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# Investigating the Effect of Online Childbirth Preparation Classes on Selected Indicators of Mother Friendly Hospitals in Qazvin City: A Prospective Cohort Study

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**ABSTRACT**

**Background:** Childbirth preparation classes can help promote physiologic childbirth in mothers. These classes were held online, Due to the Covid-19 pandemic.

**Objectives:** This study aimed to investigate the effectiveness of online training method on Selected Indicators of Mother Friendly Hospitals.

**Methods:** This is prospective Cohort study. 67pregnant women were in exposure and 72 in non-exposed group. Sampling was from November 2022 to May 2023 by the convenience sampling method and group matching was performed. The exposure was attending in online Childbirth Preparation Classes and intended outcomes were the rates of cesarean section, episiotomy, induction and use of pain relief methods that compared between the two groups**.** Data collection was by using the checklist of indicators of mother-friendly hospitals and the fear of childbirth questionnaire. SPSS software (23) and relative risk test was used to analyze the data. P-value was 0.05.

**Results:** The rates of episiotomy, induction, and the use of pharmacological pain relief methods in the exposure group were respectively 65.8%, 76.3%, 45%, while being 81.5%, 33.3%, 70.4% in the non-exposure group. (p=0.16, 0.58, 0.42) The rate of caesarean section was 43.2 in exposure group and 62.5% in exposure (RR=0.69, CI: 0.49-0.96, P=0.02) and the use of non-pharmacological methods were 60.5% in the exposure group a 18.5% in the non-exposure group.(RR=3.27,CI:1.42-7.50,P=0.001) (p=0.001)**.**

**Conclusion:** Online education can improve some indicators of a mother-friendly hospital, such as the use of non-pharmacological pain relief methods. Thus, it was a suitable alternative for face-to-face classes in crisis period.

**Key words:** Physiological childbirth, mother-friendly hospitals, childbirth preparation classes

## INTRODUCTION

Giving birth is one of the most important decisions each woman can take in her life. Childbirth is thus one of the major challenges facing mothers (1, 2). Mental and physical preparation for preventing challenges facing their prenatal care and childbirth is highly critical for mothers. One of the techniques for preventing these challenges is receiving training in prenatal care (3-5)

Childbirth preparation classes provide mothers with proper and necessary information about prenatal care, delivery and postpartum affairs. In recent years, Iran's Ministry of Health and Treatment has included policies aimed at holding childbirth and physiologic childbirth classes(2, 6, 7). These classes mainly function to provide training on the benefits of natural childbirth, pain relief methods, postpartum risk signs examination and baby care. In these courses, pregnant women receive practical training about sports skills and stretching exercises, postural correction relaxation, massaging and breathing patterns during delivery(6). These classes influence the attitudes of pregnant mothers and their decisions to give physiologic birth by providing necessary preparation to pregnant women and relaxation sports(7).

According to the American College of Nurse-Midwives (ACNM), physiologic childbirth refers to a rehabilitation process using the human and innate capacities of the mother and the fetus. This denotes that increasing non-necessary medical interventions during childbirth can undermine women's trust in their abilities for a safe and independent delivery(8). One of the major stages of physiologic childbirth is natural vaginal delivery using non-pharmacological relief methods, performed in mother-friendly hospitals(9). The concept of "Mother-friendly hospitals", developed for the first time in the 1990s, is a technique to emphasize and standardize the quality of childbirth services in health systems(10).

Fallowing this global initiative, Iranian mother-friendly hospitals started their activities since 2008. Taking measures such as performing interventions based on mother's request may create the sense of security and thus increase the sense of satisfaction among mothers(9). Implementing mother-friendly hospitals requires defining a country-specific standard(11, 12). According to the executive instructions by Iranian Ministry of Health(13), selected indicators in evaluating mother friendly hospitals include the characteristics of cesarean section delivery, induction, pain relief methods and episiotomy(11).

