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Using a social marketing approach to increase the pap-smear test uptake: randomized controlled trial among women residing in urban region

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Abstract

Background Social marketing intervention is a strategy to improve intention and behavior in this field. Therefore, this study was conducted with the aim of determining the impact of social marketing intervention on Pap-smear test uptake.

Methods The study conducted between June 5th 2023 and August 6th 2023. This study is registered in IRCT (code: IRCT20221126056609N1 & Registration date: 2023-04-27) The population studied were married women aged 18 to 65 living in Qazvin City. Comprehensive health service centers of Qazvin city were clustered for sampling and samples were randomly taken from each cluster and randomly divided into two control and intervention groups. Demographic, social, and economic information was collected before the intervention for both intervention and control groups. The intervention was based on four marketing mixes (product, price, place, and promotion). After three months, the pap smear test uptake was examined in both intervention and control groups. The data were analyzed by performing paired t-tests, chi-square, and odds ratio estimation in SPSS and Stata software.

Results The findings showed that there was a significant difference in Pap smear test uptake between the intervention and control groups after the intervention. So the participant who intervened had about 12 times more chance of a test uptake and this chance in the follow-up period was 5 times more than the control group.

Conclusion The findings of the present study showed that the intervention based on social marketing increases awareness, perceived risk, and the demand for Pap smear tests among women. By influencing women's intention and behavior, they can be led to participate in screening. For this purpose, a multifaceted intervention should be designed based on the barriers and facilitators of test's demand.

Trial registration This study is registered in IRCT (code: IRCT20221126056609N1 & Registration date: 2023-04-27).

Keywords Pap-smear test, Cervical cancer screening, Social marketing, Randomized clinical trial

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Background

Cervical cancer is the 4th common cancer among females worldwide and second common cancer in low-income countries [1, 2]. cervical cancer causes 8.3 deaths per 100,000 and it is the third most common cause of cancer mortality in low-income countries [2]. Five-year survival is 40% lower in countries with low HDI (Human development index) in comparison with high HDI [3]. Almost 85% of deaths from cervix cancer take place in low- and middle-income countries, and these countries tolerate the most significant burden [4–6].

2020 statistics showed 604,000 new diagnoses and 342,000 deaths regarding cervical cancer [4]. According to the Globocan countries with medium and low HDI have a large portion of cervical cancer new cases and deaths [7]. According to the Iranian Cancer Registry, 6 out of every 100,000 women are diagnosed with cervical cancer. This cancer is not among the top 5 most common cancers in Iran, but its mortality rate is about 42% compared to its incidence, which indicates a high level. This high mortality is because this cancer is usually diagnosed in advanced stages in Iran [8]. Cervical cancer can often be avoided with preventive measures [5]. In late diagnosed or metastasized status, the five-year survival chance is about 70% lower than the early detection [9]. Screening is a preventive way to early diagnosis of cervical cancer [10].

The World Health Organization emphasizes that the non-communicable disease control program should be designed based on quality and reliable population data and in the form of a monitoring and surveillance system [10]. The effective and consistent undertaking of the cervical cancer screening program caused the decreased incidence and mortality rate in countries that implemented it regularly [11].

Pap smear test or cytology test was proposed and used for the first time in 1970 [12]. This test should be done every three years between the ages of 23–50 and every five years between the ages of 51–60 [13]. Many experimental investigations have proven that pap-smear is effective in lowering the incidence and mortality of cervical cancer [12]. The incidence and mortality of cervical cancer have been diminished to a fifth in the last fifty years due to regular pap smear test schedules [14]. Countries with a higher HDI were able to carry out the screening program with better quality, timing, and discipline [5]. Factors such as education, socioeconomic status, place of residence, insurance, race, and sexual orientation are also effective in screening uptake [15]. These elements function as incentives or obstacles to direct the intention and behavior of women in accepting or uptaking the pap smear.

For years, interventions based on social marketing have targeted people's health behaviors around the world. Such interventions seek to change people's behavior for the benefit of individual and community health [16–18].

