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Association between depression, anxiety, stress levels, and pre-pregnancy fear of childbirth among undergraduate midwifery students

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ABSTRACT

Aims: This study examined the relationship between depression, anxiety, and stress levels and pre-pregnancy fear of childbirth (FOC) among undergraduate midwifery students.

Methods: This descriptive correlational study was conducted among undergraduate midwifery students enrolled at one state university and one private university in İstanbul during the 2023 academic year. Data were collected online using a personal information form, the Depression Anxiety Stress Scale (DASS), and the Pre-Pregnancy FOC Scale (PPFCS).

Results: A total of 378 undergraduate midwifery students were included in the study. The mean age was 21.18±1.85 years, and all of the participants were female (100%). Severe depression, moderate anxiety, and severe stress were identified in 37.8%, 34.9%, and 41.8% of participants, respectively. Depression, anxiety, and stress scores differed significantly by academic year and socioeconomic status ($p<0.05$), with fourth-year students reporting lower levels of psychological symptoms. Students with lower income levels had significantly higher psychological distress scores and greater pre-pregnancy FOC (both $p<0.05$). In multivariable analysis, stress was identified as a significant predictor of FOC ($\beta=0.220$, $p=0.014$), whereas depression and anxiety were not significant predictors. Correlation analysis revealed a weak but statistically significant positive association between total scores on the DASS and the PPFCS ($r=0.337$; $p<0.05$).

Conclusions: This study demonstrated that depression, anxiety, and stress are prevalent among undergraduate midwifery students and are associated with pre-pregnancy FOC.

Introduction

Students enrolled in applied health sciences are often exposed to persistent stress and anxiety, particularly during clinical education. Midwifery students constitute one of the student groups experiencing high levels of psychological burden

due to the emotionally demanding nature of their training and their early exposure to childbirth and women's health care (1). Stress represents the body's response to challenging situations, whereas anxiety may emerge as a prolonged reaction to stress and may adversely affect social, academic, and professional



functioning. Depression, characterized by persistent low mood and reduced self-worth, together with stress and anxiety, can impair learning processes, reduce academic performance, and negatively influence future professional functioning (2). Moreover, elevated psychological distress during education may compromise the quality of care provided by students during clinical practice and later as professional midwives.

In Türkiye, midwifery students are predominantly female and generally in late adolescence or early adulthood. These developmental periods are associated with increased psychological vulnerability, and female students are reported to experience higher levels of depression and anxiety compared with males (3). Such demographic characteristics may further increase the risk of psychological distress among midwifery students, making this group particularly vulnerable to stress-related mental health problems.

Midwifery education presents unique academic and clinical challenges that may contribute to increased stress and anxiety. High stress levels during training have been associated with depression, sleep disturbances, irritability, learning difficulties, and reduced professional competence (4,5). Many students enter midwifery programs with limited prior exposure to hospital environments and encounter clinical practice for the first time during their education (6). Unfamiliar clinical settings, fear of making mistakes or harming patients, insufficient practical skills, and negative feedback from healthcare professionals or academic staff may reduce self-confidence and increase psychological distress (6-8).

Fear of childbirth (FOC) is an important psychological factor that may influence both personal birth-related attitudes and professional identity development among midwifery students. FOC is considered a multifactorial phenomenon shaped by cognitive, emotional, and experiential processes (9,10). Among midwifery students, exposure to childbirth through clinical observation may contribute to the development of fear via vicarious traumatic experiences, particularly when students witness severe labor pain, obstetric complications, or negative maternal outcomes (11,12). Qualitative studies with midwifery students have also shown that witnessing difficult or traumatic births may lead to secondary trauma, emotional exhaustion, and defensive clinical practices, which in turn can disrupt perceptions of safety and increase threat appraisal (13). Such experiences may influence cognitive appraisal processes, leading to heightened threat perception, anticipatory anxiety, and negative expectations regarding childbirth (14). Psychological symptoms such as anxiety, depression, and stress may further intensify FOC through different mechanisms (15). Anxiety is associated with increased sensitivity to perceived threats and catastrophic thinking patterns, whereas depressive symptoms may contribute to pessimistic interpretations and reduced coping capacity; the broader psychopathology literature indicates that widely used

