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Traumatic birth perceptions of adolescent and adult pregnant women: a cross-sectional study

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ABSTRACT

Aims: This study aimed to determine and compare the traumatic birth perceptions of adolescent and adult nulliparous pregnant women and to examine the relationship between self-perception and traumatic birth perception in these groups.

Methods: This descriptive and cross-sectional study was conducted between July 2021 and July 2022 in the obstetrics clinic of a hospital. The sample consisted of 30 adolescent and 50 adult nulliparous pregnant women between 37-42 weeks of gestation who met the inclusion criteria and attended prenatal follow-ups. Data were collected via face-to-face interviews using the "Personal Information Form," the "Pregnant Women's Self-Perception Scale," and the "Traumatic Birth Perception Scale." Statistical significance was set at $p < 0.05$.

Results: The mean age of adolescent pregnant women was 17.53 ± 0.68 , whereas adult pregnant women had a mean age of 23.9 ± 3.64 . Adolescent women had higher total mean scores on the Traumatic Birth Perception Scale (TBPS) (77.26 ± 19.84) compared to adult women (64.96 ± 28.99), with this difference reaching statistical significance ($p < 0.05$). A moderate, positive, and statistically significant correlation ($r = 0.41$) was observed between adolescents' self-perception levels and their traumatic birth perception ($p < 0.05$), while no such relationship was found in adult women ($p > 0.05$).

Conclusion: Adolescent pregnant women perceive childbirth as more traumatic than adult women, and this perception is linked to their self-perception levels. These findings underscore the importance of developing age-specific psychosocial support, prenatal education, and childbirth preparation programs for adolescent pregnant women to mitigate psychological and emotional risks associated with early pregnancy.

Keywords: Adolescent pregnancy, adult pregnancy, traumatic birth, self-perception, cross-sectional study

INTRODUCTION

Childbirth is a pivotal life event with profound physiological, psychological, and social implications for women. While every woman experiences labor uniquely, maternal age is increasingly recognized as a critical determinant shaping both the childbirth experience and subsequent maternal well-being. Traumatic childbirth is characterized by intense fear, helplessness, or horror during or after labor, which may result in lasting psychological effects, including postpartum anxiety, depression, and post-traumatic stress disorder (Simpson & Catling, 2016; Yıldırım & Bilgin, 2021).

Despite the clinical significance, the factors influencing the perception of childbirth as traumatic remain underexplored. Maternal age, particularly the comparison between adolescent and adult pregnancies, represents a key but understudied factor. Adolescent pregnancies occur during a developmental period marked by incomplete physical, cognitive, and psychosocial maturation (Ayanaw Habitu et al., 2017; UNFPA, 2020). Globally, approximately 11% of births occur among adolescents, mostly in low-and middle-income

countries (WHO, 2022). In Türkiye, adolescent pregnancies are concentrated in eastern and southeastern regions, with around 4% of females aged 15-19 either pregnant or having given birth to their first child (TDHS, 2018).

Adolescent pregnant women are particularly vulnerable due to limited psychosocial maturity, underdeveloped coping strategies, and heightened emotional reactivity, which may increase the perception of childbirth as traumatic. Social vulnerability factors-including lower educational attainment, economic dependence, and weaker social support networks-may exacerbate feelings of fear and helplessness during labor. Recent studies highlight that younger mothers report higher traumatic birth perception, with contributing factors including unplanned pregnancies, lower perception of respectful maternity care, and inadequate prenatal preparation (Koç & Özkan, 2022; Aksoy Derya et al., 2024). Additionally, prenatal psychosocial variables, such as maternal-fetal attachment, health anxiety, and self-perception, have been associated with traumatic birth perception (Yılmaz & Kılıç, 2024).

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In contrast, adult pregnant women generally have greater psychosocial and emotional maturity, stronger coping mechanisms, and broader social support networks, which may buffer against traumatic perceptions. However, adults may experience age-related obstetric risks, such as gestational diabetes or hypertensive disorders, which could influence the perception of childbirth trauma through different mechanisms. Therefore, maternal age interacts with both psychosocial and biological factors to shape childbirth experiences.

Understanding these age-related differences is crucial for developing targeted interventions, including age-specific prenatal education, psychosocial support, and birth preparation programs. Despite its clinical relevance, research on traumatic childbirth perception in Türkiye remains limited and predominantly focused on adult populations. This study aims to address this gap by comparing traumatic birth perceptions between adolescent and adult pregnant women and examining the relationship between self-perception and traumatic birth perception across these age groups. By elucidating these dynamics, the study seeks to inform preventive and supportive strategies tailored to the needs of vulnerable maternal populations.

METHODS

Ethics

This study was conducted with the approval of the Ethics Committee of the Institute of Health Sciences at Marmara University (Date: 18.01.2021, Decision No: 06). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Written informed consent was obtained from all individual participants prior to their inclusion in the study.

Study Design

This study was designed as a descriptive cross-sectional study to determine the traumatic birth perceptions of adolescent and adult pregnant women.

Setting and Time

The study was conducted between July 2021 and July 2022 in the non-stress test (NST) unit of a public hospital serving the regional population. The hospital provides care to women from diverse socioeconomic backgrounds in both urban and rural areas. On average, 2-3 pregnant women attend the unit daily, corresponding to approximately 500-750 women annually.

Population and Sample

The study population consisted of all pregnant women receiving prenatal care at the hospital. The sample included a total of 80 voluntary participants (30 adolescents and 50 adults) who met the inclusion criteria. Inclusion criteria were being between 37-42 weeks of gestation, nulliparous, and classified as adolescent (15-19 years) or adult (20-35 years).

Sample Size Calculation and Power Analysis

The sample size was calculated using the finite population sample size formula:

$$n = (N \times t^2 \times p \times q) / (d^2 \times [N - 1] + t^2 \times p \times q)$$

Where:

n: Population size (≈ 600)

t: 1.96 for 95% confidence level

p: Expected prevalence (0.50)

q: $1 - p$ (0.50)

d: Margin of error (0.10)

Based on these parameters, the minimum required sample size was calculated as approximately 73 participants. Considering possible data loss, the study was completed with 80 participants.

A post-hoc power analysis indicated that the study had approximately 80% power to detect a medium effect size (Cohen's $d=0.5$) at a 95% confidence level.

Research Questions

- Is there a difference between the educational status of adolescent and adult pregnant women?
- Is there a difference between the mean scores of the self-perception scale of adolescent and adult pregnant women?
- Is there a difference between adolescent and adult pregnant women's perception of traumatic birth?
- Is there a relationship between self-perception scale and Traumatic Birth Perception Scale (TBPS) of adolescent and adult pregnant women?

Independent variables: Sociodemographic characteristics of the participants (age, education level, income level, etc.), obstetric characteristics, pregnancy process and delivery.

Dependent variables: Pregnant Women's Self-Perception Scale (PSPS) and Traumatic Birth Perception Scale.

Inclusion Criteria

Adolescent group: Age between 15-19 years, nulliparous, gestational age between 37-42 weeks, singleton pregnancy, at least primary school graduates, and consent was obtained from themselves and their parents/guardians.

Adult group: Pregnant women aged between 20-35 years, nulliparous, 37-42 weeks gestational age, singleton pregnancy, at least primary school graduate, and consent was obtained.

Exclusion Criteria

Those who had a problem with themselves or their fetus and those who agreed to participate in the study but later withdrew.

Data Collection Tools

Data were collected using Personal Information Form, PSPS and Traumatic Birth Perception Scale.

Personal Information Form (PIF): The form, developed by the researchers in accordance with the literature (Koç & Özkan, 2022; Aksoy Derya et al., 2024; WHO, 2022), includes 24 questions regarding socio-demographic and obstetric characteristics, the pregnancy process, and perceptions of childbirth.

Pregnant Women's Self-Perception Scale (PSPS): The Pregnant Women's Self-Perception Scale, developed by

Kumcağız et al. (2017), assesses pregnant women's perceptions across two subdimensions: Perception of motherhood related to pregnancy (7 items) and perception of body related to pregnancy (5 items). The first subdimension measures how women perceive their maternal role during pregnancy, with higher scores indicating a more positive perception of motherhood, while lower scores indicate a weaker perception. The second subdimension evaluates body perception during pregnancy, where higher scores indicate a more negative perception and lower scores indicate a more positive perception. Responses are scored on a four-point Likert-type scale (4=always, 3=most of the time, 2=sometimes, 1=never), and subdimension scores are interpreted separately. The scale has been validated in populations similar to the present study, and in this study, Cronbach's α was 0.69, indicating acceptable reliability for the sample.

Traumatic Birth Perception Scale (TBPS): The TBPS, developed by Yalınz et al. (2016), measures the level of traumatic birth perception among women of reproductive age. The scale consists of 13 items, with responses scored on a 0-10 scale, ranging from "none" to the maximum. Total scores range from 0 to 130 and are interpreted across five levels: 0-26 indicates a very low level, 27-52 indicates a low level, 53-78 indicates a moderate level, 79-104 indicates a high level, and 105-130 indicates a very high level of traumatic birth perception. The original scale demonstrated high reliability, with Cronbach's $\alpha=0.895$ (Yalınz et al., 2016). In the current study, Cronbach's α for the scale was 0.88, indicating excellent internal consistency.

Data Collection

The data of the study were collected from pregnant women who came to Sarıkamış State Hospital between July 2021 and July 2022 for prenatal control and who were asked for NST. Firstly, the researcher informed the adolescent pregnant women, the parents/guardians of adolescent pregnant women and the adult pregnant women about the study. Written and verbal consent was obtained from the adolescent pregnant women, parents/guardians of adolescent pregnant women and adult pregnant women who agreed to participate in the study and met the study criteria. Data were collected in 15-20 minutes by face-to-face interview method in the NST room, taking into account the privacy of the pregnant women.

Statistical Analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics were presented as frequencies (f) and percentages (%). Normality of the data was assessed using the Shapiro-Wilk test. Chi-square analysis was applied for categorical variables. Independent Samples t test and One-Way ANOVA were used for comparing group means, with effect sizes reported as Cohen's d for t-tests and eta squared (η^2) for ANOVA. Tukey's HSD test was applied for post-hoc comparisons where significant differences were found. Pearson correlation analysis was conducted to examine the relationship between scale scores. In cases where normality assumptions were violated, non-parametric alternatives (Mann-Whitney U test or Kruskal-Wallis test) were applied. Additionally, a priori power analysis was conducted to ensure adequate sample size for detecting medium effect sizes ($\alpha=.05$, power=0.80).

RESULTS

The findings of the groups participating in the study are presented in [Tables 1-4](#).

Among adolescent pregnant women, all participants (100%) were aged 15-19 years, and 50% had spouses aged 20-24 years. More than half (56.7%) had secondary education, while 73.3% of their spouses also had secondary education. All adolescent pregnant women were not working. The majority (66.7%) lived in villages, and 56.7% lived in extended families. Most participants (76.7%) reported that their income was equal to their expenses, and 83.3% had social security. Consanguineous marriage was reported by 16.7%, and all were married between the ages of 14-18 years.

Among adult pregnant women, 58% were aged 20-24 years, and 20% had spouses aged 20-24 years. Regarding education, 46% had secondary education and 42% had university education, while 44% of their spouses had secondary education. A total of 76% were not working. More than half (52%) lived in villages, and 34% lived in extended families. Half of the participants (50%) reported income equal to expenses, and 82% had social security. Consanguineous marriage was reported by 18%, and 66% were married between the ages of 20-24 years.

A statistically significant difference was found between the groups in terms of age, spouse's age, education level, spouse's education level, employment status, family type, income perception, and age at marriage ($p<0.05$) ([Table 1](#)).

The obstetric characteristics of the participants are presented in [Table 2](#). Among adolescent pregnant women, 86.7% were experiencing their first pregnancy and 13.3% had two or more pregnancies. Similarly, 86.7% had no history of miscarriage, while 13.3% had experienced at least one miscarriage. The majority (90.0%) had planned pregnancies, and 66.7% reported attending regular prenatal check-ups. Additionally, 43.3% received prenatal education, and 43.3% experienced problems during pregnancy, whereas 56.7% did not.

Among adult pregnant women, 82.0% were experiencing their first pregnancy and 18.0% had two or more pregnancies. Likewise, 82.0% had no history of miscarriage, while 18.0% had experienced at least one miscarriage. Planned pregnancies were reported by 90.0% of participants. A higher proportion (86.0%) attended regular prenatal check-ups. Furthermore, 42.0% received prenatal education. It was found that 20.0% experienced problems during pregnancy, while 80.0% did not.

No statistically significant differences were found between the groups in terms of number of pregnancies, history of miscarriage, pregnancy planning, regular prenatal check-ups, or receiving prenatal education ($p>0.05$). However, a statistically significant difference was observed in terms of experiencing problems during pregnancy ($\chi^2=3.91$, $p=0.048$), with adolescent pregnant women reporting a higher rate of problems compared to adult pregnant women ([Table 2](#)).

The comparison of the participants' PSPS and TBPS scores is presented in [Table 3](#). The mean score of the PSPS was significantly higher in adolescent pregnant women compared to adult pregnant women (36.80 ± 3.47 vs. 34.88 ± 4.03 ; $t=2.249$, $p=0.028$). Similarly, the mean score of the TBPS was significantly higher among adolescents (77.26 ± 19.84 vs. 64.96 ± 28.99 ; $t=2.249$, $p=0.027$).

Table 1. Socio-demographic characteristics of participants

Characteristics	Group	Adolescent (n=30)		Adult (n=50)		χ ²	p
		n	%	n	%		
Woman age	15-19	30	100	0	0	80.00	0.000
	20-24	0	0	29	58.0		
	25-35	0	0	21	42.0		
	Mean±SD	17.53±0.68		23.9±3.64			
Husband age	20-24	15	50	10	20.0	9.56	0.008
	25-29	13	43.3	27	54.0		
	30-38	2	6.7	13	26.0		
	Mean±SD	24.80±2.83		27.38±3.84			
Women's educational status	Primary school	13	43.3	6	12.0	20.78	0.000
	Secondary education	17	56.7	23	46.0		
	University	0	0	21	42.0		
Husband's educational status	Primary school	8	26.7	8	16.0	16.00	0.000
	Secondary education	22	73.3	22	44.0		
	University	0	0	20	40.0		
Working status of women	Working	0	0	12	24.0	8.47	0.014
	Not working	30	100	38	76.0		
Living place	Province	2	6.6	3	6.0	1.93	0.381
	District	8	26.7	21	42.0		
	Village	20	66.7	26	52.0		
Family type	Nuclear family	13	43.3	33	66.0	3.07	0.047
	Extended family	17	56.7	17	34.0		
Income perception	Income less than expenditure	7	23.3	16	32.0	8.11	0.017
	Income equal to expenditure	23	76.7	25	50.0		
	Income more than expenditure	0	0	9	18.0		
Social security	Yes	25	83.3	41	82.0	0.02	0.879
	No	5	16.7	9	18.0		
Consanguineous marriage	Yes	5	16.7	9	18.0	0.03	0.984
	No	25	83.3	41	82.0		
Marriage age of woman	14-18	30	100	4	8.0	64.94	0.000
	19-24	0	0	33	66.0		
	25-31	0	0	13	26.0		
χ ² : Chi-square, SD: Standard deviation							

 χ^2 : Chi-square, SD: Standard deviation

Table 2. Obstetric characteristics of participants

Obstetric characteristics	Group	Adolescent (n=30)		Adult (n=50)		χ^2	p
		n	%	n	%		
Number of pregnancies	1 pregnancy	26	86.7	41	82.0	0.06	0.814
	≥ 2 pregnancies	4	13.3	9	18.0		
Number of involuntary abortions	No miscarriage	26	86.7	41	82.0	0.06	0.814
	≥ 1 miscarriage	4	13.3	9	18.0		
Pregnancy planning	Planned pregnancy	27	90.0	45	90.0	0.00	1.000
	Unplanned pregnancy	3	10.0	5	10.0		
Regular prenatal check	Yes	20	66.7	43	86.0	3.11	0.078
	No	10	33.3	7	14.0		
Receiving prenatal education	Yes	13	43.3	21	42.0	0.00	1.000
	No	17	56.7	29	58.0		
Having problems in pregnancy	Yes	13	43.3	10	20.0	3.91	0.048
	No	17	56.7	40	80.0		

PSPS: Pregnant's Self-perception Scale, PMP: Perception of motherhood in pregnancy, BPP: Body perception of pregnancy, TBPS: Traumatic Birth Perception Scale

Table 3. Comparison of the participants' PSPS and TBPS scores

Scales	Groups	n	Mean	SD	t	p
PSPS	Adolescent	30	36.80	3.47	2.249	0.028
	Adult	50	34.88	4.03		
PMP	Adolescent	30	26.33	2.29	0.025	0.980
	Adult	50	26.32	2.35		
BPP	Adolescent	30	10.46	3.07	2.652	0.010
	Adult	50	8.56	3.18		
TBPS	Adolescent	30	77.26	19.84	2.249	0.027
	Adult	50	64.96	28.99		

PSPS: Pregnant's Self-perception Scale, TBPS: Traumatic Birth Perception Scale, SD: Standard deviation, PMP: Perception of motherhood in pregnancy, BPP: Body perception of pregnancy

Table 4. Comparison of the relationship between the participants' TBPS and PSPS

Groups	Scale	TBPS	PSPS	n	p
Adolescents	TBPS	1	0.41	30	0.024
	PSPS	0.41	1		
Adult	TBPS	1	0.234	50	0.101
	PSPS	0.234	1		
All participants	TBPS	1	0.168	80	0.135
	PSPS	0.168	1		

TBPS: Traumatic Birth Perception Scale, PSPS: Pregnant's Self Perception Scale

Regarding subdimensions, the body perception of pregnancy (BPP) score was significantly higher in adolescent pregnant women (10.46 ± 3.07 vs. 8.56 ± 3.18 ; $t=2.652$, $p=0.010$). However, no statistically significant difference was found between the groups in terms of perception of motherhood in pregnancy (PMP) (26.33 ± 2.29 vs. 26.32 ± 2.35 ; $t=0.025$, $p=0.980$) (Table 3).