Due to the limitations caused by the spread of Covid-19pandemic Preparation classes were online. The advantages of online learning methods are easy access, declining time and place limitations, flexibility and viability, while its disadvantages include the need for the Internet, the challenges of the online transfer of some concepts, body immobility, and the lack of communications between participants (6, 14). Few studies have studied the effectiveness of electronic learning on reducing pregnant women's challenges (15-18). Studies have been conducted on the effectiveness of prenatal online training, such as the study by Jinqio (2023), who investigated the effect of virtual training on the level of fear and satisfaction, type of delivery, and pain level which the results indicated a positive effect(19). In addition, in the study of Cheng (2020) online education had a positive effect on the level of satisfaction with epidural anesthesia and reduced the pain level (20).

The results of many of these studies were different from each other, for example, in the study of Firouzian (2020), prenatal education reduced the amount of cesarean section (21), However in study of Alivand (2023) prenatal education did not change the birth method (22).

In addition, in the study of Buran (2022), prenatal education reduced fear of childbirth, the request for natural delivery, and the request of using analgesia (5), while in the study of Lopez (2022) and The colleagues of the trained group were more inclined to use pharmacological and non-pharmacological analgesia methods (23).

**Objectives:** Determining the relationship of attendance in virtual childbirth preparation classes on the selected indicators of the mother-friendly hospital of Qazvin city.

## Methods

### *Study design and participants*

This study was a prospective cohort study. The research population included all pregnant women who referred to the health centers of Qazvin, Iran. Samples were selected based on inclusion and exclusion criteria.

**Inclusion criteria**: women who were literate pregnant for at least 20 weeks (according to the LMP), had a parity of 0-1, were willing to attend the study, had telephone lines or a cell phone, low-risk pregnant mothers according to national Safety Mothers Program.

**Exclusion criteria:** women with heart, respiratory diseases, diabetes, hypertension and mental diseases, the history of high-risk behaviors, the history of domestic violence, C/S or any surgery on the uterus, stillbirth, and genetic disorders in each of the couples or first-degree relatives, abnormal vital signs.

**Sample size**: According to the reported C/S rate of 60% [20], and training could reduce this prevalence to half, α= 0.05 and β=0.10 sample size calculated 53 for each group. This led to 140 samples by calculating a

$$n = \frac{\left(z_{1-\alpha/2} + Z_{1-\beta}\right)^2 \times [P_1 \times (1-P_1) + P_2 \times (1-P_2)]}{[P_1 - P_2]^2} \cong 53$$

sample loss of 25%.

**Matching** group was performed based on economic situations, age, occupation, education and parity**.** The samples fell under four age groups , two occupation groups , and three education groups (primary levels, junior high school, and academic), while the parity was 0 and 1.

### *Data collection instruments*

Three ***Data collection instruments*** were including Demographic Characteristics Registration Forms, Childbirth Checklist and Childbirth Fear Questionnaire. The Demographic Characteristics Registration Form includes age, education, occupation, economic situation, mother's weight and height and husband's education and occupation. Pregnancy and childbirth records included the number of pregnancies, delivery and the first day of the last period.

1. Childbirth checklist**:** The scale included items about childbirth, satisfaction with childbirth preparation classes and also the selected indicators of mother-friendly hospitals, such as equipment and facilities, freedom of movement, breathing practices, relaxation, perineal massage, performing induction and episiotomy, support of the husband and family and the amount of pains. The severity of pains was measured based on a pain ruler .Scores 0-4 denotes weak pain, 5-7 moderate and 8-10 severe pain. Support by the husband and the family also measured by 10 scores, with zero indicating the lowest and 10 the highest support.

2. Satisfaction with Childbirth Questionnaire**:** This scale includes nine items, adjusted from score zero (the lowest satisfaction) to 10 (the highest satisfaction). For the face and content validity, twelve faculty members of the Department of Nursing and Midwifery evaluated the scales and childbirth checklists. CVI and CVR were 0.78 and 0.98, respectively. The reliability of the scale was 79% and the checklists estimated at 75% using Cronbach's alpha. The above two questionnaires were completed through telephone contacts with the clients at one week postpartum.

