



# The effects of antenatal education on fear of childbirth, maternal self-efficacy and post-traumatic stress disorder (PTSD) symptoms following childbirth: an experimental study



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## ABSTRACT

**Background:** Fear of birth and low childbirth self-efficacy is predictive of post-traumatic stress disorder symptoms following childbirth. The efficacy of antenatal education classes on fear of birth and childbirth self-efficacy has been supported; however, the effectiveness of antenatal classes on post-traumatic stress disorder symptoms after childbirth has received relatively little research attention.

**Purpose:** This study examined the effects of antenatal education on fear of childbirth, maternal self-efficacy and post-traumatic stress disorder symptoms following childbirth.

**Design:** Quasi-experimental study.

**Methods:** The study was conducted in a city located in the Middle Anatolia region of Turkey and data were collected between December 2013 and May 2015. Two groups of women were compared—an antenatal education intervention group ( $n = 44$ ), and a routine prenatal care control group ( $n = 46$ ). The Wijma Delivery Expectancy/Experience Questionnaire, Version A and B, Childbirth Self-efficacy Inventory and Impact of Event Scale–Revised was used to assess fear of childbirth, maternal self-efficacy and PTSD symptoms following childbirth.

**Results:** Compared to the control group, women who attended antenatal education had greater childbirth self-efficacy, greater perceived support and control in birth, and less fear of birth and post-traumatic stress disorder symptoms following childbirth (all comparisons,  $p < 0.05$ ).

**Conclusions:** Antenatal education appears to alleviate post-traumatic stress disorder symptoms after childbirth.

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## 1. Introduction

Antenatal education is instrumental in helping prospective mothers. Prospective mothers often need antenatal education to help them make decisions about birth and during birth, and for developing skills for labor, pain relief, infant and postnatal care, breastfeeding and parenting. Although antenatal education is provided as standard through training programs in developed countries, there is no standard program in developing countries. Therefore, the quality and content of the education vary (Gagnon & Sandall, 2011).

In recent years, there has been increasing research conducted to examine the effect of antenatal education on childbirth worldwide, yet most such research has been conducted in Western countries (Brixval, Axelsen, Andersen, Due, & Koushede, 2014). Several studies found that antenatal education was effective in decreasing birth-related anxiety and fear of childbirth (Byrne, Hauck, Fisher, Bayes, & Schutze, 2014; Miquelutti, Cecatti, & Makuch, 2013; Toohill et al., 2014). Additional studies showed that antenatal education increased maternal knowledge about birth, birth satisfaction, childbirth-related self-efficacy and sense of control in birth (Byrne et al., 2014; Malata, Hauck, Monterosso, & McCaul, 2007; Spinelli, Baglio, Donati, Grandolfo, & Osborn, 2003; Toohill et al., 2014). A recent study conducted in Western Turkey demonstrated that antenatal education was effective in reducing fear of childbirth and increasing maternal self-efficacy, but had no effect on paternal attachment (Sercekus & Başkale, 2016).

Several studies have been undertaken to examine the effects of antenatal education on fear of childbirth and maternal self-efficacy (Byrne et al., 2014; Gagnon & Sandall, 2011; Sercekus & Başkale, 2016). Although fear of birth and low childbirth self-efficacy are

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predictive of post-traumatic stress disorder (PTSD) symptoms following childbirth, the effectiveness of antenatal education on PTSD symptoms following childbirth has received relatively little research attention. As such, this study aimed to examine the effects of antenatal education on fear of childbirth, maternal self-efficacy and PTSD symptoms following childbirth.

