



# Evaluation of Anxiety Status of Patients with “Low Grade Smear” as A Result of Cervical Smear

## Servikal Smear Sonucu “Düşük Dereceli Smear” Olan Hastaların Anksiyete Durumlarının Değerlendirilmesi

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### ABSTRACT

**Objective:** To evaluate anxiety levels in patients with abnormal Pap smear results. Upon identifying a significant increase in anxiety levels, the researchers seek to adopt a holistic approach to women’s health by proposing strategies to mitigate psychosocial impacts and outlining potential preventive measures.

**Methods:** The study protocol complied with the ethical standards outlined in the 1964 Declaration of Helsinki and was approved by the Clinical Research Ethics Committee of University of Health Sciences Türkiye, İstanbul Kanuni Sultan Süleyman Training and Research Hospital (approval no: KAEK/2018.6.16, date: 30.07.2018). After obtaining ethics committee approval, patients who met the predefined inclusion and exclusion criteria and provided informed consent were consecutively enrolled in the study groups until the target sample size was reached. This prospective study included 94 outpatients in the research group with atypical squamous cells of undetermined significance (ASC-US) or low-grade squamous intraepithelial lesion (LSIL) Pap smear results. The control group consisted of 94 outpatients who were seen at the gynecology clinic of our hospital and had negative Pap smear results. After their physicians informed them of their test results, patients were provided with information about the study and asked to give informed consent. They were then asked to complete a semi-structured interview form, the state-trait anxiety inventory, and the health anxiety inventory.

**Results:** Family history of cancer, current medical conditions, single or divorced marital status, and higher educational level were identified as factors associated with increased anxiety levels. Anxiety levels were significantly higher among patients with ASC-US and LSIL results than those in the control group.

**Conclusion:** Although the probability of cervical cancer among patients with low-grade smear results is extremely low (approximately 1-2 per 1,000), this group exhibited a significant increase in anxiety levels. This appears to be related to patients misinterpreting their results and lacking adequate knowledge of cervical cancer. However, anxiety levels can be reduced if healthcare professionals provide patients with clearer, more detailed, and more comprehensible information. While the primary goal of screening tests is the early detection and prevention of cervical cancer, it is equally important to preserve patients’ mental well-being and to adopt a more holistic approach to healthcare.

**Keywords:** Pap smear test, anxiety, cervical cancer

### ÖZ

**Amaç:** Çalışmamızın amacı, smear testi sonucu düşük dereceli smear gelen hastaların anksiyete düzeylerini değerlendirmektir. Anksiyete düzeylerinde anlamlı bir artış saptandığında, kadın sağlığına bütüncül bir yaklaşımla bu durumun olası psiko-sosyal etkilerini önlemeye yönelik çözümler üretmeyi ve alınabilecek önlemleri ortaya koymayı amaçlamaktayız.

**Gereç ve Yöntem:** Çalışma protokolü, 1964 Helsinki Bildirgesi’nde belirtilen etik ilkelerle uyumludur ve Sağlık Bilimleri Üniversitesi, İstanbul Kanuni Sultan Süleyman Eğitim ve Araştırma Hastanesi Klinik Araştırmalar Etik Kurulu tarafından onaylanmıştır (karar no: KAEK/2018.6.16, tarih: 30.07.2018). Etik kurul onayı alındıktan sonra, önceden tanımlanmış dahil etme ve dışlama kriterlerini karşılayan ve bilgilendirilmiş onam veren hastalar, hedeflenen örneklem büyüklüğüne ulaşılan kadar ardışık olarak çalışmaya dahil edilmiştir. Bu prospektif olarak tasarlanmış çalışmanın

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araştırma grubuna, Pap smear testi sonucu önemi belirsiz atipik skuamöz hücreler (ASC-US) ve düşük dereceli skuamöz intraepitelyal lezyon (LGSIL) gelen 94 ayaktan hasta dahil edilmiştir. Kontrol grubunu ise, hastanemiz kadın hastalıkları polikliniğine başvuran ve Pap smear sonucu negatif olan 94 ayaktan hasta oluşturmuştur. Hekimler hastalara Pap smear sonuçlarını açıkladıktan sonra çalışmanın amacı hakkında bilgi vermiş ve bilgilendirilmiş onam almıştır. Tüm hastalardan yan yapılandırılmış görüşme formu, durumluk-sürekli kaygı envanteri ve sağlık anksiyetesi envanterini doldurmaları istenmiştir.

**Bulgular:** Ailede kanser öyküsü olması, mevcut bir hastalığın bulunması, medeni durumun bekar ya da boşanmış olması ve yüksek eğitim düzeyi gibi faktörler, anksiyete düzeyini artıran risk faktörleri olarak belirlenmiştir. ASC-US ve LGSIL grubundaki hastaların anksiyete düzeyleri anlamlı derecede daha yüksek bulunmuştur.

