

ORIGINAL ARTICLE

The effect of health education on the knowledge, attitude, and uptake of free Pap smear among female teachers in Birnin-Kebbi, North-Western Nigeria

AN Adamu, AO Abiola¹, MTO Ibrahim²

Department of Obstetrics and Gynecology, Federal Medical Center, Birnin-Kebbi, Kebbi State, ¹Department of Community Health and Primary Care, College of Medicine of the University of Lagos, ²Department of Community Health, Usmanu Danfodiyo University, Sokoto, Nigeria

Abstract

Introduction: The Routine Pap smear test has successfully reduced the incidence of invasive cervical cancer in the presence of a proper structure for its implementation. This study was designed to assess the effect of health education on the knowledge, attitude, and uptake of Pap smear among female teachers.

Materials and Methods: It was a quasi-experimental, controlled study with a pre-test, post-test design. A total of 100 respondents were recruited for each of the intervention and control groups, by the multistage sampling technique.

Results: The mean knowledge score of cervical cancer was low in both the interventions (25.5% ± 10.5) and control groups (18.9% ± 10.0) at baseline; a significant rise to 57.2% ± 20.7 was recorded after the intervention in the Intervention group ($P < 0.0001$). The baseline mean attitude score was also low in the intervention and control groups (17.1% ± 6.3 and 14.1% ± 6.4, respectively); post intervention there was a significant rise of up to 28.0% ± 12.8 in the Intervention group ($P < 0.0001$). The proportion of respondents with a reported practice of Pap smear was low and similar in both the groups at baseline (1.1 and 4.9% in the intervention and control groups, respectively, $P = 0.16$). Uptake of free Pap smear was poor at the post-intervention phase in both the groups ($P = 0.45$). Reported reasons for poor uptake included the respondents' dislike for the test (38.4%) and the belief that the test was not necessary (24.4%). About 20% of the respondents did not have any reason at all.

Conclusion: Health education had no significant effect on the uptake of a free Pap smear among teachers. Despite the significant improvement in the attitude toward the test, many respondents did not like the test after than before the intervention. Sociocultural issues such as the gender of the sample collector, and system factors like few service delivery points, and the time required to access the service could have contributed to the poor uptake recorded in this study. A program designed to improve routine cervical cancer screening by Pap smear should therefore address not only the knowledge and cost, but also the sociocultural and systemic factors.

Key words: Cervical cancer, health education, Pap smear, practice, screening, uptake

Date of Acceptance: 10-Oct-2011

Introduction

Cancer of the cervix is the leading cause of cancer-related death among women, especially in developing countries.^[1] Coupled with its high incidence, late presentation is a usual occurrence.^[2] Different groups of women have been

studied in the past to assess knowledge and practice of routine screening, and some have reported a reasonable level of knowledge, relative to the kind of community, but

Address for correspondence:

Dr. Aisha N Adamu,
Department of Obstetrics and Gynecology, Federal Medical Center,
Birnin-Kebbi.
E-mail: nazaimah@yahoo.co.uk

Access this article online

Quick Response Code:



Website: www.njcponline.com

DOI: 10.4103/1119-3077.100632

PMID: 22960970

very few, if any, have reported a high level of practice.^[3] Even among health workers the practice of routine Pap smear is poor.^[4-7] The need to get information on cervical cancer screening and its benefits across to the general public has been suggested.^[4,8-10] This study, conducted between October 2009 and March 2010, was designed to assess the effect of health education on knowledge, attitude, and uptake of Pap smear for cervical cancer screening among female teachers in the Kebbi state of Nigeria.

Materials and Methods

Background of study location

The study has been carried out among female teachers in secondary schools of the Birnin-Kebbi metropolis, in Kebbi state, north-western Nigeria. Birnin-Kebbi Metropolis has two tertiary institutions, but cervical cancer screening services are provided in only one of them, which is a federal tertiary institution. In the latter, samples are collected in the Gynecological Outpatient Clinic, once a week. Sample collection is done predominantly by male medical officers in the O and G department. The collected samples are processed by a laboratory scientist in the centre's histopathology laboratory. The processed slides are read and interpreted by a visiting histopathologist who visits the center once every four weeks. The collected Pap smear results are presented to the only resident consultant (or any available visiting gynecologist as the case may be) in the weekly gynecological clinic.

