

Original Paper

# Comparison of Pregnancy-related Concerns, Perceived Social Support, and Anxiety Between Pregnant Mothers With and Without Participation in Antenatal Education Classes



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**Running Title:** Pregnancy-related Concerns, Perceived Social Support, and Anxiety Among Mothers

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## ABSTRACT

**Introduction:** Pregnancy-related concerns may adversely affect obstetric outcomes. It is crucial to manage these concerns to ensure the well-being of the mother and the fetus.

**Objective:** This study aims to compare the pregnancy-related concerns between pregnant mothers with and without participation in antenatal education classes (AEC).

**Materials and Methods:** This comparative-analytical study was conducted on 160 pregnant mothers selected by a consecutive sampling method, in two groups (n=80; participated in the AECs held in a clinic belonged the Iranian Social Welfare Organization) and control (n=80; not participating in the AEC, referred to a governmental teaching hospital in Rasht, Iran). The data were collected from August 2020 to May 2021 during the 20<sup>th</sup> and 37<sup>th</sup> weeks of gestation using the prenatal distress questionnaire (PDQ), Zimet's multidimensional scale of perceived social support, and Spielberger's trait anxiety inventory. The statistical analyses were done using Mann-Whitney U test, Wilcoxon test, multivariate analysis of covariance, analysis of covariance, and multiple general linear regression analysis. The significance level was set at 0.05.

**Results:** The mean age of the pregnant women was 29.63±3.86 and 28.56±4.84 years in the participating and non-participating groups, respectively. Most of them (86.88%) had experienced two pregnancies. The mean score of perceived social support was 47.99±5.72 in the participating group and 46.50±6.08 in the non-participating group. The mean score of trait anxiety score was 31.17±8.32 in the participating group and 31.62±8.85 in the non-participating group. Compared to the non-participating group, the participating group showed a significant reduction in concerns about birth and the baby ( $P=0.018$ ,  $\eta_p^2=0.036$ ), weight/body image ( $P<0.001$ ,  $\eta_p^2=0.147$ ), and emotions and relationships ( $P<0.001$ ,  $\eta_p^2=0.095$ ) in the 37<sup>th</sup> week of gestation following the end of the course. Participation in the educational course ( $\beta=-3.88$ , 95% CI: -5.075, -2.685,  $P=0.042$ ) and the number of pregnancies ( $\beta=-1.44$ , 95% CI: -2.479, -0.411,  $P=0.006$ ) were significant predictors of pregnancy-related concerns in the 37<sup>th</sup> week of gestation.

**Conclusion:** The pregnant mothers participating in the AEC experienced fewer pregnancy-related concerns compared to those without participation in the AEC. Hence, such training courses seem worthwhile to handle the expecting mothers' psychological worries about the dimensions of pregnancy-related concerns.

## Keywords:

Pregnant women, Prenatal distress, Prenatal education

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## Highlights

- During pregnancy, mothers may have concerns about birth and the baby, weight/body image, and emotions and relationships.
- Participation in the antenatal education classes (AEC) can reduce pregnancy-related concerns.
- Pregnant mothers participating in the AEC experience fewer pregnancy-related concerns compared to those without participation in the AEC.

## Plain Language Summary

Pregnant mothers often have various concerns about childbirth, child health, the maternal role, weight gain, emotions, and social relationships. Participation in AEC may enhance the positive experiences of pregnant women and their partners and can improve their knowledge and skills across multiple aspects of maternal and child care. The current study showed that participating in AEC from the 20<sup>th</sup> to 37<sup>th</sup> weeks of gestation may help reduce pregnant women's concerns about birth and the baby, weight/body image, and emotions and relationships.

## Introduction

During pregnancy, mothers may experience worries related to childbirth, child health, and their maternal role, which are considered anxiety symptoms during this stage of life [1, 2]. Additionally, a pregnant woman experiences a significant transformation in her physical state, such as weight gain [3, 4]. The challenges that pregnant women encounter can be divided into three domains: Concerns about childbirth and child health, concerns about weight/body image, and concerns about emotions/relationships [2, 5]. Pregnancy-related worries and concerns, along with fear of the future, are natural and somewhat inappropriate reactions to uncertainty and lived experience of personal relationships, individual roles, and daily affairs in various social situations [1, 6]. Pregnancy-related worries and concerns have been observed globally, with rates varying from 6.8% to about 60% [7-9]. Many factors are associated with pregnancy-related concerns, including age, occupation, income level, educational level, place of residence, number of pregnancies, history of stillbirth, history of abortion, history of childbirth, number of prenatal care visits, and perceived social support [10, 11]. The relationship between perceived social support and pregnancy-related concerns is of great importance [12].

Mothers' concerns during pregnancy may accompany with adverse maternal and child health outcomes [9, 13]. Promoting the mothers' awareness of pregnancy and childbirth events and their understanding of the impact of pregnancy-related concerns on maternal and fetal health

can help them adapt to the physical and emotional changes during pregnancy which, in turn, can prepare them for having pleasant motherhood and childbirth experience and facilitate a stronger mother-baby bond [14, 15]. In this regard, one of the programs offered by the health care systems is the provision of free antenatal education classes (AEC), whose goal is to familiarize the parents with pregnancy knowledge and prepare them for childbirth and the postpartum period while ensuring a pleasant experience [16, 17]. In Iran, mother-friendly hospitals have offered the AEC interventions since 2008, conducted by trained midwives. The classes cover a wide range of topics, including the anatomical/physiological changes during pregnancy, nutrition, mental health, the spouse role, communication with the fetus, warning signs, labor planning, childbirth types and processes, postpartum care and breastfeeding, correction of pregnancy-related issues, musculoskeletal and breathing exercises, and relaxation techniques [16, 18].