A social marketing intervention includes the following Marketing mix (4P): P1) Product; consists of ideas and behaviors passable to the attendance, P2) Price; perceived direct and indirect costs and barriers linked to the product; P3) Place; where the person has access to the product and its running information, P4) Promotion; communication-related elements, and ways in which people become informed of the product or behavior [19, 20].

A study in Nigeria also indicated the effectiveness of social marketing intervention in changing attitudes, increasing awareness, and uptake of pap-smear tests [20]. An Iranian study also showed that social marketing intervention changes people's attitudes and decisions in the field of health behaviors such as human papillomavirus screening uptake [21].

Cervical cancer is a priority health problem worldwide. This cancer is curable if detected early. The way of early diagnosis is to perform a pap smear test, which some women do not participate in regularly for various reasons. Social marketing intervention specifically focuses on targeted behavior changes and seeks to create sustainable changes in individuals' behavior. Additionally, by using attractive and relevant messages, it can capture people's attention and provide the necessary motivations for behavior change. The social marketing model utilizes various channels such as social media, advertising, and public events to deliver messages. In this model, collaboration with local organizations and institutions can help expand the scope of influence and access to the target community. This model also allows for the evaluation of program impacts and the collection of feedback from the target community, which aids in the continuous improvement of strategies [22–24]. Therefore, this study was conducted with the aim of determining the impact of social marketing intervention on Pap-smear test uptake. That is we attempted to test the hypothesis: "A social marketing package-based intervention increases demand for Pap smear testing."

Materials and methods

Type of study

This study is a randomized controlled trial (IRCT registration number: IRCT20221126056609N1 & Registration date: 2023-04-27). This study was performed on married women aged 18–65 who were covered by health centers in Qazvin between June 5th 2023 and August 6th 2023.

Study population

The population of this study consists of married women aged 18 to 65 from Qazvin City.

Inclusion and exclusion criteria

Inclusion criteria include (1) Voluntary and informed participation, (2) Age range from 18 to 65 years, (3) Being married, (4) Living in Qazvin city for at least the next 6 months, (5) Not to participate in similar interventions in the last six months, (6) Not to perform a pap-smear test in the last three years, (7) Having a mobile phone for patients or a family member to send text messages.

Exclusion criteria include (1) Participating in training courses related to sexually transmitted diseases, (2) Having a history of screening for human papilloma or genital wart (Co-testing), (3) Having mental disorders under treatment.

Sampling method

The following formula was used to calculate the required sample size in both groups [25]:

$$n_A = n_B = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2[p_A(1-p_A) + p_B(1-p_B)]}{(p_A - p_B)^2}$$

Females aged 18 to 65 living in Qazvin city are the population of this study. It was clustered based on urban health community centers. Then based on the share of each cluster in the total population, the number of samples required for both control and intervention groups were selected from each cluster (the population covered by each health community center).

The required data were collected through an online questionnaire before and 3 months after the intervention. Randomization of intervention and control group samples was done by the random number table. First, the target community was divided into blocks (clusters) based on the urban health community centers. Then, using a table of random numbers, within each block, 57 women were devoted to the intervention group and 56 to the control group. Randomization and research process diagramed in Fig. 1.

The control and intervention group included married women aged 18 to 65 living in Qazvin who had not had a pap smear test in the last three years.

Intervention

According to Table 1, the intervention includes a four-part package based on 4 social marketing mixes. Intervention components included:

1. A pamphlet introducing the Pap smear test and A pamphlet on how to perform the Pap smear test were designed. (Product)
2. (A) The cost of sampling was selected as the monetary cost of the intervention. Then, a pamphlet introducing comprehensive health service centers was designed as a reference for performing this test for free. (Price)
2. (B) Psychological costs, including fear of the impact of the test on sex, fear of test pain, fear of privacy violation, and fear of the positive result were selected for intervention. So 4 pamphlets were designed. (1) The first pamphlet was designed to inform the participants and their spouses that the test wouldn't affect the quality of sex. (2) The second pamphlet was designed to inform the participants that female providers would conduct the test. (3) The third pamphlet was designed to inform the participants that the test would be painless. (4) The fourth pamphlet was designed to inform that there is no need to worry if the test result is positive. (Price)
3. The informative pamphlet of the exact address of comprehensive health service centers near the residence of the participants was designed for place-based intervention. (Place)
4. A promotional message "Always stay close to your family by doing a Pap smear test." was Provided. (Promotion)

