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# Effect of cognitive–behavioral training on fear of childbirth and sleep quality of pregnant adolescent slum dwellers

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## Abstract:

**BACKGROUND:** Fear of childbirth is a common problem during pregnancy, which can give rise to sleep disorders and diminish sleep quality. This study aimed to determine the effect of cognitive–behavioral training on fear of childbirth and sleep quality of pregnant adolescent slum dwellers who visited the slum health centers of Zahedan city, Iran, in 2020.

**MATERIALS AND METHODS:** This quasi-experimental study was conducted in 2020 on 100 pregnant adolescent slum dwellers between 11 and 19 years old at 24–28 weeks pregnant. Multi-stage sampling was used and the participants were randomly divided into an intervention and a control group. The intervention group received four sessions of cognitive–behavioral training at weekly intervals. The control group only received routine care. The Wijma Delivery Expectancy/Experience Questionnaire and the Pittsburgh Sleep Quality Index were filled before and 4 weeks after the training course. The data were analyzed in SPSS 21 using independent *t*-test, paired *t*-test, Fisher's exact test, and Chi-squared test. and covariance. A *P* value of < 0.05 was considered significant.

**RESULTS:** After the intervention, the fear of childbirth significantly decreased ( $P = 0.004$ ), and sleep quality significantly improved ( $P = 0.001$ ) in the intervention group compared with the control group. The results of analysis of covariance to control the significant effect of pre-test scores showed that the mean score of fear of childbirth ( $P = 0.03$ ) and mean score of sleep quality ( $P = 0.001$ ) in the two groups after the intervention was statistically significant.

**CONCLUSION:** The results showed that in addition to reducing fear of childbirth, cognitive–behavioral training improved the sleep quality of women in the intervention group. Therefore, this training could be used as an easy and accessible method without complications to improve women's health.

## Keywords:

Adolescent pregnancy, childbirth fear, cognitive–behavioral therapy, sleep quality, slum

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## Introduction

Pregnancy is one of the most sensitive periods in a woman's life that gives rise to various physiological changes as well as psychological problems.<sup>[1]</sup> Fear of childbirth is a common psychological problem during pregnancy experienced by about 33% of pregnant women in their third trimester, of whom 10 to 11% experience severe fear of childbirth.<sup>[2]</sup> Fear of childbirth can give rise to various maternal and fetal complications. Some fetal complications include changes

in the normal fetal heartbeat pattern, the possibility of hypoxia due to decreased blood flow to the pelvic muscles in response to increased serum catecholamine and cortisol levels, increased risk of perinatal death, increased risk of dystocia, low Apgar scores, and low birth weight.<sup>[3]</sup> Other fears of child birth-associated problems include nightmares and sleep disorders that diminish the sleep quality of women during pregnancy. Sleep quality points to individuals' mental indicators and their experience of sleep (for example, feeling

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refreshed when they wake up and being satisfied with sleep quality).<sup>[4]</sup> Sleep quality and quantity patterns are affected by various cultural, social, mental, behavioral, pathophysiological, and environmental factors. Therefore, various factors, such as illness, pain, and stress, can affect sleep quality and quantity.<sup>[5]</sup> A study of sleep patterns during pregnancy has also shown that between 49 and 66% of pregnant women experience changes in their sleep patterns.<sup>[6]</sup> The most common sleep disorder is insomnia. A prevalence rate of up to 75% has been reported for sleep disorders in the third trimester as women approach their last stage of pregnancy.<sup>[7,8]</sup> Poor sleep quality is associated with adverse consequences by changing the person's immune system such as changes in the levels of cytokines and C-reactive protein. Some of these consequences include anxiety, low pain tolerance, preterm birth, low birth weight, blood pressure disorders, glucose tolerance disorders, and pregnancy and postpartum depression.<sup>[8,9]</sup> Given the above, the importance of managing the fear of childbirth and improving sleep quality becomes obvious.