Some studies have examined the efficacy of the AEC in reducing pregnancy-related concerns and have reported conflicting results [14, 18-20]. Najafi et al. found that the tendency to normal vaginal delivery among primigravida mothers significantly increased from 85.3% to 89.2% after attending the AEC courses [18]. Uslu Yuvaci et al. also observed that such classes may significantly reduce worries about childbirth; however, they did not affect concerns about the type of delivery [20]. This study aimed to compare the pregnancy-related concerns, perceived social support, and anxiety between pregnant mothers with and without participating in the AEC.

## Materials and Methods

This is a comparative-analytical study that was conducted at a hospital belonged to the [Iranian Social Welfare Organization](#) and a governmental teaching hospital in Rasht, Iran, from August 2020 to May 2021. The sample size was determined 160 (80 per group) using the mean score of pregnancy-related concerns ( $45.96 \pm 5.59$ ) reported in a previous study [2] and by considering 95% confidence level, a test power of 80%, a clinical difference of 50% of standard deviation, and a sample drop rate of 10%. The inclusion criteria were a singleton pregnancy, 20 weeks of gestational age, no history of chronic diseases and complications during the previous pregnancies, no history of stillbirth or abortion, not taking neuro-psychiatric drugs, no history of known diseases or abnormalities in the fetus, having a wanted pregnancy according to the couples, tendency to voluntarily attend the study, being familiar with the Persian language, and being literate enough to read and write. Exclusion criteria were any complications during the pregnancy, unwillingness to participate in any training sessions, and lack of cooperation during the study.

A total of 160 eligible pregnant mothers were recruited using a consecutive sampling method through individual interviews, 80 were put in the participating group and 80 in the non-participating group. The pregnant mothers in the participating group were selected from among 89 mothers referred to one clinic of the [Social Welfare Organization](#) and received the AEC participating during the given period. In this groups, seven mothers were excluded due to not meeting the inclusion criteria and two had gestational diabetes. The pregnant mothers in the participating group were selected from among 101 mothers visited the prenatal clinic of a teaching hospital to receive routine prenatal care during the given period. In this group, 13 mothers were excluded due to not meeting the inclusion criteria, six had gestational diabetes, and two had gestational hypertension.

The instrument used in this study was a four-part questionnaire. The first part surveys the participants' demographic and obstetric characteristics including age, educational level, occupation, spouse education, spouse occupation, income status, place of residence, housing situation, number of pregnancies, number of childbirths, type of previous delivery, number of children, previous childbirth experience, gender of the fetus, source of gained information related to pregnancy and childbirth, and number of prenatal care visits during the current pregnancy.

The second part was the prenatal distress questionnaire (PDQ). This measure was originally developed by Alderdice [5] and the psychometric evaluation of its Persian version has been conducted in Iran [2]. It has 12 items and three subscales: Concerns about birth and the baby (5 items), concerns about weight/body image (3 items), and concerns about emotions and relationships (4 items). The items are rated on a five-point Likert scale from 0 (not at all) to 4 (always). The total score ranges from 0 to 48, with higher scores indicating higher concerns.

The third part was the multidimensional scale of perceived social support (MSPSS), developed by Zimet et al. [21]. In this study, its Persian version was used [22]. The questionnaire has 12 items and three subscales: Support from family (4 items), support from friends (4 items), and support from a significant other (4 items). The items are rated on a five-point Likert scale from 1 (completely disagree) to 5 (completely agree). The total score ranges from 12 to 60. The higher score indicates a higher perceived social support. The fourth section was Spielberger's state-trait anxiety inventory (STAI), which consists of 40 items (20 for state anxiety and 20 for trait anxiety) scored on a four-point scale from 1 to 4, having a total score of 20-80 [23]. This measure was localized by Mahram for Iranian samples [24]. We used items related to trait anxiety, rated as 1 (almost never), 2 (sometimes), 3 (often), and 4 (almost always), with higher scores indicating higher anxiety.

Upon entering the study at the 20<sup>th</sup> week of gestation, the demographic form, PDQ, MSPSS, and STAI were completed for both groups through face-to-face interviews. The PDQ was then completed again at the 37<sup>th</sup> week of gestation. While the classes were being held in the clinic as a part of a national program at eight face-to-face sessions from the 20<sup>th</sup> to 37<sup>th</sup> weeks of gestation, the timely and regular attendance of the participating group was monitored by the researcher. Despite the COVID-19 pandemic at the time of the study, a trained midwife individually conducted the courses, considering the health protocols.

Descriptive statistics and Kolmogorov-Smirnov test, Independent t-test, chi-square and Fisher's exact tests, Mann-Whitney U test, and Wilcoxon signed-rank test were used for data analysis, followed by multivariate analysis of covariance (MANCOVA), analysis of covariance (ANCOVA), and multiple linear regression analysis using the general linear model (GLM). The obtained data were analyzed in SPSS software, version 26 (IBM Inc. USA). The significance level was set at 0.05.