**Sonuç:** Düşük dereceli smear sonucu saptanan hastalarda serviks kanseri görülme olasılığı binde 1-2 gibi oldukça düşük oranlarda olmasına rağmen, bu hasta grubunda anksiyete düzeylerinde anlamlı bir artış gözlemlenmiştir. Bu durumun, hastaların sonuçları yanlış algılaması ve servikal kanser hakkında yeterli bilgiye sahip olmamasıyla ilişkili olduğu düşünülmektedir. Ancak, hastaların hekim tarafından daha açık, anlaşılır ve detaylı bir şekilde bilgilendirilmesi durumunda bu anksiyete düzeylerinin azaltılabileceği açıktır. Serviks kanserinin erken teşhisi için tarama testlerinin yaygınlaştırılması hedeflenirken, hastaların ruh sağlığının olumsuz etkilenmemesi de göz önünde bulundurulmalı ve insan sağlığına bütüncül bir yaklaşım benimsenmelidir.

**Anahtar Kelimeler:** Pap smear testi, anksiyete, serviks kanseri

## INTRODUCTION

Cervical cancer ranks fourth in both incidence and mortality among cancers affecting women, following breast, lung, and colorectal cancers. Globally, approximately 500,000 new cases are diagnosed each year, and more than 250,000 women die from cervical cancer annually (1).

Anxiety is a state of fear, distress, tension, and uneasiness experienced in response to a perceived threat. Anxiety disorders are twice as common in women as in men, and their prevalence in the general population is estimated at 4-6% (2,3).

Several studies have reported that patients diagnosed with epithelial cell abnormalities during cervical cancer screening experience significantly increased anxiety levels, along with negative impacts on their quality of life and social functioning (4-6).

In this study, we evaluated the anxiety levels of patients with low-grade dyskaryotic cervical smear results [atypical squamous cells of undetermined significance (ASC-US) and low-grade squamous intraepithelial lesion (LSIL)] using validated anxiety-assessment tools after they were informed of the results by their physician. The aim was to compare anxiety levels between patients with abnormal cervical cytology results and those with normal cytology findings.

## METHODS

The study protocol complied with the ethical standards outlined in the 1964 Declaration of Helsinki and was approved by the Clinical Research Ethics Committee of University of Health Sciences Türkiye, İstanbul Kanuni Sultan Süleyman Training and Research Hospital (approval no: KAEK/2018.6.16, date: 30.07.2018). After obtaining approval from the ethics committee, patients who met the inclusion and exclusion criteria and provided informed consent were consecutively enrolled in the study groups until the target sample size was reached.

Patients who presented to our clinic and whose Pap smears showed ASC-US or LSIL were assigned to the patient group (n=94), while those with normal Pap smear results constituted the control group (n=94). Informed consent was obtained from all participants.

Patients were excluded from the study if they had a history of abnormal smear test results, isolated human papillomavirus (HPV) positivity, atypical squamous cells-cannot exclude high-grade squamous intraepithelial lesion, atypical glandular cells, or high-grade squamous intraepithelial lesions smear results, were informed about their results by someone other than a physician (e.g., a nurse, other healthcare personnel, or via phone), or had a history of any malignancy.

Three tools were used for data collection: a semi-structured interview form, the State-Trait Anxiety Inventory (STAI), and the health anxiety inventory.

The semi-structured interview form was used to assess the patients' anamnesis, sociodemographic and cultural characteristics, other background information, and factors that might influence their anxiety levels.

The STAI consists of two distinct subscales, each containing 20 items, for a total of 40 items. The state anxiety scale assesses how individuals feel "at a particular moment and under specific conditions," requiring them to respond based on their current emotions and experiences. In contrast, the trait anxiety scale evaluates how individuals generally feel in daily life.

In the state anxiety scale, items are rated according to the intensity of emotional experience, with the following options: 1. not at all; 2. somewhat; 3. moderately so; 4. very much so. In the trait anxiety scale, items are rated according to frequency as follows: 1. almost never; 2. sometimes; 3. often; 4. almost always. These two types of anxiety, state and trait, are conceptually distinct; this distinction forms the basis of the two-factor theory of anxiety developed. The

STAI was designed to measure both transient (state) and enduring (trait) levels of anxiety in individuals from both normal and clinical populations (7-9).

When both scales are administered together, it is recommended that the state anxiety scale be completed first, followed by the trait anxiety scale. This order is advised because the state anxiety scale is particularly sensitive to immediate emotional, physiological, and cognitive responses—such as apprehension, worry, or excitement—triggered by evaluative conditions. Administering it first allows participants to express their initial emotional state, resulting in a more accurate assessment of transient anxiety (10).

Spielberger et al. (9) assessed the reliability of the STAI at three levels. The Turkish adaptation and standardization of the inventory were conducted by Öner and Le Compte (8), and it has since been widely used in studies involving both Turkish adolescent and adult populations (9).

Both the original and Turkish versions of the STAI underwent test-retest reliability assessments and Kuder-Richardson reliability analyses. The construct validity of both scales was experimentally tested in non-clinical and clinical populations within the framework of the two-factor theory. The observed pattern in which state anxiety increases before significant or stressful events and decreases afterward, while trait anxiety remains relatively stable, supports the theoretical assumptions and provides evidence of construct validity. In this study, the STAI was administered to assess the anxiety status of patients with low-grade cervical smear results, in accordance with the procedures and psychometric standards described above.

