The effect of self-care counseling on depression and anxiety in women with Endometriosis: a randomized controlled trial.

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Abstract

**Background**: Considering the prevalence of endometriosis and depression and anxiety caused by this disease and its effect on the body, mind and quality of life of patients, this study was performed to determine the effect of self-care counseling on depression and anxiety (primary outcome), and quality of life of women with endometriosis (secondary outcome).

**Method**: This randomized controlled clinical trial was conducted on 76 women with endometriosis who were treated in Al-Zahra Teaching and Treatment Center of Tabriz between 2017-2019. The patients were divided into intervention (counselling) and control groups using random blocking method. For the intervention group, self-care group counseling was held weekly for 7 sessions. The control group received routine care. The Socio-demographic Questionnaire, Beck Depression Inventory, Spline Berger Anxiety Inventory and SF36 Quality of Life Questionnaire were completed by the researcher through an interview before and four weeks after the intervention.

**Results**: No statistically significant difference was found between the intervention and control groups in terms of socio-demographic characteristics (p>0.05). After intervention mean scores of state anxiety (mean difference: -0.12, 95% confidence interval: -9.6 to -14.4, p<0.001) and trait anxiety (mean difference: -10.9: 95% confidence interval: -9.1 to -12.7, p=0.001) were significantly lower than control group and mean score of depression in counseling group was less than control group but it was not significant (p=0.565). Mean score of quality of life in terms of physical health (mean difference= 17.2, 95% confidence interval: 13.8 to 20.5, p<0.001) and in terms of mental health mean difference = 12.0, 95% confidence interval: 9.0 to 14.9, p<0.001) were significantly upper in counselling group.

**Conclusion**: Self-care counselling is effective on anxiety and quality of life of women with endometriosis. So in addition to other therapies, this method is recommended to improve the mental health of patients with this disease.

**Trial Registration**: IRCT Registration Number: IRCT 20111219008459N13, registered 10 February
Background

Endometriosis is the second most common gynecological disease. It is defined as a benign and estrogen-dependent inflammatory disease characterized by the presence and growth of endometrial-like glands and stroma outside the uterine cavity (1, 2). Etiology of the disease is still unknown. However, some theories are proposed to explain endometriosis pathogenesis including changes in the immune system, celomic metaplasia (transformation of the germinal epithelium into ovarian endometriosis), benign metastasis (spread of endometriosis), and retrograde menstruation. The latter is the most accepted theory nowadays (3). Although the exact incidence of endometriosis remains unknown, approximately 2–10% of women of reproductive age and almost 50% of women with pelvic pain are linked to endometriosis (4, 5). Based on current knowledge, 47% of women referred for infertility problems have endometriosis (6). Endometriosis in premenarcheal girls (7) and also in 2–5% of postmenopausal women was reported (8).

Symptoms and severity of endometriosis vary depending on location, spread, and depth of lesions (4, 9). The most common symptoms are pain, reduced fertility, gastrointestinal and bladder complications, and heavy and prolonged menstrual bleeding (10, 11). There is currently no satisfactory therapy for endometriosis. The symptoms (e.g. pain) are relieved with either medication or surgery (12). The main objectives of endometriosis treatment are relieving pain, improving quality of life, preventing recurrent endometriosis, preserving fertility and reducing anatomical impact (13, 14).

The chronic nature of endometriosis and potential impacts of its symptoms put the patients at the risk of developing mental disorders. Endometriosis-associated infertility has negative impacts on both marital relationships and social activities (15). Painful sex and sexual dysfunction (consequences of endometriosis) also negatively affect the quality of life, marital relationships and self-confidence leading to development of mental disorders including depression, anxiety, mood disorders and mental diseases (16, 17). Other endometriosis-associated symptoms including dysuria, dysmenorrhea, dyspareunia, and pelvic pain reduce mental health of the patients (18, 19). Overlapping impacts of
endometriosis on different aspects of life (physical, psychological, reproductive, communicational, and quality of life) of women do not allow separate analysis of these impacts (20). Endometriosis also has negative impacts on job and education (21, 22).

