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Review Article

Impact of educational intervention on cervical cancer screening uptake among reproductive age women

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ABSTRACT

The objective of this review is to examine the efficacy of educational approaches in increasing women's adoption of cervical screening. A search was conducted through PubMed, Medline and Google Scholar. Articles that met the eligibility criteria were reviewed. The preferred reporting items for systematic reviews and meta-analysis (PRISMA) guided the data synthesis and reporting. We conducted a qualitative synthesis of evidence and pooled individual research results in meta-analyses using RevMan 5.3 review manager, where applicable. Heterogeneity has been estimated for total summary results of studies pooled together. Quality analysis of the papers was done using JADAD scale. This meta-analysis included a total of nine articles (n=2316). Statistical research findings indicate that the use of cervical cancer educational approaches substantially improved cervical cancer screening rates and screening acceptability by double folds 2.88. The results of this study support the use of educational intervention for cervical cancer to increase the acceptance of cervical cancer screening by women. We also recommend more research to assess the efficacy of various teaching approaches and the effect of intervention length on the rise in women's cervical cancer screening services utilization.

Keywords: Educational intervention, Cervical cancer, Screening, Reproductive age women

INTRODUCTION

Global burden of cervical cancer

Cervical cancer is the fourth most prevalent cancer in women worldwide, with an estimated 570,000 new cases in 2018, accounting for 7.5 percent of all deaths from female cancer. Of the estimated annual deaths of more than 311,000 from cervical cancer, more than 85% of these occur in low- and middle-income countries.[1] Compared to women without human-immunodeficiency virus (HIV), women living with HIV are six times more likely to get cervical cancer, and an estimated 5 percent of all cases of cervical cancer are due to HIV.[2] After breast cancer (2.1 million cases), colorectal cancer (0.8 million) and lung cancer (0.7 million), cervical cancer is listed. The worldwide median age-standard incidence of cervical cancer was 13.1 per 100,000 women, and this ranged widely across countries, with rates varying from less than 2 to 75 per 100,000 women.[3]

The leading cause of cancer-related death among women in eastern, western, central, and southern Africa is cervical cancer. The highest incidence was estimated in Eswatini, which had cervical cancer in around 6.5 percent of women before the age of 75 years. More than 1/3rd of the global cervical burden was contributed by both China and India, with 106 000 and 97 000 cases in China and India respectively, and 48 000 deaths in China and 60 000 deaths in India. The mean age for diagnosis of cervical cancer worldwide was 53 years, ranging from 44 years (Vanuatu) to 68 years (Vanuatu) (Singapore). The global mean age for cervical cancer deaths was 59 years, ranging from 45 years (Vanuatu) to 76 years (Vanuatu) (Martinique). In 146

(79 percent) of the 185 countries analysed, cervical cancer ranked among the top three cancers affecting women younger than 45 years of age.[4]

70 percent of cervical cancers and pre-cancerous cervical lesions are caused by two human papillomavirus (HPV) types (16 and 18). If diagnosed at an early stage and rapidly treated, cervical cancer can be cured.[5] The most common HPV-related illness is known to be cervical cancer. Nearly all cervical cancer cases may be related to HPV infection.[6] Testing for high-risk HPV screening is recommended by the World Health Organization (WHO) and the European guidelines for quality assurance for cervical cancer screening.[7,8] HPV testing has been shown to be successful in detecting precancerous cervical lesions, particularly in population-based cervical screening programs.[9-12]

A systematic study of cervical and breast cancer in 187 countries between 1980 and 2010 by Foremen et al found that developed countries with robust cancer screening programs have recorded steady decreases in cervical cancer incidence and mortality, whereas many developing countries have experienced increases in cervical cancer incidence in sub-Saharan Africa.[13] Timely identification of precancerous cervical lesions by screening remains a crucial health care intervention for decreasing cervical cancer incidence and mortality, especially in low-resource settings where HPV vaccination coverage is limited, given that there are comprehensive campaigns to increase HPV vaccination uptake (Campos et al).[9]

WHO statistics and other studies show developed countries with well-regulated cervical cancer screening programs have achieved a substantial decline in cervical cancer incidence and mortality in relation to developing countries with low vaccine coverage and lack of organized cervical cancer screening programs.[14-16] Indeed, evidence from Viriginia et al and CDC indicates that since Pap smear test originated, the incidence and mortality of cervical cancer in the USA has decreased with coordinated cervical cancer screening services and screening rates of 83% in the USA.[17,18] However, in developed countries, where cervical cancer screening rates are currently low, ranging from 6-8 percent, cervical cancer remains a huge burden.[19,20] These variations in screening rates and coverage for HPV vaccination could explain the differences in cervical cancer-related incidence and mortality in different regions around the world.