Effect size analysis indicated that the differences in PSPS and TBPS scores were of moderate magnitude (Cohen's $d \approx 0.50$), while the difference in BPP scores was also moderate ($d \approx 0.60$).

The correlation between the participants' self-perception levels (PSPS) and their perceptions of traumatic birth (TBPS) is presented in Table 4. Among adolescent pregnant women, a positive, moderate correlation was observed between PSPS and TBPS scores ($r=0.41$, $n=30$, $p=0.024$), indicating that higher self-perception levels were associated with higher perceptions of traumatic birth.

For adult pregnant women, no statistically significant correlation was found between PSPS and TBPS scores ($r=0.234$, $n=50$, $p=0.101$).

When all participants were analyzed together, the correlation between PSPS and TBPS was not statistically significant ($r=0.168$, $n=80$, $p=0.135$).

These results suggest that the relationship between self-perception and traumatic birth perception is present only in adolescent pregnant women, while no significant association is observed in adult pregnant women or in the combined sample (Table 4).

DISCUSSION

The findings of this study indicate that adolescent and adult pregnant women experience pregnancy and childbirth in

markedly different ways, influenced by social, psychological, and obstetric factors. Adolescent participants had lower educational levels, married at younger ages, and faced more challenges related to prenatal care and pregnancy management, which aligns with prior studies highlighting adolescents' vulnerabilities in physical, emotional, and social domains (Çırak & Özdemir, 2015; Panova et al., 2016; Rodríguez-Almagro et al., 2019). From a developmental perspective, the heightened self-perception observed in adolescents may reflect the dual role of pregnancy as both a developmental milestone and a life-defining event, amplifying emotional intensity and potential stress during childbirth.

Developmental and Psychosocial Mechanisms

Adolescent pregnancies occur during a critical period of incomplete psychosocial, cognitive, and emotional maturation (Ayanaw Habitu et al., 2017; UNFPA, 2020). This incomplete development may limit coping strategies, emotional regulation, and problem-solving abilities, resulting in higher perceived trauma during childbirth. Social vulnerabilities, including lower educational attainment, financial dependence, and weaker social support networks, further exacerbate stress and feelings of helplessness, contributing to heightened traumatic birth perceptions (Koç & Özkan, 2022; Aksoy Derya et al., 2024). The current study extends this understanding by demonstrating a moderate positive correlation between adolescents' self-perception and traumatic birth perception, suggesting that heightened emotional awareness and self-focus may amplify perceived trauma during labor (Siegel & Brandon, 2014; Smith Battle, 2013).

Educational and Socioeconomic Influences

Education emerged as a key determinant of both pregnancy experiences and perceptions of childbirth. Adolescents' lower educational attainment may reduce health literacy, limit utilization of prenatal services, and impair effective coping strategies (Kassa et al., 2018; UNFPA, 2022). Such deficits can heighten vulnerability to psychological stress during childbirth. Interventions that enhance education and health literacy, particularly those addressing reproductive health and prenatal care, may therefore mitigate perceived birth trauma and improve maternal outcomes.

Prenatal Care, Obstetric Risks, and Support Systems

Although adult women in this study exhibited higher age-related obstetric risks, such as gestational diabetes and hypertension, adolescents attended prenatal visits less regularly. This discrepancy may reflect structural barriers, including limited access to healthcare, transportation difficulties, and insufficient social support (Londero et al., 2019). From a biopsychosocial perspective, inadequate prenatal preparation and social support may compound the psychological stress experienced during childbirth, amplifying traumatic perceptions among adolescents.

Psychological Dimensions and Traumatic Birth Perception

Adolescents scored significantly higher on both the PSPS and the TBPS. This dual elevation suggests that pregnancy serves as both a central aspect of identity development and a source of emotional vulnerability (Abdolalipour et al., 2023; Ünal,

2023). In contrast, adult women did not exhibit a significant correlation between self-perception and traumatic birth perception, likely reflecting greater psychosocial maturity, life experience, and resilience, as well as stronger support networks buffering emotional intensity (Ahmad et al., 2024; Al-Mutawtah et al., 2023; Kohan et al., 2023). These findings are consistent with international studies highlighting the protective role of emotional preparedness and social support in mitigating childbirth-related trauma (Isobel et al., 2023; Barrett et al., 2025).

Integration with International Literature

International research suggests that adolescent pregnancies are consistently associated with higher perceived birth trauma due to a combination of developmental immaturity, limited autonomy, and social vulnerability (SmithBattle et al., 2013; Koç & Özkan, 2022). The present study reinforces these findings in a Turkish context, highlighting cultural factors such as early marriage and regional disparities in adolescent pregnancy prevalence. By integrating these local and global perspectives, the study underscores the necessity of age-specific interventions that address both psychosocial and obstetric needs.

Implications for Practice

The results indicate the importance of designing targeted interventions for adolescent pregnant women, including prenatal education programs, psychosocial support, and childbirth preparation tailored to developmental and emotional needs. Strengthening health literacy, enhancing coping strategies, and ensuring access to supportive healthcare services may reduce the likelihood of perceiving childbirth as traumatic, ultimately improving maternal and neonatal outcomes.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design restricts the ability to establish causal relationships between self-perception and traumatic birth perception. Second, the study was conducted in a single-center setting with a relatively small sample size, particularly for the adolescent group, which may limit the generalizability of the findings to other populations. Third, the use of self-report measures introduces the potential for response bias and may affect the accuracy of psychological assessments. Fourth, the PSPS used in this study had a Cronbach's alpha of 0.69, which is at the borderline of acceptability, representing a limitation in terms of measurement reliability. Fifth, selection bias may have occurred due to voluntary participation, potentially influencing the observed outcomes. Lastly, the relatively small number of adolescent pregnancies reflects their decreasing prevalence, which may have affected the statistical power and representativeness of the adolescent group.

Despite these limitations, the study also has notable strengths. It provides a comprehensive comparison of adolescent and adult pregnant women across social, obstetric, and psychological dimensions, offering valuable insights into factors influencing traumatic birth perceptions. The study employs validated scales for self-perception and traumatic birth perception, ensuring standardized measurement of

key constructs. Furthermore, by highlighting the significant relationship between self-perception and traumatic birth perception among adolescents, this study contributes evidence that can inform age-specific preventive strategies, educational interventions, and psychosocial support programs within maternal health services.

CONCLUSION

Based on the findings of this study, it can be concluded that adolescent pregnant women exhibit lower self-perception and higher levels of traumatic birth perception compared to adult pregnant women. The observed significant relationship between self-perception and traumatic birth perception among adolescents indicates that early pregnancies may carry important psychological and emotional consequences. Therefore, it is recommended that preventive strategies targeting adolescent pregnancy be implemented, alongside educational interventions aimed at strengthening self- and body-perception. Additionally, psychosocial support programs tailored to the needs of adolescent pregnant women should be developed and integrated into maternal health services to reduce potential negative outcomes and enhance overall well-being.

ETHICAL DECLARATIONS

Ethics Committee Approval

This study was conducted with the approval of the Ethics Committee of the Institute of Health Sciences at Marmara University (Date: 18.01.2021, Decision No: 06).

Informed Consent

Written informed consent was obtained from all individual participants prior to their inclusion in the study. Participants were fully informed about the study's aims, procedures, potential risks and benefits, and their rights-including the right to withdraw at any time without consequence. All participants voluntarily signed a written informed consent form.

Peer Review Process

This manuscript was subject to external peer review.

Conflict of Interest

The authors declare no conflicts of interest related to this study.

Financial Disclosure

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Author Contributions

Research Design: ZB, HE; Data Collection: HE; Analysis: ZB; Research Supervision: ZB, HE; Manuscript Writing: ZB, HE.

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Examining the relationship between nursing students' reasons for choosing a profession and their perceptions of the image of nursing

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ABSTRACT

Aims: Nursing is distinct from other professions as it involves providing care to both healthy and ill individuals grounded in scientific knowledge. Consequently, making an informed career choice in nursing is crucial for both individual and public health. This study aimed to explore the factors influencing Turkish nursing students' choice of the profession and their perceptions of its professional image.

Methods: A descriptive, cross-sectional design was employed with 490 nursing students from a faculty of nursing in Türkiye. Data were gathered using the Student Introduction Form, the Scale for the Image of Nursing Profession (INP), and the Scale of Vocational Choice in Nursing (SVCN). Statistical analyses included Chi-square, Fisher's exact test, Pearson correlation, linear regression, independent t-test, one-way ANOVA, and post hoc tests.

Results: The mean age of participants was 20.0 ± 2.2 years, with 89% being female. The mean SVCN score was 57.72 ± 14.31 , and the mean INP score was 163.52 ± 14.99 . A significant positive correlation was observed between vocational choice and professional image ($r=0.363$, $p<0.01$). Regression analysis demonstrated that vocational choice significantly influences the perception of nursing ($\beta=0.363$, $p<0.001$).

Conclusions: Strengthening students' professional image during education is essential for enhancing vocational commitment and advancing the nursing profession.

Keywords: Nursing, career choice, professional image, university students

INTRODUCTION

A profession is an activity that requires specialization in a particular field, is based on continuous learning, necessitates a diploma for practice, and provides both financial and emotional satisfaction to individuals (İnel & Akbulut, 2017). Choosing a profession is a crucial process that helps individuals develop a long-term career plan by considering their interests, abilities, and values in their chosen field of specialization (Alkaya & Yaman, 2018). As a key determinant of living standards, career choice is influenced by individuals' expectations concerning job stability and social standing. Due to its potential to meet these expectations, the nursing profession has maintained its popularity and continues to be a preferred choice (Alkaya & Yaman, 2018; Wu et al., 2015). Previous research has highlighted multiple determinants shaping individuals' preference for the nursing profession, such as professional and social standing, job stability, financial considerations, family influence, altruistic motivations, interest in the healthcare sector, opportunities for academic advancement, attainment of a university degree, and enhanced self-expression (Seval &

Sönmez, 2020; Wu et al., 2015). These factors, which influence the choice of nursing as a profession, also significantly affect the professional image of nursing (Karaman et al., 2020).

The concept of professional image is shaped by multiple factors, including the reputation of the profession, its social standing, the perceived value of its practitioners, the significance of their roles, and their societal impact (Bulut et al., 2020). The professional image of nursing is shaped by how individuals perceive themselves in their professional lives, how others view them, the working conditions they experience, and reflects the qualifications of its members, their skills, and societal perceptions of their roles (Özdelikara et al., 2015). The societal perception of nursing influences both the profession itself and the attitudes of nursing professionals and students, either positively or negatively (Karaman et al., 2020; Özdelikara et al., 2015). Nurses, affected by this image, may reflect it in their job performance, intentions to leave the profession, professional status, authority, and ability to improve healthcare services (Akan et al., 2021).

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A review of the literature indicates that the perceived image of nursing is often viewed as having relatively low social prestige. Nurses are frequently associated with stressful and demanding work environments, low salaries, and a lack of clear professional autonomy. Additionally, the scope of their responsibilities is often poorly defined, reinforcing negative perceptions and preventing the profession from reaching its desired status (Tekin & Aba, 2023). Studies suggest that improving the image of nursing requires moving beyond outdated, stereotypical, and negative perspectives. Instead, nursing should be recognized as a multidimensional, professional field that highlights the knowledge, skills, and expertise of its practitioners while acknowledging their diverse roles and responsibilities (Godsey et al., 2020; Özdelikara et al., 2015).

Choosing a profession is one of the most important decisions a person makes in their lifetime. Since nursing, unlike other fields, involves providing scientifically based care to healthy or ill individuals, making an informed choice in this profession is crucial for both individual and public health (Elilibol et al., 2017). Therefore, it is highly important to comprehend the factors influencing the selection of nursing as a profession and how its image is perceived. Although previous studies have addressed nursing students' motivations for choosing the profession and their perceptions of its image (Alkaya & Yaman, 2018; Seval & Sönmez, 2020; Wu et al., 2015), few have examined these dimensions simultaneously; hence, the findings of this study will enrich the literature by offering insights into how individuals who choose or intend to pursue a nursing career perceive the professional image of nursing.

METHODS

Ethics

This study was conducted with the approval of the Gülhane Scientific Researches Ethics Committee of the University of Health Sciences (Date: 22.08.2023, Decision No: 2023-167). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Written informed consent was obtained from all individual participants prior to their inclusion in the study.

Research Design

This research was conducted using a descriptive, cross-sectional design.

Participants

This research was carried out between August 2023 and June 2024 with nursing students from a health sciences university located in Ankara, the capital of Türkiye. The study population consisted of 750 nursing students enrolled in the faculty of nursing during the 2023-2024 academic year. The sample size was calculated using the known population sample size formula with a 95% confidence level and a 5% margin of error, and the minimum required sample size was determined as 254 students (Salant & Dillman, 1994). A total of 490 nursing students who agreed to participate voluntarily and completed the survey forms fully and accurately were included in the study.

The study aimed to reach the entire population, and students from first-, second-, third-, and fourth-year levels

were included to ensure representativeness of the sample. Participation was entirely voluntary, and no age restriction was applied.

Measures

Demographic Information Form: A 14-item form was developed by the researchers to collect data on the participants' sociodemographic characteristics. It included questions on gender, age, year of study, type of high school graduated from, the location where they had lived the longest, economic status, the presence of a healthcare professional in the family, voluntary selection of nursing, order of preference when applying to the nursing program, family influence on career choice, experience of loss within the family, and intention to pursue a nursing career after graduation.

Scale of Vocational Choice in Nursing (SVCN): To determine the factors influencing nursing students' choice of profession, the scale originally developed by Zysberg and Berry (2005) and adapted for validity and reliability by Önlü and Saraçoğlu (2010) was utilized. The scale comprises two sub-dimensions: Congruence (items 1-5, 7, 9, 14-17) and survival/need (items 6, 8, 10-13). It is a Likert-type instrument scored on a scale ranging from 0 to 100. The total and sub-dimension scores are calculated by dividing the sum of participants' item scores by the total number of items. These scores are interpreted by comparing them with independent variables associated with participants' choice of the nursing profession. In previous research, the Cronbach's alpha coefficients were reported as 0.77 for the Congruence sub-dimension and 0.78 for the survival/need sub-dimension (Önlü & Saraçoğlu, 2010). In the present study, Cronbach's alpha coefficients for the SVCN were 0.83 for the total scale, 0.82 for the Congruence sub-dimension, and 0.81 for the survival/need sub-dimension.

Scale for the Image of Nursing Profession (INP): The scale developed by Dost and Bahçecik (2015) is a 5-point Likert-type instrument comprising 42 items (Dost & Bahçecik, 2015). It consists of six sub-dimensions: professional qualifications (11 items), working conditions (10 items), gender (8 items), education (5 items), professional status (5 items), and external appearance (3 items). Fifteen items (8, 14, 15, 17, 18, 20, 21, 22, 23, 24, 25, 26, 28, 29, 31) are reverse-scored. The total score ranges from 42 to 210, with higher scores reflecting a more positive perception of the image of the nursing profession. In the original study, the Cronbach's alpha coefficient was reported as 0.88 (Dost & Bahçecik, 2015), while in the present study it was found to be 0.87.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics v22.0. Descriptive statistics (frequency, percentage, mean, standard deviation) summarized participant data. Normality was confirmed via skewness and kurtosis values, supporting the use of parametric tests. Chi-square and Fisher's Exact tests compared categorical variables between groups, while independent samples t-test, one-way ANOVA, and post hoc tests (Tukey, LSD) examined scale score differences by descriptive characteristics. Pearson correlation and linear regression analyses assessed relationships between scales. Statistical significance was set at $p < 0.05$ with a 95% confidence interval.