3. Childbirth Fear Questionnaire (CAQ): This scale developed by Harman in 1988 to investigate the fear of childbirth. This questionnaire held 14 items, scored on a 4-point Likert scale of *never* up to *much,* (scores between14-56, score 28 and higher indicating greater fear). Khoursandi localized this questionnaire [20]. This questionnaire was filled once in Week 37 and then after one week the delivery.

***Procedures:*** All mothers how referred to Qazvin's` health centers from November 2022 to May 2023 and

meeting inclusion criteria were in the exposure group, and the cohort group entered the study via the convenience sampling after matching for some criteria.

Exposure: The exposure group included clients who attended online childbirth preparation classes for at least 4 sessions. The cohort group also included pregnant women who had simultaneously presented to Qazvin's health centers in this period but did not take part in childbirth preparation classes. All the mothers who met inclusion criteria (168 people), were selected for the study. After weekly follow-up, 29 people were excluded from the study due to the lack of responsiveness, being high-risk status and preterm delivery.

The **main outcomes** were included the rates of C-section, induction, episiotomy, pain relief methods, eating and drinking during labor, and the severity of pain in labor, while **secondary outcome** included the fear of delivery.

***Ethical considerations:*** Ethics Committee of the Qazvin University of Medical Sciences registered this study. Having learned about the full process of the study, all subjects entered the study voluntarily, following the filling up of the consent forms, as collected data analyzed and reported confidentially.

***Data analysis:*** SPSS software (version 23) analyzed the data. The findings are in the forms of frequency tables, diagrams and numerical indices. Shapiro Wilk's Test investigated data normality; relative risk (RR) and the confidence level of 95% were calculated and reported. The significance level was 5%.

**Results:**

As many as 139 mothers were statistically analyzed (67 women in the exposure and 72 ones in the non-exposure group). The latter group, prior to entering the study, were matched with the former group in terms of some demographic variables, including the education, age, occupation of mothers and midwifery information variables such as parity and abortion (Tables1&2)

**Table 1:** Frequency and percentage of the demographic characteristics of the exposure and non-exposure groups

| | | Exposure | Non-exposure | Total | P-Value |
|---|---|---|---|---|---|
| **Mother's occupation*** | Housewife | 57 (85.1%) | 62 (86.1%) | 119 (85.6%) | 0.44 |
| | Government employee | 6 (8.4%) | 6 (0.09%)) | 12 (8.6%) | |
| | Self-employed | 4 (6%) | 4 (5.6%) | 8 (5.8%) | |
| **Father's occupation *** | Unemployed | 0 (0%) | 2 (2.8%) | 2 (1.4%) | 0.07 |
| | Government employee | 24 (35.8%) | 14 (19.4%) | 38 (27.4%) | |
| | Self-employed | 43 (64.2%) | 56 (77.8%) | 99 (71.2%) | |
| **Mother's education *** | Primary | 5 (6.9%) | 5 (7.5%) | 10 (7.2%) | 0.96 |
| | Junior school | 7 (10.4%) | 9 (12.5%) | 16 (11.5%) | |
| | High school | 21(31.3%) | 24 (33.3%) | 45 (32.4%) | |
| | Academic | 34 (50.7%) | 34 (47.2%) | 98 (48.9%) | |
| **Father's education*** | Primary | 4 (6%) | 3 (4.2%) | 7 (5%) | 0.14 |
| | Junior school | 5 (7.5%) | 15 (20.8%) | 20 (14.4%) | |
| | High school | 17 (25.4%)) | 19 (26.4%) | 36 (25.9%)) | |
| | Academic | 41 (61.2%) | 35 (48.6%) | 76 (54.7) | |

| | | | | | |
|---|---|---|---|---|---|
| **Economic status *** | Good | 9 (13.4%) | 10 (13.9%) | 19 (13.6%) | |
| | Moderate | 36 (53.8%) | 39 (54.2%) | 75 (54%) | 0.99 |
| | Weak | 22 (32.8%) | 23 (31.9%) | 45 (23.4%) | |
| **Age (year)**** | | 27.7 ± 6.0 | 28.1± 5.8 | 27.8 ± 6.0 | 0.70 |