Evidence of the efficacy of cervical screening procedures has been reported in previous studies.[21-23] One of the reviews centred on recognizing the effects of education on cervical cancer compared with control factors on screening rates for cervical cancer in qualifying women at risk of cervical cancer. It found that the use of theoretical educational approaches substantially increased CCS rates by more than twice as much as (OR=2.46, 95 percent CI: 1.88, 3.21). In addition, giving women the option of self-sampling for testing for HPV increased CCS rates by almost 2 times (OR=1.71, 95 percent CI: 1.32, 2.22). The research also found that invitation letters alone (or with a telephone follow-up contact), making an appointment, and sending reminders due or overdue for screening to patients had a significant impact on improving particle enhancement. Improvement of participation and CCS concentrations in at risk populations.[24] The aim of this systematic review was therefore to better understand the latest evidence on the impact of education on cervical cancer as an intervention to increase screening rates of cervical cancer in women eligible for cervical cancer screening.

Search strategy and eligibility criteria

MEDLINE, PubMed and Google Scholar were searched for studies published in any country from 2005 to 2020 and published in English to answer the research question of this paper. The findings were limited to RCTs and quasi-experimental comparative community research involving women aged 15 years and older.

Primary outcome

At the end of the interventions, the findings of concern were cervical cancer screening uptake and willingness to take cervical cancer screening. In order to include all primary studies meeting the inclusion criteria, reference lists of on-topic systematic reviews were also searched.

Study selection and data extraction

All citations detected were screened for full text analysis, citations considered appropriate were retrieved. Full text papers were independently evaluated for eligibility, relevant outcome data, research information were extracted and entered under the headings Authors, year of publication and country, study design, sampling method, sample size, action, outcome and country in descriptive Table 1.

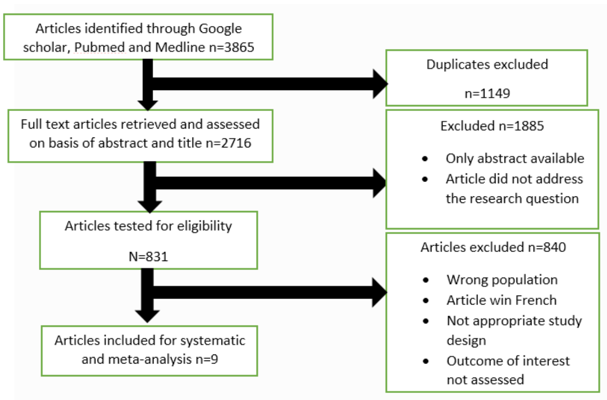

Figure 1: PRISMA diagram.

Data synthesis

The PRISMA statement guides the synthesis and reporting of the results.[25] A brief narrative of the authors, years of publication, styles of intervention, environment, region, research population, key findings, and a description of the intervention effects and p values for each study report were included in the qualitative synthesis. Using the RevMan 5.3 examination manager program, statistical pooling of the results of individual studies was achieved with meta-analysis. Specific forest plots for graphic display of the individual study effects and the overall summary effect of the interventions on cervical cancer screening rates were created by RevMan 5.3. Both statistical estimates of the individual and combined study effects of interventions in meta-analyses were developed using the odds ratio and random effects models.

This systematic and meta-analysis contains a total of 9 publications. Three studies by Tomas et al, Jenifer et al conducted in the USA and Joelle et al conducted in Kenya were RCT studies and the remaining six studies by Chizoma et al, Fang et al, Olumide et al, Parisa et al, Shabnan et al and Nancy et al used quasi experimental study design.[26-34]

The details of authors, study population, country, study design and sampling techniques used and outcome measures of intervention group and control group as well as the p values are entered in Table 2.

Table 1: Descriptive table of studies selected.

