

Effect of Continuous Care Model on Health-Related Behaviors, Satisfaction and Quality of Life among Infertile Women

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Abstract

Background: female infertility is viewed as a critical issue in the lives of women and has a major impact on various dimensions of their well-being. **Aim of the study:** determine the effect of continuous care model on health-related behaviors, satisfaction and quality of life among infertile women. **Design and setting:** a quasi-experimental, research design was applied, in the infertility clinic of the National Medical Institution, Damanhour, in Egypt's El-Beheira Governorate. **Subjects:** A convenience sample of 80 women experiencing infertility were randomly divided into two equal group, an intervention and control group 40 for each group. **Tools:** four tools were utilized: **Tool (I)** basic data structured interview schedule; **Tool (II)** health-related behaviors regarding infertility; **Tool (III)** the quality of Life questionnaire (QOL); and **Tool (IV)** satisfaction with Life scale. **Results:** A statistically significant difference in mean total scores is evident between the two examined groups, based on their engagement in behaviors related to health, their quality of life, and overall satisfaction after the intervention, in favor of the intervention group ($p < 0.001$). Moreover, a statistically significant positive relationship was observed among the intervention group between their quality of life, engagement in health-related behaviors and satisfaction level, with p-values of 0.001 and 0.015 respectively. **Conclusion:** introducing the continuous care model (CCM) into practice has a considerable positive impact on the health-related behaviours, satisfaction and quality of life regarding infertile women. **Recommendations:** it is advised that chronic patients, especially infertile women, employ the CCM as an efficient non-pharmacological solution.

Keywords: Health behaviors; Life Satisfaction; Model of continuous care application; Quality of Life & Women experiencing infertility.

Introduction

Infertility is described as "a reproductive system disorder characterized by the inability to achieve a clinical pregnancy following twelve months or more of consistent unprotected sexual intercourse" according to the World Health Organization (WHO). The prevalence of infertility varies across different regions and is estimated to affect approximately eight to twelve percent of couples globally. In developing nations, a quarter of all couples are affected by the issue of infertility. Estimates for the prevalence of infertility on a global scale for the year 2022 indicate that one out of every six individuals will have experienced infertility at some stage during their lifetime. (WHO, 2018 & WHO, 2023).

According to a study conducted by the Fertility Care Society and funded by the WHO, the prevalence of infertility among Egyptian couples is estimated to be 12%. Primary infertility impacts 4.3 percent of these individuals who have never experienced a pregnancy. Whereas, secondary infertility affects 7.7 percent of those who have previously been pregnant, regardless of whether the pregnancy resulted in a miscarriage or

an ectopic pregnancy. The population of females between the ages of 15 and 49 in Egypt exceeds 25 million, suggesting that a minimum of 3 million are unable to conceive (Ramadan & Said, 2018)

Advances in science and technology, as well as the development of modern means of infertility treatment, such as In Vitro Fertilization (IVF), have given infertile women hope. These have also resulted in increased stress and lengthy therapy times. Furthermore, unhealthy behaviors jeopardize the outcome of infertility therapy and reduce the quality of life for infertile females (Latifnejad et al., 2019). Health-related behaviors are modifiable habits and that can be altered and have an impact on the overall health and wellness of women who are unable to conceive, thereby influencing their reproductive capabilities. According to studies, health promotion behaviors increase the quality of life of infertile women and encourage them to adopt healthy lifestyles, which are the most essential variables in reducing extra fertility concerns. As a result, behaviors related to health and lifestyles enhance the standard of living for women experiencing infertility, safeguard their health, and enable them to conduct daily tasks more efficiently (Jeihooni et al., 2020).

Researchers are displaying a growing interest in investigating the effects of health-related behaviors on the infertility genesis. Many authors are paying closer attention to the role that certain health-related practices have in the development of infertility. Several researchers have presented substantial evidence indicating a correlation between adverse habits and the inability to conceive in females, including eating fat-rich diets, postponing childbearing due to education, exercise, pollution exposure, consumption of caffeine, engaging in risky sexual behaviors, misusing drugs, experiencing anxiety and depression, utilizing cellular phones, and exposure to radiation. (Alabi, 2020)

Aside from a sedentary lifestyle, behaviors refer to time spent sitting or walking with little to no mobility, which detrimentally affects the standard of life for individuals incapable of reproduction. Biological evidence supports the association between physical activity and infertility, making it one of the most significant modifiable risk factors for infertility. Furthermore, adopting health-promoting behaviors such as walking and exercise improves insulin sensitivity, ovarian function, and may boost chances of conception. Thus, physical activity helps infertile women, specifically overweight or obese women (Silvestris et al., 2019).

Quality of life (QoL) is described by WHO as individuals' perceptions of their place in life, which might vary depending on the society or culture. Many infertile women consider their inability to conceive as the most stressful experience of their lives, frequent and ongoing treatment phases as crises that increase infertile women's perception of current conditions and positively improve satisfaction and quality of life (Pedro et al., 2019 & WHO, 2022)

Life satisfaction is defined as a range of emotions and viewpoints about a person's life at a certain time. It is a cognitive, judgement process that is based on comparing a person's circumstances to an appropriate norm. People who seek infertility therapy medically are less satisfied with their lives (Nagórska et al., 2022). Medical procedures and treatments may be more likely to be affected by prospective parents. In order to diagnose and cure infertility, partners' health behaviors and overall satisfaction with life are taken into consideration (Bai et al., 2019; Cusatis et al., 2019; Nagrska et al., 2019; Amini et al., 2020 & Molgora et al., 2020).

Infertility has the potential to impact the lives of both males and females in a diverse range of manners. It is critical to meet their multidimensional training demands in order to address their individual needs and improve their overall well-being. It is vital to identify their psychosocial support and educational requirements with the purpose of create successful

strategies that will provide them with the necessary assistance (Hamidzadeh et al., 2023)

Fortunately, a variety of training options are available to fulfil the needs of women who are struggling with infertility. For women who are having difficulty getting pregnant, there are body-mind group interventions, counselling, supportive interventions, psychosocial therapies, and therapeutic interventions aimed at altering a variety of lifestyle behaviours. (Bach, 2018; Stevenson et al., 2019 & Polillo et al., 2021).

Using instructional models to enhance treatment adherence among women is one strategy. According to the literature, providing education to women and their families can serve as a preventive measure or postponing potential challenges. One of the caring models, the Continuous Care Model (CCM), aims to develop a strategy for accepting and enhancing women's perception and function for continuous care, as well as to improve quality of life by training in the skills required by women. Through a systematic method, CCM emphasizes the essential and balanced roles of the nurse, the woman and her family, while fostering efficient, interactive, and regular communication between the client and the medical staff. It has been demonstrated that the use of CCM enhances the treatment outcomes of women (Zakeri, et al., 2020).

Significant of the study:

Infertility affects a lot of people throughout their lives, according to the WHO. One in six adults globally, or 17.5% of the population, suffer from infertility, demonstrating the critical need to expand access to high-quality, reasonably priced reproductive care for those who require it. (WHO, 2023). It can lead to a number of problems for a couple, such as sexual dysfunction, financial strain from the high cost of therapy, and psychological suffering from illnesses like depression, anxiety, and social stigma. The nature of infertility and the need for prolonged therapy can have a significant detrimental impact on a couple's quality of life, satisfaction, and health-related behaviours. (Lotfollahi et al., 2021). The establishment and maintenance of a dynamic and continuous care relationship between the women and the nurse and the increasing participation of the women are the goals of the CCM. On the other hand, it is necessary to design and develop a plan to increase the acceptance, insight and proper functioning of care to avoid possible complications (Zakeri, et al., 2020). Therefore, the present study was carried out to determine the effect of Continuous Care Model on Health-Related Behaviors, Satisfaction and Quality of Life among Infertile Women.