Different studies have shown an increased prevalence of depressive symptoms and anxiety in women with endometriosis (23, 24) highlighting the importance of mood disorders in the perception of pain in these women (23, 25). Laganà et al showed high level of psychiatric disorders (especially somatization, depression and anxiety) in women suffering from endometriosis (26). Quality of life of women with endometriosis is under the influence of many factors including pain, reduced fertility, anger about disease recurrence, and uncertainty about the future regarding repeated operations or long-term medical therapy (27). Pope et al. showed that endometriosis is associated with a wide range of psychiatric disorders, especially depression, anxiety, stress and poor quality of life (18). Depression, anxiety and quality of life of patients with endometriosis were assessed in a prospective study. The results showed that 86.5% of the patients developed symptoms of depression. They also found a positive relationship between severity of pain and anxiety (25).

Counseling greatly contributes to treatment of chronic diseases. Recent studies have shown that patient-oriented counseling encourages the patients to actively participate in their own treatment and promotes positive outcomes of the treatment (28, 29). Counseling helps the patients to deal with emotions, adhere to the therapy, understand the treatment rationale, improve quality of life, decrease stress, reduce anxiety, feel more secured, and increase life satisfaction (30). Adequate knowledge on the chronic disease help the patients to combat the disease. Therefore, the type and style of counseling for chronic disease significantly contribute to treatment of the patients (31, 32).

According to the American Society for Reproductive Medicine, endometriosis should be viewed as a chronic disease requiring a life-long personalized management plan (33). Patients with chronic illnesses are inevitably in charge of their own daily care. Therefore, they determine the severity of symptoms and outcomes of each type of treatment (33, 34). W.H.O. defined self-care as" the ability of individuals, families and communities to promote health, prevent disease, maintain health, and cope with illness and disability either with or without the support of healthcare givers". Self-care is a self-
guided active practice needed to prevent short-term and long-term complications (35). It reflects that the person is responsible for health-related behaviors and activities needed to control and assess individual health (36). Self-care for chronic diseases helps to maintain physical and mental health, reduce mortality rates, decrease healthcare costs, increase patient satisfaction and promote quality of life (34, 37).

Current non-surgical treatments for endometriosis (e.g. non-steroidal anti-inflammatory drugs, oral contraceptive pills and hormonal therapies) have limited efficacy (38) and approximately 25–50% of patients discontinue treatment due to adverse effects of the medication (39). Therefore, women with endometriosis tend to practice self-care and lifestyle interventions to relieve some of the symptoms or avoid side effects of the medications (40).

Given the importance of psychological consequences of endometriosis and lack of assessment of impact of self-care counseling on depression and anxiety in women with endometriosis, the research group decided to conduct a study to determine the impact of self-care counseling on depression, anxiety (primary outcome) and quality of life (secondary outcome) in women with endometriosis.

Method

Design of study and participants

This study is a randomized, controlled trial, based on the CONSORT guideline with single-blinding (the outcomes analyzer was blinded to study groups) and having two parallel arms with 1:1 allocation ratio, conducted on 76 women with endometriosis who were from 15 to 45 years and were hospitalized in Al-Zahra Teaching and Treatment Center of Tabriz in the past 1-3 years. The participants were selected from January 2017 to June 2019. Inclusion criteria were residing in Tabriz, at least secondary school educational level, diagnosed with endometriosis via laparoscopy during the past 1-3 years, being in the age range of 15-45 years, and availability of home and cellphone number. Exclusion criteria were any condition that increased the risk of anxiety and depression (e.g. irritable bowel syndrome), intake of antidepressants in the past 3 months, malignancies according to the patient, a severe depression and a severe anxiety, a recent trauma (e.g. death of relatives or divorce) that increases the risk of developing mental disorders, speech or hearing disorders that complicate
communication with the researcher, being pregnant after being diagnosed with endometriosis and a history of current or past mental illness or a history of hospitalization for that.

The sample size was calculated as 35 using the G-Power software based on the study by Waller et al (41) by taking into account the depression variable and the largest standard deviation of depression subscales (m1=11.8, m2= 7.2 with the assumption of 35% reduction in the depression score due to intervention, sd1=sd2=6.6, α=0.05 and power=80%). The sample size was determined as 38 by taking into account 10% sample loss.