RESULTS

Of the students participating in the study, 88.9% were female, with an average age of 20.02 ± 2.21 . 38.4% were in their 2nd year and 81.4% had a medium level of family income. It was found that 89.8% selected nursing as their 1st to 10th preference, and 65.1% chose nursing voluntarily. 46.3% of the families left the career choice to the student's free will, and 62.9% of the students expressed a desire to pursue a career in nursing (Table 1).

Table 1. Sociodemographic characteristics of the students (n=490)

Variable	Mean	SD
Age	20.0	2.2
	n	%
Gender		
Female	436	89
Male	54	11
Grade		
1 st grade	94	19.2
2 nd grade	188	38.4
3 rd grade	125	25.5
4 th grade	83	16.9
Family income		
High	59	12
Middle	399	81.4
Low	32	6.5
Willingly choosing nursing		
Yes	319	65.1
No	171	34.9
Order of preference		
1 st -10 th row	440	89.8
11 and beyond	50	10.2
The influence of family on choosing nursing		
They were restrictive	52	10.6
They left the choice to me	227	46.3
They were positive	173	35.3
They had no influence	38	7.8
Desire to practice nursing profession		
I want to	308	62.9
I am undecided	155	31.6
I don't want to	27	5.5

SD: Standard deviation

Analysis of the total and sub-dimension scores of the SVCN and INP for the participating students revealed a mean total score of 57.72 ± 14.31 for the SVCN. Within its sub-dimensions, the mean score was 62.07 ± 18.76 for Congruence and 49.74 ± 15.60 for survival/need. For the INP, the mean total score was 163.52 ± 14.99 , with sub-dimension scores as follows: Professional qualification 49.39 ± 5.27 , working conditions 43.84 ± 4.48 , gender 20 ± 5.87 , education 22.06 ± 2.69 , professional status 16.14 ± 4.47 , and external appearance 11.36 ± 2.30 (Table 2).

SVCN scores differed significantly across several descriptive characteristics ($p < 0.05$). Fourth-year students had the highest total SVCN (62.76 ± 16.55), congruence (67.03 ± 18.72), and

Table 2. Mean total and sub-dimension scores for SVCN and INP

Scales			Mean±SD	Min±max
SVCN	Subdimension	Congruence	62.07±18.76	4.55±100
		Survival/need	49.74±15.60	0±98.33
Total			57.72±14.31	5.88±97.06
Scale for the INP	Subdimension	Professional qualification	49.39±5.27	23±55
		Working conditions	43.84±4.48	20±50
		Gender	20±5.87	8±40
		Education	22.06±2.69	10±25
		Professional status	16.14±4.47	5±25
		External appearance	11.36±2.3	3±15
Total			163.52±14.99	92±210
SVCN: Scale of Vocational Choice in Nursing, INP: Image of Nursing Profession, SD: Standard deviation, Min: Minimum, Max: Maximum				

SVCN: Scale of Vocational Choice in Nursing, INP: Image of Nursing Profession, SD: Standard deviation, Min: Minimum, Max: Maximum

survival/need (54.94 ± 20.23) scores. Students from higher-income families and those who voluntarily chose nursing or ranked it among their top ten preferences had significantly higher total SVCN and Congruence sub-dimension scores. Family support for career choice was associated with higher total SVCN (61.98 ± 13.53), congruence (67.52 ± 16.09), and survival/need (51.82 ± 16.27) scores. Students intending to pursue nursing had significantly higher total SVCN (62.02 ± 12.05) and Congruence (69.23 ± 14.80) scores, whereas undecided students showed a significant difference only in the survival/need sub-dimension (52.39 ± 13.92) (Table 3).

Regarding INP scores, male students scored significantly higher in the Gender sub-dimension (25.43 ± 6.10), whereas female students had significantly higher scores in the Working Conditions sub-dimension (44.06 ± 4.11) ($p < 0.05$). Fourth-year students had the highest total INP (168.94 ± 18.38), as well as professional qualifications (50.63 ± 5.44) and gender (23.27 ± 7.37) sub-dimension scores. In contrast, third-year students had significantly higher scores in the working conditions (44.99 ± 3.80) and education (22.36 ± 2.80) sub-dimensions. Students who voluntarily chose nursing had significantly higher total INP (165.80 ± 13.61) and sub-dimension scores, including professional qualifications (50.34 ± 4.19), professional status (16.94 ± 4.15), and external appearance (11.62 ± 2.22). Although no significant difference was found in total INP scores based on preference order ($p > 0.05$), students who ranked nursing within their top 10 preferences had significantly higher scores in the professional qualifications (49.66 ± 4.97), working conditions (44.08 ± 4.20), and education (22.18 ± 2.51) sub-dimensions. Students intending to pursue nursing had significantly higher scores across all sub-dimensions except gender, and family support for career choice was associated with higher professional qualifications scores (49.82 ± 4.53) (Table 4).

As shown in Table 5, a positive correlation was observed between the total score of the Scale for the INP and the total score of the SVCN ($r = 0.363$, $p = 0.001$). Similarly, positive and significant correlations were observed with the subdimensions of congruence ($r = 0.366$, $p = 0.001$) and survival/need ($r = 0.137$, $p = 0.002$). When examining the subdimensions of INP, a positive relationship was found between professional qualifications and the total score of SVCN ($r = 0.275$, $p = 0.001$), as well as congruence ($r = 0.323$, $p = 0.001$). The subdimension

Table 3. Relationship between student-related variables and mean scores of SVCN total and sub-dimension scores

Variable	SVCN total score	SVCN sub-dimension	
		Congruence	Survival/need
Grade	Mean±SD	Mean±SD	Mean±SD
1 st grade	55.91±14.29	58.99±20.49	50.28±11.56
2 nd grade	57.22±13.69	62.77±18.15	47.07±15.32
3 rd grade	56.47±13.01	60.04±17.77	49.92±14.35
4 th grade	62.76±16.55	67.03±18.72	54.94±20.23
Statistical values	f=4.419	f=3.406	f=5.082
	p=0.004*	p=0.018*	p=0.002*
Family income			
High	62.05±13.69	68.32±16.36	50.57±16.52
Middle	57.46±14.25	61.55±19.03	49.97±15.14
Low	52.96±14.62	57.05±17.23	45.47±19.09
Statistical values	f=4.608	f=4.647	f=1.326
	p=0.010*	p=0.010*	p=0.267
Willingly choosing nursing			
Yes	62.43±12.41	69.57±14.96	49.33±16.30
No	48.94±13.49	48.07±17.05	50.53±14.23
Statistical values	t=11.123	t=14.432	t = -0.811
	p=0.001**	p=0.001**	p = 0.417
Order of preference			
1 st -10 th row	58.70±13.45	63.48±17.82	49.92±15.20
11 and beyond	49.13±18.412	49.65±22.16	48.17±18.90
Statistical values	t=4.569	t=5.061	t=0.755
	p=0.001**	p=0.001**	p=0.451
The influence of family on choosing nursing			
They were restrictive	47.03±13.99	44.84±17.18	51.03±14.03
They left the choice to me	57.69±13.15	62.62±17.95	48.64±14.81
They were positive	61.98±13.53	67.52±16.09	51.82±16.27
They had no influence	53.16±16.23	57.54±22.18	45.13±17.99
Statistical values	F=17.722	F=23.036	F = 2.650
	p=0.001**	p=0.001**	p = 0.048*
Desire to practice nursing profession			
I want to	62.02±12.05	69.23±14.80	48.79±15.89
I am undecided	52.06±14.54	51.94±18.33	52.39±13.92
I don't want to	40.96±13.68	38.52±15.64	45.43±19.48
Statistical values	f=54.001	f=90.704	f=3.872
	p=0.001**	p=0.001**	p=0.021*

SVCN: Scale of Vocational Choice in Nursing, Z= Mann-Whitney U Test Statistic Value, F: Anova Test, t: Independent Samples T-Test, PostHoc: Tukey, LSD: Significant at ** p<0.001, * p<0.05, SD: Standard deviation

of working conditions also has a positive relationship with the total score of SVCN ($r=0.160$, $p=0.001$) and congruence ($r=0.173$, $p=0.001$). The gender subdimension of INP showed a significant relationship with the total score of SVCN ($r=0.130$, $p=0.004$). There is also a positive relationship between survival/need (a subdimension of SVCN) and the gender subdimension of INP ($r=0.236$, $p=0.001$). The education subdimension of INP shows very weak positive relationships with the total score of SVCN ($r=0.146$, $p=0.001$) and the congruence subdimension ($r=0.194$, $p=0.001$). The professional status subdimension of INP has significant weak

positive correlations with the total score of SVCN ($r=0.335$, $p=0.001$), congruence ($R^2=0.350$, $p=0.001$), and survival/need ($r=0.098$, $p=0.029$) subdimensions. The external appearance subdimension of INP also shows weak positive relationships with the total score of SVCN ($r=0.271$, $p=0.001$) and the Congruence subdimension ($r=0.283$, $p=0.001$).

Table 6 displays the results of a linear regression analysis investigating the impact of the sub-dimensions of the SVCN, namely congruence and survival/need, on the image of the nursing profession. The analysis indicated that the congruence sub-dimension had a significant positive effect on the nursing profession's image ($\beta=0.353$, $p<0.001$), whereas the survival/need sub-dimension did not demonstrate a significant effect ($\beta=0.07$, $p=0.13$). The model's overall explanatory power was $R^2=0.14$, suggesting that the sub-dimensions of vocational choice account for 13.5% of the variance in the perception of the nursing profession. These findings highlight that the congruence sub-dimension has a meaningful and significant impact on the professional image of nursing, while the survival/need sub-dimension does not significantly contribute to this relationship.

DISCUSSION

Vocational choice is one of the most significant decisions individuals make in their lives, and it is influenced by perceptions of the profession's image (Elbol et al., 2017). This study was conducted to investigate the relationship between nursing students' reasons for choosing the profession and their perceptions of its professional image. The findings are expected to contribute to the literature by elucidating how the motivations for selecting nursing relate to students' perceptions of the nursing profession, particularly for those who have chosen or are in the process of choosing this career.

The gender factor is influential during the vocational choice process, but its effect on choosing the nursing profession is more pronounced compared to other professional groups. Since nursing is a profession predominantly practiced by women in society, it is not considered among the professions suitable for men (Kocabaş & Erdem, 2019). According to the results of our study, although 89% of the participants were female, male students scored higher in the INP gender subdimension. This finding is similar to results from studies showing that gender-based judgments related to the nursing profession are beginning to be overcome (Karaman et al., 2020). As seen globally in recent years, men are also choosing the nursing profession in our country (Kocabaş & Erdem, 2019; Prosen, 2022). An increase in male nursing students reflects a changing perception of gender roles within the profession (Aydın & Sayılan, 2022). The growing number of male nurses is believed to contribute to elevating the profession's social standing and challenging traditional gender stereotypes within nursing.

Academic year is another factor influencing nursing profession perception and vocational choice. In this study, 4th-year students had significantly higher SVCN and INP scores than other years, with notable differences in professional qualifications and gender subdimensions. This aligns with studies showing that theoretical and practical knowledge gained during nursing education positively shapes professional perception (Okuyan et al., 2020; Ünsal & Güven,

Table 4. Relationship between student-related variables and mean scores of INP total and sub-dimension scores.

Scale for the INP sub-dimension							
Variable	INP total score	Professional qualification	Working conditions	Gender	Education	Professional status	External appearance
Gender							
Female	163.28±13.82	49.58±4.97	44.06±4.11	20.12±5.58	22.15±2.52	16.06±4.34	11.32±2.27
Male	165.39±22.40	47.85±7.14	42.17±6.61	25.43±6.10	21.41±3.79	16.82±5.45	11.72±2.63
Statistical values	t=-0.973	t=2.284	t=2.947	t=-6.520	t=1.911	t=-1.171	t=-1.219
	p=0.503	p=0.089	p=0.045*	p=0.001**	p=0.167	p=0.330	p=0.224
Grade							
1 st grade	157.25±14.77	47.33±5.72	42.645±4.71	19.70±5.05	21.06±3.09	15.59±4.36	10.92±2.35
2 nd grade	161.96±12.78	49.31±4.73	43.44±4.12	19.64±4.78	21.92±2.25	16.37±4.07	11.29±2.22
3 rd grade	166.97±13.72	50.24±5.18	44.99±3.80	21.36±6.28	22.81±2.41	15.97±4.67	11.60±2.06
4 th grade	168.94±18.38	50.63±5.44	44.42±5.44	23.27±7.37	22.43±3.18	16.518±5.13	11.68±2.73
Statistical values	f=12.854	f=7.701	f=6.127	f=9.184	f=8.572	f=0.911	f=2.207
	p=0.001**	p=0.001**	p=0.001**	p=0.001**	p=0.001**	p=0.436	p=0.086
Willingly choosing nursing							
Yes	165.80±13.61	50.34±4.19	44.08±4.17	20.59±5.72	22.23±2.40	16.94±4.15	11.62±2.22
No	159.26±16.50	47.62±6.51	43.42±4.99	20.92±6.17	21.77±3.17	14.66±4.68	10.88±2.41
Statistical values	t=4.695	t=5.612	t=1.571	t=-0.590	t=1.815	t=5.532	t=3.392
	p=0.001**	p=0.001**	p=0.117	p=0.556	p=0.096	p=0.001**	p=0.001**
Order of preference							
1 st -10 th row	163.93±14.20	49.66±4.97	44.08±4.20	20.54±5.66	22.18±2.51	16.12±4.38	11.35±2.27
11 and beyond	159.84±20.55	47.04±7.07	41.84±6.14	22.14±7.45	21.04±3.86	16.34±5.29	11.44±2.67
Statistical values	t=1.834	t=3.362	t=3.380	t=-1.828	t=2.863	t=-0.329	t=-0.254
	p=0.176	p=0.014*	p=0.015*	p=0.147	p=0.046*	p=0.778	p=0.799
Desire to practice nursing profession							
I want to	165.721±13.06	50.30±4.68	44.24±4.28	20.42±5.42	22.35±2.49	16.78±4.16	11.64±2.19
I am undecided	159.677±16.33	48.02±5.37	43.27±4.43	20.87±6.32	21.58±2.87	14.95±4.75	10.99±2.21
I don't want to	160.407±21.91	46.96±8.16	42.78±6.32	22.96±7.74	21.67±3.53	15.74±5.01	10.30±3.44
Statistical values	f=9.294	f=13.265	f=3.274	f=2.426	f=4.548	f=9.046	f=7.256
	p=0.001**	p=0.001**	p=0.039*	p=0.089	p=0.011*	p=0.001**	p=0.001**
The influence of family on choosing nursing							
They were restrictive	159.15±16.30	47.29±7.17	43.44±5.13	21.27±6.03	21.62±3.31	14.83±4.02	10.71±2.29
They left the choice to me	163.48±14.56	49.63±4.87	43.71±4.52	20.54±5.57	22.15±2.74	16.12±4.57	11.33±2.11
They were positive	165.02±14.69	49.82±4.53	44.16±4.00	20.64±6.13	22.15±2.40	16.67±4.28	11.60±2.41
They had no influence	162.90±16.51	48.90±7.01	43.84±5.41	21.24±6.44	21.84±2.86	15.68±5.03	11.40±2.90
Statistical values	f=2.081	f=3.452	f=0.485	f=0.332	f=0.692	f=2.443	f=1.998
	p=0.102	p=0.017*	p=0.693	p=0.802	p=0.557	p=0.063	p=0.113
f: Anoda Test; t: Independent Samples T-Test; PostHoc:Tukey, LSD; Significant at ** p<0.001, * p<0.05. INP: Image of Nursing Profession							

F. Anoda Test; t. Independent Samples T-Test; PostHoc:Tukey, LSD; Significant at ** p<0.001, * p<0.05. INP: Image of Nursing Profession

2020), though Hingkanont and Nanudorn (2023) found no significant INP score differences across academic years. The regulation of working conditions in the nursing profession, receiving fair salaries, and changes in the profession's societal image will positively influence perceptions of nursing and career choice, regardless of class year.

Most students (81.4%) came from middle-income families; however, those from higher-income backgrounds had significantly higher SVCN and congruence subdimension scores. While some studies link income level to nursing career choice, others find no such relationship (Elibol et al., 2017; Kocabaş & Erdem, 2019; Wu et al., 2015). These inconsistencies may partly reflect the study's limitation of being conducted at a single prominent university in Türkiye's capital.