Aim of the study

The aim of this study was determine the effect of Continuous Care Model on Health-Related Behaviors, Satisfaction and Quality of Life among Infertile Women.

Research hypothesis

H1: Infertile women who engage in the implementation of the continuous care model demonstrate an increased level of engagement in health-related behaviors for the purpose of controlling and managing infertility in comparison to those who receive routine hospital care.

H2: Infertile women who engage in the implementation of the continuous care model exhibit a higher satisfaction level with their overall life circumstances in comparison to those who receive routine hospital care.

H3: Infertile women who engage in the implementation of the continuous care model exhibit an enhanced quality of life in comparison to those who receive routine hospital care.

Method and Materials**Materials****Design of the study:**

A quasi-experimental research design was applied.

The setting:

The study was carried out at the National Medical Institution's obstetrics and gynaecology infertility clinic in Damanhour, El-Behiera Governorate.

Study Subjects:

A convenient sample of 80 infertile women were enrolled into the study and control one, which were randomly distributed equally between the two groups: Intervention group (1) included "40" women who engaged in the continuous care model application in addition to receive the routine hospital care, Control group (2) included "40" women who only received routine hospital care.

Inclusion criteria:

1. Infertile women in the fertility age (20-35 years).
2. Diagnosed with primary or secondary infertility.
3. Sexually active.
4. Normal fertility investigations (e.g., FSH, LH, estradiol, prolactin).
5. Free from any undelying health issues as diabetes.
6. Willingness to take part in the research.

The Epi-Info 7 program was utilized in order to estimate the sample size of women suffering from infertility. This estimation was based on the application of the following parameters:

- The size of the population was determined to be 840 woman over a period of 3 months.
- A frequency of occurrence of 50% was expected.
- An acceptable margin of error of 5% was deemed appropriate.

- A confidence coefficient of 95% was selected.
- The minimum sample size required was determined to be 79 infertile woman.

Study tools:

Data were gathered using four tools.

First tool: Basic data structured interview schedule, which comprised of three sections; **Part one:** socio-demographic data such as age, age at marriage, marriage period, education level, residence, type of job, family type, crowding index as well as family income. **Part two:** Reproductive History including gravidity, parity, abortion, stillbirth, and living children, and **Part three:** Infertility history as type of infertility, period of infertility, and infertility causes.

Second tool: Health-related behaviors regarding infertility:

The tool was adapted from Fehintola (2017) to assess women's self-reported health behaviors in relation to the management and control of infertility. It included nine recommendations: keep a healthy weight, health balanced diet, avoid excessive caffeine, using relaxation techniques to decrease her stress, avoid over counter medications, avoid excessive exposure to unhealthy rays like mobile phones, avoid dealing with wrong misconceptions and beliefs about infertility, avoid engaging in sedentary lifestyle behaviors, and avoid active and passive smoking.

The scoring system employed in this study involved the use of a three-point Likert scale, whereby participants were asked to rate the items. The scale consisted of three options: always, sometimes, and never, which corresponded to scores of 3, 2, and 1 respectively.

The scores ranged from 9 to 27, with 9–15 denoting poor engagement in health-related behaviour, 16–22 denoting moderate engagement in health-related behaviour, and 23–27 denoting higher engagement in health-related behaviour.

Third tool: The quality of Life (QOL) questionnaire:

World Health Organisation (WHO) developed the WHOQOL-100, a thorough QOL assessment scale connected to health. There are 100 questions in total. The WHOQOL-100 items fit well with models that included six different domains.

The domains can be categorized as follows:

1. Physical health, which encompasses three different aspects: pain and discomfort, energy level and fatigue, and sleep and rest.
2. Psychological health, which consists of five aspects: positive feelings, thinking and concentration, self-esteem, bodily image, and negative feelings.
3. Level of independence, which includes four facets: Mobility, activities of daily living, dependence on medication, and work capacity.

4. Social relationships, which can be broken down into three facets: personal relationships, social support, and sexual activity.
5. The environment domain is composed of eight facets: physical safety and security, home environment, financial resources, health and social care, opportunities for acquiring new information and skills, recreation/leisure, physical environment, and transport.
6. The spirituality/religion/personal beliefs domain, which focuses solely on spirituality, religion, and personal beliefs.

The overall quality of life and general health are two of the 24 components that make up these categories. The WHOQOL-100 has five categories: not at all (1), little (2), moderate (3), very much (4), and an extreme amount (5). The following facets are categorised after being given a score using summative scaling:-

- Poor quality of life if it's under 250.
- Fair quality of life is found between 250 and 374.
- Good quality of life is between 375 and 500.

Fourth tool: Satisfaction with Life scale (SWLS)

It was derived from the work of Pavot and Diener (1993) in order to evaluate an individual's overall satisfaction with their life. The scale consists of five statements that can be either agreed or disagreed with. Participants are asked to indicate their level of agreement with each item using a scale ranging from 1 to 7.

- The scale is as follows: 7 = Strongly agree, 6 = Agree, 5 = Slightly agree, 4 = Neither agree nor disagree, 3 = Slightly disagree, 2 = Disagree, and 1 = Strongly disagree.
- Despite the fact that scoring should be continuous, the following cutoffs can be used as guidelines.
- Extremely satisfied: 31–35, satisfied: 26-30, unsatisfied: 21–25, neutral: 20 slightly satisfied: 15-19, dissatisfied: 10–14 and Extremely Satisfied: 5-9.

The investigation was completed in accordance with the subsequent procedures:

Authorization:

- Subsequent to the submission of the research proposal, a letter of authorization was acquired from the research Ethics committee at the Faculty of Nursing, University of Damanhour, on the 16th of March, 2023.
- To obtain permission to collect data, the necessary authorities of the study site were addressed in a formal letter by the University of Damanhour's Faculty of Nursing.

Study tools:

- The researchers designed first tool after examining recent literature, while second, third and fourth tools were modified and translated into Arabic.

- The tools' face validity and content were assessed by five obstetric and gynaecological nursing specialists. The acceptable level was 0.7, while the content validity index was =0.87.
- The reliability of second, third and fourth tools was accomplished to measure the internal consistency of their items by using test & retest technique. Reliability coefficient for second tool = 0.91. Reliability coefficient for third tool = 0.88, while reliability coefficient for fourth tool =0.89.

Pilot Research:

A pilot study was done on 8 infertile women (4 women from intervention group who engaged in the continuous care model application in addition to receive the routine hospital care and 4 from control group who only received the routine hospital care).

The major objectives of the pilot study were:

- Determine the tools' applicability, clarity, and usefulness.
- Calculate the amount of time required to acquire the data.
- Identify any problem with the statements' order and clarity which can obstruct the data collection procedure.