Many psychological, social, and cultural factors influence the development of fear of childbirth, including the fear of the unknown and the unfamiliar atmosphere of the delivery room, the inclination to have a painless childbirth and pain intolerance, mothers' personality characteristics, anxiety over the adverse effects on the mother, poor communication with the medical staff, lack of adequate social support, low education levels, feeling of a lack of psychological preparedness for giving fear of childbirth and coping with labor pain, fear of perineal injury as well as adolescent pregnancy, which result in an inadequate understanding of delivery conditions.<sup>[10]</sup>

Different methods have been employed to reduce the fear of childbirth and improve sleep quality during pregnancy, including writing therapy, music therapy, exercise, physical activity, and distraction techniques.<sup>[11,12]</sup> Cognitive-behavioral training is another safe method without complications used for this purpose. It targets individuals' thoughts and behavior and hence it is the best option for treating and managing the fear of childbirth and the variables related to it as it is a short-term therapy and changeable and focused on the problem itself.<sup>[13]</sup> In cognitive-behavioral training, individuals are assisted to identify their distorted thinking patterns and inefficient behaviors. In this method, the participants learn to objectively assess and test their thoughts and perceptions about unpleasant events.<sup>[14]</sup> Then, the therapist uses special organized assignments to change these thoughts and behaviors. In other words, the treatment follows a training approach in which cognitive and behavioral techniques are implemented through in-session exposure, cognitive reconstruction

of the past as well as homework. However, in the study by Amiri *et al.* (2020),<sup>[10]</sup> using this approach showed no significant decrease in the fear of childbirth. These authors stated that this might have been due to the difference between the control and intervention groups at the time of completing the questionnaires (36 weeks pregnant and before labor).

Most of these factors involved in the development of the fear of childbirth can be observed in slum-dwelling women. The majority of these women experience repeated adolescent pregnancies, have low education and awareness levels, and receive inadequate social support.<sup>[15,16]</sup> In addition, slum dwellers struggle with many challenges, including health in various dimensions.<sup>[17,18]</sup> Zahedan, as the largest city in southeastern Iran, is no exception to this situation and, unfortunately, slum dwellers comprise about one-third of its urban population.<sup>[19]</sup> They experience severe hardships due to poverty and unemployment and women and children are naturally more vulnerable given the cultural and social situation.<sup>[20]</sup> Female children and adolescents in these regions marry to escape poverty.<sup>[21]</sup> In a study by Khayat *et al.* (2017),<sup>[19]</sup> it was reported that 65.3% of slum-dwelling women in Zahedan experienced their first pregnancy in their adolescent years. Adolescent pregnancy, in addition to being slum dwellers, can increase the probability of experiencing fear of childbirth risk.<sup>[22]</sup> However, the results that explain these matters are not available on reducing the fear of childbirth and improving sleep quality in pregnant adolescent slum dwellers. This study was designed and executed to investigate the effect of using cognitive-behavioral training on the fear of childbirth and sleep quality in pregnant adolescents living in the slums in Zahedan.

## Materials and Methods

### Study design and setting

This was a two-group quasi-experimental study with a pretest-posttest design from September to December 2020 on 100 pregnant adolescent slum dwellers.

### Study participants and sampling

The statistical population was pregnant women between 11 and 19 years old visiting slum health centers in Zahedan in 2020. The inclusion criteria were being monogamous adolescents between the age of 11 to 19 years having finished elementary school, having single-fetus pregnancy, being at 24–28 weeks of gestation, living in the slums of Zahedan, not taking narcotics or being afflicted with psychological disorders, not taking psychiatric drugs, and not having high-risk pregnancy (with disorders such as preeclampsia, gestational diabetes, and special diseases). Exclusion

criteria were having fetal or maternal complications during the study, being absent from at least one consultation session, and experiencing any stressful accidents or events during the study.

