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The investigation of effects of static immersion and calming in water on pregnant women's stress participating in preparation classes for childbirth

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Abstract:

INTRODUCTION: Stress in pregnancy can have a negative effect on mother and fetus and at last on childhood. The use of stress reduction techniques in pregnant women has an effective role in the reduction of the mother and child's mental problems. This study aimed at determining the effect of static immersion and relaxing the pregnant women in water on stress, participating in preparation classes for childbirth in Isfahan, Iran, 2017.

METHODS: The present study was a semi-experimental and had pre- and post-test one on 55 pregnant women aged 20–30 weeks (20 test group and 35 control group) participating in the preparation classes for delivery by available sampling method selected in 2017 and their stress level was assessed by depression, anxiety, and stress scale questionnaire. Then, they were divided into test and control groups. In the control group, no intervention was performed, and in the test group, static immersion and calming in water was done in Isfahan University's 9-Dey Pool. To analyze the data, paired *t*-test, Chi-square *t*-test, and independent *t*-test were used.

RESULTS: In this study, stress in the test group decreased after the intervention, so that the mean stress score decreased from 20.20 to 16.67 ($P < 0.05$). Of course, the stress level declined in the control group, but in the control group, it decreased significantly.

CONCLUSION: Based on the findings of the present study, static immersion and calming in water are considered as reducing women's stress intervention in improving pregnancy period and are therefore recommended to be included in the sanitary system.

Keywords:

Calming, pregnancy, static immersion, stress

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Introduction

Pregnancy and childbirth are the special part of the life events of women, which is a pleasure and exciting period for many women. However, the unique changes in physical and mental status[1] and the gender dimension and lifestyle in women and families turn this period into a stressful one.[2]

Pregnancy is a very sensitive stage,[3] so that the conflict between the individual needs of women and the duties and responsibilities that the woman face after the baby's birth is a physical change that may conflict with the beauty of some women,[4] the impact of new economic needs is due to the relationship between couples, pregnancy complications that mothers face commonly, they are the risks in a way that if happened (November 28, 2018), they can threaten the mothers' and fetus's lives, and frightened from childbirth,

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there are factors that can reduce the mental health of women.[5]

The mental health of women during pregnancy is an important issue, not only for the mother but also it is an effective factor in the growth and evolution of the fetus.[6]

The findings suggest that stress has a detrimental effect on the mental health of pregnant women and also damages the relationship between mother and infant, and can reduce the mother's role in maternity.[7] In a study in 2017, Ericson showed that there is a relationship between the mental health of mothers and the infant.

In general, stress is a nonspecific response to any kind of desires and needs that are created by the pleasurable, nonpleasurable conditions.[8] Under the definition of stress, there is no requirement that stress is always undesirable.[8] However, if a stressful condition persists, the person will have a mental illness for a long time.[9]

In Iran, the prevalence of mental disorders in the first trimester of pregnancy is 29%, the second trimester is 28%, and the third trimester is 39%.[10]

These results demand particular attention of health-care providers to the mental health of women during pregnancy.[11]

In order to reduce the stress of pregnant mothers, efforts have been made in the health system. However, national plans such as the provision of preparation classes for childbirth with the goal of raising awareness and reducing the fear of delivery have long been on-going but increase in the prevalence of mental disorders in 2017[12] shows that efforts to reduce stress require a variety of approaches that can control the various causes of stress in pregnancy.

There are many ways in which can improve the mental state of pregnant women biologically, such as the use of calming techniques,[13] yoga.[14] In each of these techniques, whose positive effects have also been reported, mentality and concentration skills play an important role in the effect of the method on the stress, and it may not be effective for women with lower levels of inferiority, as well as diversity in stress reduction methods, individuals with different interests can have more choice.

One of the ways to reduce these disturbances is by static immersion and relaxation in water.[15]

The American College of Gestation has stated that a pregnant woman could spend on average 30 min a day or more on sports activities, such as static immersion, while not being exempt from exercise.[16]

Static immersion in water increases blood flow, natural muscle elongation, endurance of the muscles of feet and hands muscles and gives the feeling of weightlessness with the vitality and composure of the pregnant woman. On the other hand, it reduces the daily stress and tiredness, making the muscles and joints soft and keeping the spiral column stretching safe, lower back pain, and strengthening the control of muscle congestion, especially the abdomen and basin, which is very important in midwifery.[17]