After accessing the samples and collecting the initial data, the pamphlets were sent to the intervention group through social apps. Then a promotional message was sent to the participants of the intervention group for 3 months during the follow-up period weekly via SMS. The control group did not receive any intervention.

In the initial contact with the samples who were illiterate, they were asked to talk to a member of the family who was literate. Then a literate family member (wife/child/sister/brother/…) was asked to help fill out the questionnaire. Also, text messages and brochures were sent to the mobile phones of the literate people in the family to be explained and read. Informing the contents of SMS and brochures to the illiterate sample was followed.

Main outcome

Pap smear uptake was the main outcome of the study. The meaning of uptake the test is that the person has done the pap smear test according to his economic status and the costs of the test. which in this study is measured based on a binary variable (0: no demand and 1: demand).

Data collection

The required data was collected through an online questionnaire. The questionnaire had several parts. In the first part, demographic, social, and economic information was questioned. In the second part, the questions related to awareness and perceived risk of pap smear-test was asked. In the third part, the question related to the uptake of a Pap-smear test in the past period has been questioned. In the first stage (before the intervention)

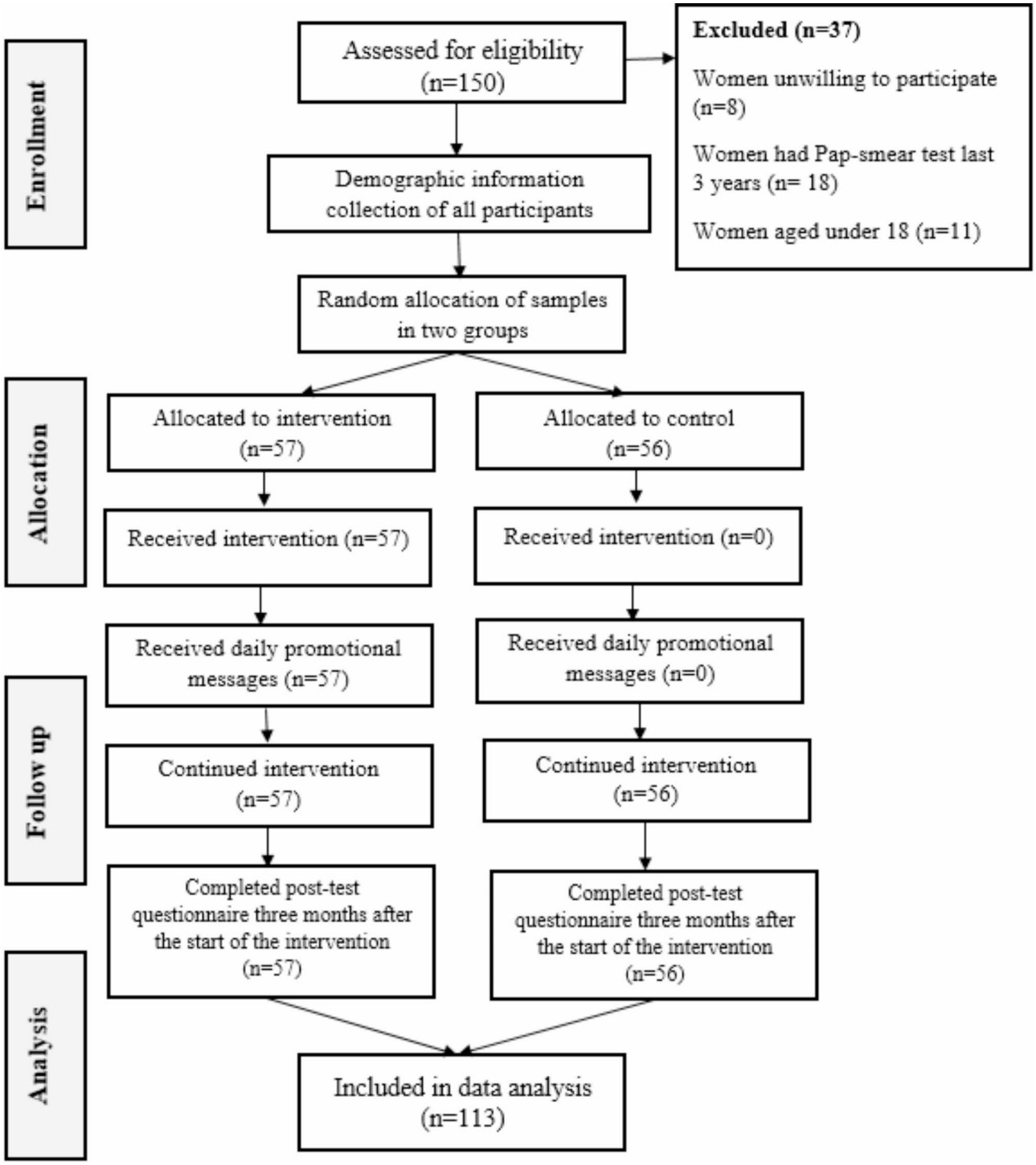

Fig. 1 Randomization and research process diagram

the data were collected from the control and intervention groups. In the second stage, three months after (follow-up period) the intervention, data were collected again from two groups.

Part I:

Age, marriage age, Number of years of marriage, women's education level, Spouse's education level, Economic status of self or family, Employment status, Health insurance status, Type of health insurance, Additional insurance status.

Part II:

Table 1 Social marketing mixed model for pap-smear test uptake and related intervention

4P	Definition	Specimen in this study	Intervention