Health anxiety is condition in which individuals excessively misinterpret normal bodily sensations negatively despite the absence of any underlying medical condition. It consists of two core components: the belief that one has a serious illness and the perception that this illness will result in harmful consequences (11).

The primary psychiatric disorder associated with health anxiety is hypochondriasis, and the two conditions are often considered to exist on a continuum. Elevated levels of health anxiety are also thought to be present in other somatoform disorders (12).

The health anxiety inventory is a self-report questionnaire developed by Salkovskis et al. (13). It consists of 18 items. The first 14 items offer four-option, sequential responses designed to assess the respondent's emotional and cognitive states. The remaining four items evaluate how the individual might feel if they assumed they had a serious illness. Each item is scored on a scale from 0 to 3, with higher scores indicating greater levels of health anxiety.

The Turkish adaptation and validation of the inventory were conducted by Aydemir et al. (14).

After data collection, the state, trait, and health anxiety scores were calculated and recorded for each patient.

### Statistical Analysis

Continuous variables were expressed as mean±standard deviation, and categorical variables as frequencies and percentages. The normality of the distribution of continuous variables was assessed using the Kolmogorov-Smirnov test.

The chi-square test or Fisher's exact test was used to compare categorical variables between groups. An independent samples t-test was used to compare continuous variables between two groups. One-way analysis of variance (ANOVA) followed by appropriate post-hoc tests was used to compare three groups.

Two-way ANOVA was performed to assess the interaction between smear test results and demographic variables on STAI-State version (STAI-S) scores.

A simple logistic regression analysis was used to evaluate the association between each sociodemographic variable and increased levels of state anxiety. Variables found to be significant in univariate analyses were further analyzed using multiple logistic regression to identify independent predictors.

All statistical analyses were conducted using IBM SPSS Statistics, version 21.0. (IBM Corp., Armonk, NY, USA).

## RESULTS

Patients were categorized into two groups based on their Pap smear results: those with normal results (normal group) and those with ASC-US or LSIL results (abnormal group). The demographic characteristics of the two groups are presented in Table 1. The rate of abnormal smear results was significantly higher in older patients (67%) than younger patients (4.3%) ( $p=0.036$ ). Additionally, while the proportion of patients with normal smear results was significantly higher in the 21-24 age group ( $n=14$ ), the frequency of abnormal results was significantly greater among patients aged 35 and above ( $n=63$ ).

There was no statistically significant difference in the distribution of smear results among education levels ( $p=0.472$ ).

Similarly, no statistically significant differences were observed in the distribution of smear results based on patients' marital status ( $p=0.275$ ) or number of children ( $p=0.241$ ).

**Table 1.** Comparison of the distribution of demographic characteristics according to the smear results

		Smear result		x <sup>2</sup> ; p
		Negative=94	Positive=94	
Age	≤24	14 (14.9%)	4 (4.3%)	6.626; 0.036*
	25-34	28 (29.8%)	27 (28.7%)	
	≥35	52 (55.3%)	63 (67.0%)	
Education	None	6 (6.4%)	2 (2.1%)	2.545; 0.472**
	Primary education	55 (58.5%)	53 (56.4%)	
	High school	24 (25.5%)	28 (29.8%)	
	University	9 (9.6%)	11 (11.7%)	
Marital status	Single	19 (20.2%)	11 (11.7%)	2.580; 0.275*
	Married	65 (69.1%)	71 (75.5%)	
	Widow	10 (10.6%)	12 (12.8%)	
Child (grouped)	0	23 (24.7%)	15 (16.0%)	2.849; 0.241*
	1-3	52 (55.9%)	63 (67.0%)	
	≥4	18 (19.4%)	16 (17.0%)	
Employment	No	48 (51.1%)	63 (67.0%)	6.740; 0.034*
	Yes	42 (44.7%)	25 (26.6%)	
	Retired	4 (4.3%)	6 (6.4%)	
Smoking history	No	74 (78.7%)	64 (68.1%)	2.725; 0.099*
	Yes	20 (21.3%)	30 (31.9%)	
Alcohol history	No	90 (95.7%)	89 (94.7%)	1.000***
	Yes	4 (4.3%)	5 (5.3%)	
Previous smear history	No	48 (51.1%)	50 (53.2%)	0.085; 0.884**
	Yes	46 (48.9%)	44 (46.8%)	
Presence of disease history	No	84 (89.4%)	81 (86.2%)	0.198; 0.656****
	Yes	10 (10.6%)	13 (13.8%)	
Family history of cancer	No	66 (70.2%)	57 (60.6%)	1.905; 0.168*
	Yes	28 (29.8%)	37 (39.4%)	
Have you ever received psychiatric treatment before?	No	80 (85.1%)	74 (78.7%)	0.898; 0.343****
	Yes	14 (14.9%)	20 (21.3%)	
Presence of significant problems in the last year	No	74 (78.7%)	72 (76.6%)	0.031; 0.861****
	Yes	20 (21.3%)	22 (23.4%)	
Do you know about CxCa before?	No	50 (53.2%)	69 (73.4%)	8.265; 0.004*
	Yes	44 (46.8%)	25 (26.6%)	
Result acknowledgment status	Good	92 (97.9%)	17 (18.1%)	123.221; <0.001*
	Bad	0 (0.0%)	53 (56.4%)	
	Uncertain	2 (2.1%)	24 (25.5%)	

