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Assessing the effectiveness of telephone-based educational intervention using the health belief model on preventing abortion attempts among married mothers

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Abstract:

BACKGROUND: Unsafe and illegal abortions continue to be a major contributor to maternal mortality globally. Education, particularly when applied as a primary prevention strategy, plays a vital role in reducing such risks. The health belief model (HBM) introduces behavioral science into public health and offers a framework for influencing health-related decisions. Considering the difficulties associated with in-person education for women considering abortion, a telephone-based educational approach was selected as a practical alternative. The present study aimed to investigate the effectiveness of educational intervention via telephone using the HBM in preventing abortion attempts in married women in Isfahan.

MATERIALS AND METHOD: This semi-experimental clinical trial involved 72 pregnant married women seeking abortion services at four randomly chosen comprehensive health centers. Two centers were assigned to the intervention group and two to the control group. Participants were selected using convenience sampling. Data collection involved two tools: a demographic questionnaire and a 34-item HBM-based questionnaire. The intervention group received three educational sessions of 20 min each via telephone. The control group received standard care. Questionnaires were completed before the intervention and again 1 week later to allow for timely guidance and prevention efforts.

RESULTS: Post-intervention results showed a significant improvement in the intervention group's mean scores for perceived susceptibility, severity, benefits, and self-efficacy ($P < 0.001$), alongside a notable reduction in perceived barriers. Although the difference in barriers between groups was not statistically significant, within-group change was meaningful.

CONCLUSION: These findings confirm that telephone-based education using the HBM can effectively discourage abortion attempts and promote informed reproductive decisions.

Keywords:

Health belief model, induced abortion, married, mothers, telephone education

Introduction

Unintended pregnancies and subsequent abortions remain an important and serious public health issue worldwide.^[1] Despite the tremendous efforts of the authorities and relevant institutions

regarding reproductive health, unintended or unwanted pregnancies and criminal abortions continue to occur in Iran.^[2] Illegal and unsafe abortion is a significant contributor to maternal mortality, leading to numerous complications, including infertility, genital tract infections, vaginal bleeding, and intra-abdominal injuries.^[3]

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From 2015 to 2019, there were approximately 121 million unwanted pregnancies globally each year, with 61% resulting in abortion.^[4] Recent research in Iran reported nearly 290,000 illegal abortions annually, with the most common age group being 15–24 years old.^[5] A study indicated that 11,500 married women in Tehran undergo abortions for unwanted pregnancies each year.^[4]

According to the World Health Organization, “Reproductive health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes.” Therefore, both men and women have the right to marry, found a family, and access healthcare services. Moreover, every woman has the right to safe and respectful maternal healthcare.^[6]

Preventive education is the most fundamental way of prevention.^[7] Most women take advice from family, friends, and others around when making decisions regarding illegal and voluntary abortion.^[8] The first step in creating a health education program is to choose a suitable model or framework. The health belief model (HBM) is one of the theories in the field of behavior change regarding health issues.^[9] The HBM mostly matters when it comes to disease prevention and postulates that health behavior is the result of core health beliefs.^[10] It consists of six cognitive constructs that influence behavior: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action. Each construct is explained as follows^[11–13]:

1. Perceived susceptibility: Does the individual perceive vulnerability and risk to the specific disease?
2. Perceived severity: Does the individual perceive the seriousness of the disease or condition?
3. Perceived benefits: What are the positive outcomes of adopting a new practice and behavior?
4. Perceived barriers: Inhibitory factors such as time limitation and cost that prevent individuals from adopting a new behavior.
5. Self-efficacy: An individual's belief in their capability to perform a specific behavior or task effectively.
6. Cues to action: Signals from the environment or within individuals that motivate health behavior. These cues can include encouragement from family, or reminders from healthcare providers.

In the present study, women who insisted on having their unwanted or unplanned child aborted needed to realize the risks of its complications. As a result of awareness, all they needed was a change in behavior. Providing pregnant mothers with a HBM might have changed their minds concerning abortion. Therefore, the HBM could result in the number of abortions, as the

willingness to change health behaviors primarily comes from health perceptions.