Findings derived from the pilot research:

- Following the completion of the pilot research, the tools were rebuilt and prepared for usage.
- As a consequence of the pilot study, a few terms were changed.
- The tool phrases were clear, relevant, and suitable.
- Pilot study participants were excluded from the study.

Work field:

- Data were collected over the period of a 5-months, beginning at March 2023 and ending in July 2023.
- Each infertile woman who was available, had the inclusion criteria and accepted the participation in the research was assigned to either the intervention and control group.
- To avoid study contamination, the control group was used as the researcher's starting point before the intervention group.

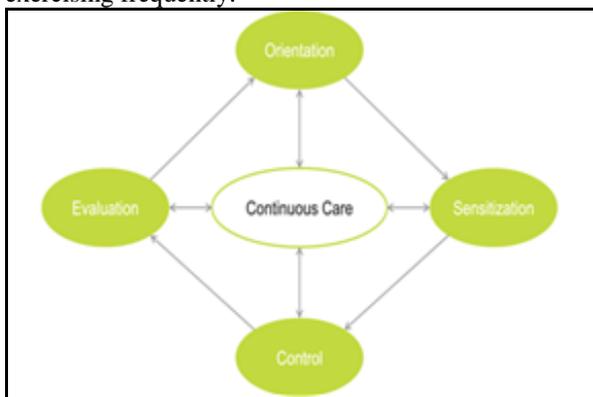
The following phases (**Orientation, Sensitization, Control, and Evaluation**) of the continuous care model were followed:-

- A. At the orientation phase,** the researchers formally introduce themselves and provide a comprehensive overview of the study's objectives and intentions. Additionally, they expound upon each component of the continuous care model that pertains to the intervention group. Moreover, they offer words of encouragement and underscore the significance of maintaining regular communication between the researchers and the women being studied. Furthermore, the researchers define the various channels of

communication and establish a schedule for the necessary phone calls that will occur throughout the duration of the intervention period.

B. Sensitization phase: It was carried out to involve the infertile women in continuous care model application, assess their basic needs, and demonstrate their necessity in light of treatment adherence. Each woman participated in the **four** instructional sessions, with two sessions occurring per week. These sessions, lasting between thirty to forty-five minutes and included discussion, role-playing, video training, and PowerPoint presentations. At the beginning of each subsequent session, feedback from the previous session was gathered; as a result, the prepared educational material was re-explain with complete clarification.

In the first session, the researchers aimed to give a general review of infertility, covering its definition, incidence, types, causes, risk factors, and prevention measures. **Second session:** To manage and prevent further effects of infertility, the researchers taught the infertile women the value of adopting health promotion behaviors. These behaviors included limiting caffeine consumption, abstaining from all unnecessary prescription drugs, refraining from using recreational drugs, limiting contact with electronic devices like mobile phones, and prevent passive smoking. **Third session:** in addition to discussing the necessity of meeting one's nutritional needs, the researchers also talked on the value of keeping a healthy weight, eating a diet high in protein, low in sodium, and low in fat, as well as drinking a lot of water each day. There's also the need of having enough rest, getting a good night's sleep, and exercising frequently.



In the fourth session: investigators engaged in a comprehensive discussion on the significance of adhering to follow-up appointments, taking prescribed drugs, reducing stress by participating in relaxation techniques, and avoiding dealing with false perceptions and ideas regarding infertility. Additionally, the concept of quality of life and how

improved quality of life for infertile women is connected to adherence to health-related behaviors. At the conclusion of this session, the studied women were also given the instruction manual.

C. Control phase: regarding to the women's preferred time for telephone conversations (either in the morning or afternoon), the researcher maintained mutual communication with the studied women by making eight weekly calls for each participant. Each call lasted approximately 10 minutes, but the duration can be ranged from about 10 minutes to 15 minutes, depending on the woman educational needs. Additionally, any unmet informative requirements or newly emerged health concerns were evaluated, identified, and effectively addressed.

D. Evaluation phase: Following a three-month period of implementing the continuous care model, an assessment was conducted to measure the impact. This assessment focused on health-related behaviors in relation to infertility, utilizing the infertility questionnaire (tool two). Additionally, the assessment included an evaluation of the quality of life (tool three) and overall satisfaction with life (tool four). The follow-up was carried out at the prementioned study setting for attended women and via telephone with women who cannot attend.

Statistical analysis

The statistical programme for social sciences (SPSS) version 23.0 was used for the statistical analysis that followed the collecting of the data. Numbers and percentages were used in descriptive statistics to describe infertile women's sociodemographic, obstetric and infertility histories, engagement in health related behavior, quality of life and satisfaction level. The normality of the study's variables was assessed through an examination of their distribution using the Shapiro-Wilk test. Chi-square test (Monte Carlo or Fisher Exact) was used to compare infertile women's data between the two groups. Each group's before-and-after comparison of the intervention was done using the t-test. Normally distributed quantitative variables were correlated using the Pearson coefficient. Finding the most important independent factors affecting WHOQOL and satisfaction with life through regression analysis. All tables' statistical analyses were judged significant at $P < 0.05$.

Ethics-related considerations:

In relation to each participant enlisted, the subsequent factors were taken into account: obtaining informed permission, respecting her anonymity and the right to withdrawal at any time, and ensuring the confidentiality of her data.

Results:**Table (1): Comparison between the two studied groups according to their socio-demographic data**

Socio demographic data	Intervention (n = 40)		Control (n = 40)		χ^2	MC p
	No.	%	No.	%		
Age (years)						
20 – 24	3	7.5	5	12.5	0.618	0.813
25 – 29	31	77.5	29	72.5		
30+	6	15.0	6	15.0		
Mean + SD	27.33±3.08		27.45±3.54		t = 0.168	0.867
Age at marriage (years)						
<20	3	7.5	5	12.5	0.762	0.778
20 – 25	30	75.0	27	67.5		
26 – 30	7	17.5	8	20.0		
Mean + SD	23.28±2.69		23.63±3.09		t = 0.540	0.591
Marriage period (years)						
5	30	75.0	26	65.0	1.619	0.445
6 – 7	4	10.0	8	20.0		
8+	6	15.0	6	15.0		
Educational level						
Read and write	5	12.5	6	15.0	7.322	0.063
Preparatory school	10	25.0	3	7.5		
Secondary school	23	57.5	23	57.5		
University	2	5.0	8	20.0		
Original residence						
Rural	1	2.5	5	12.5	2.883	FE p= 0.201
Urban	39	97.5	35	87.5		
Type of job						
Housewife	38	95.0	37	92.5	0.667	1.000
Teacher	1	2.5	1	2.5		
Employment	1	2.5	2	5.0		
Family type						
Nuclear	27	67.5	33	82.5	2.400	0.121
Extended	13	32.5	7	17.5		
Crowding index						
Not crowding (>2)	35	87.5%	37	92.5	0.556	FE p=0.712
Crowding (<2)	5	12.5%	3	7.5		
Family income						
Enough and save	2	5.0%	3	7.5%	0.213	FE p= 1.000
Not enough	38	95.0%	37	92.5		

 χ^2 : Chi square test

MC: Monte Carlo

FE: Fisher Exactt: Student t-test

Table (2): Comparison between the two studied groups according to their obstetric and infertility histories