\*: Pearson chi-square test, \*\*: Pearson exact chi-square test, \*\*\*: Fisher's exact chi-square test, \*\*\*\*: Yates chi-square test, CxCa: Cervical cancer

A statistically significant difference was observed in the distribution of smear results according to employment status (p=0.034). The rate of abnormal smear results was significantly higher among non-working individuals (housewives) (67%) and retired individuals (6.4%) compared with employed patients (26.6%). When employment subgroups (working, retired, and non-working) were

evaluated separately, the proportion of abnormal results was significantly higher among retired and non-working women. In contrast, the frequency of normal smear results was significantly higher among employed patients.

The relationships between smear results and several patient-related factors were examined individually, including history of smoking (p=0.099), alcohol use (p=1.000), previous Pap

smear testing ( $p=0.884$ ), presence of a significant medical condition ( $p=0.656$ ), family history of cancer ( $p=0.168$ ), history of psychiatric treatment ( $p=0.343$ ), and major life events in the past year ( $p=0.861$ ). No statistically significant associations were found for any of these variables.

The rate of abnormal smear test results was significantly higher among patients who lacked prior knowledge of cervical cancer ( $p=0.04$ ). Furthermore, among patients with abnormal smear results ( $n=94$ ), a substantial proportion (73.4%) reported no prior knowledge of cervical cancer, which was statistically significant ( $p=0.04$ ).

A statistically significant difference in the distribution of smear results was observed according to how patients received their results ( $p<0.001$ ). Among patients with abnormal smear results, the proportion of negative emotional responses was significantly higher than among patients with normal smear results.

Smear results and state anxiety scores from the STAI of all patients in the abnormal ( $n=94$ ) and normal ( $n=94$ ) groups were compared across patients' demographic characteristics using two-way analysis of variance (Table 2).

According to the smear test results, there was a statistically significant difference in STAI-S scores between age groups within both the normal and abnormal groups. Among women aged 21-24, the mean STAI-S score in the normal group was significantly lower than that in the abnormal group ( $p<0.001$ ). Similar findings were observed in the 25-34 age group and in patients aged 35 years and older ( $p<0.001$ ; for both). In each age group, patients with normal smear results had significantly lower mean STAI-S scores compared to those with abnormal results.

Across multiple comparisons, no statistically significant difference in mean STAI-S score was found between patients aged 21-24 and those over 35 years, all with abnormal smear results ( $p=0.21$ ).

Within each educational subgroup (primary school, high school, university or higher), mean STAI-S scores were significantly higher in those with abnormal smear results than in those with normal results ( $p<0.001$ ).

In multiple comparisons, the mean STAI-S score was significantly higher among patients with abnormal smear results who had university-level education or higher than among those with only a high school education ( $p=0.01$ ).

**Table 2.** Comparison of smear results and STAI test state anxiety scores according to the demographic characteristics of the patients

		Smear result				p*	
		Normal		Abnormal			
		Mean	±SD	Mean	±SD		
Age	≤24 (1)	38.93	2.24	57.25	4.19	<0.001	
	25-34 (2)	38.00	1.58	52.70	1.61	<0.001	
	≥35 (3)	37.29	1.16	51.81	1.06	<0.001	
	Multiple comparison	1-2:	0.74		0.31		
		1-3:	0.52		0.21		
		2-3:	0.72		0.64		
Education	None (0)	36.67	3.39	47.50	5.86	0.11	
	Primary education (1)	38.64	1.12	52.26	1.14	<0.001	
	High school (2)	36.46	1.69	50.54	1.57	<0.001	
	University (3)	36.44	2.76	57.82	2.50	<0.001	
	Multiple comparison	0-1:	0.58		0.43		
		0-2:	0.96		0.62		
		0-3:	0.96		0.11		
		1-2:	0.28		0.37		
		1-3:	0.46		0.04		
		2-3:	1.00		0.01		
Marital status	Single (0)	40.26	1.89	56.64	2.48	<0.001	
	Married (1)	36.40	1.02	51.76	0.98	<0.001	
	Widow (2)	41.70	2.60	51.50	2.38	0.01	
	Multiple comparison	0-1:	0.07		0.07		
		0-2:	0.66		0.14		
		1-2:	0.06		0.92		

