

Original Article

Effectiveness of Educational Intervention Based on Theory of Planned Behavior on Health Promoting Behaviors and Quality of Life among Infertile Women

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Abstract

Background and Aim: Infertility, as a cause of psychological stress, can lead to a crisis in patients. The present study aimed to investigate the effectiveness of the theory of planned behavior training on health-promoting behaviors and the quality of life of infertile women.

Materials and Methods: This was a semi-experimental study with pretest, post-test, and follow-up designs and a control group. The statistical population included 30 infertile women selected by convenience sampling and were randomly assigned to the experimental and control groups. The experimental group underwent 6 sessions of 90 minutes of the theory of planned behavior training. Health Promoting Lifestyle Profile and WHOQOL-BREF quality of life were used to collect data. The data were analyzed by repeated-measures ANOVA using SPSS-22.

Results: The results showed that the theory of planned behavior training significantly improves health-promoting behaviors ($P < 0.001$) and quality of life ($P < 0.0001$) in infertile women.

Conclusion: It can be concluded that the theory of planned behavior training can improve health-promoting behaviors and quality of life in infertile women by changing their attitudes and cognition.

Keywords: Theory of planned behavior, Health behaviors, Quality of life, Infertility

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Introduction

Infertility is defined as not being able to get pregnant after at least one year or longer of unprotected sex (1). Infertility is a serious health issue worldwide, affecting approximately 8%–10% of couples worldwide (2). The prevalence of infertility in Iran ranges from 10.3% to 24.9%. Infertility is a deeply personal issue affecting all areas of a couple's life (3). Causes of infertility can be genetic issues, anatomical problems, disease, and more (4). Also, Healthy behaviors and a person's lifestyle choices can cause infertility (5).

Lifestyle behaviors result from an individual's values, knowledge, and norms and affect body weight and overall health (5). Healthy lifestyle behaviors, including fruit and vegetable consumption, physical activity, and healthy weight, protect against many chronic conditions (6). Several studies have provided evidence of an association between lifestyle behaviors and infertility in men and women (7). These include but are not limited to nutrition, weight, and exercise; physical and psychological stress; environmental and occupational exposures; substance and drug use and abuse; medications, smoking, eating fat-rich diets, alcohol, and caffeine consumption (8). For example, it has been suggested that moderate exercise for over an hour and less than 5 hours per week increases fertility in all women (9). According to other studies, reproductive performance is influenced by foods and nutrition (10). Weight also is an essential factor. Weight loss among overweight and obese women has improved reproductive outcomes, including fertility (8). On the other hand, women with low body weight may have irregular menstrual cycles and ovulation disorders, showing a clear connection between weight and infertility (10). Psychological factors such as depression and anxiety also can affect fertility (11). Research has shown that women with a history of depression are twice as likely to experience infertility (11). Stress can also negatively affect by prolonging the time needed to achieve pregnancy (9).

On the other hand, studies have reported that couples with infertility are more prone to experiencing depression, anxiety, sexual intercourse problems,

marital problems, decreased self-confidence, and low levels of psychological well-being (4). Research shows that infertility and its treatment considerably affect an individual's quality of life (12). Therefore, infertile couples might experience psychological distress and suffer from impaired health-related quality of life (13). Quality of life is a broad multidimensional concept that usually includes subjective evaluations of life's positive and negative aspects (14). World Health Organization defines quality of life as an individual's perception of their position in life in the context of the culture and value systems in which they live and their goals, expectations, standards, and concerns (15). This is an important outcome measure for many populations, including infertile women (16). Quality of life provides healthcare professionals with a holistic view of the self-perceived health status of an individual that can be used to determine whether follow-up action is necessary (17). A study reported that the quality of life in women patients with infertility was significantly impaired (18).