Study design and sample size determination

The study was a quasi-experimental controlled study with pre- and post-test design. The study was based on the hypothesis that at post-intervention, the intervention group would have at least 20% (0.20) improvement in the knowledge, attitude, and uptake of Pap smear screening for cervical cancer. The level of significance was set at 5% ($\alpha=0.05$), while the power of the study ($1-\beta$) was set at 80%. The sample size formula, $n = [(Z\alpha + Z\beta) \times 2pq] / d^2$; for the comparison of proportions in independent groups was used to estimate the 70 minimum number of subjects required per group.^[11] One hundred (100) respondents were, however, recruited for each of the intervention and control groups by the multistage sampling technique in two stages. In the first stage a list of secondary schools in the Birnin-Kebbi metropolis was compiled and each school was assigned as the intervention or control group by using the simple random sampling technique, using the balloting procedure. In the second stage a list of all female teachers in each group was compiled and 100 teachers were selected for each group by simple random sampling, using the table of random numbers.

A pre-tested, interviewer-administered questionnaire with closed and open-ended questions was used for the

purpose of data collection. Information sought included the sociodemographic profile, knowledge, attitude, and practice of the Pap smear for cervical cancer screening. The pre-intervention (baseline) data were collected from both the intervention and control groups. The health education intervention included a lecture on the general overview of cervical cancer, including its complications and how it can be prevented, and cervical cancer screening methods, with an emphasis on screening by cervical cytology using the Pap smear. Information on the cost of the test, and where and how to access the test was also provided. This lecture, together with a practical demonstration session on how a Pap smear is collected, was carried out after collection of the baseline data for the intervention group. The lecture was repeated after four weeks at the end of which each respondent was given a coupon for a free Pap smear test.

The post-intervention data collection was carried out in both the intervention and control groups three months after the second intervention. The same instrument of data collection used at the baseline was used for post-intervention data collection. However, for the benefit of the members of the control group and for ethical consideration, the control group was also provided with the health education intervention similar to that provided to the intervention group one week after post-intervention data collection.

Analysis

Each correct response of the study subjects on the knowledge, attitude, and practice of Pap smear screening for cervical cancer was scored one mark and any wrong or non-response was scored with a zero. The total score obtained by each study subject was converted to a percentage. Data processing was done using the Epi Info version 3.4.1, Microsoft Excel and Graph pad Instat, computer statistical software packages. Frequency distribution and cross tabulations to examine relationships between variables were carried out. The Chi-square test was used to compare the differences between proportions, while the student t-test was used for comparison of mean differences.

Approval to conduct the study was obtained from the Ethics and Research Committee of the Usmanu Danfodiyo University Teaching Hospital. Informed consent was obtained from each of the respondents at the time of study. The study was carried out between October 2009 and March 2010.

Results

A total of 89 and 81 respondents in the intervention and control groups, respectively, participated in all phases of the study, out of the 100 recruited for each group.

Sociodemographic characteristics of the respondents

There was no statistically significant difference in terms of age ($P=0.19$), religion ($P=0.34$), marital status ($P=0.14$), educational qualification ($P=0.67$) or teaching experience ($P=0.11$) between the intervention and the control groups [Tables 1a and 1b].

Knowledge of cancer of the cervix

At baseline, the proportion of respondents with adequate knowledge of cancer of the cervix was similar in both the intervention (10.1%) and control (9.9%) groups ($P=0.58$). Following intervention, the proportion of the respondents with adequate knowledge of cancer of the cervix differed significantly between the intervention and control groups ($P<0.001$) and for the intervention group pre- and post-intervention ($P<0.001$) [Table 2]. The mean knowledge score (%), which suggested the depth of knowledge on the various aspects of cancer of the cervix studied was also low

in both the intervention and control groups, but differed significantly ($P<0.001$) at the baseline. Following intervention the mean knowledge score (%) differed significantly between the intervention and control groups ($P<0.0001$) and for the intervention group pre- and post-intervention ($P<0.0001$). An improvement of 124.3% in the mean knowledge score (%) was observed in the intervention group compared to 13.7% in the control group [Table 3].