Table 2. Continued

		Smear result				p*	
		Normal		Abnormal			
		Mean	±SD	Mean	±SD		
Child (grouped)		0 (0)	40.43	1.71	54.93	2.12	<0.001
		1-3 (1)	36.21	1.14	51.25	1.03	<0.001
		>3 (2)	39.56	1.93	53.94	2.05	<0.001
	Multiple comparison	0-1:	0.04		0.12		
		0-2:	0.73		0.74		
1-2:		0.14		0.24			
Employment		No(1)	37.38	1.19	53.56	1.04	<0.001
		Yes (2)	38.52	1.27	51.12	1.65	<0.001
		Retired (3)	34.00	4.11	44.00	3.36	0.06
	Multiple comparison	1-2:	0.51		0.21		
		1-3:	0.43		0.01		
2-3:		0.29		0.06			
Smoking history		No (0)	37.23	0.97	51.63	1.04	<0.001
		Yes (1)	39.65	1.86	53.73	1.52	<0.001
	Multiple comparison		0.25		0.25		
Alcohol history		No (0)	37.73	0.86	51.69	0.87	<0.001
		Yes (1)	38.00	4.09	63.20	3.66	<0.001
	Multiple comparison		0.95		<0.001		
Previous smear history		No (0)	36.90	1.19	53.92	1.17	<0.001
		Yes (1)	38.63	1.22	50.45	1.25	<0.001
	Multiple comparison		0.31		0.04		
Presence of disease history		No (0)	38.04	0.90	52.94	0.92	<0.001
		Yes (1)	35.30	2.62	48.31	2.30	<0.001
	Multiple comparison		0.33		0.06		
Family history of cancer		No (0)	37.91	1.03	51.96	1.11	<0.001
		Yes (1)	37.36	1.58	52.81	1.38	<0.001
	Multiple comparison		0.77		0.63		
Have you ever received psychiatric treatment before?		No (0)	36.85	0.92	51.62	0.95	<0.001
		Yes (1)	42.86	2.19	54.80	1.83	<0.001
	Multiple comparison		0.01		0.13		
Presence of significant problems in the last year		No (0)	37.22	0.97	52.35	0.99	<0.001
		Yes (1)	39.70	1.87	52.14	1.78	<0.001
	Multiple comparison		0.24		0.92		
Do you know about CxCa before?		No (0)	35.98	1.14	53.80	0.97	<0.001
		Yes (1)	39.75	1.22	48.16	1.62	<0.001
	Multiple comparison		0.03		<0.001		
Result acknowledgment status		Good (0)	37.63	0.81	45.12	1.88	<0.001
		Bad (1)	-		56.02	1.07	-
		Uncertain (2)	43.00	5.49	49.17	1.59	0.28
	Multiple comparison	0-1:	-		<0.001		
		0-2:	0.34		0.10		
1-2:		-		<0.001			

\*: Two-way analysis of variance, CxCa: Cervical cancer, SD: Standard deviation

Similarly, patients with abnormal smear results and with university-level education had significantly higher STAI-S scores than those with primary school education ( $p=0.04$ ).

In subgroup analyses based on variables such as marital status (single, married, widowed), number of children (none, 1-3,  $\geq 3$ ), employment status (employed, unemployed, retired), smoking status and alcohol use, history of previous smear testing, presence of serious illness or cancer, psychiatric treatment history, major life events in the past year, and prior knowledge of cervical cancer, each category was evaluated separately. In all subgroups except for illiterate individuals, retired patients, and those who responded "uncertain" to the question about how they reacted to their smear result, patients with abnormal smear results had significantly higher STAI-S scores compared to those with normal results. No statistically significant differences were found among these three subgroups.

In multiple comparisons, patients with abnormal smear results who lacked prior knowledge about cervical cancer (mean STAI-S=53.80) had significantly higher anxiety levels than those who had prior knowledge (mean STAI-S=48.16) ( $p<0.001$ ). Conversely, among patients with normal smear results, those without prior knowledge of cervical cancer had significantly lower STAI-S scores (mean=35.98) than those who were informed (mean=39.75) ( $p=0.03$ ).

Simple logistic regression analysis was conducted to identify the sociodemographic factors associated with increased state anxiety levels and to determine whether each variable, individually, constituted a risk factor. In the final step, all sociodemographic variables were analyzed simultaneously using multiple logistic regression analysis to identify statistically significant categories and independent risk factors contributing to elevated state anxiety levels (Table 3).

**Table 3.** Single and multiple logistic regression analysis

	Single model		Multiple model (final step)	
	p	Odds ratio* (95% CI)	p	Odds ratio* (95% CI)
<b>Age (<math>\leq 24</math>)</b>	0.418			
25-34	0.384	2.296 (0.354-14.896)		
$\geq 35$	0.196	4.26 (0.474-38.267)		
<b>Education (none)</b>	0.760			
Primary education	0.378	2.447 (0.334-17.912)		
High school	0.675	1.598 (0.179-14.297)		
University	0.540	2.285 (0.163-32.078)		
<b>Marital status (single)</b>	0.005		0.001	
Married	0.302	0.261 (0.02-3.336)	0.059	0.349 (0.117-1.042)
Widow	0.091	8.416 (0.713-99.409)	0.029	5.795 (1.195-28.106)
<b>Child (0)</b>	0.597			
1	0.696	0.614 (0.053-7.09)		
2	0.856	0.791 (0.063-9.911)		
3	0.178	0.173 (0.013-2.218)		
4	0.448	0.367 (0.028-4.89)		
5	0.648	0.334 (0.003-36.864)		
6	0.811	0.264 (0-14500.028)		
Employment (no)	NA		NA	
Smoking history (yes)	0.895	0.92 (0.265-3.194)		
Alcohol history (yes)	0.520	2.336 (0.176-30.965)		
Previous smear history (yes)	0.600	1.35 (0.441-4.134)		
Presence of disease history (yes)	0.027	0.154 (0.03-0.806)		
Family history of cancer (yes)	0.010	4.478 (1.434-13.98)	0.021	2.928 (1.176-7.29)
Have you ever received psychiatric treatment before? (yes)	0.806	0.853 (0.241-3.017)		
Presence of significant problems in the last year (yes)	0.509	1.48 (0.462-4.743)		