In our study, a large majority of nursing students intentionally chose the nursing program and ranked it among their top 10 preferences. Students who selected nursing within their top 10 choices had significantly higher SVCN total and congruence subdimension scores, as well as higher INP scores. Similar findings in the literature indicate that students who consciously choose nursing tend to develop more positive attitudes and stronger professional alignment (Çingöl et al., 2020; Seval & Sönmez, 2020). This phenomenon can be explained through the Person-Environment Fit theory, which suggests that individuals who choose careers aligned with their personal values and abilities are more likely to develop stronger professional commitment and job satisfaction (Kristof-Brown et al., 2005; Van Vianen, 2018).

Table 5. Correlation coefficients and significance of SVCN with INP

Scales		SVCN		
Total score		Sub-dimens		
		Congruence		Survival/need
Scale for the INP	Total score	r=0.363**	r=0.366**	r=0.137*
	Sub-dimens	p=0.001	p=0.001	p=0.002
	Professional qualification	r=0.275**	r=0.323**	r=0.003
		p=0.001	p=0.001	p=0.944
	Working conditions	r=0.160**	r=0.173**	r=0.035
		p=0.001	p=0.001	p=0.437
	Gender	r=0.130*	r=0.046	r=0.236**
		p=0.004	p=0.306	p=0.001
	Education	r=0.146**	r=0.194**	r=-0.048
		p=0.001	p=0.001	p=0.286
	Professional status	r=0.335**	r=0.350**	r=0.098*
		p=0.001	p=0.001	p=0.029
	External appearance	r=0.271**	r=0.283**	r=0.080
		p=0.001	p=0.001	p=0.078

r=correlation coefficient, Significant at ** p<0.001, * p<0.05. SVCN: Scale of Vocational Choice in Nursing, INP: Image of Nursing Profession

Table 6. The effect of vocational choice in nursing on the image of nursing profession

Independent variable	B	β	SE	95% CI	p-value
SVCN total	0.38	0.36	0.04	0.29-0.47	<0.001
Congruence	0.28	0.35	0.03	0.22-0.35	<0.001
Survival/need	0.06	0.07	0.04	- 0.02-0.14	0.13

Dependent Variable=Image of Nursing Profession Total Score, Abbreviations: B- β , regression coefficients, SE: Standart error, CI: Confidence interval, SVCN: Scale of Vocational Choice in Nursing

In line with this theoretical perspective, our findings indicate that consciously prioritizing nursing in university preferences reflects a proactive alignment process, leading to greater professional compatibility and a more favorable perception of the profession.

Professional image significantly influences vocational choice, commitment, and intention to remain in the field (Dönmez & Balkaya, 2021). In our study, 62.9% of students intended to pursue nursing after graduation, consistent with literature reporting increased continuation rates (Aydın et al., 2021). Key motivators include ethical values such as honesty and responsibility, as well as employment opportunities and economic factors. However, actual practice may differ from initial expectations, as working conditions, stress, and heavy workload can negatively affect retention (Liang et al., 2018). Notably, students intending to continue in the profession scored significantly higher on the SVCN and INP. Therefore, improving nursing working conditions may reinforce professional values and enhance students' motivation to remain in the field.

Family support plays a key role in career choices, particularly when students aim to make their families proud by choosing nursing at a young age. In our study, positive family attitudes significantly affected both SVCN total and subdimension scores, as well as the professional qualification subdimension of the INP. Consistent with the literature, family and close

social circles strongly influence the choice of nursing (Alkaya & Yaman, 2018; Sümen et al., 2022), while broader societal image may have a limited or negative effect (Wu et al., 2015). These findings suggest that, although family influence is important, supporting students in making informed and independent decisions may promote a more positive perception of the profession.

Choosing a profession is a difficult decision, and selecting nursing is of great importance for both individual and societal health. Vocational choice is influenced by various factors, but as shown by our regression analysis, there is a positive correlation between the SVCN congruence subdimension and the INP. Additionally, the correlation analysis shows that a positive perception of the nursing profession is a significant factor in students' vocational choices. Consistent with the literature, individuals with a favorable image of nursing are more likely to choose the profession (Dönmez & Balkaya, 2021; Sümen et al., 2022). Similarly, Tekin and Aba (2023) emphasize that vocational choices based on congruence strengthen alignment with professional values. Supporting students' awareness of the nursing profession's image and encouraging them to make informed decisions is an essential step in preparing professional nurses. Therefore, enhancing the image of the profession and ensuring students' professional alignment is critical in nursing education.

Limitations

A limitation of this study is its single-center design, conducted at a public university, which restricts the generalizability of the findings to all nursing students. In addition, the fact that the study took place in Ankara, a city with higher socioeconomic levels compared to neighboring provinces, may have impacted the results.

CONCLUSION

In this study, it was observed that gender stereotypes related to the nursing profession are gradually being overcome, students' perceptions of the profession strengthen as their academic level increases, and factors such as family income level play a role in career choices. Based on these findings, it is recommended to raise societal awareness about the nursing profession, break down gender stereotypes and provide economic and social support mechanisms to students. Additionally, exposing nursing students and those at the career selection stage to role models would be effective in increasing interest in the profession and strengthening professional commitment.

ETHICAL DECLARATIONS

Ethics Committee Approval

This study was conducted with the approval of the Gülhane Scientific Researches Ethics Committee of the University of Health Sciences (Date: 22.08.2023, Decision No: 2023-167).

Informed Consent

Written informed consent was obtained from all individual participants prior to their inclusion in the study. Participants were fully informed about the study's aims, procedures, potential risks and benefits, and their rights-including the right to withdraw at any time without consequence. All

participants voluntarily signed a written informed consent form.

Peer Review Process

This manuscript was subject to external peer review.

Conflict of Interest

The authors declare no conflicts of interest related to this study.

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Author Contributions

Concept: ŞZA; Design: ŞZA; Control: ŞZA, ENK; Data Collection and/or Processing: ŞZA, İG, RE; Analysis and/or Interpretation: ŞZA, ENK; Literature Review: ENK, İG, RE; Article Writing: ŞZA, ENK, İG, RE; Critical Review: ENK.

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The relationship between attitudes and beliefs toward HPV testing and fatalism among university students

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ABSTRACT

Aims: This study examined the relationship between fatalistic beliefs and attitudes toward human papillomavirus (HPV) testing among university students using a cross-sectional design.

Methods: A total of 332 students completed an online questionnaire that included the Attitudes and Beliefs Toward HPV Testing Scale and the Fatalism Tendency Scale.

Results: Although awareness of HPV (82.2%), HPV testing (78.0%), and the HPV vaccine (77.7%) was high, vaccination uptake was low (9.6%). Significant correlations were observed between fatalism and HPV testing attitudes, including positive correlations with Personal Barriers ($r=.28$), Social Norms ($r=.29$), and Anxiety ($r=.14$), and a negative correlation with Trust ($r=-.195$) ($p<.05$). SEM results confirmed these relationships, showing that fatalism increased Personal Barriers ($\beta=.352$), Social Norms ($\beta=.359$), and Anxiety ($\beta=.196$), while reducing Trust in HPV testing ($\beta=-.241$) (all $p<.001$). Model fit indices indicated acceptable fit ($\chi^2/df=2.59$; RMSEA=.075; CFI=.930; NNFI=.920).

Conclusion: These findings highlight fatalism as a significant determinant of HPV testing attitudes among university students, emphasizing the need for fatalism-targeted psychoeducational programs, self-efficacy enhancement, and stigma reduction strategies to reduce fatalistic perceptions and promote HPV-related preventive behaviors.

Keywords: HPV testing, fatalism, health beliefs, nursing students, preventive health behavior

INTRODUCTION

Human papillomavirus (HPV) is a highly prevalent sexually transmitted infection and a leading cause of several cancers later in life (CDC, 2024). HPV infection is associated with malignancies of the cervix, vulva, vagina, anus, rectum, penis and oropharynx, with cervical cancer accounting for more than 90% of HPV-related cancers in women (Ferlay et al., 2020). Effective prevention strategies include HPV vaccination and cervical cancer screening methods such as Pap smear and HPV DNA testing, and awareness of these methods significantly influences participation in screening programs (Mahmoud et al., 2024).

Beyond biomedical factors, HPV prevention and management are strongly shaped by sociocultural determinants. Cultural values, sexual norms, religious beliefs, and social taboos surrounding sexuality can limit access to reliable information and reduce engagement with preventive services, thereby hindering recognition of HPV as a sexually transmitted infection and lowering willingness to participate in vaccination and screening programs (Veeravagu et al., 2025). In addition, participation in cancer screening is influenced by limited knowledge, absence of symptoms leading to

low perceived need, embarrassment, and fear of diagnostic outcomes (Rosario-Ramos et al., 2022).

Fatalism is an important psychological construct influencing preventive health behaviors and refers to the belief that life events and health outcomes are predetermined and beyond individual control (Garrido, 2020). Individuals with stronger fatalistic beliefs tend to perceive cancer as uncontrollable and early detection as ineffective, which increases fear and discourages participation in screening behaviors (Vrinten, Wardle, & Marlow, 2016). Cancer fatalism, defined as the belief that death is inevitable once cancer occurs, has been identified as a significant barrier to cancer screening and the use of diagnostic and treatment services (Powe & Finnie, 2003). It has also been associated with reduced engagement in preventive health behaviors through its effects on knowledge, self-efficacy, and perceived control (Nagler & Hornik, 2012). Overall, fatalistic beliefs may lead to avoidance of preventive practices such as HPV testing and Pap smear screening (Marván & Catillo-López, 2016).

University students aged 18-25 represent a particularly vulnerable group for HPV infection. Risk is increased by

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inconsistent condom use, multiple sexual partners, low HPV vaccination uptake, and limited knowledge (Nkwonta et al., 2020). Living away from family, reduced supervision, and limited access to health services may further increase risky sexual behaviors (Dai et al., 2022). Sociocultural factors such as conservative family structures, education level, and socioeconomic status also shape attitudes toward sexuality, while cultural taboos surrounding sexual health communication may limit awareness and increase perceived risk (Dönmez et al., 2024).

Structural barriers further complicate HPV prevention efforts. In Türkiye, the HPV vaccine is not included in the national immunization program and is generally obtained privately, which limits accessibility and uptake (Akalın, 2022).

In line with WHO's global cancer prevention goals (WHO, 2023), examining sociocultural determinants-particularly fatalistic beliefs-is essential for improving participation in cervical cancer screening programs (Philipson et al., 2023). Addressing fatalism through psychoeducational interventions, enhancing self-efficacy, and reducing stigma may improve engagement in preventive behaviors among young women.

This study is grounded in the Powe Fatalism Model, which defines fatalism as a belief system characterized by inevitability, pessimism, luck, and divine control in relation to disease outcomes (Powe, 1995a). According to this model, individuals who perceive illness as predetermined are less likely to engage in preventive health behaviors, as fatalism reduces perceived control and undermines belief in the effectiveness of early detection. Although originally developed for colorectal cancer screening in older adults (Powe, 1995b), the model has also been applied to HPV-related preventive behaviors among young women (Taskin et al., 2024).

To date, no studies have directly examined the relationship between fatalism and HPV testing attitudes among university students. Considering that high-risk HPV types such as HPV 16 and 18 are responsible for approximately 70% of cervical cancers (Pimple, 2022), and that cervical cancer remains one of the leading causes of cancer-related mortality among women (Ferlay et al., 2020), this gap is important. Therefore, this study aims to examine how fatalistic beliefs shape university students' attitudes and beliefs toward HPV testing.

The present study aimed to address the following research questions:

1. Is there a significant relationship between the fatalism levels of university students and their attitudes and beliefs towards HPV testing?
2. Does the level of fatalism among university students significantly affect their attitudes and beliefs towards HPV testing?
3. Does an increase in fatalism lead to a significant change in attitudes and beliefs towards HPV testing?

METHODS

Ethics

This study was conducted with the approval of the Başkent University Clinical Ethics Committee for Non-interventional

Clinical Researches (Date: 17.04.2025, Decision No: E-91694447-604.01-452759). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Written informed consent was obtained from all individual participants prior to their inclusion in the study.

Settings and Sample

This study was conducted at the Vocational School of Health Services at Başkent University, which offers two-year health-related programs and enrolls a socio-demographically diverse student population, between March 1 and December 1, 2025. Sample size estimation was performed using G*Power 3.1.9.2 based on multiple regression with 22 predictors. An effect size of $f^2=0.09$ (small-to-medium), significance level $\alpha=0.05$, and power $(1-\beta)=.90$ yielded a minimum required sample of 318 participants. A convenient sampling approach was employed because students were accessible via institutional platforms, allowing timely and practical recruitment. Inclusion criteria consisted of (1) being actively enrolled at the institution, (2) voluntary willingness to participate, and (3) ability to read and write in Turkish. Students who submitted incomplete, inconsistent, or erroneous survey responses were excluded from the analysis to ensure data quality and reliability.

Data Collection Procedure

Data collection was conducted online using a self-administered survey distributed via student communication portals and class announcement systems. Participants anonymously accessed the survey link and completed the questionnaire at their convenience. The web-based format was selected to enhance accessibility, minimize social desirability bias in response to sensitive questions regarding sexual behavior and beliefs, and ensure participant comfort and confidentiality. Prior to participation, students were provided with an electronic informed consent form outlining the study objectives, confidentiality measures, expected duration, and the voluntary nature of participation. The survey required approximately 10-12 minutes to complete. No personal identifiers, including name, student ID, IP address, or email address, were collected. All data were automatically recorded in a secure electronic database accessible only to the research team.

Instruments

Socio-demographic form: The socio-demographic form, developed by the researchers and informed by the literature, consisted of 21 items designed to assess demographic, sexual, and health-related characteristics, including age, marital status, income, living arrangements, sexual behavior, and substance use.

Attitudes and Beliefs Toward HPV Testing Scale: Developed by Tatar et al. (2023) and adapted into Turkish by Söğüt et al. (2024), this 20-item scale assesses psychological and social responses to HPV testing across four subscales: personal barriers, social norms, trust, and anxiety. Higher scores indicate more negative attitudes for all subscales except Trust. The Turkish version demonstrated strong internal consistency ($\alpha=0.769-0.892$ in this study; $0.856-0.981$ in the original adaptation), indicating acceptable to excellent reliability.

Fatalism Tendency Scale: Developed by Kaya and Bozkur (2015), this 24-item, 5-point Likert scale assesses fatalistic tendency across four subdimensions: predetermination, personal control, superstition, and chance. Total scores range from 24 to 120, with higher scores indicating greater fatalism. In this study, the mean score was 76.39 ± 11.37 . The scale demonstrated acceptable internal consistency, with Cronbach's alpha coefficients ranging from 0.718 to 0.807 across subdimensions.

Statistical Analysis

Descriptive statistics, reliability analyses, and structural equation modeling (SEM) were conducted. Normality was assessed using skewness and kurtosis (± 2) and supported by Q-Q plots (Demir, 2022). Frequencies, percentages, and descriptive statistics (mean, standard deviation, median, minimum, maximum) were reported for all variables. Internal consistency of the scales was evaluated using Cronbach's alpha.

Confirmatory factor analysis (CFA) was conducted using the DWLS estimation method. Model fit was assessed using χ^2 (Chi-square), degrees of freedom (df), χ^2/df (CMIN/DF), GFI, AGFI, CFI, TLI, NNFI, RMSEA, and SRMR fit indices (Hu& Bentler, 1999; Kline, 2023). Path diagrams for the CFA models were generated in R using the lavaan package (Karch, 2025).

Structural equation modeling was performed using the lavaan package in R (Rosseel, 2012). Graphical representations of the models were produced with the semPlot package (Epskamp & Stuber, 2017), and relationships among variables were visualized using the ggcorrplot package (Kassambara, 2023). Analyses were conducted in R using the lavaan, semPlot, and ggcorrplot packages, with statistical significance set at $p < 0.05$.

RESULTS

A total of 332 university students participated in the study. Descriptive characteristics and sexual health-related variables are presented in Table 1A, 1B. The majority of participants were female (81.6%), lived in a nuclear family structure (80.7%), and reported prior awareness of HPV (82.2%) and HPV testing (78.0). Only 9.6% had received the HPV vaccine.

Table 2 presents the descriptive statistics for the Attitudes and Beliefs About HPV Testing Scale and the Fatalism Tendency Scale. Among the HPV attitude subdimensions, trust had the highest mean score (33.68 ± 6.93), followed by personal barriers (21.72 ± 7.48) and social norms (15.29 ± 5.93). Anxiety scores were comparatively lower (11.64 ± 4.15). Cronbach's alpha coefficients ranged from .718 to .892, indicating acceptable to high internal consistency. For the fatalism subdimensions, Predetermination (24.77 ± 4.79) and Superstitious Beliefs (16.16 ± 4.67) had the highest mean scores. The total fatalism score demonstrated adequate reliability ($\alpha = .791$).