Knowledge of Pap smear

The proportion of the respondents with adequate knowledge of the Pap smear was low and similar in both groups at pre-intervention ($P=0.61$), but differed significantly post-intervention ($P<0.001$). The proportion of respondents with adequate knowledge of the Pap smear also differed significantly in the intervention group pre- and post-intervention ($P<0.001$) [Table 4]. The mean knowledge score (%) was low in both the intervention and control groups, but differed significantly ($P=0.0024$) at the baseline. Following intervention, the mean knowledge score (%) also differed significantly between the intervention and control groups ($P<0.0001$) and for the intervention group pre- and post-intervention ($P<0.0001$). An improvement of 63.7% in the mean knowledge score (%) was observed in the intervention group compared to a decrease of 9.2% in the control group [Table 5].

Attitude toward Pap smear

Fewer respondents had a good attitude toward Pap smear in both the intervention (19.1%) and control groups (17.3%), in the pre-intervention phase ($P=0.46$). Post-intervention, the proportion of respondents with a good attitude toward the Pap smear was significantly higher in the intervention group than in the control group ($P<0.001$); and also significantly higher in the intervention group post-intervention than pre-intervention ($P<0.001$) [Table 6]. The pre-intervention mean attitude score was similarly low in both groups ($P=0.68$). In the post-intervention phase, the mean attitude score differed significantly between the two groups ($P<0.001$), and in the intervention group, between the two phases ($P<0.001$). An improvement of 49.2% in the mean attitude score (%) was recorded for the intervention group (IG) following the intervention [Table 7].

Reported practice of Pap smear

The proportion of respondents with a reported practice of Pap smear was similarly poor in both groups at the baseline ($P=0.16$); at post-intervention ($P=0.45$) and between the two phases in the intervention group, $P=0.31$ [Table 8]. The respondents were asked the reason for not having done the test; pre-intervention, 52.3% of the intervention group and 63.6% of the control group reported that they had not been asked to do it, 18.2 and 5.2% of the intervention and control groups did not think Pap smear was necessary, while

Table 1a: Sociodemographic characteristics of the respondents

Characteristic	Intervention group (%)	Control group (%)	Statistics and P value
Age group			
<30 years	19 (21.3)	25 (30.9)	t=1.31 P=0.19
30 – 39 years	46 (51.7)	39 (48.1)	
≥40 years	24 (27)	17 (21)	
Total	89 (100%)	81 (100%)	
Mean	34.8 ± 6.9	33.4 ± 6.8	
Religion			
Islam	50 (56.2)	49 (60.5)	P=0.34 (Fisher exact)
Christianity	39 (45.8)	32 (39.5)	
Total	89 (100%)	81 (100%)	
Marital Status			
Single	15 (16.9)	20 (24.7)	P=0.14 (Fisher exact)
Married/widowed/divorced	74 (83.1)	61 (75.3)	
Total	89 (100%)	81 (100%)	

Table 1b: Sociodemographic characteristics of the respondents continued

Characteristic	Intervention group (%)	Control group (%)	Statistics and P value
Educational qualification			
NCE/ND	36 (40.4)	38 (46.9)	X ² =5.4 df=2 P=0.67
BSc/BA/HND	38 (42.7)	32 (39.5)	
MSc/MA/PGD	15 (16.9)	11 (13.6)	
Total	89 (100%)	81 (100%)	
Years of teaching experience			
0 – 5 years	48 (51.7)	52 (64.2)	t=1.59 P=0.11
6 – 10 years	21 (25.8)	15 (21)	
>10 years	19 (22.5)	15 (21)	
Total	89 (100%)	81 (100%)	
Mean	7.5 ± 7.3	5.9 ± 5.6	

Table 2: Comparison of proportions of respondents with adequate and inadequate knowledge of cancer of the cervix

Study phase and statistical comparison	Study group				Statistic and P value
	Intervention group		Control group		
	Adequate (%)	Not adequate (%)	Adequate (%)	Not adequate (%)	
Pre-intervention	9 (10.1)	80 (89.9)	8 (9.9)	73 (90.1)	P=0.58 (Fisher exact)
Post intervention	77 (86.5)	12 (13.5)	8 (9.9)	73 (90.1)	P<0.001 (Fisher exact)
Statistic and P value	P<0.001		P=0.63		