## 2. Background

### 2.1. PTSD symptoms following childbirth

Childbirth is both a natural and challenging experience that includes positive and negative psychological responses. Women's psychological responses to birth are largely determined by retrospective appraisal of the birth process, and interpretation, thoughts and emotions during and after birth (Ayers, 2007). Births experienced as particularly traumatic might thus have a negative impact on a woman's postnatal psychological well-being. Recently, researchers have increasingly focused on women's psychological trauma and its symptoms following childbirth (Ayers, 2014; Boorman, Devilly, Gamble, Creedy, & Fenwick, 2014). Prevalence estimates of PTSD symptoms following childbirth vary substantially across studies; yet, in a recent review the prevalence of PTSD symptoms following childbirth was found to be 3.17% in community samples and 15.7% in high-risk samples, respectively (Grekin & O'Hara, 2014). Subjective birth experience has been found to have the strongest effect on PTSD symptoms following childbirth (Garthus-Niegel, von Soest, Vollrath, & Eberhard-Gran, 2013). It should also be noted that PTSD symptoms following childbirth are related not only to actual birth trauma but also to other factors can make women more vulnerable or at risk of developing PTSD symptoms following childbirth (Ayers, 2014). Symptoms of PTSD are generally divided into three categories including re-experience/intrusion via nightmares, intrusive thoughts or flashbacks; avoidance and numbing; and increased arousal such as hypervigilance, irritability, difficulty concentrating and other emotional dysregulation. For birth-related PTSD, two clusters of symptoms were identified: (1) re-experiencing and avoidance symptoms; and (2) emotional numbing and arousal symptoms (Ayers, Harris, Sawyer, Parfitt, & Ford, 2009).

### 2.2. Fear of childbirth and PTSD symptoms following childbirth

The fear of childbirth during pregnancy is a predictive factor for developing PTSD symptoms subsequent to birth (Ayers, 2014). Women with severe fear of childbirth were more likely to describe their birth experiences as involving a sense of not being present in the delivery room, and were more likely to state that they did not receive sufficient support from midwives, and that their faith in their ability to give birth was shaken (Nilsson, Bondas, & Lundgren, 2010). Although fear of childbirth is more likely to be observed in nulliparous women, women with traumatic or difficult birth experiences are around five times more likely to report childbirth fear in a subsequent pregnancy (Storksen, Garthus-Niegel, Vangen, & Eberhard-Gran, 2013). In addition, complications during childbirth may increase postpartum fear of birth, and intense fear during birth may be more predictive than perceived threat of injury or death for postnatal PTSD symptoms following childbirth (Boorman et al., 2014).

### 2.3. Childbirth related maternal self-efficacy and PTSD symptoms following childbirth

Another risk factor for PTSD following childbirth that has not been widely examined is low self-efficacy. A mother's self-efficacy is affected by her perception of the birth, and confidence in her ability to give birth affects coping mechanisms (Ip, Tang, & Goggins, 2009). High levels of self-efficacy result in greater capability to cope with the stresses of childbirth and to perform required behaviors (Lowe, 1993). According

to Bandura (1989), "Self-efficacy is determined by the belief in what outcome a given behavior will have in a given situation (outcome expectancy) and the belief in one's ability to perform that behavior in the actual situation (self-efficacy expectancy)". In nulliparous women, outcome expectancy and self-efficacy expectancy are positively correlated each other and both variables are negatively correlated with fear of delivery (Salomonsson, Berterö, & Alehagen, 2013). In accordance with the research outlined above, it is proposed that psychological and mental preparation of pregnant women for childbirth in antenatal education might help to reduce fear of childbirth, induce childbirth related maternal self-efficacy and in this way, minimize the risk of experiencing PTSD symptoms following childbirth.

## 3. Purpose

The main objective of this study was to assess the effects of antenatal education on fear of childbirth, maternal self-efficacy and PTSD symptoms following childbirth.

## 4. Methods

### 4.1. Design

A quasi-experimental study was conducted, comparing two groups of women: an antenatal education intervention group, and a usual prenatal care control group.

### 4.2. Hypotheses

**H1.** Women who receive antenatal education will have a lower degree of fear of childbirth than those in a control group.

**H2.** Women who receive antenatal education will have a higher degree of maternal self-efficacy than those in a control group.

**H3.** Women who receive antenatal education will have a lower degree of PTSD symptoms following childbirth than those in a control group.

### 4.3. Setting and participants

The study was conducted in a city located in the Middle Anatolia Region of Turkey. Maternity care in this region is provided in family health centers and hospitals. Routine antenatal and postnatal care is provided by midwives, nurses and general practitioners in family health centers. If women require non-routine care, they are referred to obstetricians at the two local hospitals (a government hospital and a private hospital).

