



## Research article

## Cognitive-behavioral counseling and mental health of pregnant women

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## ABSTRACT

**Background:** Pregnancy is characterized with several physical and mental changes in women. These changes cause mental health problems in pregnant women and especially in nulliparous women.

**Objective:** To determine the effects of cognitive-behavioral counseling on mental health of pregnant women.

**Method:** The study was carried out as a quality of life clinical trial with a control group. The participants were 60 pregnant women (less than 20 weeks) who visited Kamyaran-based health centers (Iran) in 2018. The participants were allocated randomly to experiment and control groups (n = 30 each). The experiment group attended eight group behavioral cognitive counseling sessions (70-90min) on weekly basis. Pre-intervention data was collected using a demographics checklist and Goldberg's General Health Questionnaire. One month after the last counseling session, the questionnaires were filled out once more by all the participants. The data was analyzed using Mann-Whitney, independent t-test, Friedman, and Chi Squared tests using SPSS (23).

**Results:** The results showed that the difference between the control and experiment groups in terms of mental health score was not significant before the intervention (p = 0.169). However, the difference between the two groups was significant immediately (p = 0.001) and one month (p = 0.001) after the group behavioral cognitive counseling.

**Conclusion:** The group behavioral cognitive counseling sessions improved mental health in nulliparous women. Further studies with longer follow-up terms to ensure resilience of the effects of such interventions are recommended.

## 1. Introduction

Pregnancy is a critical life experience for women, which in many cases is featured with stress and physiological/mental changes [1]. Despite the scientific advances about mental and physical problems during pregnancy, mental problems are still one of the main issues for pregnant women [2]. The first pregnancy experience in women is a conditional crisis. While pregnancy usually causes a notable fit of happiness and euphoria in the parents, it may cause anxiety in nulliparous women as well [3].

The stress caused by the birth of the first child is categorized at the top of intensive mental-social stresses [4]. Mental disorders like depression and anxiety might disrupt one's social role and efficiency. Studies have shown that mental pressure causes social functions, psychological, physical, and familial disorders [5]. Liu et al. (2013) reported that anxiety disorders in pregnancy were highly important as more than 50% of

pregnant women develop some degrees of anxiety, of which 8.5–10.5% is generalized anxiety, 1.4–5.2% is panic disorder, 1.2–5.2% is obsessive-compulsiveness, and 3% is post-traumatic stress disorder [6].

Pregnancy is one of the major stressors that might uncover or intensify the background causes for depression. The risk of depression is higher in the cases of marital problems, unplanned pregnancy, history of depression in family or the individual, and low socio-economic class [5, 7]. Dunkel Schetter and Tanner (2012) concluded that stress, anxiety, and depression in pregnancy can be associated with preterm birth, fetal neurodevelopment and neonate outcomes [8].

Pregnancy brings in several tensions and many women adapt to such tensions by seeking family and social supports [9]. However, some women might face mental disorders and develop the ground for mental and spiritual problems [7]. Therefore, many changes that a woman experiences during pregnancy affects them from different health aspects especially mental health and their quality of life [10]. Such changes may

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be beyond the mother's control and unprecedented and make her vulnerable physically and mentally [9]. In other words, women's physical, mental, and social health and quality of life in general undergo severe changes during pregnancy [7].

Given the different problems that women experience during pregnancy, it is essential to find effective programs to improve their health and quality of lives [11]. Corno et al. (2018) found in their case series study that positive psychotic interventions led to appropriate psychological support, increased mental health, and reduced symptoms of depression in pregnant women [12]. Behavioral cognitive counseling is an effective method that helps individuals to think differently. Using new ways of thinking, they can adopt healthier and better behaviors in the face bitter events and experiences [13]. Such approach may be effective in mother's health [14]. Several studies have put emphasis on health condition of pregnant women and found it essential for pre/post-pregnancy cares [7, 10, 15]. In this regard, Noorbala et al. (2019) found that psychiatric interventions could increase the mental health of pregnant mothers [16]. Currently in Iran, the routine pregnancy cares for pregnant women relies heavily on physical health care and mental health cares, especially mental health prevention programs, are almost neglected by families and care centers. Given this introduction and the paucity of studies on mothers' health, nulliparous women in particular, the present study is an attempt to determine the effects of group behavioral cognitive counseling on mental health of nulliparous pregnant women visiting Kamyaran-based health centers (Iran).