Product	Behavior/Service/Idea/consumption	A Pap-smear test, specifically, includes: taking a sample, sending the sample to the lab, and getting a sample report	- Pap smear introduction pamphlet - Pamphlet on how to perform a pap smear test
Price	The cost that consumers are compelled to give up as long as they gain the product (monetary, attitudinal, functional, psychological, anxiety)	1. Including direct monetary costs: the cost of transportation, the cost of sampling, the cost of the laboratory, the cost of a doctor's visit 2. Indirect costs: waiting time in the center; Psychological such as spouse's dissatisfaction, stress, worry and fear	- Navigation pamphlet to free sampling centers - Pamphlet explaining that the test doesn't affect the quality of sex for the spouses - Pamphlet introducing the female staff performing the test and explaining the painlessness in order to reduce the stress of the samples - Pamphlet explaining that there is no need to worry if the test is positive to reduce the fear of knowing the test result
Place	A place where individuals receive a product and be exposed to the consumers community	Urban health community centers	- Detailed information pamphlet about the location of the comprehensive urban health center and its distance from the place of residence
Promotion	A tool for extend messages and communicating with the target people	Effective communication with the intervention group in the field of study objectives	- Through promotional messages using short messages (SMS) and social messengers

1. Have any of your friends or relatives been diagnosed with cervical cancer?
2. Do you have regular examinations by a gynecologist?
3. Have you injected the HPV vaccine?
4. Do you know what a Pap-smear test (cervical cancer screening) is?
5. Have you ever heard or read about the pap-smear test (cervical cancer screening)?

Part III:

1. Have you ever done a pap-smear test? If yes, when?
2. What is the probability that you will get cervical cancer?
3. Are you planning to do a pap-smear test?

Statistical analysis

The data were analyzed by performing paired t-tests, chi-square, logistic regression and odds ratio estimation in SPSS 25 and Stata 17 software.