Participants in the study were recruited using posted advertisements in the private hospital. To be included in the study, mothers were required to be nulliparous, between 20 and 32 weeks gestation, have no history of pregnancy complications, have their pregnancies be considered non high-risk, and not be attending any other antenatal program. All participants were also required to have graduated from at least primary school and to be able to communicate in Turkish.

The intervention group consisted of women who volunteered to participate in the study under the 'usual care' condition, and met the inclusion criteria. The control group was composed of women who were receiving usual prenatal care at an outpatient maternity clinic of the same private hospital and met the inclusion criteria. In the hospital, usual prenatal care visits take 10–15 minutes, and consist of collecting medical information, a physical examination and ultrasound scan. No antenatal education is offered in these visits, as antenatal education classes are currently not a part of routine care in the region.

Since no prior experimental study has been conducted using the data collection instrument employed in this study, the required sample

size could not be calculated at the beginning of the study. When the sample size reached 10 participants in each group, power was calculated based on collected data, using Minitab 15. The primary outcome was the total score for PTSD symptoms following childbirth. The number of the participants required for each group was determined based on a significance level of 0.05, and assumed mean differences (15.20) and standard deviations (12.39) on the data collection tool for PTSD symptoms following childbirth. To achieve a study power of 80%, each group was required to include at least 31 participants. To account for potential loss to follow-up, 50 participants were assigned into each group. To reach the predetermined sample size, 113 women were invited to participate in study (response rate: 88.4%). Fig. 1 shows the flow chart for the study phases.

4.4. Intervention

The content of the antenatal education class is presented in Table 1. The content and structure of antenatal education class were based on Dick-Read's "natural labor", Lamaze's "psychoprophylaxis", Balaskas's "active birth" and Mongan's "hypnobirthing" philosophy (Balaskas, 1992; Dick-Read, 1933; Lamaze, 1958; Mongan, 2005). The sessions in the intervention group were conducted using simulator mannequins, animation videos, role-playing and slide presentations. The sessions were led by the authors, who had previously participated in Childbirth Educator Courses, and Rational, Emotive & Cognitive-Behavioral Theory Courses. The first author has been an antenatal education instructor for 8 years.

Pregnant women assigned to the intervention group attended classes in groups of 5–8 women. They were offered a structured antenatal education course consisting of 16 hours of instruction split into four 240-minute weekly sessions. Each session included presentation of theoretical information for 150 minutes, warm-up and stretching exercises for 45 minutes and relaxation exercises for 45 minutes.

4.5. Data collection

Data were collected between December 2013 and May 2015. Fig. 1 gives an overview of the design, response rates and measures taken in pregnancy (time 1) (before and after education in intervention group), and after birth (time 2). Expected delivery dates were collected from medical records. Women completed the second set of questionnaires at 6 to 8 weeks after birth in home visits (intervention group: 43.6 ± 7.9 days, control group: 42.4 ± 6.3 days, p > .05).

4.5.1. Time 1: prenatal period

4.5.1.1. Demographic information. Participants provided information on age and education level.

4.5.1.2. The Wijma Delivery Expectancy/Experience Questionnaire A Version (W-DEQ-A). The W-DEQ-A was designed to assess women's feelings and fear about childbirth (Wijma, Wijma, & Zar, 1998). The W-DEQ-A is a 33-item self-rating scale. Scores range from 'not at all'

