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# Investigation of the Relationship Between Dysmenorrhea, Birth Beliefs and Fear of Childbirth in Nursing Faculty Students

*Hemşirelik Fakültesi Öğrencilerinde Dismenore, Doğum İnançları ve Doğum Korkusu Arasındaki İlişkinin İncelenmesi*

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## ÖZET

**Aim:** To determine the relationship between the dysmenorrhea status of nursing faculty students and their birth beliefs about their planned pregnancies and their fears of birth.

**Method:** The universe of the research consisted of all female students studying in the faculty of nursing in the 2020-2021 academic year between March-April 2021. No sample selection was made in the study, and a total of 521 female students were reached during the study.

**Results:** The mean age of the students participating in the study was 21.12±1.69 and it was determined that 87.7% of them had dysmenorrhea and the mean Visual Analog Scale (VAS) score was 6.58±1.94. When the total scores of the students from the scales are examined; The mean Functional and Emotional Dysmenorrhea Scale (FEDS) functional sub-dimension score was 24.31±8.21, the emotional sub-dimension mean score was 19.53±8.64, and the total scale mean score was 43.84±16.03. The mean score of the natural process sub-dimension of Birth Beliefs Scale (BBS) was 19.20±5.45 and the mean score of the medical process sub-dimension was 20.94±4.82. On the other hand, the mean score of Women Childbirth Fear – Prior to Pregnancy Scale (WCF-PPS) was calculated as 41.64±13.34.

**Conclusion:** This study emphasizes that students with dysmenorrhea in nursing faculty perceive birth as a medical process and their fear of birth before pregnancy is high.

***Keywords:*** Dysmenorrhea, birth beliefs, fear of birth

## ABSTRACT

**Amaç:** Hemşirelik fakültesi öğrencilerinin dismenore durumları ile planladıkları gebeliklere ilişkin doğum inançları ve doğum korkuları arasındaki ilişkiyi belirlemek.

**Gereç ve Yöntem:** Araştırmanın evrenini 2020-2021 eğitim-öğretim yılında Mart-Nisan 2021 tarihleri arasında hemşirelik fakültesinde öğrenim gören tüm kız öğrenciler oluşturmaktadır. Araştırmada örneklem seçimi yapılmamış olup, çalışma süresince toplam 521 kız öğrenciye ulaşılmıştır.

**Bulgular:** Araştırmaya katılan öğrencilerin yaş ortalaması 21,12±1,69 olup, %87,7'sinde dismenore olduğu ve ortalama Vizüel Analog Skala (VAS) skorunun 6,58±1,94 olduğu belirlendi. Öğrencilerin ölçeklerden aldıkları toplam puanlar incelendiğinde; Fonksiyonel ve Emosyonel Dismenore Ölçeği (FEDÖ) fonksiyonel alt boyut puan ortalaması 24,31±8,21, emosyonel alt boyut puan ortalaması 19,53±8,64 ve ölçek toplam puan ortalaması 43,84±16,03'tür. Doğum İnançları Ölçeği (DİÖ) doğal süreç alt boyutunun ortalama puanı 19,20±5,45 ve tıbbi süreç alt boyutunun ortalama puanı 20,94±4,82'dir. Kadın Gebelik Öncesi Doğum Korkusu Ölçeği (KGÖ-DKÖ) puan ortalaması ise 41,64±13,34 olarak hesaplandı.

**Sonuç**: Bu çalışma, hemşirelik fakültesinde dismenoresi olan öğrencilerin doğumu tıbbi bir süreç olarak algıladıklarını ve gebelik öncesi doğum korkularının yüksek olduğunu vurgulamaktadır.

