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Effectiveness of an educational intervention using theory of planned behavior on health care empowerment among married reproductive-age women: A randomized controlled trial

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Abstract:

BACKGROUND: Empowerment is an essential issue in women's lives. Powerful women can act successfully in health-related issues more than others. This study aimed to determine the effectiveness of an educational intervention designed based on theory of planned behavior (TPB) on health care empowerment among married women in reproductive age.

METHODS: This randomized controlled trial was carried out among 488 reproductive-age women between 2018 and 2019 in Tehran, Iran. Participants were recruited using randomized cluster sampling and divided into intervention ($n = 243$) and control ($n = 245$) groups by random allocation. Data were collected using a self-administered researcher-made questionnaire based on TPB and Health Care Empowerment Questionnaire. Validity (content validity index = 0.87; content validity ratio = 0.89) and reliability of the questionnaires were confirmed ($\alpha = 0.96$). Intervention was implemented within four sessions (lasting 60 min) using eight health related scenarios based on TPB constructs. Baseline and post intervention data (6 months after the intervention) were analyzed by SPSS₂₅ (Inc., Chicago, IL, USA) using independent t -test, Chi-squared test, Fisher's Exact test, Mann-Whitney, path analysis, and regression of generalized estimating equation model. $P < 0.05$ was considered statistically significant.

RESULTS: Results showed the mean \pm standard deviation age of the participants was 33.6 ± 7.1 . Six months after the intervention, a significant difference was highlighted in health care empowerment domains as well as behavioral intention, attitude toward behavior, subjective norms, and perceived behavioral control ($P < 0.001$) between intervention and control groups.

CONCLUSION: TPB-based educational intervention can significantly improve women's perception about health care empowerment. Tailoring and implementation of TPB-based intervention by health policy makers and health care providers is suggested to achieve better perception of empowerment toward receiving health care among women.

Keywords:

Health care empowerment, intervention, reproductive-age women, theory of planned behavior

Introduction

The World Health Organization (WHO) has emphasized on individuals, families, and communities empowerment

for improving health.^[1] According to the WHO, empowerment is a process through which people gain greater control over their decisions, lifestyles, and activities affecting

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their health.^[2] Empowerment can be considered as a health improvement process.^[3]

Nowadays, women’s health and well-being as half of society’s population are not only recognized as a human right, but also its impact on family and society health become increasingly important.^[4,5] Their mortality and disability might affect society health, that’s why they need significant attention.^[6] Thus, improving access to health care services can lead to reduce health problems among mothers and infants.^[7]

Promoting women’s capacity through raising awareness and program can lead to maintain and improve their own and family health. Moreover, women’s empowerment can improve their reproductive behaviors that, in turn, lead to better life management, independency in decision-making about important issues of life, and lifestyle improvement.^[7]

Studies revealed that the most effective educational programs are theory-based approaches.^[8] The first step to plan an educational program is the process of selecting health behavior theories/models. Using appropriate theory/model can play an important role in effectiveness of health educational programs.^[8] Theory of planned behavior (TPB) as a behavior change theory suggests that individual’s intention is a key factor in changing behavior.^[9] Behavioral intention is determined using three constructs including attitude (positive or negative assessment) toward the behavior, subjective norms (perception of significant others’ thoughts), and perceived behavioral control (perception of the amount of control on behavior implementation).^[10] TPB is a cognitive-social theory of expectancy value that states intention determines behavior.^[8] This theory has been predicted behavioral intention and behavior in many social and health behavior studies^[11] In Iran, a comprehensive study to assess the effect of an intervention on health care women’s empowerment using scenarios in the context of TPB has not been found. This study aimed to determine the effect of an educational intervention based on TPB on health care empowerment among reproductive-age women who referred to Southern health care centers affiliated to Tehran University of Medical Sciences (TUMS), Tehran, Iran.