According to the study by Uçar *et al.* (2018)<sup>[23]</sup> and using the mean and standard deviation, the sample size was 25

$$\text{women in each group based on } n = \frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2 (S_1^2 + S_2^2)}{(\bar{X}_1 - \bar{X}_2)^2},$$

with a confidence interval (CI) of 95% and a statistical power of 95%. For greater confidence and considering the possible sample attrition, a sample size of 50 was considered for each group (a total of 100 participants).

### Procedure

Sampling was conducted after obtaining the ethical approval code IR.ZAUMS.REC.1399.327 <https://ethics.research.ac.ir/ProposalCertificateEn.php?id=158020&Print=true&NoPrintHeader=true&NoPrintFooter=true&NoPrintPageBorder=true&LetterPrint=true> from Zahedan University of Medical Sciences, coordinating with the Health Deputy and receiving an official letter of introduction from the Deputy of Research and Technology to the manager of the health centers in Zahedan. There are 10 health centers in the slums of Zahedan. Multistage sampling was used in this study. In the first stage, four centers were selected from the 10 slums in Zahedan using the lottery method. Two bases were then randomly selected from each health center: one as the control group and the other as the intervention group. A list of all pregnant adolescents was extracted from the electronic health information systems in the selected health bases, and then telephone calls were made to these pregnant adolescents to invite them to come to the centers. When they visited the centers, the objectives of the study were explained to them and the eligible women who were willing to participate in the study filled written informed consent form. Then, they filled out demographic information form as well as the Delivery Expectancy/Experience Questionnaire and the Sleep Quality Index.

### Educational intervention framework

The 45- to 60-min cognitive-behavioral training sessions were conducted for 4 weeks (one session per week) according to Table 1 in small groups of two or three while observing social distancing and health protocols (face masks and gloves due to the COVID-19 pandemic). In these sessions, it was attempted to establish friendly relationships with the participants and attract their trust. The researcher's mobile phone number was given to the pregnant adolescent slum dwellers so that the researcher could answer their possible questions and solve their problems. Four weeks after the training sessions, necessary coordination was made with the participants and they re-filled

**Table 1: Content of cognitive-behavioral training sessions for the fear of childbirth and quality of sleep in the pregnant adolescents**

Session	Training content
First	Introducing the consultant and getting the participants to know each other, explaining the fear of childbirth and its effect on pregnancy and sleep quality, summarizing the first session, giving assignments, and receiving feedback.
Second	Checking the assignments and reviewing the previous session, familiarizing the participants with cognitive-behavioral training, introducing common mental errors concerning childbirth, identifying the participants' expectations of the intervention, and correcting their expectations if required, teaching the stages of labor, reviewing, and giving assignments, summarizing the session, and getting feedback.
Third	Checking the assignments and reviewing the previous sessions, doing teamwork, practicing behavioral techniques such as distraction, deep breathing, and relaxation of the 16 muscle groups, listening to music, summarizing the session, psychological approaches to cope with the fear of childbirth and sleep disorders, giving assignments, and giving feedback.
Fourth	Checking the assignments and briefly reviewing the previous sessions, final summarization, giving assignments, and getting feedback.

the post-test questionnaires; the control group only received the routine care.

### Data collection tool and technique

Data were collected using the demographic information form, the Wijma Delivery Expectancy/Experience Questionnaire and the Pittsburgh Sleep Quality Index.

The demographic information form included the mother's age, body mass index (BMI), mothers' education level and occupation, their spouses' occupation, having intended pregnancy, and ethnicity of the participants. It was completed by the participants.