Reyhani *et al.*^[14] and Khakbazan *et al.*^[15] conducted research regarding the effectiveness of telephone-based educational intervention using the HBM; according to their research, telephone-based educational intervention is effective in learning, and it can be employed where research samples are not easy to access. Most mothers in the present study refused to meet with healthcare providers or researchers to explain their reasons for seeking an abortion due to the illegal prohibition against induced abortion. Thus, given the circumstances, the in-person educational approach was not an option, and telephone-based educational intervention was selected instead. Another privilege of this study is the country's population and childbirth policy in view of its current population policies. Therefore, the present study aimed to investigate the effectiveness of telephone-based educational intervention using a HBM to prevent abortion among mothers in Isfahan during the years 2022–2023.

Materials and Methods

Study design and setting

This semi-experimental clinical trial had a pre-test-post-test design and included two groups and was conducted in 2022–2023 with the aim of investigating the effectiveness of educational intervention via telephone using the HBM on preventing abortion attempts in married women in Isfahan.

Eight comprehensive health centers were suggested for sampling, namely Amir Hamzeh, Navaab Safavi, Shahid Awal, Imam Ali (AS), Ibn Sina, Shahid Fadaei, Khadijeh Kobra, and 14 Masoom, due to the large population of pregnant women covered and the possibility of high rates of unwanted and unplanned pregnancies.

Study participants and sampling

The study population included 72 pregnant women. The Inclusion criteria were as follows: participants had to be Iranian and willing to participate in the study. Additionally, they needed to fill out an informed consent form. Participants were required to be officially married, with a gestational age of <14 weeks, residing in Isfahan. Last but not least, the researchers had to ensure that participants were mentally healthy using the SIB system database, asking for staff opinions, or having regular conversations with them. It is worth noting that participants had the right to withdraw from the study at any time, either during or after receiving the education.

An educational program related to abortion was developed using the HBM. The researcher randomly

selected four out of eight comprehensive health centers for the study. To ensure a fair selection process, the names of all eight centers—Imam Ali, Amir Hamzeh, Ibn Sina, Shahid Fadaei, and four others—were written on slips of paper. The centers of Imam Ali, Amir Hamzeh, Ibn Sina, and Shahid Fadaei were chosen through a drawing. The Amir Hamzeh and Ibn Sina comprehensive health centers were assigned as the intervention group. In contrast, the other two centers, Imam Ali and Shahid Fadaei, were selected as the control group.

The researcher was unable to sample both the intervention and control groups simultaneously. Therefore, an interviewer was stationed at Imam Ali and Shahid Fadaei centers, with the researcher present on even days at Imam Ali and on odd days at Shahid Fadaei. After explaining the objectives of the study and introducing the interviewer, the researcher conducted a cluster random sampling by drawing lots for the Amir Hamzeh and Ibn Sina healthcare centers. This was done on even days at the Amir Hamzeh Center and odd days at the Ibn Sina Center. Individuals who met the criteria were then provided with telephone educational intervention. It is important to note that blinding was not possible due to the nature of the study.

Each participant was asked to complete a consent form, indicating their willingness to be part of the study, by telephone. We then designed a questionnaire, using the HBM constructs as our theoretical framework. To protect the participants' privacy, we prepared the questionnaire anonymously, assigning each participant a unique code. Additionally, we used a demographic characteristics questionnaire to collect further information.

Data collection tools and technique

The researcher-made questionnaire consisted of 34 items and five constructs, namely perceived susceptibility, perceived benefits, perceived barriers, self-efficacy, and perceived severity, measured on a 5-point Likert scale (strongly agree: 5 points, agree: 4 points, no opinion: 3 points, disagree: 2 points, agree: 1 point). Perceived susceptibility included six items, perceived severity seven items, perceived benefits nine items, perceived barriers seven items, and self-efficacy five items. It is important to note that items 23–29, related to perceived barriers to continuing pregnancy, were scored in reverse.