Methods

This randomized controlled trial was conducted on 488 married reproductive-age women who referred to Southern health care centers affiliated to TUMS, Iran. The sample size was calculated based on the interaction variable in the study conducted by Tol *et al.*,^[12]

$$n = \frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2 \times 2 \times S^2}{d^2} \times Deff$$

$$(Deff = 2.1, d=5, \delta = \frac{10}{5}, \beta = 1 - \%95, \alpha = \%5)$$

Six health care centers were selected using cluster sampling and divided into two groups randomly and individuals in each center were randomly selected. To avoid data contamination, each center had only one study group. The inclusion criteria was married reproductive-age women (15–49 years), resident of the area covered by TUMS, being literate and being interested in participating in the study. Women who moved from the covered area were excluded. This study was approved by the Ethics Committee of TUMS (IR.TUMS.SPH.REC.1397.017, 2018-05-09) and registered in the Iranian Clinical Trial Registration database (IRCT20151208025431N6). Initially, 488 married reproductive-age women were enrolled in the study and answered the questions related to the demographic information, items on the TPB constructs, and Health Care Empowerment Questionnaire (HCEQ). Participants were randomly divided into intervention (243 individuals) and control (245 individuals) groups using random allocation. After the first phase of follow-up, 46 participants were excluded from the study, and in the last phase, 441 participants entered the final analysis on a blind side [Figure 1].

After introducing and explaining study purposes, participants filled the questionnaires. Data were collected using a self-administered, multi-dimensional questionnaire as demographic information and items on the TPB constructs, HCEQ. Demographic items included as age, job status, level of education, disease background, and frequency of using health center service.

The TPB questionnaire consisted of 44 items with three main constructs and six subconstructs that was evaluated by Likert-type scale (totally agree to totally disagree).

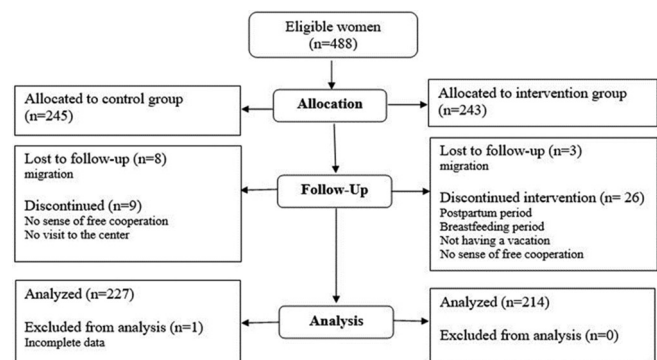


Figure 1: Consort diagram of the study

The constructs of TPB questionnaire were consisted of behavioral intention (5 items), attitude toward behavior (4 items direct and 4 items indirect), behavioral beliefs (4 items), outcome evaluation (4 items), subjective norm (5 items direct and 4 items indirect), and perceived behavioral control (4 items direct and 5 items indirect) and perceived power (5 items) which were evaluated both directly and indirectly. The direct final score of each structure was calculated as the average score. By multiplying two subconstructs of each structure, indirect evaluation of construct was obtained.

The TPB questionnaire's validity and reliability were measured. The content validity of the questionnaire was measured using content validity ratio (CVR) and content validity index (CVI) using 10 experts of health education and health promotion fields. The CVI = 0.87 and CVR = 0.89 were calculated. Reliability of TPB questionnaire was assessed through filling the questionnaire using 30 individuals who referred to health care centers. They were not included in the trial. Reliability was calculated using the Cronbach's alpha coefficient partially and totally. Results were as: behavioral intention 0.93, attitude toward behavior 0.6, behavioral belief 0.81, outcome evaluations 0.88, subjective norms 0.78, normative beliefs 0.87, motivation to comply 0.92, perceived behavioral control 84%, control belief 90%, perceived power 94%, and for total questionnaire reliability was 96%.

Health care empowerment was measured using the standard HCEQ developed by Gagnon *et al.*^[13] This questionnaire consisted of 10 questions in three domains: Decision-making power, interaction power, and control degree that measured final consequence. The Persian version of reliability and validity was measured and confirmed by Mohebbi *et al.*'s study (2018).^[14] The score of each question is calculated by multiplying the score of the two parts of the answer, the level of perception and the degree of importance. Minimum and maximum score of each question was 1 and 16, respectively. Total score of each domain was obtained by summing the scores of each domain's questions. The minimum and maximum score of each domain is as: decision-making power (3–48), interaction power (4–54), and degree of control (3–48). A more empowered individual gains more scores.