### The Wijma Delivery Expectancy/Experience Questionnaire

The questionnaire was developed by Wijma *et al.* (1998). It includes 33 items scored on a 6-point Likert scale, where 0 = extremely and 5 = not at all. The minimum and maximum scores are 0 and 165, respectively. This questionnaire measures women's feelings and thoughts during the study and they are asked to answer the questions according to what they think their delivery will be and not based on what they hope it to be. The validity of the questionnaire is approved and the reliability of the original questionnaire is 0.87 using Cronbach's alpha.<sup>[24]</sup> Validity and reliability of the Persian version of the questionnaire were approved by Mortazavi *et al.*,<sup>[25]</sup> with Cronbach's alpha of 0.94. In this study, the reliability of the instrument was 0.78 using Cronbach's alpha.

### Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index was developed by

Buysse *et al.* (1989)<sup>[26]</sup> and originally included 9 items. Item 5 consists of 10 secondary items; therefore, the whole index consists of 19 items scored on a 4-point Likert scale, ranging from 0 to 3 (0 = no difficulty, 1 = mild difficulty, 2 = moderate difficulty, and 3 = severe difficulty). The total score ranges from 0 to 21. Higher scores indicate lower sleep quality. This scale consists of 7 subscales including subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disorders, taking sleeping pills, and daily performance disorders. Content validity of the index is approved and the estimated internal consistency using Cronbach's alpha is 0.83.<sup>[26]</sup> The reliability of the Persian version of the index is 0.89.<sup>[27]</sup> The estimated reliability of the index using Cronbach's alpha was 0.83.

### Ethical consideration

The present study was conducted with the approval of the research deputy of the Zahedan University of Medical Sciences and also the Ethics Committee of the university with the code IR.ZAUMS.REC.1399.327. Before the study, the objectives of the study were explained to them and those who were willing to participate in the study filled out the written informed consent form. The researcher sought to protect all financial and intellectual property rights of the research samples, including information confidentiality. To observe ethical considerations, a CD of cognitive-behavioral training course was provided to the control group after the intervention.

### Data analysis

The data were collected and analyzed in SPSS 21. To analyze the data, descriptive statistics including frequency, mean percentage, and standard deviation as well as analytical tests such as paired *t*-test, independent *t*-test, and Chi-squared test were used. For controlling pre-test effect size, covariance analysis was used. A *P* value of < 0.05 was considered significant.

## Results

The participants in this study consisted of 100 pregnant adolescent slum dwellers. Analysis of the individual social data on the participants showed no significant difference between the two groups' terms. The mean and standard deviation of the age was  $16.52 \pm 1.43$  years and  $16.94 \pm 1.44$  years and the BMI was  $23.55 \pm 2.8$  and  $24.84 \pm 3.65$  in the intervention and control groups, respectively. The results of the independent *t*-test indicated no significant difference in the mean age and BMI of the two groups ( $P = 0.1$  and  $P = 0.51$ , respectively). In this study, 98% of women in the intervention group and 100% of participants in the control group were housewives. The demographic characteristics of the samples are summarized in Table 2.

The mean score of of the fear childbirth the participants received before the intervention was  $77.72 \pm 10.01$  in the intervention group and  $78.80 \pm 8.98$  in the control group, which changed to  $71.80 \pm 11.66$  for the intervention group and  $80.96 \pm 18.36$  for the control group after the intervention. The independent *t*-test indicated that the mean scores for fear of childbirth showed no significant difference between the two groups before the intervention ( $P = 0.572$ ), whereas the difference between them in this respect was significant after the cognitive-behavioral training intervention ( $P = 0.001$ ). The intra-group comparison of this variable indicated a significant decrease in the score for fear of childbirth score in the intervention group ( $P = 0.000$ ) but not in the control group ( $P = 0.38$ ). In addition, the mean score for sleep quality before the intervention was  $10.74 \pm 3.30$  in the intervention group and  $11.02 \pm 3.38$  in the control group, which changed to  $7.94 \pm 2.38$  in the intervention group and to  $10.90 \pm 2.65$  in the control group after the intervention. The independent *t*-test indicated no significant difference between the two groups in the mean score for sleep quality before the intervention ( $P = 0.67$ ); however, this difference was significant following the cognitive-behavioral training course ( $P = 0.001$ ). The intra-group comparison of this variable showed a significant improvement in the sleep quality of the participants in the intervention group ( $P = 0.001$ ) but not in the control group ( $P = 0.67$ ) [Table 3].