The face and content validity of the questionnaire were reviewed by 10 faculty members. The reliability of the instrument was calculated as 0.8 using the test-retest method.

The sample size was calculated to be 36 individuals for each group, including a 10% sample dropout through the following formula:

$$n = \frac{(z_1 + z_2)^2 (s^2)}{d^2}$$

The questionnaires were completed by telephone once before the intervention and again 1 week after the end of education sessions, given the urgency of rescheduling the second session as soon as possible to help prevent mothers from abortion.

Married women who had the intention of induced abortion were trained virtually by telephone, using the HBM to help them change their mind. Before the educational sessions, participants were asked about their intention to have an induced abortion through prepared questionnaires. Based on the devised content, three 20–30-minute telephone educational sessions on an alternate day during the week were planned for individuals in the intervention group.

However, if the intervention group requested more detailed information or if the researcher believed that additional explanations were necessary to better understand the material, the educational resources would be shared on the researcher's Eitaa soft ware (an Iranian messaging app). Moreover, any questions from the intervention group would be addressed individually.

The researcher shared information about the complications of abortion and reasons why mothers should keep their babies in their ITA. Additionally, they provided images and videos related to the risks of induced abortions. The participants were able to ask any questions regarding abortion. However, the control group was only provided with a pamphlet with the purpose of increasing mothers' awareness and knowledge about the complications of abortion.

The questionnaires were completed over the telephone, first before the intervention and again 1 week after the educational sessions ended. The items on the questionnaires were fully answered, as the researcher filled them out personally. Additionally, participants were motivated to complete the questionnaires by receiving gifts provided by comprehensive health service centers.

Ethical consideration

The study was conducted under the ethics code IR.MUI.NUREMA.REC.1401.108 and the clinical trial code IRCT20221129056664N1. After receiving approval, the researchers began the research process from January 1, 2023, to March 21, 2023.

Statistical analyzed

The data were analyzed using descriptive and analytical statistics and IBM SPSS version 22.0. The manufacturer of SPSS is IBM (International Business Machines

Corporation), a global technology and consulting company. The significance level of 0.05 was considered significant for all tests.

Results

Among 72 participants, 36 pregnant women in the control group were aged 19–50 years, with a mean age of 32.75 ± 7.64 years, while mothers in the intervention group were aged 20–50 years, with a mean age of 32.86 ± 7.57 years. Fathers in the control group were 20–65 years old, with a mean age of 36.22 ± 10.39 years, and in the intervention group, they were 22–54 years old, with a mean age of 36.81 ± 7.63 years. The mean age difference between fathers and mothers was 5.42 ± 4.29 years in the control group and 5.56 ± 3.46 years in the intervention group.

The mean gestational age was 7.69 ± 3.88 weeks in the intervention group and 7.78 ± 3.75 weeks in the control group. The mean duration of marriage was 9.97 ± 5.89 years in the intervention group and 6.92 ± 5.80 years in the control group. The education level

of both the intervention and control groups' parents was mostly diploma. Most mothers were also housewives in the intervention and control groups. Most families' economic status fell into the middle-class category. In the intervention group, the majority of mothers reported having one child, whereas families in the control group had no children. The lack of statistical significance of the aforementioned variables between the intervention and control groups indicates the correct random allocation of the research samples.

All HBM constructs, except for the barriers construct, showed a significant mean difference between the intervention and control groups ($P < 0.001$) as indicated by the results of the repeated-measures ANOVA [Table 1].

According to the results of the repeated-measures analysis of variance, all constructs of the HBM showed a significant mean difference within the intervention group ($P < 0.001$) [Table 2].