After baseline measurement, educational intervention was conducted as eight health scenarios in intervention group during four sessions (60 min), once a week for a month. Effective constructs in health care empowerment had been identified in our previous study;^[15] and results had shown that attitude and subjective norms were the best predictors of health care behavior intention ($P < 0.001$). Attitude toward behavior, subjective norms

was more powerful in predicting the behavior intention. Perceived behavioral control did not have a role in predicting health care behavior. Pamphlets and posters related to the scenarios were delivered to the participants to improve their perception of health care empowerment advantages and its influence on individual, social and family life. In each scenario, short stories and dialogues exchanged among participants and health problems of a real life (such as the attitude scenario in the framework of empowerment subjective obstacles, the subjective norms scenario with the subject of pregnancy, and perceived behavioral control related to the subject of vaccination) were discussed. It should be noted that all additional educational materials used in the scenario were confirmed in a piloted study.

Based on the result of our preliminary study to assess the strengths and weakness of empowering women using health care, the subject of two scenarios was selected.^[15] In the first session, two scenarios about improving women's attitude toward ability to have an appropriate relation with health experts and removing subjective obstacles of health care empowerment for receiving better services were discussed.

In the second session, scenarios of women's subjective norm changes and normative beliefs in health care empowerment about pregnancy and ways to prevent pregnancy were given to the participants. Effectiveness and ineffectiveness of individuals' subjective norms for receiving health care and the effect of individuals' normative beliefs on health were discussed.

In the third session, scenarios were discussed to increase women's perceived behavioral control. Scenarios were about vaccination and time management. Easy and difficult accesses to health care, knowing the effect of services on health improvement, the role of time management in health promotion were discussed.

In the fourth session, scenarios about increasing outcome evaluations in women about breast cancer screening and Pap smear test were presented. Individuals' behavioral consequence and its value for individuals (outcome evaluations) were discussed. Supplementary educational content such as animations and posters were used in line with the scenario's subjects in the intervention group.

During 6 months after intervention, the intervention group received purposeful messages through text messages and social media (Telegram groups) for following up instruction. In the second follow-up, 6 months after the educational intervention, all questionnaires were completed again by participants in two groups.

Baseline and post intervention data (6 months after the intervention) were analyzed by SPSS₂₅ (Inc., Chicago, IL, USA) using independent *t*-test, Chi-squared test, Fisher’s Exact test, Mann–Whitney, and regression of generalized estimating equation (GEE) model. *P* value less than was considered statistically significant.

Results

Results showed that mean ± standard deviation of age among participants was 33.6 ± 7.1. Demographic information is shown in Table 1. Among direct TPB constructs, the highest and the lowest scores belonged to subjective norms (83.12 ± 14.94) and perceived behavioral control (73.71 ± 18.10), respectively. There were no significant differences between behavioral intention and perceived behavioral control in the control group, before and after the intervention (*P* > 0.05) [Table 2].

Results of GEE model showed that the most and the least difference between the intervention and control groups belonged to perceived behavioral control (10.89) and subjective norms (6.05), respectively. There was a significant difference among all direct TPB constructs 6 months after the intervention.

The highest and lowest scores among indirect TPB constructs prior to the intervention were attitude toward behavior (68.13 ± 21.25) and perceived behavioral control (65.78 ± 20.69), respectively. Results of GEE model showed that the most difference between the intervention and control groups was for subjective norms (17.85)

and the least amount of difference was for perceived behavioral control (12.92). There was a significant difference among all direct TPB constructs 6 months after the intervention [Table 3]. Among subconstructs of TPB before intervention, the highest score belonged to outcome evaluations subconstructs (83.35 ± 11.16) and the lowest amount to subconstruct of perceived power (80.04 ± 13.87). GEE model results revealed that the most difference between the intervention and control groups was for normative belief (10.71) and the least difference was related to the perceived power (7.65). There was a significant difference among all TPB subconstructs 6 months after intervention [Table 4].

Among domains of health care empowerment before the intervention, the highest score was calculated for the interaction domain (48.8 ± 28.45) and the lowest one was for control domain (47.59 ± 29.86). After the intervention, decision-making obtained the highest score (71.8 ± 22.01). There were no significant differences between interaction, control, and decision-making in the control group before and after the intervention (*P* < 0.05). Results of GEE model test showed that between both groups, the most difference was in decision-making domain (24.15) and the least difference was in interaction domain (20.36). In the intervention and control groups, there was a significant difference among all domains of health care empowerment 6 months after the intervention [Table 5].