The theory of planned behavior is one of the most influential theories in predicting healthy behavior (19). The theory of planned behavior links one's beliefs and behavior (20). It extends the theory of reasoned action by adding the concept of perceived behavioral control, defined as an individual's perception of the ease or difficulty of performing a particular behavior (21). The theory states that intention toward attitude, subject norms, and perceived behavioral control together shape an individual's behavioral intentions and behaviors (22). The theory of planned behavior uses a person's attitude and opinion in combination with their perceived control of the behavior and societies' subjective norms to influence their behavioral intention, which will lead to the behavior or action (23). Subjective norms result from social and environmental surroundings and a person's perceived control over the behavior (23). Generally, a positive attitude and positive subjective norms result in greater perceived control and increase the likelihood of intentions governing changes in behavior (20). The theory of planned behavior has been applied through an appropriate number of primary studies (22). Its predictive utility has been proved both for a wide range of behaviors and specific health-risk or health-

protective behaviors (24). Therefore, the theory of planned behavior has been used successfully to predict and explain a wide range of health behaviors, including exercise, smoking, drug use, and HIV prevention behaviors (22-24).

Infertility can cause a lot of stress by generating a lot of problems. Infertile people are exposed to severe psychological damage due to aggressive treatment, failure of many treatment strategies, and being criticized by community members, and reduction in their quality of life. On the other hand, having a healthy lifestyle with health-oriented behaviors plays an essential role in reducing the severity of infertility, which may be overlooked in infertile people. The theory of planned behavior is one intervention that seems to help increase health behaviors and quality of life in infertile people. For this reason, the present study investigates the effectiveness of the theory of planned behavior on health promotion behaviors and quality of life in infertile women.

Methods

This study was a pretest-posttest quasi-experimental and follow-up with a control group conducted on women referring to Najmieh Infertility Treatment Center in Kerman in 2019. To collect data, initially, permission was obtained from the Research Ethics Committee of Hormozgan University of Medical Sciences with the code IR.HUMS.REC.1399.101. By convenient sampling, 36 infertile women were selected and randomly assigned to experimental and control groups (18 people in each group). The first author implemented six sessions- 90 minutes of the theory of planned behavior for the experimental group from July to August 2019 in the Najmieh Infertility Treatment Center in Kerman. The follow-up phase was performed two months after the end of the sessions. Therefore, participants completed the Health Promoting Behaviors Questionnaire and the Quality-of-Life Questionnaire during the pretest, post-test, and follow-up stages.

The inclusion criteria were female gender, infertility, aged 20-40, education at least at the diploma level, not having adopted child, not having acute physical and mental illness and substance dependence,

consent to participate in the study, and duration of infertility for at least one year. Exclusion criteria were unwillingness to continue the participation and the occurrence of an event that makes it impossible to continue attending the meetings. Three people from each group were excluded from the study due to unwillingness to continue the collaboration. The ethical issues included in the informed consent of participants, ensured the confidentiality of participants and leaving the study at any stage when the treatment process deprived them of psychological comfort.

The data were analyzed by repeated-measures ANOVA (analysis of variance) in SPSS-22.

Materials

Health Promoting Lifestyle Profile (HPLP-II)

HPLP-II consists of 52 items that measure health-promoting behavior or habits. It contains six domains or factors, namely health responsibility (nine items), physical activity (eight items), nutrition (nine items), spiritual growth (nine items), interpersonal relations (nine items), and stress management (eight items). It uses a four-point response scale that indicates respondents' engagement frequency in each behavior. Items are scored as 1="never," 2="some time," 3="often," 4="routinely" (25). The total score of the HPLP II ranges from 52 to 208. The reliability and validity of this tool have been confirmed in different cultures and societies. The measurement has been used widely internationally and has good validity and reliability (25). Tanjani et al. (26) also evaluated the psychometrics of this instrument in Persian. Using content validity and construct validity, the instrument's validity was confirmed. Also, using re-test method ($r = 0.92$) and internal consistency (Cronbach's alpha coefficient $\alpha = 0.91$), its reliability was confirmed.