## Results

The participants' demographic and obstetric characteristics are shown in [Table 1](#). According to the Mann-Whitney U test results, the two groups were not significantly different regarding the total and subscale scores of PDQ in the 20<sup>th</sup> week of gestation. Moreover, the total scores of MSPSS and friends support in the 20<sup>th</sup> week of gestation were significantly higher in the participating group compared to the non-participating group ( $P=0.044$  and  $0.046$ , respectively), according to the Mann-Whitney U test results. The two groups were not statistically different regarding family support and trait anxiety scores.

According to the Mann-Whitney U test, in the 37<sup>th</sup> week of gestation, the median or interquartile range (IQR) of the total score of PDQ significantly reduced in the participating group, compared to the non-participating group ( $P>0.001$ ). In addition, the participating group showed significant decrease in PDQ domains of concerns about birth and the baby ( $P=0.045$ ), weight/body image ( $P<0.001$ ), and emotions and relationships ( $P<0.001$ ).

In the within-group comparison, the Wilcoxon test results revealed the median of the total score of PDQ reduced significantly in the participating group after attending the ACE course ( $P<0.001$ ). Furthermore, in this group, the median of PDQ domains of concerns about birth and the baby ( $P<0.001$ ), and concerns about emotions and relationships ( $P<0.001$ ) significantly reduced after the end of course. However, the concerns about weight/body image in the participating group showed no significant difference after the end of course. Similarly, the non-participating group showed a significant decrease in the median of the total score of PDQ ( $P<0.001$ ), and in its two domains of concerns about birth and the baby ( $P<0.006$ ) and concerns about emotions and relationships ( $P<0.006$ ).

[Table 2](#) compares the two study groups regarding pregnancy-related concerns in the 20<sup>th</sup> and 37<sup>th</sup> weeks of gestation after controlling covariates, using MANCOVA. Participation in the ACE courses resulted in a significant decrease in concerns about birth and the baby ( $\eta_p^2=0.036$ ,  $P=0.018$ ), weight/body image ( $\eta_p^2=0.147$ ,  $P<0.001$ ), and emotions and relationships ( $\eta_p^2=0.095$ ,  $P<0.001$ ) in the 37<sup>th</sup> week of gestation. As can be seen, participation in the ACE course had more effect on reducing pregnancy-related concerns about weight/body image compared to other concerns in the 37<sup>th</sup> week of gestation. The pregnancy-related concerns about birth

and the baby were significantly different between the 20<sup>th</sup> and 37<sup>th</sup> weeks of gestation ( $\eta_p^2=0.028$ ,  $P=0.04$ ). In addition, perceived social support from significant others was significantly related to pregnancy-related concerns about emotions and relationships in the 37<sup>th</sup> week of gestation ( $\eta_p^2=0.041$ ,  $P=0.012$ ).

According to the ANCOVA results shown in [Table 3](#), pregnancy-related concerns in the 37<sup>th</sup> week of gestation significantly different in terms of group ( $\eta_p^2=0.142$ ,  $P<0.001$ ). [Table 4](#) shows the results of multiple linear regression analysis using the GLM method. Accordingly, the participation in the educational course ( $\beta=-3.88$ , 95% CI;  $-5.075$ ,  $-2.685$ ,  $P=0.042$ ) and the number of pregnancies ( $\beta=-1.44$ , 95% CI;  $-2.479$ ,  $-0.411$ ,  $P=0.006$ ) were significant predictors of pregnancy-related concerns in the 37<sup>th</sup> week of gestation.

## Discussion

The present study compared pregnancy-related concerns of the two groups of Iranian pregnant mothers with and without participation in the AEC participating, using the PDQ. As expected, the participating group had lower scores in the 37<sup>th</sup> week of gestation, indicating fewer pregnancy-related concerns after the AEC course. Uslu Yuvaci et al. found that the antepartum education significantly reduced concerns about childbirth in Turkish primigravida pregnant women; however, it could not reduce concerns about the type of delivery [20]. Similarly, we observed a significant decrease after attending the classes in the pregnancy-related concerns about birth and the baby, which included worries about childbirth and labor pain. Another study showed that problem-focused counseling could reduce pregnancy-related concerns about maternal and fetal health, childbirth, and family relationships; however, it could not help reduce the concerns about economic affairs [25]. A cohort study in Iran demonstrated that the fear of childbirth experienced during the third semester of gestation significantly declined among the participants of the AEC course. Consequently, this group showed higher tendency towards vaginal delivery [18]. We also found that attending the AEC could reduce pregnancy-related concerns about birth and the baby. This indicates that the course could alleviate the mothers' worries about childbirth and labor pain. Serçekuş et al. found no association difference in pregnant mothers' fear of childbirth after antenatal education [19]. Conversely, we found a reduction in concerns about birth and the baby, including the fear of childbirth, after the educational course. Therefore, it seems necessary to conduct further research on the association between pregnancy-related concerns,

