

# Evaluating the Effect of an educational program on increasing cervical cancer screening behavior among rural women in Guilan, Iran

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## Research article

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# Abstract

**Background:** Cervical cancer is one of the major health problems and the third prevalent cancer in women all around the world. As a simple, inexpensive, and with no side-effects test, Pap test is a reliable way to screen cervical cancer. This study aimed to investigate, the effects of educational intervention based on the Health Belief Model (HBM) on doing pap tests in the women living in the rural areas of the north of Iran.

**Methods:** In a quasi-experimental study, 160 rural women were randomly divided into control and experiment groups to experience a three session's intervention. The experiment group received, educational programs based on the HBM constructs through personal consultation, asking/answering questions, and an educational pamphlet. The control group, received the routine educational programs of the health center. The post-test data were collected two months after the intervention and analyzed on SPSS-18.

**Results:** Before the intervention, there was no significant difference between the control and experiment groups in terms of the mean score of knowledge, performance, and the constructs of the HBM. After the intervention, however, there was a significant difference in the mean scores of knowledges, performance, and all constructs of the HBM of the two groups ( $p < 0.001$ ). The rate of doing a pap test in the experimental group increased from 18.7% to 78.7% in the intervention group.

**Conclusions:** The findings supported the effectiveness of cervical cancer prevention programs based on the HBM. Therefore, conducting similar programs in other regions is recommended.

## Background

After breast cancer and colorectal cancer, cervical cancer is the third prevalent cancer in women[1]. Every year, 300 to 400 thousand women are diagnosed with cervical cancer and 200 thousand women die because of the disease in the world. The prevalence of the disease is highest in the developing countries so that about 80% of the new cases of the disease are diagnosed in these countries[2, 3]. About 15% of malignancies of women in developing countries are caused by cervical cancer; this figure in the developed countries is 1%. The prevalence of cancer in Iran is 3.73 cases in every 100 thousand women[2, 3]. Experts believe that geographical differences mostly depend on the availability of effective screening and therapeutic programs and also access to pap tests as an early diagnostic tool of cervical cancer. The mortality rate of cervical cancer in developed countries has declined notably thanks to routine pap tests and human papillomavirus (HPV) screening in recent years[4].

The main risk factors of cervical cancer are pregnancy in young ages, several sex partners, human immune deficiency virus (HIV), herpes simplex virus (HSC), cytomegalovirus (CMV), HPC, exposure to DES during embryonic period, sexual infection, frequent infections, the immune system weakness, contraceptive medicines, diet (shortage of folate serum, vitamins C and A, and beta carotene), genetically factors, and exposure to chemical material (for the women working in chemical plants or farms)[5–8].

cervical cancer is conserved as preventable cancer taking into account the long precancerous period, availability of reliable screening plans, and efficient treatment of the early lesions[7][3]. In general, preventive health behaviors can lead to satisfactory health results. The preventive behavior for this disease is the Pap test, which is a fast way to diagnose cancer and attenuate the effects of the disease to a great extent[9]. As a healthy behavior and a way to improve health conditions, the Pap test is a screening test for cervical cancer in women who demonstrate no symptoms. The test should be conducted every three years in sexually active women[10].

Pap test is the most efficient and economical way for screening cancer and a simple, economic, and with no side-effect way for screening cervical cancer. If performed properly using proper sampling tools, pap tests can diagnose cervical cancer with 70–95% accuracy[4]. Lack of routine pap test screening leads to a 2-6times increase in the risk of cervical cancer[11]. About 70% of women who dye due to cervical cancer did not take a pap test[5].

