

Effect of Social Media-based Intervention on Adjustment, Anxiety and Pregnancy Rate among Infertile Women Undergoing Assisted Reproductive Technology

Mona Ahmed Abd-Elhamed¹, Enas Sabry Fathy Elbeltagy², Nehmedo Ezzat Osman³, Reda Taha Ahmed⁴ & Ebtsam Hanafy Saber⁵

¹. Lecturer of Woman Health and Obstetric Nursing, Faculty of Nursing -Minia University, Egypt.

². Lecturer of Woman's Health and Midwifery Nursing, Faculty of Nursing, Mansoura University, Egypt.

³. Lecturer of Woman's Health and Midwifery Nursing, Faculty of Nursing, Mansoura University, Egypt.

⁴. Lecturer of Mental Health and Psychiatric Nursing, Faculty of Nursing, Port Said University, Egypt.

⁵. Lecturer of Psychiatric Mental Health Nursing, Faculty of Nursing Minia University, Egypt.

Abstract

Background: Smartphones have significantly changed how lay people manage their health and illness in recent years; particularly with reference to infertility which increases psychological difficulties such as anxiety and depression. Identification of adjustment strategies for stressful events like infertility is important. **Aim:** Evaluate the effect of social media-based intervention on adjustment, anxiety and pregnancy rate among infertile women undergoing assisted reproductive technology. **Design:** A quasi-experimental pre posttest design with only one group was used for this study. **Setting:** The study was carried out at Minia Infertility Special Nile Center for IVF. **Sample:** Included a purposive sample of 100 infertile women. **Tool:** Four tools were used for data collection: a structured interviewing questionnaire, fertility adjustment scale, state-trait anxiety inventory, and pregnancy rate. **Results:** The current study revealed that half of the studied sample had low anxiety at post intervention. More than two thirds of them had good adjustment at post intervention. Furthermore, greater than half of the studied sample was pregnant after in vitro fertilization. **Conclusion:** This study concluded that social media-based intervention was an effective tool in improving levels of adjustment, pregnancy rate and reducing levels of anxiety among infertile women undergoing assisted reproductive technology. **Recommendation:** psychological support should be provided to all infertile couples to enhance coping with infertility and manage their problems effectively.

Keywords: *Adjustment, Anxiety, Assisted Reproductive Technology, Infertile women & Pregnancy rate.*

Introduction:

Infertility is a medical condition that can cause psychological, physical, mental, spiritual, and medical detriments to the patient. The unique quality of this medical condition involves affecting both woman and the partner. For women, infertility is a challenge; the psychological wellbeing of infertile women is negatively impacted by the significant issue of infertility. Women who are infertile are under more stress and have a worse quality of life (Fawaz, Ebrahim, & Al-Inany, 2019).

Infertility also affects women's sense of self, future goals, and their social status. This could lead to feelings of humiliation, regret, and failure. It influences 9% to 10% of people worldwide (Mehrerjerd, Rezaei, Eslami, Ratna, & Khadem Ghaebi, 2022). Infertility defined clinically by the World Health Organization (WHO) as inability to conceive following one year of regular unprotected sexual intercourse (without the use of any kind of contraception) and described scientifically as the failure to produce a live birth (Demirel, Taskin Yilmaz, & Yenicesu, 2021).

Infertility can be primary or secondary, primary infertility defined as a couple that has never been able to conceive a pregnancy after a minimum of 1 year of unprotected intercourse. Meanwhile, inability of a woman to become pregnant after a previous pregnancy and capacity to give birth is known as secondary infertility. Most infertile couples have primary infertility globally (Xie, You, Guan, Gu, Yao, & Xu, 2022).

Women are required to look for outside assistance to get pregnant when infertility interferes with the natural process. In most cases, couples can benefit from assisted reproductive technology (ART) (Praba, Rajeswari, Addline, Sakthi, & Bennet, 2022). Many women who have been told they are infertile can benefit from these therapies, which also provide them an opportunity to start a family. Numerous difficulties and possibly stressful elements, such as daily injections, blood tests, hormone changes, laparoscopic surgery, waiting for results, and monetary charges, are frequently associated with these medical treatments depicts a long and difficult journey (Wischmann, Scherg, Strowitzki, & Verres, 2019).

All procedures involving the in vitro manipulation of human sperm or embryos for reproductive purposes are referred to as assisted reproductive technology (ART), preimplantation genetic testing (PGT), embryo biopsy, in vitro fertilization (IVF), embryo transfer, intracytoplasmic sperm injection (ICSI), and cryopreservation of gametes and embryos are all examples of ART. When ART is used primarily to address reproductive and infertility issues, it is often referred to as "fertility therapy" (Medica, 2019).

Furthermore, many reproductive procedures, particularly those requiring in vitro fertilization, are invasive, time-consuming, frequently expensive, and typically have low success rates. If unsuccessful, it may make infertile couples feel worse, more physically and emotionally distressed. It may be physically and emotionally exhausting, which degrades the **quality of life** (Mahmoud et al., 2021). Men's primary anxiety is tied to their worry about their partner's health risks, whereas women's primary anxiety appears to be the potential failure to become pregnant. Infertility has a widespread stigma and negative effects because it is often seen as a feminine ailment in many countries. Women experience anxiety due to the current and future issues (emotional, psychological, and social illnesses) resulting from infertility (Hasanpoor-Azghady, Simbar, Vedadhir, Azin, & Amiri-Farahani, 2019). ART is a complex stressful problem and often contributes to stress and anxiety. The primary stressor in ART therapy is another unpredicted side effect that very certainly causes anxiety (Musa et al., 2014).

Studies had reported data on the association between anxiety or distress and ART outcome as a high level of stress associated with a reduction in the chance of pregnancy. Therefore, managing stress and anxiety and adjustment to infertility problems significantly improves ART outcomes, specifically pregnancy rate (Abdolahi et al., 2019; Rasoulzadeh Bidgoli, Latifnejad Roudsari, & Montazeri, 2020).

Individual processes information relevant to infertility, therapeutic procedures, and their outcomes using the adjustment to infertility is considered way of mental processing. Adjustment in this context does not signify complete acceptance of being childless or a decline in the desire for a biological child; rather, it denotes the capacity to consider the prospect of having children or not on a cognitive, behavioral, and emotional level (Spoletini, Di Trani, Renzi, Fedele, & Scaravelli, 2022).