Obstetric and infertility history	Intervention (n = 40)		Control (n = 40)		χ^2	MC p
	No.	%	No.	%		
Gravidity						
Not applicable	34	85.0	35	87.5	0.489	1.000
One	4	10.0	4	10.0		
Two	2	5.0	1	2.5		
Parity						
Not applicable	34	85.0	35	87.5	0.105	0.745
One	6	15.0	5	12.5		
No of abortion						
Not applicable	38	95.0	39	97.5	0.346	1.000
One	2	5.0	1	2.5		
No of stillbirth						
Non	40	100.0	40	100.0	-	-

Obstetric and infertility history	Intervention (n = 40)		Control (n = 40)		χ^2	MC p
	No.	%	No.	%		
No of living children						
Not applicable	34	85.0	35	87.5	0.105	0.745
One	6	15.0	5	12.5		
Type of infertility						
Primary	34	85.0	35	87.5	0.105	0.745
Secondary	6	15.0	5	12.5		
Period of infertility						
2 years	3	7.5	5	12.5	0.618	0.813
3 years	31	77.5	29	72.5		
More than 3 years	6	15.0	6	15.0		
Infertility cause						
Wife	3	7.5	5	12.5	2.005	0.577
Her husband	1	2.5	0	0.0		
Wife and husband together	32	80.0	29	72.5		
Unknown cause	4	10.0	6	15.0		
Is you performed IVF before?						
Yes	2	5.0	3	7.5	0.213	1.000
No	38	95.0	37	92.5		
If your answer yes, how many number performed IVF?						
Not applicable	38	95.0	37	92.5	1.072	1.000
One time	2	5.0	2	5.0		
Two times	0	0.0	1	2.5		

χ^2 : Chi square test

MC: Monte Carlo

Table (3): Comparison between the two studied groups in mean total scores according to their engagement in health related behavior

Engagement in health related behavior	Time	Intervention (n = 40)						Control (n = 40)						χ^2	MC p
		Never		Sometimes		Always		Never		Sometimes		Always			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Keep healthy weight	Before	32	80.0	6	15.0	2	5.0	32	80.0	5	12.5	3	7.5	0.395	1.000
	After	5	12.5	6	15.0	29	72.5	27	67.5	11	27.5	2	5.0	40.112*	<0.001*
Healthy balanced diet	Before	27	67.5	9	22.5	4	10.0	25	62.5	11	27.5	4	10.0	0.357	0.940
	After	5	12.5	4	10.0	31	77.5	18	45.0	16	40.0	6	15.0	31.440*	<0.001*
Avoid excessive caffeine	Before	29	72.5	7	17.5	4	10.0	25	62.5	12	30.0	3	7.5	1.779	0.409
	After	4	10.0	6	15.0	30	75.0	20	50.0	13	32.5	7	17.5	27.543*	<0.001*
Using relaxation techniques to decrease her stressors	Before	26	65.0	8	20.0	6	15.0	22	55.0	12	30.0	6	15.0	1.133	0.567
	After	6	15.0	9	22.5	25	62.5	16	40.0	14	35.0	10	25.0	12.061*	<0.001*
Avoid over counter medications	Before	24	60.0	7	17.5	9	22.5	25	62.5	8	20.0	7	17.5	0.337	0.845
	After	0	0.0	7	17.5	33	82.5	16	40.0	14	35.0	10	25.0	30.636*	<0.001*
Avoid excessive exposure to unhealthy rays as telephone	Before	29	72.5	5	12.5	6	15.0	25	62.5	9	22.5	6	15.0	1.439	0.487
	After	3	7.5	6	15.0	31	77.5	18	45.0	15	37.5	7	17.5	29.729*	<0.001*
Avoid believing with wrong misconceptions	Before	32	80.0	6	15.0	2	5.0	28	70.0	8	20.0	4	10.0	1.226	0.588
	After	5	12.5	7	17.5	28	70.0	28	70.0	11	27.5	1	2.5	42.057*	<0.001*
Avoid living in un stable life pattern	Before	30	75.0	6	15.0	4	10.0	28	70.0	9	22.5	3	7.5	0.864	0.751
	After	0	0.0	1	2.5	39	97.5	20	50.0	15	37.5	5	12.5	58.523*	<0.001*
Avoid smoking	Before	24	60.0	5	12.5	11	27.5	27	67.5	7	17.5	6	15.0	1.980	0.372
	After	0	0.0	1	2.5	39	97.5	19	47.5	14	35.0	7	17.5	52.528*	<0.001*
Total score	Before	12.88±2.73						13.13±4.16						t = 0.318	0.752
	After	24.43±3.09						14.83±4.41						t=11.282*	<0.001*
P0		<0.001*						0.103						-	-

χ^2 : Chi square test

MC: Monte Carlo

t: Student t-test

*: Statistically significant at p ≤ 0.05

P0: P value for Paired t-test for comparing between before and after in each group

