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Anxiety and Depression in Women with Abnormal Cervical Cytology Referred for Colposcopy: A Study at Suratthani Cancer Hospital

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ABSTRACT

Objectives: To evaluate the prevalence of anxiety and depression in women with abnormal cervical cytology referred for colposcopy at Suratthani Cancer Hospital and identify associated risk factors.

Materials and Methods: In this cross-sectional analytic study, all women with abnormal cervical cytology referred for colposcopy at Suratthani Cancer Hospital between January 2025 and March 2025. Participants completed the Thai version of the hospital anxiety and depression scale (HADS). A score ≥ 11 on the anxiety (HADS-A) or depression (HADS-D) subscale was considered clinically significant and identified factors that associated to this group by multivariable logistic regression analysis.

Results: Total one hundred ninety-five women were participants. The mean age was 42.2 years (standard deviation 10.0). Clinically significant anxiety (HADS-A ≥ 11) was present in 15.4% of participants, and depression (HADS-D ≥ 11) in 5.6%. The only factors that significant associated with anxiety was depression ($p < 0.01$) and independent predictors of depression with multivariate regression analysis were smoking (adjusted odds ratio (aOR) 7.6, 95% confidence interval (CI) 2.20–98.72), poor cervical cancer knowledge (aOR 24.98, 95%CI 2.78–224.67), and concurrent anxiety (aOR 23.0, 95%CI 4.3–121).

Conclusion: Psychological distress was common among women referred for colposcopy, with significant predictors including smoking, poor disease knowledge, and co-existing anxiety. Integrating mental health screening and patient education into colposcopy care could improve psychological outcomes and care engagement.

Keywords: cervical cancer screening, colposcopy, anxiety, depression, HADS.

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ภาวะวิตกกังวลและซึมเศร้าในสตรีที่มีผลการตรวจคัดกรองมะเร็งปากมดลูกผิดปกติและได้รับการส่องกล้องคอลโปสโคปในโรงพยาบาลมะเร็งสุราษฎร์ธานี

กาญจนา กันธิยะ

บทคัดย่อ

วัตถุประสงค์*: เพื่อประเมินระดับภาวะวิตกกังวลและภาวะซึมเศร้าในสตรีที่มีผลการตรวจคัดกรองมะเร็งปากมดลูกผิดปกติและได้รับการส่งต่อเพื่อส่องกล้องคอลโปสโคปในโรงพยาบาลมะเร็งสุราษฎร์ธานี และประเมินปัจจัยที่มีผลต่อภาวะวิตกกังวลและซึมเศร้า*

วัสดุและวิธีการ*: เป็นการศึกษาภาคตัดขวาง โดยนำสตรีที่มีผลการตรวจคัดกรองมะเร็งปากมดลูกผิดปกติและได้รับการส่งต่อเพื่อส่องกล้องคอลโปสโคปในโรงพยาบาลมะเร็งสุราษฎร์ธานี ระหว่างเดือนมกราคม 2568 ถึงมีนาคม 2568 ผู้เข้าร่วมศึกษาทำแบบประเมิน hospital anxiety and depression scale (HADS) ฉบับภาษาไทย และได้จำแนกคะแนนตั้งแต่ 11 คะแนนขึ้นไปในหมวดภาวะวิตกกังวล (HADS-A) หรือภาวะซึมเศร้า (HADS-D) ถือว่ามีอาการทางคลินิก และศึกษาปัจจัยที่มีผลต่อสตรีกลุ่มนี้โดยการวิเคราะห์ถดถอยโลจิสติกพหุคูณ*