Discussion

This study was designed and implemented to determine the effect of an intervention on increasing health care empowerment in married reproductive-age women who referred to health centers affiliated to TUMS based on TPB. The intervention showed to be effective. For specifying study purpose about the amount of implemented educational programs effect, results showed positive effects of theory-based educational intervention on health care empowerment and made improvements in the sub constructs of TPB that is, behavioral intention, subjective norm, attitude toward behavior, perceived behavioral control, and subscales of health care empowerment; interaction, decision-making, and health care empowerment control during 6 months after the intervention in the intervention group.

After educational intervention and during 6 months after the intervention follow-up, mean of behavioral intention in health care empowerment for women were calculated. It is noted that making decision for doing a behavior improves the goal because improving intention increases the possibility of a behavior. These results were consistent with the results of Tsorbatzoudis study that showed intervention with TPB was effective in

Table 1: Baseline sociodemographic characteristics of participants in two groups

Variables	Options	Intervention, n (%)	Control, n (%)	<i>P</i>
Age (years)	18-27	44 (18.1)	58 (23.7)	0.087
	28-37	124 (51)	125 (51)	
	38-49	75 (30.9)	62 (25.3)	
Employment	Public employee	25 (10.3)	43 (17.6)	0.096
	Private employee	8 (3.3)	11 (4.5)	
	Household	205 (84.4)	185 (75.5)	
Level of education	Student	5 (2.1)	6 (2.4)	0.709
	Up to diploma	43 (17.7)	35 (14.3)	
	Diploma	104 (42.8)	114 (46.5)	
Spouse education level	Higher	96 (39.5)	96 (39.2)	0.705
	Illiterate	3 (1.2)	4 (1.6)	
	Up to diploma	55 (22.6)	52 (21.2)	
Spouse job	Diploma	99 (40.7)	110 (44.9)	0.512
	Higher	86 (35.4)	79 (32.2)	
	Public employee	87 (35.8)	78 (31.8)	
	Private employee	138 (56.8)	141 (57.6)	
Past medical history	Unemployed	6 (2.5)	11 (4.5)	0.732
	Retired	12 (4.9)	15 (6.1)	
	Yes	40 (16.5)	36 (14.7)	
	No	203 (83.5)	209 (85.3)	

Table 2: Mean and standard deviation of direct constructs of the theory of planned behavior

Variables	Group, mean±SD		Differences	ICC 95%		P
	Intervention	Control		Lower	Upper	
Behavioral intention						
T ₁ *	78.49±16.86	80.28±18.90	7.04	4.93	9.15	<0.001
T ₂ **	86.21±11.57	79.93±15.80				
Change	-7.14±10.59	0.48±13.86				
P-within	<0.001	0.599				
Attitude towards the behavior						
T ₁ *	81.50±13.86	85.22±14.07	8.18	5.65	10.71	<0.001
T ₂ **	88.05±11.14	81.27±12.24				
Change	-6.10±10.67	3.60±13.07				
P-within	<0.001	<0.001				
Subjective norm						
T ₁ *	83.12±14.94	86.71±13.33	6.05	3.75	8.36	<0.001
T ₂ **	89.36±10.42	84.71±10.95				
Change	-5.81±11.24	2±12.21				
P-within	<0.001	0.014				
Perceived behavioral control						
T ₁ *	73.71±18.10	78.69±17.70	10.89	7.55	14.23	<0.001
T ₂ **	86.21±11.49	77.61±15.29				
Change	-12.23±13.57	1.23±15.09				
P-within	<0.001	0.217				

*T₁=Test 1, **T₂=Test 2. SD=Standard deviation, ICC=Intraclass correlation coefficient

Table 3: Mean and standard deviation of indirect constructs of the theory of planned behavior after intervention

Variables	Group, mean±SD		Differences	ICC 95%		P
	Intervention	Control		Lower	Upper	
Attitude toward the behavior						
T ₁ *	68.13±21.25	75.55±20.36	14.23	11.02	17.44	<0.001
T ₂ **	80.36±16.34	69.84±17.50				
Change	-11.12±13.49	5.81±15.93				
P-within	<0.001	<0.001				
Subjective norm						
T ₁ *	66.38±20.72	71.73±23.15	17.85	13.13	22.56	<0.001
T ₂ **	80.06±16.65	64.98±20.95				
Change	-12.76±13.93	6.87±17.85				
P-within	<0.001	<0.001				
Perceived behavioral control						
T ₁ *	65.78±20.69	73.15±21.20	12.92	8.03	17.82	<0.001
T ₂ **	77.84±16.70	68.75±19.80				
Change	-10.87±13.47	4.43±16.42				
P-within	<0.001	<0.001				