* $k^2$ test

** t test

**Table 2:** Frequency and percentage of midwifery information variables in the exposure and non-exposure groups-parity abortion

| | | Exposure | Non-exposure | Total | P-Value |
|---|---|---|---|---|---|
| Number of deliveries (parity) * | None | 41 (61.2%) | 41 (56.9%) | 82 (58.9%) | 0.61 |
| | Once | 26 (38.8%) | 31 (43.1%) | 57 (41%) | |
| Number of abortions* | None | 54 (80.6%) | 57 (79.2%) | 111 (79.8%) | 0.96 |
| | One | 11 (16.4%) | 13 (18.1%) | 24 (17.2%) | |
| | Two or more | 2 (3%) | 2 (2.8%) | 4 (2.8%) | |
| History of breastfeeding * | Yes | 26 (38.8%) | 33 (45.8%) | 59 (42.4%) | 0.40 |
| | No | 41 (61.2%) | 39 (54.2%) | 80 (57.5%) | |
| History of surgery * | Yes | 6 (9%) | 6 (8.3%) | 12 (8.6%) | 0.89 |
| | No | 61 (91%) | 66 (91.7%) | 127 (91.3%) | |
| History of diseases * | No | 64 (95.5%) | 67 (93.1%) | 131 (94.2%) | 0.53 |
| | Yes | 3 (4.5%) | 5 (6.9%) | 8 (5.7%) | |
| Number of healthcare visits* | 1-3 care | 10 (14.9%) | 23 (31.9%) | 33 (23.7%) | 0.04 |
| | 4-6 care | 17 (25.4%) | 29 (38.9%) | 45 (32.3%) | |
| | 7-9 care | 24 (35.8) | 13 (18.1%) | 37 (26.6%) | |
| | 10 and more | 16 (23.9%) | 8 (11.1%) | 24 (17.2%) | |
| BMI* | Natural | 45 (67.2%) | 45 (62.5%) | 90 (64.7%) | 0.56 |
| | Overweight | 22 (32.8%) | 27 (37.5%) | 49 (32.2%) | |
| | Low | 2 (3%) | 3 0.0%) | 5 (0.0%) | |
| Weighting in pregnancy * | Natural | 48 (71.6%) | 53 (73.6%) | 101 (72.2%) | 0.92 |
| | Overweight | 17 (25.4%) | 16 (22.2%) | 33 (23.7%) | |
| Perineal massaging training * | Received | 15 (22.4%) | 4 (5.6%) | 19 (13.7%) | 0.00 |
| | Not received | 52 (77.6%) | 68 (94.4%) | 120 (86.3%) | |
| Husband's support ** | | 8.9 ± 1.7 | 9.2 ± 1.6 | | 0.57 |
| Friend support ** | | 8.4 ± 2.3 | 8.9 ± 1.9 | | 0.16 |

* $k^2$ test

** t test

The highest percentage of the reasons for admitting in hospital (60.4%) pertained to the physician order, which included reasons for being post-dated, the dilatation of cervix, the rupture of the water bag, etc. Second reason for hospitalization was labor pain (33%); other reasons included bleeding (4.3%), reduced movement (0.7%). Around 52% of both groups had presented to government hospitals, and the main pharmacological method used was the Entonox gas (74.5%), no significant difference in the two groups (P=.58)

The rate of C/S in the exposure group (43%) was less than the non-exposure group (62%) The relative risk of C-section in the exposure group was 0.69 times lower than the non-exposure group (RR=0.69, CI=0.49-0.96, P=0.02).

Frequency of the selected indicators of mother-friendly hospitals in exposure and non-exposure groups illustrated in tables 3and 4.