According to Ashraf, Marjan, & Mahshid (2021), an assessment of a woman's emotional adjustment to infertility and her ART therapy found a high correlation between the reported adverse emotional reactions and treatment results. Accepting

childlessness was therefore found to be a key indicator of how patients will feel about their therapy. Facebook and WhatsApp, two popular social media platforms with groups and channels that seem to offer visual and textual information regarding gynecological disorders and their treatment, are examples of social media interventions (Lee, Park, & Han, 2022). Social media may be widely utilized in a variety of contexts, which has a stronger influence on public health. Also, it widely employed to enhance maternal and reproductive health (Miremberg et al., 2018).

Additionally, maternity nurses can connect with couples using assisted reproductive technology via social media and offer online counselling. Through this, couples have the chance to discuss their ideas, feelings, and beliefs with an unbiased, sympathetic professional who is aware of the relevant issues (Shimpuku, 2021). At each stage of the operation, a nurse who usually goes with the couple to treatments may offer main support and crucial information (Ahmed, Abdel Hafeze, & Arief, 2019; Kyei, Manu, Kotoh, Meherali, & Ankomah, 2020).

Significance of the study

Men and women are equally affected by infertility, which continues to be a serious global issue. There are now millions of couples that are unable to conceive. At least one in six couples worldwide struggle with infertility, which is more common in poor than developed nations. According to research carried out by the Egyptian Fertility Association and funded by the WHO in Egypt, 12% of Egyptian couples experience infertility, 4.3% of these women have primary infertility, and 7.7% experience secondary infertility (El-Sherif, Kamal, Ahmed, & Sayed, 2021).

Many couples seek therapy with assisted reproductive technology (ART) after receiving an infertility diagnosis. The treatment procedure is poorly understood by a large percentage of infertile women who are sent to fertility facilities, and many of their inquiries go unanswered (Dumbala et al., 2020).

Furthermore, a meta-analysis by (Gaitsch, Benard, Hugon-Rodin, Benzakour, & Streuli, 2020) hypothesized that psychosocial therapies could be successful in improving emotional adjustment, lowering psychological anxiety, and increasing clinical pregnancy rates in infertile couples. Internet-based interventions have several features that make them especially useful for offering low-threshold support services. There is no need for a second consultation at the clinic, and there is little financial outlay. So, this study was designed to evaluate the effect of social media-based intervention on adjustment, anxiety and pregnancy rate among

infertile women undergoing assisted reproductive technology.

Aim of the study:

The present study aimed to evaluate the effect of social media-based intervention on adjustment, anxiety and pregnancy rate among infertile women undergoing assisted reproductive technology.

Hypothesis

To achieve the aim of this study, three hypotheses were tested:

Hypothesis I: Infertile women undergoing assisted reproductive technology exhibit higher levels of adjustment after social media-based intervention.

Hypothesis II: infertile women undergoing assisted reproductive technology exhibit lower levels of anxiety after social media-based intervention.

Hypothesis III: infertile women undergoing assisted reproductive technology have improved chances of becoming pregnant after social media-based intervention.

Operational definitions

Adjustment: it means the extent to which infertile women can process cognitively, emotionally, and behaviorally for the possibilities of having a child or not.

Anxiety: Anxiety is an emotion which is characterized by an unpleasant state of inner turmoil and includes feelings of dread over anticipated events.

Pregnancy rate: which was measured through β -human chorionic gonadotropin test (β -hCG), sonography or both after two weeks from embryo transfer.

Assisted Reproductive Technology (ART): is defined as the application of laboratory or clinical techniques to gametes and/or embryos for the purposes of reproduction, which involves 'clinical treatments; counselling services; and laboratory procedures for the assessment and preparation of human oocytes, sperm, or embryos (Newman, Chambers, and Paul, 2022).

Materials and Method

Research Design:

This study used a quasi-experimental design with only one group pre-and post-testing. A quasi-experiment is an empirical interventional research that does not employ randomization to determine the causal effects of an intervention on the target population. For each subject, baseline measurements of the dependent variables were taken. After that, subjects got the suggested intervention. To assess the extent of the dependent variable's change, all participants were retested (LoBiondo-Wood & Haber, 2018).

Setting:

The study was carried out at Nile Center for IVF (NIC, Minia, Egypt). The center serves Minia governorate and its nine districts, also all governorates of Egypt. Region of the center Corniche El Nil - Minia - The Pearl Tower - in front of the Police Club - the third floor - above the Social Fund for Development. The center has nine rooms: Admission room, 3 Operating rooms, 2 Recovery rooms, Embryology, Andrology and Blood labs. center services, in vitro fertilization (IVF), intra uterine insemination (IUI), preimplantation genetic testing (PGT), artificial insemination-embryo freezing-egg freezing, laparoscopy, diagnostic hysteroscopy, testicular biopsy (TB), 4D, microinjection operations, selection the type of fetus, treatment of male diseases, semen analysis, freezing and testicular sample operations (normal surgery and microsurgery). The center is opened at 8 A.M. to 4 P.M and working every day.

Sample:

The study was carried out between the beginning of February 2022 to the end of July 2022. A purposive sample of one hundred (100) infertile women who visited Nile Center for IVF was included. Infertile women were eligible to participate in the study should met the following criteria: age between 18 and 48 years, able to read and write, had primary or secondary infertility, have no medical or psychological problems, have an Android mobile phone with Wi-Fi availability, using WhatsApp or telegram and willing to participate in the study.

Sampling Technique:

The sample size was calculated to be 100 women using the Epi-info program version 3.3, with a power of 80%, a value of 2.5 chosen with a 95% confidence level (CI), and the measurement.

Tools of the study

Tool I: A Structured Interviewing questionnaire

The researchers developed this questionnaire after reviewing the relevant literature (Ahmed et al., 2019) which consisted of three parts: **The first part** included the sociodemographic characteristics of infertile women, such as age, occupation, place of residence, education level, duration of marriage, income, and phone number. **The second part** concerned with obstetric history of the infertile women such as gravidity, mode of delivery, number of living children. **The third part** included data about infertility history such as type of infertility, causes, duration, type and number of ART.