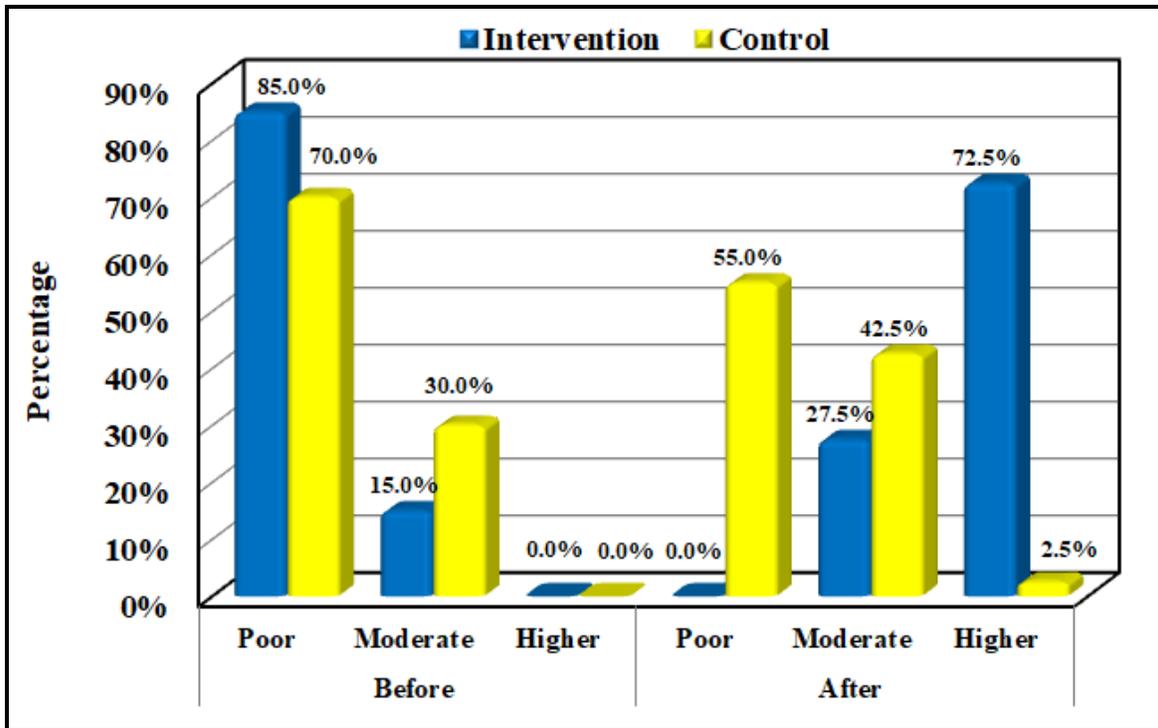


Figure (1): Engagement in health related behavior

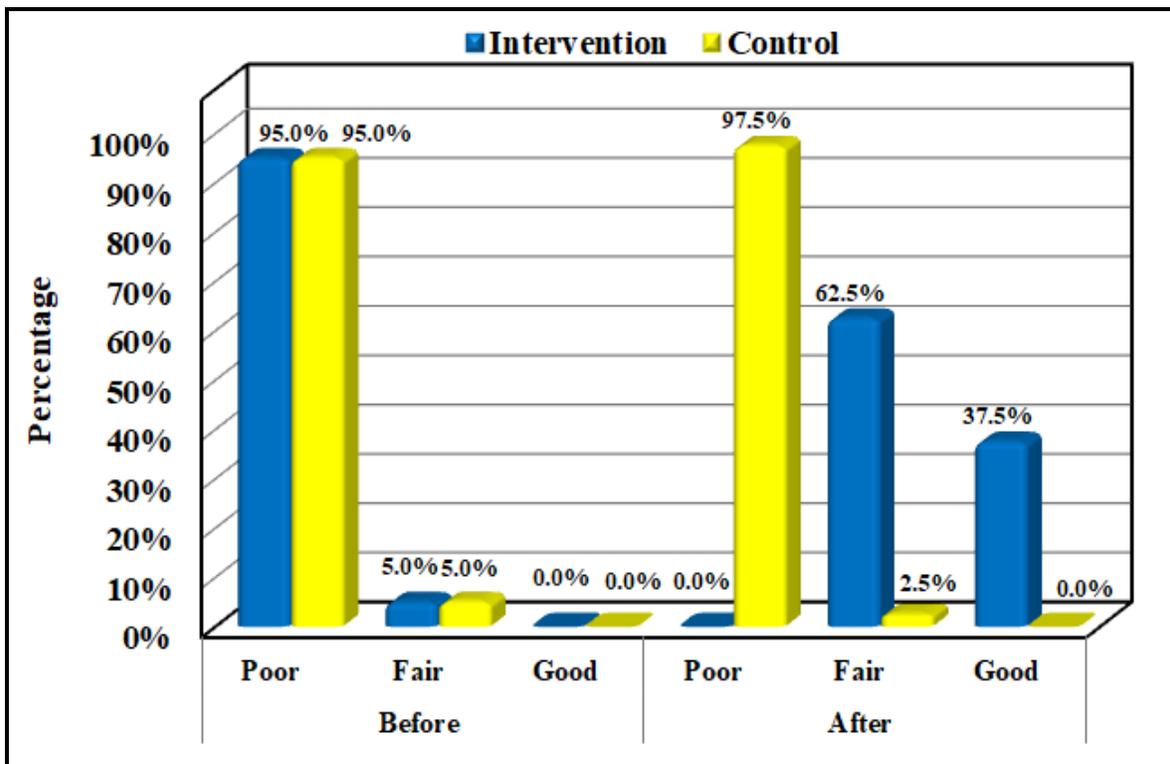


Figure (2): Quality of life (The WHOQOL-100 scale)

Table (4): Correlation between quality of life and their engagement in health related behavior among intervention group (n = 40)

Engagement in health related behaviors	Quality of life			
	Before		After	
	r	p	r	P
Keep healthy weight	0.245	0.128	0.327*	0.039*
Healthy balanced diet	0.181	0.263	0.274	0.088
Avoid excessive caffeine	0.090	0.582	0.289	0.070
Using relaxation techniques to decrease her stressors	0.323*	0.042*	0.306	0.055
Avoid over counter medications	0.520*	0.001*	0.338*	0.033*
Avoid excessive exposure to unhealthy rays as telephone	0.399*	0.011*	0.216	0.182
Avoid believing with wrong misconceptions	0.361*	0.022*	0.326*	0.040*
Avoid living in un stable life pattern	0.205	0.205	0.075	0.645
Avoid smoking	0.328*	0.039*	0.075	0.645
Overall Engagement in health related behavior	0.701*	<0.001*	0.441*	0.004*

r: Pearson coefficient

*: Statistically significant at p ≤ 0.05

Table (5): Comparison between the two studied groups according to their satisfaction level

Satisfaction	Intervention (n = 40)				Control (n = 40)				Intervention vs. Control			
	Before		After		Before		After		Before		After	
	No.	%	No.	%	No.	%	No.	%	χ ²	MC p	χ ²	MC p
In most ways my life is close to my ideal.												
Dissatisfied	8	20.0	0	0.0	6	15.0	7	17.5	0.435	0.936	94.976*	<0.001*
Slightly dissatisfied	4	10.0	0	0.0	4	10.0	5	12.5				
Neutral	28	70.0	0	0.0	30	75.0	28	70.0				
Slightly satisfied	0	0.0	3	7.5	0	0.0	0	0.0				
Satisfied	0	0.0	31	77.5	0	0.0	0	0.0				
Extremely satisfied	0	0.0	6	15.0	0	0.0	0	0.0				
The conditions of my life are excellent.												
Dissatisfied	7	17.5	0	0.0	6	15.0	10	25.0	0.637	0.871	94.259*	<0.001*
Slightly dissatisfied	3	7.5	0	0.0	5	12.5	5	12.5				
Neutral	30	75.0	0	0.0	29	72.5	25	62.5				
Slightly satisfied	0	0.0	8	20.0	0	0.0	0	0.0				
Satisfied	0	0.0	28	70.0	0	0.0	0	0.0				
Extremely satisfied	0	0.0	4	10.0	0	0.0	0	0.0				
I am satisfied with my life.												
Dissatisfied	5	12.5	0	0.0	4	10.0	6	15.0	0.255	1.000	95.536*	<0.001*
Slightly dissatisfied	3	7.5	0	0.0	3	7.5	4	10.0				
Neutral	32	80.0	0	0.0	33	82.5	30	75.0				
Slightly satisfied	0	0.0	7	17.5	0	0.0	0	0.0				
Satisfied	0	0.0	31	77.5	0	0.0	0	0.0				
Extremely satisfied	0	0.0	2	5.0	0	0.0	0	0.0				
So far I have gotten the important things I want in life.												
Dissatisfied	6	15.0	0	0.0	6	15.0	6	15.0	0.095	0.954	94.171*	<0.001*
Slightly dissatisfied	7	17.5	0	0.0	6	15.0	8	20.0				
Neutral	27	67.5	0	0.0	28	70.0	26	65.0				
Slightly satisfied	0	0.0	7	17.5	0	0.0	0	0.0				
Satisfied	0	0.0	28	70.0	0	0.0	0	0.0				
Extremely satisfied	0	0.0	5	12.5	0	0.0	0	0.0				
If I could live my life over, I would change almost nothing.												
Dissatisfied	10	25.0%	0	0.0%	10	25.0%	6	15.0%	0.612	0.840	93.335*	<0.001*
Slightly dissatisfied	5	12.5	0	0.0	3	7.5	9	22.5				
Neutral	25	62.5	0	0.0	27	67.5	25	62.5				
Slightly satisfied	0	0.0	10	25.0	0	0.0	0	0.0				
Satisfied	0	0.0	19	47.5	0	0.0	0	0.0				
Extremely satisfied	0	0.0	11	27.5	0	0.0	0	0.0				