The first step in the process of programming health education is to use models and theories[11]. The HBM has been recommended by many studies as an educational model. It is a comprehensive model that, rather than controlling the disease, is mostly used for preventing diseases. The model emphasizes on how one's perception leads to motivation, movement, and behavior in return [9, 10, 12].According to the HBM, to adopt cervical cancer preventive functions the individual needs to believe that they are prone to a disease like cervical cancer (perceived sensitivity), perceive the seriousness of the symptoms of the disease on the different aspects of their life (perceptive severity), and find the recommended behaviors like pap test effective in attenuating the risk or severity of the disease (perceived benefits) to overcome the action barriers like time, cost, pain and so on (perceived obstacles). Also, the individual needs to believe in their ability to do a successful pap test (perceived self-efficacy) to be able to do a risk preventive function – i.e. pap test[5, 13, 14].

Taking into account that awareness of early symptoms, early diagnosis, and timely treatment are critical for cancer control and that studies have shown that Pap test in Iran is notably less common than other countries, there is a serious need for effective educational intervention. Therefore, and given the above introduction, the present study is an attempt to determine the effects of the HBM-based education on giving pap tests in the women living in rural areas of Shaft City, Guilan, Iran.

## Methods

Women living in rural areas under the coverage of Shaft City health center (Guilan, Iran) constituted the study population of this quasi-experiment study. The participants were selected using random sampling. To this end, a rural health and treatment center among the health centers affiliated with Shaft City health center was selected randomly. The six health houses affiliated with the selected health center constituted the study group. Three health houses out of the six health houses were selected randomly as the intervention group and the other three were selected as the control group. Afterward, using the family

rosters available at the health houses, 27 women from the first and second health houses and 26 women from the third health house were selected randomly as the subjects in the intervention group.

Considering the accuracy of 5% and confidence coefficient of 95%, and the level of behavior derived from previous similar researches[15], sample size for each group was obtained equal to 66. To increase the study power and given the probable leaves, the sample size was increased by 20% so that 160 individuals were selected totally (80 subjects for each group) (fig1). Inclusion criteria were married women for at least six months, age range 20-65, no history of hysterectomy, and no history of cervical cancer. Exclusion criteria were a reluctance to participate and missing the two educational sessions.

The data gathering tool was a multi-item questionnaire with three sections including demographics, awareness, and the constructs of the HBM, used in similar researches were used[3, 9, 10].

The demographics section consisted of 12 questions and the second section consisted of 13 statements of knowledge (score range 0-26) with 2 points were considered for Yes, 1 point for the "no idea", and 0 points for No; Section three consisted of 36 items on the constructs of the HBM including perceived sensitivity (six items; score range 6-30); perceived severity (five items; score range 5-25); perceived benefits (five items; score range 5-25); perceived barriers (14 items; score range 14-70); perceived self-efficacy (six items; 5-25). The answers are designed on a five-point Likert type scale from 1(completely disagree) to 5(completely agree).

Pap test function was assessed by one question. Besides, using a checklist, the medical file of the women was checked in terms of giving Pap test before and after the educational intervention.

The validity of the tool was examined using a content validity test using the content validity index (CVI) and content validity ratio (CVR). To this end, the tool was provided to nine experts and faculty board members (four health education experts, one health services management expert; 1 epidemiology expert, three gynecologists, and midwives) at Guilan and Saveh University of Medical Sciences. They were asked to give us feedbacks given the objectives of the study and about the relevance of the statements. Further modifications were performed on the tool based on the feedback so that CVR and CVI were obtained equal to 1 and 0.90 respectively.

To check the reliability of the tool, it was provided to 20 women of the study population who were identical to the sample group in terms of demographical variables. As to the questions about awareness, the split-half method was used and as to the constructs of the HBM, Cronbach's alpha was used. In the split-half method, Spearman-Brown's coefficient was equal to 0.71 and Cronbach alpha for perceived sensitivity, perceived severity, perceived benefits, perceived barriers, and perceived self-efficacy were obtained equal to 0.71, 0.71, 0.72, 0.85, and 0.86 respectively.

After the participants signed a written letter of consent, the questionnaire was filled through self-statement and interview for illiterate participants. Two months after the educational intervention, the participants filled out the questionnaire once more.