Tool II: Fertility Adjustment Scale (FAS):

This tool, which consists of 12 statements, was adopted from (Glover, Hunter, Richards, & Katz, 1999) and includes cognitive, emotional, and behavioral reactions to fertility issues. To avoid a

neutral midpoint, the Likert scale was typically expressed by six points, ranging from "1" for strongly disagree to "6" for strongly agree. To reduce the influence of the answer set, items were balanced between positive and negative assertions. The scores for each item were added together to create an overall score. Positively oriented statements (2, 4, 6, 9, 10, and 12) were reverse score. The lowest and highest scores that could be obtained were 12 and 72 respectively. A high FAS questionnaire score indicates poor adjustment. FAS levels are indicated as follows 12-32: High adjustment, 33-52: Moderate adjustment, 53-72: poor adjustment.

Tool III: State Trait Anxiety Inventory (STAI):

The STAI was a validated 20 item self-report assessment device which includes separate measures of state and trait anxiety. The original STAI form was constructed by (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). This measurement has two subscales. First, the State Trait Anxiety Scale (S-Anxiety) assesses the level of anxiety that was now present by asking respondents how they are feeling "right now" and utilizing questions to measure their degree of anxiety, tension, and autonomic nervous system activation/arousal. The Trait Anxiety Scale (T-Anxiety) measures "anxiety" in terms of generally constant traits including overall calmness, assurance, and security.

Response options based on a self-reported, 4-point Likert scale (1 = not at all, 2 = somewhat, 3 = moderately and 4 = very much so). Several STAI components have inverted coding (Items 1, 2, 5, 8, 11, 15, 16, 19, and 20). The total score for State Trait Anxiety ranges from 20-80, with higher scores indicating greater anxiety. Scores of 20-39, 40-59, and 60-80 indicate low, moderate, and high anxiety, respectively.

Tool IV: Pregnancy rate which was measured through β -human chorionic gonadotropin test (β -hCG), sonography or both after two weeks from embryo transfer.

Validity of the study tools:

A group of five obstetric and psychiatric nursing experts from the nursing faculties at Minia University and Mansoura University decided the validity of the current tool. Each expert panel was asked to score the tool according on its content, language, length, coverage clarity, and structure. The following was done to create the suggested configuration: to make statements more understandable, simplify certain terms and rephrasing others.

Reliability of the study tools:

To ensure that the research tool was reliable, reliability of the tool testing was done. The internal consistency was calculated to determine the degree to which the tool's components measured the things they

were designed to measure. The Cronbach's alpha coefficient was used to evaluate the tool's internal consistency. The State Trait Anxiety inventory scores and the Infertility Adjustment Scale both had Cronbach's alpha values of 0.895 and 0.903, respectively, which indicating strong reliability for both tools.

Pilot Study:

To evaluate the clarity of the developed questionnaire, the applicability of the study tools, and to determine the time needed to collect the study sample, a pilot study included 10% of the study sample (10 infertile women) and modification was done. Pilot study was excluded from the study sample.

Research Process:

To achieve the research aim, four phases of preparation, assessment, implementation, and evaluation were conducted for about six months from early February 2022 to the end of July 2022.

Preparatory phase

Researchers gathered relevant national and international literature for the study during the preparatory phase, designed and validated research tools, and then carried out a pilot study. To submit the content of the educational interventions the researchers first carried out a WhatsApp and Telegram group. The researchers created a booklet in Arabic format that was divided into two sections; the **first part** focuses on educating the patient about the female reproductive system, conception process, types, reasons, and various forms of ART treatment for infertility. While the **second part** focused on information about management of anxiety, emotional control, social support, and strategies of adjustment with infertility problems through online instruction on WhatsApp and Telegram groups.

Interviewing and assessment phase

Researchers began the study after getting the go-ahead from the administrator of Nile Center for IVF and the research ethics panel of Minia faculty of nursing. Data were gathered starting in February 2022 and concluding in July 2022. Three days/week, the researchers searched registers at the previously stated location from 9 am to 1 pm to locate infertile women who satisfied the inclusion criteria. Before beginning interview with women, researchers introduced themselves, described the aim of the study, and got the women's oral consent to participate in the study to address ethical concerns.

Additionally, women received a counseling plan as well as gave the researchers their phone numbers to join in the study via a WhatsApp and Telegram groups. It was made clear that participation was completely optional and that their data would be kept private in order to gain the trust and confidence of

women. The next step for researchers was to meet with each infertile woman individually and explained how long the questionnaire would take time to be completed. The researchers distributed the three tools to record sociodemographic characteristic, obstetric history, and infertility history (Tool I: a structured Interview Questionnaire), assess infertile women's levels of adjustment (Tool II: Fertility Adjustment Scale) and assess infertile women's levels of anxiety (Tool III: State Trait Anxiety Inventory scale). It took about 30 minutes to fill out the questionnaire.

Implementation of social media-based intervention

Infertile women were divided into subgroups and added to a WhatsApp and Telegram groups by the researchers after appropriate dates and times had been set with them. Eight sessions, divided into two theoretical sessions and six practical sessions, and each one was created to tackle a specific topic. The researchers shared on the previously mentioned social media groups a handout (booklet) and Power Point slides with simple Arabic language and other instructive pictures were used to make the material more understandable, each group comprised twenty infertile women. Each session was held three days \ week (Sunday, Tuesday, and Thursday) at 7:00 pm which lasted between 30 to 45 minutes. Each time a technique relating to the session's subject matter was provided, researchers communicated and discussed it with the participants until they were able to effectively use it. Later in the day, participants got the chance to practice methods while listening to presentations.

Theoretical sessions:

The theoretical portion covered the following topics in two sessions using media, posters, and videos: a warm welcome, an explanation of the time needed for each session, information on the reproductive system, a definition of infertility and its cause, various ART types and techniques, side effects experienced by couples during ART, and the success rates of ART process. Definitions, signs, and causes of anxiety in infertile women are discussed, as well as how anxiety affects ART success rates and various strategies to adjust with infertility problem, definition of adjustments, types, and different strategies to deal with infertility problems.

Practical sessions:

Anxiety management, emotional control, and social support were the three themes covered in six sessions of the practical portion, which was presented through posters, demonstrations, films, and recordings. Through recorded movies, visuals, and animations, anxiety management emphasized body relaxation techniques and applicability for enhancing therapy outcomes; learn about techniques

for managing anxiety, such as yoga, meditation, and breathing exercises.

Promotes emotional adjustment by outlining precise problem-solving techniques for handling conflicts brought on by infertility issues. A better ability to handle negative emotions including grief, shock, feelings of guilt, embarrassment, and hopelessness. Social support centered on the requirements of infertile women, communication abilities, interpersonal processes, increased knowledge, and awareness of challenges in family communication, group learning, and peer support via WhatsApp and Telegram groups. The researcher instructed infertile women to practice this intervention at home at least five day a week and during ART treatment cycle including the waiting period after the embryo transfer.