**Table 3:** Frequency of the selected indicators of mother-friendly hospitals in exposure and non-exposure groups

| | | **Exposure** | **Non-exposure** | **Relative risk(RR)** | **CI** | **P-Value** |
|---|---|---|---|---|---|---|
| **Type of delivery** | Cesarean | 29 (43.3%) | 45 (62.5%) | 0.69 | 0.49-0.96 | 0.02 |
| | Natural | 38(56.7%) | 27(37.5%) | | | |
| **Episiotomy ****** | Yes | 13 (34.2%) | 5 (18.5%) | 1.85 | 0.91-2.01 | 0.16 |
| | No | 25 (65.8%) | 22 (81.5%) | | | |
| **Pharmacological pain relief** | Yes | 9 (23.7%) | 8 (29.6%) | 0.80 | 0.53-1.44 | 0.58 |
| | No | 29 (76.3%) | 19 (70.4%) | | | |
| **Non-pharmacological pain relief** | Yes | 23 (60.5%) | 5 (18.5%) | 3.27 | 1.42-7.50 | 0.00 |
| | No | 15 (39.5%) | 22 (81.5%) | | | |
| **Induction**** | Yes | 9 (45.1%) | 8 (33.3%) | 1.35 | 0.64-2.84 | 0.42 |
| | No | 11 (55.0%) | 16 (66.7%) | | | |
| | Total | 20 (0.4%) | 24 (54.5%) | | | |
| **Freedom of drinking and eating** | Yes | 31 (81.6%) | 21 (77.8%) | 1.05 | 0.81-1.34 | 0.76 |
| | No | 7 (18.4%) | 6 (22.2%) | | | |

*based on normal delivery type, As seen in table3, the rate of natural childbirth in the exposure group was significantly higher than the non-exposure group

** admitted without pains and underwent natural delivery or emergency C-section

**Table4:** frequency of causes of C-section, pain relief type and severity of pain in exposure and non-exposure groups

| | | Exposure | Non-exposure | Total | P-Value |
|---|---|---|---|---|---|
| **Cause of C-section** | mothers' Requested | 8 (27.6%) | 18 (40.1%) | 26 (35.3%) | 0.52 |
| | Physician order | 10 (34.5%) | 14 (31.1%) | 24 (32.4%) | |
| | Emergency * | 11 (37.9%) | 13 (28.9%) | 24 (32.4%) | |
| | Total | 20 (0.4%) | 24 (54.5%) | 44 (100%) | |
| **augmentation ** (admitted with pain and underwent natural delivery)** | Yes | 12 (31.6%) | 11 (40.8%) | 23 (35.4%) | 0.74 |
| | No | 12 (31.6%) | 7 (25.9%) | 19 (29.2%) | |
| | I don't know | 14 (26.8%) | 9 (33.3%) | 23 (35.4%) | |
| | Total | 38 (58.5%) | 27 (41.5%) | 65 (100%) | |
| Non pharmacologic pain relief Type | Breathing technique | 23(100%) | 5(100%) | 28(100%) | 0.01 |
| | Birth ball | 17(73%) | 3(60%) | 20(71.4%) | |
| | aromatherapy | 10(43.5%) | 2(40%) | 12(42.8%) | |
| | massage therapy | 3(13%") | 0 | 3(10.7%) | |
| | others | 5(21.7%) | 0 | 5(17.57%) | |
| | total | 23(100%) | 5(100%) | 29(100%) | |
| **severity of pain in labor** | Weak | 2 (5.3%) | 1 (3.7%) | 3 (4.6%) | 0.95 |
| | Moderate | 4 (10.5%) | 3 (11.1%) | 7 (10.8%) | |
| | Severe | 32 (84.2%) | 23 (85.2%) | 55 (84.6%) | |

* Emergency childbirth is due to some reasons, including fetal heart failure, meconium and prolonged labor. The physician's order included reasons such as being post-dated, breech, psychologist's letter and other midwifery reasons. These results were calculated only in C-sections.

The relative risk of using non-pharmacological pain relief methods in the exposure group was 3.27 times higher than the non-exposure group (RR=3.27, CI=1.42-7.50 and P=0.001),

23women in exposure group and 5women in non-exposure group were used Non-pharmacological methods, included breathing technique (100%) and using birth balls (71.4%) and aromatherapy (42.8%). Less frequency methods were music therapy and massage therapy or a combination of them totally was 17.5%. (Table 4).