Based on the analysis of the collected information at the pretest stage, the educational intervention was conducted for the experiment group consisting of three sessions (50-60min). The educations were in the form of giving a lecture, asking/answering questions, and group discussions, which were held in three consecutive weeks by the research team. The control group, on the other hand, received the routine educational interventions and programs of the health center. After an introduction in the first session, the participants were briefed about the objectives, signed an informed letter of consent, received information about reproduction system anatomy, and learned about the objectives of the test, the age range for giving the test, cervical cancer risk factors, the symptoms, and preventions. This session consisted of giving a lecture by the author, asking/answering questions, and showing slides. Session 2 focused on improving the perceived risk in the participants so that they were informed about the outcomes of failure to observe reproduction organs hygiene, a physical and emotional consequence of cervical cancer, the effects of cervical cancer on one's job, family, and chance to have children. To affect the construct "perceived sensitivity", lecturing method was used and to affect the construct "perceived severity" films and answering/asking question method was used. Session three was focused on decreasing the perceived barrier, creating and improving the perceived benefits and perceived self-efficacy. In this session, the participants were informed about the benefits and advantages of giving Pap test and its effects on physical and psychological health, the benefits of early diagnosis of disorders through screening, risk attenuation methods, stress attention methods to give medical tests, strategies, and alternative behaviors to promote Pap test. To add to the effectiveness of the test, the group discussion method was used. In addition, through brainstorming and group discussion afterward, the participants were given the chance to highlight the barriers and the solutions to overcome them with the help of a discussion moderator. As to the construct self-efficacy, techniques like motivating, boosting, and reducing stress were used. To improve the efficiency of education, equipment like posters, pamphlets, slides, memory cards, and scheduling cards were used.

Two months after the educational intervention, the participants in the two groups filled out the questionnaire once more and the collected data was analyzed in SPSS 18. Data analyses were done using descriptive statistics like definite and relative frequency distribution, mean indices, and standard deviation and inferential statistics like independent t-test, Mann Whitney U, Wilcoxon, and paired t-test were used (awareness, perceived severity, and perceived benefits). Besides, the Chi-square test was used to measure variation in performance before and after the intervention.

After securing an approval letter from the Research and Technology Department, the study was approved by the Ethics Committee under No.4920341301 on 7 Dec. 2013 and registered at the Iran Clinical Trial database (IRCTID: IRCT2013123016006N1). The participants in both groups were ensured that their information would remain confidential throughout the study.

## Results

Totally, 160 women living in rural areas in the age range 20–55 took part in the study. The mean age of the participants in the experiment and control groups was  $42 \pm 10.8$  and  $40 \pm 11.4$  respectively. The

marriage age of the majority of women in the experiment (85%) and control (88.8%) groups was above 17 years old. In addition, the number of child deliveries in the majority of women in the experiment (68.8%) and control (78.8%) groups ranged from zero to three. The majority of the participants in the experiment group were illiterate (36.2%) or had elementary educations (36.2%); these figures in the control group were 26.2% and 36.2% respectively. The majority of the participants in the experiment group (46.2%) and control group (37.5%) were farmers and of course, all of the participants were homemakers as well. According to the Chi-square test, the experiment and control groups were identical in terms of demographics and there was no significant difference between them ( $p > 0.05$ ).

More than 90% of the women in the study knew about one of the risk factors of cervical cancer (Table 2). There was no significant difference between the two groups before the intervention in terms of awareness and perceived sensitivity, severity, benefits, barriers, and self-efficacy ( $P > 0.05$ ). However, after the intervention, there was a significant difference between the two groups after the intervention in terms of the mean scores of awareness and all constructs of the HBM ( $P < 0.001$ ). That is, after the educational intervention, the mean scores of awareness and the constructs of the HBM increased significantly and the mean score of perceive barriers decreased significantly; while there was no significant difference in the mean scores of constructs in the control group after the intervention ( $p > 0.05$ ) (Table 3).

As listed in Table 4, the rates of doing paptests before the intervention in the experiment and control groups were 18.7% and 16.2% respectively. These figures after the intervention increased significantly in the experiment (78.7%) and control (22.5%) groups ( $p < 0.001$ ).