**Sampling and randomization**

The participants were selected after obtaining the license from the ethics committee of Tabriz University of Medical Sciences (ethical code: REC.1397, 625 TBZMED.IR) and registering the study on the Iranian Registry of Clinical Trials (IRCT 20111219008459N13). The researcher visited Al-Zahra Teaching and Treatment Center of Tabriz, prepared a list of women with endometriosis hospitalized in the center during the past 1-3 years based on medical records and contacted the patients through phone calls and explained objectives and design of the project. Then in a face-to-face meeting with eligible patients the objectives and design of the project were fully explained and informed written consent were obtained. The socio-demographic questionnaire, Beck Depression Inventory (BDI-II), Spline Berger State-Trait Anxiety Inventory (STAI), and the Quality of Life Questionnaire (SF36) were completed through interviews. The patients with mild to severe anxiety (32-75 state anxiety scores and 32-72 trait anxiety scores) and mild to moderate depression (14-28 depression scores) were enrolled in the study.

The patients were divided into intervention (counselling) and control groups using stratified block randomization (with blocks of 4 and 6) based on infertility history via the www.random website. The intervention was written down on a paper and placed in sequentially numbered opaque sealed envelopes by a person who was not involved in sampling and data analysis to conceal the allocation sequence. The envelopes were given to the participants in order of their arrival and the type of group was determined.


**Intervention**

For the intervention group, self-care group counseling was conducted during 7 sessions of 90-60 minutes per week at Al-Zahra Training and Treatment Center in a relaxing and friendly environment and in the native language. Content of the sessions is given here:

First session: In this inducting session, the number and duration of each session, the interval between sessions, and the rules governing the sessions, definition and concept of endometriosis, etiology, diagnostic methods, current treatment methods, and complications were explained to the patients. An educational booklet was distributed among the patients.

Second session: The concept and importance of self-care were explained to the patients in a simple tone. Self-care skills and aspects were also paraphrased.

Third session: Necessary training was given on proper and healthy diet.

Fourth session: The importance of physical exercise in healthy lifestyle and relief of endometriosis symptoms (especially pain) were explained in a simple tone. The proper medication regimen (e.g. timing and amount of medication) was also discussed. The key points were repeated at the end of each session.

Fifth session: Non-pharmacological pain management therapies were explained and the factors that worsen the endometriosis symptoms and harmful practices were also explained and was recommended to be avoided.

Sixth session: The self-care aspects (psychological, social and spiritual) and their impacts on physical and mental health were explained to the participants.

Seventh session: Self-care behaviors were practiced.

The control group received routine care. The Beck Depression Inventory, the Spline Berger Anxiety Inventory and SF36 Quality of Life Questionnaire were completed by the researcher through an interview via phone calls four weeks after the intervention (12 weeks after initial assessment).
Data collection tools:

Required data was collected using the above instruments.

Socio-Demographic questionnaire collected data on age, marital status, duration of marriage, number of children, history of infertility, history of treatments for infertility, tendency to get pregnant again, ethnicity, education, occupation, education of spouse, occupation of spouse, adequacy of income to cover living expenses, place of residence, life satisfaction, duration of endometriosis, time of diagnosis, treatment methods, and post-treatment status. This questionnaire was prepared by the researcher. Its content validity was approved by 10 faculty members of Tabriz University of Medical Sciences.

Beck Depression Inventory

The Beck Depression Inventory was developed by Beck et al in 1996. It contains 21 items that assesses all domains of depression based on the cognitive theory of depression. Each item has four options. The individuals reveal their feelings and behaviors by answering each question. Each option is scored from 0 to 3 depending on the severity of symptoms. The range of scores is from 0 to 63. The inventory can be applied to >13 years of age populations since it assesses both incidence and severity of depression. It reflects feelings during the past two weeks. 0<score<13 represent negligible depression, 14<score<19 represents mild depression, 20<score<28 represents moderate depression, and 29<score<63 represents severe depression (42). Rajabi et al. assessed reliability of the Beck Depression Inventory-Second Edition by calculating Cronbach’s alpha coefficient. Alphas for the whole questionnaire, the first factors (cognitive-affective) and the second factors (negative attitudes-somatic symptoms) were obtained as 0.86, 0.84 and 0.87 respectively. These alphas were acceptable, which showed homogeneity of the subscales. The correlation coefficients of the whole scale with the first and second factors were 0.90 and 0.95 respectively. The correlation of the first and second factors was obtained as 0.75. These coefficients were significant at p<0.001 significance level (43).