Results

Descriptive statistics

Table 2 shows the demographic characteristics of the control and intervention groups. According to the table, the mean age, age at the time of marriage, and number of years of marriage in the control group were 38.05 (12.984), 21.50 (5.464), and 15.93 (13.045) respectively in the control group. These were respectively 39/82 (11/630), 23/16 (5/301), and 16/91 (12/989) in the intervention group. The majority of the control group had a bachelor's degree ($n=24$) and most of their spouses had a diploma ($n=18$). The majority of the intervention group had a bachelor's degree ($n=32$) and most of their spouses had a bachelor's degree ($n=26$). Most of the control group ($n=38$) were unemployed. Almost half of the intervention group ($n=28$) were unemployed and half ($n=29$) were employed. In terms of economic status, the majority of the control group ($n=36$) and the intervention group ($n=45$) were moderate. Most of the control group ($n=48$) and the intervention group ($n=53$) had insurance. Most of the control group ($n=40$) and the intervention group ($n=45$) had social security insurance, and only one person was covered by the armed forces insurance.

According to Table 3, most of the control group ($n=44$) and the intervention group ($n=49$) knew about the Pap smear test or cervical cancer screening, and 43 people from the control group and 43 from the intervention group had read or heard something about it. Most of the control group ($n=31$) and the intervention group ($n=38$) had not taken the test in the last three years. The mean perceived risk of the control group was 5.39 (10.001) and the intervention group was 3.74 (8.665).

Also, according to Table 3, after the intervention, most of the control group ($n=46$) knew about the Pap smear test or cervical cancer screening, and 45 of them had read or heard something about it. Also, most of the intervention group ($n=54$) knew about the pap smear test or cervical cancer screening, and 49 of them had read or heard something about it. The mean perceived risk of the control group was 5.39 (10.29) and the intervention group was 9.91 (13.631). Finally, only two participants from the control group and 18 participants from the intervention group had demanded this test after the intervention.

Table 4 shows the description of the crossover frequency of the control and intervention groups after the intervention based on the demand and non-demand of the test. As it is known, 3.6% of the control group and 31.6% of the intervention group had demanded the test after the intervention.

Table 2 Description of the demographic characteristics (control = 56, intervention = 57)

Variable		Control		Intervention	
		Frequency	Percentage	Frequency	Percentage
Age	Under 20	5	8.92	1	5.7
	20–30	16	28.57	13	22.8
	31–40	10	17.85	16	28.07
	41–50	14	25	15	26.31
	51–60	9	16.07	10	17.54
	More than 60	2	3.57	2	3.5
Age at time of marriage	Under 18	18	32.14	11	19.29
	18–30	35	62.5	42	73.68
	31 and upper	3	5.35	28	49.11
Number of years of marriage	Under 10	31	55.35	13	22.8
	10–20	5	8.92	8	14.03
	21–30	13	23.21	9	15.78
	31–40	2	3.57	3	5.26
	More than 41	5	8.92	11	1.94
Level of Education	Elementary school	11	19.64	10	17.54
	Secondary education	16	28.57	32	56.14
	Bachelor	24	42.85	3	5.26
	Master	5	8.92	1	1.75
Spouse's education level	Elementary school	14	26.78	29	50.87
	Secondary education	18	32.14	26	45.61
	Bachelor	17	30.35	2	3.5
	Master	6	10.71	15	26.31
Ethnicity	Kurd	12	21.42	25	43.85
	Persian	27	48.21	3	5.26
	Lor	6	33.6	1	1.75
	Turkish	11	19.64	5	8.77
Employment status	Unemployed	38	67.85	8	14.03
	Employed	18	32.14	28	49.12
Economic status of self or family	Very weak	2	3.57	29	50.87
	Weak	15	26.78	10	17.54
	Moderate	36	64.28	45	78.94
	Strong	3	5.35	2	3.5
Insurance status	Insured	48	85.71	53	92.98
	No insurance	8	14.28	4	7.01
Supplementary insurance status	Insured	19	33.92	21	36.84
	No insurance	37	66.07	36	63.15
Type of health insurance	No insurance	8	14.28	4	7.01
	Social security	40	71.42	45	78.94
	Health Service	8	14.28	8	14.28