Analysis of covariance analysis was conducted to compare the effectiveness of education whilst controlling for the pre-test. Levene's test and normality checks were carried out and the assumptions were met ( $F = 0.073$ ,  $P = 0.78$ ). There was a significant difference in the mean score for sleep quality ( $F = 93/37$ ,  $P = 0.001$ ) and mean score for fear of childbirth ( $F = 3/88$ ,  $P = 0.003$ ) between intervention and control groups after educational intervention, with controlling the pre-test effect size [Table 4].

## Discussion

This study was conducted to investigate the effect of cognitive-behavioral training on the fear of childbirth and sleep quality of pregnant adolescent slum dwellers and visiting slum health centers in Zahedan in 2020. The findings suggested that the cognitive-behavioral training significantly reduced the fear of childbirth in these pregnant adolescents. In line with these results, Ghazaei *et al.* (2018)<sup>[28]</sup> investigated the effect of cognitive-behavioral therapy on the fear of childbirth compared to psychoeducation and reported that cognitive-behavioral training was more successful in reducing the fear of childbirth than psychoeducation training. Uçar (2019)<sup>[23]</sup> and Ghasemi *et al.* (2018)<sup>[29]</sup> investigated the effect of



**Table 2: Demographic characteristics of research units in control and intervention group**

Group Variables	Control (n=50) Number (%)	intervention (n=50) Number (%)	Test results Chi-square and independent t-test
Pregnancy type			
Wanted	26 (52)	30 (60)	P=0.54
Unwanted	24 (48)	20 (40)	
Level of education			
Elementary	29 (58)	34 (68)	P=0.30
Middle education	21 (42)	16 (32)	
Husband's education level			
Elementary	18 (36)	9 (18)	P=0.05
Middle education	25 (50)	26 (52)	
Diploma and above	7 (14)	15 (30)	
Husband's employment status			
Unemployed	9 (18)	5 (10.0)	P=0.38
Employed	41 (82)	45 (90.0)	
Mean±standard deviation			
Husband's age	22.46±3.05	22/74±2/73	P=0.83
Age of marriage	15/40±1/45	15/27±1/41	P=0.45

**Table 3: Effect of education on fear score and quality of sleep score in control and intervention group**

Variable	Mean±standard deviation		Paired t-test
	pretest	posttest	
Score of fear of childbirth			
Intervention	77/72±10/01	71/80±11/66	P=0/001
Control	78/80±8/96	80/96±18/36	
Independent t-test	P=0/56	P=0/001	
Sleep quality			
Intervention	10/74±3/30	7/94±2/38	P=0/001
Control	11/02±3/38	10/90±2/65	
Independent t-test	P=0/67	P=0/001	

cognitive-behavioral-based training programs on the fear of childbirth in pregnant women and found it effective in coping with and reducing the fear of childbirth in pregnant women. Nieminen *et al.*<sup>[30]</sup> concluded that the cognitive-behavioral training owed its success to the fact that the participants developed a more realistic attitude toward the coming labor and delivery, greater self-confidence, and more active coping strategies. In this study, the training provided for the participants helped pregnant women, despite their familiarity with their anatomy, to answer their frequently asked questions and correct their common mental errors, and use relaxation techniques to reduce the fear of childbirth and improve their sleep quality. Amiri *et al.* (2020)<sup>[10]</sup> claimed that the cognitive-behavioral approach did not significantly decrease the fear of childbirth. In a review conducted to identify possible non-medical interventions for reducing the fear of childbirth, Aguilera-Martín *et al.* (2021)<sup>[31]</sup> concluded that mental training and counseling before delivery affected the fear of childbirth while claiming that more research was needed on the effect of cognitive-behavioral therapy and the other alternative medicine approaches. The results of their study did not conform

to those of the present study. This non-conformity could be due to the population studied in their study. In this study, pregnant adolescent slum dwellers participated who had little knowledge of the labor process and, as Nieminen *et al.* reported<sup>[30]</sup>, received the cognitive-behavioral training and found more realistic knowledge of delivery, which reduced their fear of childbirth, whereas, in the above studies, women over 18 years old participated, most of whom had high school diplomas or higher degrees.

