, the reasons advanced for poor utilization are modifiable. Efforts at developing educational programs and comprehensive cervical cancer screening strategy can reduce indulgence in risky sexual behavior, increase the importance related to cervical cancer as well as translate the high level of awareness recorded into good uptake of cervical cancer screening. Implementation of other methodologies for cervical cancer screening such as liquid-based cytology and HPV DNA and visual inspection with acetic acid (VIA) testing could result in improved cervical cancer prevention and more accurate identification of early-stage disease.

Source of Support or Funding

None.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

Author VCI, NNI and CPI were involved in the design and implementation of the study. CCN was involved in the analysis of data, interpretation of results, write up of this study and editing of the main paper, ALI and JII were involved in the design and editing of the main paper. All authors read and approved the final manuscript.

References

- [1] Adefuye PO. Knowledge and practice of cervical screening among professional health workers in a suburban district in Nigeria. *Nigerian Medical Practitioner*.2006;50:19-22.
- [2] Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, et al., Estimated cancer incidence, mortality and prevalence worldwide in 2012. GLOBOCAN. 2012. Available@http://globocan.iarc.fr/Pages/fact_sheets_population.aspx,v1.0, [Accessed on 22 May, 2016].
- [3] Forouzanfar MH, Foreman KJ, Delossantos AM, Lozano R, Lopez AD, Murray CJ, et al., Breast and cervical cancer in 187 countries between 1980 and 2010: A systematic analysis. *Lancet*.2011;378 (9801):1461-84.
- [4] Africa Health, Human and Social Development Information Service (Afri---Dev. Info i.e. Formerly Africa Public Health. Info), Africa Coalition on Maternal Newborn and Child Health. Summary scorecard and research findings at end of scorecard including: Global/Africa Continental/Sub Regional and Country trends; and links with Sexual and Reproductive Health (SRH), HIV/AIDS, Adolescent and Maternal Health. Advancing multi-sectoral policy and investment for girls, women and children's health. 2014. [Accessed on 22 May, 2016].
- [5] Jedy-Agba E, Curado MP, Ogunbiyi O, Oga E, Fabowale T, Igbino F, et al., Cancer incidence in Nigeria: a report from population-based cancer registries. *Cancer Epidemiol*. 2012; 36(5): e271-8.
- [6] Bayo S, Bosch FX, de Sanjose S, Munoz N, Combita AL, Coursage P, et al. Risk factors of invasive cervical cancer in Mali. *International Journal of Epidemiology* 2002; 31:202-9.
- [7] Muñoz N, Franceschi S, Bossetti C, Moreno V, Herrero R Smith JS, et al. Role of parity and human papillomavirus in cervical cancer: The IARC Multicentric Case-Control Study. *Lancet* 2002;359:1093-101.
- [8] World Health Organization (WHO). Comprehensive cervical cancer control: A guide to essential practice. Screening for cervical cancer. Geneva, WHO Press.2002.
- [9] Adjorlolo-Johnson G, Unger ER, Boni-Ouattara E, Coulibaly KT, Maurice C, Vernon SD, et al., Assessing the relationship between HIV infection and cervical cancer in Côte d'Ivoire: A case-control study. *BMC Infect. Dis*. 2012;10:242.
- [10] Mbamara SU, Ikpeze OC, Okonkwo JE, Onyiaorah IV, Ukah CO. Knowledge, attitude and practice of cervical cancer screening among women attending gynecology clinics in a tertiary level medical care center in southeastern Nigeria. *J Reprod Med*. 2011;56(11-12):491-6.
- [11] Program for Appropriate Technology in Health. Planning appropriate cervical cancer prevention programs, 2nd edition. Seattle, 2000.
- [12] Sherris J, Castro W, Lewin C, Dzuba I, Arossi S. The case for investing in cervical cancer prevention. *Cervical Cancer Prevention Issues in Depth* no. 3. Alliance for Cervical Cancer Prevention. 2004, Seattle. Available@ www.path.org/files/RH_accp_case.pdf. [Accessed on 22 May, 2016].
- [13] Nnebue CC. The Epidemiological transition: policy and planning implications for developing countries. *Niger J Med*. 2010; 19(3): 250-6.
- [14] World Health Organization. Human papillomavirus and cervical Cancer. 2010. Available@<http://www.who.int/mediacentre/factsheets/fs380/en/>. [Accessed on 22 May, 2016].
- [15] Naseema BA, Smitha SK. Awareness of cervical cancer and Pap smear and it's utilization among health care workers in medical college, Kozhikode. *Journal of Evidence Based Medicine and Healthcare*.2014;1(2):48-53.

