



# Design and Standardization of Infertile Women Self-care Tools

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## Abstract

**Background and aims:** Infertility is considered as a disease of the reproductive system meaning by the failure to reach a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse. This study aimed to design and standardize a self-care tool in infertile women.

**Methods:** For the purpose of the study, we performed a cross-sectional pilot study on 233 infertile women referred to Najmieh Infertility Treatment Center in Kerman city in 2020 whose selection were randomly. Considering the available theoretical foundations and theories as well as available questionnaires associated with the self-care, a self-administered questionnaire with 42 items was constructed. In the following, the psychometric properties of the questionnaire were assessed using the face validity, content validity, structural validity as well as internal consistency. After determining the face validity and content validity quantitatively and qualitatively, the number of items was reduced to 36 items. Pearson correlation coefficient between self-care factors had a significant correlation at the level of 0.01, which indicates the convergent validity of this tool.

**Results:** As a result of explanatory factor analysis, a questionnaire with 28 questions remained, representing 5 factors which altogether accounted for 60.17% of the total variance of the test. The Cronbach's alpha coefficient of 0.764 confirmed the internal consistency of the questionnaire. Pearson correlation coefficients between self-care factors had a significant correlation at the level of 0.01, which indicates the convergent validity of this tool.

**Conclusion:** This study showed that the questionnaire entitled with "Self-care questionnaire for women with infertility" consisted of 28 items has good reliability and validity. Furthermore, this questionnaire is useful for assessing the self-care abilities of women with infertility and therefore, it can be used by health care providers working in the healthcare field.

**Keywords:** Design, Standardization, Questionnaire, Self-care, Infertility

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## Introduction

Based on the latest international glossary on infertility and fertility care, infertility is defined as a disease characterized by the failure to establish a clinical pregnancy after 12 months of regular, unprotected sexual intercourse or due to an impairment of a person's capacity to reproduce, either as an individual or with his/her partner (1). Really, female infertility is the most common form around the globe, often due to reproductive tract infections. Formal definitions are, however, very important for appropriate management of reproductive disorders. Worldwide more than 186 million people suffer from infertility, the majority being residents of developing countries (2). Infertility as a biological defect is associated with several negative psychological consequences including sadness, depression, anger, confusion, despair, hurt, embarrassment as well as humiliation (3). Generally, studies have shown that psychological indicators can both contribute to infertility as well as can appear as one of its major consequences (4,5). In Iran, it seems that approximately 21%-22% of female experience infertility

during their married life (6). Dealing with infertility is an emotionally and physically challenging process. As one focuses on getting pregnant and building her family, she also needs to focus on taking care of herself. Self-care is a conscious, learned and purposeful action taken by an individual to maintain and promote their health (7). The methods used by people to meet their care needs are not inherent, but rather an acquired behavior and one acquires them from the family, the community and the culture of the community and depends on the habits and beliefs of the community to which they belong (8). Therefore, self-care as a strategy to adapt to stressful life events and situations, promotes the personal health and independence (9).

The theory of self-care emphasizes activities performed or initiated by each individual to sustain life, health, and well-being. Orem's self-care model is one of the most complete models of self-care; it recommends the offering of clinical guidance for planning and administering self-care among patients (10). Orem (11) introduced self-care as abilities available to adults for working and activity and

stated that it is a process of self-regulation acquired in humans in order to help them focus on their inner abilities in caring behaviors relying on themselves. Vickery and Iverson (12) distinguished between the medical and health self-care and those aimed at maintaining and improving the health. They believed that whether for medical self-care or for health self-care, the individual is the most important decision maker in the self-care; since this the person who values the benefits or losses of the desired work. Barofsky (13) divided self-care into four categories: body functions regulation, disease prevention, symptoms alleviation and disease alleviation.