**Table 1.** The demographic and obstetric characteristics of participants in two groups

| Variables                  |  | No. (%)                     |                                 | Total (n=160) | P        |
|----------------------------|--|-----------------------------|---------------------------------|---------------|----------|
|                            |  | Participating in AEC (n=80) | Non-participating in AEC (n=80) |               |          |
| Age (y)                    | <25  | 9(11.25)                    | 18(22.50)                       | 27(16.88)     | 0.163*   |
|                            | 25-30  | 29(36.25)                   | 26(32.50)                       | 55(34.38)     |          |
|                            | ≥30  | 42(52.50)                   | 36(45.00)                       | 78(48.75)     |          |
| Age (y), Mean±SD           |  | 29.63±3.86                  | 28.56±4.84                      | 29.09±4.40    | 0.127*** |
| Spouse age (y)             | <25  | 0(0.00)                     | 2(2.50)                         | 2(1.25)       | 0.071**  |
|                            | 25-30  | 12(15.00)                   | 20(25.00)                       | 32(20.00)     |          |
|                            | ≥30  | 68(85.00)                   | 58(72.50)                       | 126(78.75)    |          |
| Spouse age (y), Mean±SD    |  | 32.46±3.32                  | 32.12±4.0                       | 32.29±3.67    | 0.562*** |
| Educational level          | Lower than high school                       | 33(41.25)                   | 36(45.00)                       | 69(43.13)     | 0.026**  |
|                            | Diploma                                      | 47(58.75)                   | 38(47.50)                       | 85(53.13)     |          |
|                            | University degree                            | 0(0.00)                     | 6(7.50)                         | 6(3.75)       |          |
| Spouse's educational level | Lower than high school                       | 23(28.75)                   | 31(38.75)                       | 54(33.75)     | 0.090*   |
|                            | Diploma                                      | 49(61.25)                   | 47(58.75)                       | 96(60.00)     |          |
|                            | University degree                            | 8(10.00)                    | 2(2.50)                         | 10(6.25)      |          |
| Occupation                 | Housewife                                    | 77(96.25)                   | 76(95.00)                       | 153(95.63)    | 0.681**  |
|                            | Employed (in medical or non-medical sectors) | 3(3.75)                     | 4(5.00)                         | 7(4.38)       |          |
|                            | Unemployed                                   | 1(1.25)                     | 1(1.25)                         | 2(1.25)       |          |
| Spouse occupation          | Worker                                       | 52(65.00)                   | 62(77.50)                       | 114(71.25)    | 0.014*   |
|                            | Farmer                                       | 21(26.25)                   | 6(7.50)                         | 27(16.88)     |          |
|                            | Employed (In non-medical sector)             | 6(7.50)                     | 11(13.75)                       | 17(10.63)     |          |
| Income status              | Poor   | 6(7.50)                     | 13(16.25)                       | 19(11.88)     | 0.092**  |
|                            | Sufficient                                   | 74(92.50)                   | 66(82.50)                       | 140(87.50)    |          |
|                            | High   | 0(0.00)                     | 1(1.25)                         | 1(0.63)       |          |
| Place of residence         | Urban areas                                  | 72(90.00)                   | 69(86.25)                       | 141(88.13)    | 0.463*   |
|                            | Rural areas                                  | 8(10.00)                    | 11(13.75)                       | 19(11.88)     |          |
| Housing situation          | Private house                                | 55(68.75)                   | 51(63.75)                       | 106(66.25)    | 0.504*   |
|                            | Rental house                                 | 25(31.25)                   | 29(36.25)                       | 54(33.75)     |          |

| Variables  |           | No.(%)                         |                                    |               | P       |
|--|-----------|--------------------------------|------------------------------------|---------------|---------|
|  |           | Participating in AEC<br>(n=80) | Non-participating in AEC<br>(n=80) | Total (n=160) |         |
| Number of pregnancies  | 1         | 30(37.50)                      | 27(33.75)                          | 57(35.63)     | 0.536** |
|  | 2         | 39(48.75)                      | 43(53.75)                          | 82(51.25)     |         |
|  | 3         | 7(8.75)                        | 9(11.25)                           | 16(10.00)     |         |
|  | 4         | 4(5.00)                        | 1(1.25)                            | 5(3.13)       |         |
| Number of childbirths  | 0         | 30(37.50)                      | 27(33.75)                          | 57(35.63)     | 0.536** |
|  | 1         | 39(48.75)                      | 43(53.75)                          | 82(51.25)     |         |
|  | 2         | 7(8.75)                        | 9(11.25)                           | 16(10.00)     |         |
|  | 3         | 4(5.00)                        | 1(1.25)                            | 5(3.13)       |         |
| Number of children   | 0         | 30(37.50)                      | 27(33.75)                          | 57(35.63)     | 0.536** |
|  | 1         | 39(48.75)                      | 43(53.75)                          | 82(51.25)     |         |
|  | 2         | 7(8.75)                        | 9(11.25)                           | 16(10.00)     |         |
|  | 3         | 4(5.00)                        | 1(1.25)                            | 5(3.13)       |         |
| Type of previous childbirth                                      | NVD       | 35(70.00)                      | 44(83.02)                          | 79(76.10)     | 0.118*  |
|  | CS        | 15(30.00)                      | 9(16.98)                           | 24(23.30)     |         |
| Previous childbirth experience                                   | Hard      | 30(58.82)                      | 37(69.81)                          | 67(64.42)     | 0.242*  |
|  | Easy      | 20(41.18)                      | 16(30.19)                          | 36(35.58)     |         |
| Gender of the current fetus                                      | Female    | 38(47.50)                      | 36(45.00)                          | 74(46.25)     | 0.859*  |
|  | Male      | 35(43.75)                      | 35(43.75)                          | 70(43.75)     |         |
|  | Unknown   | 7(8.75)                        | 9(11.25)                           | 16(10.00)     |         |
| Source of gained information related to pregnancy and childbirth | Physician | 11(13.75)                      | 25(31.25)                          | 36(22.50)     | 0.008*  |
|  | Midwife   | 65(81.25)                      | 47(58.75)                          | 112(70.00)    |         |
|  | Other     | 4(5.00)                        | 8(10.00)                           | 12(7.50)      |         |
| Number of prenatal care visits during the current pregnancy      | ≤2        | 14(17.50)                      | 10(12.50)                          | 24(15.00)     | 0.001*  |
|  | 3         | 64(80.00)                      | 50(62.50)                          | 114(71.25)    |         |
|  | ≥4        | 2(2.50)                        | 20(25.00)                          | 22(13.75)     |         |