Researchers underlined their conclusions on the main ideas of each session at the conclusion. For each group of women, educational sessions were repeated, and each woman received notice of the time of the upcoming session. New sessions began with the incorporation of feedback from earlier ones. As a result, we repeated our conversations and clarified the education's subject matter.

Evaluation Phase

The effectiveness of social media based intervention was evaluated immediately after embryo transfer using Tool (II) Fertility Adjustment Scale and Tool (III) State Trait Anxiety Inventory to evaluate infertile women's levels of adjustment and anxiety. While, pregnancy rate was assessed after two weeks from embryo transfer via telephone number or hospital's follow up.

Ethical considerations

A letter from the Minia Nursing Research Ethics Committee approving the study. All participants in the study must provide oral agreement after being informed of the study's aim, objectives, risks, and advantages. Each participant affirmed the privacy of the information gathered and the safety of the intervention. The option to end the research was also acknowledged.

Statistical Analysis

Version 20.0 of SPSS for Windows was used for all statistical analyses (SPSS, Chicago, IL). Regularly distributed continuous data are given as mean standard deviation (SD). Numbers and percentages were used to convey categorical data. Using the chi-square test, variables and categorical data were compared. For the study's questionnaires, an internal consistency test, or reliability test, was computed. The level of statistical significance was fixed at $p < 0.05$.

Results:**Table (1): Frequency and percentage distribution of sociodemographic characteristics of the studied sample (n= 100)**

Items	No.	%
Age (Years)		
18 < 28	47	47.0
28 < 38	34	34.0
≥ 38	19	19.0
Mean ±SD	29.2 ±7.9	
Occupation		
Working	54	54.0
Housewives	46	46.0
Residence		
Rural	52	52.0
Urban	48	48.0
Who do you live with?		
Alone with Husband	67	67.0
Family	33	33.0
Education		
Educated	51	51.0
Not Educated	49	49.0
Marital duration		
Less than 5 years	70	70.0
More than 5 years	30	30.0
Income		
Sufficient	28	28.0
Insufficient	72	72.0

Table (2): Frequency and percentage distribution of menstrual history of the studied sample (n= 100)

Items	No.	%
Age of Menarche		
< 13	14	14.0
13 < 15	80	80.0
≥ 15	6	6.0
Duration (days)		
Less than 2	13	13.0
2 – 5	72	72.0
Above 5	15	15.0
Regularity		
Irregular	28	28.0
Regular	72	72.0
Amount		
Heavy quantity	17	17.0
Medium quantity	55	55.0
Light quantity	28	28.0

Table (3): Frequency and percentage distribution of obstetric history and infertility data of the studied sample (n= 100)

Items	No.	%
Number of gravidities		
Nulligravida	83	83.0
Once	10	10.0
More than one	7	7.0
Previous delivery		
Nullipara	83	83.0
Once	10	10.0
More than one time	7	7.0
Number of living Children		
None	92	92.0
1	7	7.0
2 or More	1	1.0
Infertility		
Type		
Primary	83	83.0
Secondary	17	17.0
Duration		
1 – 5	65	65.0
6 – 10	23	23.0
More than 10 years	12	12.0
Causes		
Male	1	1.0
Female	65	65.0
Both together	34	34.0
ART times		
One time	36	36.0
Two times	38	38.0
More than two times	26	26.0

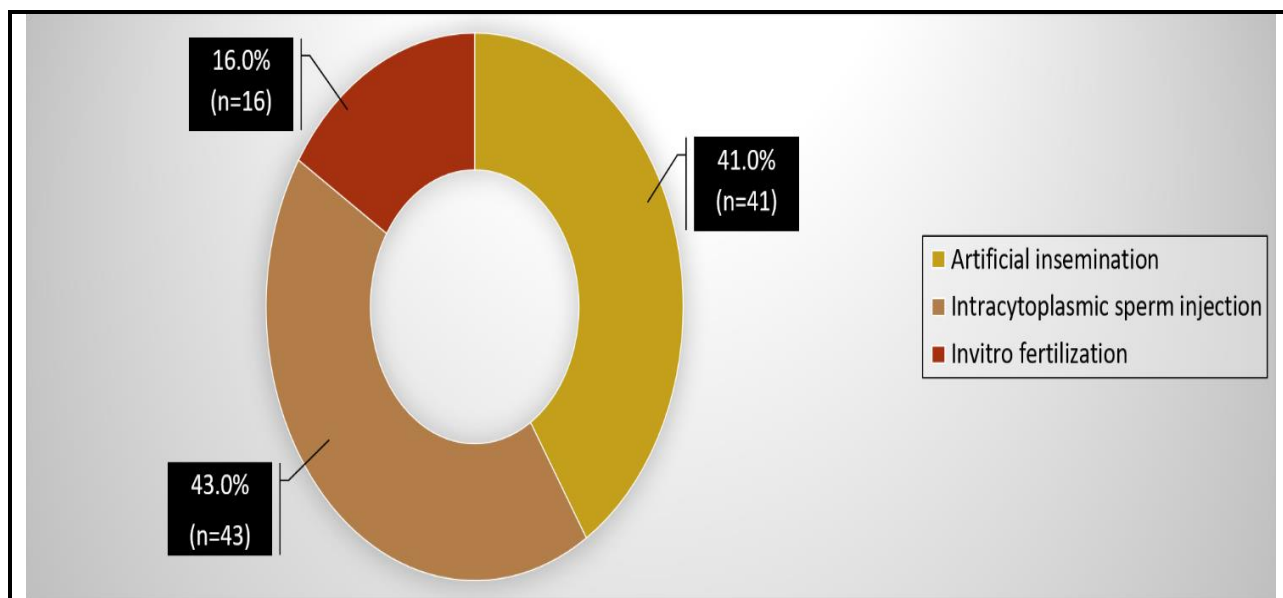


Figure (1): Percentage and distribution of the studied sample regarding to the type of assisted reproductive technology (n=100)