trait anxiety scales strongly reflect general negative affect and depressive emotionality, and that anxiety and depressive symptoms are closely intertwined (16). Chronic stress may impair emotional regulation and resilience, thereby increasing vulnerability to fear responses; moreover, persistent stress and inadequate social support during pregnancy and the postpartum period have been shown to be associated with the continuation of depressive, anxiety, and trauma-related symptoms and with reduced psychological well-being (17,18).

Although midwifery education aims to enhance self-efficacy and promote positive perceptions of childbirth, delivery rooms are demanding learning environments that may intensify stress and anxiety (19). In Türkiye, clinical education constitutes approximately half of the undergraduate midwifery curriculum and involves close and repeated exposure to childbirth. Witnessing labor pain, concerns about causing harm, complex clinical responsibilities, and limited support in clinical settings may further increase psychological distress (20). Despite these challenges, evidence regarding the combined effects of depression, anxiety, and stress on FOC among midwifery students remains limited (21).

Midwives play a critical role in maternal and child health services in Türkiye and are expected to provide sexual and reproductive health education, counseling, and care throughout the lifespan. Maintaining good mental health during undergraduate education is therefore essential for both professional competence and long-term workforce sustainability (22). Although previous studies in Türkiye have examined stress and anxiety during clinical practice among midwifery students (7), the relationship between depression, anxiety, and stress levels and pre-pregnancy FOC has not been adequately investigated. Moreover, only a limited number of studies have examined FOC in relation to overall psychological distress conceptualized as a unified construct, particularly among midwifery students. In Türkiye, the structure of midwifery education involves early and intensive clinical exposure, which may uniquely influence students' psychological experiences and perceptions of childbirth. Addressing this gap is important, as persistent psychological symptoms during education may have long-term consequences for professional development and well-being. Therefore, this study aimed to examine the relationship between levels of depression, anxiety, and stress and pre-pregnancy FOC among undergraduate midwifery students.

Methods

Study design, setting, and participants

This study employed a descriptive, cross-sectional, correlational design and was conducted between February 20 and April 30, 2023, in the midwifery departments of Marmara University and Üsküdar University in İstanbul, Türkiye, as well as

in the hospitals affiliated with these institutions where midwifery students received clinical training. Marmara University is a public university, whereas Üsküdar University is a private university. These institutions were selected to represent the two main types of higher education systems in Türkiye. Since public and private universities generally follow similar curricula and clinical training standards in midwifery education, the inclusion of both types of universities and their affiliated clinical training settings was considered appropriate to reflect institutional diversity while maintaining feasibility. The study population consisted exclusively of undergraduate midwifery students who were predominantly female and enrolled in a four-year educational program combining theoretical courses with progressive clinical training.

During the planning phase, efforts were made to include institutions with students in all four academic years to ensure representation of different educational levels. Accordingly, one public university and one private university that met this criterion were selected.

Participants were included if they were enrolled in an undergraduate midwifery program and voluntarily agreed to participate in the study. Students who did not provide informed consent or who submitted incomplete questionnaires were excluded from the analysis.

Although this approach aimed to enhance representativeness within the selected institutions, the sample was limited to two universities. Therefore, the findings may not be fully representative of all undergraduate midwifery students in Istanbul or Türkiye; this limitation should be considered when interpreting the results.

The minimum required sample size was calculated to be 316 participants using the formula for a known population at a 99% confidence level. All eligible students from the selected institutions were invited to participate, and 378 volunteer students completed the study.