Satisfaction	Intervention (n = 40)				Control (n = 40)				Intervention vs. Control			
	Before		After		Before		After		Before		After	
	No.	%	No.	%	No.	%	No.	%	χ^2	^{MC} p	χ^2	^{MC} p
Overall Satisfaction												
Dissatisfied	4	10.0	0	0.0	4	10.0	8	20.0	0.091	1.000	95.352*	<0.001*
Slightly dissatisfied	26	65.0	0	0.0	26	65.0	21	52.5				
Neutral	10	25.0	0	0.0	10	25.0	11	27.5				
Slightly satisfied	0	0.0	29	72.5	0	0.0	0	0.0				
Satisfied	0	0.0	11	27.5	0	0.0	0	0.0				
Extremely satisfied	0	0.0	0	0.0	0	0.0	0	0.0				
Total score Satisfaction	17.65±2.15		29.83±1.47		17.88±2.04		17.48±2.34		t = 0.480	0.633	t = 28.269*	<0.001*
P0	<0.001*				0.304							

χ^2 : Chi square test MC: Monte Carlo t: Student t-test

*: Statistically significant at $p \leq 0.05$

P0: P value for Paired t-test for comparing between before and after in each group

Table (6): Correlation between the quality of life, engagement in health related behavior and satisfaction level among intervention group (n = 40)

Engagement in health related behavior	Satisfaction			
	Before		After	
	r	p	r	p
Keep healthy weight	0.230	0.153	0.326*	0.040*
Healthy balanced diet	0.281	0.079	0.289	0.071
Avoid excessive caffeine	0.236	0.142	0.252	0.116
Using relaxation techniques to decrease her stressors	0.206	0.202	0.450*	0.004*
Avoid over counter medications	0.465*	0.002*	0.353*	0.025*
Avoid excessive exposure to unhealthy rays as telephone	0.350*	0.027*	0.429*	0.006*
Avoid believing with wrong misconceptions	0.383*	0.015*	0.492*	0.001*
Avoid living in un stable life pattern	0.483*	0.002*	0.202	0.211
Avoid smoking	0.421*	0.007*	0.202	0.211
Overall engagement in health related behavior	0.799*	<0.001*	0.566*	<0.001*
Quality of life scores	0.745*	<0.001*	0.422*	0.007*

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

Table (1): Portrays that around three-quarters (77.5%) of intervention and 72.5% of control group were in their twenties, with mean 27.33±3.08 and 27.45±3.54 years of them respectively. Sizeable proportion 75% and 67.5% of the examined groups had mean marriage ages of 20 to 25 years, representing 23.28±2.69 and 23.63±3.09 years, among intervention and control group respectively. Moreover, it was noticed that (75% & 65%) and (57.5% & 57.5%) of participants their marriage period from one to five years and had secondary educational level respectively. Most of intervention (97.5%) and majority (87.5) of control group were urban dwellers. Most of intervention and control group (95% & 92.5%) and (95% & 92.5%) were housewives and had not enough family income respectively. Furthermore, (67.5% & 82.5%) and (87.5% & 92.5%) of them had nuclear family and not crowding houses respectively. The association between the sociodemographic data of the two groups, nevertheless, was determined to be not statistically significant.

Table (2): Exhibits that majority of intervention and control group (85% & 87.5%) were nulliparous and 15% & 12.5% of them had one delivery respectively. Most of participants 95% and 97.5% had not abortion respectively. All study subjects had not still birth. Majority with similar percent (85% & 87.5%) of them had not living children and had primary type of infertility. In addition, it was observed that 77.5% and 72.5% of them had three years of infertility period respectively. Regarding to infertility cause, it was noticed that 80% of intervention and 72.5% of control group had male and female cause together. Most of intervention and control groups (95% & 92.5%) had not performed IVF before and similar percent (5%) of them had only once IVF and 2.5% of control group had twice IVF. As a result, there were no significant differences in the obstetric and infertility histories between the two groups.

Table (3): Demonstrates there wasn't any significant different in the average total scores between the two investigated participants according to their engagement in health related behavior before

intervention ($p=0.752$). Where, it was seen that mean score of intervention group was (12.88 ± 2.73) and control group (13.13 ± 4.16). However, it was found that after the intervention, there was a significantly different in mean total scores between the two investigated groups in favor the intervention group ($p<0.001$). Where, it was observed that mean score of intervention group was (24.43 ± 3.09) and control group (14.83 ± 4.41). Additionally, there was a statistically significant difference between the intervention group's participation in health-related behaviour before and after the session ($p<0.001$). When comparing the control group's engagement in health-related behaviour before and after the intervention, there was no statistically significant difference ($p=0.103$).

Figure (1): Revealed that 85% and 70% of intervention and control group had poor engagement in health related behavior before intervention respectively. However, after intervention, 72.5% of the intervention group and only 2.5% of the control group reported higher engagement in health-related behaviour respectively.

Figure (2): Showed that the vast majority of both the intervention and control groups (95%) had poor quality of life prior to the session. Comparatively, 97.5% and 2.5% of the control group had poor and fair quality of life, respectively, while 62.5% and 37.5% in the intervention group had fair and good quality of life following the intervention.

Table (4): Displays that the quality of life and overall engagement in health-related behaviour among the intervention group prior the intervention were shown to be positively statistically correlated ($p<0.001$, $r=0.701$). Whereas, using relaxation techniques, avoiding over-the-counter medications, excessive exposure to unhealthy rays, believing with wrong misconceptions and smoking have statistically significant positive associations with quality of life among intervention group ($p=0.042$, $r=0.323$, $p<0.001$, $r=0.520$, $p=0.011$, $r=0.399$, $p=0.022$, $r=0.361$ & $p=0.039$, $r=0.328$) accordingly.

Moreover, this table also shows the quality of life and overall engagement in health related behavior among intervention group after intervention were shown to be positively correlated statistically ($p=0.004$, $r=0.441$). Where as, keeping healthy weight, avoiding over counter medications and believing with wrong misconceptions have statistically significant positive associations with quality of life among intervention group ($p=0.039$, $r=0.327$, $p=0.033$, $r=0.338$ & $p=0.040$, $r=0.326$) respectively.

Table (5): Compares the satisfaction levels of the two study groups before and after the interventions. Prior to the intervention, a sizable proportion of each of the

intervention and control groups, respectively, had neutral satisfaction levels for all items (70% and 75%), (75% and 72.5%), (80% and 82.5%), (67.5% and 70%), and (62.5% and 67.5%). Additionally, the same percentage (65%) of them reported a slight dissatisfaction with overall satisfaction, with no statistically significant difference between the two groups' total scores ($p=0.633$) and mean score were (17.65 ± 2.15) and (17.88 ± 2.04) respectively. **After the intervention,** intervention group had improvement in their satisfaction level regarding all items. Where, 77.5 %, 70%, 77.5 %, 70% & 47.5 % of the intervention group had satisfied level, compared to 70%, 62.5%, 75 %, 65% & 62.5 % in the control group, who reported being neutrally satisfied. Furthermore, a significant difference was observed between the two groups in terms of their total score of overall satisfaction ($p<0.001$), favoring the intervention group. The mean scores for the intervention and control groups were (29.83 ± 1.47) and (17.48 ± 2.34) respectively. In contrast to the control group, where there was no statistically significant variations between them before and after the interventions ($p=0.304$), the intervention group showed a highly statistically significant variations ($p<0.001$).