State-trait anxiety inventory (STAI)
This is a standard questionnaire. Its reliability was confirmed in previous studies. The scale used in this study contained 40 self-report items (20 for the state anxiety and 20 for trait anxiety). The state anxiety is scored based on a four-point Likert scale ((1) very low, (2) low, (3) very high, and (4) very high). The trait anxiety is also scored based on a four-point Likert scale ((1) almost never, (2) sometimes, (3) often, and (4) almost always). The minimum and maximum scores were 20 and 80 respectively. Items 1, 2, 5, 8, 10, 11, 15, 16, 19, 20, 21, 23, 26, 27, 30, 33, 34, 36, 36, 39 were scored inversely (44). In state anxiety, 20<score<31 represents mild anxiety, 32<score<42 represents low to moderate anxiety, 43<score<53 represents moderate to high anxiety, 54<score<64 represents relatively severe anxiety, 65<score<75 represents severe anxiety, and score>75 represents severe anxiety. In trait anxiety, 20<score<31 represents mild anxiety, 32<score<42 represents low to moderate anxiety, 43<score<52 represents moderate to high anxiety, 53<score<62 represents relatively severe anxiety, 63<score<72 represents severe anxiety, and score>72 represents very severe anxiety. Mahram et al. standardized the scale for Iranian population and calculated the Cranach's alpha as 0.91 (45).

**The short form healthy survey (SF-36)**

SF36 Quality of Life Questionnaire is the most popular tool for measuring quality of life. It was developed in the United States and translated into different languages. It measures 8 health-related concepts, namely physical functioning (10 items), role limitation due to physical reasons (4 items), physical pain (2 items), public health (5 items), vitality (4 items), social functioning (2 items), role limitations due to emotional reasons (3 items), and mental health (5 items). An item indicating changes in public health per year was added to this questionnaire. The score of each dimension was determined by the score of items included in that dimension. The Quality of Life Questionnaire was designed in the United States in 1992. Reliability and validity of the questionnaire was studied by Montazeri et al. in Iran in 2005. They recommended it as a reliable and reliable tool for measuring public health-related quality of life (46). Reliability of the questionnaires was determined using test-retest on sample of 20 women within a
two-week interval by calculating Cronbach’s alpha and the intraclass correlation coefficient in the present study. In this study intraclass correlation coefficients of Beck Depression Inventory, State Anxiety Inventory, Trait Anxiety Inventory and SF36 Quality of Life Questionnaire were calculated as 0.91, 0.88, 0.83 and 0.93 respectively. The Cronbach’s alphas were also obtained as 0.87, 0.78, 0.72 and 0.91 respectively.

**Statistical analysis**

The collected data was analyzed using the SPSS-Version 21 software. Normality of quantitative data was determined using the Kolmogorov-Smirnov. All variables were normal except the depression. Chi-square, Trend chi-square, Fisher’s exact test and independent t-test were used to assess homogeneity of the groups in terms of personal and social characteristics. The independent t-test was used to compare the mean anxiety, depression and quality of life scores between the two groups before the intervention. ANCOVA was used to compare the scores between the two groups within a four-week interval by controlling the baseline values. The Mann-Whitney U test was used to assess the variables with abnormal distribution. All analyzes were performed based on intention-to-treat method. P<0.05 was considered significant.