Data collection procedure

Data were collected using an online survey platform. Senior student representatives at each university were contacted, and the survey link was distributed through official student WhatsApp groups. Completion of the questionnaire required approximately 10-15 minutes. The survey consisted of a sociodemographic information form and two standardized assessment instruments.

Data collection instruments

Sociodemographic form

The sociodemographic form was developed by the researchers based on previous literature examining psychological distress and related factors among university and midwifery students (2,7,23). The questionnaire included

questions related to age, academic year, marital status, income level, family structure, employment status, place of longest residence, history of psychiatric diagnosis, and use of psychiatric medication.

Depression Anxiety Stress Scale (DASS)

Psychological distress was assessed using the DASS developed by Lovibond and Lovibond (24). The Turkish validity and reliability study was conducted by Akın and Çetin (25). The scale consists of 42 items across three subscales (depression, anxiety, and stress), each comprising 14 items. Responses are rated on a four-point Likert scale, with higher scores indicating greater symptom severity. In the Turkish validation study, the Cronbach's alpha coefficients ranged between 0.90 and 0.92 for the subscales. In the current study, the internal consistency coefficient (Cronbach's alpha) for the total scale was 0.96.

Participants were categorized into severity levels (normal, mild, moderate, severe, and extremely severe) according to the standard cut-off scores provided in the original DASS manual by Lovibond and Lovibond (24), as these classifications are not specified in the Turkish validation study. The cut-off values were 0-9, 10-13, 14-20, 21-27, and ≥ 28 for depression; 0-7, 8-9, 10-14, 15-19, and ≥ 20 for anxiety; and 0-14, 15-18, 19-25, 26-33, and ≥ 34 for stress.

Pre-Pregnancy FOC Scale (PPFCS)

FOC was measured using the PPFCS, developed by Stoll et al. (26) and adapted into Turkish by Uçar and Taşhan (27). The scale includes 10 items rated on a six-point Likert scale, yielding total scores ranging from 10 to 60, with higher scores indicating greater fear. The Cronbach's alpha coefficient in this study was 0.89.

Study outcomes

The primary outcome was the independent association of depression, anxiety, and stress scores with pre-pregnancy FOC, as measured using the PPFCS.

Secondary outcomes were differences in depression, anxiety, stress, and PPFCS scores according to academic year and socioeconomic status, as well as the distribution of psychological symptom severity levels within the sample.

Ethical considerations

Ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Marmara University Faculty of Health Sciences (approval no: 162, date: 29.12.2022). All procedures were conducted in accordance with the principles of the Declaration of Helsinki. Participants were informed about the purpose and procedures of the study, and electronic informed consent was obtained prior to participation.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were calculated, with continuous variables presented as mean $\pm$ standard deviation and median values, and categorical variables expressed as frequencies and percentages. The normality of the data distribution was assessed using the Shapiro-Wilk and Kolmogorov-Smirnov tests. Group comparisons were conducted using independent samples t-tests and one-way analysis of variance. Associations between categorical variables were examined using the chi-square test. Pearson correlation analysis was applied to evaluate the relationship between psychological distress scores and pre-pregnancy FOC scores. Statistical significance was set at $p < 0.05$.

A post-hoc power analysis was conducted using G*Power software (version 3.1) to evaluate whether the sample size was sufficient to detect the observed correlation between psychological distress and FOC. Based on the detected effect size ($r = 0.337$), an alpha level of 0.05, and a sample size of 378 participants, the statistical power was calculated to be greater than 0.99, indicating adequate power.

Results

Participant characteristics

A total of 378 undergraduate midwifery students were included in the study. The mean age was 21.18 ± 1.85 years with 82.5% aged between 18 and 22 years, and all of the participants were female (100%). The majority of students (98.7%) were single. No participants were excluded due to incomplete data, as all submitted questionnaires were complete and eligible for analysis.