Segall and Goldstein (14) included the four functions defined by Barofsky for the four types of self-care including regulatory self-care (eating, bathing, sleeping); preventive self-care (exercise, diet, brushing one's teeth); reactive self-care (responding to symptoms without physician intervention); and, restorative self-care (includes behavior change and compliance with a professionally prescribed treatment). A number of tools are available for assessing self-care in various groups. According to reviews by the authors, A self-care questionnaire for infertile people has not yet been designed. However, such assessment tools are available for some other groups, such as the elderly or diabetics. For example, elderly self-care ability tool developed by Söderhamn and Cliffordson examined the perceived self-care ability in the elderly (15). Söderhamn and Cliffordson (15) developed the self-care ability scale for the elderly composed of 17 questions. Cook-Cottone and Guyker (16) developed an 84-item mental-clinical self-care scale to assess the frequency of reported self-care behaviors. On self-care assessment in diabetic patients, Schmitt et al (17) developed a scale that assesses the structure of self-care behaviors in the form of questions that allow subjects to report the quality of their diabetes-related self-care activities over the past 7 days. Having healthy diet, injecting insulin or taking the right medications, blood sugar testing, exercising, foot care, and smoking behaviors were included in it. Younesi Boroujeni et al (18) also designed a 29-item questionnaire to assess the self-care of the elderly with four factors. The dimensions included spiritual psychological self-care, social self-care, physical self-care and self-care during illness. Hemmati Maslak Pak and Hashemlo (19) designed a questionnaire to assess the self-care ability of the elderly based on Orem theory with 40 expressions and standardized it in the Iranian elderly. Saakvitne and Pearlman (20) developed self-care assessment worksheet in six dimensions of physical, mental, spiritual, emotional, balance and professional work environment. In the present study, in order to design a self-care questionnaire for infertile women and predict its dimensions and components, Orem theory, Hemmati and Hashemloo's elderly self-care questionnaire (19), Boroujeni et al's elderly self-care questionnaire (18), Saakvitne and Pearlman's (20) self-care assessment worksheet and to some extent the Cook-Cottone and Guyker's (16) mental-clinical

self-care scale were reviewed.

Given the importance of self-care in infertile women and the lack of evaluation tools and questionnaires in this field as well as the need to consider the category of cultural values in designing the questionnaire, the present study aimed to design a self-care questionnaire for infertile women as well as standardize it in order to create a tool for measuring the self-care in infertile women.

### *Significance of the study*

The phenomenon of infertility, as influenced by physiological factors and is involved in in the realm of medical sciences, has also a psycho-social aspect that should be considered in terms of behavioral and social sciences. For women, Infertility is a bad experience, especially; since motherhood is accepted as an essential role for women and most treatments are performed on women. In addition, Infertility can also increase the sexual dysfunction and incompatibility, especially in infertile women, and reduce the sexual satisfaction and sexual activity. Infertility stress, in turn, has a negative effect on the infertile person's general health and quality of life. In addition to being affected by physiological factors, psychological factors also play a vital role in exacerbating or improving the response to treatment and if an infertile person can overcome the stress of infertility by using effective strategies and by using a comprehensive and useful self-care model, improve the health and quality of life, she will remove psychological and emotional barriers in the reproductive process and thus facilitate this process and increase therapeutic responses. Accordingly, and given that infertile women are exposed to multiple psychological problems that must be addressed; self-care tools need to be designed to help them with this important issue.

### **Methods**

The present study is a methodological study conducted to design and evaluate the psychometric properties of self-care questionnaire in women with infertility. The population included 233 infertile women referred to Najmieh Infertility Treatment Center in Kerman in 2020. Our sampling method was purposive. Our inclusion criteria for subjects were Infertility, age between 20-40 years, literacy and willingness to participate in the study.

After studying the available theoretical foundations and theories as well as examining the last made self-care questionnaires, the main factors associated with self-care in the field of infertile women were extracted. Therefore, considering all the factors presented as self-care, a questionnaire with 42 questions was prepared. For the reliability and validity of self-care questionnaire in women with infertility to check the face validity of the questionnaire, a number of infertile women and psychologists were interviewed about the simplicity and comprehensibility of the questions and their opinions were taken into account in revising the questions. Content

validity was assessed qualitatively and quantitatively. In the qualitative assessment, 13 experts were requested to present their corrective views in detail and in written form and after carefully studying the tool. Their view points were taken into account in the construction and normalization of the questionnaire. Thirteen experts were also asked to examine each item based on a three-part spectrum (necessary, useful but not necessary, not necessary).