***Anahtar Kelimeler:*** Dismenore, doğum inancı, doğum korkusu

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## INTRODUCTION

Dysmenorrhea is a painful menstrual condition that spreads to a wide area such as the pelvic and abdominal region and lower back. Women with dysmenorrhea experience sharp, intermittent, spasmodic pain, localized mainly in the suprapubic area. Dysmenorrhea is caused by the release of prostaglandin F2α from the endometrium during menstruation. Due to this, contractions occur in the myometrium, causing pain similar to the contractions that occur during labor (1). Pain caused by contractions during labor is an important fear factor for women regarding childbirth. Regardless of parity, fear of labor pain is associated with general fear of pain and leads to an increase in the rate of elective cesarean section (2). Studies have shown that nulliparous women are more afraid of labor pain and therefore choose cesarean section as an alternative to painless delivery (3, 4). In another study in which women's views on childbirth were determined, it was similarly found that they preferred cesarean section due to labor pain (5). In a qualitative study, it was found that one of the reasons for fear of childbirth experienced by pregnant women was labor pain (6), and in another study, 50% of pregnant women preferred cesarean delivery because of their fear of labor pain (7). All the above-mentioned studies show that dysmenorrhea experienced during menstruation may cause prospective anxiety about the pain they will experience during the birth process, which may increase the fear of childbirth.

Basic beliefs about whether birth is a natural/safe or medical/risky process are central to decisions about where and how to give birth but vary across societies and cultures (6). Since birth beliefs are usually shaped in the preconceptional period, it is important to examine the factors that predict this situation. In the literature, these factors are attributed to parameters such as fear of childbirth, birth self-efficacy, media and social environment, social norms, cultural factors, previous experiences and attitudes of health professionals (2,3,7). In addition to these parameters, pain experienced during menstruation may also affect beliefs about childbirth and increase fear of childbirth or lead to a negative attitude towards the birth process (4,8). Women's medical belief in childbirth leads to the transformation of low-risk and non-medical problems into a permanent risky situation during pregnancy and childbirth (9). It has been reported that women who plan to deliver by elective cesarean section or epidural analgesia have strong beliefs that the delivery is medical. This leads to interventions such as continuous fetal monitoring, induction, episiotomy and cesarean section (4,6). According to the Turkey Demographic and Health Survey (TDHS) 2018 data, caesarean section rates of 52%, only 3% of prenatal care provided by a nurse or midwife, 7.8% of midwife-led deliveries, and

approximately 99% of all deliveries taking place in hospitals (10) are indicators of the prevalence of medical birth belief approach in our country (11).

The relationships between dysmenorrhea, birth beliefs and fear of childbirth are complex and individualized. Each woman's past experience, education, level of knowledge and support systems are different and can influence these relationships. In order to prevent dysmenorrhea from turning into medical birth beliefs and fear of childbirth, it is extremely important to receive birth preparation education, counseling, positive birth experience sharing and help from support systems before conception, if possible. Although there are separate studies on dysmenorrhea, birth beliefs and fear of childbirth (4,7,11), there is no study examining the relationship between these concepts. Based on this information, this study aimed to examine the relationship between dysmenorrhea and birth beliefs and birth fears in nursing students regarding their planned pregnancies. With the results of the study, it is thought that the information about the birth beliefs and fears of nursing students will be better understood and may contribute to the design of supportive programs in this regard.

**Research Questions**

1. What is the prevalence of dysmenorrhea in nursing students?
2. What are the birth beliefs of nursing students?
3. Do nursing students have fear of childbirth?
4. Is there a relationship between dysmenorrhea, birth beliefs about their planned pregnancies and fear of childbirth in nursing students?

## METHOD

**Research Type**

This is a cross-sectional study.

**Sample**

The population of the study consisted of all female students (N=1047) studying at Ege University Faculty of Nursing in the 2020-2021 academic year between March and April 2021. It was determined that at least 450 students should be sampled for difference analysis in sample size calculation using GPower 3.1 program with Type I error .05, d=.05 effect size 80% power (12). The study was completed with 521 female students. Statistical significance level $p < 0.05$ confidence interval was determined as 95%.

**Inclusion Criteria**

Female students who did not have a psychiatric history/diagnosis, without pregnancy/birth history and volunteered to participate were included.

**Exclusion Criteria**

Students who did not meet inclusion criteria were excluded.

**Data Collection Tools**

The Individual Introduction Form, Functional and Emotional Dysmenorrhea Scale (FEDS), Birth Beliefs Scale (BBS) and Women Childbirth Fear – Prior to Pregnancy Scale (WCF-PPS), which were created by the researchers by reviewing the literature (3,13,14), were used to collect the data.

***Individual Identification Form:*** It consists of 17 questions including demographic characteristics (3 questions) and gynecologic characteristics (14 questions) of the students.