As illustrated by Diagram 1, the mean fear in both groups of mothers in pregnancy was higher than 28; therefore, the fear of delivery was high in all mothers. However, this difference was reported to be significant in postpartum (p=0,001).

The relative risk of fear of childbirth in pregnancy in the exposure group is 0.93 times higher than the non-exposure group (RR=0.93, CI=0.80-1.08 and P=0.38) as illustrated in diagram 1

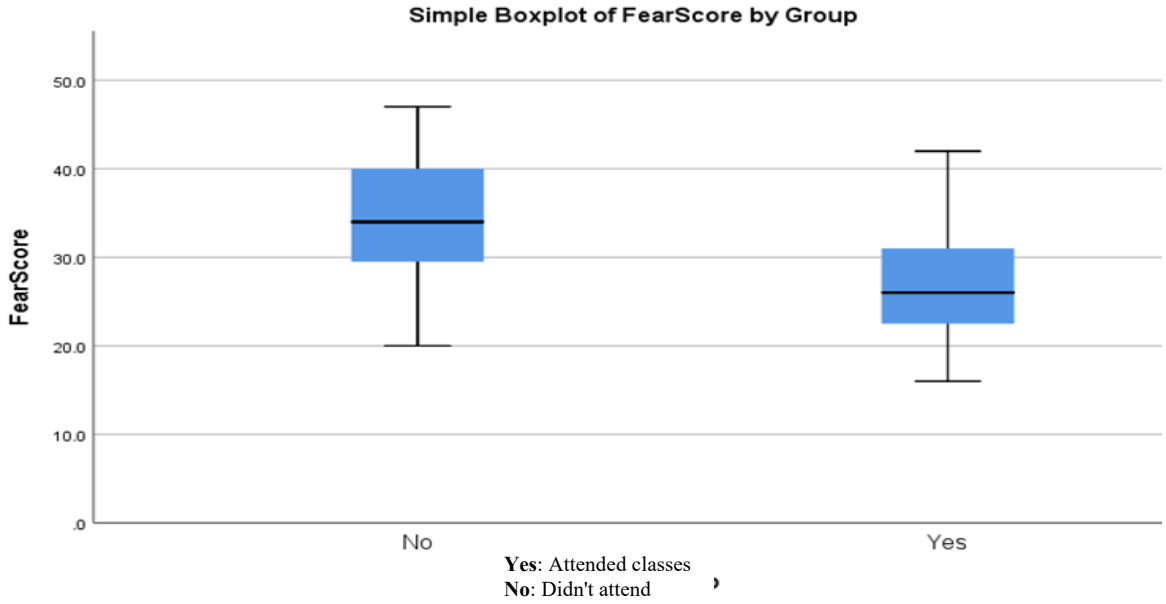


**Diagram 1: Fear of delivery postpartum**

**Discussion**

Findings indicated that the rate of C/S in the exposure group was less than the non-exposure group. Many studies have revealed that training has affected the type of delivery and the tendency to natural childbirth (4, 6, 8, 24-26)The present study is similar to these studies and can confirm the effectiveness of online education on this regard by reducing mother request for C-section. .

For example, in a semi-experimental study by Hands (8) or in a cohort study by Risisky the rate of natural childbirth in the trained group was higher than the none exposure group (26).

In other study in Italy by Ricchi (27), or in a study by Sturrock (28), no significant difference noted between the two groups in frequency of C/S. Although these findings didn`t appear to be in line with ours, the rate of C/S in the present study similar to those research was high, these results indicated that face to face classes or online training were not alone capable of reducing C/S, as expected (29).

Regarding the use of episiotomy in natural childbirth, findings showed high rate of episiotomy in two groups. This study similar to Headrington` study (24) or Bilgin` study(30) that over 70% of mothers in both groups underwent episiotomy although these findings were in line with our research, the rate of episiotomy constituted 33% in our study.

Naidu`s study in India, a significant reduction was noted in the rate of episiotomy in intervention group (31). The findings of this study didn`t match with our present study because of continuous care until delivery. Remember that the rate of episiotomy in Iran is controlled by delivery factors. In addition, effective factor is perineal massaging during pregnancy, which was provided in childbirth preparation classes. In this study, the clients had not received this intervention.