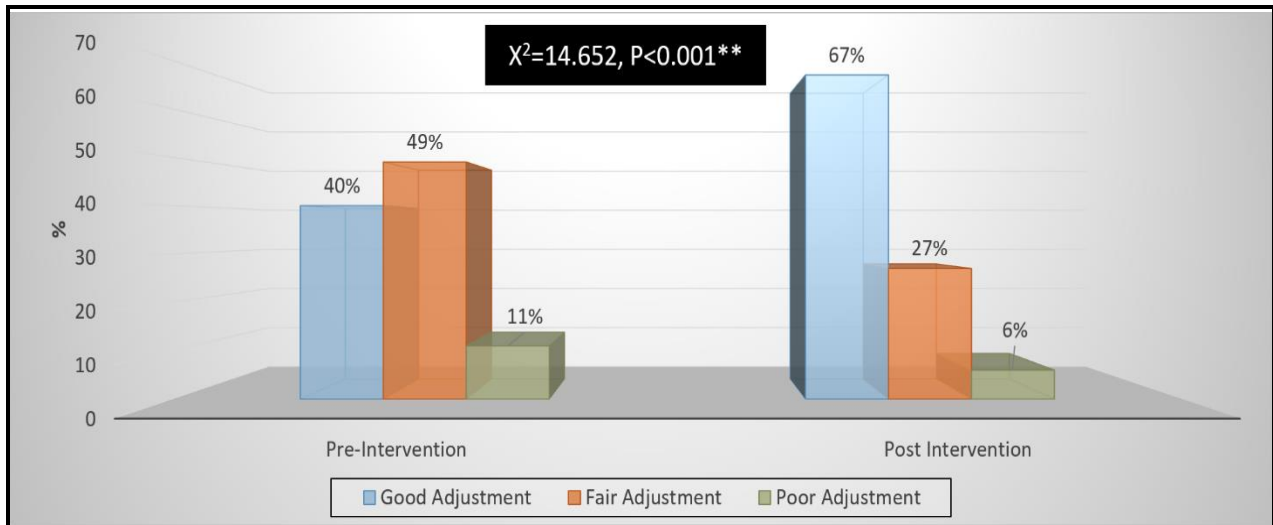


Figure (2): Percentage and distribution of the studied sample according to the total infertility adjustment score

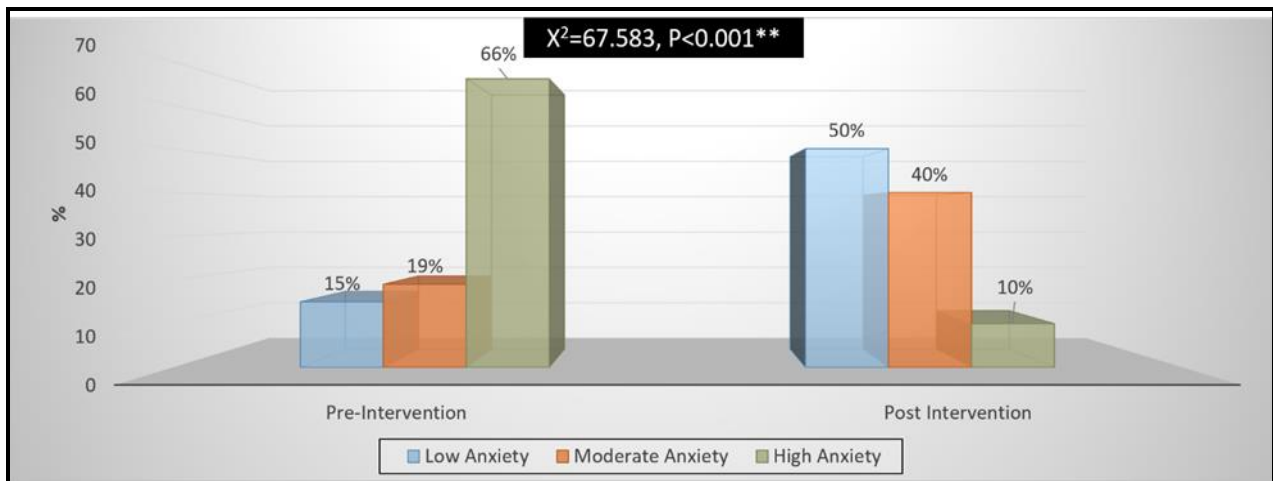


Figure (3): Percentage and distribution of the studied sample regarding to the total state trait anxiety inventory score (n=100)

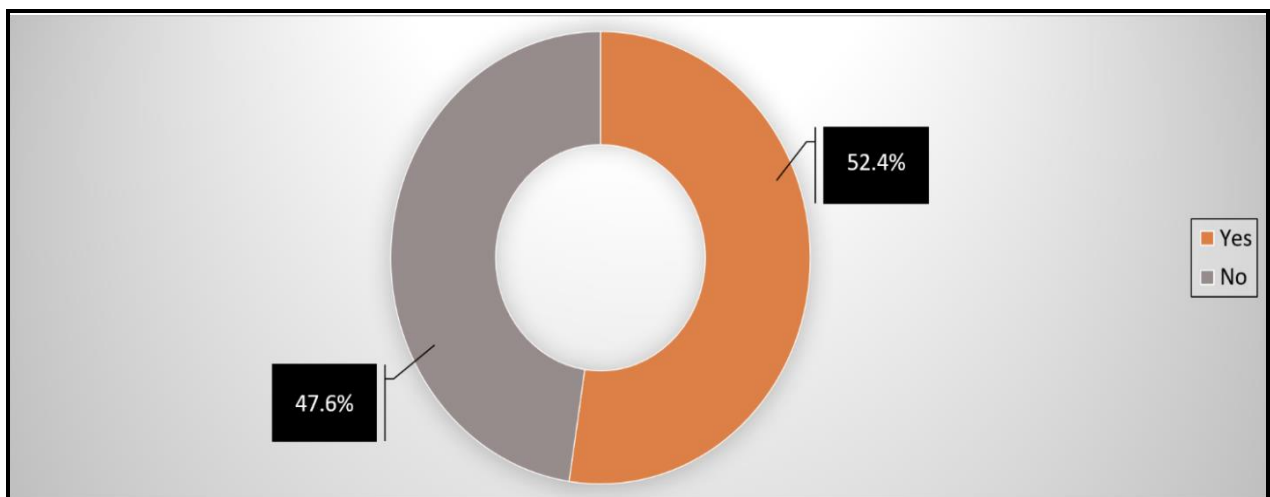


Figure (4): Percentage of pregnancy rate among the studied sample post intervention (n=100)

Table (4): Relation between obstetric history of the studied sample and infertility adjustment pre and post intervention (n= 100)