WHOQOL-BREF quality of life (WHOQOL-BREF)

The WHOQOL-BREF is a 26-item instrument consisting of four domains: physical health (7 items), psychological health (6 items), social relationships (3 items), and environmental health (8 items); it also contains QOL and general health items (27). Each item of the WHOQOL-BREF is scored from 1 to 5 on a response scale, which is stipulated as a five-point

Table 1: The structure of training protocol based on the theory of planned behavior.

session	Content
1	Expressing the overall purpose of the training sessions that is to focus on promoting self-care, quality of life and health in infertile women; Expressing the importance of improving the quality of life and health of infertile women; informing the participants about adverse physical and psychological effects of poor quality of life and health in infertile women.
2	Discussing the negative and positive beliefs and attitudes about infertility; identifying and challenging the negative beliefs about infertility; focusing on the effects of negative beliefs about infertility on reducing the quality of life and health in infertile women; trying to correct negative beliefs about infertility and reinforcing the positive beliefs about not having children.
3	Discussing the person's beliefs and opinions about factors that facilitate or problematize the fertility and identifying these beliefs; challenging the individual beliefs that emphasize on problematic factors for fertility; contrasting the beliefs based on facilitating factors and beliefs based on problematic factors for fertility; making efforts to strengthen the beliefs on factors that facilitate fertility and correcting the beliefs on problematic factors for fertility.
4	Lectures about one's beliefs about the perceived ease or difficulty in overcoming infertility; Challenging individual beliefs that emphasize the difficulty of overcoming infertility; Contrasting the beliefs about the difficulty of overcoming infertility and beliefs about the perceived ease of overcoming fertility; trying to strengthen the beliefs on the ease of overcoming infertility and correcting the beliefs about the difficulty of overcoming infertility.
5	Lectures about the beliefs and opinions of patient companions about infertility and trying to identify and challenging negative normative beliefs about infertility, emphasizing the effects of these negative normative beliefs on reducing quality of life and health in infertile women; Contrasting positive and negative normative beliefs about infertility and infertility, trying to correct negative normative beliefs about infertility, and reinforcing positive normative beliefs about infertility.
6	Lecture on the perceived risk in the individual about the effect of negative attitudes on reducing health and fertility; identifying and challenging beliefs about not feeling threatened by the negative attitudes on reducing health and fertility; identifying a person's beliefs and contrasting them with beliefs about perceived risk regarding the effect of these negative attitudes; Trying to correct a person's beliefs about not perceiving risk toward the effect of negative attitudes on reduced health and fertility.

ordinal scale. The scores are transformed linearly to a 0–100-scale. In the results of this scale developers, Cronbach's alpha coefficient is reported between 0.79 - 0.89 for the four subscales and the whole scale. Usefy et al. (28) determined the validity, the correlation of the total score of each dimension with the individual questions that make up that dimension was used. The range of correlation coefficients obtained was from 0.45 to 0.83, and all coefficients were significant at the level of 0.01. Each question had the highest correlation with its dimension.

Theory of Planned Behavior Training

The structure of the theory of planned behavior training sessions was from Ajzen (21), which included six 90-minute sessions. Table 1 presents the training protocol sessions based on the theory of planned behavior.

Results

The mean age of the subjects in the experimental group control group was 31.33 ± 6.84 and 34.40 ± 5.12 , respectively. The duration of infertility in the experimental and control groups was 6.48 and 5.12 years, respectively. The frequency of diploma, bachelors, and master's degrees was 33%, 54%, and 13% in the control group and 20%, 60%, and 20% in the experimental group. The mean and standard deviation of the scores of variables are presented in Table 2.

As shown in Table 2, the theory of planned behavior has increased the scores of health-promoting behaviors and quality of life, while in the control group, such a change is not visible.