## Discussion

The health education program based on the HBM improved performance in the intervention group in terms of doing Paptest screening. Although, the routine educational programs of the health center significantly increased the rate of Pap test in the control group, the increase in the experiment group was much higher and close to 80%. The significant increase in the rate of giving pap test after the educational intervention based on the HBM is also reported by Shobeiri et al.[9], Parsa et al.[10], Koc et al.[16], and Kolutek et al.[17]. Taking into account the importance of pap test and the role of health centers in this area, it appears that implementing such programs based on the HBM in health clinics may lead to an increase in the quality of educations, more effectiveness in the target group, higher motivation in the individuals to attend the screening program, and higher chance of early diagnosis of pre-cancer and cancer lesions. All these result in a lower prevalence of cervical cancer, fewer medication costs, and lower mortality rates.

The educational intervention improved the awareness score of the women in the experiment group about cervical cancer. Consistently, Bebis et al.[18], and Shobeiri et al.[9], showed that after the educational intervention, the mean score of awareness was improved. Other studies have shown that there is a significant and direct relationship between awareness level and performance so that with higher awareness, the chance of doing Pap test increases. For instance, Lee et al. [19] studied Korean women

and showed that one of the barriers to doing the pap test was the low level of awareness in women. Kairmy et al.[3], showed that the lack of knowledge or positive attitude were some of the barriers to healthy behaviors like doing pap tests.

The educational intervention was effective in creating mental belief in the experiment group subjects about damages caused by cervical cancer, perceiving the risk of the disease, seriousness of the disease, and the costs and hardships of treatment -i.e. higher sensitivity and perceived severity. The increase of the mean scores of sensitivity and perceived severity after the intervention is consistent with other studies that used the same model[9, 10]. McFarland[20],and Demirtas et al.[21]maintained that the reason for not giving the Pap test was a low sensitivity and perceived severity in women. According to the HBM, to create motivation for doing a healthy behavior, the individual needs to know that they are at risk of being afflicted by a health problem. To have an effective education, trainers need to describe the probability of developing a health problem, intensify the risks, create sensitivity, and increase the perceived severity of the problems so that a decent ground to take action is created.

The participants' perception of the benefits and barriers of doing a pap test in the two groups before the educational intervention was identical. However, after the intervention, the perceived benefits increased and perceived barriers decreased in the experiment group. Consistent with our findings, Park et al. [22],reported that after education, the experiment group had a higher score of perceived benefits of Pap test. Garces-Palacio et al.[23], and Jirojwong et al.[24], argued that there was a positive relationship between the perceived benefits and the rate of doing pap tests. According to the HBM, an individual performs an action when they rationally find its benefits higher than the barriers. In other words, people do not necessarily accept any health recommendations unless they clearly understand the potential benefits of such behavior relative to the barriers. Other studies have shown that perceived barriers are of the main constructs related to a pap test. De Peralta et al.[25], and Chesun et al.[26], argued that the perceived barriers were the main predictors of the screening behavior. Similarly, Demirtas B.[21], argued that the probability of doing a pap test was higher when women had lower perceived barriers. This means that lowering the barriers leads to a higher rate of doing pap tests.

Our results showed, the mean score of perceived self-efficacy in the experiment group increased after the intervention compared with the control group; this result has consisted of other similar studies. High self-efficacy increases one's ability, capability, competence[10], and self-confidence for successful demonstration of behavior[27]. Researchers believe that people with higher self-efficacy tend to show higher persistence and hardworking attitudes in the face of hardships. Improving individuals' self-efficacy enables them to overcome challenges and hardships more easily, which is reflected in their performance [10, 12, 27].

Taking into account the role of this construct in enabling women to adopt healthier behaviors, it should receive more attention in designing educational programs.

Although the findings supported the effectiveness of the educational intervention, the study was not free of limitations including the effects of other information sources on the experiment and control groups

and failure to assess the construct of cues of action in the study. However, this research has some strengths. This research used the HBM which has contributed to evaluating attitudes and behaviors.