The other results of this study indicated that the sleep quality of women in the intervention group significantly improved after the intervention, compared with the control group. In line with these results, Khatibi *et al.* (2020)<sup>[32]</sup> investigated the effect of cognitive-behavioral counseling on the sleep quality of pregnant women and reported that it could be improved through cognitive-behavioral counseling. Kalmbach *et al.* (2020)<sup>[33]</sup> examined the effect of remote cognitive-behavioral therapy on pregnant women's sleep. Their results showed that this therapy could also improve pregnant women's sleep quality and duration during pregnancy and in the postpartum period. Liu *et al.* (2016)<sup>[34]</sup> found that diminished stress and anxiety after the therapy sessions improved the sleep quality of pregnant women. Montazeri *et al.* (2020)<sup>[35]</sup> took one step further and claimed that writing therapy as a cognitive-behavioral approach could improve the sleep quality of neonates born to women who received this intervention. The above results comply with the results of the present study. In the reviews conducted by the authors of this research, no study was found that contradicted the results obtained in this study. Previous research indicated that sleep disorders resulted from obsessive rumination and emotional arousal. Cognitive-behavioral counseling

**Table 4: Result of covariance analysis of sleep quality and fear of child mean score with control for the effect size of pre-test**

Source	Sum of squares	Df	mean of squares	F	P	Effect size	Power of test
Sleep quality							
Pretest	422/06	1	422/06	203/42	0/001	0/67	1
Group	193/73	1	193/73	93/37	0/001	0/49	1
Error	201/25	97	2/07				
Total	9716	100					
Score of fear of childbirth							
Pretest	505/14	1	505/14	18/09	0/001	0/32	0/67
Group	321/50	1	321/50	3/88	0/03	0/22	0/87
Error	341/86	97	3/52				
Total	5130	100					

reduces disturbing thoughts and, consequently, improves the quality of sleep using methods that make people aware.<sup>[36]</sup> Maliszewska *et al.* (2016)<sup>[37]</sup> reported that the fear of childbirth reduced the sleep quality even in the postpartum period. However, Alipour *et al.*<sup>[38]</sup> found no significant correlation between the fear of childbirth and sleep quality; this non-conformity could be due to the different types of research as they conducted a prospective study without intervention, whereas in this study, the mothers received consultations.

### Limitations and recommendations

One of the limitations of this study was the use of self-report to complete the questionnaires. Considering the cultural conditions, the participants may not have been completely honest when completing the questionnaires. In addition, sampling was conducted only in one county. In this regard, it seems that studies that can be done online and virtually to complete the questionnaires can obtain better information. In contrast, studies can be done in different counties to be more generalizable and comparable.

### Conclusion

The results of the study suggested that cognitive-behavioral training reduced the fear of childbirth and improved sleep quality in pregnant adolescent slum dwellers. Therefore, it could be used as a useful, inexpensive, and accessible approach without complications. It is recommended to provide adult pregnant women enjoying higher socioeconomic status with cognitive-behavioral training to help them cope with the fear of childbirth and improve their sleep quality. Because prenatal care is provided free of charge in Iran, training staff in this field, including midwives, can provide better services and more effective training to pregnant mothers and reduce the fear of childbirth and improve their sleep quality.

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### Declaration of patient consent

Written informed consent was obtained from all participants.

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### Conflicts of interest

There are no conflicts of interest.

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