Exercises in water, in comparison to land, have better effects, especially on pregnant women.[18] In a study, it was shown that immersion in water is not harmful for the outcome of the childbirth process, such as early and late childbirth and the fetal development.[15] Conversely, in Canada, in 2017, in a comparative study between the use of aerobics in water with exercise on land on the outcome of pregnancy, it has been concluded that exercising on the land compared with exercise in water has the greatest effect on improving the weight of the pregnant mother, while exercising in water reduces maternal prevalence in gestational diabetes.[19]

Moreover, calming or relaxation is also one of the important skills in reducing stress, which is the same as relaxing the muscles of the body.[8]

Calming through closing the gate (valve theory) and the prevention from painful stimuli to the brain centers and endorphins secretion can reduce mood disturbances in pregnant women.[20] According to the instructions of the Ministry of Health and Medical Education, it is better to do relaxation or calming and exercises in pregnant women at the same time.

Vallim *et al*. concluded in 2011 that eco-yoga did not improve the quality of life or the mood problems of pregnant women, and therefore suggested that this study be carried out in a larger research community and in different cultures.[21] Based on this, according to the results of extensive research on static immersion in other countries, and in contrast to the few studies in Iran, and the lack of awareness of Iranian women and their cultures about the use of static immersion in water during pregnancy due to the evaluation of a number of visitors in several large swimming pools in Isfahan such as the Ali Qapu, Setare, and Aqil Pools which showed that the total number of pregnant individuals participating are 10 people per year. Therefore, this study was aimed at the effect of static immersion and relaxation on stress, anxiety, and depression in pregnant women in Isfahan city in 2017.

Methods

This study is a semi-experimental study with pre- and post-test by available sampling method. In this study,

10 preparation clinics for childbirth in Isfahan city were selected by random sampling. The inclusion criteria in this study included (1) samples were selected among pregnant women aged 18–35 years old who had single and healthy fetus pregnancies in the 20–30 weeks, in accordance with pregnancy records and maternity preparation classes. (2) Samples with known cardiovascular disease and diabetes-renal disease-nodal history–hysteria, intestinal problems-nervous diseases like migraines-family violence-history of cigarette smoking were not comparable with that of the pregnancy profile. (3) Those with problems with pregnancy, such as: shedding,-drainage, -early delivery history, -history of cervical failure or cerclage,-in this pregnancy,-preeclampsia,-abortion record, placenta previa was not a true case of pregnancy. (4) People with severe stress scores was not entered the population as well as those treated by the psychiatrist or stated the stress-like symptoms did not enter the study. Exclusion criteria included: (1) Pregnant women who for whatever reason avoided the continuation of collaboration. (2) The incidence of gestational disorders (according to entry criteria) during the period. (3) The absence of more than 3 successive sessions during periods (in the absence of one or two successive sessions, for the individuals, extra classes were held). In this research, among the pre-term preparation classes with a high number of visits, randomly 10 classes were selected including Milad Hospital, Asgariyeh, Amin, Zohre and Marzieh, Sadoughi, Khanevade, Goldis, Sina, Hazrat Zahra, Otufat Private Clinic (5 classes for the test group and 5 for the control group).

Pregnant women referred to the Isfahan Maternity Preparedness Clinic, under the supervision of a woman's physician, were then subjected to standardized stress assessment, the Depression, Anxiety and Stress Scale (DASS), and a list of demographic feature.

In this study, scores of 15–18 were considered as mild stress, scores of 19–25 were considered as moderate stress, and scores higher than 25 were regarded as severe stresses. In this research, individuals who were in the mild and very severe group as well as those who received treatment were not included in the study. The control group was also selected on the basis of the score and only received the usual interventions during pregnancy but did not receive any interventions.

The sample size based on the statistic formulation was considered 55 individuals, 20 people in the test group and 35 subjects in the control group. For the test group, in addition to the usual interventions during pregnancy and participation in the preparation classes for childbirth, 18 sessions were held for immersion classes and calming in the 9th Dey Pool of University of Isfahan.

Then, the program of starting classes and telephone numbers of the researcher was placed in a timetable to be accessible for participants. Static immersion and calmness sessions were also performed under the supervision of a swimming and researching professor. Before and after the beginning of the class, the pulse rate of fetus, the heart and blood pressure of the mother were recorded by the researcher checks and were recorded in the table. The test group regularly participated the sports activities 3 times a week and for 50 min in the roofed swimming Pool of 9-Dey in Isfahan University with water temperature at 33°C–28°C and depth of water which was to their axillary at the time of standing up. Classes continued for 6 weeks. The participants were specially dressed for the pool. The use of fluids before and during the class was recommended to mothers.