Applying 2 indices, content validity index (CVI) and content validity ratio (CVR), content validity was assessed quantitatively for two reasons. First, to ensure that the most important and correct content is selected; Second, the measures are best designed for the content. Furthermore, exploratory factor analysis was used to assess construct validity. The Kaiser-Meyer-Olkin (KMO) index of sampling adequacy varies between zero and one and the higher it is, the better the factor analysis. It is north worthy that this index should be at least 0.70 and preferably higher, and the value above 0.90 is considered excellent and the value above 0.80 is considered good. In addition, the Scree plot and eigenvalue (characteristic value) were used to determine the number of constituents of our questionnaire. Also, the varimax rotation which is an orthogonal rotation, was used to simplify and interpret the factor structures questionnaire. After extracting the factors, they were named based on the expressions of each factor. In factor analysis, the factor loadings greater than 0.4 were used. to determine the reliability of the questionnaire, the internal consistency was calculated by Cronbach's alpha coefficients. The questionnaire was scored using the Likert 5-point scale awarding 5 to 1 points for answers. In order to prevent bias, the questions including the questions 5, 9, 12, 27, 28, 18, 20, 23 were reversed and their scoring was done in reverse.

**Reliability and Validity**

For validity of self-care questionnaire in women with infertility, a number of infertile women and psychologists were interviewed about the simplicity and comprehensibility of the questions and their opinions were taken into account in revising the questions. Content validity was assessed qualitatively and quantitatively. For the reliability of the questionnaire, the internal consistency was calculated by Cronbach's alpha coefficients. the Cronbach's alpha coefficient for the total score of the questionnaire was 0.774. in addition, to evaluate the convergent validity, the correlation coefficients between the factors were calculated.

**Results**

The results of the content validity showed that the CVI was 0.89 and the CVR was 0.82. Six questions in the evaluation of content validity index and content validity ratio did not meet the required criteria and were omitted. Therefore, from 42 questions in the initial questionnaire, 36 questions had the necessary criteria to perform the

validity of the structure. The construct validity of our questionnaire was assessed performing explanatory factor analysis and using the principal components method on 36 items.

The KMO index was 0.804. Also, considering that the significance of Bartlett sphericity is less than 0.05; Therefore, it can be said that the factor analysis was correct and the components of the questionnaire were more than one factor (Table 1).

In order to identify and determine the factors, the explanatory factor analysis through principal axis factoring using SPSS-21 software was performed and in order to determine the number of factors, Scree plot and eigenvalue method (Kaiser criterion) were performed. The values are presented in Table 2.

According to the results mentioned in the second column of Table 2, considering the Kaiser criterion, the eigenvalues for the five factors were greater than 1 and when this value is higher than greater than 1, it can be considered as a major factor.

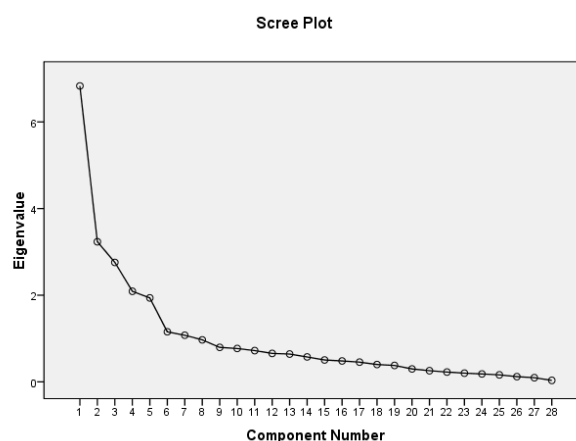
Given the results presented in Table 2, The five factors mentioned in the questionnaire explain about 60.175% of the variance of self-care questionnaire in women with infertility and each factor explains a significant amount of total variance (the first factor about 24.395%, the second factor about 11.548%, the third factor about 9.846%, the fourth factor about 7.466% and the fifth factor about