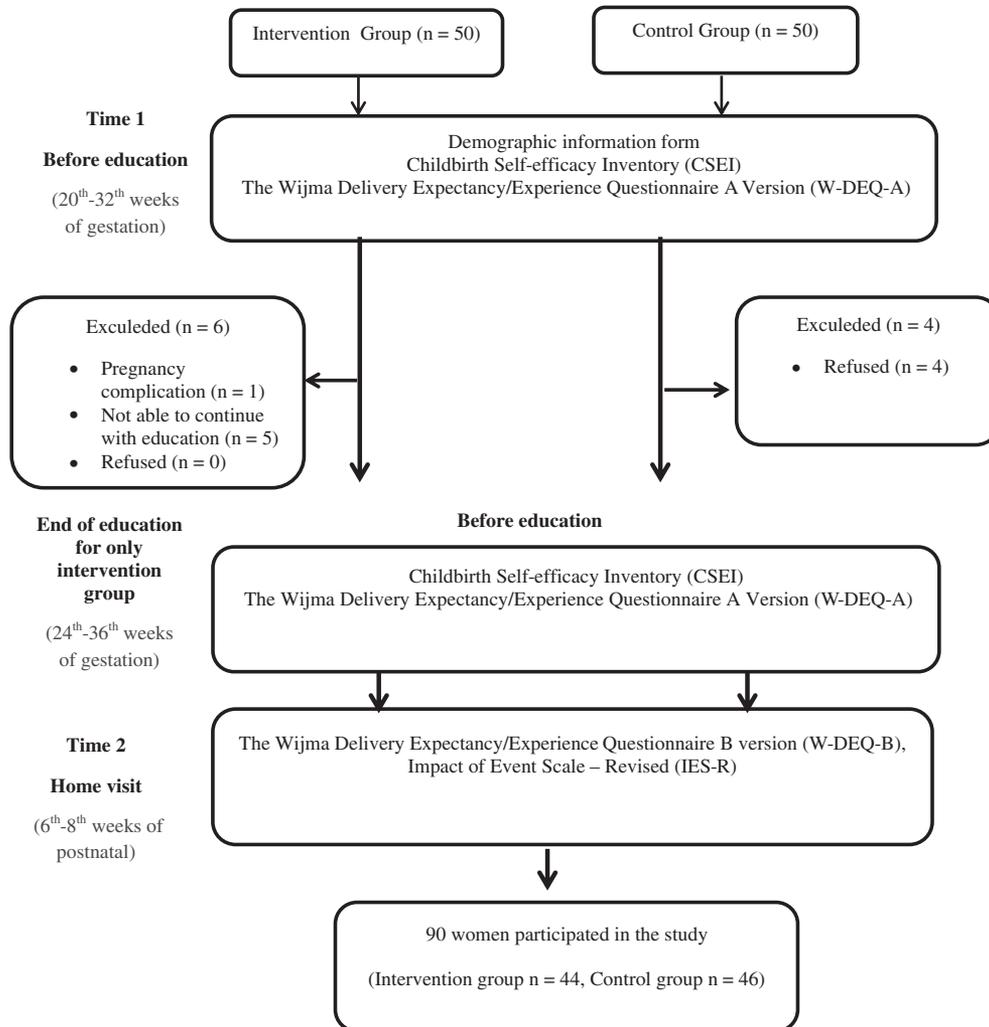


Fig. 1. The flow chart of the study phase.

**Table 1**  
4-Week antenatal class series outline.

Week/duration	Objectives	Content
1st week	Introduction	-Welcome & Introduction -Overview of classes
	Overview to course	-Course objectives -Introduction to questionnaires
	Class expectations	-Pre-test -An introduction to the understanding of different philosophies of birth
	Raising awareness of fear of childbirth	-Sharing emotions and thoughts about birth -Identifying and recognizing different emotions about childbirth
	Strategies to cope with fear of birth	-Introduction to history of fear of childbirth -Recognition of the dynamics and sources of childbirth fear -Introduction to the effects of childbirth fear on birth (neuroendocrine effects) -Introduction to a positive birth experience without any fear -Role play: visualization of birth -Exercises to trust and control your body through mind
2nd week	Psychological and physiological and adaptation to birth	-The importance of adaptation to pregnancy and parenthood and presentation of exercises for enhancing adaptation skills -Psychological preparation for birth -Physiological preparation for birth (nutrition and exercise) -Practical implementation of exercises to make the body prepared for birth -Practical implementation of progressive relaxation exercises that can be used in and during birth
		- Recognizing the pre-signs of labor -Understanding the medical procedures applied in/during birth -Understanding the stages of labor -Understanding the role of the uterus and the baby -Understanding the hormones released and their roles in birth -Practical implementation of relaxation techniques (breathing techniques, body massage, acupressure points for pain relief, different labor positions, music, aromatherapy, taking a shower or use of mini pool, mental imagery)
		- Relaxation exercises (Glove anesthesia) - Watching a birth video
		-Watching different live birth videos -Preparing a realistic birth plan
3rd week	Understanding birth	
	Having a sense of control over birth	
4th week	Positive appraisal of birth	-Postpartum adaptation -Cognitive restructuring of birth memories -Preservation of positive birth -Psychological changes in postpartum period -Discussion of postpartum blues, postpartum depression, postpartum psychosis and PTSD symptoms following childbirth -Summarizing what you have learnt -Sharing thoughts and emotions about the antenatal class -Post-test -Presentation of course certificates
	Preservation of positive birth memories	