Table 3: Mean Knowledge Score of cancer of the cervix compared between the intervention and control groups for pre- and post-intervention phases

Mean knowledge score and statistical comparison and proportion of change	Study phase	Study groups		Statistical comparison of study groups during the pre- and post-intervention phases
		Intervention group (n=89)	Control group (n=81)	
Mean knowledge score (%)	Pre-intervention (P1)	25.5 ± 10.5	10.0	t=4.2 df=168 P<0.0001
	Post intervention (P2)	57.2 ± 20.7	21.5 ± 10.9	
Statistical comparison of the study populations during pre- and post-intervention phases		t=12.9 df=176 P<0.0001	t=1.6 df=160 P=0.1	
Proportion of changes in the mean knowledge score (%)= (P2-P1)/P1 × 100		124.3	13.7	

Table 4: Proportion of respondents with adequate or inadequate knowledge of Pap smear compared between the intervention and control groups

Study phase	Respondents' knowledge of Pap smear				Statistic and P value
	Intervention group (n=89)		Control group (n=81) (%)		
	Adequate (%)	Not adequate (%)	Adequate (%)	Not adequate (%)	
Pre-intervention	3 (3.4)	86 (96.6)	3 (3.7)	78 (96.3)	P=0.61 (Fisher exact)
Post intervention	64 (71.9)	25 (28.1)	3 (3.7)	78 (96.3)	P<0.001 (Fisher exact)
Statistic (Fisher exact)	P<0.001		P=0.66		

Table 5: Mean knowledge score of Pap smear compared between intervention and control groups

Mean knowledge score, statistical comparison, and proportion of change	Study phase	Study groups		Statistical comparison of study groups during the pre- and post-intervention phases
		Intervention group (n=89)	Control group (n=81)	
Mean knowledge score (%)	Pre-Intervention (P1)	17.1 ± 6.3	14.1 ± 6.4	t=3.1 df=168 P=0.0024
	Post intervention (P2)	28.0 ± 12.8	12.8 ± 7.2	
Statistical comparison of the study populations during the pre- and post-intervention phases		t=7.2 df=176 P<0.0001	t=1.2 df=160 P=0.22	
Proportion of changes in the mean knowledge score (%)= (P2-P1)/P1 × 100		63.7	-9.2	

Table 6: Comparison between proportions of respondents with good or poor attitude toward Pap smear

Study phase	Respondents' attitude toward Pap smear				Statistic and P value
	Intervention group		Control group		
	Good (%)	Poor (%)	Good (%)	Poor (%)	
Pre-intervention	17 (19.1)	72 (80.9)	14 (17.3)	67 (82.7)	P=0.46 (Fisher exact)
Post intervention	59 (66.3)	30 (33.7)	10 (12.3)	71 (87.7)	P<0.001 (Fisher exact)
Statistic (Fisher exact)	P<0.001		P=0.25		

6.7 and 1.3%, respectively, in the two groups, stated that they did not like the test, [Table 9].

Observed uptake of Pap smear

The observed uptake was dismally low in both groups. At

baseline, none of the respondents was observed to have done a Pap smear, while post-intervention only two (2.2%) of the respondents in the intervention group and none in the control group were observed to have done a Pap smear test in the six-month study period. The difference between the

Table 7: Comparison of the mean attitude score of respondents between the intervention and control groups

Mean attitude score, statistical comparison, and proportion of change	Study phase	Study groups		Statistical comparison of study groups during pre- and post-intervention phases
		Intervention group (n=89)	Control group (n=81)	
Mean attitude score (%)	Pre-Intervention (P1)	35.4 ± 10.3	26 ± 8.7	t=6.4 df=168 P<0.0001
	Post intervention (P2)	52.8 ± 6.4	24.1 ± 4.4	t=33.7 df=168 P<0.0001
Statistical comparison of the study populations during the pre- and post-intervention phases		t=13.5 df=176 P<0.0001	t=1.8 df=160 P=v0.08	
Proportion of changes in the mean attitude score (%)= (P2-P1)/P1x100		49.2	-7.3	