## 2. Methods

### 2.1. Research design

A quality of life clinical trial was carried out [17] with a study population comprised of all pregnant women (less than 20 weeks).

### 2.2. Study setting

The participants were the women visiting Kamyaran-based health centers. In addition to the routine cares, the experiment group (n = 32) participated in eight group behavioral cognitive sessions (70-90 min) held by the first author. The experiment group was divided into three groups of 11–12 members. The content and structure of the sessions are listed Table 1. The control group (n = 30) received the routine cares of the health centers. Then the both groups filled out the demographics checklist and Goldberg General Health Questionnaire (GHQ) with 28 statements.

The first author held the eight weekly group behavioral cognitive counseling sessions (70-90 min) for the experiment group. Immediately and one month after the last session, the participants in the both groups filled out the questionnaires. The sessions were held at Kamyaran Health Center Hall on Sundays, Mondays and Tuesdays.

**Table 1.** Content and structure of counseling sessions.

Session	Title	Content
1	Introduction and explaining the study procedure	<ul style="list-style-type: none"> <li>- Greeting, introduction, and giving chance to the participants to know each other.</li> <li>- Pretest.</li> <li>- Making arrangement for the next sessions.</li> <li>- Emphasizing on confidentiality of the discussions and the counseling sessions.</li> <li>- Explaining the structure of counseling work (e.g. number of counseling sessions, duration, place, and so on) and general introduction to the counseling process.</li> <li>- Evaluating the participants' information about the changes caused by pregnancy using brain storming method.</li> </ul>
2	Introduction to one's thoughts and feelings about pregnancy	<ul style="list-style-type: none"> <li>- Discussing about the effect of thoughts on feeling social supports and the effective factors.</li> <li>- Discussing about the effect of activities on the mood.</li> <li>- Giving home assignment (writing down feelings in the case of physical disorder, anxiety, sleep problem, and depression symptoms and writing down the thoughts about any feelings in the given table).</li> </ul>
3	Introduction to negative thoughts and beliefs about oneself and the level of belief in such thoughts	<ul style="list-style-type: none"> <li>- Reviewing the last session and receiving group feedback.</li> <li>- Introduction to negative thoughts and beliefs about oneself and ability to differentiate them from reality.</li> <li>- Introduction to the assessment of the level of emotions and beliefs in negative thoughts about pregnancy.</li> <li>- Giving home assignment (writing down negative thoughts during the day and the possible reality of each negative thought in the pertinent cell of the given table. Determining the level of emotions and beliefs in such thoughts from 0 to 199).</li> </ul>
4	Introduction to automatic thoughts	<ul style="list-style-type: none"> <li>- Reviewing the last session and receiving group feedback.</li> <li>- Introduction to automatic thoughts.</li> <li>- Introduction to breathing relaxation techniques.</li> <li>- Giving home assignment (writing down negative thoughts and the source of automatic thoughts in the given table throughout 10min relaxation practice).</li> <li>- Ten minutes relaxation at the end of the session.</li> </ul>
5	Examining the evidence for/against negative beliefs	<ul style="list-style-type: none"> <li>- Reviewing the last session and receiving group feedback.</li> <li>- Introduction to the evidences for/against negative thoughts about pregnancy.</li> <li>- Expressing feelings and attitudes about pregnancy using Socratic method.</li> <li>- Giving home assignment (writing down negative thoughts and evidences for/against them in the given table, 10min relaxation).</li> </ul>
6	Expressing stresses and how to deal with them	<ul style="list-style-type: none"> <li>- Checking previous session's assignments and giving group feedback.v- Encouraging participants to share their stresses and the causes of anxiety due to appearance of pregnancy sign and dealing with them.</li> <li>- Discussing about irrational thoughts and emotional irresponsiveness.</li> <li>- Role playing practices (group practices)</li> </ul>
7	Expressing fears and concerns	<ul style="list-style-type: none"> <li>- Checking previous session's assignments and giving group feedback.</li> <li>- Discussing about communication methods used by the participants.</li> <li>- Sharing attitudes about fears caused by pregnancy based on Socratic technique.</li> <li>- Ten minutes relaxation practice.</li> </ul>
8	Asking questions	<ul style="list-style-type: none"> <li>- Checking previous session's assignments and giving group feedback.</li> <li>- Reviewing treatment program and objectives.</li> <li>- Giving feedback about progress of the treatment.</li> <li>- Receiving feedbacks from the group members about successful and unsuccessful aspects of the treatment.</li> <li>- Assessment and following up group therapy session after completion of the work.</li> </ul>

The pregnant women who had the inclusion criteria were selected through convenient sampling and randomly allocated to control and experiment groups using simple random method.