**Table 1.** KMO and Bartlett test results

KMO	Bartlett	P value
0.804	330.600	0.0001

**Table 2.** Eigenvalue and variance accounted for the components of infertile women self-care questionnaire

Factor	Eigenvalue	Percentage of variance explained	Compression Percentage of variance explained
First	12.000	24.395	24.395
Second	8.735	11.548	35.943
Third	6.786	9.846	45.789
Fourth	5.478	7.466	53.256
Fifth	1.429	6.919	60.175



**Figure 1.** Scree plot.

6.919). Another way for determining the number of factors is scree plot. Figure 1 shows the five factors identified. The main factors that calculate the highest variance are located in the sloping part and the secondary factors that calculate the lowest variance are located in the shallow part.

The minimum significant factor load was 0.4. therefore, given this value, 8 questions were removed due to their low factor load and a total of 28 questions were analyzed. Each question had more factor load on one of the extraction factors and less load on other factors. The first factor, consisted of 8 questions associated with physical activity, adherence to a proper diet, regular visits to the doctor and following the treatment plan, was named as physical self-care. The second factor, consisted of 5 questions associated with worship and prayer, searching for meaning and purpose in life and reviewing positive experiences in life, was named spiritual self-care. The third factor, consisted of 5 questions associated with tendency to establish and strengthen friendly relations and social participation, was called social self-care. The fourth factor, consisted of 6 questions associated with avoiding stressful situations, being aware of emotions and expressing them properly, using various methods such as relaxation and referring to a counselor to promote mental health, was called mental self-care. The fifth factor, consisted of 4 questions associated with tendency to have fun and enjoy life, was called recreational self-care.

To determine the reliability of the questionnaire, the internal consistency was calculated by Cronbach's alpha coefficients and the results show that this coefficient was 0.936 for the first factor named physical self-care and was 0.771 for the second factor named spiritual self-care and was 0.798 for the third factor named social self-care and was 0.684 for the fourth factor named mental self-care and was 0.789 for the fifth factor named recreational self-care. the Cronbach's alpha coefficient for the total score of the questionnaire was 0.774 (Table 3).

Furthermore, Pearson correlation coefficient was used to examine the correlation coefficients between self-care

**Table 3.** Determination of internal consistency of Cronbach's alpha coefficients of self-care questionnaire in infertile women

Subscales	Cronbach's alpha coefficients
The first factor: physical self-care	0.936
The second factor: spiritual self-care	0.771
The third factor: social self-care	0.798
The fourth factor: mental self-care	0.684
The fifth factor: recreational self-care	0.789
Total score	0.774

**Table 4.** Pearson correlation coefficients between factors

	Physical self-care	Spiritual self-care	Social self-care	Psychological self-care	Recreational self-care
The first factor: physical self-care	1				1
The second factor: spiritual self-care	0.68**	1			
The Third factor: social self-care	0.44**	0.41**	1		
The fourth: Psychological self-care	0.59**	0.67**	0.55**	1	
The fifth factor: recreational self-care	0.65**	0.49**	0.43**	0.58**	1

factors of the questionnaire presented in Table 4. As can be seen, the factors identified in the self-care questionnaire have a significant correlation at the level of 0.01.