**Table 3.** Continued

	Single model		Multiple model (final step)	
	p	Odds ratio* (95% CI)	p	Odds ratio* (95% CI)
Do you know about CxCa before? (yes)	0.365	1.648 (0.559-4.861)		
<b>Result acknowledgment status (good)</b>	<0.001		<0.001	
Bad	<0.001	191.365 (24.647-1485.77)	<0.001	94.863 (17.022-528.661)
Uncertain	<0.001	52.709 (9.477-293.138)	<0.001	31.589 (7.163-139.313)

\*: An odds ratio (OR) is a measure of association between an exposure and an outcome, NA: Non-applicable, CxCa: Cervical cancer, CI: Confidence interval

Being single, having a history of illness, having a family history of cancer, and having an unclear or negative response to the smear result were identified as individual risk factors for elevated state anxiety levels.

When all sociodemographic characteristics were evaluated simultaneously, marital status, family history of cancer, and patients' emotional responses to their smear test results (such as reacting negatively or with uncertainty) were identified as the primary factors contributing to elevated state anxiety scores.

The state anxiety scores in patients with abnormal smear results (n=94) were significantly higher than in patients with

normal smear results (n=94) (p<0.001) (Table 4). However, no statistically significant differences were found between the groups for trait anxiety scores (p=0.117) or health anxiety inventory scores (p=0.168).

In Table 5, unlike Table 4, smear results were analyzed in three groups rather than two and multiple comparisons were conducted. Accordingly, the state anxiety scores of patients with normal smear results were significantly lower than those of patients with ASC-US and LGSIL smear results (p<0.001; for both comparisons). However, no statistically significant difference in state anxiety scores was observed between patients with ASC-US (n=52) and those with LGSIL (n=42) smear results (p=0.465).

**Table 4.** Comparison of anxiety scores between patients with normal and abnormal smear results

	Group	n	Mean	±SD	Minimum	Maximum	p
STAI test status anxiety score	0	94	37.74	7.936	17	58	<0.001
	1	94	52.3	8.734	22	71	
STAI test trait anxiety score	0	94	45.89	8.645	30	67	0.177
	1	94	47.56	8.257	30	69	
Health anxiety inventory	0	94	18.36	7.931	3	39	0.168
	1	94	19.95	7.773	6	38	

SD: Standard deviation, STAI: State-Trait Anxiety Inventory, 0: Patients with normal smear test results (control group), 1: Patients with abnormal smear test results (low-grade squamous intraepithelial lesion, atypical squamous cells of undetermined significance) (research group)

**Table 5.** Comparison of anxiety scores among patients with normal, ASCUS, and LGSIL smear results

	Group	n	Mean	±SD	Minimum	Maximum	p	Multiple comparison
STAI test status anxiety score	0	94	37.74	7.936	17	58	<0.001	0-1: <0.001 0-2: <0.001 1-2: 0.465
	1	52	51.73	8.31	39	71		
	2	42	53	9.284	22	71		
STAI test trait anxiety score	0	94	45.89	8.645	30	67	0.394	-
	1	52	47.73	8.727	30	67		
	2	42	47.36	7.736	32	69		
Health anxiety inventory	0	94	18.36	7.931	3	39	0.361	-
	1	52	19.67	8.556	6	38		
	2	42	20.29	6.765	7	37		

SD: Standard deviation, ASCUS: Atypical squamous cells of undetermined significance, LGSIL: Low-grade squamous intraepithelial lesion, STAI: State-Trait Anxiety Inventory, 0: Patients with normal smear results (n=94), 1: Patients with ASCUS smear result (n=52), 2: Patients with LGSIL smear result (n=42)

## DISCUSSION

In the present study, following the disclosure of cervical smear test results, we evaluated patients' anxiety levels using standardized assessment tools. Patients with ASC-US or LSIL smear results had significantly higher state anxiety levels than those with normal smear results. Furthermore, being single or divorced, having a family history of cancer, and responding negatively or uncertainly to smear-test results were identified as significant risk factors for elevated levels of state anxiety.

In two separate studies, Crombie et al. (15) and Gray et al. (16) concluded that patients experienced a significant increase in fear, pain, and discomfort following routine cervical screening tests.

In their study, Maissi et al. (17) investigated the psychosocial effects of HPV testing by assessing four patient groups: those with normal smear test results; those with borderline smear results who were HPV-positive; those with borderline smear results who were HPV-negative; and those with borderline smear results whose HPV status was not checked. They reported that anxiety was significantly lower in patients with normal smear results, whereas both anxiety and sadness were significantly higher in patients with borderline smear results who tested HPV-positive. In the long term, patients with borderline smear results were followed, and their levels of persistent anxiety, general distress, and concern about the outcome—especially during the first month after receiving their smear results—were significantly higher compared with those of patients with normal smear results.