Variable		Minimum	Maximum	Mean	Std. Deviation
Age	Control	18	63	38.05	12.984
	Intervention	19	63	39.82	11.630
Age at time of marriage	Control	10	41	21.50	5.464
	Intervention	14	38	23.16	5.301
Number of years of marriage	Control	3	47	15.93	13.045
	Intervention	3	45	16.91	12.989

Analytical statistics

Table 5 shows the comparison of the odds ratio of the test's demand before and after the intervention. As it is known, the odds ratio of the test's demand before the intervention was 2.48 (1.157–5.314). While the implementation of the intervention has made the odds ratio reach 12.46 (2.731–56.853). The odds ratio of the intervention group (12.462) is statistically significant (95% confidence interval: 2.731–56.853). That means the participants who received the intervention have about

Table 3 Descriptive statistics of awareness and perceived risk before and after the intervention (control = 56, intervention = 57)

Question		Before				After			
		Control		Intervention		Control		Intervention	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Do you know what Pap smear test (cervical cancer screening) is? (awareness)	Yes	44	78.57	49	85.96	46	82.14	54	94.73
	No	12	21.42	8	14.03	10	17.85	3	5.26
Have you ever heard or read about Pap smear test (cervical cancer screening)? (awareness)	Yes	43	76.78	43	75.43	45	80.35	59	85.96
	No	13	23.21	14	24.56	11	19.64	8	14.03
Have you ever done a pap smear test? If yes, when?	No	31	55.35	19	33.33	54	96.42	39	68.42
	Yes	25	44.65	38	66.67	2	3.57	18	31.57
	3 years ago	8	14.28	7	12.28	-			
	4–10 years ago	14	25	29	50.87				
	More than 10 years	3	5.35	2	3.5				
Question		**Mean**	**Std. Deviation**			**Mean**	**Std. Deviation**		
What percentage do you think you will get cervical cancer? (perceived risk)	Control	5.39	10.001			5.39	10.290		
	Intervention	3.74	8.665			9.91	13.631		

Table 4 Description of the frequency of demanding and not demanding for pap smear tests after the intervention

		control	intervention
Not demanding	**Count**	54	39
	% within arm	96.4	68.4
Demand	**Count**	2	18
	% within arm	3.6	31.6

Table 5 The comparison of the odds ratio of the test's demand before and after the intervention

Odds Ratio		Value	95% Confidence Interval		*p*-value
			Lower	Upper	
	Before	2.480	1.157	5.314	< 0.05
	After	12.462	2.731	56.853	< 0.05

Table 6 The comparison of the odds ratio of awareness before and after the intervention

Odds Ratio		Value	95% Confidence Interval	
			Lower	Upper
	Before (Q1)	1.670	0.625	4.464
	Before (Q2)	0.929	0.391	2.206
	After (Q1)	5.442	1.457	20.325
	After (Q2)	1.332	0.483	3.667

Table 7 Tests of model effects

	Wald Chi-Square	df	*p*-value
Intercept	14.568	1	< 0.05
arm	13.298	1	< 0.05
Time	33.528	1	< 0.05
arm * Time	4.226	1	< 0.05

12 times more chance to demand a test than the control group.

Table 6 shows the comparison of the odds of awareness before and after the intervention. As it is known, the odds ratio of knowledge (Q1) before the intervention was 1.670 (0.625–4.464) and the odds ratio of knowledge (Q2) was 0.929 (0.391–2.206) before the intervention. The implementation of the intervention has caused the odds ratio for Q1 to reach 5.442 (1.457–20.325) and for Q2 to 1.332 (0.483–3.667).

Table 7 shows the results of estimating the effects of the model. As it is known, being in the intervention group has increased the demand for pap smear tests after the intervention.