***Functional and Emotional Dysmenorrhea Scale (FEDS):*** It is a 14-item Likert-type scale developed by Li et al. in 2012, and its Turkish validity and reliability was performed by Gün in 2014. The scale was developed to provide functional and emotional measurement of dysmenorrhea. As the scores obtained from the scale increase, the functional and emotional effects of dysmenorrhea increase. There are no reverse items in the scale (15). The Cronbach's α internal consistency value, which was calculated as .89 for the functional subscale, .84 for the emotional subscale and .90 for the total scale in the original scale, was found to be .94 for the functional subscale, .93 for the emotional subscale and .96 for the total scale in this study.

***Birth Beliefs Scale (BBS):*** It is a five-point Likert-type scale consisting of 11 items developed by Heidi Preis and Yael Benyamini in 2016 to assess women's basic beliefs about childbirth, and its Turkish validity and reliability was conducted by Paker and Ertem in 2022. There are two sub-dimensions in the scale. While one of these dimensions evaluates birth as a natural process, the other evaluates birth as a medical process. The group with a higher numerical value as a result of the arithmetic mean constitutes the woman's belief in childbirth. There are no reverse items in the scale (16). The Cronbach's α internal consistency value, which was calculated as .89 for the natural process subscale and .86 for the medical process subscale in the original scale, was found to be .85 for the natural process subscale and .75 for the medical process subscale in this study.

***Women Childbirth Fear – Prior to Pregnancy Scale (WCF-PPS):*** It is a six-point Likert-type scale consisting of 10 items developed by Stoll et al. in 2016 to assess young women's fear of childbirth before pregnancy, and its Turkish validity and reliability was conducted by Uçar and Taşhan in 2018. A high item total score indicates a high level of fear (17). Cronbach's α internal consistency value, which was calculated as .89 in the original scale, was found to be .95 in this study.

**Data Collection**

The data of the study were collected with the online survey technique created through Google Forms due to the COVID-19 process. It took an average of 15-20 minutes to fill out the forms.

**Statistical Analysis**

The kurtosis and skewness coefficients were used to evaluate the suitability of the data for normal distribution, and it was determined that the data fit the normal distribution. Mean, standard deviation, number-percentage were used to evaluate the socio-demographic characteristics of the participants. Independent Sample t test and One Way ANOVA test were used to examine the differences between the groups due to the normal distribution of the variables. In case of differences in the ANOVA test, differences were calculated with the Tukey test, taking into account the assumption of homogeneity of variances. Pearson's correlation test was used to examine the relationship between continuous variables. SPSS 25.0 package program was used in the analyses and significance level was accepted as $p<0.05$.

**Ethical Consideration**

Ethics committee approval (Date: 24.09.2020, No: E.244503) from Ege University Scientific Research and Publication Ethics Committees and from Ege University Faculty of Nursing institutional permission were obtained to conduct the study. Verbal and written consent was obtained from the students participating in the study.

**RESULTS**

The mean age of the students participating in the study was 21.12±1.69 years (min: 17, max: 36) and 7.88% of them had chronic diseases. It was determined that 80.19% of the students had regular menstrual cycles, the mean age at menarche was 12.89±1.29 (min: 9, max: 17) and 87.7% had dysmenorrhea. In this study, the mean VAS score was 6.58±1.94.

Distribution of the Factors Affecting the Scale Subscale/Score Averages according to the students' responses is given in Table 1.