Table 8: Reported practice of the Pap smear

Study phase	Study group n=89		Control group n=81		Statistic (Fisher exact)
	Yes (%)	No (%)	Yes (%)	No (%)	
Pre-intervention	1 (1.1)	88 (98.9)	4 (4.9)	77 (95.1)	P=0.156
Post intervention	3 (3.4)	86 (96.6)	4 (4.9)	77 (95.1)	P=0.448
Statistic (Fisher exact)	P=0.31		P=0.64		

Table 9: Reasons for not having done a Pap smear test presented to the intervention and control groups

Reasons for not having done a Pap smear test before	Respondents' responses			
	Study group (n=89)		Control group (n=81)	
	Pre-intervention (%)	Post intervention (%)	Pre-intervention (%)	Post intervention (%)
Pap smear not necessary	16 (18.2)	21 (24.4)	4 (5.2)	12 (15.6)
Was not asked to do the test	46 (52.3)	11 (12.8)	49 (63.6)	43 (55.8)
Do not like Pap smear	6 (6.7)	33 (38.4)	1 (1.3)	2 (2.6)
Pap smear is expensive	4 (4.6)	3 (3.4)	2 (2.6)	3 (3.9)
No reason at all	16 (18.2)	18 (20.9)	21 (27.3)	17 (22.1)
Total	88 (100)	86 (100)	77 (100)	77 (100)

two groups was not significant ($P > 0.05$). The major reason for not utilizing the service had changed from not being aware of the test (reported by 52.3% pre-intervention and 12.4% post intervention) in the intervention group, to not liking the test (reported by 6.7% pre-intervention and 38.4% post intervention) in the same group [Table 9]. Hence, the most recurrent reason for not having done the test at the post-intervention phase was the respondents' dislike for the test.

Discussion

A total of 170 teachers, 89 in the intervention group and 81 in the control group, participated in all phases of the study. Sociodemographically the two groups were essentially similar. Any difference recorded in the study variables between the two groups was, therefore, unlikely to be a result of the differences in the respondents' sociodemographic characteristics.

The respondents generally had very poor knowledge of cancer of the cervix at the baseline. The proportion with adequate knowledge of cancer of the cervix was much lower than the values reported by other researchers in the same geographical area.^[5,6] The difference here could be attributed

to the composition of the study population. The fact that the study population in the latter studies comprised of health workers might have contributed to this observed difference. The attitude of the respondents was also not favorable in both groups prior to the intervention. This may be related to their perception of the test.

Reported practice of Pap smear was very low at the baseline in both groups. The finding of only 1% of the respondents reporting having done a Pap smear test before was similar to the 0.5% reported by Chukwuali, among users of a cervical cancer screening service in Enugu, Nigeria.^[12] Both these values were much lower than those reported in other developing countries.^[5,9,10,13] The WHO reported that in most developing countries only 5% of the women had been screened within the past five years at any point in time.^[14] The poor level of practice could be explained by the poor attitude to the test, which was shown by the respondents in both groups prior to the intervention. Low level of utilization of the service was attributed to many reasons, but the most commonly reported reason was probably 'lack of awareness' about the test. Lack of physicians' referral was reported in previous studies to be a significant reason for poor practice.^[5,6,9,15]

Knowledge of both cancer of the cervix and Pap smear improved significantly after the intervention and more respondents were knowledgeable about the disease and about Pap smear. As these values remained virtually the same in the control group, it could be assumed that the improvement in these variables was probably due to the health education intervention that was given. Unfortunately these improved parameters did not positively influence the uptake of Pap smear, as there was no significant change in uptake in the intervention group, between the two phases of the study. The uptake of Pap smear post intervention was only about 2%.

The very poor uptake of free Pap smear after counseling reported in the present study, although similar to findings reported by Wright *et al.*^[16] in their study on market women in Lagos, Nigeria, differed from what was reported by Adamu *et al.* in their study on health workers, conducted in Sokoto (the same geographical area as the present study), where a 50% uptake rate for free Pap smear was recorded after counseling.^[6] This latter research was conducted in the hospital among health workers, and the fact that they received the health education in the hospital and their closeness to the screening facility could have impacted positively on the respondents' response to the health education intervention.^[6] Proximity to the site of service provision might thus be an important determining factor. Perhaps if sample collection was undertaken in the respective schools of the teachers, the uptake would have been better.