Discussion

The findings showed that there was a significant difference in the demand for Pap smear tests between the two intervention and control groups after the intervention. So the individuals who were intervened had about 12 times more chance to request a test and this chance in the follow-up period was 5 times more than the control group. Also, the findings showed that there was a significant difference in the awareness of the Pap smear test and the perceived risk of cancer between the two intervention and control groups after the intervention.

In the line with present study, Tope Olubodun et al.'s study showed that conducting an intervention based on 4 social marketing mixes, increased the demand for pap smear tests in Nigerian women. After their intervention, the demand for testing reached 84%, which was significantly different from the control group. This study paid attention to performing the test by female health workers [20]. The same intervention that was conducted in Nigeria years ago raised the awareness of the intervention group, but due to sampling by male staff, it could not significantly increase the demand for testing [26].

In the study of Hemantha Amarasinghe et al., similar to the present study, social marketing intervention that included a promotional message to the target group caused a significant increase in test's demand in the intervention group. In this study, sending messages with thematic categories has a greater effect than sending uncategorized messages together [17]. In the present study, pamphlets and messages were sent by subject classification.

Similar to the findings of the present study, a systematic review by John O. Olawepo et al. in the field of HIV testing showed that social marketing intervention was effective in increasing the demand for HIV tests [27]. Barnes et al.'s study also increased participation in the national screening program by using a social campaign based on social marketing mixes [28].

Tope Olubodun et al. similar to the present study, increased the knowledge and attitude score towards the Pap smear test in the intervention group by conducting a marketing intervention. while there was no significant difference in the control group [20]. The study of Daghighbin et al. has raised awareness through health workers and midwives, as well as the use of virtual media [21].

Parallel to the findings of this research, a systematic review by Wiyola Audina et al. showed that interventions targeting people's health behaviors have a positive effect on improving participation in cervical cancer screening [29]. The study by Désirée Schliemann et al. also indicated that the use of small media (promotion mix) is effective in increasing women's awareness and participation in cervical cancer screening [30]. Sara Shawky et al.'s review showed that the use of mass media, which is another example of the marketing promotion mix, has increased awareness [31]. The study of Orimadegun Boluwatito et al. in Nigeria also confirmed the direct effect of increased awareness and perceived risk on the demand for Pap smear tests [32].

In this study, pamphlets on the description of Pap smear test and how to perform it (product mix) were provided to the intervention group. These pamphlets were designed to show the importance of doing the test and familiarizing the test's procedure. According to the results of many studies, perceived sensitivity is one of the factors that lead women to perform the Pap smear test. People who consider themselves vulnerable to cervical cancer are more likely to participate in screening [33]. For example, married women in the age group of 30–39 years showed the highest participation in screening [34]. This is due to the perceived sensitivity of these people towards their sexual health [35, 36]. People with a higher level of education participated more in Pap smear tests due to their greater awareness and knowledge [36]. Also, people who had a history of cervical cancer in their family and considered themselves prone to the disease participated more [37]. People who have sexually transmitted diseases or urinary infections, as well as people who have multiple sexual partners, consider themselves vulnerable to cervical cancer and participate more in Pap smear tests [38]. This means awareness of vulnerability to cervical cancer in all studies lead women to uptake screening. This awareness can rise from a history of same or similar diseases or can provide from a national or local training plans that is integrated to other health services.

In the present study, the promotional message (promotion mix) was sent to the intervention group. Because to increase the perceived sensitivity in women, it is an effective approach to create awareness and knowledge through the media and campaigns to promote screening [34, 39].

In the current study, a pamphlet was designed to inform about the need not to worry if the test is positive (mixture of price: psychological cost). Because women should believe that this cancer can be prevented and treated [39]. In addition, pamphlets to show that the test is not painful (mixture of price: psychological cost), no impact of the test on sexual function (mixture of price: psychological cost), provision of services by female employees (mixture of price: psychological cost), introduction of comprehensive health service centers as a reference, free sampling (mixed price: monetary cost) was prepared. Because, according to major studies, the obstacles that prevent women from demanding a pap smear test are: shame, financial obstacles, fear of pain, unwillingness to know the test result, religious beliefs, lack of access to a female physician, and lack of consent from the

spouse, fear of the impact of the test on sexual function and fertility [35–37, 40].