Each session, a class with playing relaxation music on reducing stress, was performed in three steps. The first phase was educating and giving awareness to mothers (it was recommended to mothers to inform the doctors in the event of problems such as shortness of breath, headache, muscle weakness, nausea, fatigue, chest pain, back pain, pelvic pain, difficulty walking, diminished fetal movements, vaginal bleeding, dripping, uterine contraction, eye sensitivity to chlorine), the second phase was walking and warming in water, in which the participant was told to walk at the side of the pool in the shallow depth, taking into account the distance between the two participants, when walking in water, the participants were recommended to listen to music, walking in the water lasted about a quarter, in case of tiredness, the mothers were advised to either stand out of water or drink juice. In the third phase, the relaxation technique was performed. At this stage, each participant was given a nodule, and the participant tied it around the belly so that there was no pressure feeling on the abdomen. Then, at the first, each individual was held suspended back by the researcher on the water, so that her body was completely on the water and gave the participant a lightness and exhilarated feeling. At the next sessions, the participants would be suspended on water without help which lasted 50 min totally. The researcher also informed them by telephoning the duration of the research to follow the control group (attendance and participation in the classes).

At the end of the last session, the DASS questionnaire was completed by both groups and reviewed by SPSS software version 16. Data were analyzed using descriptive and analytical statistics such as (one-way ANOVA), independent *t*-test, paired *t*-test, Chi-square, and Mann–Whitney tests.

Results

The present study was a quasi-experimental study. This study was multivariate, consisting of two groups, one control and one test group, and 55 subjects from 18 to 35 years old, whose first pregnancy was from 20 to 30 weeks, and participated in childbirth preparation classes and had mild and average and intense stress, and had the inclusion criteria for the study, were studied.

To determine and compare the individual characteristics of the subjects and their spouses, with stress in test group and control group before intervention. Table 1 indicates that the two groups did not have a significant difference in terms of the age of each other ($P > 0.05$). There was no difference between women and men in the two groups in terms of job ($P > 0.05$). Most of the individuals (88.8%) in the test and control groups (70%) were housekeepers. There was no significant difference between the two groups in the level of education of wife and husband and their view about their spouses ($P > 0.05$). The level of education of most participants in the test group was 75% and the control group 74.2% was diploma.

Table 2 shows that the frequency of the stress distribution in the studied units did not differ significantly ($P < 0.05$). According to the frequency distribution of stress intensity, participants with a mild, moderate, and severe score were included, and the participants with very severe stress score did not enter the study, and participants with symptoms suffering from severe stress were referred to a psychiatrist.

Paired *t*-test showed that the mean of stress scores in the test group was significantly lower after intervention rather than before intervention ($P < 0.05$). So that the mean stress score in the test group before intervention was 32.20 ± 7.78 and after intervention, it was 18.70 ± 6.59 which showed a significant difference ($P < 0.001$). Paired *t*-test showed that the mean score of stress in control group after intervention was significantly lower than before intervention ($P < 0.05$). In a way that the mean of stress score in the control group before intervention was 31.23 ± 6.75 and 27.16 ± 6.3 after intervention and showed a significant difference ($P < 0.01$) [Table 3]. Independent *t*-test showed that there was no significant difference between the mean score of stress before intervention between two groups ($P > 0.05$), but after intervention in test group, it was significantly lower than that of control group ($P < 0.05$). In the control group, stress was also reduced, but this decrease was higher in the test group.

Table 1: The average age of spouse in two group

Variable	Mean±SD		Independent *t*-test	
	Test group	Control group	*t*	*P*
Wife age (year)	27.50±2.98	26.81±3.36	0.72	0.46
Husband age (year)	30.85±2.92	30.23±3.80	0.72	0.47

SD=Standard deviation

Table 2: Distribution of frequency of stress before and after intervention in two groups

Time	Test group, *n* (%)	Control group, *n* (%)	Mann-Whitney tests	
			Z	*P*
Before intervention				
Normal	0 (0)	0 (0)	0.34	0.73
Mild	1 (5)	0 (0)		
Moderate	3 (15)	6 (17.2)		
Severe	16 (80)	29 (82.8)		
After intervention				
Normal	7 (35)	0 (0)	4.85	<0.001
Mild	8 (40)	2 (5.7)		
Moderate	3 (15)	14 (40)		
Severe	2 (10)	19 (54.3)		

Table 3: Comparison of the mean of stress score before and after the intervention in the test and control groups