**Table 1. Distribution of Factors Affecting Scale Subscale/Score Averages**

| | n | % | FEDS Total Scale Score | BBS Natural Process Subscale | BBS Medical Process Subscale | WCF-PPS Total Scale Score |
|---|---|---|---|---|---|---|
| Grade level | | | | | | |
| 1 | 113 | 21.73 | 44.75±15.38 | 19.54±4.19 | 20.83±3.48 | 39.94±12.94 |
| 2 | 111 | 21.35 | 41.90±15.39 | 19.74±4.20 | 19.75±5.06 | 40.61±14.04 |
| 3 | 141 | 27.12 | 48.10±16.49 | 17.51±7.09 | 22.45±5.37 | 44.98±12.52 |
| 4 | 155 | 29.80 | 40.70±15.74 | 20.10±5.01 | 20.50±4.66 | 40.59±13.33 |
| F | | | 6.137 | 6.662 | 7.615 | 4.19 |
| p | | | **0.001*** | **0.001*** | **0.001*** | **0.006*** |
| Difference ** | | | 2<3<br>3>4 | 3<1<br>3<2<br>3<4 | 3<1<br>3<2<br>3<4 | 2<3<br>3>4 |
| Status of taking a childbirth course | | | | | | |
| Yes | 303 | 58.27 | 44.16±16.38 | 18.97±6.10 | 21.33±4.97 | 42.35±12.92 |
| No | 217 | 41.73 | 43.41±15.55 | 19.52±4.36 | 20.41±4.56 | 40.66±13.81 |
| t | | | 0.522 | -1.182 | 2.155 | 1.423 |
| p | | | 0.602 | 0.263 | **0.032***** | 0.155 |
| Planning to give birth | | | | | | |
| Yes | 425 | 81.73 | 43.60±15.67 | 19.52±5.41 | 20.82±4.85 | 40.86±12.77 |
| No | 95 | 18.27 | 44.94±17.58 | 17.78±5.43 | 21.48±4.71 | 45.15±15.06 |
| t | | | -0.735 | 2.832 | -1.212 | -2.575 |
| p | | | 0.463 | **0.005***** | 0.226 | **0.011***** |
| Choice of birth | | | | | | |
| Vaginal | 324 | 76.23 | 52.88±17.54 | 21.18±3.02 | 19.70±4.11 | 38.98±12.09 |
| Caesarean section | 101 | 23.77 | 59.32±15.04 | 13.82±7.34 | 24.86±4.89 | 59.32±15.04 |
| t | | | -3.342 | 14.748 | -10.555 | -3.646 |
| p | | | **0.001***** | **0.000***** | **0.000***** | **0.000***** |
| Fear of vaginal birth | | | | | | |
| Yes | 349 | 67.12 | 46.78±15.44 | 18.25±15.95 | 22.19±4.25 | 47.17±10.54 |
| No | 171 | 32.88 | 37.86±15.59 | 21.15±13.54 | 18.40±4.93 | 30.37±11.08 |
| t | | | 6.168 | -6.94 | 9.031 | 16.79 |
| p | | | **0.001***** | **0.001***** | **0.001***** | **0.001***** |

*One way Anova test **Tukey test ***Independent Sample T test

When the total scores of the students from the scales were examined, it was determined that the mean score of the functional sub-dimension of the FEDS was 24.31±8.21, the mean score of the emotional sub-dimension was 19.53±8.64 and the mean total score of the scale was 43.84±16.03. The mean score of the natural process sub-dimension and the mean score of the medical process sub-dimension were 19.20±5.45 and 20.94±4.82, respectively. The mean score of the WCF-PPS scale was calculated as 41.64±13.34.

There is no statistically significant relationship between ***age levels*** and scale levels (p>0.05). An inverse and weak (r=-0.098; p<0.05) and statistically significant relationship was found between ***menarche age*** levels and FEDS scale levels, and a weak (r=0.158; p<0.05) and statistically significant relationship was found between BBS Natural Process Subscale levels. ***Dysmenorrhea severity levels*** and FEDS scale levels have the same direction and moderate strength (r=0.524; p<0.05); BBS Natural Process Subscale levels have the opposite direction and weak strength (r=-0.150; p<0.05); BBS Medical Process Subscale (r=0.131; p<0.05) and WCF-PPS (r=0.187; p<0.05) (Table 2).

**Table 2. Comparison of Scale Levels with Age, Age at Menarche and Dysmenorrhea Severity Levels**

| | | FEDS Total Scale Score | BBS Natural Process Subscale | BBS Medical Process Subscale | WCF-PPS Total Scale Score |
|---|---|---|---|---|---|
| Age | r | -0.062 | 0.051 | 0.002 | -0.036 |
| | p | 0.161 | 0.244 | 0.972 | 0.409 |
| Age at Menarche | r | -.098* | .158** | 0.030 | -0.023 |
| | p | **0.026*** | **0.000*** | 0.489 | 0.604 |
| Dysmenorrhea Severity Levels | r | .524** | -.150** | .131** | .187** |
| | p | **0.000*** | **0.001*** | **0.005*** | **0.000*** |