## Conclusions

Health educational programs based on the HBM improved awareness and performance of the women under study as to pap tests. Therefore, designing and implementing educational interventions using the HBM in health centers is recommended. Other recommendations are a routine assessment of the target behavior with longer follow-ups (more than one year) and similar studies with other behavior change models.

## Abbreviations

HBM  
Health Belief Model  
HPV  
Human papillomavirus  
CVI  
Content Validity Index  
CVR  
Content Validity Ratio

## Declarations

Ethics approval and consent to participate

All participants were informed about the study and confidentiality protocols. Informed consent was obtained from all the participants. After securing an approval letter from the Research and Technology Department, the study was approved by the Ethics Committee under No.4920341301 and registered at the Iran Clinical Trial database (IRCTID: IRCT2013123016006N1). The participants in both groups were ensured that their information would remain confidential throughout the study.

Consent for publication

Not applicable.

Availability of data and material

All data generated during and/or analyzed during the study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that there is no conflict of interests associated with the manuscript.

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No financial support was received for this research.

## Authors' contributions

PK and MA were supervisors and principal investigators of the study and drafted the manuscript. SBE, ZAR were advisors of the study. All author contributed in design, data gathering and analysis. All authors contributed to drafting the manuscript. All authors read and approved the final version of the manuscript.

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## References

1. Hacker NF, Friedlander ML: **Cervical Cancer**. In: *Berek & Hacker's Gynecologic Oncology*. edn. Edited by Jonathan S. Berek NFH. Philadelphia: Wolters Kluwer; 2015: 326-389.
2. Abdullah NN, Al-Kubaisy W, Mokhtar MM: **Health behaviour regarding cervical cancer screening among urban women in Malaysia**. *Procedia-Social and Behavioral Sciences* 2013, **85**:110-117.
3. Karimy M, Azarpira H, Araban M: **Using health belief model constructs to examine differences in adherence to Pap test recommendations among Iranian women**. *Asian Pacific journal of cancer prevention: APJCP* 2017, **18**(5):1389.
4. Khan M, Diaz-Montes T: **Cervical Cancer**. In: *The Johns Hopkins Manual of Gynecology and Obstetrics*. 4th edn. Philadelphia: Wolters Kluwer; 2011: 541-558.
5. Miller C, Elkas JC: **Cervical and Vaginal Cancer**. In: *Berek & Novak's Gynecology. Volume 2*, edn. Edited by Berek DL. Philadelphia: Wolters Kluwer; 2012: 1304 -1349.
6. **Center for disease control non communicable deputy cancer control office. Iranian Annual Of National Cancer Registration Report**. Tehran: Ministry Of Health and Medical Education; 2008-2009.
7. R.Abu-Rustum N, Ungar L, Alektiar K, chi Ds: **Cancer of the Cervix**. In: *Te Linde's operative gynecology. Volume 2*, 11th edn. Philadelphia: Wolters Kluwer; 2015: 1192.
8. Abulizi G, Abulimiti T, Li H, Abuduxikuer G, Mijiti P, Zhang S-Q, Maimaiti A, Tuergan M, Simayi A, Maimaiti M: **Knowledge of cervical cancer and Pap smear among Uyghur women from Xinjiang, China**. *BMC women's health* 2018, **18**(1):21.
9. Shobeiri F, Javad MT, Parsa P, Roshanaei G: **Effects of group training based on the health belief model on knowledge and behavior regarding the pap smear test in Iranian women: a quasi-experimental study**. *Asian Pac J Cancer Prev* 2016, **17**(6):2871-2876.