Abbreviations: No. (%): Frequency (percentage); AEC: Antenatal education classes; SD: Standard deviation; NVD: Normal vaginal delivery; CS: Cesarean section.

\*Chi-squared test, \*\*Fisher's exact test, \*\*\*Independent t-test.

fear of childbirth, and the selection of delivery type. On the other hand, it is important to consider the quality of antenatal education [26]. Another study in Turkey showed that providing education to pregnant moth-

ers could enhanced their pregnancy acceptance and reduced their fear of childbirth [27]. This is consistent with our study regarding the fear of childbirth which is related to the concerns about birth and the baby. How-



**Table 2.** Comparison of study variables based on pregnancy-related concerns between the 20<sup>th</sup> and 37<sup>th</sup> weeks of gestation in the study groups

| Variables   | Pregnancy-related Concerns in the 37 <sup>th</sup> Week | Sum of Squares | d | f      | P*    | $\eta^2_p$ | Test Power |
|---|---|----------------|---|--------|-------|------------|------------|
| Participation in the educational course   | Concerns about birth and the baby                       | 14.107         | 1 | 5.718  | 0.018 | 0.036      | 0.661      |
|   | Concerns about weight/body image                        | 60.009         | 1 | 26.060 | 0.000 | 0.147      | 0.999      |
|   | Concerns about emotions and relationships               | 13.121         | 1 | 15.934 | 0.000 | 0.095      | 0.978      |
| Concerns about birth and the baby in the 20 <sup>th</sup> week of gestation         | Concerns about birth and the baby                       | 10.624         | 1 | 4.307  | 0.040 | 0.028      | 0.541      |
|   | Concerns about weight/body image                        | 4.718          | 1 | 2.049  | 0.154 | 0.013      | 0.296      |
|   | Concerns about emotions and relationships               | 0.778          | 1 | 0.945  | 0.333 | 0.006      | 0.162      |
| Concerns about weight/body image in the 20 <sup>th</sup> week of gestation          | Concerns about birth and the baby                       | 0.213          | 1 | 0.086  | 0.769 | 0.001      | 0.060      |
|   | Concerns about weight/body image                        | 0.215          | 1 | 0.093  | 0.760 | 0.001      | 0.061      |
|   | Concerns about emotions and relationships               | 0.150          | 1 | 0.093  | 0.760 | 0.001      | 0.061      |
| Concerns about emotions and relationships in the 20 <sup>th</sup> week of gestation | Concerns about birth and the baby                       | 0.105          | 1 | 0.043  | 0.837 | 0.0001     | 0.055      |
|   | Concerns about weight/body image                        | 1.307          | 1 | 0.568  | 0.452 | 0.004      | 0.116      |
|   | Concerns about emotions and relationships               | 1.520          | 1 | 0.568  | 0.452 | 0.004      | 0.116      |
| Trait anxiety   | Concerns about birth and the baby                       | 5.607          | 1 | 2.273  | 0.134 | 0.015      | 0.322      |
|   | Concerns about weight/body image                        | 0.938          | 1 | 0.407  | 0.524 | 0.003      | 0.097      |
|   | Concerns about emotions and relationships               | 0.292          | 1 | 0.355  | 0.552 | 0.002      | 0.091      |
| Family support  | Concerns about birth and the baby                       | 0.023          | 1 | 0.009  | 0.923 | 0.000      | 0.051      |
|   | Concerns about weight/body image                        | 2.114          | 1 | 0.918  | 0.339 | 0.006      | 0.159      |
|   | Concerns about emotions and relationships               | 2.114          | 1 | 0.918  | 0.339 | 0.006      | 0.159      |
| Friends support   | Concerns about birth and the baby                       | 0.804          | 1 | 0.326  | 0.569 | 0.002      | 0.088      |
|   | Concerns about weight/body image                        | 0.902          | 1 | 0.392  | 0.532 | 0.003      | 0.095      |
|   | Concerns about emotions and relationships               | 2.016          | 1 | 2.448  | 0.120 | 0.016      | 0.343      |
| Significant others support  | Concerns about birth and the baby                       | 0.019          | 1 | 0.008  | 0.931 | 0.000      | 0.051      |
|   | Concerns about weight/body image                        | 1.386          | 1 | 0.602  | 0.439 | 0.004      | 0.120      |
|   | Concerns about emotions and relationships               | 5.339          | 1 | 6.483  | 0.012 | 0.041      | 0.716      |

\*MANCOVA.