Figure presents the correlations among fatalism subdimensions and attitudes toward HPV testing. Personal Control showed negative associations with several variables, including trust ($r = -.36$) and fatalism tendency ($r = -.40$). Social norms had small positive correlations with predetermination ($r = .21$), fatalism tendency ($r = .29$), superstitious beliefs ($r = .21$), luck ($r = .21$), and personal barriers ($r = .20$). Trust correlated negatively with fatalism tendency ($r = -.12$), superstitious beliefs ($r = -.08$), and luck ($r = -.20$). Fatalism subdimensions

Table 1A. Sociodemographic characteristics of the participants (n=332)

Variables	n (%)
Year of study	
1 st year	197 (59.3)
2 nd year	135 (40.7)
Gender	
Female	271 (81.6)
Male	61 (18.4)
Family type	
Nuclear family	268 (80.7)
Extended family	43 (13.0)
Single-parent / separated family	21 (6.3)
Mother's education level	
Illiterate	3 (0.9)
Literate	9 (2.7)
Primary school	65 (19.6)
Middle school	73 (22.0)
High school	135 (40.7)
College or higher	47 (14.2)
Father's education level	
Literate	3 (0.9)
Primary school	51 (15.4)
Middle school	68 (20.5)
High school	140 (42.2)
College or higher	70 (21.1)
Perceived income status	
Income lower than expenses	33 (9.9)
Income equal to expenses	199 (59.9)
Income higher than expenses	100 (30.1)
Current living arrangement	
Family home	273 (82.2)
Student house	15 (4.5)
Living alone	9 (2.7)
Dormitory	35 (10.5)
Smoking status	
Yes	137 (41.3)
Quit	15 (4.5)
No	180 (54.2)
Alcohol use	
Never	204 (61.4)
Once a month	67 (20.2)
Several times a month	24 (7.2)
Once a week	14 (4.2)
Several times a week	10 (3.0)
Quit	13 (3.9)

demonstrated moderate intercorrelations, particularly between predetermination and fatalism tendency ($r = .77$) and between fatalism tendency and superstitious beliefs ($r = .70$). Personal barriers and anxiety were moderately correlated ($r = .36$).

The structural equation model demonstrated an acceptable overall fit to the data, as indicated by $\chi^2/\text{df} = 2.59$, CFI = 0.93, NNFI = 0.92, and RMSEA = 0.075 (90% CI: 0.071-0.079).

Table 1B. Sociodemographic characteristics of the participants (n=332) (continued)

Variables	n (%)
Use of contraceptive methods during sexual intercourse	
Yes	62 (18.7)
No	270 (81.3)
Awareness of HPV	
Yes	273 (82.2)
No	36 (10.8)
Not sure	23 (6.9)
Awareness of HPV testing	
Yes	259 (78.0)
No	52 (15.7)
Not sure	21 (6.3)
Awareness of HPV vaccine	
Yes	258 (77.7)
No	54 (16.3)
Not sure	20 (6.0)
History of HPV vaccination	
Yes	32 (9.6)
No	300 (90.4)
History of HPV diagnosis	
Yes	3 (0.9)
No	329 (99.1)
History of HPV treatment	
Yes	3 (0.9)
No	329 (99.1)

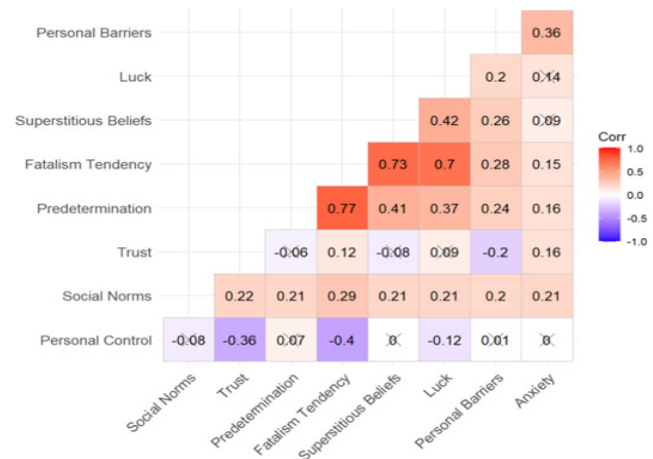
HPV: Human papillomavirus

Table 2. Descriptive statistics for the Attitudes and Beliefs About HPV Testing Scale and the Fatalism Tendency Scale

Variables	Mean±SD	Median (min-max)	Alpha
Personal barriers	21.72±7.48	21 (7-46)	0.769
Social norms	15.29±5.93	16 (4-28)	0.788
Trust	33.68±6.93	35 (6-42)	0.892
Anxiety	11.64±4.15	12 (3-21)	0.779
Predetermination	24.77±4.79	25 (10-38)	0.786
Personal control	12.23±3.80	12 (6-30)	0.807
Superstition	16.16±4.67	16 (6-30)	0.763
Chance	12.03±3.19	12 (4-20)	0.718
Fatalism tendency (total)	76.39±11.37	76 (25-115)	0.791

HPV: Human papillomavirus, SD: Standard deviation, Min: Minimum, Max: Maximum

Although GFI (0.893) and AGFI (0.889) were slightly below the recommended thresholds, they remained within an acceptable range, supporting the adequacy of the model. **Table 3** presents the structural model results examining the effect of fatalism tendency on attitudes and beliefs toward HPV testing. Fatalism was found to have a positive and statistically significant effect on personal barriers ($\beta=0.352$, $B=1.419$, $SE=0.205$, $z=6.935$, $p<0.001$), social norms ($\beta=0.359$, $B=1.856$, $SE=0.270$, $z=6.884$, $p<0.001$), and anxiety ($\beta=0.196$, $B=0.734$, $SE=0.129$, $z=5.676$, $p<0.001$), while it had a negative and significant effect on trust ($\beta=-0.241$, $B=-1.239$, $SE=0.180$, $z=-6.864$, $p<0.001$). These findings indicate that higher levels of fatalism are associated with increased perceived barriers,

**Figure.** Correlations between the Attitudes and Beliefs About HPV Testing Scale and the Fatalism Tendency Scale

HPV: Human papillomavirus

Table 3. Structural model results for the effect of fatalism on attitudes and beliefs toward HPV testing

Dimension	Std. (beta)	Beta	SE	z	p
Personal barriers (PB) ← fatalism tendency	0.352	1.419	0.205	6.935	<0.001
Social norms (SN) ← fatalism tendency	0.359	1.856	0.270	6.884	<0.001
Trust (TR) ← fatalism tendency	-0.241	-1.239	0.180	-6.864	<0.001
Anxiety (AN) ← fatalism tendency	0.196	0.734	0.129	5.676	<0.001

HPV: Human papillomavirus, Std: Standard, SE: Standard error

stronger social normative influences, greater anxiety, and reduced trust regarding HPV testing. The R^2 values of the structural model indicate that 12.4% of the variance in personal barriers, 12.9% in social norms, 5.8% in trust, and 3.8% in anxiety are explained by the model.

DISCUSSION

This study examined the relationship between fatalistic beliefs and university students' attitudes and beliefs toward HPV testing. Although HPV awareness was high-with 82.2% of students reporting familiarity with HPV and 77.7% awareness of the HPV vaccine-only 9.6% had been vaccinated. This marked discrepancy between knowledge and preventive behavior aligns with global evidence indicating persistently low vaccination uptake despite moderate to high awareness levels (Escoffery et al., 2023). This study contributes to the existing literature by examining the role of fatalistic beliefs in shaping attitudes toward HPV testing within a structural equation modeling framework in a Turkish university population, thereby providing context-specific insights into sociocultural determinants of preventive health behaviors.

Contextual factors, including the exclusion of HPV vaccination from national immunization programs, financial barriers, and limited knowledge regarding vaccine safety, may contribute to the development of fatalistic attitudes (Okay et al., 2022; Çınar & Çetin, 2024). In the present study, lower perceived personal control was significantly associated with higher levels of fatalism ($r=0.40$), supporting the notion that fatalism operates through diminished perceived agency and increased perceived barriers.

Although sexual stigma was not directly measured, the findings should be interpreted in light of existing evidence indicating that stigma-along with religious beliefs and social norms-can influence both HPV testing attitudes and fatalistic beliefs (Fujisawa & Hagiwara, 2015). Accordingly, cultural and religious values, as well as prevailing social norms, may play a critical role in shaping health-related perceptions and behaviors.

The findings further suggest that fatalistic beliefs are associated with individuals' cognitive and emotional evaluations of screening procedures. Consistent with this perspective, fatalism was positively associated with personal barriers ($r=0.28$) and anxiety ($r=0.15$). These results are in line with previous studies demonstrating that perceived barriers are strongly linked to cervical cancer screening behaviors (Gutusa & Roets, 2023; Nyaaba & Akurugu, 2023). Personal barriers, including stigma, misconceptions, fear, and discomfort related to examination procedures, appear to be more prevalent among individuals with higher fatalistic tendencies.

Anxiety also emerged as a significant factor influencing HPV testing attitudes. Previous research indicates that uncertainty regarding screening intervals and recommended ages may increase fear and reduce willingness to undergo testing (Tatar et al., 2023). The discomfort reported by participants in relation to changes in screening initiation age may reflect underlying emotional responses that shape attitudes toward HPV testing. These findings underscore the importance of clear, accessible, and student-centered communication strategies to reduce uncertainty and alleviate fear.

The theoretical framework also highlights a social dimension, suggesting that fatalism is associated with normative influences. In this study, significant positive relationships were observed between social norms and fatalism, indicating that individuals with stronger fatalistic beliefs may rely more heavily on family and peer guidance when making decisions about HPV testing. This pattern may be explained by developmental and contextual factors, such as economic dependence and limited sexual health literacy during university years.

Previous research grounded in the Powe Fatalism Model (PFM) has demonstrated that demographic factors-including age, gender, income, and education-are associated with cancer-related knowledge and fatalistic beliefs. Studies have consistently shown that higher levels of fatalism are linked to lower educational attainment, reduced knowledge, and decreased participation in screening programs (Powe, 1995a; Keller et al., 2021; Cohen et al., 2022). These findings highlight the combined influence of psychological and structural determinants on preventive health behaviors.

Within this framework, psychological mechanisms appear to shape attitudes and anxiety related to HPV testing, while social norms influence how these attitudes translate into behavior. Consistent with this model, the present study identified significant associations between fatalism and the personal barriers and social norms subdimensions. Similarly, prior research has indicated that fatalistic beliefs may influence HPV vaccination behaviors through social

normative processes (Taskin et al., 2024), suggesting a potential moderating role of social context.

The Fatalism Tendency Model further supports the role of fatalism in shaping cancer-related attitudes within broader sociocultural and psychological contexts. Evidence suggests that fatalism is associated with screening behaviors, Pap smear intentions, and general health beliefs (Selvi & Kaya, 2022; Güneş & Başkan, 2024). In the present study, significant associations were observed among predetermination, personal control, superstition, and chance dimensions ($p<0.001$), indicating that perceiving life events as predetermined is linked to stronger fatalistic tendencies. This finding is consistent with previous research highlighting the relationship between fatalism and perceived control (Guo et al., 2021).

Among the fatalism dimensions, superstition demonstrated the strongest association with overall fatalism, aligning with evidence that superstitious beliefs may delay healthcare-seeking behavior and increase reliance on non-evidence-based practices (Lord et al., 2012). In this study, the strongest correlations were observed for superstition ($r=0.73$) and chance ($r=0.70$). These findings are consistent with previous research indicating that lower levels of fatalism are associated with greater participation in screening programs (Chen & Kim, 2024; Özen, 2025).

Furthermore, prior studies have shown that fatalistic beliefs are associated with lower HPV vaccine uptake and reduced completion of vaccination schedules (Vanderpool et al., 2015; Taskin et al., 2024), supporting the broader influence of fatalism on preventive health behaviors.

Limitations

A key strength of this study lies in its examination of the mediating role of beliefs about HPV testing in the relationship between fatalistic tendencies and attitudes toward HPV testing among university students using a structural equation modeling framework. In addition, a theory-driven model was employed to explore the potential cognitive, emotional, and social pathways through which fatalistic beliefs are associated with HPV testing attitudes. Several limitations should be acknowledged. First, the cross-sectional design precludes the assessment of temporal relationships among variables, highlighting the need for longitudinal research. Second, data were collected exclusively through web-based questionnaires, which may have introduced response bias and limited participation among individuals with lower digital literacy or restricted internet access.

CONCLUSION

The structural equation model demonstrated satisfactory goodness-of-fit indices, supporting the adequacy of the measurement and structural models. Overall, the findings indicate that fatalism is significantly associated with all subdimensions of attitudes toward HPV testing, suggesting that it operates through interconnected cognitive, emotional, and social pathways.

Taken together, these findings highlight fatalism as an important factor shaping HPV testing attitudes among university students. Interventions targeting fatalistic beliefs-such as psychoeducational programs, strategies to enhance self-efficacy, and stigma reduction approaches-may contribute to

improved engagement in preventive behaviors. Strengthening perceived personal control, addressing misconceptions, and reducing superstition-based interpretations may increase participation in HPV testing and help reduce disparities in preventive health outcomes among young adults.

ETHICAL DECLARATIONS

Ethics Committee Approval

This study was conducted with the approval of the Başkent University Clinical Ethics Committee for Non-interventional Clinical Researches (Date: 17.04.2025, Decision No: E-91694447-604.01-452759).

Informed Consent

Written informed consent was obtained from all individual participants prior to their inclusion in the study. Participants were fully informed about the study's aims, procedures, potential risks and benefits, and their rights-including the right to withdraw at any time without consequence. All participants voluntarily signed a written informed consent form.

Peer Review Process

This manuscript was subject to external peer review.

Conflict of Interest

The authors declare no conflicts of interest related to this study.

Financial Disclosure

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Author Contributions

Designed the Study: HKY, CAT; Collected the Data: HKY, CAT; Analyzed the Data: CAT; Prepared the Manuscript: HKY, CAT; All Authors Approved the Final Version for Submission.

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YouTube as a source of information for mesalazine enema administration: a reliability and quality analysis

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ABSTRACT

Aims: This study aimed to assess the reliability and quality of YouTube videos demonstrating mesalazine enema administration for patients with inflammatory bowel disease.

Methods: A cross-sectional content analysis was conducted on YouTube videos in March 2026 using a standardized search strategy with English keywords. The first 100 most-viewed videos for each keyword were screened. Duplicate videos, irrelevant content, advertisements, videos without audio, videos shorter than 30 seconds, and non-English videos were excluded. Video characteristics, including views, daily viewing rate, age, likes, comments, duration, uploader source, and Video Power Index, were recorded. Reliability and quality were evaluated independently by two researchers using DISCERN and the Global Quality Scale.

Results: A total of 181 videos were identified, of which 10 met the inclusion criteria. The overall DISCERN score was 2.60, indicating low-to-moderate reliability, and the overall GQS score was 3.30, indicating moderate quality. Videos uploaded by healthcare professionals had significantly higher DISCERN and GQS scores than those uploaded by non-healthcare professionals. A strong positive correlation was found between DISCERN and GQS scores. However, popularity-related metrics, including daily viewing rate, likes, comments, and video duration, were not significantly associated with reliability or quality.

Conclusion: YouTube videos on mesalazine enema administration are limited in number and only moderate in educational value. Videos uploaded by healthcare professionals appear more reliable and of higher quality, whereas popularity metrics do not distinguish trustworthy content. Professionally developed, patient-centered, and standardized educational videos are needed to support safe administration and treatment adherence.

Keywords: Enema, inflammatory bowel diseases, mesalazine, patient education, social media

INTRODUCTION

Inflammatory bowel diseases (IBD), primarily including Crohn's disease and ulcerative colitis, are chronic disorders of the gastrointestinal tract characterized by a relapsing-remitting course (Ajani et al., 2025; Mercuri et al., 2025). Systematic analyses based on the Global Burden of Disease (GBD) 2019 data estimate that approximately 4.9 million people worldwide were living with IBD in 2019, with the overall number of cases increasing steadily over time (Wang et al., 2023). Because IBD frequently begins in young adulthood and requires lifelong monitoring and management, its impact on patients' quality of life and healthcare utilization is particularly significant from a clinical perspective (Mercuri et al., 2025). The principal goals of IBD management are to control symptoms, suppress inflammation, achieve sustained remission, and prevent complications. To this end, treatment options encompass a broad range of pharmacological therapies, including 5-aminosalicylic acid (5-ASA), corticosteroids,

immunomodulators, and biologic or other advanced therapies (Raine et al., 2022; Ajani et al., 2025). In mild-to-moderately active ulcerative colitis, 5-ASA agents are recommended in many guidelines as first-line therapies for both induction and maintenance because of their favorable efficacy and safety profiles (Raine et al., 2022). However, the clinical benefit of appropriate pharmacotherapy ultimately depends not only on the prescription itself, but also on the patient's ability to administer the medication at the correct dose, at the correct frequency, and using the correct technique (Mercuri et al., 2025; King et al., 2025).