Based on results of present study and compared ones, Women have a better chance at getting a Pap smear if they appreciate the importance of it and its meaning to them. Letting women know getting a screening is normal and those who do not are inappropriately behaving is essential. Addressing of perceived barriers to getting a Pap smear test such as fear and discomfort and time deficiency and promoting the benefits associated with the smear such as early detection and prevention were common influential factors in above studies. Providing incentives such as small gifts discounts or other forms of recognition to encourage individuals to get screened was useful. Assisting health practitioners to advocate Pap smear screening as part of a routine check was a national intervention used in many countries [41–44].

Strength and limitations

The present study is valuable as only a few articles have been published on social marketing interventions and their impact on the demand for Pap smear tests. As far as we searched, this is the first study on this topic in Iran. Despite the limitations of prospective studies in tracking, a three-month follow-up of the samples was conducted in this study. Additionally, to prevent sample loss, the details of all respondents were collected confidentially to enable their follow-up after the intervention. The first limitation is that the questionnaires were not validated and were developed based on similar previous studies worldwide. The next limitation is that there was no study in Iran with exactly the same topic for comparison.

Conclusion

The findings of the present study showed that the intervention based on social marketing increases awareness, perceived risk, and the demand for Pap smear tests among women. By influencing women's intention and behavior, they can be led to participate in screening. The simultaneous use of measures based on 4 marketing mixes (Product, Price, Place, and Promotion) leads to better and multi-faceted targeting of behavior and test's demand intention. There are some practical and policy advices: (1) The governments in association with health organizations should undertake well-focused public health campaigns to create awareness for cervical cancer, fund campaigns to promote Pap smears, and educate women on their risk factors. (2) Mobile units should conduct screening exercises regularly in partnership with community-based organizations and health providers. Offer incentives to motivate clients to use screening services, such as free screening or small gifts. (3) Access to free or affordable prices for a Pap smear for women should be vigorously pursued, the focus of many policies. (4) Provide training to doctors on how to discuss cervical cancer screening with women. Put in place a system for rewarding those providers who achieve the specified targets, either with some gift or monetary gain. (5) Pap smear screening should become a part of other preventive strategies such as vaccinations to gain maximum efficiency. Instituting an integrated service configuration within the health care system, which says Pap tests can be performed along with yearly examination or family planning. (6) There is need for a policy directive that supports the use of community Health Workers in implementing preventive strategies. (7) The issues of multicultural and multi-lingual urban settings should be given special air and consideration by healthcare providers. (8) Cervical cancer should be taught to students as part of an educational curriculum. (9) Create EHRs of flagged scheduled screening due dates: SMS, email, and phone alerts. (10) Anti-stigma messages should specifically target misconceptions and dread associated with Pap smear tests. 11) Implementation: Use illustrations, and feedback plus experiences from women who have undergone Pap smears. The process of Pap smear should not be outlawed.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12905-025-03642-1.

Supplementary Material 1

Supplementary Material 2

Supplementary Material 3

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Author contributions

Maleki collected the research data. Khosrovizadeh and Maleki helped in writing the paper. Alizadeh and Ahedinezhad analyzed the data.

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Data availability

All data generated or analyzed during this study are included in this published article [and its supplementary information files].

Declarations

Ethics approval and consent to participate

According to the instructions of Research Ethics Committee of Qazvin University of Medical Sciences, informed consent was obtained from all study participants and this research was carried out with the permission and certificate (IR.QUMS.REC.1402.002) of this Committee. This study is a master's thesis and conducted in compliance with the Helsinki Declaration. Also, this study is registered in IRCT (code: IRCT20221126056609N1 & Registration date: 2023-04-27) and adheres to CONSORT guidelines.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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