**Table 3.** Comparison of pregnancy-related concerns in the study groups in the 37<sup>th</sup> week of gestation

| Source   | Sum of Squares | d | f      | P*    | $\eta_p^2$ | Test Power |
|--|----------------|---|--------|-------|------------|------------|
| Participation in the educational course                              | 220.380        | 1 | 25.285 | 0.000 | 0.142      | 0.999      |
| Pregnancy-related concerns in the 20 <sup>th</sup> week of gestation | 34.094         | 1 | 3.912  | 0.050 | 0.025      | 0.502      |
| Family support   | 0.797          | 1 | 0.091  | 0.763 | 0.001      | 0.060      |
| Friends support  | 1.919          | 1 | 0.220  | 0.640 | 0.001      | 0.075      |
| Significant others support   | 0.480          | 1 | 0.055  | 0.815 | 0.00       | 0.056      |
| Trait anxiety  | 22.708         | 1 | 2.605  | 0.109 | 0.017      | 0.361      |

\*ANCOVA.

**Table 4.** Pregnancy-related concerns factor in the 37<sup>th</sup> week of gestation based on multiple generalized linear regression (GLM)

| Variables  |                                   | $\beta$ | Standard Error | 95% CI      |             | X <sup>2</sup> | P     |
|--|-----------------------------------|---------|----------------|-------------|-------------|----------------|-------|
|  |                                   |         |                | Lower Bound | Upper Bound |                |       |
| Constant   |                                   | 10.934  | 5.3748         | 0.400       | 21.468      | 4.138          | -     |
| Participation in the AEC   |                                   | -3.880  | 0.6097         | -5.075      | -2.685      | 40.504         | 0.042 |
| Non-participation in the AEC   | Spouse occupation (unemployed)    | -5.108  | 3.1462         | -11.274     | 1.059       | 2.635          | 0.105 |
|  | Spouse occupation (worker)        | -1.672  | 1.0266         | -3.684      | 0.340       | 2.652          | 0.103 |
|  | Spouse occupation (farmer)        | -1.466  | 1.1896         | -3.798      | 0.865       | 1.520          | 0.218 |
| Spouse occupation (employed in medical sector)                       | Housing situation (private house) | 0.321   | 0.5918         | -0.839      | 1.481       | 0.295          | 0.587 |
| Gender of the current fetus  | Female                            | -0.412  | 1.0999         | -2.567      | 1.744       | 0.140          | 0.708 |
|  | Male                              | -0.045  | 1.1010         | -2.220      | 2.131       | 0.002          | 0.968 |
| Type of previous childbirth  | NVD                               | -0.883  | 0.7008         | -2.256      | 0.491       | 1.586          | 0.208 |
| Source of gained information related to pregnancy and childbirth     | Physician                         | 1.037   | 1.3550         | -1.619      | 3.693       | 0.586          | 0.444 |
|  | Midwife                           | 1.084   | 1.3399         | -1.542      | 3.710       | 0.655          | 0.418 |
| Age  |                                   | -0.007  | 0.1415         | -0.285      | 0.270       | 0.003          | 0.959 |
| Spouse age   |                                   | 0.093   | 0.1688         | -0.238      | 0.424       | 0.304          | 0.582 |
| Pregnancy-related concerns in the 20 <sup>th</sup> week of gestation |                                   | 0.012   | 0.0406         | -0.068      | 0.091       | 0.086          | 0.769 |
| Family support   |                                   | 0.008   | 0.1585         | -0.303      | 0.379       | 0.003          | 0.959 |



| Variables   | $\beta$ | Standard Error | 95% CI      |             | $\chi^2$ | P     |
|---|---------|----------------|-------------|-------------|----------|-------|
|   |         |                | Lower Bound | Upper Bound |          |       |
| Friends support   | 0.031   | 0.0806         | -0.127      | 0.189       | 0.151    | 0.697 |
| Significant others support                                  | -0.076  | 0.1889         | -0.466      | 0.294       | 0.163    | 0.687 |
| Trait anxiety   | -0.023  | 0.0269         | -0.076      | 0.029       | 0.744    | 0.388 |
| Educational level   | -0.400  | 0.5626         | -1.503      | 0.703       | 0.505    | 0.477 |
| Spouse educational level                                    | -0.203  | 0.5441         | -1.269      | 0.864       | 0.139    | 0.709 |
| Income status   | -0.330  | 0.7981         | -1.894      | 1.234       | 0.171    | 0.679 |
| Number of pregnancies                                       | -1.445  | 0.5277         | -2.479      | -0.411      | 7.496    | 0.006 |
| Number of prenatal care visits during the current pregnancy | -0.063  | 0.5327         | -1.107      | 0.981       | 0.014    | 0.909 |

Abbreviations: NVD: Normal vaginal delivery; CS: Cesarean section; AEC: Antenatal education class; CI: Confidence interval.

ever, the mentioned study revealed an enhanced acceptance of pregnancy (related to concerns about birth and the baby) among those received education.