Mesalazine is among the most commonly used agents in the 5-ASA class, and its rectal formulations may promote clinical improvement in distal or left-sided ulcerative colitis by delivering the drug directly to the site of inflammation (Rothen et al., 2025). Despite their demonstrated clinical effectiveness, rectal 5-ASA therapies remain underutilized in practice

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because of difficulties related to the route of administration, treatment volume, and integration into daily life (Boyle et al., 2015; Rothen et al., 2025). In a prospective study, Boyle et al. (2015) reported that 71% of patients prescribed rectal mesalazine were non-adherent to treatment, with the most frequently cited reasons being the mode of administration and a busy lifestyle. Qualitative evidence further suggests that patients often experience hesitation when initiating rectal therapy, and that difficulties encountered during the first attempts, as well as uncertainties regarding administration technique, are not always adequately addressed by healthcare professionals. These findings indicate that patient-centered demonstration materials, visual supports, and clear communication may represent important intervention targets for improving adherence (Rothen et al., 2025; King et al., 2025).

In IBD, health literacy is closely linked to treatment adherence and self-management. Limited health literacy and digital health literacy may reduce patients' ability to access, interpret, and critically evaluate reliable information, thereby increasing the risk of disparities in both clinical and behavioral outcomes (Mercuri et al., 2025). Supporting this digital context, recent survey data show that patients frequently use the internet as a primary source of health-related information and are generally receptive to digital solutions; however, familiarity with and use of IBD-specific applications remain low, highlighting the need for high-quality, user-friendly digital resources supported by professional guidance (Kretzschmar et al., 2025). In this context, YouTube and similar video-sharing platforms are increasingly used to disseminate clinical educational materials (Topps et al., 2013). Video-based resources may be particularly useful for teaching procedures that require skilled techniques because moving images can support step-by-step demonstration (Jang & Kim, 2014). However, the lack of content verification and limited editorial oversight increase the risk that incomplete, inaccurate, or misleading information may be disseminated through such platforms. As a result, users may be exposed to anecdotal content that does not align with evidence-based standards (Madathil et al., 2015). Given the critical role of correct rectal mesalazine enema administration in treatment adherence and therapeutic effectiveness, the reliability and quality of digital video content designed to teach this technique are of particular importance for patient education (Boyle et al., 2015; Rothen et al., 2025). Although certain aspects of YouTube content related to IBD have previously been examined (Gkikas et al., 2023), evidence regarding videos specifically demonstrating the step-by-step administration of mesalazine enemas remains limited. The present study extends the literature by focusing on a treatment-specific, technique-dependent aspect of care that has direct implications for medication adherence, self-management, and the safe use of rectal therapy.

METHODS

Ethics

The study was conducted in accordance with the relevant ethical principles and publication ethics standards. The names of the individuals or institutions responsible for uploading the videos were not disclosed in the study.

Aims

This study aimed to assess the reliability and quality of YouTube videos demonstrating mesalazine enema administration. The main research question of this study was: What are the reliability and quality characteristics of YouTube videos related to mesalazine enema administration for patients with inflammatory bowel disease?

YouTube Search and Video Characteristics

The YouTube search was conducted in March 2026 using a standardized search procedure. To ensure international content coverage, English keywords were used, and the results for each keyword were sorted by views. Previous studies have reported that approximately 95% of YouTube users do not go beyond the first 50-100 videos listed in the search results and are unlikely to view subsequent content. Therefore, the first 100 most-viewed videos for each keyword were screened. The inclusion and exclusion criteria were designed to identify videos that were directly relevant to patient education on mesalazine enema administration. Therefore, only English-language videos that included audible educational content and specifically addressed mesalazine enema use or administration were included. Duplicate videos were excluded to avoid repeated evaluation of the same content. Advertisements were excluded because their primary purpose was promotional rather than educational. Irrelevant videos were excluded when they did not focus on mesalazine enema administration, and videos shorter than 30 seconds were excluded because they were considered unlikely to provide sufficient procedural or educational information for reliable assessment. To minimize the influence of user history-based effects, the search was performed while logged out and after clearing the viewing history. The search terms used were "Salofalk enema," "mesalazine enema," "mesalamine enema," "how to use mesalazine enema," and "rectal mesalamine." Using this strategy, a total of 181 video records were identified. After excluding duplicates (n=13), irrelevant videos (n=102), videos that did not meet the language criterion (n=42), and short videos (n=14), a total of 10 videos were included in the analysis (Figure).

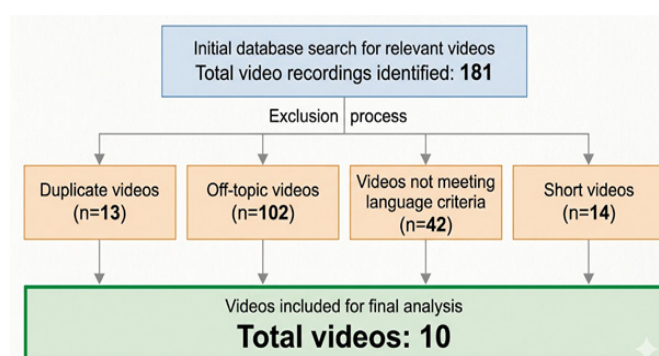


Figure. Flowchart of video selection and inclusion process

Evaluation of Videos

The URLs of the videos were copied and stored in a separate file. The videos were independently assessed by two researchers. The following variables were recorded: number of views, video age (in months from the upload date to March 2026), number of likes, number of dislikes, number of comments,

duration (in seconds), uploader type (healthcare professionals or non-healthcare professionals), Video Power Index (VPI), DISCERN score, and Global Quality Score (GQS).

Evaluation of Video Quality

Video quality was evaluated using the GQS, an instrument developed by Bernard et al. (2007) to assess the quality of video content. This five-point scale includes criteria related to the flow, usability, and overall quality of the video. Scores of 4-5 indicate high quality, 3 indicates moderate quality, and 1-2 indicate low quality (Bang et al., 2024).

Evaluation of Video Reliability

Video reliability was evaluated using DISCERN, a tool originally developed by Charnock and Shepperd (2004) and adapted for video-based content by Singh et al. (2012). The instrument consists of five items, each scored as “yes” (1 point) or “no” (0 points), yielding a total score ranging from 0 to 5. Videos scoring 1 or 2 are considered unreliable and not recommended, those scoring 3 are regarded as moderately reliable and require consultation of additional sources, and those scoring 4 or 5 are accepted as reliable and informative (Dünya et al., 2024).

In addition, video popularity was assessed using the VPI, calculated with the formula: $\text{likes} \times \text{daily viewing rate} / 100$ (Kaya & Sarıkaya Solak, 2022).

Statistical Analysis

SPSS version 27 was used for the analyses. Data normality was assessed using the Shapiro-Wilk test together with kurtosis and skewness values. Continuous variables were summarized as means and standard deviations, whereas categorical variables were presented as numbers and percentages. Agreement between the two independent reviewers was evaluated using intraclass correlation coefficient (ICC) analysis. Statistical significance was set at $p < 0.05$, and results were interpreted within a 95% confidence interval.

RESULTS

A total of 181 videos were screened, and 10 met the inclusion criteria. Overall, the videos demonstrated low-to-moderate reliability and moderate quality, with mean DISCERN and GQS scores of 2.60 and 3.30, respectively. Detailed descriptive characteristics of the videos are presented in Table 1.

When compared by uploader type, videos uploaded by healthcare professionals had significantly higher DISCERN and GQS scores than those uploaded by non-healthcare professionals. In addition, videos from healthcare professionals were significantly older (Table 1).

Correlation analysis showed a strong positive correlation between DISCERN and GQS scores. However, DISCERN and GQS scores were not significantly associated with popularity-related variables such as daily viewing rate, number of likes, number of comments, or video duration. Detailed correlation coefficients are shown in Table 2.

Table 2. Correlation between the scoring systems and some video parameters

	DISCERN	GQS	Viewing rate	Length	Comments	Likes
DISCERN	1					
GQS	$r=0.911$ $p<0.05$					
Viewing rate	$r=-0.256$ $p>0.05$	$r=0.378$ $p>0.05$				
Length	$r=0.142$ $p>0.05$	$r=-0.127$ $p>0.05$	$r=-0.328$ $p>0.05$			
Comments	$r=0.294$ $p>0.05$	$r=0.271$ $p>0.05$	$r=0.856$ $p<0.05$	$r=0.110$ $p>0.05$		
Likes	$r=0.369$ $p>0.05$	$r=0.364$ $p>0.05$	$r=0.870$ $p<0.05$	$r=-0.032$ $p>0.05$	$r=0.850$ $p<0.05$	

GQS: Global Quality Score, r: Pearson correlation, Values presented in bold indicate statistical significance at the $p<0.05$ level

DISCUSSION

This study points to an important gap in procedure-specific digital patient education. The limited number of eligible videos, together with their only modest reliability and quality, suggests that YouTube may be an insufficient source of support for mesalazine enema administration. Given the technique-dependent nature of rectal therapy, this may have implications for correct use and treatment adherence.

These findings are consistent with the broader literature on YouTube-based health information. Recent studies and systematic reviews have shown that patient education content on YouTube is often heterogeneous, unsupervised, and frequently of low or moderate quality. In particular, a 2025 systematic review evaluating surgical patient education videos emphasized that the educational quality of videos varies considerably and the materials available on

Table 1. Comparison of the video data uploaded by healthcare professionals and non-healthcare professionals

	Healthcare professionals (n=5)	Non-health care professionals (n=5)	Total (n=10)	p-value
Views (n), median (range)	229600 (35000-436000)	108249 (164-527000)	168924.5 (164-572000)	>0.05
Viewing rate (daily), median (range)	55.41 (11.98-108.59)	77.37 (1.09-360.95)	66.39 (1.09-360.95)	>0.05
Video age (months), median (range)	156 (86-286)	18.20 (2-48)	87.10 (2-268)	<0.05
Likes (n), median (range)	222.2 (0-513)	373.6 (0-1600)	297.9 (0-1600)	>0.05
Length (seconds), median (range)	348.4 (124-997)	465.6 (156-1107)	407 (124-1107)	>0.05
Comments (n), median (range)	30.6 (4-59)	48.8 (0-157)	39.70 (0-157)	>0.05
DISCERN, mean $\pm$ SD	3.40 (3-5)	1.80 (1-3)	2.60 (1-5)	<0.05
GQS, mean $\pm$ SD	4 (3-5)	2.60 (2-4)	3.30 (2-5)	<0.05
VPI, median (range)	74.11 (0-181.05)	1163.6 (0-5775.20)	618.89 (0-5775.20)	>0.05

GQS: Global Quality Score, VPI: Video Power Index, SD: Standard deviation

the platform cannot be safely accepted as standard patient education resources (Pavuloori et al., 2025). Similarly, cross-sectional analyses conducted in different clinical fields have reported that, despite high view counts, content may remain inadequate in terms of scientific accuracy, comprehensiveness, and reliability (Barlas et al., 2023; Günbaş et al., 2025). In this respect, the findings of the present study reflect not only a weakness specific to mesalazine enema videos, but also a broader structural problem related to digital health information.

One of the most important findings of this study was the significant difference in quality according to uploader type. The significantly higher DISCERN and GQS scores of videos uploaded by healthcare professionals compared with those uploaded by non-healthcare professionals suggest that source credibility is one of the key determinants of online video quality. This finding is largely consistent with previous studies on other health-related topics (Alba et al., 2025; Halici et al., 2025). For example, studies evaluating YouTube videos on inhaler-use skills and insulin administration demonstrated that videos uploaded by physicians, nurses, or institutional healthcare accounts provided more accurate, systematic, and reliable information (Canbolat et al., 2024). Likewise, a study examining YouTube food- and nutrition-related videos for patients with IBD reported that, although videos uploaded by healthcare professionals received less engagement than patient-generated videos, they referred to scientific evidence far more frequently (Gkikas et al., 2024). These findings suggest that uploader type may serve as an important indicator of information reliability in online health content.

Despite the fact that videos uploaded by healthcare professionals were found to be of higher quality and reliability, no significant relationship was identified between popularity indicators and content quality. In the present study, DISCERN and GQS scores were not associated with daily viewing rate, video duration, number of comments, or number of likes. By contrast, engagement variables such as comments, likes, and daily viewing rate were strongly correlated with one another, suggesting that user engagement does not reflect educational quality. Consistent with our findings, studies evaluating YouTube videos in different clinical areas have shown that view counts and engagement metrics do not necessarily parallel content quality, and that videos that are scientifically weaker but more attention-grabbing or simply presented may sometimes gain greater visibility (Alba et al., 2025; Halici et al., 2025). Therefore, for both clinicians and patients, video popularity should not be considered a proxy for content reliability.

In addition to the issues discussed above, it should also be emphasized that small samples can yield unstable correlation estimates and wider uncertainty around the true magnitude of associations, which reduces confidence in the precision of the observed coefficients (Schönbrodt & Perugini, 2013; Hung et al., 2017). Therefore, although the strong positive correlation between DISCERN and GQS is noteworthy, it should be considered preliminary rather than preliminary. Likewise, the absence of statistically significant correlations between popularity-related metrics and quality indicators should not be interpreted as evidence of no association, because non-significant findings in small samples may reflect limited power

rather than the true absence of an effect (Altman & Bland, 1995). For this reason, the descriptive findings of the study, including the overall distribution of video characteristics and score patterns, should be interpreted alongside the inferential results to provide a more balanced presentation of the data.

Limitations

Several limitations of this study should be acknowledged. First, the small final sample size may have affected the statistical analyses by reducing statistical power and increasing the risk of type II error; therefore, true small or moderate associations may not have reached statistical significance (Serdar et al., 2021). For this reason, the non-significant relationships between popularity-related indicators and DISCERN or GQS scores should be interpreted with caution, because absence of statistical significance does not necessarily indicate absence of an effect (Altman & Bland, 1995). In addition, subgroup comparisons and correlation coefficients may be less stable in such a small sample. Second, YouTube is a dynamic platform; because video rankings, view counts, comments, and accessibility may change over time, the findings reflect a cross-sectional snapshot captured at a specific point in time. Third, strict inclusion and exclusion criteria may have influenced the scope and representativeness of the analyzed sample. Although these criteria improved the relevance of the final sample by ensuring that only videos specifically addressing mesalazine enema administration were evaluated, they also narrowed the range of videos included in the analysis. In particular, excluding non-English videos, videos without audio, advertisements, irrelevant videos, and very short videos may have resulted in the omission of some content that patients could still encounter on YouTube. Nevertheless, the fact that only 10 of 181 screened videos met the eligibility criteria is itself an important finding, suggesting that directly relevant and assessable educational videos on mesalazine enema administration are limited. Finally, although validated instruments such as DISCERN and GQS were used, these scales do not directly assess all technical details specific to rectal medication administration. Therefore, future studies should be conducted with larger samples, include videos in multiple languages, and incorporate topic-specific checklists designed to evaluate the accuracy of administration techniques.

CONCLUSION

As a result, this study demonstrates that YouTube videos on mesalazine enema administration are limited in both number and quality; videos uploaded by healthcare professionals are more reliable and of higher quality, whereas popularity-related metrics are insufficient to distinguish trustworthy content. Given the clinical importance of rectal mesalazine in the treatment of ulcerative colitis, there is a clear need for professionally developed, patient-centered, and standardized educational videos. Healthcare professionals should take a more active role in recommending reliable digital resources and in developing procedure-specific video materials to support correct administration and treatment adherence. Likewise, content developers should prioritize evidence-based, clearly structured, and practically demonstrative videos that address the real educational needs of patients.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was conducted in accordance with the relevant ethical principles and publication ethics standards.

Informed Consent

Since this study did not involve human participants, informed consent was not required.

Peer Review Process

This manuscript was subject to external peer review.

Conflict of Interest

The authors declare no conflicts of interest related to this study.

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Author Contributions

Concept: YA, YY; Design: YA, YY; Control: YA, YY; Data Collection and/or Processing: YA, YY; Analysis and/or Interpretation: YA; Literature Review: YA, YY; Article Writing: YA, YY; Critical Review: YA, YY.