	Pre – Intervention						Post – Intervention					
	Good adjustment (n=40)		Fair adjustment (n=49)		Poor adjustment (n=11)		Good adjustment (n=67)		Fair adjustment (n=27)		Poor adjustment (n=6)	
	N	%	N	%	N	%	N	%	N	%	N	%
Number of gravidities												
Nulligravida	33	82.5	40	81.6	10	90.9	50	74.6	27	100.0	6	100.0
Once	5	12.5	4	8.2	1	9.1	10	14.9	0	0.0	0	0.0
More than one	2	5.0	5	10.2	0	0.0	7	10.4	0	0.0	0	0.0
Chi-Square [X2, P]	X²=2.237		P=0.692				X²=10.088		P=0.038*			
Previous delivery												
Nullipara	36	90.0	45	91.8	10	90.9	60	89.6	25	92.6	6	100.0
Once	4	10.0	3	6.1	1	9.1	6	9.0	2	7.4	0	0.0
More than one time	0	0.0	1	2.0	0	0.0	1	1.5	0	0.0	0	0.0
Chi-Square [X2, P]	X²=1.481		P=0.830				X²=1.137		P=0.888			
Number of living Children												
None	37	92.5	45	91.8	10	90.9	61	91.0	25	92.6	6	100.0
1	3	7.5	3	6.1	1	9.1	5	7.5	2	7.4	0	0.0
2 or More	0	0.0	1	2.0	0	0.0	1	1.5	0	0.0	0	0.0
Chi-Square [X2, P]	X²=1.180		P=0.881				X²=0.989		P=0.911			
Infertility Type												
Primary	23	57.5	49	100.0	11	100.0	50	74.6	27	100.0	6	100.0
Secondary	17	42.5	0	0.0	0	0.0	17	25.4	0	0.0	0	0.0
Chi-Square [X2, P]	X²=30.723		P<0.001**				X²=10.088		P=0.006*			
Infertility Duration												
1 – 5	24	60.0	31	63.3	10	90.9	50	74.6	15	55.6	0	0.0
6 – 10	12	30.0	10	20.4	1	9.1	11	16.4	12	44.4	0	0.0
More than 10 years	4	10.0	8	16.3	0	0.0	6	9.0	0	0.0	6	100.0
Chi-Square [X², P]	X²=5.451		P=0.244				X²=55.744		P<0.001**			
Infertility Causes												
Man	1	2.5	0	0.0	0	0.0	0	0.0	0	0.0	1	16.7
Female	25	62.5	35	71.4	5	45.5	44	65.7	19	70.4	2	33.3
Both together	14	35.0	14	28.6	6	54.5	23	34.3	8	29.6	3	50.0
Chi-Square [X2, P]	X²=4.299		P=0.367				X²=17.322		P=0.002*			
Type of ART												
Artificial insemination	20	50.0	20	40.8	1	9.1	24	35.8	16	59.3	1	16.7
Intracytoplasmic sperm injection	13	32.5	23	46.9	7	63.6	30	44.8	9	33.3	4	66.7
Invitro fertilization	7	17.5	6	12.2	3	27.3	13	19.4	2	7.4	1	16.7
Chi-Square [X2, P]	X²=7.176		P=0.127				X²=6.650		P=0.156			
ART times												
One time	14	35.0	15	30.6	7	63.6	26	38.8	10	37.0	0	0.0
Two times	18	45.0	18	36.7	2	18.2	24	35.8	10	37.0	4	66.7
More than two times	8	20.0	16	32.7	2	18.2	17	25.4	7	25.9	2	33.3
Chi-Square [X², P]	X²=6.060		P=0.195				X²=3.837		P=0.429			

Table (5): Relation between obstetric history of the studied sample and state trait anxiety score pre and post intervention (n= 100)

	Pre – Intervention						Post – Intervention					
	Low Anxiety (n=15)		Moderate Anxiety (n=19)		High Anxiety (n=66)		Low Anxiety (n=50)		Moderate Anxiety (n=40)		High Anxiety (n=10)	
	N	%	N	%	N	%	N	%	N	%	N	%
Number of gravidities												
Nulligravida	12	80.0	15	78.9	56	84.8	33	66.0	40	100.0	10	100.0
Once	2	13.3	4	21.1	4	6.1	10	20.0	0	0.0	0	0.0
More than one	1	6.7	0	0.0	6	9.1	7	14.0	0	0.0	0	0.0
Chi-Square [X², P]	X²=5.338		P=0.254		X²=20.482		P<0.001**					
Previous delivery												
Nullipara	13	86.7	15	78.9	63	95.5	43	86.0	39	97.5	9	90.0
Once	1	6.7	4	21.1	3	4.5	6	12.0	1	2.5	1	10.0
More than one time	1	6.7	0	0.0	0	0.0	1	2.0	0	0.0	0	0.0
Chi-Square [X², P]	X²=11.209		P=0.024*		X²=3.887		P=0.422					
Number of living Children												
None	13	86.7	15	78.9	64	97.0	44	88.0	39	97.5	9	90.0
1	1	6.7	4	21.1	2	3.0	5	10.0	1	2.5	1	10.0
2 or More	1	6.7	0	0.0	0	0.0	1	2.0	0	0.0	0	0.0
Chi-Square [X², P]	X²=13.090		P=0.011*		X²=3.151		P=0.533					
Infertility Type												
Primary	12	80.0	15	78.9	56	84.8	44	88.0	29	72.5	10	100.0
Secondary	3	20.0	4	21.1	10	15.2	6	12.0	11	27.5	0	0.0
Chi-Square [X², P]	X²=0.477		P=0.788		X²=6.060		P=0.048*					
Infertility Duration												
1 – 5	12	80.0	11	57.9	42	63.6	41	82.0	24	60.0	0	0.0
6 – 10	2	13.3	6	31.6	15	22.7	9	18.0	12	30.0	2	20.0
More than 10 years	1	6.7	2	10.5	9	13.6	0	0.0	4	10.0	8	80.0
Chi-Square [X², P]	X²=2.442		P=0.655		X²=54.978		P<0.001**					
Infertility Causes												
Man	0	0.0	0	0.0	1	1.5	1	2.0	0	0.0	0	0.0
Female	10	66.7	12	63.2	43	65.2	33	66.0	25	62.5	7	70.0
Both together	5	33.3	7	36.8	22	33.3	16	32.0	15	37.5	3	30.0
Chi-Square [X², P]	X²=0.587		P=0.964		X²=1.335		P=0.855					
Type of ART												
Artificial insemination	6	40.0	7	36.8	28	42.4	22	44.0	17	42.5	2	20.0
Intracytoplasmic sperm injection	6	40.0	11	57.9	26	39.4	20	40.0	18	45.0	5	50.0
Invitro fertilization	3	20.0	1	5.3	12	18.2	8	16.0	5	12.5	3	30.0
Chi-Square [X², P]	X²=3.043		P=0.551		X²=2.994		P=0.559					
ART times												
One time	6	40.0	7	36.8	23	34.8	19	38.0	12	30.0	5	50.0
Two times	6	40.0	10	52.6	22	33.3	17	34.0	17	42.5	4	40.0
More than two times	3	20.0	2	10.5	21	31.8	14	28.0	11	27.5	1	10.0
Chi-Square [X², P]	X²=4.376		P=0.358		X²=2.530		P=0.639					