Variable	Mean±SD		Before intervention	
	Paired *t*-test	After intervention	*t*	*P*
Stress score (test)	32.30±7.78	18.70±6.59	5.01	<0.001
Stress score (control)	31.23±6.75	27.16±6.32	4.63	<0.001

SD=Standard deviation

Discussion

The aim of this study was to investigate the effect of static immersion and relaxation in water on pregnant women's stress in preparation classes for childbirth selected in Isfahan in 2017. The results of this study show that static immersion and relaxation in water lead to stress reduction in pregnant women according to this fact Navas *et al*., in a study entitled "the effect of aerobics in water in pregnancy on the use of painless method in childbirth," in 2018, concluded that the use of water exercises in pregnancy reduced the pain during childbirth and the mother's mental problems, and as a result, there was less need to use analgesic methods in childbirth.[22] The study of Sayed Ahmadinejad *et al*. in 2014, which assessed the impact of teaching relaxation on stress reduction in pregnancy showed that learning programs based on relaxation in water skills can lead to decline the pregnancy anxiety and stress.[23]

In the study by Rahimi *et al*. in 2014, entitled "the effect of body relaxation trainings on anxiety of pregnant women

in high-risk group" showed that the level of anxiety and stress in pregnant women in the test group decreased after doing relaxation exercises ($P < 0.05$) the results of this study are consistent with the previous studies.[24]

The statistical results showed that static immersion and relaxation in water reduced stress in the test group; however, in the control group, stress was also decreased, but the stress level in the test group had a much more reduction than that of the control group. On the one hand, according to the experience of researcher in the test group, relaxed sleep had increased in participants, as well as gastrointestinal problems and skeletal pains in the test group had decreased. On the other hand, midwifery problems such as preterm delivery, and delivery pains and vaginal infections, and reduced fetal movements and so on were not observed in the test group. In addition, all participants in the test group gave birth at the right time, and they required less caesarian method and at last, they bred babies with normal Apgar. This reflects the benefits of static immersion and relaxation in pregnancy. It should be noted that the above items were not followed up in the control group as it is not the part of the study's goals. In line with the results of this study:

The results of Rafiee *et al*.'s study in 2012, showed that 1 month after intervention, the mean score of anxiety and stress among women and postpartum depression in all three groups had a significant statistic difference ($P < 0.05$).[13]

Smith *et al*. examined the effect of eco yoga on problems of pregnancy, especially mood disorders. After 6 weeks, pregnancy problems such as pregnancy anxiety and stress decreased. In the study of Diack *et al*., they investigated the useful effects of water exercise in pregnancy, and they found that water exercises improved mothers' mood and reduced pregnancy and childbirth problems.[18] In contrast Barakat *et al*. in Canada in 2017, in a comparative study between the use of aerobics in water with exercise on land on the outcome of pregnancy, concluded that exercising on the dry land compared with exercising in water has the greatest effect on improving the weight of the pregnant mother, while exercising in water reduces maternal prevalence to gestational diabetes.[19] Vallim *et al*. in 2011, entitled "the effect of eco yoga on the quality of life in pregnancy" showed that eco-yoga did not improve the quality of life or the mood problems of pregnant women, and therefore suggested that this study be conducted in a larger research population and different cultures.[21] The results of the present study showed that, in general, immersion in water and relaxation technique reduce stress, anxiety, and depression in pregnant women, and as the tables show the intensity of scores has decreased. However, stress scores ranged from severe to moderate or moderate to mild, indicating that, considering 18 sessions, three times a week, the immersion in water class, there should be more sessions, or recommended that they had better be in general continued throughout pregnancy, and the participants' interest in the case was also evident. In addition, due to the time immersion in water and relaxation, which the samples demanded more time to exercise in water, and in particular, to continue relaxation in water, on the one hand, the participants were also interested in aerobic movements and massage in water, but, the limitations in terms of pool time, commuting equipment, and most importantly, the time set and the method of work according to studies, were finally based on the research plan. The examination of these results shows that although the methods of relaxation have been different, but in any case, maternal relaxation has always been able to reduce their stress and given the fact that the reduction of these variables is proven and is important for the health of the mother and the child, these variables should be reduced during pregnancy in any possible way.

Conclusion

The results of this research confirm the role of the preparation classes for childbirth with focusing on static immersion and relaxation in water skills to reduce stress during pregnancy. Therefore, to provide mental health for pregnant mothers, the establishment of static immersion classes and relaxation in water classes are suggested along with pregnancy care.

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Conflicts of interest

There are no conflicts of interest.

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