Table (6): Exhibits that the quality of life, engagement in health-related behavior and satisfaction level among the intervention group prior the intervention were shown to be positively correlated statistically ($p<0.001$, $r=0.745$). Whereas, avoiding over counter medications, excessive exposure to unhealthy rays, believing with wrong misconceptions, living in un stable life pattern, smoking and overall engagement in health related behavior have statistically significant positive associations with quality of life among intervention group ($p=0.002$, $r=0.465$, $p=0.027$, $r=0.350$, $p=0.015$, $r=0.383$, $p=0.007$, $r=0.421$ & $p<0.001$, $r=0.799$) accordingly.

Furthermore, this table also exhibits that the quality of life, overall engagement in health related behavior and satisfaction level among intervention group after intervention were revealed to be positively correlated statistically ($p=0.007$, $r = - 0.422$). Where as, keeping healthy weight, using relaxation techniques, avoiding over counter medications, excessive exposure to unhealthy rays, believing with wrong misconceptions and overall engagement in health related behavior have statistically significant positive associations with quality of life among intervention group ($p=0.040$, $r=0.326$, $p=0.040$, $r=0.450$, $p =0.025$, $r=0.353$, $p=0.006$, $r=0.429$, $p=0.001$, $r=0.492$ & $p<0.001$, $r=0.566$) respectively.

Discussion

The condition of infertility is a matter of significant concern and complexity in terms of one's overall health (Borumandnia et al, 2022). Couples who are unable to conceive may deal with a variety of issues, including sexual dysfunction, financial pressure caused by the high expense of therapy, and psychological distress caused by conditions like anxiety, sadness and social stigma. The nature of infertility, the requirement for lengthy therapies, which can have a large negative influence on a couple's life and cause changes to their health-related behaviours, satisfaction, and quality of life (Lotfollahi et al, 2021).

Subsequently, protect women's fertility and improve quality of life, it is crucial to promote health-related behaviors in addition to infertility therapy (Latifnejad & Rasoulzadeh, 2017). Therefore, the present research was carried out to ascertain the impact of implementing the continuous care model on health behaviors, satisfaction and quality of life among females experiencing infertility.

Regarding the health behaviors pertaining to infertility prior to and subsequent to the implementation of the continuous care model, the present research identified a statistically significant difference in average total scores between the two studied groups according to their engagement in health related behavior after intervention in favor of the intervention group ($p < 0.001$). Whereas, it was observed that the average score of the intervention group was high score, while the control group exhibited a low score. The results of this study substantiated the initial research hypothesis of the current investigation entitled "The implementation of the continuous care model is expected to yield enhanced health-related behaviors in infertile women compared to those who do not receive it."

These findings were in line with Latifnejad & Rasoulzadeh (2017), they demonstrated how collaborative infertility counseling enhanced healthy behaviors in infertile females undergoing IVF, such as good nutrition, abstaining from excessive coffee and alcohol usage, and reducing stress levels. These parallel findings showed that the continuous care model's application to the health-related behaviors and quality of life of infertile women had a positive impact on their understanding of their infertility condition and treatment, playing a proactive role in making decisions to change from sedentary lifestyles into healthier behaviors. Additionally, the ongoing process of sensitization through consistent participation at classes and follow-up care motivated, encouraged, and enabled females experiencing infertility to continue engaging in positive behaviors each week.

Regarding the satisfaction with life, the present findings showed that there was a significant difference between the two groups favouring the intervention group before and after the sessions ($p < 0.001$) as in contrast to the control group ($p = 0.304$). It may reflect the facts that social interactions with close friends and family can teach infertile women self-care and empathy, resulting in a better sense of self-compassion (Maheux & Price, 2016). The findings of the present investigation confirmed the second inquiry proposition suggesting that the application of the continuous care model will produce enhanced levels of satisfaction with life among infertile women, as compared to those who do not receive it.

Furthermore, quality of life variable in the current findings, it was noted that significant differences in the average mean scores across the study participants, with a preference towards the intervention after the sessions ($p < 0.001$). Specifically, mean score of the intervention group was higher than the control group. These findings were in line of those reported by Zhu et al., (2021), who found that the QOL scores of each dimension showed statistically significantly higher after the intervention among the both study participants ($p = 0.05$). As well as, the present results in agreement with a research conducted by Fadaei et al., (2016), they noted that following the implementation of the continuous care model, the mean quality of life score pertaining to infertility therapy among the intervention group was considerably higher than that of the control group.

This similarity with the present results reflects the importance of providing infertile women with help, support and education to adopt healthier behaviors and build life with high quality. The above results come in accordance and prove the third research hypothesis which suggests that application of the continuous care model will have improved quality of life among the females experienced with infertility than those who will not receive it.

Moreover, the current study found that the quality of life and overall engagement in health-related behaviour among the intervention group prior the intervention were shown to be positively correlated statistically ($p < 0.001$, $r = 0.701$). These findings are supported by Baloushah et al. (2021), which examined the quality of life of couples experiencing infertility and following IVF in the Gaza Strip, Palestine. The researchers concluded that the presence of infertility has a detrimental impact on the overall quality of life for infertile Palestinian couples. This conclusion is drawn from the observation that the average scores for various dimensions regarding quality of life, including emotion, mind/body, social interactions, core aspects,

tolerability and treatment, were significantly lower prior to the implementation of interventions, but exhibited a significant increase following intervention. These improvements are due to better education provided and couples' better understanding of their condition in order to overcome social pressures on them. This in line with the findings, points to a positive impact of adopting more health practices to improve quality of life. Females' capacity to engage in self-care practices will enhance their quality of life and can also have a positive impact on lowering the cost of invasive procedures used during therapy.

Additionally, the current analysis found that the relationship between quality of life, engagement in health-related behaviors and satisfaction level of the intervention group prior the intervention, were shown to be positively correlated statistically ($p < 0.001$, $r = 0.745$). These findings are congruent with Nagórska et al. (2022), who found that in infertile patients, the degree of satisfaction with life is positively connected with the intensity engagement of healthy behaviours.

Conclusion

In the light of the current study findings, the researchers concluded that the continuous care model implementation had improved the health-related behaviors, satisfaction with life as well as quality of life amongst infertile females. In addition, a statistically significant positive association between the intervention group's quality of life, engagement in health related behaviors and satisfaction level was discovered.

The research recommendations:

On the basis of the study's findings, the following suggestions are proposed:

1. Specific policies, procedure manuals or posters about the use of CCM to improve health-related behaviors, satisfaction and quality of infertile women should be provided in maternity health agencies.
2. Utilize the continuous Care Model (CCM) as a highly successful non-pharmacologic measure for individuals with chronic conditions, encompassing women experiencing infertility.
3. Maternity nurses should receive in-service training programs related to CCM to improve health-related behaviors, satisfaction and quality of infertile women.

Further studies are needed to:

Replicate the study on a larger sample size for better generalization.

Acknowledgement: The researchers thank all women who participated in this study.

Conflict of interest: The authors declares that there is no conflict of interest

Funding: No funding was received for this study.