10. Parsa P, Sharifi F, Shobeiri F, Karami M: **Effects of group counseling based on health belief model on cervical cancer screening beliefs and performance of rural women in Kaboudrahang, Iran.** *Asian Pacific journal of cancer prevention: APJCP* 2017, **18**(6):1525.
11. **Giuntoli II RL , Bristow RE. Cervical Cancer.** In: *Danforth's Obstetrics and Gynecology.* edn. Edited by Gibbs RS KB, Haney AF , Nygaard IE Philadelphia: Wolters Kluwer; 2008: 971- 988.
12. Khademolhosseini F, Noroozi A, Tahmasebi RJAPjocpA: **The effect of health belief model-based education through telegram instant messaging services on Pap smear performance.** 2017, **18**(8):2221.
13. Sharma SM, John AR: **Theoretical Foundations of Health Education and Health Promotion** 2nd edn: Cathleen Sether; 2016.
14. Nigussie T, Admassu B, Nigussie A: **Cervical cancer screening service utilization and associated factors among age-eligible women in Jimma town using health belief model, South West Ethiopia.** *BMC women's health* 2019, **19**(1):127.
15. Reza-Soltani p, Parsai S: **Maternal & Child Health**; 2005.p.350-352.[Text in Persian].
16. Koç Z, Özdes EK, Topatan S, Çinarlı T, Sener A, Danacı E, Palazoglu CAJcN: **The Impact of Education About Cervical Cancer and Human Papillomavirus on Women's Healthy Lifestyle Behaviors and Beliefs: Using the PRECEDE Educational Model.** 2019, **42**(2):106-118.
17. Kolutek R, Avci IA, Sevig U: **Effect of planned follow-up on married women's health beliefs and behaviors concerning breast and cervical cancer screenings.** *Journal of Cancer Education* 2018, **33**(2):375-382.
18. Bebis H, Reis N, Yavan T, Bayrak D, Unal A, Bodur S: **Effect of health education about cervical cancer and papanicolaou testing on the behavior, knowledge, and beliefs of Turkish women.** *International Journal of Gynecologic Cancer* 2012, **22**(8):1407-1412.
19. Lee HY, Lee MH: **Barriers to cervical cancer screening and prevention in young Korean immigrant women: implications for intervention development.** *Journal of Transcultural Nursing* 2017, **28**(4):353-362.
20. McFarland DMJIjowsh: **Associations of demographic variables and the Health Belief Model constructs with Pap smear screening among urban women in Botswana.** 2013, **5**:709.
21. Demirtas B, Acikgoz IJAPJoCP: **Promoting Attendance at Cervical Cancer Screening: Understanding the Relationship with Turkish WomensHealth Beliefs.** 2013, **14**(1):333-340.
22. Park S, Chang S, Chung CJPhn: **Effects of a cognition-emotion focused program to increase public participation in Papanicolaou smear screening.** 2005, **22**(4):289-298.
23. Garcés-Palacio IC, Ramos-Jaraba SM, Rubio-León DC: **Health Beliefs Associated with the Follow-Up of Pap Smear Abnormalities Among Low-Income Women in Medellín, Colombia.** *Journal of Cancer Education* 2018, **33**(2):417-423.
24. Jirojwong S, Maclennan R, Manderson L: **Health beliefs and Pap smears among Thai women in Brisbane, Australia.** *Asia Pacific Journal of Public Health* 2001, **13**(1):20-23.

25. De Peralta AM, Holaday B, McDonell JR: **Factors affecting Hispanic women's participation in screening for cervical cancer.** *Journal of immigrant and minority health* 2015, **17**(3):684-695.
26. Chesun A, Harncharoen K, Taechaboonsermsak P, Siri S: **Factors related with cervical cancer screening test among Thai muslim women in Satun province.** *Asia J Public Health* 2012, **3**(3):79-85.
27. Taher M, Bayat ZSJMjotlRol: **Correlation between compliance regimens with health locus of control in patients with hypertension.** 2015, **29**:194.