In the following, using repeated measures ANOVA, the differences between the scores of health-promoting

Table 2: Descriptive indicators of health promotion behaviors and quality of life in infertile women patients.

variables	Level	Group	Mean	S.D
Health promotion behaviors	Pretest	Experiment	116.26	4.62
		Control	115.93	4.80
	Post-test	Experiment	128.40	4.93
		Control	121.34	5.69
	Follow-up	Experiment	128.93	5.56
		Control	117.92	3.65
Quality of life	Pretest	Experiment	73.53	4.18
		Control	74.53	3.22
	Post-test	Experiment	90/33	5.40
		Control	72/33	4.11
	Follow-up	Experiment	89.66	3.75
		Control	74.33	3.77

Table 3: Results of multivariate analysis of the effect of the theory of planned behavior on health-promoting behaviors and quality of life.

Variable	Source	Wilks Lambda	F	Group df	Error df	P	Eta
Health-promoting behaviors	Time	0.32	27.99	2	27	0.001	0.67
	Group * Time	0.60	8.82	2	27	0.001	0.39
Quality of life	Time	0.18	60.00	2	27	0.001	0.81
	Group * Time	0.16	69.72	2	27	0.001	0.83

behaviors and quality of life were compared according to the situation between the groups and within the groups. Kolmogorov-Smirnov Z indicated that the data were normal ($P > 0.05$). Levin's F test showed that the assumption of homogeneity of variance is established among the independent groups. Results of Mauchly's W showed that the error covariance matrix was homogeneous ($P < 0.05$). Therefore, Greenhouse -Geiser test was used. The results of multivariate tests are given in Table 3. This analysis first compared the linear composition of the score of health-promoting behaviors and quality of life among groups in terms of time and the

interactive effects of group and time separately.

As shown in Table 3, There is a significant difference between the scores of health-promoting behaviors and quality of life in the three times of pretest, post-test, and follow-up, and in the experimental and control groups.

As shown in Table 4, the effect of time on the variables of health-promoting behaviors ($F = 26.11$, $P = 0.0001$) and quality of life ($F = 35.53$, $P = 0.0001$) is significant. Also, there is a significant difference between pretest, post-test, and follow-up levels. Also, the interactive effect between the time and group and this effect is statistically significant for the health-

Table 4:Results of intragroup and intergroup effects of health promotion and quality of life.

Variable	Source	SS	Df	MS	F	P	Eta
Health-Promoting behaviors	Time	1326.86	1.98	670.13	26.11	0.0001	0.48
	Group ×Time	436.46	1.98	220.43	8.59	0.0001	0.23
	Error	257.28	48.85	5.26	-	-	-
	Groups	846.40	1	846.40	38.59		0.58
	Error	614.00	28	21.92	-	-	-
Quality of life	Time	1172.02	1.59	734/86	35.53	0.0001	0.55
	Group ×Time	1587.22	1.59	995/19	48.12	0.0001	0.63
	Error	923.42	44.65	20.67	-	-	-
	Groups	2613.61	1	2613.61	143.11		0.58
	Error	511.37	28	18.26	-	-	-

promoting behaviors ($F = 8.59$, $P = 0.001$) and quality of life ($F = 48.12$, $P = 0.0001$). Table 4 shows that there is a significant difference between the scores of health-promoting behaviors ($F = 38.59$, $P = 0.0001$) and quality of life ($F = 143.11$, $P = 0.0001$) between the experimental and control groups. The results of the Bonferroni post-hoc test showed that the difference between the scores in the post-test with the pretest is 8.76 and 7.30 for health promotion and quality-of-life, respectively, which is significant ($P = 0.001$). The difference between follow-up and pretest for health-promoting was 7.33 and for quality of life was 7.96, which was significant ($P = 0.001$). The difference between the health-promoting behaviors quality of life scores at follow-up was not statistically confirmed ($P > 0.05$).