**Discussion**

Infertility is a common problem affecting one couple in six. It can be defined as the incapacity to fulfill pregnancy after reasonable time of sexual intercourse with no contraceptive measures taken. The evidence for changes in the prevalence of infertility is difficult to establish. Studies have shown that infertility can have many psychological consequences; the fact that a person naturally and like other people cannot follow the process of reproduction and have a child, is one of the bitter experiences of life that the physical, psychological and social context and conditions can add to its importance and make it a psychological crisis it for the person (5). Infertile couples who consider themselves the cause of infertility, regularly blame themselves, and this condition raises the stress and thus exacerbates the problem (21). In addition, the stresses induced by infertility have destructive effects on health and this negative effect is more in women than men (22). In such conditions, psychological self-care can effectively deal with the stressful situation, especially the complications and negative consequences of infertility (23). In fact, self-care is a set of voluntary and acquired health behaviors as well as having a right suitable lifestyle that helps the individual to seek effective treatments. Self-care behavior consists of the individual's immediate and continuing behavioral reactions to illness, the basic coping strategies and steps taken to preserve and maintain personal health. Such behavior encompasses preventive health care and behavioral and other health interventions, including basic daily health maintenance behavior and interaction with social support networks and the health care system (24). Different theories about self-care have been presented. According to social learning theory, cognitive processes change the behavior, and on the other hand, these processes themselves are created or changed by successful experiences. Bandura (25) introduced self-efficacy as an important cognitive factor in behavior change and considered human agency and control as its main components. He believes that they are concepts by which one trusts his/her ability to organize and arrange the necessary steps to achieve the goal. Social cognitive theory considers a person's self-efficacy as an important determinant of his/her behavior. Beliefs in self-efficacy pushes the person in a direction to set big goals while the opposite limits his/her goals. Therefore, one's belief in his/her own ability to act as well as make an impact is

considered as an important factor in motivating a person for health-oriented actions. The level and power of perceived self-efficacy is associated with the possibility of adopting or changing certain health behaviors. Social learning theory implies that positive experiences, using the experience of others and social motivation are among sources of self-efficacy and each can raise the level of perceived ability for changing the behavior. Therefore, successful experience is associated with increased self-efficacy as well as expected successful performance. In addition, it increases the likelihood of developing healthy behaviors and correcting unhealthy behavioral patterns. Transtheoretical Model (TTM) developed by Prochaska and Velicer (26) in the late 1970s is a widely used model for planning and creating health behaviors as well as changing non-efficient behaviors. This model is an integrative, biopsychosocial model to conceptualize the process of intentional behavior change. Whereas other models of behavior change focus exclusively on certain dimensions of change (e.g. theories focusing mainly on social or biological influences), this model seeks to include and integrate key constructs from other theories into a comprehensive theory of change that can be applied to a variety of behaviors, populations, and settings. Hence, the name Transtheoretical. TTM recognizes change as a process that unfolds over time, involving progress through a series of stages. While progression through the Stages of Change can occur in a linear fashion, a nonlinear progression is common. Often, individuals recycle through the stages or regress to earlier stages from later ones. Söderhamn and Cliffordson (15) developed the self-care ability scale for the elderly composed of 17 questions. This scale focuses only assesses the ability and potential of self-care of the elderly in the dimensions of physical and mental self-care, including daily life activities, dressing, feeling well, feeling lonely and willpower. Cook-Cottone and Guyker (16) developed an 84-item mental-clinical self-care scale to assess the frequency of reported self-care behaviors. It comprised of 10 components including nutrition, exercise, relaxation strategies, self-awareness/mindfulness, rest, relationships, physical activity, environmental factors, self-sufficiency and mood. Younesi Boroujeni et al (18) also designed a 29-item questionnaire to assess the self-care of the elderly with four factors. The dimensions included spiritual psychological self-care, social self-care, physical self-care and self-care during illness. Hemmati Maslak Pak and Hashemlo (19) designed a questionnaire to assess the self-care ability of the elderly based on Orem theory with 40 expressions and standardized it in the Iranian elderly. It comprised of 5 components including physical self-care, daily self-care, emotional self-care, social self-care and self-care at the time of illness. The present study is the first study dealing with the design and standardization of self-care questionnaire in infertile women and no questionnaire in this case has been available and this is while there has been such an assessment tool for some other groups including