References

- Alabi, O (2020): A qualitative investigation of surrogacy as a panacea for infertility in Nigeria, *F1000Research*, Vol.(9), No.(103), Pp.1-10
- Amini, L. Ghorbani, B. & Afshar, B (2020): The comparison of infertility stress and perceived social support in infertile women and spouses of infertile men, *Iran Journal of Nursing*, Vol.(32), No.(103), Pp.80–90.
- Bach, M (2018): Psychosocial interventions for individuals with infertility [Master's alternative plan paper, Minnesota State University, Mankato]. *Cornerstone: A Collection of Scholarly and Creative Works for Minnesota State University, Mankato*. Available at URL: <https://cornerstone.lib.mnsu.edu/etds/760/>
- Bai, C. Sun, J. Li, J. Jing, W. Zhang, X. Ma, L. Yue, R. & Cao, F (2019): Gender differences in factors associated with depression in infertility patients, *J. Adv. Nurs*, Vol. (75), No. (12), Pp. 3515– 3524.
- Baloushah, S. Barjasteh, S. Elsous, A. & Aldirawi, A (2021): Quality of life of infertile couples in the Gaza Strip, Palestine, *Asian Pacific Journal of Reproduction*, Vol.(10), No. (6), Pp.262-268.
- Borumandnia, N. Majd, H. Hadembashi, N. & Alaii, H (2022): Worldwide trend analysis of primary and secondary infertility rates over past decades: a cross-sectional study, *International Journal of Reproductive BioMedicine*, Vol.(20), No. (1), Pp.37-46.
- Cusatis, R. Fergestrom, N. Cooper, A. Schoyer, K. Kruper, A. Sandlow, J. Strawn, E. & Flynn, K (2019): Too much time? Time use and fertility-specific quality of life among men and women seeking specialty care for infertility, *BMC Psychol*, Vol. (7), No. (45), Pp.1-9.
- Fadaei, M. Damghanian, M. Rahimi-Kian, F. Shahrokh Nejad, E. & Mehran, A (2016): The effect of educating based on a continuous care model on the infertility treatment-related quality of life, *Nurs Pract Today*, Vol.(3), No. (3), Pp.81-90.
- Fehintola, A. Fehintola, F. Ogunlaja, A. Awotunde, T. Ogunlaja, I. & Onwudiegwu, U (2017): Social meaning and consequences of infertility in Ogbomoso, Nigeria, *Sudan Journal of Medical Sciences*, Vol.(12), No. (2), Pp.63-77.
- Hamidzadeh, A. Salehin, S. Naseri Boori Abadi, T. Chaman, R. Mogharabian, N. & Keramat, A (2023): The effect of e-health interventions on meeting the needs of individuals with infertility: a

- narrative review, Middle East Fertility Society Journal, Vol. (28) No. (1), Pp. 1-15.
- **Jeihooni, A. Rakhshani, T. and Gholampour, Y (2020):** Investigating the effect of an educational intervention on health promotion behaviors, hope enhancement, and mental health in Cancer patients, Research square Available at URL: <https://www.researchsquare.com/article/rs-22721/v1>. Retrieved on: 5 April 2023.
 - **Latifnejad, R. Hadizadeh, F. Simbar, M. & Khadem, N (2019):** Challenges of donor selection: The experiences of Iranian infertile couples undergoing assisted reproductive donation procedures, The Iranian Journal of Obstetrics Gynecology and Infertility, Vol. (16), No. (88), Pp.1-13.
 - **Roudsari, R. & Bidgoli, M (2017):** The Effect of Collaborative Infertility Counseling on Marital Satisfaction in Infertile Women Undergoing In Vitro Fertilization: A Randomized Controlled Trial, Nursing Midwifery Studies journal, Vol.(6),No. (2), Pp.1-7.
 - **Lotfollahi, H. Riazi, H. Omani-Samani, R.Maroufzadeh, S & Montazeri, A (2021):** Sexual self-concept in fertile and infertile women: a comparative study, Int J Fertil Steril, Vol. (15), No. (1), Pp. 60-64.
 - **Nagórska, M. Lesińska-Sawicka, M. Obrzut, B.Ulman, D. Darmochwał-Kolarz, D. & Zych, B (2022):** Health Related Behaviors and Life Satisfaction in Patients Undergoing Infertility Treatment, International journal of Environmental Research and Public Health, Vol.(19),No. (9188), Pp.1-12.
 - **Molgora, S. Baldini, M. Tamanza, G. Somigliana, E. & Saita, E (2020):** Individual and relational well-being at the start of an ART treatment: A focus on partners' gender differences, Front. Psychol, Vol. (11), No. (2027), Pp.1-10
 - **Nagórska, M. Bartosiewicz, A. Obrzut, B. & Darmochwał-Kolarz, D (2019):** Gender differences in the experience of infertility concerning polish couples: Preliminary research, Int. J. Environ. Res.Public Health, Vol. (16), No. (13), Pp.1-10.
 - **Pavot, W. & Diener, E (1993):** Review of the Satisfaction with Life Scale. Psychological Assessment, Vol. (5), No. (2), Pp.164-172.
 - **Pedro, J. Vassard, D. Malling, H. Hougaard, O. Schmidt, L. & Martins, V (2019):** Infertility related stress and the risk of antidepressants prescription in women: A 10-year register study, Human Reproduction, Vol. (34), Pp.1505–1513.
 - **Polillo, A. Gran-Ruaz, S. Sylvestre, J. & Kerman, N (2021):** The use of E health interventions among persons experiencing homelessness: a systematic review, Digit Health, Vol.(7),Pp.1-14.
 - **Ramadan, S. & Said, A (2018):** Effect of an Educational Intervention for Infertile Women Regarding Natural Fertility Methods and Sexual Skills for Improving Sexual Function. American Journal of Nursing Research, vol. (6), No. (1), Pp. 1–11.
 - **Silvestris, E. Lovero, D. & Palmirotta, R (2019):** Nutrition and female fertility: an independent correlation, Frontiers in Endocrinology, Vol. (10), No. (346), Pp 1–13.
 - **Stevenson, J. Campbell, Z. Webster, A. Chow, C. Tong, A. & Craig, J. (2019):** E health interventions for people with chronic kidney disease, Cochrane Database Syst Rev, Vol. (8), No. (8), Pp.CD012379.
 - **World Health Organization (WHO) (2018):** International classification of diseases, 11th revision (ICD-11), Geneva, Switzerland: WHO.
 - **World Health Organization. (WHO) (2022):** WHOQOL measuring Quality of Life, Geneva, Switzerland: WHO. Available from: <https://www.who.int/tools/whoqol>.
 - **World Health Organization (WHO) (2023):** Infertility prevalence estimates: 1990–2021, Geneva, Switzerland: WHO.
 - **Zakeri, A. Khoshnood, Z. Dehghan, M. & Abazari, F (2020):** The effect of the Continuous Care Model on treatment adherence in patients with myocardial infarction: a randomised controlled trial, Journal of Research in Nursing, Vol. (15), No. (1), Pp. 54-65.
 - **Zhu, H. Xu, S. Wang, M. Shang, Y. Wei, C. & Fu, J (2021):** The effects of comprehensive nursing intervention on the negative emotions of patients with infertility, American journal of translational research, Vol. (13), No. (7), Pp.7767–7774.

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