**p<0,05; ** Correlation Coefficient*

**Table 3. Relationship between Scale Levels**

| | | FEDS Total Scale Score | BBS Natural Process Subscale | BBS Medical Process Subscale | WCF-PPS Total Scale Score |
|---|---|---|---|---|---|
| FEDS Total Scale Score | r | 1 | | | |
| | p | | | | |
| BBS Natural Process Subscale | r | -.359** | 1 | | |
| | p | **0.001*** | | | |
| BBS Medical Process Subscale | r | .514** | -.479** | 1 | |
| | p | **0.001*** | **0.001*** | | |
| WCF-PPS Total Scale Score | r | .505** | -.335** | .638** | 1 |
| | p | **0.001*** | **0.001*** | **0.001*** | |

**p<0,05; ** Correlation Coefficient*

Table 3 shows that the relationships between the findings obtained and the scale sub-dimensions/scores are statistically significant.

## DISCUSSION

The findings of the study, which evaluated the relationship between the presence of dysmenorrhea and birth beliefs and fear of childbirth in female students studying at a university's nursing faculty, are discussed in this section in line with the literature.

Although being under the age of 30 is among the risk factors for dysmenorrhea, its prevalence decreases with advancing age (1). In a study conducted with health personnel with dysmenorrhea, it was found that 61.5% of women were between the ages of 20-30 (14). The mean age of the students participating in the study was found to be 21.12±1.69 (min: 17, max: 36) and there was no significant relationship between age levels and scale scores, unlike the literature (Table 2). This is thought to be due to the small age difference between the students. In addition, it is stated in the literature that fear of childbirth is higher in young women, and fear of childbirth increases as age decreases (3,18). This is thought to be due to the fact that young women are nulliparous or uninformed about childbirth. On the contrary, there are also studies in the literature that students studying in the field of health perceive birth as traumatic and prefer cesarean delivery due to their high fear of birth (7,19). In this study, a result that supports the literature was obtained and when evaluated according to the grade levels, it was seen that the fear of childbirth of third grade students was significantly higher regardless of dysmenorrhea. It is thought that the presence of obstetrics practice in the third grade in the education program in which the students are studying has an effect on the increasing fear of childbirth. As Gulec's study, it is thought that the birth and parenthood preparation course should be revised to support the belief in natural birth within the scope of the curriculum (3).

Menarche is the first menstrual bleeding and the average age of menarche is generally accepted as 11-16 years (20-22). Studies have emphasized that early menarche age causes an increase in dysmenorrhea complaints (15,21). Potur et al. (2013) reported that there was no relationship between age at menarche and dysmenorrhea (23), while Jang et al. (2013) reported that dysmenorrhea was less common in women with late menarche (24). In another study, it was reported that 52.3% of women with dysmenorrhea had an age at menarche of 14 years or older (14). In this study, it was determined that as the age at menarche increased, the level of being affected by dysmenorrhea decreased and their beliefs towards childbirth became more natural. In this direction, we see that as the duration of pain experience decreases, positive attitudes towards childbirth develop.

In studies on the prevalence of dysmenorrhea, it has been determined that the prevalence varies between 54.5% and 95.5% and 2% to 29% of women experience severe pain (1,23,25). In this study, the prevalence of primary dysmenorrhea was found to be 87.7%, similar to the literatures. These differences in the prevalence of dysmenorrhea are thought to be related to the methods used to evaluate dysmenorrhea and the different pain thresholds of the individuals participating in the studies, as well as social cultures.

In the presence of dysmenorrhea, Visual Analog Scale (VAS) is often used to assess the severity of pain. According to this scale, the pain score is graded as mild pain if it is less than 3, moderate pain if it is between 3 and 6 points, and severe pain if it is greater than 6 points (26). It is reported in the literature that the mean VAS score of primary dysmenorrhea varies between 5.43-6.33 (1,25,27). In this study, the mean VAS score was found to be 6.58±1.94 in accordance with the literature and it was determined that the students had severe pain. It was also found that as the severity of dysmenorrhea increased, the level of being affected by dysmenorrhea, medical beliefs and fear of childbirth increased. All these results are important in terms of showing that dysmenorrhea may cause students to worry about the pain they will experience in childbirth in the future and this may increase their fear of childbirth.