Findings indicated that less than one third of clients in the two groups with vaginal delivery used

pharmacological methods to reduce pains. This finding was not in line with most studies (27, 31). For example, Sturrock (28) or Naidu (31) saw significant reduction in the intervention group, because of different methodologies (those were experimental studies) and data analyses . However, findings in our study indicate that online training cannot affect the use of pharmacological methods or episiotomy, probably various intermediary factors, may affect them.

In the present study, the use of non-pharmacological methods in the exposure group who had had vaginal birth increased significantly. In this connection, birth balls, breathing techniques and aromatherapy were used more than other methods. This subject was in line with studies by Ricchi (27) and Naidu (31) and Headrington (24). This indicates that although training breathing techniques and relaxation require practical exercises, attending in online classes can be useful in this regard.

Induction and augmentation techniques were performed in more than one third of the samples, but no significant difference was noted between two groups. This finding was in line with Gluck et al.'s study (32). In addition, the study by Hands showed that the trained mothers saw greater delivery progress and had a less need for augmentation (7). This finding was not similar to our present study. It is important to mention, these subjects are influenced by upstream system such as specialists and training midwives.

In the present study, the severity of labor pain in two groups was not significant. The study by Perkovic (33) and Kohan`s study in Isfahan, were suggested pre-delivery training had reduced pain in the first stage of delivery(34). These findings weren`t in line with present study. The experimental method of this study can be reasons for this non-similarity. Nevertheless, Collier `s prospective study, in line with our study, indicated that no significant difference was noted between the two studied groups in terms of pain (35).

Results showed that the mean fear of both groups were higher than 28, which did not in line with Zafmans` study, they did a trial study to investigate the efficacy of online training on mothers in U.S. Mothers in the intervention group experienced less anxiety after training and had less turned to emergency visits (36). In present study, the rate of visit to health centers was significantly higher in exposure group. The difference between the Zafman study and the present study was sample research (American black women, multiparous and low economic status but in present study these variables were not been or were matched). In addition, in the Iranian culture, out-of-plan visits are not regarded as emergency visits, which may be due to greater sensitivity to health problems in exposure group. In a semi-experimental study by Moshki, the efficacy of online and physical childbirth preparation classes was examined along with the control group. Findings showed that the mean pre- and post-intervention scores of fear from natural childbirth changed between the three groups showed a significant difference, changes being higher in the physical group than the online group and in the online group than the control group (37). The present study wasn`t similar to this study, which may pertain to the semi-experimental methodology.

Mehrabadi's study indicated that the childbirth preparation classes increased the fear of childbirth (38). This study was carried out on primiparous and multiparous mothers, who had regarded delivery as a horrible event and gained scores of above 30.

**Conclusions**

Findings demonstrated that online training can help promote some of the indicators of mother-friendly hospitals, such as the use of non-pharmacological pain relief methods and the type of delivery, and thus can be regarded as an appropriate alternative or complementary for face-to-face training in crisis period.

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Strong point of this study was following up mothers who attended to online classes of preparation for delivery and reported the outcomes without any interpretation.

Weak point of this study was limitation of cohort study and we should followed up special variables, although many subjects can affect the mother friendly hospitals indexes.

**Competing interests**: The authors declare that they have no competing interests.

**Abbreviations: C**/S (Cesarean Section), LMP (Last Menstruation Period), BMI (Body Mass Index), CAQ (Childbirth Attitude Questionnaire)

**Authors' contributions**

Conception and design: N. Azh, G**.** Abbaszadeh

Collection and assembly of data: G**.** Abbaszadeh

Analysis and interpretation of data: Amir Javadi, Nezal Azh

Drafting of the article: N. Azh, F. Olfati

Critical revision of article for important intellectual content: N.Azh

Statistical expertise: A.Javadi

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**Consent for publication** by submitting this document, the authors declare their consent for the final accepted version of the manuscript to be considered for publication.

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