This study showed that the number of pregnancy was a predictor of pregnancy-related concerns. This is consistent with the results of Hassanzadeh et al. [28]. Additionally, our finding regarding the association of participation in the educational course during pregnancy and the reduction of concerns about birth and the baby, including fear of childbirth, is consistent with them. The present study also revealed that the lowering effect of AEC on pregnancy-related concerns about weight/body-image was significantly more noticeable than that on worries about birth and the baby and emotions and relationships in the 37<sup>th</sup> week of gestation. Although, the concerns about weight/body-image did not show any significant change by comparison within each group with or without participation in educational courses over time from the 20<sup>th</sup> week to the 37<sup>th</sup> week. This finding can also suggest that education may have a further reductive effect on that particular concern. Our study involved a thorough search of various databases but yielded no comparable studies to weigh up this finding. Therefore, this finding may represent a previously unidentified impact of AEC on a specific domain of concern that expectant mothers experience during pregnancy. This study had some limitations. First, the AEC was provided during the COVID-19 pandemic in a clinic using face-to-face method that can affect these classes. Another limitation was that the findings cannot be generalized to all pregnant women in the country. Accordingly, studies conducted in other cities and health

centers using larger sample sizes are recommended to verify the results.

The pregnant mothers participated in the AEC courses experienced fewer pregnancy-related concerns compared to the pregnant mothers without receiving the education. This suggest that AEC courses can provide an effective solution to address the pregnancy-related concerns, including concerns about birth and the baby, weight/body image, and emotions and relationships in pregnant mothers. Therefore, healthcare providers should encourage pregnant mothers to attend the AEC courses for having acceptable maternal and child health outcomes.

## Ethical Considerations

### Compliance with ethical guidelines

This study was approved by the Ethics Committee of [Guilan University of Medical Sciences](#), Rasht, Iran (Code: IR.GUMS.REC.1399.232). The participants received information regarding the study objectives and were assured of the confidentiality of their participation and their right to leave the study at any time. All participants signed a written informed consent form.

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### Authors' contributions

Design: Najme Ghashghaee, Parvaneh Rezasoltani, and Mojgan Nazari; Data collection and analysis: Najme Ghashghaee, Parvaneh Rezasoltani, and Ehsan Kazem-nezhad Leily. Final approval: All authors.

### Conflict of interest

The authors declared no conflict of interest.