**Result**

The participants consisted of 332 women with endometriosis who were between 15 and 45 years of age and were hospitalized in Al-Zahra Teaching and Treatment Center of Tabriz in 2017–2019. Of these, 256 people did not meet the inclusion criteria and 76 patients were randomly assigned to two counseling (38) and control (38) groups. Three patients in the control groups left the study (1 person was not available at follow-up time and 2 persons refused to fill out the questionnaires). Therefore, 38 in the counseling group and 35 in the control group were assessed in follow up (Fig. 1).

No statistically significant difference was found between the intervention and control groups in terms of personal social characteristics (Table 1).

| Variable     | Counselling group (n = 38) | Control group (n = 38) | P-Value |
|--------------|---------------------------|------------------------|---------|
| Age (year)*  | 34.8 (6.0)                | 34.0 (6.2)             | 0.539†  |
| Marital Status |                           |                        | 0.338*  |
| Widow        | 1 (2.6)                   | 0 (0.0)                |         |
| Divorced                  | 5 (13.2) | 2 (5.3) |
|--------------------------|----------|---------|
| Married                  | 27 (71.1)| 33 (86.8)|
| Single                   | 5 (13.2) | 3 (7.9) |
| Duration of marriage (year)* | 12.9 (6.4) | 12.1 (6.9) | 0.624† |
| Number of children       |          |         |
| No child                 | 11 (28.9)| 9 (23.7) |
| One child                | 6 (15.8) | 17 (44.7)|
| Two and more child       | 14 (36.8)| 8 (21.1) |
| History of infertility   |          |         |
| Yes                      | 15 (39.5)| 14 (36.8)| 0.804‡ |
| Willingness to re-pregnancy |         |         |
| Yes                      | 19 (50.0)| 19 (50.0)| 0.715‡ |
| Education                |          |         |
| Secondary school         | 12 (31.6)| 11 (28.9)| 0.464§ |
| High school              | 2 (5.3)  | 4 (10.5) |
| Diploma                  | 15 (39.5)| 11 (28.9)|
| Academic                 | 9 (23.7) | 12 (31.6)|
| Job                      |          |         |
| Housewife                | 28 (73.7)| 27 (71.1)| 0.509# |
| Employed                 | 10 (26.3)| 11 (28.9)|
| Husband’s Education      |          |         |
| Illiterate               | 0 (0.0)  | 1 (2.6)  |
| Elementary               | 8 (21.1) | 3 (7.9)  |
| Secondary school         | 7 (18.4) | 5 (13.2) |
| High school              | 3 (7.9)  | 3 (7.9)  |
| Diploma                  | 6 (15.8) | 10 (26.3)|
| Academic                 | 5 (13.2) | 11 (28.9)|
| Husband’s Job            |          |         |
| Unemployed               | 2 (5.3)  | 1 (2.6)  |
| Employee                 | 3 (7.9)  | 6 (15.8) |
| Worker                   | 7 (18.4) | 9 (23.7) |
| Other**                  | 17 (44.7)| 17 (44.7)|
| Income sufficiency       |          |         |
| Enough                   | 7 (18.4) | 10 (26.3)| 0.185§ |
| Not enough               | 12 (31.6)| 7 (18.4) |
| Relatively enough        | 19 (50.0)| 21 (55.3)| 0.904# |
| House status             |          |         |
| Personal                 | 19 (50.0)| 23 (60.5)|
| Rental                   | 10 (26.3)| 8 (21.1) |
| Woman’s parents’ house   | 2 (5.3)  | 2 (5.3)  |
| Husband’s parents’ house | 7 (18.4) | 5 (13.2) |
| Satisfaction with marital status | | | 0.264§ |
| Satisfied                | 22 (57.9)| 26 (68.4)|
| Relatively satisfied     | 5 (13.2) | 4 (10.5) |
| Dissatisfied             | 2 (5.3)  | 3 (7.9)  |
| Duration of Endometriosis Diagnosis (Year)* | 3.9(2.2) | 3.3(1.9) | 0.179† |
| Treatment                |          |         |
| Laparoscopy              | 29 (76.3)| 32 (84.2)| 0.719# |
| Laparoscopy + medical    | 6 (15.8) | 5 (13.2) |
| Laparoscopy + medical + Herbal | 2 (5.3) | 1 (2.6) |
| Laparoscopy + herbal     | 1 (2.6)  | 0 (0.0)  | 0.105‡ |
| Post treatment condition |          |         |
| Recover                  | 32 (84.2)| 26 (63.4)|
| Recurrence               | 6 (15.8) | 12 (31.6)|