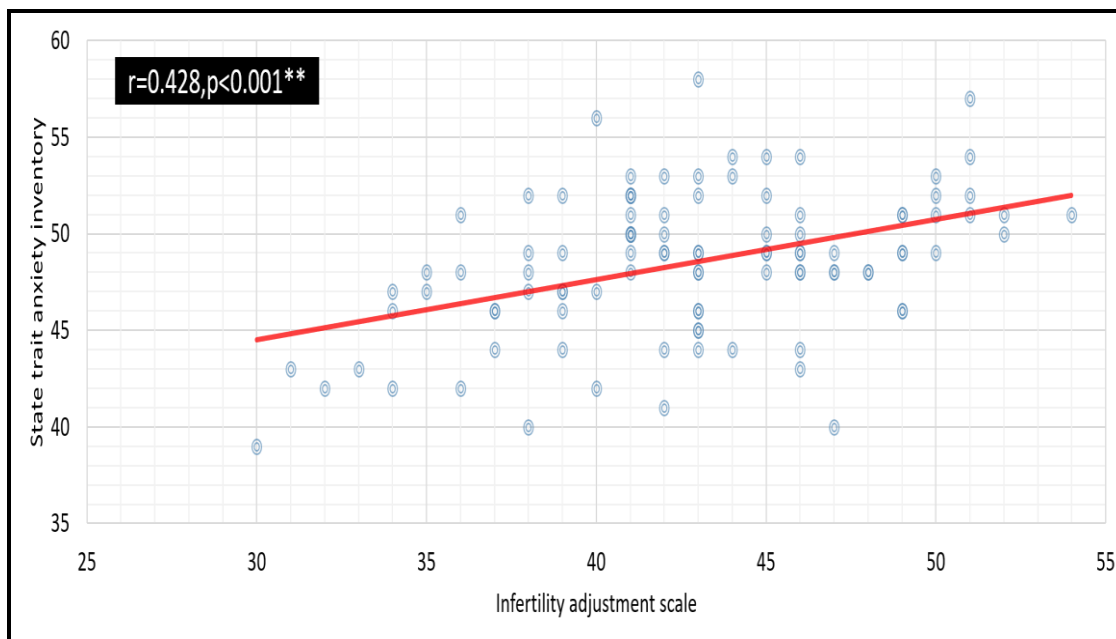


Figure (5): Correlation between infertility adjustment and state trait anxiety inventory at post intervention (n= 100)

Table (1): Shows that nearly half of the sample (47.0%) are aged from 18 – 28 years with mean age (29.2 ± 7.9), slightly greater than half of them were working, from rural area and were educated (54.0% and 52.0% and 51.0) respectively. Additionally, more than two thirds of them were married from less than 5 years and had insufficient income (70.0% and 72.0%) respectively.

Table (2): Illustrates that (80.0%) of the studied sample age of menarche was at 13-15 years. Also, more than two thirds (72.0%) the menstruation takes 2-5 days with regular intervals. As regard to amount of menstrual flow, greater than half of the sample (55.0%) had medium quantity.

Table (3): Shows that (83%) of the sample were nulligravida. Regarding to infertility data, it was obvious that (83.0%) of them had primary infertility, nearly two third (65.0%) were diagnosed from 1-5 years and their causes of infertility were female causes. Greater than one third (38.0 %) of the studied sample made assisted reproductive technology two times.

Figure (1): Reveals that (43.0%) of the studied sample did intracytoplasmic sperm injection, less than half (41.0%) of them did artificial insemination. While (16.0%) only did in vitro fertilization.

Figure (2): Demonstrates that nearly half (49%) of the studied sample had fair adjustment at pre intervention, while more than two thirds (67%) of them had good adjustment at post intervention. So, there were highly significant differences at post

intervention regarding total infertility adjustment score at p – value (<0.001).

Figure (3): Summarizes those two thirds of the studied sample (66.0%) had high anxiety at pre intervention, while half of them (50.0%) had low anxiety at post intervention So, there were highly significant variance at post intervention regarding total state trait anxiety inventory score at p- value (0.001).

Table (4): Displays that there was a significant relation among infertility adjustment at post-intervention with (number of gravidities, infertility type, duration, and causes of infertility) at P value (0.038, 0.006, 0.001, 0.002) respectively. Meanwhile, there was not a significant relation between number of previous deliveries, number of living children, type and times of ART and infertility adjustment at post intervention.

Table (5): Displays that there was a significant relation between state trait anxiety at post intervention with (number of gravidities, type of infertility, and duration of infertility) at P value (0.001, 0.048, 0.001) respectively. On the other hand, there was not a significant relation between number of previous deliveries, number of living children, infertility causes, and times of ART and state trait anxiety score at post intervention.

Figure (5): Demonstrates that there was a statistically significant positive correlation among infertility adjustment and state trait anxiety at post-intervention at ($r=0.428$) P value (<0.001).

Discussion

The present study was conducted to assess the effects of a social media-based intervention on adjustment, anxiety, and pregnancy rates among infertile women undergoing assisted reproductive technology. Within the hypotheses that infertile women who received social media-based interventions had lower anxiety levels, improved adjustment, and higher rates of pregnancy, the results of this study very significantly met their objectives.