## Tables

Table 1: Comparison of qualitative variables in two groups of Intervention and Controlwomen

Variables	Intervention		Control		P-value *
	Number	Percentage (%)	Number	Percentage (%)	
<b>Age</b>					
≤30	10	12.5	17	21.2	0.264
31-40	28	35	31	38.8	
41-50	17	21.2	16	20	
>50	25	31.2	16	20	
<b>Marital status</b>					
Married	75	96.2	73	93.8	0.468
single	5	3.8	7	6.2	
<b>Marriage age</b>					
<17	12	15	9	11.2	0.482
≥17	68	85	71	88.8	
<b>Education</b>					
Illiterate	29	36.2	21	26.2	0.455
Elementary	29	36.2	29	36.2	
Middle school	12	15.1	15	18.8	
High school and diploma	10	12.5	15	18.8	
<b>Number of deliveries</b>					
0-3	55	68.8	63	78.8	0.151
≥4	25	31.2	17	21.2	

\*Chi-square

Table 2: Comparison of the participants in terms of the knowledge of the risk factors of cervical cancer

	Yes	no idea	No
Risk factors of cervical cancer	N(%)	N(%)	N(%)
(Marriage at an early age (under 16year	101(63.1)	46(28.8)	13(8.1)
(The first pregnancy at an early age (under 20 years	104(65)	39(24.4)	17(10.6)
(The high number of deliveries (more than 4	109(68.1)	38(23.8)	13(8.1)
Women whose husbands have multiple spouses	107(66.9)	32(20)	21(13.1)
Deficiency of Vitamin A, C and Folic Acid	114(71.2)	43(26.9)	3(1.9)
Women who have been married more than once	121(75.6)	32(20)	7(4.4)
Women smokers	137(85.6)	19(11.9)	4(2.5)
Family catheter for cervical cancer	126(78.8)	23(14.4)	11(6.9)
Taking birth control pills	72(45)	43(26.9)	45(28.1)
Non-compliance with genital health	149(93.1)	10(6.2)	1(0.6)
A couple's history of STDs	138(86.2)	21(13.1)	1(0.6)
Low socioeconomic status	150(93.8)	6(3.8)	4(2.5)

Table 3: Comparison of HBM constructs in two groups at before and after of intervention

Variable	Group Time	groupIntervention Mean ± SD	groupControl Mean ± SD	P-value*
Knowledge	Baseline	20.5±2.2	20.1±1.8	0.580
	months follow-up-2	25.2±2.1	19.7±1.6	0.001
	P-value**	0.001	0.435	-
perceived sensitivity	Baseline	22.5±2.7	22.6±2.1	0.101
	months follow-up-2	29.0±2.20	22.7±2.9	0.001
	P-value**	0.001	0.490	-
perceived severity	Baseline	19.6±1.7	19.8±1.0	0.802
	months follow-up-2	24.5±1.1	19.6±1.7	0.001
	P-value**	0.001	0.329	-
perceived benefits	Baseline	20.1±1.9	19.3±1.3	0.181
	months follow-up-2	24.2±1.6	19.2±1.4	0.001
	P-value**	0.001	0.469	-
perceived barriers	Baseline	30.9±5.6	29.8±3.5	0.359
	months follow-up-2	18.0±6.5	30.1±3.7	0.001
	P-value**	0.001	0.07	
perceived self-efficacy	Baseline	20.1±3.3	19.8±1.1	0.06
	months follow-up-2	24.7±1.0	19.1±3.0	0.001
	P-value**	0.001	0.06	

\* Independent T-test; \*\* Paired T-test

Table 4: Frequency distribution of Pap test before the educational intervention

Variables	Intervention		Control		P-value*
	Number	Percentage (%)	Number	Percentage (%)	
Pap test					
Yes	15	18.75	13	16.25	0.836
No	65	81.25	67	83.75	

Table5: Frequency distribution of Pap test after the educational intervention

Variables	Intervention		Control		P-value*
	Number	Percentage (%)	Number	Percentage (%)	
Pap test					
Yes	63	78.75	18	22.5	0.001
No	17	21.25	62	77.5	