†Trend Chi-square test, † Independent T-test # Fisher exact test ‡ Chi-square test
*Numbers are reported in mean (standard deviation)

Mean (standard deviation) score of depression was 0.21 (9.0) in the counseling group before the
intervention and 0.20 (8.1) in the control group. There was no statistically significant difference between the groups in terms of depression (P = 0.645). Mean (standard deviation) score of depression was 14.6 (9.5) four weeks after the intervention in the counseling group and 15.4 (11.4) in the control group. The Mann-Whitney U test results showed no statistically significant difference between the groups in terms of depression by controlling baseline values (P = 0.565) (Table 2).

| Variable                  | Counselling group (N = 38) median (first and third quartiles) | Control group (N = 38) median (first and third quartiles) | P value |
|---------------------------|---------------------------------------------------------------|------------------------------------------------------------|---------|
| Pre intervention          | 18.0 (14.7–30.0)                                              | 17.0 (14.7–25.2)                                            | 0.645   |
| Post intervention         | 12.0 (7.7–23.0)                                               | 11.0 (7.0–19.0)                                             | 0.565   |

§ Due to the abnormal distribution, the Mann-Whitney U test was used and the median (first and third quartiles) was reported.

The depression score range is 0–63

There was no significant difference between the groups in terms of state anxiety before the intervention (p = 0.507). Mean (standard deviation) of state anxiety score was 44.8 (10.4) before the intervention and 35.1 (8.0) four weeks after the intervention in the counseling group. Mean (standard deviation) of obvious anxiety score was 43.2 (10.6) before the intervention and 47.1 (10.2) four weeks after the intervention in the control group. The ANCOVA test results showed statistically significant difference between the groups in terms of state anxiety score by controlling baseline values (mean difference: -0.12, 95% confidence interval: -9.6 to -14.4, p < 0.001). There was no statistically significant difference between the groups in terms of trait anxiety before the intervention (P = 0.136). Mean (standard deviation) score of trait anxiety was 44.9 (9.9) before the intervention and 37.0 (8.2) four weeks after the intervention in the counseling group. Mean (standard deviation) score of trait anxiety was 41.7 (8.8) before the intervention and 45.6 (9.1) four weeks after the intervention in the control group. ANCOVA test results showed statistically significant difference between the groups in terms of trait anxiety score by controlling baseline values (mean difference: -10.9: 95% confidence interval: -9.1 to -12.7, p < 0.001) (Table 3).
Table 3
Comparison of mean scores of state and trait anxiety before and 4 weeks after intervention between counselling and control groups

| Variable     | Counselling group | Control group | Mean difference (95% confidence interval) | p-value |
|--------------|-------------------|---------------|------------------------------------------|---------|
| State anxiety |                   |               |                                          |         |
| Pre intervention | 44.8 (10.4)   | 43.2 (10.6)  | 1.6 (-3.2 to 6.4)                        | 0.507   |
| Post intervention | 35.1 (8.0)   | 47.1 (10.2)  | -12.0 (-14.4 to -9.6)                    | <0.001  |
| Trait anxiety  |                   |               |                                          |         |
| Pre intervention | 44.9 (9.9)    | 41.7 (8.8)   | 3.2 (-1.0 to 7.5)                        | 0.136   |
| Post intervention | 37.0 (8.2)   | 45.6 (9.1)   | -10.9 (-12.7 to -9.1)                    | <0.001  |

For comparison of groups before intervention Independent t-test and after intervention, ANCOVA test with controlled baseline values was used.

The range of state and trait anxiety scores is 20–80.