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### References

- [1] Newman MG, Llera SJ, Erickson TM, Przeworski A, Castonguay LG. Worry and generalized anxiety disorder: A review and theoretical synthesis of evidence on nature, etiology, mechanisms, and treatment. *Annu Rev Clin Psychol*. 2013; 9:275-97. [DOI:10.1146/annurev-clinpsy-050212-185544] [PMID]
- [2] Yousefi R. [Psychometric properties of Persian version of prenatal distress questionnaire (PDQ) (Persian)]. *Nurs Midwifery J*. 2015; 13(3):215-25. [Link]
- [3] Crossland AE, Munns L, Kirk E, Preston CEJ. Comparing body image dissatisfaction between pregnant women and non-pregnant women: A systematic review and meta-analysis. *BMC Pregnancy Childbirth*. 2023; 23(1):709. [DOI:10.1186/s12884-023-05930-w] [PMID]
- [4] Escañuela Sánchez T, Meaney S, O'Connor C, Linehan L, O'Donoghue K, Byrne M, et al. Facilitators and barriers influencing weight management behaviours during pregnancy: A meta-synthesis of qualitative research. *BMC Pregnancy Childbirth*. 2022; 22(1):682. [DOI:10.1186/s12884-022-04929-z] [PMID]
- [5] Alderdice F, Lynn F. Factor structure of the Prenatal Distress Questionnaire. *Midwifery*. 2011; 27(4):553-9. [DOI:10.1016/j.midw.2010.05.003] [PMID]
- [6] Brunton R, Simpson N, Dryer R. Pregnancy-related anxiety, perceived parental self-efficacy and the influence of parity and age. *Int J Environ Res Public Health*. 2020; 17(18):6709. [DOI:10.3390/ijerph17186709] [PMID]
- [7] Gourounti K, Anagnostopoulos F, Lykeridou K. Coping strategies as psychological risk factor for antenatal anxiety, worries, and depression among Greek women. *Arch Womens Ment Health*. 2013; 16(5):353-61. [DOI:10.1007/s00737-013-0338-y] [PMID]
- [8] Malakouti J, Mirghafourvand M, Salehi Pour Mehr H, Shamsaei F, Safari Komeil M. [Maternal worries and their relationship with coping strategies in pregnant women referring to health centers in Hamadan (Persian)]. *J Hayat*. 2018; 24(1):35-47. [Link]
- [9] Akinsulore A, Temidayo AM, Oloniniyi IO, Olalekan BO, Yetunde OB. Pregnancy-related anxiety symptoms and associated factors amongst pregnant women attending a tertiary hospital in south-west Nigeria. *S Afr J Psychiatr*. 2021; 27:1616. [DOI:10.4102/sajpsychiatry.v27i0.1616] [PMID]
- [10] Chen J, Huang J, Ooi S, Lin L, Chen C, Liu Y, et al. Effect of flexible patterns of health education on enhancing the compliance of pregnant women from Tibet, China. *Medicine (Baltimore)*. 2020; 99(1):e18447. [DOI:10.1097/MD.00000000000018447] [PMID]
- [11] Kabukcu C, Sert C, Gunes C, Akyol HH, Tipirdamaz M. Predictors of prenatal distress and fear of childbirth among nulliparous and parous women. *Niger J Clin Pract*. 2019; 22(12):1635-43. [DOI:10.4103/njcp.njcp\_613\_18] [PMID]
- [12] Bedaso A, Adams J, Peng W, Sibbritt D. The relationship between social support and mental health problems during pregnancy: A systematic review and meta-analysis. *Reprod Health*. 2021; 18(1):162. [DOI:10.1186/s12978-021-01209-5] [PMID]
- [13] Mortazavi F, Akaberi A. Worries of pregnant women: Testing the Farsi Cambridge worry scale. *Scientifica (Cairo)*. 2016; 2016:5791560. [DOI:10.1155/2016/5791560] [PMID]
- [14] Gandomi N, Sharifzadeh G, Torshizi M, Norozi E. The effect of educational intervention based on self-efficacy theory on pregnancy anxiety and childbirth outcomes among Iranian primiparous women. *J Educ Health Promot*. 2022; 11(1):14. [DOI:10.4103/jehp.jehp\_1548\_20] [PMID]
- [15] Kashiha M, Hosseini J, Samadaee Gelekholaee K. Mothers' perceptions about childbirth preparation classes: A qualitative study. *Int J Community Based Nurs Midwifery*. 2023; 11(4):278-86. [DOI:10.30476/IJCBNM.2023.98607.2247] [PMID]
- [16] Hadjigeorgiou E, Frangou M, Koliandri Y, Christofi MD, Middleton N. Description of the culture of childbirth and parenting classes in Cyprus: An ethnographic approach. *Eur J Midwifery*. 2024; 8. [DOI:10.18332/ejm/186665] [PMID]
- [17] Moghasemi S, Vedadhir A, Simbar M. Models for providing midwifery care and its challenges in the context of Iran. *J Holistic Nurs Midwifery*. 2018; 28(1):64-74. [DOI:10.18869/acadpub.hnmj.28.1.64]
- [18] Najafi F, Abouzari-Gazafrudi K, Jafarzadeh-Kenarsari F, Rahnama P, Gholami Chaboki B. [Relationship between attendance at childbirth preparation classes and fear of childbirth and type of delivery (Persian)]. *Hayat*. 2016; 21(4):30-40. [Link]
- [19] Serçeşu P, Mete S. Turkish women's perceptions of antenatal education. *Int Nurs Rev*. 2010; 57(3):395-401. [DOI:10.1111/j.1466-7657.2009.00799.x] [PMID]
- [20] Uslu Yuvaci H, Cinar N, Yalınzöglü Caka S, Topal S, Peksen S, Sağlam N, et al. Effects of antepartum education on worries about labor and mode of delivery. *J Psychosom Obstet Gynecol*. 2021; 42(3):228-34. [DOI:10.1080/0167482X.2020.1725465] [PMID]
- [21] Zimet GD, Dahlem NW, Zimet SG, Farley GK. The Multidimensional scale of perceived social support. *J Pers Assess*. 1988; 52(1):30-41. [DOI:10.1207/s15327752jpa5201\_2]

- [22] Rajabi G. [The study of psychometric properties of the multidimensional scale perceived social support (Persian)]. *Int J Behav Sci*. 2012; 5(4):357-64. [\[Link\]](#)
- [23] Spielberger CD. Manual for the State-Trait-Anxiety Inventory: STAI (form Y). Palo Alto, CA: Consulting Psychologists Press; 1983. [\[Link\]](#)
- [24] Mahram B. Standardization of Spielberger's test anxiety inventory in Mashhad [MA thesis]. Mashad: Ferdousi University; 1993. [\[Link\]](#)
- [25] Karrabi R, Farjamfar M, Mortazavi F, Nazari A M, Goli S. [The effect of solution-focused group counseling on pregnant women's worries: A randomized clinical trial (Persian)]. *J Hayat*. 2019; 25(1):81-94. [\[Link\]](#)
- [26] Anis W, Amalia RB, Dewi ER. Do mothers who meet the minimum standard of antenatal visits have better knowledge? A study from Indonesia. *J Educ Health Promot*. 2022; 11(1):134. [\[DOI:10.4103/jehp.jehp\\_671\\_21\]](#) [\[PMID\]](#)
- [27] Karabulut Ö, Coşkuner Potur D, Doğan Merih Y, Cebeci Mutlu S, Demirci N. Does antenatal education reduce fear of childbirth? *Int Nurs Rev*. 2016; 63(1):60-7. [\[DOI:10.1111/inr.12223\]](#) [\[PMID\]](#)
- [28] Hasanzadeh R, Abbas-Alizadeh F, Meedya S, Mohammad-Alizadeh-Charandabi S, Mirghafourvand M. Assessment of childbirth preparation classes: A parallel convergent mixed study. *Reprod Health*. 2019; 16:160. [\[DOI:10.1186/s12978-019-0826-2\]](#) [\[PMID\]](#)