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Anxiety and hopelessness levels related to climate change in oncology patients

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ABSTRACT

Aims: Anxiety related to an uncertain and changing natural environment is defined as climate change anxiety. Oncology patients may experience the effects of climate change both directly and indirectly, which can negatively impact their mental well-being. According to Beck's Cognitive Model, persistent exposure to stressors, such as climate change-related disruptions, may lead to negative automatic thoughts, reinforcing feelings of anxiety and hopelessness. This theoretical framework supports the exploration of the relationship between climate change anxiety and hopelessness. This study aimed to examine the relationship between climate change anxiety, conceptualized as a secondary stressor, and hopelessness among patients receiving oncology treatment, as well as to identify sociodemographic and clinical factors associated with hopelessness.

Methods: This descriptive cross-sectional study was conducted with 203 patients undergoing treatment in an oncology clinic. Patients' anxiety regarding climate change and hopelessness levels were assessed using the Beck Hopelessness Scale (BHS) and the Climate Change Anxiety Scale (CCAS). The study was reported in accordance with the STROBE checklist.

Results: Sixty-four percent of the participants were between the ages of 45 and 59, with the majority being women. Climate change anxiety and hopelessness levels were found to be moderate. According to the hierarchical regression analysis, the duration of cancer treatment were significant predictors of hopelessness. Additionally, when climate change anxiety was included in the model, the explanatory power increased. This finding suggests that higher climate anxiety is associated with an increase in hopelessness levels.

Conclusion: The findings indicate that when climate change anxiety is conceptualized as a secondary contextual stressor, it is associated with hopelessness in oncology patients; however, its relative impact remains limited compared to cancer-related factors. These results underscore the importance of considering broader environmental concerns as part of the psychological context influencing emotional well-being in clinical populations.

Keywords: Climate change, oncology patients, hopelessness level, climate anxiety

INTRODUCTION

Climate change encompasses phenomena such as rising global temperatures, sea level rise, and an increase in the frequency of extreme weather events. These changes-including elevated temperatures, droughts, floods, wildfires, and other disasters-negatively impact ecosystems and public health, increasing the risk of numerous diseases, including cardiovascular, respiratory, and cancer-related Conditions (Limaye, 2021; Schiller, 2024). Furthermore, climate change exacerbates the burden on healthcare systems, disrupting medical services and hindering access to critical treatments. Oncology patients, who often require long-term and specialized care, are particularly vulnerable to these disruptions (Schiller, 2024).

The effects of climate change not only contribute to the rise in disease incidence but also interfere with cancer treatment (Schiller 2024). Environmental disasters, extreme weather conditions, and healthcare system breakdowns can delay

or limit access to necessary therapies, thereby intensifying the psychological distress experienced by oncology patients. Research has shown that impeded access to treatment and disrupted communication with healthcare teams due to climate crises and natural disasters can lead to increased anxiety and despair among oncology patients (Ginex et al., 2023; Jemal et al., 2019; Karabulut Gul et al., 2024). In addition, extreme weather events and disasters can result in the destruction of healthcare infrastructure, affecting energy and communication systems and further delaying cancer treatment (Lynch & Merdjanoff, 2023). These challenges amplify feelings of hopelessness among oncology patients, a population already at heightened psychological risk due to the physical and emotional burden of their illness. Cancer itself accounts for approximately 10% of global deaths, and climate-related disruptions in healthcare may exacerbate patient

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suffering, increasing both anxiety and hopelessness (Jemal et al., 2019; Ogunbode et al., 2022).

Recent research highlights the psychological toll of climate change, demonstrating that uncertainty about the future triggers a condition known as climate change anxiety (Jemal et al., 2019). This form of anxiety not only intensifies emotional distress and concerns about environmental issues but may also contribute to a broader sense of hopelessness. According to Beck's Cognitive Model, persistent exposure to stressors, such as climate-related disruptions in healthcare, can foster negative automatic thoughts, reinforcing feelings of anxiety and hopelessness (Beck, 1970). Within this framework, individuals experiencing high levels of climate change anxiety may develop an increased sensitivity to climate-related threats, exacerbating their general anxiety and leading to more pronounced feelings of hopelessness.

Climate change anxiety can be considered a secondary contextual stressor for oncology patients, as it is not directly related to the disease itself but may increase the existing stress burden. In line with Beck's Cognitive Model, environmental and societal uncertainties accompanying primary stressors such as a cancer diagnosis and its treatment may create a basis for the development of negative automatic thoughts. In this context, anxiety related to climate change may influence overall anxiety levels by increasing perceptions of uncertainty about the future and may intensify feelings of hopelessness. However, this effect is considered to be more limited and indirect compared to cancer-related clinical and psychosocial factors (Dickman et al., 2022; Hawaamdah & Fowler, 2023; Karabulut Gul et al., 2024; Samba et al., 2023).

Research Questions

What is the level of climate change anxiety among oncology patients?

What is the level of hopelessness among oncology patients?

Does climate change anxiety affect the level of hopelessness among oncology patients?

METHODS

Ethics

This study was conducted with the approval of the Ethics Committee for Non-interventional Clinical Researches at İzmir Bakırçay University (Date: 10.07.2024, Decision No: 1663). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Written informed consent was obtained from all individual participants prior to their inclusion in the study.

Design

This descriptive cross-sectional study was conducted in the oncology clinic of a hospital between July and October 2024. The study was reported in accordance with the STROBE checklist.

Participants and Setting

The sample size was calculated using an approach for an unknown total population. Using the G*Power program with a 95% confidence level, 5% margin of error, and 11.8% population proportion, the required sample size was

determined to be at least 169 participants. To account for potential sample loss, a 20% additional participant rate recommended in the literature was applied, setting the target sample size at 202 participants (Unvar, 2019).

A total of 250 patients were screened for eligibility. After screening, 20 patients were deemed ineligible, and 27 declined to participate. Ultimately, 203 patients were included in the analysis (Figure).

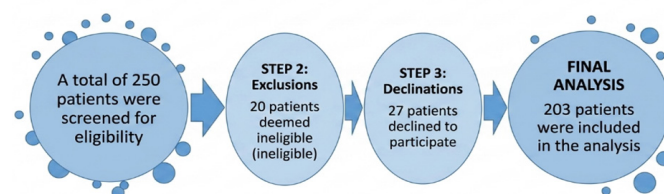


Figure. Flowchart of the study participants

The inclusion criteria were as follows: being hospitalized in the oncology clinic, aged 18 years or older, and possessing sufficient cognitive and language ability to answer the questions.

Instruments

Data were collected from patients selected through convenience sampling. The instruments used included the "Climate Change Anxiety Scale," the "Beck Hopelessness Scale," and a "Patient information form" prepared by the researchers. The data collection process, conducted face-to-face, took approximately 15-20 minutes.

Patient Information Form

Developed by the researchers based on a review of the literature, this form contains questions about demographic characteristics (e.g., gender, age, marital status, presence of children, education level, occupation, employment status, economic status, social security, place of residence, living arrangements) (Yıldırım et al., 2009).

Climate Change Anxiety Scale

Developed by Stewart (2021) to measure climate change anxiety, this scale was adapted into Turkish by Gezer and İlhan (2021). It comprises two subdimensions-Anxiety (items 1, 2, 3, 4, 5, 8, 10) and Helplessness (items 6, 7, 9)-with a total of 10 items rated on a five-point Likert scale ranging from "never" (1) to "always" (5). The Cronbach's alpha coefficients were 0.87 for the Anxiety subdimension, 0.83 for Helplessness, and 0.91 for the overall scale. Scores range from 10 to 50, with higher scores indicating higher levels of climate change anxiety (Gezer & İlhan, 2021).

Beck Hopelessness Scale

This scale, developed by Beck et al. (1971), measures pessimism about the future and consists of 20 items categorized into three subdimensions: Feelings and Expectations about the Future, Loss of Motivation, and Hopelessness. Items are answered as true or false, with total scores ranging from 0 to 20. Higher scores indicate greater hopelessness. Scores are categorized as follows: 0-3 minimal, 4-8 mild, 9-14 moderate, and >15 severe hopelessness.

Statistical Analysis

Data were analyzed using SPSS 22.0. First, the distribution of the scale subdimension and total scores was examined for normality using skewness and kurtosis values, confirming a normal distribution. For hypothesis testing, independent sample t-tests were used to compare two groups, and one-way ANOVA was applied for comparisons among more than two groups. LSD post hoc tests were conducted to identify specific group differences in ANOVA analyses. Pearson correlation analysis was performed to assess relationships between variables.

To examine relationships between the dependent variable (Beck Hopelessness Scale [BHS] score) and independent variables (Climate Change Anxiety Scale [CCAS] score, and demographic characteristics such as age, gender, education, and income), hierarchical regression analysis was conducted. Model fit was evaluated using R^2 and Adjusted R^2 values. A p-value <0.05 was considered statistically significant for all analyses.

The internal consistency of the scales was assessed using Cronbach's alpha coefficient. The Cronbach's alpha values were 0.816 for the CCAS and 0.896 for the BHS, indicating good to excellent reliability.

RESULTS

Participants' Characteristics

The demographic and clinical characteristics of the 203 oncology patients included in the study are presented in [Table 1](#). More than half of the participants (64.0%) were aged between 45 and 59 years, and the majority were female. Most patients were diagnosed with rare cancer types (e.g., pancreatic, biliary, thyroid), with treatment durations generally ranging from 1 to 5 years.

Comparison of CCAS and BHS Scores [Table 2](#) summarizes the comparison of the CCAS and BHS scores based on patients' characteristics.

Climate change anxiety: The analysis revealed significant differences in CCAS scores based on education, occupation, and income levels ($p < 0.05$). University graduates, administrative employees, and patients with income exceeding their expenses demonstrated significantly higher CCAS scores. Furthermore, patients diagnosed with breast cancer or rare cancer types reported higher levels of climate-related helplessness compared to other cancer types.

Hopelessness: Regarding BHS scores, married patients, those with primary education, and patients with a cancer treatment duration of 1-5 years exhibited significantly higher total BHS scores ($p < 0.05$). Patients with head and neck cancer displayed higher levels of hopelessness compared to other diagnosis groups. No significant differences were found between sex and total scale scores ($p > 0.05$).

Descriptive Statistics of the Scales

The descriptive statistics for the scales and their sub-dimensions are presented in [Table 3](#). The mean total score for the CCAS was 19.52 (SD=8.41), while the mean total score

Table 1. Sociodemographic characteristics of patients (n=203)

Variables	Category	Mean±SD (n=203)	
		n	%
Age	15-24	6	3
	25-45	29	14.30
	45-59	130	64
	60 year and above	38	15.80
Gender	Female	103	53.2
	Male	94	46.3
Marital status	Married	173	85.2
	Single	27	13.3
Number of children	0	18	8.9
	1 and 2	142	69.2
	3 and above	43	21.2
	Spouse	89	43.8
Household composition	Child	3	1.5
	Spouse and child	92	39.4
	Parents	3	1.5
	Grandparents	9	4.4
	Alone	13	6.4
	Other	6	3
Education level	Illetrate	5	2.5
	Primary school graduate	21	10.3
	Middle school graduate	65	32
	High school graduate	78	38.4
	University and above	34	16.8
	Husewife	34	16.7
Occupation	Worker	2	1.0
	Civil servant	26	12.8
	Retired	98	48.3
	Other	43	21.2
Health insurance	Yes	182	89.7
	No	21	10.3
Economic status	Income less than expenses	16	7.9
	Income equal to expenses	122	60.1
	Income more than expenses	65	32
Cancer type	Breast cancer	21	16.5
	Lung cancer	13	9.4
	Colon cancer	6	4.7
	Prostate cancer	20	15.7
	Liver	7	4.7
	Rare (pancreas, gallbladder, thyroid)	21	29.9
	Head and neck cancer	2	1
	Skin	10	4.9
	female reproductive system	9	4.4
	Other	8	3.9
Cancer treatment duration	6 month-1 year	45	22.2
	1-5 year	115	74.4
	6-10 year	7	3.5

SD: Standard deviation

Table 2. Comparison of sociodemographic characteristics of patients and CCAS and BHS total score means - relationship analysis

	CCAS-total score	CCAS subscale of-helplessness	CCAS subscale of anxiety	BHS total score	BHS subscale of motivation	BHS subscale of-anxiety about the future	BHS subscale of hopelessness
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Age							
15-24	20±0.	7 ± 6.7	12±3.3	7±5.	2±8.33	2±1.66	2±5.
25-45	22±2.41	7± 5.2	14±9.3	10±3.10	3±5.86	3±1.37	3±4.82
45-59	17 ± 8.76	6±1.5	11±7.2	9±5.84	3±6.07	2±9.46	3±0.61
60-74	21 ± 8.43	7±1.6	14±6.9	12±4.68	4±3.75	4±1.87	3±8.75
75-89	16 ± 6.66	6±0.0	10±6.7	11±4.5	3±4.66	3±4.83	4±0.
F/p	2.785/ .028	1.500 / .204	3.446 / .010	3.838/0.05	1.472 /0.212	6.529 / .000	2.112 / .081
Gender							
Female	19±7.	6±6.8	13±0.9	10±4.8	3±7.96	3±3.88	3±3.51
Male	18±4.	6±3.7	12±0.6	9±7.	3±5.85	2±9.04	3±1.48
t/p	1.075/0.286	.632/0.53	1.075/0.201	1.290/ .201	6.472 / .012	1.912/ .168	.001/ .970
Marital status							
Married	19±1.9	6±7.8	12±6.	10±6.2	3±9.19	3±3.17	3±3.87
Single	19±8.1	6±7.	13±1.1	7±5.9	2±4.81	2±4.44	2±6.66
t/p	-.358/0.721	-.170/0.865	-.400/0.690	3.525/0.01	.000/ .988	1.826 / .178	.251 / .617
Number of children							
0	19±4.44	6±8.3	12±6.1	8±7.77	2±8.88	2±5.55	3±3.33
1	18±2.07	6±1.9	12±0.5	9±6.36	3±5.06	3±0.2	3±0.64
2	20±1.84	6±7.5	13±4.8	10±6.	3±8.30	3±4.	3±4.61
3	19±4.51	6±8.4	12±6.1	10±8.06	4±2.58	3±1.2	3±3.22
4	18±4.16	6±5	11±9.2	11±1.66	4±0.83	3±9.16	3±1.66
F/p	.521/ .721	.352/ .842	.610/ .656	1.272/ .282	1.969/ .101	2.319 / .058	.474 / .755
	CCAS-total score	CCAS subscale of helplessness	CCAS subscale of anxiety	BHS total score	BHS subscale of motivation	BHS-subscale of -anxiety about the future	BHS-subscale of hopelessness
Household composition	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Spouse	17±7.4	6±1.2	11±6.4	10±4.94	3±8.20	3±3.25	3±3.03
Child	24±0	10±0	14±0	9±0	2±0	3±0	4±0
Spouse and child	20±7.5	7±0.9	13±7.4	10±5.5	3±8.62	3±2.62	3±4.87
Parents	20±6.67	5±0	15±6.7	6±3.33	1±6.66	2±3.33	2±3.33
Grandparents	19±3.33	6±7.8	12±5.6	9	3±8.88	2±8.88	2±2.22
Alone	14±5.38	4±8.5	9±6.9	8±3.84	3±3.84	2±2.30	2±6.92
Other	25	8	17	7±3.33	2±1.66	2±6.66	2±5.
F/p	2.287/ .037	1.976/ .071	2.424/ .028	1.576/ .156	1.953/ .074	1.544/ .166	1.420/ .209
Education level							
Illiterate	16±6	5±2.	11±4.	12±2.	4±8.	4±4.	3±0
Primary school graduate	17±2.38	6±0	11±2.4	12±3.81	4±2.38	4±0.47	4±0.47
Middle school graduate	16±9.07	5±5.4	11±3.7	8±9.23	3±3.23	2±8.15	2±7.53
High school graduate	18±7.62	6±5.9	12±1.8	10±0.64	3±8.59	3±0.64	3±2.17
Universty	25±8.78	8±8.2	17±2.4	11	3±6.36	3±3.93	3±8.78
Universty and above	26	12±0	14	9	2	3	4
F/p	6.365 .000*	5.410/ .000*	6.157/ .000*	2.831 / .017	1.514 / .187	3.569/ .004*	2.955 / .014*
Occupation							
Housewife	16±7.94	5±7.1	11±0.9	10±5.29	3±7.05	3±7.64	3±3.52
Civil servant	23±8.84	8±2.	15±6.9	10±4.61	3±5.38	3±2.69	3±4.23
Retired	18±5.20	6±3.	12±2.4	10±3.46	3±8.57	3±1.53	3±3.06
Worker	27±0.	9±5.	17±5.	13±5	5±5.	5±0.	3±0.