(0) to 'extremely' (5), yielding a minimum score of 0 and a maximum score of 165. A higher score indicates more severe fear of childbirth. The W-DEQ-A has good split-half reliability of .87 in nulliparous women and .96 in multiparous women (Wijma et al., 1998). The scale was adapted for use with Turkish women (Korukcu, Kukulcu, & Firat, 2012), and was reported to have good internal consistency ( $\alpha = .89$ ), which was also found in the current study ( $\alpha = .92$ ).

**4.5.1.3. Childbirth Self-efficacy Inventory (CBSEI).** The short form of the Childbirth Self-efficacy Inventory has two subscales: outcome expectancy and efficacy expectancy (Ip, Tang, & Goggins, 2008). Efficacy expectancy is a personal conviction about one's ability to successfully perform required behaviours in a given situation, and outcome expectancy is the belief that a given behavior will lead to a given outcome. Each subscale consists of 16 items and yields a score between 16 and 160. Higher scores indicate higher levels of efficacy or outcome efficacy for birth. The CBSEI has strong psychometrics, with good internal consistency ( $\alpha = .82$ ) (Ip et al., 2008). Psychometric properties of the Turkish version of CBSEI were tested (Ersoy, 2011) and internal consistency was similarly high ( $\alpha = .90$ ). This was also found in the current study ( $\alpha = .94$ ).

#### 4.5.2. Time 2: postnatal period

**4.5.2.1. The Wijma Delivery Expectancy/Experience Questionnaire B version (W-DEQ-B).** The W-DEQ-B is a 33-item questionnaire with answers based on a 6-point Likert scale. The W-DEQ-B is used to determine fear during childbirth, feelings, and thoughts of postpartum women who have normal vaginal childbirth. Total scores can range from zero to 165, with higher scores indicative of more intense fear of childbirth in postnatal period. Internal consistency and split-half reliability of the W-DEQ-B are  $\geq .87$  for samples of both nulliparous and multiparous women (Wijma et al., 1998). A study exploring the reliability of the Turkish translated version of the scale found the internal consistency to be very good ( $\alpha = .89$ ) (Korukcu, Bulut, & Kukulcu, 2014). This was also found in the current study ( $\alpha = .93$ ).

**4.5.2.2. Impact of Event Scale-Revised (IES-R).** PTSD symptoms following childbirth were measured with the Impact of Event Scale-Revised (IES-R). The IES-R is a 22-item questionnaire that provides an assessment of the three symptom clusters of PTSD: intrusive thoughts (8 items), avoidance behaviors (8 items), and hyperarousal (6 items) (Horowitz, Wilner, & Alvarez, 1979). Participants were asked to answer all questions in relation to their experiences of childbirth. Items were rated on a 5-point scale based on the degree of they felt distressed or bothered during the past 7 days by each symptom presented. The IES-R has good reliability in women who have recently given birth ( $\alpha = .88$ ). Psychometric characteristics of the Turkish version of the IES-R show very good internal consistency ( $\alpha = .93$ ) (Çorapçıoğlu, Yargıç, Geyran, & Kocabaşoğlu, 2006), which was also found in this study ( $\alpha = .91$ ).

#### 4.6. Ethical considerations

Ethical approval was obtained from the Institutional Review Board of the university where this study took place (Nigde University Ethics Committee, IRB number: 28.03.2013–05–01). All participants provided written informed consent. During the study, all participants were assured that they could withdraw from the study at will ensured to withdraw from the study whenever they ask. To protect participants' privacy, all data were encoded and used only for research purposes.