In our study, abnormal smear test results were significantly less common among patients who had prior knowledge about cervical cancer. This may be attributed to preventive health behaviors adopted by these individuals, such as practicing monogamy, delaying the onset of sexual activity, avoiding smoking, and maintaining a healthy diet.

In a comprehensive study conducted by Drolet et al. (18), the authors investigated the psychosocial impacts of abnormal cervical smear results. Anxiety was assessed at three time points: shortly after the smear result, at four weeks, and at twelve weeks. The main findings of their study and the comparisons with our results are outlined below:

- Drolet et al. (18) found that the rate of abnormal smear results was significantly higher among patients with low income and those who were single. Similarly, in our study, the rate of abnormal smear results was significantly higher among women with lower educational attainment and those who were not employed.

- When asked about the likelihood of an abnormal smear result progressing to cervical cancer within 10 years, regardless of their actual result, a majority of patients in Drolet et al. (18) study either reported having no information or assumed a high risk. This suggests a widespread misunderstanding of what a smear result indicates. Interestingly, in our study, among patients with normal smear results, those with prior knowledge of cervical cancer had significantly higher anxiety levels than those without knowledge. This could be attributed to their awareness not only of cervical cancer screening but also of the disease's prognosis, thereby increasing anticipatory anxiety. It may also suggest that even a normal screening result may not reduce anxiety in patients who are well-informed but already fearful of the disease. Conversely, in patients with abnormal results, a lack of prior knowledge was associated with significantly higher anxiety levels. These findings indicate that appropriate patient education about cervical cancer and screening results may help reduce anxiety, thereby promoting both physical and psychological well-being.

- In Drolet et al. (18) study, 35% of patients with abnormal smear results continued to experience elevated anxiety even 12 weeks after receiving their results. Risk factors for persistent anxiety included low income and misinterpretation of the smear result as indicative of a high cancer risk. In our study, patients with abnormal smear results who had never undergone a smear test reported significantly higher anxiety levels than those who had previously undergone a smear test. This may be due to concerns about delayed diagnosis or fear that the abnormality had been present for a long time. Patients who had previously participated in screening may have experienced lower anxiety, possibly due to confidence in early detection and adherence to screening protocols.

- In Drolet et al. (18) study, smear results were communicated to patients by physicians or health personnel, by telephone, or by mail. Notably, patients who received their results via letter or telephone experienced significantly lower anxiety levels than those who were informed directly by a physician or health worker. Additionally, higher educational level, living alone, low income, and an increased number of recent stressful life events were identified as risk factors for increased anxiety. In our study, anxiety levels were found to be significantly higher among patients with a university-level education compared with those with primary or high school education. One possible explanation is that higher education may be associated with greater personal and family responsibilities, leading to anxiety about potential future impairment in their ability to fulfill these roles.

In our study, anxiety levels were also higher among patients with abnormal smear results who reported alcohol use than among non-users. This may be attributed to the negative effects of alcohol on the psychophysiological system.

In our study, we observed a statistically significant increase in STAI-S scores among patients with abnormal smear results, whereas STAI-Trait version (STAI-T) and health anxiety scores did not differ significantly between the groups. This finding suggests that the anxiety experienced by these patients is most likely a transient and reactive emotional response to the unexpected and often misunderstood nature of abnormal smear results, rather than a chronic psychological trait or a general tendency toward health-related anxiety.

This result is consistent with previous literature, as it is well established that state anxiety is sensitive to acute stressors and contextual triggers, while STAI-T reflects a more stable personality disposition. Indeed, in their reliability and standardization studies of the STAI, Öner and Le Compte (19) demonstrated that, despite fluctuations in state anxiety scores under varying conditions over time intervals ranging from 10 days to one year, STAI-T scores in the same individuals remained relatively stable.

Furthermore, the absence of significant differences in health anxiety scores indicates that participants were not affected by somatoform disorders or generalized health-related fears, but rather exhibited situation-specific emotional reactions. These findings emphasize the importance of timely and effective physician-patient communication when disclosing abnormal screening results.

In our study, patients with ASC-US or LSIL smear results exhibited significantly higher anxiety levels than those with normal results. From the patients' perspective, both diagnoses appeared to induce a similar level of anxiety. When adequate time is devoted to patient communication and detailed information is provided regarding the procedures and their outcomes, the resulting anxiety may be reduced, thereby preventing negative effects on daily functioning and preserving both physical and mental well-being.

## CONCLUSION

In our study, we observed a significant increase in anxiety levels among patients with ASC-US and LSIL smear results, consistent with previous findings in the literature. Factors such as personal history of illness, family history of cancer, and single or divorced marital status were identified as significant contributors to elevated anxiety. Additionally, higher levels of anxiety were noted among women with

higher educational attainment, those who used alcohol, and those who had never undergone a smear test.