The nature of the test may also have contributed to its poor uptake post intervention. There was a rise in the proportion of respondents who did not like the test from 6.7% at the baseline to 38.4% after the intervention. Their reasons for this attitudinal change were not explored, but perhaps the practical demonstration on sample collection (bordering around the issue of privacy) could be contributory. It needed a lot of personal conviction and motivation (aside education) to electively submit oneself (genitals) to a second party (medical or not), especially when there were no symptoms. It could be viewed as wishing oneself the disease condition, some might simply say: 'I reject it!'

Again, contrary to what has been reported by other researchers elsewhere,^[10] educational status did not appear to have had any positive impact on the uptake, as poor uptake was recorded in spite of the respondents' high level of education. Poor uptake of the Pap smear has been similarly reported among female medical practitioners in Enugu, Nigeria.^[17] Lack of referral by a physician, as reported both in this study and elsewhere,^[5] may also not be as important a factor as it is thought to be, as the uptake remained poor even after the respondents had been given free request forms for the test. These findings suggest that other factors may be at play.

The significant rise in the proportion of respondents who did not like the test post intervention has been mentioned earlier. Looking at the background of the study area, almost all the care providers who conduct the sample collection are males, and this fact is known to the respondents. In addition, the fact that there is no resident pathologist in the center suggests the possibility of a long waiting period before the cytology reports are ready. The once-a-week Gynecology Clinic day may also make it more difficult to access the service, especially if women have to cue up for their turn with the doctors, just like the other clinic attendees who are there because they are ill. The time needed for the whole process of sample collection, report retrieval, and consultation with a doctor in the Gynecology Clinic for feedback and subsequent management of positive cases may appear daunting to a woman who is apparently healthy, even if she is interested in the test. All these are important factors that any woman with an interest in cervical cancer screening will need to consider and weigh against 'a free test,' even when her knowledge and attitude toward it have improved significantly. These are also issues that lend weight to the search for alternative methods for a Pap smear, for routine cervical cancer screening. Visual inspection is said to be cheaper and easier to conduct, especially as it does not require so much technical skill. It is proposed by some as a preliminary step in the selection of women for a subsequent Pap smear test, as it correlates well with the latter.^[18] This may be so, but visual inspection still has to contend with the 'privacy' issue mentioned earlier. If a woman must subject herself to an unsolicited vaginal examination, then she should stand to benefit optimally from the procedure. The Pap smear test is still the gold standard in cervical cancer screening and should be considered necessary for every woman who needs it.

The issues raised here, border on the availability of service, ease of access, availability of culturally acceptable sample collection services, availability of adequate laboratory support, especially in terms of specialists, to interpret processed samples, and availability of specialists to offer correct counseling on negative results and correct management of positive results.

These are issues that have the potential to improve or inhibit the utilization of Pap smear services as has been implied by findings in this study. It will be interesting to find out in a follow-up study, how controlling these factors (gender and number of the sample collectors, site of sample collection, shortened interval between collection and retrieval of results, and ease of access to specialists who would interpret the result, and institute appropriate management) will impact on utilization of the service.

Study limitation

A limitation of the study was the short follow-up interval of three months and this was due to time constraints on

the part of the researchers; a longer interval might have captured a better picture on the utilization of the service post intervention. Post-intervention data collection could address this limitation, where time permits.

In conclusion, this study has shown that health education has a positive effect on the knowledge and attitude toward Pap smear. An improved uptake of the test would, however, require more than health education and an offer of free services. The system that is needed to support the whole process of collection, processing, interpretation, result retrieval, and management of a positive test must be improved upon, to achieve a successful practice of a routine Pap smear. A follow-up study in the sociocultural determinants of utilization of Pap smear services in this semi-urban area is recommended, as the information generated can then be used to design a cervical cancer screening program that is culturally acceptable to the people.

Acknowledgment

We wish to acknowledge the contributions of Dr. JA Oyetunji in the review of the draft study report, and Prof. BA Ekele in the review of the draft manuscript. We thank all the teachers who participated in this study. Kebbi State Ministry of Education and State School of Nursing Birnin-Kebbi are both appreciated for allowing us access to their schools and their students.