#### 4.7. Data analysis

Data were analyzed with SPSS (Statistical Package for Social Sciences) version 16.0. Descriptive statistics were used to analyze frequency distributions, percentages, means, and standard deviations. Statistical significance was defined as  $p < .05$ . Independent-samples *t* tests and chi-square tests were used to analyze differences in demographic data. Significance tests of the difference between two mean values (independent-samples *t* tests and paired-samples *t* tests) were used to compare the study groups in terms of CBSEI, W-DEQ-A, W-DEQ-B and SCIB. A Mann-Whitney U-test was used to compare

the groups' IES-R scores due to non-normal distribution of data for this instrument.

## 5. Results

There were no differences in the sociodemographic characteristics of participants in the active treatment and control groups. Participants in the intervention group were on average 26.8 years old ( $SD = 2.6$ ) and the majority were university graduates (70.5%). Similarly, participants in the control group were on average 25.3 years old ( $SD = 4.6$ ) and the majority were university graduates (52.2%) ( $p > .05$ ,  $\chi^2 = 4.46$ ).

Table 2 summarizes differences in childbirth self-efficacy and fear of birth in pregnancy between the two groups before the intervention. There were no significant differences in childbirth self-efficacy scores, outcome expectancy score, efficacy expectancy score and fear of birth in pregnancy score were noted between the groups ( $p > .05$ ).

Table 3 summarizes differences in childbirth self-efficacy and fear of birth in pregnancy in the intervention group before education and after education. The differences in childbirth self-efficacy scores, outcome expectancy scores, efficacy expectancy scores and fear of birth in pregnancy scores were significant ( $p < .01$ ).

Table 4 presents a comparison of fear of birth postpartum, and PTSD symptoms following childbirth between the intervention and control groups in the postpartum period. The difference in fear of birth in the postpartum period between the groups was significant ( $p < .05$ ). Women in the intervention group had significantly lower PTSD symptoms following childbirth than women in the control group in the postpartum period ( $p < .01$ ).

## 6. Discussion

This research is the first study of the effectiveness of antenatal education on PTSD symptoms following childbirth in women in Turkey. However, it has some limitations, including sample characteristics and data collection. The main limitation of this research is that the sample in this study consisted of participants from a city in Central Anatolia, Nigde, Turkey. Therefore, the results found in this study should only be used to inform practice in this province and they may not relate to the general population of pregnant women in the country. Secondly, participants were not randomly allocated to the intervention and control groups due to concerns about dropout rates. Rather, women were informed about the study and offered the opportunity to choose their group, women who agreed to participate in the antenatal education were included in the experimental group and women who had been receiving only routine prenatal care at a hospital were included in the control group.

In the present study, compared to the control group, women receiving antenatal education had a lower degree of fear of birth in prenatal and postnatal periods. In other some experimental studies, antenatal education has also been shown to reduce fear of childbirth (Boorman et al., 2014; Byrne et al., 2014; Sercekuş & Başkale, 2016; Toohill et al., 2014). In contrast, a recent study conducted in Turkey found that antenatal education increased childbirth fear in some women, but the reason of this result was not known (Sercekuş & Mete, 2010). For this

**Table 3**

Comparison of childbirth self-efficacy and fear of birth in pregnancy for intervention group before and after education.

Variable	Before education (n = 44)	After education (n = 44)	p-Value
	Mean ± SD	Mean ± SD	
Childbirth Self-efficacy	224.1 ± 54.5	297.9 ± 17.8	.00
Outcome expectancy	129.5 ± 25.2	152.6 ± 7.4	.00
Efficacy expectancy	94.6 ± 37.6	145.2 ± 12.0	.00
Fear of birth in pregnancy	66.8 ± 23.7	30.4 ± 18.07	.00

reason, the education program in this study included role-playing. Each woman provided the reason for her fear of childbirth and was then supported in overcoming it in role play scenarios. In addition, it was recognized the dynamics and sources of fear of childbirth and told effects of childbirth fear on birth. The result showed that antenatal education in this study was effective on fear of childbirth.