(table continues)

Table 2. Comparison of sociodemographic characteristics of patients and CCAS and BHS total score means - relationship analysis (table continues)

Other	19±2.32	6±6	12±6.7	9±0.	3±37.21	2±6.0.47	3±0.
F/p	3.460/.009*	2.596/.038*	3.158/.015*	1.236/.297	1.007/.405	4.241/.003*	.340/.851
	CCAS-total score	CCAS subscale of helplessness	CCAS subscale of anxiety	BHS total score	BHS subscale of motivation	BHS-anxiety about the future	BHS subscale of hopelessness
Health insurance	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Yes	21±8.5	7±9.0	13±9.5	11±7.5	4±3.0	3±6.5	3±8.0
No	18±8.8	6±4.0	12±5.2	9±9.3	3.62±4	3±1.09	3±0.33
t/p	1.499/0.355	1.887/0.308	1.73/0.91	1.801/0.488	3.531/.062	.431/.512	2.132/.146
Economic status							
Income more than expenses	25±1.25	8±3.80	16±7.50	10±2.04	4±0.	2±5	3±2.5.
Income equal to expenses	18±4.50	6±3.8	12±1.20	10±2.04	3±5.73	3±2.86	3±3.85
Income less than expenses	19	6±4.2	12±5.8	10±0.92	3±8.76	3±1.23	3±0.30
F/p	4.628/0.011*	2.555/0.080	4.933/0.008*	0.064/0.938	.766/.466	2.215/.112	.866/.422
Cancer type							
Breast cancer	21±0.	6±5.1	12±8.5	9±4.5	3±4.09	3±1.14	3±0.65
Lung ca	13±0.	5±2.6	11±7.	10±5.6	3±7.82	3±2.17	3±4.34
Colon ca	6±0.	6±8.	13±4.	10±6.	3±8.	3±4	3±4
Prostate cancer	20± 0.	4±6.1	10±7.2	7±05.	2±3.88	2±1.66	2±3.33
Liver	7±0.	4±1.4	9±0.29	8±0.	2±8.57	2±5.71	2±5.71
Rare (pancreas, bile, triod)	21±0.	8±0.7	13±0.82	11±5.8	4±3.81	3±4.72	3±6.90
Head and neck cancer	2±0.	1±0.	21±0.	16±0.	5±0.	5±0.	6±0.
Skin cancer	10±0.	4±9.	10±4.	8±0.	3±2	2±4.	2±5
female reproductive system	9±0.	4±4.	13±7.8	11±7.7	4±2.22	3±8.89	3±6.66
Other	8±0.	3±9.	11±2.5	11±6.2	4±3.7.5	3±6.25	3±6.25
F/p	2.395 /0.014*	3.387/0 .001*	1.676/0 .097	3.367/0 .001*	2.670/ .006*	2.632 /.007*	2.106 .031*
Cancer treatment duration							
6 month-1 year	16±3.7	5±4.7	10±9.1	7±4.4	2±4.44	2±1.56	2±7.11
1-5 year	19±7.9	6±7.4	13±0.6	10±7.3	3±8.7.5	3±5.	3±4.86
6-10 year	20±0.	6±9.3	13±1.4	11±0.	4.1519	3±3.6.71	3±2.91
F/p	2.323/0.76	2.160/0.94	1.98/0.118	8.727/0.00*	8.189 /.000*	9.143/ .000*	1.886/ .114

F-one- way Anova test; * p<0.05 t-Independent samples t-test result, CCAS: Climate Change Anxiety Scale, BHS: Beck Hopelessness Scale SD: Standard deviation

Table 3. Climate change anxiety scale and beck hopelessness scale score averages of patients

	n	Min	Max	Mean	SD
CCAS subscale of helplessness	203	3	16	6±5.5	3.398
CCAS subscale of anxiety	203	6	30	12±6.4	5.649
CCAS total score	203	9	42	19±1.52	8.4127
BHS subscale of motivation	203	0	8	3±7.04	1.87778
BHS subscale of future hopelessness	203	1	5	3±1.72	1.43328
BHS subscale of anxiety about the future	203	0	7	3±2.61	1.75359
BHS total score	203	3	20	10±1.37	4.28914

Min: Minimum, Max: Maximum, SD: Standard deviation, CCAS: Climate Change Anxiety Scale, BHS: Beck Hopelessness Scale

for the BHS was 10.37 (SD=4.29). These findings provide a baseline for the psychological burden of climate anxiety and hopelessness in the study population.

Relationship Between Climate Change Anxiety and Hopelessness

Pearson correlation analysis was performed to examine the relationship between the scales. As shown in [Table 4](#), a moderate, positive, and statistically significant correlation was found between the CCAS total score and the BHS total score ($r=0.43$, $p<0.001$). This finding indicates that higher

Table 4. Relationship of scale scores to each other

		CCAS total score	BHS total score
CCAS total score	Pearson correlation	1	.431**
	Sig. (2-tailed)		0
	n	203	203
BHS total score	Pearson correlation	.431**	1
	Sig. (2-tailed)	0	
	n	203	203

** Correlation is significant at the 0.01 level (2-tailed). Pearson Correlation Coefficient, *: $p<0.05$ CCAS: Climate Change Anxiety Scale, Sig: Significance, BHS: Beck Hopelessness Scale

levels of climate change anxiety are associated with increased levels of hopelessness among oncology patients.

Factors influencing hopelessness: Hierarchical Regression Analysis a hierarchical regression analysis was conducted to identify the significant predictors of hopelessness (Table 5). Following the reviewers' recommendation to simplify the model, only variables that showed significance in the univariate analysis were included. In model 1, cancer treatment duration was entered, explaining 8.0% of the variance ($R^2=0.08$, $p<0.05$). In model 2, the CCAS total score was added to the model. The explanatory power of the model increased significantly to 27.0% ($R^2=0.27$, $\Delta R^2=0.19$, $F=7.69$, $p<0.001$). In the final model, both treatment duration ($B=0.74$, $p=0.009$) and total CCAS score ($B=0.21$, $p<0.001$) were identified as significant independent predictors of hopelessness. These results suggest that climate change anxiety significantly contributes to the psychological state of hopelessness, even when clinical factors are controlled.

DISCUSSION

Recent studies on climate change have largely overlooked its effects on feelings of hopelessness and anxiety in cancer patients. This study reveals a significant relationship between oncology patients' concerns about climate change and their levels of hopelessness. In this study, the average score on the CCAS for cancer patients was found to be 19.52 (SD=8.41), indicating a significant level of anxiety regarding climate change.

The research was conducted in İzmir, Türkiye's third-largest city, which has been characterized by increasing temperatures, forest fires, and more severe weather events in recent years, typical of the Mediterranean climate (Ercanlı & Savaşır, 2022). Major environmental events such as the large forest fires and heatwaves in İzmir in 2021 are likely to have exacerbated climate change anxiety, especially among cancer patients.

The study found that individuals with higher levels of education exhibited greater concern about climate change.

The literature similarly suggests that individuals with higher education and economic well-being are more environmentally conscious, which consequently leads to heightened climate change anxiety (Bouman et al., 2020; Meyer, 2015). Poortinga et al. (2019) have presented findings indicating that an increase in knowledge about climate change among highly educated individuals raises environmental anxiety (Poortinga et al., 2019). Moreover, Meyer (2015) emphasizes that the environmental awareness of educated individuals directly affects their anxiety levels, with increased awareness leading to higher anxiety (Meyer, 2015).

Consistent with education levels, individuals with better economic status also exhibited higher levels of climate change anxiety. This phenomenon is associated with the tendency of economically well-off individuals to be better informed about environmental issues and to consider the potential future effects in greater depth (Bouman et al., 2020). Hoekstra et al. (2024) identified social status as a contributing factor in their study on why education causes significant differences in attitudes toward climate change (Hoekstra et al., 2024). Findings showing that economic well-being increases individuals' environmental anxiety support this notion (Bouman et al., 2020; Ronen & Kerret, 2020). Economically stronger individuals may be more capable of assessing the long-term impacts of climate change, which could lead to increased anxiety.

Our study found that individuals with breast cancer and rare cancer types exhibited higher levels of climate change anxiety. Research indicates that cancer patients develop increased sensitivity to environmental issues (Ronen & Kerret, 2020). This sensitivity, when combined with uncertainties about their health and the potential impacts of climate change, can elevate anxiety levels. Extreme temperatures caused by climate change, such as heatwaves or cold weather conditions, may negatively affect cancer patients' immune systems and thermoregulation functions, worsening their condition. For example, a recent randomized controlled trial examining the effects of environmental temperature on breast cancer survival outcomes in mice demonstrated that exposure to

Table 5. Regression analysis on factors affecting the level of hopelessness

95% CI							
Model _p	B	β	t	p	Adjust R ²	Lower bound	Upper bound
F=7.691							
Constant	7.287		2.543	0.012	0.267	1.635	12.938
CCAS total score	0.214	0.419	6.053	0	0.267	0.144	0.283
Age	0.416	0.071	0.950	0.343		-0.448	1.281
Gender	-1.000	-0.119	-1.729	0.085		-2.141	0.141
Educatiyon	-0.281	-0.064	-0.780	0.436		-0.993	0.430
Marital status	-1.405	-0.120	-1.632	0.104		-3.102	0.293
Number of children	0.025	-0.006	-0.082	0.935		-0.627	0.577
Household composition	-0.202	-0.092	-1.307	0.193		-0.506	0.103
Occupation	-0.085	-0.026	-0.376	0.707		-0.534	0.363
Economic status	0.057	0.008	0.106	0.916		-1.007	1.121
Health insurance	-0.011	-0.001	-0.011	0.991		-1.924	1.902
Cancer type	0.052	0.037	0.571	0.568			
Cancer treatment duration	0.874	0.194	2.821	0.005		0.263	1.486
CI: Confidence interval, CCAS: Climate Change Anxiety Scale, Adjust R2, coefficient of determination; B, unstandardised coefficients							

CI: Confidence interval, CCAS: Climate Change Anxiety Scale, Adjust R², coefficient of determination; B, unstandardised coefficients

cold, non-thermoneutral temperatures was associated with higher tumor growth rates and an immunosuppressive tumor microenvironment compared to thermoneutral Conditions (Nogueira et al. 2023). Additionally, Nogueira (2023) highlights that some chemotherapy drugs exert pressure on the thermoregulation system, making cancer patients more vulnerable to heatwaves (Nogueira, 2023). In this context, considering that anti-estrogen treatments used in breast cancer may cause vasomotor symptoms such as hot flashes, the high levels of climate change anxiety observed in this patient group are understandable (Gupta et al., 2024).

Another significant finding of our study was the total BHS score of 10.37 (SD=4.29), which indicates a moderate level of hopelessness. Similar levels of hopelessness have been observed in the literature, although some studies have reported lower hopelessness scores in cancer patients. Mystakidou et al. (2007, 2008) reported higher levels of hopelessness (7.7±5.9) in cancer patients treated at a palliative care center in Greece (Mystakidou et al., 2008). In contrast, Yıldırım et al., in their study on Turkish cancer patients, reported a BHS score of 5.20±4.39 (Yıldırım et al., 2009). These comparisons suggest that cultural, social, and health-related differences may contribute to variations in hopelessness levels among cancer patients.

Hierarchical regression analysis in our study revealed a significant relationship between treatment duration and hopelessness. The prolonged treatment processes of cancer patients can strain psychological resilience due to physical fatigue, treatment-related side effects, and uncertainty. Literature reports that as the duration of illness increases, patients' anxiety levels rise, and their expectations for the future decrease (IBrintzemhofe-Szoc et al., 2009; Izci et al., 2018; Rustøen & Wiklund, 2000). Furthermore, our analysis demonstrated a significant and positive relationship between hopelessness and climate change anxiety. The results of the hierarchical regression showed that adding climate change anxiety to the model significantly increased the explanatory power ($\Delta R^2=0.19$) and significantly impacted hopelessness levels. This suggests that climate change anxiety is a critical factor influencing the psychological state of oncology patients.

The higher scores observed in head and neck cancer patients on the subscales of "future expectations" and "loss of motivation" also support this finding. Jones et al. (2003) highlighted that as disease duration extends, the severity of physical and psychological symptoms increases, leading to higher levels of hopelessness (Scharloo et al., 2005).

The findings of our study indicate a significant and positive relationship between hopelessness levels and climate change anxiety. Hierarchical regression analysis results showed that adding climate change anxiety to the model increased explanatory power and significantly impacted hopelessness. This finding suggests that climate change anxiety is a critical factor influencing hopelessness levels in oncology patients and significantly affects their psychological state.

These results support previous studies in the literature and highlight the impact of environmental concerns on the psychological state of cancer patients (Hiyatt et al., 2020). The literature indicates that the health impacts of climate change on cancer patients extend beyond disruptions in

care access and represent a significant concern (Hiyatt et al., 2020). Individuals diagnosed with cancer are considered more vulnerable to health hazards associated with climate change due to the physical, psychological, and socioeconomic challenges of their treatment processes (Kiraz, 2019). Hopelessness is a critical factor that affects individuals' ability to cope with challenges and uncertainties (Yıldırım et al., 2009). In this context, it has been observed that individuals with high levels of hopelessness develop greater sensitivity to environmental issues, particularly climate change, as their concerns about the future increase (Öztürk et al., 2022). Fritze et al. (2008) noted that climate change anxiety contributes to the psychological burden of individuals, emphasizing the necessity for tailored interventions to address these concerns (Fritze et al., 2008).

Additionally, Hayes et al. (2018) emphasized in their study that increased environmental concerns can have direct or indirect adverse effects on individuals' mental health (Hayes et al., 2018).

Our analysis suggests that climate change anxiety is significantly associated with hopelessness, contributing incremental explanatory value beyond primary clinical stressors. Rather than indicating a direct causal effect, this association may reflect the role of climate-related concerns as a secondary contextual stressor influencing future-oriented cognitions in oncology patients. In line with this interpretation, Bednarek (2020) conceptualizes climate anxiety not as a pathological condition requiring treatment, but as an expression of heightened awareness of environmental threats. Within the present clinical context, such awareness may coexist with adaptive cognitive engagement, rather than constituting a dominant source of psychological distress when compared to cancer-related stressors (Bednarek, 2019).

This study highlights the need for developing psychosocial support interventions for oncology patients. According to Beck's Cognitive Model, ongoing stressors like climate change concerns can exacerbate anxiety and hopelessness. The data from the CCAS provide valuable evidence for understanding the strong link between environmental concerns and hopelessness. Developing interventions that address both the emotional burden of climate change and the specific psychological needs of oncology patients is crucial in mitigating these effects.

Limitations

One of the strengths of this study is its unique approach, as it is the only research to examine in detail and from multiple perspectives the relationship between climate change anxiety and hopelessness in oncology patients. Analyses based on various demographic characteristics contribute to a better understanding of the effects of climate change on individuals' mental health. Furthermore, conducting the study on a large sample and using reliable measurement tools enhance the validity of the findings.

The study's limitation lies in its confinement to patients in an oncology clinic, which may restrict the generalizability of the findings. The research was conducted in a region with a Mediterranean climate; therefore, the results are specific to this region and may not be generalizable to other cities with different geographical and climatic conditions.

For future studies, longitudinal research tracking the long-term psychological effects of climate change anxiety is recommended.

CONCLUSION

This study found that oncology patients reported moderate levels of both climate change anxiety and hopelessness, with a statistically significant association between these variables. Higher levels of climate change anxiety were accompanied by higher levels of hopelessness; however, this relationship should be interpreted within the context of cancer-related stressors as the primary psychological burden.

The findings suggest that climate change may constitute a secondary, contextual psychological stressor that contributes to the broader emotional landscape of patients undergoing cancer treatment, rather than acting as a direct determinant of hopelessness. In this sense, climate-related concerns may influence future-oriented cognitions alongside clinical and sociodemographic factors.

Recognizing environmental concerns as part of the psychosocial context of oncology care may help clinicians better understand patients' emotional experiences. Integrating awareness of such background stressors into supportive care approaches may contribute to a more comprehensive assessment of psychological well-being and quality of life among oncology patients.

ETHICAL DECLARATIONS

Ethics Committee Approval

This study was conducted with the approval of the Ethics Committee for Non-interventional Clinical Researches at İzmir Bakırçay University (Date: 10.07.2024, Decision No: 1663).

Informed Consent

Written informed consent was obtained from all individual participants prior to their inclusion in the study. Participants were fully informed about the study's aims, procedures, potential risks and benefits, and their rights-including the right to withdraw at any time without consequence. All participants voluntarily signed a written informed consent form.

Peer Review Process

This manuscript was subject to external peer review.

Conflict of Interest

The authors declare no conflicts of interest related to this study.

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Author Contributions

Concept: DAU, ŞÖ, YY; Design: YY, FŞA; Control: YY, FŞA; Data Collection and/or Processing: DAU, ŞÖ, YY; Analysis and/or Interpretation: DAU, ŞÖ, YY; Literature Review: YY, FŞA; Article Writing: DAU, ŞÖ, YY; Critical Review: All Authors

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