*T₁=Test 1, **T₂=Test 2. SD=Standard deviation, ICC=Intraclass correlation coefficient

physical activities.^[16] Our study results were in line with Besharati *et al.* study.^[17] In their study, they showed that there was a significant difference between control and intervention groups in mothers' intention for vaginal birth before and after the education in the intervention group. Based on the TPB, when individuals have a positive attitude toward health care empowerment, they would have high intention to implement a behavior and when the intention is specified well, receiving health care would increase. Average of attitude toward health care empowerment increased after implementing educational intervention. A study in Iran (2013) showed

positive effect of education on having positive attitude toward continuous use of birth control pills that was consistent with our study's results.^[18] Another study by Petraszko in Canada about predicting multivitamin use showed that attitude has a significant relation with behavioral intention, individuals with positive attitude use more multivitamins.^[19] By studying the effect of intervention program based on TPB on improving exclusive breastfeeding, Bai *et al.* showed that after 6 months after childbirth, awareness, attitude, and breastfeeding increased, results agreed with the current study.^[20]

Table 4: Mean and standard deviation subscales of the theory of planned behavior after intervention

Subscales	Group, mean±SD		Differences	ICC 95%		P
	Intervention	Control		Lower	Upper	
Behavioral beliefs						
T ₁ *	80.11±15.44	84.03±15.18	8.43	7.28	9.59	<0.001
T ₂ **	88.25±10.44	81.58±13.14				
Change	-7.59±10.64	2.47±12.57				
P-within	<0.001	0.003				
Outcome evaluation						
T ₁ *	83.35±11.16	88.62±11.55	7.84	5.29	10.39	<0.001
T ₂ **	90.36±10.79	84.82±11.82				
Change	-6.04±10.42	3.88±11.47				
P-within	<0.001	<0.001				
Normative beliefs						
T ₁ *	81.27±14.33	84.79±14.44	10.71	8.35	13.07	<0.001
T ₂ **	89.74±10.55	80.64±14.52				
Change	-7.68±10.94	4.26±12.20				
P-within	<0.001	<0.001				
Motivation to comply						
T ₁ *	80.29±15.01	82.70±16.90	10.39	7.01	13.77	<0.001
T ₂ **	88.49±11.18	79.13±16.04				
Change	-7.68±11.31	3.66±15.24				
P-within	<0.001	<0.001				
Control beliefs						
T ₁ *	80.59±14.63	84.87±14.01	7.84	5.10	10.58	<0.001
T ₂ **	87.78±10.56	81.89±13.76				
Change	-6.63±10.93	2.81±11.86				
P-within	<0.001	<0.001				
Perceived power						
T ₁ *	80.04±13.87	84.53±13.55	7.65	4.33	10.97	<0.001
T ₂ **	87.85±10.96	82.36±13.67				
Change	-.84±10.18	2.23±11.10				
P-within	<0.001	0.003				

*T₁=Test 1, **T₂=Test 2. SD=Standard deviation, ICC=Intraclass correlation coefficient

Table 5: Mean and standard deviation subscales of health care empowerment

Subscales	Group, mean±SD		Differences	ICC 95%		P
	Intervention	Control		Lower	Upper	
Degree of control items						
T ₁ *	47.59±29.86	43.11±28.99	21.01	16.9	25.1	<0.001
T ₂ **	67.13±22.49	42.88±25.51				
Change	-18.67±18.93	0.19±22.62				
P-within	<0.001	0.990				
Involvement in interaction						
T ₁ *	48.80±28.45	47.90±27.41	20.36	17.20	23.51	<0.001
T ₂ **	68.82±21.22	46.90±22.93				
Change	-18.73±18.77	0.18±23.62				
P-within	<0.001	0.904				
Involvement in decisions						
T ₁ *	47.79±29.07	47.38±28.97	24.15	20.08	28.21	<0.001
T ₂ **	71.80±22.01	46.74±25.02				
Change	-22.64±22.77	0.50±26.24				
P-within	<0.001	0.770				

*T₁=Test 1, **T₂=Test 2. SD=Standard deviation, ICC=Intraclass correlation coefficient

By implementing educational scenarios among intervention group's women, it was determined that component of subjective norm had the least effect.