References

- World Health Organisation (WHO) Report, 2000.
- Hoque M, Hoque E, Kader SB. Evaluation of cervical cancer screening program at a rural community of South Africa. *East Afr J Public Health* 2008;5:111-6.
- Ayinde OA, Ogunbode OO, Adebayo OJ. Determinants of cervical cancer knowledge and the utilization of screening in a Nigerian female population. *Trop J Obstet Gynaecol* 2005;22:21-4.
- Kabir M, Iliyasu Z, Abubakar IS, Mahboob S. Awareness and Practice of Cervical Cancer Screening among Female Health Professionals in Murtala Mohammed Specialist Hospital, Kano. *Niger Postgrad Med J* 2005;12:179-82.
- Nwobodo EI, Malami SA. Knowledge and practise of cervical cancer screening among female health workers in Sokoto, North-Western Nigeria. *Niger Postgrad Med J* 2005;12:255-7.
- Adamu AN, Ekele BA. Matching knowledge with practise: Acceptance of cervical cancer screening among health workers in a Nigerian Hospital. 41st Scientific Conference and AGM of SOGON. 2008.
- Olaniyan OB, Agboghroma OC, Ladipo OP. Knowledge and practise of cervical cancer screening among female health workers in government hospital in Abuja metropolis, Nigeria. *Trop J Obstet Gynaecol* 2000;17:18-20.
- Woltman KJ, Newbold KB. Immigrant women and cervical cancer screening uptake: A multilevel analysis. *Can J Public Health* 2007;98:470-5.
- Gamarra CJ, Paz EP, Griep RH. Knowledge, attitudes and practice related to Papanicolaou smear test among Argentina's women. *Rev Saude Publica* 2005;39:270-6.
- Al Sairafi M, Mohamed FA. Knowledge, attitudes, and practice related to cervical cancer screening among Kuwaiti women. *Med Princ Pract* 2009;18:35-42.
- Ibrahim T. Sample size determination. In: *Research Methodology and Dissertation writing for Health and Allied Health professionals*. Cress Global Link Limited Abuja, Nigeria; 2009: 70-75.
- Chukwuali LI, Onuigbo WI, Mgbor NC. Cervical Cancer Screening in Enugu, Nigeria. *Trop J Obstet Gynaecol* 2003;20:109-12.
- Gichangi P, Estambale B, Bwayo J, Rogo K, Ojwang S, Opiyo A, *et al.* Knowledge and practice about cervical cancer and Pap smear testing among patients at Kenyatta National Hospital, Nairobi, Kenya. *Int J Gynecol Cancer* 2003;13:827-33.
- Ojiyi EO, Dike EI. Knowledge and practice of cervical cancer screening at the Imo State University Teaching Hospital, Orlu Port Harcourt Medical Journal 2008;2:145-151.
- Agurto I, Bishop A, Sanchez G, Betancourt Z, Robles S. Perceived barriers and benefits to cervical cancer screening in Latin America. *Prev Med* 2004;39:91-8.
- Wright KO, Faseru B, Kuyinu YA, Faduyile FA. Awareness and uptake of the Pap smear among market women in Lagos, Nigeria. *J Public Health Afr* 2011;2:e14.
- Dim CC, Ekwe E, Madubuko T, Dim NR, Ezegwui HU. Improved awareness of Pap smear may not affect its use in Nigeria: A case study of female medical practitioners in Enugu, southeastern Nigeria. *Trans R Soc Trop Med Hyg* 2009;103:852-54.
- Mbamara SU, Ukah CO, Ikpeze O, Okokwo J, Onyiaora V. Correlation between visual inspection of the cervix and pa smear test for cervical cancer screening. *J Cancer Res Exp Oncol* 2011;3:8-13.

How to cite this article: Adamu AN, Abiola AO, Ibrahim M. The effect of health education on the knowledge, attitude, and uptake of free Pap smear among female teachers in Birnin-Kebbi, North-Western Nigeria. *Niger J Clin Pract* 2012;15:326-32.

Source of Support: Nil, **Conflict of Interest:** None declared.