Although the incidence of carcinoma among patients with low-grade smear results (ASC-US and LSIL) is extremely low (approximately 0.1-0.2%), patients often perceive their results as "bad" or alarming. This highlights the importance of providing patients with clear, descriptive, and empathetic explanations when delivering abnormal smear results. Physician-patient communication plays a crucial role in alleviating emotional distress in these cases.

For patients with abnormal cervical cytology, it is essential to implement not only appropriate clinical follow-up and treatment protocols but also holistic support strategies that protect mental well-being. Further comprehensive studies are needed to identify and develop effective communication and counseling approaches to minimize anxiety and promote psychological resilience in this patient population.

## ETHICS

**Ethics Committee Approval:** The study protocol complied with the ethical standards outlined in the 1964 Declaration of Helsinki and was approved by the Clinical Research Ethics Committee of University of Health Sciences Türkiye, İstanbul Kanuni Sultan Süleyman Training and Research Hospital (approval no: KAEK/2018.6.16, date: 30.07.2018).

**Informed Consent:** Informed consent was obtained from all participants.

## FOOTNOTES

### Authorship Contributions

Surgical and Medical Practices: İ.Y., İ.T.Y., Concept: Y.C., Ö.A., Design: Y.C., Ö.A., İ.T.Y., Data Collection or Processing: İ.Y., S.A., Analysis or Interpretation: İ.Y., İ.T.Y., Literature Search: Y.C., S.A., Writing: İ.Y., S.A.

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## REFERENCES

1. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *Int J Cancer*. 2015;136:E359-86.
2. Stanley MA, Beck JG. Anxiety disorders. *Clin Psychol Rev*. 2000;20:731-54.
3. Yetkin S, Aslan S, Akdemir A, Örsel S. Anksiyete bozuklukları. In: Sadock BJ, Sadock BA, editors. *Kaplan & Sadock's Concise Textbook of Clinical Psychiatry*. 2nd ed. İstanbul: Öncü Kitabevi; 2005. p. 211-2.

4. Marteau TM, Kidd J, Cuddeford L, Walker P. Reducing anxiety in women referred for colposcopy using an information booklet. *Br J Health Psychol.* 1996;1:181-9.
5. Cullen J, Schwartz MD, Lawrence WF, Selby JV, Mandelblatt JS. Short-term impact of cancer prevention and screening activities on quality of life. *J Clin Oncol.* 2004;22:943-52.
6. Bell S, Porter M, Kitchener H, Fraser C, Fisher P, Mann E. Psychological response to cervical screening. *Prev Med.* 1995;24:610-6.
7. Marteau TM, Bekker H. The development of a six-item short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI). *Br J Clin Psychol.* 1992;31:301-6. Erratum in: *Br J Clin Psychol.* 2020;59:276.
8. Öner N, Le Compte WA. Durumluk-sürekli kaygı envanteri el kitabı. Boğaziçi Üniversitesi Yayınları; 1985.
9. Spielberger CD, Gonzalez-Reigosa F, Martinez-Urrutia A, Natalicio LF, Natalicio DS. The State-Trait Anxiety Inventory. *Interam J Psychol.* 1971;5.
10. Öner N. Türkiye’de kullanılan psikolojik testler: bir başvuru kaynağı. Boğaziçi Üniversitesi; 1997.
11. Abramowitz JS, Olatunji BO, Deacon BJ. Health anxiety, hypochondriasis, and the anxiety disorders. *Behav Ther.* 2007;38:86-94.
12. Noyes R Jr, Stuart SP, Langbehn DR, Happel RL, Longley SL, Muller BA, et al. Test of an interpersonal model of hypochondriasis. *Psychosom Med.* 2003;65:292-300.
13. Salkovskis PM, Rimes KA, Warwick HM, Clark DM. The health anxiety inventory: development and validation of scales for the measurement of health anxiety and hypochondriasis. *Psychol Med.* 2002;32:843-53.
14. Aydemir Ö, Kirpınar İ, Sati T, Uykur B, Cengiz C. Reliability and validity of the Turkish version of the health anxiety inventory. *Noro Psikiyatrs Ars.* 2013;50:325-31.
15. Crombie IK, Orbell S, Johnston G, Robertson AJ, Kenicer M. Women’s experiences at cervical screening. *Scott Med J.* 1995;40:81-2.
16. Gray NM, Sharp L, Cotton SC, Masson LF, Little J, Walker LG, et al.; TOMBOLA group. Psychological effects of a low-grade abnormal cervical smear test result: anxiety and associated factors. *Br J Cancer.* 2006;94:1253-62.
17. Maissi E, Marteau TM, Hankins M, Moss S, Legood R, Gray A. Psychological impact of human papillomavirus testing in women with borderline or mildly dyskaryotic cervical smear test results: cross sectional questionnaire study. *BMJ.* 2004;328:1293.
18. Drolet M, Brisson M, Maunsell E, Franco EL, Coutlée F, Ferenczy A, et al. The psychosocial impact of an abnormal cervical smear result. *Psychooncology.* 2012;21:1071-81.
19. Öner N, Le Compte A. Süreksiz durumluk/sürekli anksiyete envanteri el kitabı. Boğaziçi Üniversitesi Yayınları.; 1983. p. 1-26.