There was a significant difference between the counseling and control group in terms of physical health before the intervention (p < 0.05). Mean (standard deviation) score of physical health was 55.0 (8.1) before the intervention and 58.9 (4.9) four weeks after the intervention in the counseling group. Mean (standard deviation) score of physical health was 43.8 (6.6) before the intervention and 39.5 (5.4) four weeks after the intervention in the control group. The ANCOVA test results showed statistically significant difference between the groups in terms of physical health score by controlling baseline values (mean difference = 17.2, 95% confidence interval: from 13.8 to 20.5, p < 0.001).

There was a significant difference between the counseling and control group in terms of mental health before the intervention (p < 0.05). Mean (standard deviation) of mental health score was 53.3 (6.2) before the intervention and 57.1 (4.8) four weeks after the intervention in the counseling group. Mean (standard deviation) of mental health score was 47.5 (7.5) before the intervention and 44.7 (4.8) four weeks after the intervention in the control group. The ANCOVA test results showed statistically significant difference between the groups in terms of mental health score by controlling baseline values (mean difference = 12.0, 95% confidence interval: -9.0 to 14.9, p < 0.001) (Table 4).
Comparison of mean scores of quality of life before and 4 weeks after intervention between counselling and control groups.

| Variable                  | Counselling group | Control group | Mean difference (95% confidence interval) | P-Value |
|---------------------------|-------------------|---------------|-------------------------------------------|---------|
| Quality of life           |                   |               |                                           |         |
| Physical Health Field     |                   |               |                                           |         |
| Pre intervention          | Mean (SD) (n = 38)| Mean (SD) (n = 38)| Mean difference (95% confidence interval) |         |
| Mental health field       |                   |               |                                           |         |
| Pre intervention          | Mean (SD) (n = 38)| Mean (SD) (n = 38)| Mean difference (95% confidence interval) |         |
| Post intervention         | Mean (SD) (n = 38)| Mean (SD) (n = 38)| Mean difference (95% confidence interval) |         |

For comparison of groups before intervention Independent t-test and after intervention, ANCOVA test with controlled baseline values was used.
The range of quality of life scores is 0-100.

Discussion
The results of the present study showed a reduction in the mean score of depression and anxiety four weeks after the intervention in the counseling group compared to the control group. The reduction was significant in case of anxiety score but not significant in case of depression. The mean score of quality of life was significantly higher in the counseling group than the control group.

Pope et al assessed the association between endometriosis and mental disorders in a systematic review study. They reviewed 18 papers on the relationship between endometriosis and psychological symptoms. They also studied 999 patients with endometriosis. Of 18 studies, 14 reported that endometriosis was at least associated with a reduction in some aspects of mental functioning, mental health, and quality of life. These studies also showed that women with endometriosis are at risk of psychological disorders and should be screened and treated for mental disorders (47). Qualitative studies identified a wide range of emotions in women with endometriosis including distress, hopelessness, worthlessness, loneliness and suicide. Depression was more common in women who suffered from persistent pelvic pain. Similar psychological complications were identified in women with infertility-associated endometriosis including anxiety, inadequacy, depression, and relationship problems. Studies have shown that endometriosis symptoms have negative impacts on quality of life, daily activities, career advancement, and sexual relationships. Delays in diagnosis of endometriosis can lead to severe psychological consequences, distress, and insecurity. The study showed that women with endometriosis suffered from depression (86%), moderate to severe anxiety (29%), and
mood disorders (68%). The prevalence of these disorders was much higher in these patients compared to the general population (48).

The impact of self-care counseling on mental health and quality of life in women with endometriosis was not assessed before. Therefore, similar studies are discussed here:

Zhao et al assessed the impact of progressive muscle relaxation on depression, anxiety, and quality of life in a randomized clinical trial. They examined 100 Chinese women with endometriosis who were 18–48 years of age and underwent agonist therapy. The therapy lasted 12 weeks and significantly reduced depression and anxiety, and improved quality of life in the intervention group (49). The results of this study were consistent with the results of present study except in the depression variable. However, the type of intervention and the sample size were different in these two studies.

Alhayek et al assessed the impact of a certain training program on anxiety and depression in a prospective study in Saudi Arabia. They examined 104 diabetic patients from May 2011 to October 2012. The training program was a videotape about diabetes and individual counseling sessions. Depression significantly decreased in the patients after six months (50). The results of this study were inconsistent with the results of the present study. There was no control group and group counseling in the former study and target group was not women with endometriosis.