Fisher's Exact Test\*

## Figures

## CONSORT 2010 Flow Diagram

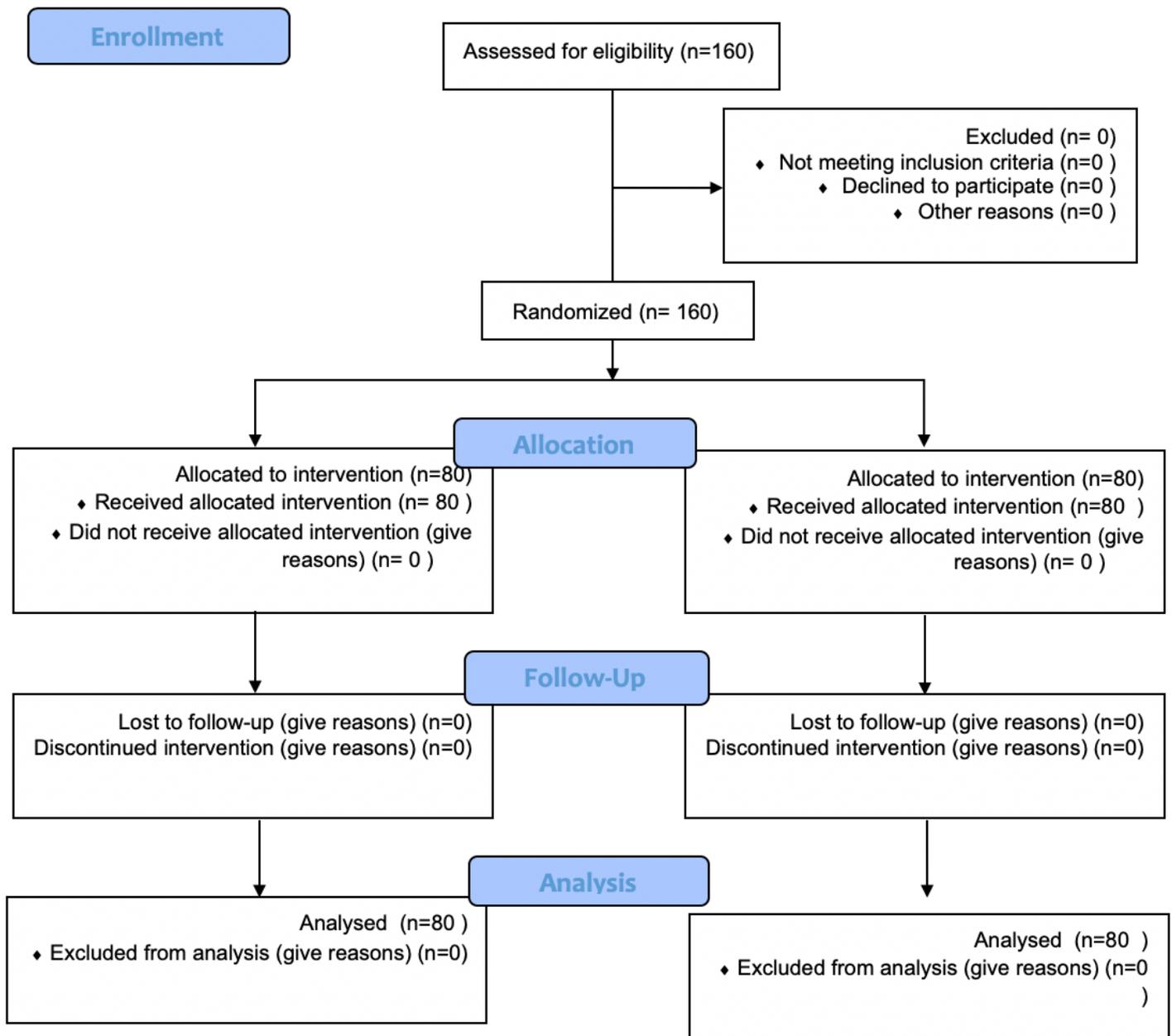


Figure 1

Consort flow diagram of the participants

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [CONSORT2010Checklist.doc](#)