Regarding the personal characteristics of the infertile women, it was discovered that nearly half of them were between the ages of 18 and 28 with a mean age (29.2 ±7.9), slightly more than half of them were employed, from rural areas, and **were educated**, these characteristics are pertinent to the subjects of many related research studies. In this regard, **Manuela, Antunes, João, & Claudia (2015)** noted that the study participants' ages ranged from 19 to 42 years, with an average of 35.57 years (SD 3.92 years), most of them (89.6%), were married or in a civil union, and 40.5% had a higher education.

Regarding infertility data, the current study revealed that more than 75% of the studied samples were found to have primary infertility. The quasi-experimental (before and after) research design by **Ahmed, Abdel Hafeze, & Arief (2019)**, who noted that more than two-thirds of the women have primary infertility was consistent with this result. This showed that young couples were highly aware of early treatment when they were diagnosed with infertility, which enhanced the outcome of ART. Additionally, **Ramadan, & Said (2018)** observed that only one-quarter of the study sample had secondary infertility, whereas three-quarters of them had primary infertility.

The current study results found that nearly two-thirds of the studied sample was diagnosed with infertility between One to five years, and the cause of infertility was female causes. Also, more than a third of them had undergone assisted reproduction twice. These results were consistent with **(Aimagambetova et al., 2020)** who found that the median duration of infertility was her 5.9 years, more than half of the infertility cases were attributed to a female factor, and a quarter of the women had previously tried IVF cycle.

These results contrasted with **Ahmed et al. (2019)** who observed that the main cause of infertility was male (48.5%), followed by ovaries (14.5%). Additionally, **Ahmed et al., (2016)** reported in their study, the most frequent causes of infertility were still male factors. Additionally, **Maleki-Saghooni, Amirian, Sadeghi & Roudsari (2017)** reported that the mean duration of infertility was 10.34 years.

More than two-thirds of the infertile women in the current study showed good adjustment following the intervention. The current study's findings confirmed the initial study hypothesis, which stated that "infertile women using assisted reproductive technology exhibit higher levels of adjustment after social media-based intervention." Like that, **Tokmak et al., (2015)** showed that psychotherapy and counselling treatments significantly increased the degree of adaption of women having hysterosalpingography. The better comprehension of the researched sample's relationship to the problems being faced may account for these outcomes. Additionally, using effective coping strategies, controlling anxiety, and improving communication appear to enhance the level of adjustment among infertile women.

According to the study's findings, half of the infertile women had low levels of anxiety following the intervention, according to their anxiety ratings. Therefore, the overall state trait anxiety assessment score at the end of the intervention showed highly significant differences. The second study hypothesis, "Infertile women undergoing assisted reproductive technology exhibit lower levels of anxiety after social media-based intervention," was therefore also confirmed.

The results of a randomized controlled experiment (RCT) carried out by **Farnia, Aflatoonian, & Kalantari (2019)** support this conclusion in their study about Preoperative anxiety in infertile women and their results showed a substantial difference in mean anxiety. Similarly, **Terzioglu (2016)** found that the average level of anxiety before counseling (before testing) was higher than after counseling.

According to the findings of the current study, more than half of the samples were pregnant following the intervention. Consequently, the third research hypothesis was also approved. These findings supported **Katyal, Poulsen, Knudsen, & Frederiksen's (2021)** comprehensive review and meta-analysis of randomized controlled trials (RCTs), which recommended a minimum of 15 days of psychological intervention reported that there was a favorable correlation between infertile women's pregnancy rates. The efficacy of therapies in lowering anxiety levels and enhancing adaptations that raise infertile women's chances of conception can be used to explain these outcomes. Meanwhile, results were in contrast with **Maroufizadeh, Navid, Omani-Samani & Amini (2019)**, who found no difference in clinical IVF pregnancy rates after the intervention.

The findings of the present study demonstrated a significant relation between post intervention infertility adjustment and obstetric data regarding the (number of pregnancies, type of infertility, duration,

and cause of infertility). Similar to this finding, the length of infertility was positively connected with adaptation in research by **Manuela, Antunes, João, & Claudia (2015)** on the association between the timing of conception attempts and adaptability to infertility. Additionally, on all parameters of the fertility adjustment scale, women who have been trying to get pregnant for three years or longer had low adjustment.

Contrarily, **Benyamini (2018)** emphasized that coping with infertility was a very personal experience impacted by prior pregnancies. The number of ART treatments and the length of infertility only indirectly affected adaption by altering how both men and women see fatherhood. These results may be explained by the length and kind of infertility, which may have a big influence on how well women can handle crises like infertility. Whether it was the reason or not was frequently seen as a problem for women and may be connected to women's lowered adaptive capacity.

According to the study's findings, there was a statistically significant correlation between post-intervention anxiety level and the number of pregnancies, type of infertility, and length of infertility. These findings matched those of a cross-sectional study carried out by **Rahmati, Delpisheh, Moghadam, Sayehmiri, & Mohamadian (2019)** who concluded a statistically significant correlation between anxiety with the kind and length of infertility. Meanwhile, the findings were contradictory with a study conducted by **Maroufizadeh et al., (2019)** who found that there was no association between duration of infertility and anxiety level for infertile women.

However, there was no statistically significant correlation between post-intervention anxiety levels and prior births, the number of living children, the reasons of infertility, or the number of ART. This finding was in line with a descriptive correlation research by **Lasuh, David & Aleyamma (2020)**, which found no link between anxiety and infertility reasons or treatment length. Additionally, these findings were in line with those of **Ahmed et al. (2019)**, who found no significant association between infertility reasons and time on ART and anxiety levels in infertile women.

The results of this study showed a statistically significant positive correlation between post-intervention state trait anxiety and infertility adjustment. Consistent with a single-group cohort design conducted by **Zurlo, Cattaneo Della Volta, & Vallone, (2020)** and found a statistically significant positive correlation between post-intervention infertility adjustment and state trait anxiety. This might be because women who are infertile manage

their anxiety levels because of adjusting to reproductive challenges.

Conclusion

Based on the present study findings the three study hypotheses were accepted where, social media-based intervention was an effective tool in improving levels of adjustment, pregnancy rate and reducing levels of anxiety among infertile women undergoing assisted reproductive technology.

Recommendations

- Psychological support should be provided to all infertile couples to enhance coping with infertility and manage their problems effectively.
- Implementing in-service counseling programs for infertile women in discussing steps of assisted reproductive technologies management to reduce levels of anxiety and improve assisted reproductive technologies outcomes.

Further study

- Examining the effect of an educational intervention on pregnancy outcomes for infertile women is recommended.

Conflicts of interest:

There are no conflicts of interest.

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