Authors, year of publicat-ion and country	Study design	Sampling technique	Samp-le size	Intervention	Result	Conclusi-on
Tomas et al, 2010, USA[25]	RCT	Random sampling method	381	Social cognitive theory (SCT) was used as a guiding principle for the intervention design. All women randomized to the intervention were asked to attend at least one teaching class and 1 year later were given a refresher class. Women received no educational intervention in the normal care group. All were sent a reminder by mail and got a phone call reminder about scheduling a visit for breast and cervical screening	Women in the intervention group were 1.5 times more likely to report getting a Pap smear in the last year, although this was not statistically significant (95% CI=0.9-2.6)	Educatio-nal interventio n based of SCT model was effective
Joelle et al, 2015, Kenya[27]	RCT	Random sampling	467	An informative 30-minute talk on cervical cancer reviews basic health information about cervical cancer, risk factors, how screening is done, what screening outcomes mean, and options for treatment. A guided discussion on screening barriers and issues or stigma associated with screening was included	In the intervention group, the screening acceptability of women increased but was not substantially different from the initial sample (p=0.26)	The educatio-nal interventi-on did not lead to higher rates of screening
Chizoma et al, 2017, Kenya[29]	Quasi experi mental	Systematic random sampling	904	Data on cervical cancer and screening presented by the nurses to women attending antenatal clinics. On the clinical days in the intervention group, health lessons were given to the women's cluster and they collected the knowledge in groups. In supplying information on cervical cancer in hospitals, nurses used flex charts with detailed information on cervical cancer, women in the control group were not exposed to such information	CCS uptake increased marginally from 1.4% at baseline to 3.6% at IG and 2.1% to 2.3% at post intervention CG	Despite the nurse-led educatio-nal initiative, cervical cancer screening uptake remained low

Continued.

Authors, year of publicat-ion and country	Study design	Sampling technique	Samp-le size	Intervention	Result	Conclusi-on
Fang et al, 2007, USA[29]	Quasi experi mental	Systematic random sampling	102	Cervical cancer education and patient navigation supported by bilingual Korean health educators were obtained by the intervention group. The control group obtained general health education, including cervical cancer details and screening	83% of women in the intervention group had undergone screening at 6 months post intervention, compared with 22% in the control group	Increased screening rates observed
Olumide et al, 2014, Nigeria[30]	Quasi experi mental	Multistage sampling technique	700	A film on cervical cancer and screening was used by the health education intervention to stimulate participatory health education. Hand bills created in both Yoruba (the local language) and English were given to reinforce what had been taught. Period of the 7-day intervention	A statistically significant difference between the intervention and control groups in their attitude toward cervical and screening awareness and practice ($p<0.05$) after the intervention was recorded	Health education interventio n was effective
Parisa et al, 2017, Iran[31]	Quasi experi mental	Multistage sampling technique	80	The intervention was carried out as community counselling based on the Health Belief Model and Collect counselling measures in the intervention group. Three 45-60 min sessions with a one-week interval and a capacity of 10 people per session were conducted during the counselling meeting, using the community counselling approach with posters and pamphlets in village health houses in the intervention group	The Pap smear examination was conducted by 17 patients from the intervention group and 4 patients from the control group after the intervention ($p<0.055$)	The group counselling based on the health belief mode was effective
Nancy et al, 2019, Ghana[34]	Non-equival -ent control-group design	Convenien -ce sampling technique	782	Health education provided cervical cancer information and screening to boost the level of awareness of the disease. Focus of cervical cancer education was on the cause, predisposing factors, signs/symptoms, complications and prevention methods. With regard to cervical cancer screening, individuals were introduced to where they could go for testing	Despite the obstacles to cervical cancer screening, the intervention community showed high awareness and optimistic beliefs about cervical cancer screening	Health education-n is effective
Shabnam et al, 2017, Iran[32]	Quasi-experi mental study design	Cluster and simple random sampling techniques were used	143	The experimental group received an educational program on cervical cancer focused on the PMT model. Every 45-minute session was planned for small groups of 10 to 15 women. During the sessions, after each educational session, the participants were educated on the basis of active learning methods,	The incidence of routine Pap smear examination and referral to health centres was significantly increased ($p=0.048$), but not	PMT-based educational interventio-n was successful in enhancing periodic

Continued.