Of the participants, 65.6% were enrolled at a public university, and 33.1% were fourth-year students. Regarding socioeconomic status, 68.3% reported that their income was equal to their expenses. Most students reported no history of psychiatric diagnosis (91.8%) and no use of psychiatric medication (89.4%). The majority had a nuclear family structure (82.8%), were not employed (91.0%), and reported predominantly living in a provincial center (66.6%). Detailed sociodemographic characteristics are presented in Table 1.

Distribution of depression, anxiety, and stress levels

Based on the DASS, 37.8% of the students were classified as having severe depression, 34.9% as having moderate anxiety, and 41.8% were classified as having severe stress. The distribution of symptom severity levels across the three subscales is shown in Table 2.

FOC according to sociodemographic characteristics

Mean scores on the PPFCS did not differ significantly across university types, academic year (first year vs. other years), age

Table 1. Participants socio-demographic characteristics (n=378)

University	n	%
State	248	65.6
Foundation	130	34.4
School year		
1	74	19.6
2	84	22.2
3	95	25.1
4	125	33.1
Age		
18-22	312	82.5
≥ 23	66	17.5
Marital status		
Married	5	1.3
Single	373	98.7
Socioeconomic level		
Income<expenses	87	23.0
Income=expenses	258	68.3
Income>expenses	33	8.7
Presence of a psychiatric disorder		
Yes	31	8.2
No	347	91.8
Use of psychiatric medication		
Yes	40	10.6
No	338	89.4
Family type		
Nuclear	313	82.8
Extended	65	17.2
Employment		
Yes	34	9.0
No	344	91.0
Place of the longest residence		
Village	40	10.6
District	86	22.8
Province	252	66.6

group, marital status, psychiatric medication use, presence of psychiatric diagnosis, family structure, employment status, or place of longest residence ($p > 0.05$). Similarly, no statistically significant differences by socioeconomic status were observed, although students reporting lower income levels had higher fear scores ($p > 0.05$) (Table 3).

Depression, anxiety, and stress scores according to sociodemographic characteristics

Depression, anxiety, and stress scores differed significantly by academic year and socioeconomic status ($p < 0.05$). Fourth-year students reported significantly lower psychological symptom

Table 2. Depression, anxiety and stress levels of the participants according to their depression anxiety stress scale scores

Levels	Depression		Anxiety		Stress	
	n	%	n	%	n	%
Normal	11	2.9	15	4.0	1	0.3
Mild	38	10.1	57	15.1	24	6.3
Moderate	93	24.6	132	34.9	50	13.2
Severe	143	37.8	130	34.4	158	41.8
Extremely severe	93	24.6	44	11.6	145	38.4

Table 3. Comparison of the mean fear of childbirth scale scores by socio-demographic characteristics

Characteristics	Fear of childbirth scale score (mean $\pm$ SD)	Test statistic	p-value
University			
State	35.83 $\pm$ 9.82	t=0.168	0.867
Foundation	35.65 $\pm$ 10.74		
School year			
1	36.70 $\pm$ 10.74	F=1.815	0.144
2	36.80 $\pm$ 10.09		
3	36.38 $\pm$ 9.45		
4	34.06 $\pm$ 9.45		
Age			
18-22	35.58 $\pm$ 10.16	t=-0.767	0.444
$\geq$ 23	36.64 $\pm$ 10.03		
Marital status			
Married	40.20 $\pm$ 13.68	t=0.985	0.325
Single	35.71 $\pm$ 10.90		
Socioeconomic level			
Income<expenses	36.95 $\pm$ 9.76	F=1.759	0.174
Income=expenses	35.71 $\pm$ 9.71		
Income>expenses	33.09 $\pm$ 13.63		
Presence of a psychiatric disorder			
		t=0.886	0.886
Yes	35.51 $\pm$ 9.52		
No	35.78 $\pm$ 10.19		
Use of psychiatric medication			
		t=-0.572	0.568
Yes	34.90 $\pm$ 9.55		
No	35.86 $\pm$ 10.20		
Family type			
Nuclear	36.08 $\pm$ 10.09	t=1.318	0.188
Extended	34.26 $\pm$ 10.27		
Employment			
		t=-0.001	0.999
Yes	35.76 $\pm$ 10.91		
No	35.76 $\pm$ 10.07		
Place of the longest residence			
		F=2,345	0.097
Village	38.85 $\pm$ 9.44		
District	36.08 $\pm$ 11.04		
Province	35.17 $\pm$ 9.86		