As the results of Bonferroni post-hoc test indicated, there was no significant difference between the mean scores of

Table 1: A Comparison of health belief model constructs between the intervention and control groups, before and after the intervention

Variable	Period	Control Group	Experiment Group	Repeated-measures ANOVA*		
		Mean±SD	Mean±SD	Group	Period	Interaction Effect
Perceived susceptibility	Before the test	17.69±3.170	16.31±3.624	<0.001	<0.001	<0.001
	One week after the test	22.50±3.212	16.17±3.895			
Perceived severity	Before the test	19.19±2.388	18.25±3.184	<0.001	<0.001	<0.001
	One week after the test	25.11±3.853	18.44±3.541			
Perceived benefits	Before the test	23.08±4.506	21.67±4.263	<0.001	<0.001	<0.001
	One week after the test	31.22±4.679	21.72±4.826			
Perceived barriers	Before the test	18.47±4.060	18.47±5.649	0.025	0.011	0.735
	One week after the test	17.61±4.789	18.42±5.659			
Self-efficacy	One week after the test	15.31±3.031	14.36±3.226	<0.001	<0.001	<0.001
	Before the test	19.28±2.548	14.53±3.385			

*Calculated by the analysis of variance with repeated measurement

Table 2: Group-wise comparison of health belief model constructs before and after the intervention

Construct	Group	Before Intervention (1)	Before Intervention (2)	Mean Difference (2 – 1)	Standard Error	*P
Mean perceived susceptibility	Intervention	17.69	22.50	4.806*	0.273	<0.001
	Control	16.31	16.17	–0.139	0.273	0.613
Mean perceived severity	Intervention	19.19	25.11	5.917*	0.351	<0.001
	Control	18.25	18.44	0.194	0.351	0.581
Mean perceived benefits	Intervention	23.08	31.22	8.139*	0.399	<0.001
	Control	21.67	21.72	0.056	0.399	0.890
Mean perceived barriers	Intervention	18.47	17.61	–0.861*	0.249	0.001
	Control	18.47	18.42	–0.056	0.249	0.824
Mean self-efficacy	Intervention	15.31	19.28	3.972*	0.252	<0.001
	Control	14.36	14.53	0.167	0.252	0.510

all constructs before the intervention. However, the mean scores of perceived susceptibility, severity, benefits, and self-efficacy were significantly higher in the intervention group compared to the control group ($P < 0.001$), although the perceived barriers showed no significant difference ($P = 0.517$) [Table 3].

After the intervention, the Chi-square test results indicated that mothers intending to have an abortion in the intervention group (41.7%) was significantly lower than in the control group (69.4%) ($P = 0.018$) [Table 4].

Discussion

The present study aimed to investigate the effectiveness of telephone education based on the HBM in preventing abortion attempts among married mothers. The results of the present study showed an increase in mothers' perceived susceptibility, that is, pregnant mothers are made aware of being at a high risk of developing health problems due to related abortion procedures, leading to a change in health behaviors and ultimately not having an abortion. In line with the results of the present study, Desoky *et al.*^[16] showed that education based on the HBM increases pregnant women's perceived susceptibility regarding gestational diabetes. Gemmill and Cowan, in their study "Low perceived susceptibility to pregnancy as a reason for unprotected intercourse among women with unplanned births," indicated that women with low perceived susceptibility have more unprotected sex; moreover, those who have low awareness of their risk of becoming pregnant often realize they are pregnant later than others. As a result, they also begin their maternal care later.^[17]

The results of the present study also showed that telephone educational intervention positively impacts individuals' perceived severity. In other words, intervention participants realized the severity and complications caused by an abortion. Shakerinejad *et al.*^[18] also reported that participants' perceived severity was significantly higher in the control group

after multimedia education based on the HBM in preventing COVID-19 in pregnant women. In the study conducted by Sheibani *et al.*^[19] "comparing the effect of group training and telemedicine on exercise during pregnancy," all constructs improved.