Authors, year of publicat-ion and country	Study design	Sampling technique	Samp-le size	Intervention	Result	Conclusi-on
				including lectures, group discussions and questions-answers and pamphlets and a booklet were given to women	in the control group (p>0.05)	Pap smear testing
Molokwu et al, 2018, USA[26]	Rando-mized control-ed trial	Random sampling technique	201	The intervention group receives culturally tailored education from the promoter while the control group receives a written training pamphlet	The study found a high degree of self-sampling acceptability independent of educational severity and a trend towards increased follow-up of Pap smear in participants who tested positive	No significant difference

Table 2: Descriptive table of studies selected.

Author	Population	Country	Year	Study design	Sampling method	Intervention group (screened)	Control group (screened)	P value	Study quality
Tomas et al[25]	Women ≥50 years	USA	2010	RCT	Random sampling	93/104	87/116	0.05	High
Joelle et al[27]	Women	Kenya	2015	RCT	Random sampling	145/161	155/167	0.37	High
Chizoma et al[28]	Women	Nigeria	2017	Quasi experim-mental	Systematic random sampling	15/417	10/429	0.27	High
Fang et al[29]	Women	USA	2007	Quasi experim-mental	Random sampling	39/46	5/39	<0.001	High
Olumide et al[30]	Women 25-64	Nigeria	2014	Quasi experim-mental	Multistage sampling	300/325	270/289	0.038	High
Parisa et al[31]	Women	Iran	2017	Quasi experim-mental	Multistage sampling	37/40	16/40	<0.001	High
Shabnam et al[32]	Women	Iran	2017	Quasi experim-mental	Cluster and simple random sampling	35/72	23/71	0.048	High

Quality assessment

The JADAD quality assessment scale was used. It has three measures which is randomization, to which 1 score is given if the study described as randomized and an additional point if the method for generating the sequence of randomization was described and it was appropriate and 1 point is deducted if the method for generating the sequence of randomization was described and it was inappropriate. 1 point if the study described as double blind and extra 1 point if the method of double-blinding was described and it was appropriate and 1 point deducted if the method of double-blinding was described and it was inappropriate. The third item on the scale assesses if the studies have a description of withdrawals and dropouts (30). *Yes=1, for a total of 5 possible points; ≥3 points indicate a superior quality trial. The 6 studies which meet the eligibility have a score of ≥3 and are considered as high quality. Details of studies with score of greater or equal to three are included in Table 3.

A search through Google scholar, Pubmed and Medline yielded 3865 articles, after duplicates were removed, a total of 2716 full text articles were retrieved and assessed on basis of abstract and title. Of the 831 articles assessed for eligibility, only 9 articles were included in qualitative synthesis. To respond to the research question, "What is the effect of educational intervention of cervical cancer screening rates and acceptability of cervical cancer screening?" seven studies were put together. Three random controlled studies (RCT) and four quasi experimental studies. Three (3) of the studies were conducted from USA and two from Nigeria, two from Iran and one from Kenya.

Table 3: Details of studies with score of greater or equal to three.

Study	Random-ization	Blind -ing	Description of withdrawals	% max score
26	2	1	1	4
28	2	1	1	4
29	2	1	0	3
30	2	1	1	4
31	2	1	0	3
32	2	1	2	5
33	2	1	1	4

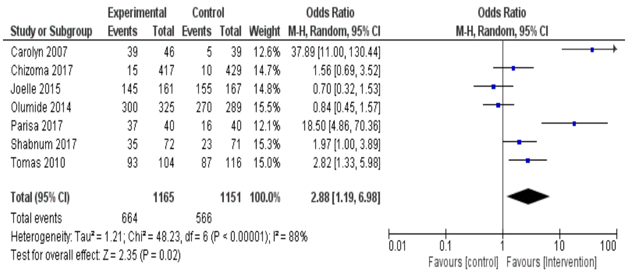

Figure 2: Evidence of an improvement in screening rates for cervical cancer in women exposed to the intervention relative to the controls.