t: Independent samples t-test, F: One-way ANOVA, SD: Standard deviation

scores compared with students in earlier years. Additionally, students with lower income levels had higher depression, anxiety, and stress scores. Students using psychiatric medication also demonstrated significantly higher psychological distress across all subscales ($p<0.05$). Detailed comparisons are presented in Table 4.

Primary outcome: predictors of FOC

A multiple linear regression analysis was conducted to examine whether depression, anxiety, and stress predict FOC (PPFCS). The overall model was statistically significant [$F(3.374)=17.418$, $p<0.001$] and explained 12.3% of the variance in PPFCS scores ($R^2=0.123$; adjusted $R^2=0.116$; $n=378$).

When the predictors were entered simultaneously, stress emerged as a significant positive predictor of FOC [$B=0.271$; standard error (SE)=0.110; $\beta=0.220$; $t=2.472$; $p=0.014$], indicating that higher stress levels were associated with higher FOC scores. In contrast, depression ($B=0.132$; SE=0.096; $\beta=0.114$; $p=0.170$) and anxiety ($B=0.057$; SE=0.117; $\beta=0.039$; $p=0.626$) were not significant predictors after controlling for the other variables. Regression results are presented in Table 5.

Secondary outcome: association between psychological distress and FOC

Correlation analysis revealed a weak but statistically significant positive association between total scores on the DASS and the PPFCS ($r=0.337$; $p<0.05$), indicating that higher psychological distress was associated with greater FOC.

Discussion

The present study demonstrated an association between pre-pregnancy FOC and depression, anxiety, and stress levels among undergraduate midwifery students. The findings indicate that psychological distress is common in this population and is significantly influenced by academic year and socioeconomic status. Although the relationship between psychological distress and FOC was weak, it was statistically significant, suggesting an interaction between emotional well-being and perceptions related to childbirth.

In addition to relational findings, the distribution of symptom severity indicated that a substantial proportion of students experienced severe depression and stress. These high

Table 5. Multiple linear regression predicting fear of childbirth (PPFCS) from depression, anxiety, and stress

Dependent variable	Predictors	B	β	SE	t	p-value
PPFCS	Depression	0.132	0.114	0.096	1.374	0.170
	Anxiety	0.057	0.039	0.117	0.488	0.626
	Stress	0.271	0.220	0.110	2.472	0.014

R²=0.123; Adjusted R²=0.116; F(3, 374)=17.418; p<0.001; n=378
 PPFCS: Pre-Pregnancy Fear of Childbirth Scale, B: Unstandardized coefficient, β : Standardized coefficient, SE: Standard error

prevalence rates suggest that midwifery students may face a considerable psychological burden during their education and highlight the need for early screening and preventive mental health strategies.

Consistent with previous studies, fourth-year students reported significantly lower levels of depression, anxiety, and stress than students in earlier academic years. Early phases of university education are often characterized by adjustment difficulties, including adaptation to academic demands, separation from family, financial challenges, and exposure to unfamiliar clinical environments (6,7). Initial clinical experiences, particularly first encounters with childbirth and hospital settings, may further intensify stress and anxiety (6,28). International evidence similarly reports high stress prevalence among midwifery students, with approximately 40-56% experiencing elevated stress during training, especially following early clinical exposure (5,28,29). These findings suggest that increased experience, professional confidence, and familiarity with clinical settings in later years may have a protective effect on students' mental health.