Inclusion criteria were nulliparous women before the 20<sup>th</sup> week of pregnancy; literacy; good command of Farsi language; no history of infertility; older than 18 years old; no history of mental disorders, drug addiction, or using psychedelic drugs; no history of divorce; pregnancy without complication; planned pregnancy; no disease diagnosed in the fetus; Iranian nationality; no mental/physical disease; not using antidepressant and anti-anxiety drugs; not participating in relaxation classes like Yuga and the like; and no traumatic events over the past three months (e.g. first degree relatives).

Exclusion criteria were abortion or preterm birth during the study; hospitalization during the study; development of fetal or maternal complications during the study; development of any mental disease that makes intervention and using medicine inevitable; missing more than two intervention sessions; unexpected stressors during the intervention; and reluctance to participate. Two participants were excluded during the 5<sup>th</sup> and 7<sup>th</sup> weeks of the intervention due to missing the sessions.

### 2.3. Data collection and instruments

A demographics checklist and GHQ-28 were used for data gathering. The GHQ-28 covers four subscales viz. physical symptoms (statements 1-7), anxiety and sleep disorders (statements 8-14), social function disorder (statements 15-21), and severe depression (statements 22-28). The statements are four alternative questions (a = 0, b = 1, c = 2, d = 3). The respondent has complication symptoms when the score of each subscale is higher than six and the total score is higher than 22 [18]. The Farsi version of the tool is featured with some modifications in categorization of the statements and the reliability coefficients of the tool are reported equal to 0.94 (Cronbach's alpha), 0.86 (split-half), and 0.6 (test-retest). Factor analyses revealed four factors including "depression," "social function," "anxiety," and "physical symptoms." The cut-off point was obtained equal to 19.20 using with ROC test (sensitivity = 0.83, specificity = 0.76) [19].

### 2.4. Data management and analyses

The collected data was analyzed is SPSS (v.21) using analytical statistics such as Kolmogorov Smirnov (KS) and Shapiro tests to ascertain normal distribution of the data; frequent measures test for the data with normal distribution; and Tukey post-hoc test for pairwise comparisons at different time intervals. Independent t-test was used to compare the mean score of variables at each time interval between the control and experiment groups. Frequent measures test was used to survey mean score trends of the variables and aspects with normally distributed data before, immediately after, and one month after the intervention in the experiment group. In the case of control group, Freidman's non-parametric test (non-parametric equivalent of frequent measure test) was used. To compare the mean scores of general health (total score) and the subscales at different time intervals between the experiment and control groups, Mann Whitney tests (non-parametric equivalent of independent t-test) was used.

### 2.5. Ethical consideration

The author visited the health centers after securing the Ethics Committee and IRCT's approvals.

At first, the participants were briefed about the study and signed a written informed letter of consent. This study with clinical trial code: IRCT2017030532900N1 is based on an MSs Dissertation in counseling and midwifery under ethics code: KUMS.REC.1395.718, Kermanshah University of Medical Sciences approved on 9 Mar. 2017 by the Research Ethics Committee.

## 3. Results

The results showed that there was no significant difference between the control and experiment groups in terms of demographics and clinical variables (Table 2).

Kolmogorov Smirnov and Shapiro test showed that the variables mother's age, pregnancy age, and spouse's age were normally distributed. In addition, the mean age of the mothers in the control and experiment groups were  $23.53 \pm 4.31$  and  $23.7 \pm 3.93$  respectively, which means

**Table 2.** Relative and definite frequency of the subjects in the control and experimental groups based on demographical and clinical variables.

Variables	Experiment		Control		Value	P-value	
	F	%	F	%			
Education	Employed	13	43.3	13	43.3	0.001	0.999
	Housewife	17	56.7	17	56.7		
Income (month)	Less than 1000\$	25	83.3	22	73.3	0.884	0.347
	More than 1000\$	5	16.7	8	26.7		
Residence	Urban area	20	66.7	18	60	0.287	0.592
	Rural area	10	33.3	12	40		
Education	High school	8	26.7	10	33.3	0.666	0.717
	Academic	9	30	10	33.3		
	College degree	13	43.3	10	33.3		
History of hospitalization	Positive	9	30	12	40	0.884	0.347
	Negative	21	70	18	60		
History of abortion	Positive	12	40	16	53.3	1.071	0.301
	Negative	18	60	14	46.7		
History of stillbirth	Positive	9	30	10	33.3	0.077	0.781
	Negative	21	70	20	66.7		
Spouse' education	High school	9	30	20	66.7	8.07	0.004
	Academic	21	70	10	33.3		
Spouse's job	Freelancer	14	46.7	14	46.7	4.50	0.105
	Office employee	11	36.7	5	16.7		
	Other	5	16.7	11	36.7		