Discussion

The present study aimed to investigate the effectiveness of the theory of planned behavior training on health-promoting behaviors and the quality of life of infertile women. The results showed that the theory of planned behavior training was effective in health-promoting behaviors and quality of life in infertile women. This was consistent with the results of previous studies on the effect of

planned behavior on creating behavioral intent for pregnancy or changing and modifying unhealthy behavioral patterns such as overeating and smoking, as well as adherence to the treatment regimen in chronic patients (19-23). Rich et al. (19), in their meta-analysis study of the theory of planned behavior training on patients with chronic diseases, showed that this intervention can increase behavioral intent in adhering to treatment by improving these patients' attitudes toward the illness and medication as perceived control. Ajzen (21) showed that planned behavior-based training theory could effectively make rational decisions about food consumption patterns by improving people's attitudes. Karimy et al. (23) showed that the principles used in the theory of planned behavior significantly affect the behavioral intention of adolescent smokers to quit smoking.

To explain the findings, the health-promoting behavioral changes may be influenced by various factors such as personal awareness and attitudes. In other words, people's attention and attitudes have the primary role in improving health behaviors (21). In the theory of planned behavior, the main driver for behavior is the intention to perform the behavior. The first factor that affects people's intention to perform or not perform a behavior is attitude (19). A positive attitude toward a particular behavior is created by

positive feelings about that behavior (20). People are more inclined toward a behavior when they have positive feelings about it or rate it positively (22). Also, perceived behavioral control is an individual's perception of function control that is very close to self-efficacy theory. Perceived behavioral control are the individual's understanding of her internal and external limitations, the ease or difficulty of performing a behavior, and her understanding of the skills, resources, and opportunities needed to perform that behavior (23). It is accepted that self-efficacy and perceived behavioral control structures would strengthen intention and maintain behavior because individuals will attempt more to perform appropriate and controllable behaviors. The self-efficacy of health-oriented behaviors is a person's perceived ability to choose and perform healthy behavioral patterns such as following a healthy diet or having a physical activity (20). Karimy et al. (20), in a study, showed that in patients with myocardial infarction, the application of the theory of planned behavior-based intervention could help them to improve their unhealthy and harmful lifestyle for heart health and engage in healthy activities such as daily exercise, quitting smoking and eating a healthy diet and do this through improving their beliefs self-efficacy for changing unhealthy behavioral patterns. People with high self-efficacy remove barriers by improving their self-management and perseverance skills and have more resilience and control over problems (24). Therefore, understanding self-efficacy can help maintain health-promoting behaviors (22). On the other hand, in different people and especially infertile people whose infertility can be explained mainly by lifestyle and behavioral patterns and some factors like mobility, weight, diet, mental health, and stress have a significant impact on their fertility chances, changing and improving behavioral patterns from unhealthy to healthy can be helpful for them in various ways such as improving physical and mental condition, experiencing positive emotions and reducing stress, increasing adherence to treatment regimens and improving therapeutic response to increasing their fertility chances and ultimately improving their quality of life psychologically and physically (5). In the intervention phase of the present study, the beliefs of infertile women about

the perceived ease or difficulty in overcoming infertility were discussed. Also, these beliefs and challenges with these ideas and beliefs and the effects of these negative beliefs on reducing the quality of life and health were identified and discussed (24).

On the other hand, in different people, especially infertile people, whose infertility can be explained mainly by lifestyle and behavioral patterns, correcting behavioral patterns from unhealthy to healthy can improve their physical and mental condition, reduce stress, and follow Treatment regimens to increase their chances of fertility and ultimately improve their quality of life (23). During the intervention program, infertile women's beliefs about the perceived ease or difficulty in overcoming infertility and the effects of these beliefs on quality of life and health were identified. On the other hand, emphasis was placed on identifying ideas that are perceived as easy to overcome infertility and the role of these beliefs in increasing the quality of life and health, which can effectively correct infertile women's infertile beliefs about infertility, thus their quality of life (22).

Conclusion

The results of this study showed that education based on the theory of planned behavior was effective in health-promoting behavior and quality of life of infertile women. Therefore, in the health field of infertile people, this intervention can improve their health-promoting behaviors and quality of life. Limitations accompanied the present study. Firstly, our data are based on the subjects' self-reports, which can be biased in presenting the data. Also, the limitation of the study sample to infertile women in Kerman makes it impossible to generalize the results.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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