Socioeconomic status emerged as a key determinant of both psychological distress and FOC. Students whose incomes were lower than their expenses reported significantly higher levels of depression, anxiety, and stress. This finding is consistent with studies from different countries indicating that financial hardship constitutes a major stressor for midwifery students and is associated with reduced psychological well-being and increased risk of academic difficulties (30,31). In Türkiye, ongoing economic challenges may exacerbate these stressors, underscoring the importance of institutional support mechanisms, scholarships, and social assistance programs to reduce financial strain among students.

The weak but significant correlation between depression, anxiety, stress, and pre-pregnancy FOC suggests that psychological distress may contribute to negative perceptions of childbirth. However, the relatively low strength of this association may indicate a buffering role of midwifery education. Educational content related to childbirth, repeated clinical exposure, and increasing professional competence may help reduce fear over time (19,27). Since FOC was not examined in relation to the intensity or duration of clinical exposure, future longitudinal studies are warranted to clarify these relationships.

Bivariate evidence consistently shows that stress, anxiety, and depression are positively associated with FOC, reflecting their shared negative affect component (10). In multivariable models, however, predictors often "drop out" because much of their association with FOC is shared variance rather than unique effects—sometimes a broader construct such as negative affectivity accounts for the relationship, while in other samples stress retains the strongest independent contribution (15). Findings also vary across populations, with some studies showing anxiety and/or depression remaining significant after adjustment, suggesting contextual and measurement influences (9,32). Importantly, many individuals with high FOC do not have clinically significant anxiety or depression, pointing to additional mechanisms (e.g., personality, prior birth trauma, pain catastrophizing, low self-efficacy, attachment factors, and care-related context) that likely contribute to FOC beyond general distress (33,34).

In line with these findings, the regression analysis in the present study demonstrated that stress, rather than depression or anxiety, independently predicted FOC. This suggests that stress-related mechanisms, such as emotional overload, perceived lack of control, and reduced coping capacity, may play a more central role in shaping childbirth-related fears among midwifery students.

Study Limitations

This study has several strengths, including students from both public and private universities, validated psychometric instruments, and adequate statistical power supported by post-hoc analysis. However, several methodological limitations should be considered. First, the study employed a voluntary, non-probability sampling approach, which may introduce selection bias and limit the representativeness of the findings. In addition, the sampling frame was limited to two universities, which may not fully reflect the broader population of midwifery students in İstanbul or in Türkiye.

Second, data were collected through self-report measures, which may be subject to reporting bias and social desirability effects. Third, potential confounding variables—such as personality traits, prior traumatic experiences, coping styles, and levels of clinical exposure—were not controlled for in the analyses. Finally, the cross-sectional design and lack of

longitudinal follow-up preclude causal inferences and limit the ability to examine changes over time. Future studies using longitudinal designs and probabilistic sampling strategies are recommended to address these limitations and enhance the generalizability of findings.

Conclusion

This study demonstrated that stress, anxiety, and depression are common among midwifery students and are influenced by academic year and socioeconomic status. The findings highlight the need for early monitoring of mental health problems and structured support throughout both academic and clinical education.

Integrating content that promotes mental health and enhances coping skills into midwifery curricula may strengthen students' psychological well-being and professional resilience. In addition, addressing socioeconomic challenges through comprehensive approaches may play a key role in supporting students' mental health.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Marmara University Faculty of Health Sciences (approval no: 162, date: 29.12.2022).

Informed Consent: Participants were informed about the purpose and procedures of the study, and electronic informed consent was obtained prior to participation.

Footnotes

Authorship Contributions

Concept: N.K., F.B.B., A.B., E.B., H.K.D., Design: N.K., F.B.B., A.B., E.B., H.K.D., Data Collection or Processing: N.K., F.B.B., E.B., H.K.D., Analysis or Interpretation: N.K., F.B.B., A.B., Literature Search: N.K., F.B.B., E.B., H.K.D., A.A., Writing: N.K., A.B., E.B., H.K.D., A.A.

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