- [16] Peirson L, Fitzpatrick-Lewis D, Ciliska D, Warren R. Screening for cervical cancer: a systematic review and meta-analysis. *Syst Rev.*2013;2:35.
- [17] Dang J, Lee J, Tran JH. Knowledge, attitudes, and beliefs regarding breast and cervical cancer screening among Cambodian, Laotian, Thai, and Tongan Women. *J Cancer Educ.*2010; 25: 595-601.
- [18] World Health Organization. Comprehensive cervical cancer control: A guide to essential practice. Geneva, Switzerland. 2005a.p.272.
- [19] World Health Organization (WHO). WHO guidelines for screening and treatment of precancerous lesions for cervical cancer prevention. Geneva, Switzerland: WHO.2013.
- [20] Pan American Health Organization. Situational analysis of cervical cancer prevention and control in the Caribbean: results from a 2013 assessment of country policies and services for HPV vaccination, cervical cancer screening, diagnosis and treatment. 2013.
- [21] Botha H, Cooreman B, Dreyer G, Lindeque G, Mouton A, Guidozi F, et al. Cervical cancer and human papillomavirus: South African guidelines for screening and testing. *South Afr J Gynaecol Oncol.*2010;2:23-26.
- [22] The United States Preventive Services Task Force (USPSTF). Screening for cervical cancer: clinical summary of USPSTF recommendation. AHRQ Publication No. 11-05156-EF-3, March 2012. Available@:<http://www.uspreventiveservicestaskforce.org/uspstf11/cervcancer/cervcancersum.htm>. [Accessed on 22 May, 2016].
- [23] American Cancer Society. Screening guidelines for the prevention and early detection of cervical cancer. American Cancer Society, Atlanta, Ga.2012. Available@ <http://www.cancer.org>. [Accessed on 22 May, 2016].
- [24] Pengpid S, Peltzer K. Attitudes and practice of cervical cancer screening among female university students from 25 low, middle income and emerging economy countries *Asian Pacific Journal of Cancer Prevention.*2014;15:7235-9.
- [25] Akujobi CN, Ikechebelun JI, Onunkwo I, Onyiaorah IV. Knowledge, attitude and practice of screening for cervical cancer among female students of a tertiary institution in South Eastern Nigeria. *Niger J Clin Pract.*2008;11:216-9.
- [26] Aniebue PN, Aniebue UU. Awareness and practice of cervical cancer screening among female undergraduate students in a Nigerian university. *J Cancer Educ.*2010;25: 106-8.
- [27] Ayinde OA, Omigbodun AO, Ilesanmi AO. Awareness of cervical cancer, papanicolaou's smear and its utilisation among female undergraduates in Ibadan. *Afr J Reprod Hlth.*2004;8:68-80.
- [28] Oladepo O, Ricketts OL, John-Akinola Y. Knowledge and utilization of cervical cancer screening services among Nigerian students. *Int Q Community Health Educ.*2008/9;29:293-304.
- [29] Abotchie PN, Shokar NK. Cervical cancer screening among college students in Ghana: knowledge and health beliefs. *Int J Gynecol Cancer.*2009;19:412-6.
- [30] Dhendup T, Tshering P. Cervical cancer knowledge and screening behaviors among female university graduates of year 2012 attending national graduate orientation program, Bhutan. *BMC Womens Health.*2014;14:44.
- [31] Bakogianni GD, Goutsou SC, Liti MV, Rizopoulou SI, Nikolakopoulos KM, Nikolakopoulou NM. Knowledge, attitude, and practice of cervical cancer screening among Greek students: a short report. *Int J Adolesc Med Health.*2012;24:329-30.
- [32] Durvasula 7238 Durvasula RS, Regan PC, Ureño O, Howell L (2006). Frequency of cervical and breast cancer screening rates in a multi-ethnic female college sample. *Psychol Rep.*2006;99:418-20.
- [33] Hyacinth HI, Adekeye OA, Ibeh JN, Osoba T. Cervical cancer and Pap smear awareness and utilization of pap smear test among Federal civil servants in North Central Nigeria. *PLoS One.*2012;7(10):e46583.
- [34] Araoye MO. Research methodology with statistics for health and social sciences. Nathadex Publications, saw-mill, Ilorin 2nd ed.2008:p 115- 22.
- [35] Statistical Package for Social Sciences (IBM SPSS) 22.0 version. Armonk NY: IBM United States. IBM Corp. 2013.
- [36] Kishore J, Mundra V, Grewal I. Perception and use of Pap smear among medical personnel in New Delhi, India. *Health and Population: Perspectives and Issues.*2009;32:141-147
- [37] Ezem B U. Awareness and uptake of cervical cancer screening in Owerri, South-Eastern Nigeria. *Ann Afr Med.*2007;6:94-8.
- [38] Bukar M Takai IU , Audu BM .Determinants of utilization of papanicolaou smear among outpatient clinic attendees in north-eastern Nigeria. *African Journal of Medicine and Medical Sciences.*2012;41(2):183-9
- [39] Onajole AT, Ajekigbe AT, Bamgbala AO, Odeyemi KA, Ogunnowo BO, Osisanya TF, et al. The socio-demographic characteristics and level of awareness of prevention of cancer of the cervix among commercial sex workers in Lagos, Nigeria. *Nigerian Medical Practitioner.*2004;45:52-5.
- [40] Duru CB, Abejegah C, Nnebue CC, Uwakwe KA, Obi- Okaro AC, Azuogu BC. Heterosexual behaviour, awareness and practice of cervical cancer screening among female staff and students in a private tertiary institution in South-south, Nigeria. *Indian Journal of Medical Research and Pharmaceutical Sciences.* 2014;1(6):1-9.
- [41] Obiechina NJ, Mbamara SU. Knowledge attitude and practice of cervical cancer screening among sexually active women in Onitsha, southeast Nigeria. *Niger J Med.* 2009;18(4):384-7.