the elderly or diabetics. In this study, we designed and standardized a self-care tool for infertile women. This tool included five components of physical self-care, mental self-care, social self-care, spiritual self-care and recreational self-care. Comparing the components with other scales, Cook- Cotton's mental-clinical self-care scale can be mentioned. The mentioned scale dealt with 10 self-care components including nutrition, exercise, relaxation strategies, self-awareness/mindfulness, rest, relationships, physical and medical practices, environmental factors, self-sufficiency and mood. Although this scale included more dimensions than ours, our tool includes most of its components. For example, in the physical care dimension, our scale included all aspects of exercise, nutrition, rest, and physical and medical functions. Also, compared with Söderhamn and Cliffordson's (15) elderly self-care ability questionnaire dealing with two dimensions of physical and mental self-care, infertile women self-care tool in addition to the components of physical and mental self-care, also included dimensions of spiritual, social and recreational self-care. Also, the psychological dimension of self-care in infertile women self-care questionnaire can include some of the psychological and emotional dimensions in the mentioned questionnaire. Considering the scale designed by Toobert and Glasgow (27) which examined self-care behaviors in people with diabetes, primarily assesses the self-care dimension in terms of behavior and effective self-care measures, including having a healthy diet, insulin injection or proper pill intake, blood sugar testing, exercises, foot care and smoking behaviors, it can be similar to the physical self-care dimension in the infertility women self-care questionnaire. The infertile women self-care questionnaire is similar to the mentioned tool with physical and spiritual self-care dimensions. Reviewing the self-care assessment worksheet designed by Saakvitne and Pearlman (20) which examines self-care measures in six dimensions of physical, mental, spiritual, emotional, balance and professional work environment, the infertile women self-care questionnaire is similar to the mentioned tool in terms of with physical and spiritual self-care dimensions.

### Conclusion

Self-care in women suffering from infertility is an important and fundamental category and given the acute conditions of these people in terms of individual, social, physical, psychological and etc. In the field of health, infertility behavior by infertile women can lead to poor self-care, disruption of the treatment process, slowing down the recovery process and increasing the exorbitant costs of medical services. Infertility treatment is a grueling and costly process and if patients don't follow a healthy lifestyle and refuse to perform self-care behaviors such as healthy diet, physical activity and exercise, and maintaining and improving mental health, this process can be much longer and more annoying, as well as increasing the likelihood of treatment failure and imposing a double cost burden on

### What does this paper contribute to the wider global clinical community?

- The 28-item Self-care of Women with Infertility Scale (SWIS) is a valid and reliable instrument for self-care assessment among women with infertility.
- Healthcare providers can use SWIS as a valid and reliable instrument for self-care assessment among women with infertility.
- Healthcare providers' use of SWIS can help them develop more appropriate plans for self-care improvement among women with infertility.

the individual and the health system.

Furthermore, it can be expected that self-care behaviors in infertile people are associated with accelerating the treatment process as well as increasing the likelihood of achieving a successful therapeutic response and reducing costs. Therefore, given the high prevalence of infertility in society and its negative consequences, it is necessary to design a tool to assess the health status and self-care of infertile people. Investigating the condition of infertile people regarding self-care behaviors in order to identify possible causes treatment failure and improving the services in the health systems of the community is an important and vital matter and designing a measurement tool with appropriate reliability and validity is necessary. It is also necessary to consider the category of cultural values in designing the questionnaire. Given the results of this study, the self-care questionnaire in women experiencing infertility has the necessary and appropriate validity and reliability. From the benefits of this questionnaire is that healthcare professionals can use this tool to assess the level of self-care in infertile women and as well as to reduce the damages caused by infertility and improve the physical and mental health of these people and ultimately help them to facilitate the treatment process. From the limitations of the present study is that the researcher-made self-care questionnaire in women with infertile was constructed and normalized on a limited community, i.e., infertile women referred to the Najmieh Infertility Treatment Center in Kerman. Another limitation of this study is the possibility of subjects' bias and inaccuracy in answering the questions. It is suggested that other studies in the future focus on larger communities of infertile women in order to examine the psychometric properties of the self-care questionnaire in infertile women and also consider its validity and reliability.

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#### Conflict of Interests

The authors declare no conflict of interests.

#### Ethical Approval

This study was approved by Ethics Committee of Homozgan medical university with the ethical code IR.HUMS.REC.1399.101

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