In addition, the results of the present study showed that telephone educational intervention using the HBM increased perceived benefits in pregnant women. Consistent with the findings of this study, Abab *et al.*^[20] indicated that education grounded in the HBM—specifically concerning perceived benefits and barriers—can influence the intention of vulnerable women to receive the human papillomavirus vaccine. In contrast to our findings, the study by Torshizi *et al.*^[21] showed no significant difference in the mean scores of perceived benefits regarding dietary calcium intake and walking in the intervention. This discrepancy may be due to the demographic differences between the study groups, as the characteristics of menopausal women differ from those of pregnant women. In addition, the sampling in the mentioned study was conducted non-randomly. Our study's findings confirmed that individuals' self-efficacy improved after the educational intervention using the HBM method, which aligns with the research conducted by Seyed-Rajabizadeh *et al.*^[22] Their study showed that an educational intervention based on the HBM was effective in promoting the preventive behavior of urinary tract infections among pregnant women. According to the study by El Sayed *et al.*,^[23] the educational intervention based on the HBM significantly increased pregnant women's self-efficacy in performing preventive behaviors against COVID-19. Self-efficacy refers to an individual's belief and confidence in their ability to successfully and effectively perform a specific behavior. It is an important and influential factor in most educational programs. The findings of the present study confirmed that participants' self-efficacy improved following an educational intervention based on the HBM method. Our study's findings showed that the telephone educational intervention, based on the HBM, had a significant impact on the intervention group. The

Table 3: Results of bonferroni post-hoc test in the intervention and control groups

Construct	Period	Control Group (1)	Intervention Group (2)	Mean Difference (2 – 1)	SD	*P
Mean score of perceived susceptibility	Before intervention	16.31	17.69	1.389	0.802	0.088
	After intervention	16.17	22.50	6.333*	0.841	<0.001
Mean score of perceived severity	Before intervention	18.25	19.19	0.944	0.663	0.159
	After intervention	18.44	25.11	6.667*	0.872	<0.001
Mean scores of perceived benefits	Before intervention	21.67	23.08	1.417	1.034	0.175
	After intervention	21.72	31.22	9.500*	1.120	<0.001
Mean scores of perceived barriers	Before intervention	18.47	18.47	0.000	1.159	1.000
	After intervention	18.42	17.61	-0.806	1.235	0.517
Mean score of self-efficacy	Before intervention	18.25	19.19	0.944	0.738	0.205
	After intervention	18.44	25.11	4.750*	0.706	<0.001

Table 4: Comparing frequency of abortion prevention among married mothers after the intervention between the intervention and control groups

The group intends to seek an abortion	Yes		No		P*
	Number	Percent	Number	Percent	
Control	25	69.4	11	30.6	0.018
Experiment	15	41.7	21	58.3	

*Calculated by the chi-square test

mean score of perceived barriers in this group decreased significantly after the intervention, suggesting a potential for positive change in health behavior. In contrast, the control group showed no significant change in the mean score of perceived barriers before and after the intervention.

Moreover, there was no significant difference in the mean scores of perceived barriers between participants in the intervention group and those in the control group after the intervention. Consistent with the findings of our study, Jadgal, Zarban, Faryabi, *et al.*^[24] reported that the mean score of perceived barriers to breast self-examination among women in the intervention group significantly decreased 2 months after the intervention. Similarly, Sadeghi *et al.* demonstrated that education based on the HBM significantly reduced the mean score of perceived barriers to preventive behaviors against influenza A among pregnant women.^[25] In the present study, although the mean score of perceived barriers in the intervention group decreased after the intervention compared to before, there was no significant difference between the intervention and control groups. This lack of difference may be due to various social determinants that serve as barriers, which can take time to overcome.

Limitation and recommendation

Family, social, or economic problems of the research participant, negative influence of those around them, or the influence of pregnant women from other peer groups were among the limitations of this study.

Conclusion

The findings of this study indicate the effectiveness of telephone educational intervention using the HBM in preventing abortion among married mothers with the intention of having an abortion. Therefore, this model could be employed in the design and implementation of educational interventions to promote maternal health and educate students and staff in abortion prevention. Moreover, considering the current youth policy, using the results of this study can effectively contribute to achieving this policy.

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Conflicts of interest

There are no conflicts of interest.

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