that the age distribution in the two groups was equal ( $p = 0.876$ ). Moreover, mean age of pregnancy in the control and experiment groups were  $10.60 \pm 2.11$  and  $10.46 \pm 2.34$  weeks respectively, so that there was no significant difference ( $p = 0.818$ ). Mean age of the husbands in the control and experiment groups were  $27.36 \pm 4.86$  and  $29.66 \pm 4.24$  years respectively, which means the two groups were identical in this regard ( $P = 0.056$ ).

Yates Correction Test was used to examine homogeneity of demographical specifications including employment, income, residence, history of hospitalization, history of abortion, history of stillbirth, and husband's education. The results showed that there was homogeneity in the said variables in the two groups except for husband's education ( $p > 0.05$ ).

Moreover, Chi squared test was used to examine homogeneity of the variables mother's education and spouse's job. The results supported homogeneity of the said variable in the two groups ( $p > 0.05$ ).

As Shapiro test results showed, the variable general health at all the three stages was normally distributed in the control and experiment groups. In addition, all subscales of general health at all the three stages were not normally distributed in the control and experiment groups so that they were tested using non-parametric tests.

As listed in Table 3, t-test results showed that there was no significant statistical difference in the control and experiment groups in terms of general health before the intervention. However, the two groups were

significantly different in terms of general health immediately and one month after the intervention ( $p < 0.05$ ).

With regard to the four subscales of general health, U Mann-Whitney test showed no difference between the two groups before the intervention. However, the two groups were significantly different in terms of the four subscales except for anxiety immediately and one month after the intervention ( $p < 0.05$ ). The groups were significantly different in terms of anxiety only one month after the intervention.

The ANOVA with repeated measures showed that, the intervention led to significant changes in the experiment group in terms of the mean score of general health ( $P = 0.001$ ). The post hoc Tukey test showed that there was no significant change in the experiment group between the phases immediately after and one month after the intervention. However, there was a significant difference between the other phases. This change in control group was significant as Friedman test and U Mann-Whitney test showed significant differences between different stages ( $P = 0.004$ ).

As to the sub-scales of general health, the Freidman test indicated a significant difference in the mean scores of four subscales of general health in the control and experiment groups ( $P = 0.001$ ). The U Mann-Whitney test also showed no significant difference in the control group before and immediately after the intervention ( $P > 0.05$ ); the difference was significant before and one month after the intervention ( $P = 0.001$ ). However, the changes in experimental group were significant ( $P < 0.01$ ).

**Table 3.** Mean score of general health scores and the subscales in the control and experimental groups before, immediately after, and one month after the intervention.

		Before		Immediately after		One month after		
		Mean	SD	Mean	SD	SD	Mean	
General health	Experiment	36.73	1.99	31.37	1.97	27.8	2.2	F* = 119.16
	Control	36.37	2.76	34.53	2.28	32.13	2.05	P = 0.0001
								F** = 8.92
								P = 0.004
								T = 0.589
								T = -5.74
								T = -7.89
								P = 0.585
								P = 0.0001
								P = 0.0001
Physical evidences	Experiment	9.9	0.9	8.53	0.73	7.8	0.99	F** = 47.78
	Control	9.5	1.19	8.73	1.01	8.47	1.07	P = 0.0001
								F** = 28.27
								P = 0.001
								Z = -1.59
								Z = -0.818
								Z = -2.65
								P = 0.112
								P = 0.413
								P = 0.008
Anxiety and sleep problems	Experiment	9.7	1.15	8.23	1.1	6.7	1.23	F** = 51.29
	Control	9.97	1.37	9.23	1.13	8.36	1.18	P = 0.0001
								F** = 42.54
								P = 0.0001
								Z = -0.821
								Z = -2.98
								Z = -4.82
								P = 0.412
								P = 0.003
								P = 0.0001
Social function	Experiment	9.8	1.16	8.7	0.95	7.57	0.94	F** = 51.51
	Control	9.87	1.04	9.57	0.94	8.87	1.19	P = 0.0001
								F** = 24.96
								P = 0.0001
								Z = -0.232
								Z = -3.38
								Z = -4.15
								P = 0.817
								P = 0.001
								P = 0.0001
Depression symptoms	Experiment	7.3	0.99	5.9	1.42	5.73	1.17	F** = 40.21
	Control	7.03	0.99	7	0.95	6.43	1.07	P = 0.0001
								F** = 13.16
								P = 0.001
								Z = -1.06
								Z = -3.05
								Z = -2.04
								P = 0.287
								P = 0.002
								P = 0.016

T = Independent T test.