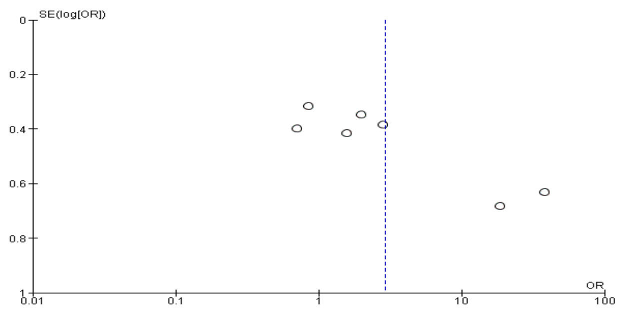

Figure 3: The Funnel plot.

In a meta-analysis of a total of 1165 women who were exposed to cervical cancer education and 1151 women in the reference community, seven studies were pooled together. The findings of our meta-analysis presented in Figure 2 showed evidence of an improvement in screening rates for cervical cancer in women exposed to the intervention relative to the controls. In the interventional group, the combined summary effect of the interventions included was two times greater than in the control group 2.88 [1.19, 6.98].

DISCUSSION

The key findings of this study are that educational approaches used in various communities to increase the acceptance of cervical cancer screening are successful. Cervical cancer and HPV procedures greatly increase cervical cancer screening rates. The forest plot above illustrates the cumulative results of seven studies on educational approaches for cervical cancer. This showed an average impact of 2.88. Women in the intervention group are twice likely to screen compared to the control group.

Cervical cancer education

Different methods were used to deliver cervical cancer education to study participants randomized into the interventional group. These interventions range from, the use social cognitive theory (SCT), interactive talk about cervical cancer, focused information on cervical cancer, use of movies on cervical cancer, one adopted the health belief model and GATHER counselling steps and other interventions delivered in bi-languages.

The social cognitive structure was used to direct one of the studies examined. This theory states that the perception of health risks and benefits is the precondition for improvement, and if people do not have knowledge of how their lifestyle behaviours relate to their health, they may have little reasons to support activities or attempts to change those unhealthy habits.[26,35,36] In contrast with the normal treatment group, women in the intervention group were 1.5 times more likely to report getting a Pap smear during the last year. Community therapy focused on the wellbeing belief model and GATHER counselling measures was used in another report. Three 45-60 min sessions with a one-week interval and a capacity of 10 people per session were conducted during the counselling meeting, using the community counselling approach with posters and pamphlets in the village health houses of the intervention group. The health behaviour structure involves the combined impact of individual and health care system variables, environmental and personal barriers, a review by Musa et al.[24,32] As was seen in the intervention groups of the studies included in their analysis, the use of theory-based educational approaches is very relevant for emerging communities with low levels of literacy, which is also similar to the results of this research. Our studies have shown a positive effect of educational involvement in increasing the acceptance of cervical cancer screening. Such initiatives not only increased women's cervical cancer screening rates, but also strengthened visibility, knowledge of cervical cancer, screening significance, and provided barrier advice and guidance on when and how to do CCS, thus improving the overall chances of qualified women turning up or scheduling cervical cancer screening.[26,31,32] We have faith in the findings and encourage the use of educational approaches to improve women's participation in cervical screening programs, because only high-quality studies have been checked.

Limitations

This review only included studies retrieved from three electronic databases, results from studies published in other data bases could be different. More so, through the application of our inclusion criteria, articles excluded might give different results.

CONCLUSION

The findings of this review contribute to the growing literature supporting the implementation of educational interventions for cervical cancer to increase cancer screening rates among eligible women, particularly by targeting sexually active young people/students and illiterate women. Educational approaches such as social cognitive theory and the health belief system focused on theory-based driven cervical cancer are modelled to target frameworks such as avoiding screening for cervical cancer where no signs manifest, believing that it was easier to have no awareness of one’s diagnosis of cervical cancer and believing that only women who participate in sexual risk-taking activities such as prostitution, drug abuse and polyandry need to receive pap smear and assist target groups to make informed health choices and facilitate the recognition and completion of cervical cancer screening activities. More research should, however, be carried out to assess the efficacy of provider recommendation initiatives, such as invitation letters with follow-up telephone call reminders, community advice and film use, suggestion and promotion of women's self-sampling methods to achieve a substantial improvement in screening rates. In order to provide more understanding and draw effective conclusions, the implications of the length of educational programs on cervical cancer screening rates should also be studied.

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