ผลการศึกษา*: สตรีจำนวน 195 รายเข้าร่วมทำแบบสอบถามมีอายุเฉลี่ย 42.2 ปี พบว่าร้อยละ 15.4 มีภาวะวิตกกังวลและร้อยละ 5.6 มีภาวะซึมเศร้า ในระดับที่มีนัยสำคัญทางคลินิก และพบปัจจัยที่มีผลต่อภาวะนี้ โดยการวิเคราะห์เชิงเดียวพบว่าการสูบบุหรี่ ความรู้เกี่ยวกับมะเร็งปากมดลูกที่จำกัด และประวัติการตรวจคัดกรองที่ไม่สม่ำเสมอ มีความสัมพันธ์กับภาวะซึมเศร้า การวิเคราะห์ถดถอยโลจิสติกพหุคูณพบว่า การสูบบุหรี่ (adjusted odds ratio (aOR) 7.6, 95% confidence interval (CI) 2.20–98.72) ความรู้ที่ไม่เพียงพอเกี่ยวกับมะเร็งปากมดลูก (aOR 24.98, 95%CI 2.78–224.67) และอาการวิตกกังวลร่วม (aOR 23.0, 95%CI 4.3–121) เป็นปัจจัยพยากรณ์อิสระของภาวะซึมเศร้า*

สรุป*: ภาวะวิตกกังวลและภาวะซึมเศร้าพบได้บ่อยในสตรีที่มีผลการตรวจคัดกรองมะเร็งปากมดลูกผิดปกติและได้รับการส่งต่อเพื่อส่องกล้องคอลโปสโคปในโรงพยาบาลมะเร็งสุราษฎร์ธานี โดยมีปัจจัยที่สัมพันธ์ได้แก่ การสูบบุหรี่ ความรู้เกี่ยวกับโรคที่ไม่เพียงพอ และอาการวิตกกังวลร่วม จากข้อมูลนี้จะช่วยพัฒนาการบูรณาการการคัดกรองสุขภาพจิตและการให้ความรู้แก่สตรีก่อนการส่องกล้องคอลโปสโคปบริเวณปากมดลูก อาจช่วยลดภาวะเครียดและเพิ่มความร่วมมือในการรักษาได้*

คำสำคัญ*: การตรวจคัดกรองมะเร็งปากมดลูก, คอลโปสโคป (colposcopy), วิตกกังวล, ซึมเศร้า, HADS*

Introduction

Cervical cancer remains a significant public health concern and is the fourth most common cancer among women worldwide. In 2022, approximately 660,000 new cases and 350,000 related deaths were reported globally[1]. In Thailand, around 9,158 new cases and 4,705 deaths occur annually[2]. The high incidence and mortality rates are largely attributed to the lack of effective screening programs and limited coverage of existing services[3-4].

Persistent infection with high-risk types of human papillomavirus (HPV), particularly types 16 and 18, is the primary cause of cervical cancer, accounting for approximately 70% of cases[5]. Current screening methods include cytology and HPV testing. In Thailand, campaigns promoting HPV deoxyribonucleic acid (DNA) self-sampling have led to increased detection of HPV infections. According to data from the National Cancer Institute, the proportion of women with abnormal screening results rose from 1.13% to 1.53% between 2010 and 2014, with 6–7% requiring colposcopy[6].

Colposcopy is a procedure that enables magnified visualization of the cervix is essential for evaluating abnormal findings and guiding further management, such as biopsy, cryotherapy, or cauterization. However, the procedure can cause considerable psychological distress[7]. A study in Thailand reported significantly higher anxiety and depression levels among women referred for colposcopy due to abnormal cytology[8]. Despite this, healthcare providers often underestimate the psychological burden, potentially exacerbating patient anxiety. Elevated anxiety can impair cognitive processing, hinder understanding of medical information, and contribute to negative perceptions of care[9-10]. These effects may reduce compliance with appointments and increase discomfort during the procedure.

The aim of this study was to assess anxiety and depression levels in women undergoing colposcopy after abnormal cervical cytology and to identify factors that predict heightened anxiety. The findings may inform strategies to better support at-risk patients and improve overall care delivery.

Materials and Methods

A cross-sectional analytic study was conducted to assess the level of anxiety in women with abnormal cervical cancer screening results undergoing colposcopy at Suratthani Cancer Hospital between January 2025 and March 2025. The study was approved by the Institutional Review Board, and both verbal and written informed consent were obtained from all participants.

Inclusion criteria were 18 or more-year-old women with abnormal cervical cytology results and undergoing colposcopy at Suratthani Cancer Hospital. Exclusion criteria were women inability to communicate in Thai or incomplete survey responses (i.e., more than two unanswered questions).