In Gulec's study, it was determined that the fear of childbirth decreased with the status of taking a childbirth course; similarly, in the study of Ocal and colleagues, it was determined that students who took childbirth courses would prefer vaginal delivery because they saw birth as a natural event (2,3). In a study examining the effect of having taken a childbirth course on students' birth preferences in midwifery students, it was observed that students who took a childbirth course preferred vaginal birth more and the reason for this was that they considered vaginal birth as a more natural process (28). In our study, unlike the literatures, it was found that the students who took childbirth course saw childbirth as a medical process ($p<0.05$). This suggests that the reason for this may be that the negative experiences in the clinical practice of the course may be seen as a factor that may trigger the fear of childbirth, especially for female students.

In studies conducted in our country, it was determined that most of the nursing students preferred vaginal delivery because they thought it was natural and healthy (2,3,29). Sercekus et al. (2015) found that nulliparous women and their spouses preferred vaginal delivery because it was healthier; those who were afraid of childbirth and thought that childbirth would pose a risk to the baby preferred cesarean section (30). Duran and Atan (2011) found that studying in the department of midwifery or nursing did not affect the preferences for mode of delivery (29).

In this study, it was determined that students who were considering giving birth had natural beliefs about childbirth and had less fear of childbirth. In addition, it was found that students with fear of vaginal delivery were more affected by dysmenorrhea, and their medical beliefs about childbirth and fear of childbirth were higher. From this point of view, it is understood that experiencing pain is an important factor affecting birth beliefs and preferences. In order to reduce medical birth beliefs, it would be beneficial to raise awareness about pain control in dysmenorrhea without showing a judgmental attitude to students who are afraid of childbirth.

Although the belief that birth is a natural process is widespread in the world, negative stimuli from the environment cause women's confidence in their bodies to decrease, leading to the emergence of fear of childbirth and belief in medical birth (19). Women's birth beliefs can be influenced by many factors such as socio-demographic, obstetric and cultural characteristics, fears and concerns about birth, past birth experiences, quality of prenatal care, birth environment, and support of health professionals (4,8,31). In a study conducted in Israel, it was found that pregnant women who believed that birth was a natural process had lower levels of fear of childbirth (8). Similarly, in another study by Preis (2019), it was reported that women experienced fear of childbirth depending on their medical beliefs and preferred cesarean section (4). A study of non-pregnant university students in Australia found a direct relationship between medical birth beliefs and epidural analgesia, cesarean delivery and hospital birth planning (19). In a longitudinal study conducted jointly in Australia and Sweden, it was reported that pregnant women who were more fearful of vaginal birth perceived birth as medical and preferred cesarean section (32). Wilson and Sirois (2010) also found a negative relationship between natural childbirth philosophy and medical birth beliefs, and a positive relationship between preferring a midwife over an obstetrician at birth (33). Qualitative research in this field reports a complex relationship between birth beliefs and women's fear of childbirth and birth preferences (6,32). As can be understood from this, basic birth beliefs are closely related to women's pregnancy and birth process. Women with medical birth beliefs fear birth more than women with natural birth beliefs. As a result, the risk of prolonged labor, intervention delivery, elective cesarean delivery and complications increases (34). This study revealed the relationship between the presence of dysmenorrhea and birth beliefs and fear of childbirth. In line with the results of the study, it was determined that the birth beliefs of women with dysmenorrhea were negatively affected even in a period when they were not yet pregnant, and this situation caused fear of childbirth. The reason for this is that young women with dysmenorrhea are worried that they will experience similar pain in labor.

### Study Limitations

The limitations of this study are that the research was conducted with participants who completed the questionnaires online and the research data was collected based on the personal statements of the participants.

### Conclusion and Recommendations

It was found that 87.7% of the students had dysmenorrhea; their medical birth beliefs were higher than their natural birth beliefs and their fear of childbirth was high. It was determined that as the level of being affected by dysmenorrhea increased, natural birth beliefs decreased and medical beliefs and fear of childbirth increased. This study demonstrated how strong the relationship between dysmenorrhea, birth beliefs and fear of childbirth is. It would be beneficial to plan qualitative research to understand the reasons underlying their beliefs and fears about pregnancy and childbirth. It is thought that developing a better education program for students on this subject will contribute to students' more positive view of childbirth.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the by the Ege University Scientific Research and Publication Ethics Committees (2020-09/03)

**Informed Consent:** Written and verbal informed consent was obtained from students who participated in this study.

**Declaration of Interests:** The authors have no conflicts of interest to declare.

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