The results of previous studies on this topic suggest that antenatal childbirth education was associated with a significant improvement in maternal self-efficacy, feelings of empowerment and confidence in women (Byrne et al., 2014; Seçekuş & Başkale, 2016). In a randomized controlled trial, an efficacy-enhancing educational intervention raised women's confidence in their capabilities to cope with childbirth (Ip et al., 2009). In response to these findings, antenatal education in this study was designed to foster the development and improvement of women's self-confidence and childbirth self-efficacy. A mother's self-efficacy is affected by her perception of the birth (Ip et al., 2009). Therefore, during the antenatal education sessions in this study, participants shared emotions and thoughts about birth, read or told positive birth experiences, and watched positive birth videos. In addition, participants were taught techniques for coping with some challenge situations during childbirth. As a result, the intervention group in this study reported higher childbirth self-efficacy, outcome expectancy, and efficacy expectancy. Fear of childbirth has been negatively correlated with outcome expectancy and efficacy expectancy in nulliparous women (Salomonsson et al., 2013). Our intervention may have reduced fear of childbirth, since we found increased childbirth self-efficacy in the antenatal education group.

This study provides support for the idea that antenatal education can reduce the occurrence of PTSD symptoms following childbirth. There are three possible reasons for this. First, reduction of the fear of childbirth associated with antenatal education may reduce PTSD symptoms following childbirth. The fear of childbirth during pregnancy is a predictive factor for developing PTSD symptoms in response to the subsequent birth (Ayers, 2014). In addition, intense fear during birth may be more predictive than perceived threat of injury or death for postnatal PTSD symptoms following childbirth (Boorman et al., 2014). Second, low childbirth-related self-efficacy is associated with PTSD symptoms following childbirth. Ford, Ayers, and Bradley (2010) found that low self-efficacy was associated with increased PTSD symptoms following childbirth. In nulliparous women, outcome expectancy and efficacy expectancy are positively correlated each other and both variables are

**Table 2**

Comparison of obstetric characteristics childbirth self-efficacy and fear of birth in pregnancy between two groups before education.

	Intervention group (n = 44)	Control group (n = 46)	p-Value
	Mean ± SD	Mean ± SD	
Childbirth self-efficacy	224.1 ± 54.5	229.8 ± 51.1	.60
Outcome expectancy	129.5 ± 25.2	127.5 ± 24.4	.70
Efficacy expectancy	94.6 ± 37.6	102.3 ± 34.1	.30
Fear of birth in pregnancy	66.8 ± 23.7	58.3 ± 25.8	.10

**Table 4**

Comparison of PTSD symptoms following childbirth and fear of birth in postpartum between two groups.

Variable	Intervention group (n = 44)	Control group (n = 46)	p-Value
	Mean ± SD	Mean ± SD	
Fear of birth postpartum	25.5 ± 18.2 (n = 14)	46.8 ± 25.4 (n = 8)	.03
PTSD symptoms following childbirth	4.2 ± 7.8	15.8 ± 13.1	.00

negatively correlated with fear of delivery (Salomonsson et al., 2013). It may be that reduction of the fear of childbirth may increase childbirth-related self-efficacy and in turn reduce PTSD symptoms following childbirth. Third, during our antenatal education intervention, women learned how to do cognitive restructuring of birth memories to aid in coping with PTSD symptoms following childbirth. All three of these factors can lead to diminished PTSD symptoms following childbirth. The antenatal education provided in this study appears to have provided a foundation for a positive birth experience and postnatal period, by reducing childbirth fear and increasing childbirth self-efficacy—factors that likely account for the lower levels of PTSD symptoms following childbirth.

## 7. Summary and conclusions

The effectiveness of antenatal education in reducing fear of childbirth, increasing childbirth self-efficacy, and minimizing PTSD symptoms following childbirth has been supported in this study. This is the first study to our knowledge to investigate the effects of antenatal education on PTSD symptoms following childbirth. This finding is particularly important for developing countries like Turkey, where the prevalence of PTSD symptoms following childbirth is relatively high.

## 8. Relevance to clinical practice

Antenatal education appears to alleviate fear of childbirth as well as PTSD symptoms after childbirth. Routine implementation of antenatal education should be seriously considered as a component of standard prenatal care.

## Conflict of Interest

The author(s) declare that they have no conflict of interest.

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