Based on Aghamolaei *et al.* (2017), subjective norm was the weakest predictor that was in line with the current study.^[21] Jalambadani *et al.* (2020) studied folate use for

preventing anemia based on TPB on pregnant women in Neyshabu; results showed that there was no significant difference in subjective norm between groups after intervention.^[22] Zhao *et al.* (2019) study showed that there was no significant difference in subjective norm between groups after intervention. This shows that this component has no effect or a weak effect.^[23] These results agreed with some studies such as Besharati *et al.*,^[17] Sharifirad *et al.* (2009),^[24] and Caron *et al.*^[25]

In health care empowerment, perceived behavioral control domain had the highest effect among others. Honari's study (2015) about evaluating the effect of TPB-based educational intervention on prenatal care of addicted pregnant women indicated increasing perceived behavioral control and getting power to overcome external and internal obstacles scores (i.e., high cost of sonogram, long distance to county health center, and giving birth) which were accordance to our study result.^[26] The power to overcome obstacles such as traveling cost to health centers, long distance to health center and inaccessibility to centers has been achieved. Tsorbatzoudis^[16] and Shakerinejad *et al.*^[18] studies also agreed with these results.

Planned health-related scenario based on perceived behavioral control construct and practicality of TPB in adopting health behaviors and problems which women may encounter in their real life, feeling power to overcome external and internal obstacles among women in the intervention group about receiving health cares which can be lead to increase individuals' control on obstacles can be main reasons of significant differences.

Attitude toward indirect behavior (multiplying behavioral beliefs and consequence assessment) showed the positive effect of instructional programs on improving individuals' skill in behavioral belief. After implementing educational intervention, mean score of attitude toward behavior in health care empowerment in studied women increased. In their study, Harghi *et al.*, revealed that pregnant women had more positive attitude toward cesarean section before delivery. However, after exposure and labor, they expressed less positive evaluation of cesarean section than delivery before labor, and this showed different behavioral beliefs as a result of exposure.^[27] The positive assessment of natural childbirth increases women's intention to have a normal childbirth.^[28,29] These results confirmed with the current study.

After implementing educational intervention, mean of indirect score of perceived behavioral control (multiplying normative beliefs and motivation for obedience) in health care empowerment increased among women. This component had the least effect among indirect

constructs. Hanson's study (2015) about direct and indirect perceived behavioral control and the role of behavioral intention in preventing pregnancy, showed there were significant and positive relation among direct and indirect components of perceived behavioral control and intention and perceived behavioral control.^[30]

After the intervention, results of health care empowerment, interaction, control, decision-making domains significant statistically increased among women in the intervention group. The highest and the lowest score of difference were related to decision-making and interaction domains, respectively. Health care empowerment is the final consequence of this study. Cheng *et al.* showed that intervention based on empowerment in patients with diabetes 2 increases empowerment and life quality and intervention, there was a significant difference between intervention and control groups about anxiety, life quality during 1 week and then 3 months after intervention.^[31] Mataji Amirrood *et al.* (2013) study showed that instruction has made a significant difference on obese women to correct their nutritional habits using family-based empowerment theory model after 2 months but changes were not significant in control group.^[32] These results agreed the current study results.

Some limitations of this study were using self-reporting questionnaire and not being able to generalize results to all population. This study has been done just on women and it cannot be a scale for all community members. Lack of intervention of all TPB constructs might be another study limitation.

Interventions of this study were designed and implemented based on scenario and a theory about women health issues. Assessing the effect of TPB intervention on health care empowerment among women using scenario was conducted among women for the first time in Iran. This study revealed the capability of integration among health care empowerment concept, constructs of TPB, and health-related scenarios toward achieving better perception of empowerment in receiving health care women.

Conclusion

In general, education is considered as a main pillar of health care. It is concluded that the use of instructional methods as scenario and short stories designed through behavior change theories and models to create health care behavior can be effective. Results of this study confirmed reliability and validity of this tool for measuring components of TPB about health care empowerment among studied population. Tailoring and implementation of TPB-based intervention by health

policy makers and health care providers is suggested to achieve better perception of empowerment toward receiving health care among women.

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Conflicts of interest

There are no conflicts of interest.

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