Self-care is a conscious self-regulatory learning practice needed to supply and maintain necessary resources in order to preserve physical, mental, social, spiritual function and growth for survival. It is a life-long practice at all eras (51). Self-care training courses offer a broad insight into individuality, objective and life. It encourages people to accept their disease and be rational about it. It guides them to pursue and promote self-care practices (34). There was a significant statistical difference in terms of anxiety between the counseling and control groups after the intervention in the present study. Various aspects of self-care (e.g. diet, physical exercise, and pain control) were discussed in the counselling sessions that may promoted self-control practices and self-care behaviors and help the patients to control their anxiety.

There was no significant statistical difference in terms of depression between the counseling and control groups after the intervention in the present study. Counselling did not decrease depression
since the chronic endometriosis with no definitive treatment and associated complications (e.g. infertility and stress) significantly increase depression and perhaps our intervention has not been enough in resolving many of these tensions.

The results of the present study showed improvement in quality of life after the intervention in the counseling group compared to the control group. The following are several similar studies in line with the results of the present study in different patients:

Abdallah et al. assessed impact of educational intervention on sexual function and quality of life of 138 women with endometriosis in a semi-experimental study. The intervention improved sexual function and quality of life of these women (52). The results of this study were consistent with the results of the present study and the main component of self-care counseling is training and providing necessary information to patients.

A similar semi-experimental study aimed to assess the impact of self-care training on the quality of life of 60 diabetic patients in Seyed Al-Shohada Treatment Center of Tehran was done. The results showed that proper training on prevention and treatment of diabetes can promote self-care practices, improve public health, and enhance quality of life of diabetic patients (53). The results of this study were consistent with the results of the present study. However, the target group and type of intervention were different in these two studies.

Heidari et al. assessed 60 elderly people who resided in the Omid Elderly Care Center of Brujen in a controlled randomized trial. They reported that self-care training program for the elderly (proper diet, physical exercise, sleep and medication) improved their quality of life (54). Narimani et al. assessed 32 dialysis patients in Maragheh in a semi-experimental study. They reported that self-care training in hemodialysis patients improved their quality of life (55).

In explaining the results, it can be said that the evidence shows that self-care education leads to the improvement of the patient's information and feelings about the disease and its conditions, the ability to cope daily and the development of self-care behaviors that promote inner satisfaction, psychological well-being, and self-efficacy (components of quality of life) (56–58).

Limitations and strengths
All participants were literate in this study therefore, the results cannot be generalized to the population of illiterate women. The strengths of this study was adherence to all principles of clinical trial (e.g. random allocation and concealment of allocation), completion of the questionnaires by the researcher and eliminating the probability of incomplete, false and ignored items and answers. Also, during the counseling sessions, the native language of participants was used to communicate more with them.

Conclusion
The results showed that self-care counseling may reduce anxiety and improve the quality of life of women with endometriosis. In addition to physical support for them, to improve the consequences of their illness, improve mental health and increase the quality of life, health care providers can use this method of counseling along with routine care for women with endometriosis referred to medical centers.

Abbreviations
BDI: Beck Depression Inventory; STAI: State-Trait Anxiety Inventory; SF-36: Short Form Healthy Survey (36 items).

Declarations

**Ethics approval and consent to participate**
All participants were informed about the study and written informed consent was obtained from them (Consent to participate was obtained from the parents/guardians for participants under 16 years old). The Ethics Committee of Tabriz University of Medical Sciences confirmed the study (ethical code: REC.1397, 625 TBZMED.IR).

**Consent for publication**
Not applicable.

**Availability of data and materials**
Data and materials of this study are available from the corresponding author upon reasonable request.

**Competing interests**
The authors declare that they have no competing interests.
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**Authors' contributions**

NF implemented the study and was responsible for data collection and wrote the first draft of the manuscript. SHH and MM contributed in the study design and data analysis, assisted in the preparation of the final version of the manuscript, KHE designed the counseling protocol. All the authors read and approved the final version of the manuscript.

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