Z = U Mann-Whitney test.

\*ANOVA with repeated measures.

\*\*Friedman Test.

#### 4. Discussion

The effects of cognitive-behavioral counseling on general health of pregnant women was examined. The statistical analyses showed that the intervention led to a significant change in general health score and its subscales in the experiment group at different measurement occasions. Lin et al. (2001) found that cognitive-behavioral treatment was significantly effective in the mothers in experiment group and improved their ability to speak, do self-care, and do child care [20]. Cather (2005) reported that cognitive-behavioral approach was effective in the treatment of mental health symptoms [21]. The repeated measures ANOVA in the control and intervention groups showed that the general health of the participants in the both groups improved in time. Taking into account the mean score of changes in independent t-test results, it is evident that improvement in general health condition in the experiment group was higher than that in the control group. Thus, natural changes and the routine intervention by the health centers had been effective in the mothers in the control group so that gaining more experience improved general health of the nulliparous mothers in the control group. In addition, participants felt less stress with the increase in pregnancy age. The results of this study are consistent with the results of other studies [14, 16, 22]. To explain how this type of counseling affects the mental health of pregnant women, the positive impacts of the cognitive and behavioral techniques are notable. The techniques available in this type of counseling for pregnant mothers improve rational and objective thinking and promote mental health in new situations such as pregnancy.

As the findings showed, group counseling with cognitive behavioral approach improved the subscales of general health including physical symptoms, anxiety symptoms, sleep disorder, depression symptoms, and social function of general health (mental health). Ammerman et al. (2013) showed that behavioral cognitive counseling improved the indices of depression in mothers immediately after the intervention and at the follow-up [23]. Alaem et al. (2019) concluded that group counseling decreased anxiety and stress in the family of pregnant mothers [24]. Sheik Azadi et al. (2016) showed that the nulliparous mothers had less anxiety and stress after group discussion intervention [22]. With regard to the subscales of general health and the trend of changes before, immediately after, and four weeks after the intervention, the changes were significant in the control and experiment groups. These findings are consistent with those reported by other studies [12, 16, 25]. It is notable that the changes in physical symptoms and depression symptoms in the control group were not significant immediately after and four weeks after the intervention. The mean scores of subscales at three measurement occasions indicated that the trend of changes in the intervention group was relatively higher than those of the control group; this might be an indicative of the fact that changes in the control group happen as a natural process over time.

An advantage of the present study is the evaluation of the participants of the both groups at two stages after the intervention. In addition, standard and normalized tools for Iranian population were used in the study.

Due to limitations, the follow-up evaluation was limited to only one month, which is a limitation of the study. With a longer follow-up term, the results might have been different.

#### 5. Conclusion

Behavioral cognitive counseling improved mental health of the pregnant women. Since anxiety, fear, and depression are the most common disorders during pregnancy, finding approaches, at policy making level, to facilitate access to mental health services in the national health system is recommended. Provision of different types of counseling in care centers for pregnant women might lead to a higher level of mental health in these women. It is recommended, therefore, to follow this approach at

clinical settings. In addition, group counseling might be effective in social interactions and relationships of pregnant women and lead to a higher social health in them.

#### Declarations

##### Author contribution statement

S. Heydarpour: Conceived and designed the experiments; Performed the experiments; Wrote the paper.

A. Jalali: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

F. Tohidinejad: Conceived and designed the experiments; Wrote the paper.

N. Salari: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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##### Competing interest statement

The authors declare no conflict of interest.

##### Additional information

The clinical trial described in this paper was registered at the Iranian Registry of Clinical Trials under the registration number IRCT2017030532900N1.

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##### Consent for publication

All the authors consented to publish the study in your journal.

##### Availability of data and material

The datasets used and analyzed in the study can be made available by the corresponding author on reasonable request.

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