Anxiety and depression symptoms were assessed using the Thai version of the hospital anxiety and depression scale (HADS), a self-administered questionnaire. The HADS consists of 14 items, divided into two subscales: seven items for anxiety (HADS-A) and seven for depression (HADS-D). Each item is scored on a 4-point Likert scale (0–3), resulting in subscale scores ranging from 0 to 21. The scores are categorized as follows:

0–7: no anxiety or depression, 8–10: mild symptoms, not considered a definitive psychiatric disorder, 11–21: moderate to severe symptoms, considered indicative of a psychiatric disorder[11-12].

Internal consistency of the subscales was assessed using Cronbach's alpha. Participants completed the questionnaire independently while waiting for their colposcopy procedure.

The sample size was calculated using the formula for descriptive studies, assuming a 95%

confidence level (CI), 2% margin of error, and the proportion of women undergoing colposcopy based on a study by Chait et al[13]. A minimum of 160 participants was required. To account for potential dropouts or incomplete data, the sample size was increased by 10%, yielding a final target of 180 participants.

Demographic and clinical data were collected, including age, marital status, religion, comorbidities, smoking history, number of sexual partners, psychiatric history, cancer history, family history of cancer, income, education level, self-assessed cervical cancer and colposcopy understanding, waiting time for colposcopy, and cervical screening results.

The primary outcome was the prevalence of anxiety symptoms, defined as a HADS-A score > 11. The secondary outcome was the prevalence of depression, defined as a HADS-D score > 11. Multivariate regression analysis was used to identify predictors of anxiety.

Statistical analysis was performed using Stata® version 12. Descriptive statistics were used to summarize the data: categorical variables were presented as frequencies and percentages, and continuous variables as means with standard deviations (SD) or medians with interquartile ranges (IQR), as appropriate. A p value < 0.05 was considered statistically significant. Chi-square test and independent t test were used for univariate regression analysis. Variables with $p < 0.05$ were entered into multivariate regression analysis to identify independent factors associated with anxiety (HADS-A) and depression (HADS-D).

Results

A total of 195 women referred for colposcopy following abnormal cervical cytology at Suratthani Cancer Hospital were included in the study. The demographic and characteristics are shown in Table 1. The mean age of participants was 42.2 years (SD 10.0), ranging from 18 to 65 years. Regarding marital status, 50.3% (n = 98) were married, 28.7% (n = 56) single, 7.7% (n = 15) divorced, and 13.3% (n = 26) widowed. Most participants identified as Buddhist (97.4%, n = 190), with smaller proportions identifying as Muslim (2.1%, n = 4) or Christian (0.5%, n = 1).

Educational levels were relatively balanced, with 46.7% (n = 91) having completed university education and 53.3% (n = 104) having less than university-level education. The majority (77.9%, n = 152) reported a monthly income above 10,000 Baht. Two-thirds (66.7%, n = 130) were parous, and 55.9% (n = 109) reported having more than one lifetime sexual partner. Only 2.6% (n = 5) were current smokers.

In terms of health history, 21.1% (n = 47) had at least one chronic medical condition, and 2.6% (n = 5) reported a history of depression. The personal history of cancer was rare (7.7%, n = 15), with cervical cancer being the most common (5.1%, n = 10). A family history of cancer was reported by 39.0% (n = 76). Only 15.9% (n = 31) had received HPV vaccination. Knowledge of cervical cancer was generally low: 24.1% (n = 47) reported no knowledge, and 42.6% (n = 83) reported limited understanding. Similarly, 48.7% (n = 95) had no prior knowledge of colposcopy. With regard to screening history, 32.8% (n = 64) had never undergone cervical cancer screening, 45.6% (n = 89) reported regular screening, and 21.5% (n = 42) reported occasional screening.

Psychological assessment using the HADS revealed mean anxiety and depression scores of 6.4 (SD 3.9) and 3.5 (SD 3.3), respectively. Clinically significant anxiety (HADS-A ≥ 11) was identified in 15.4% (n = 30), and clinically significant depression (HADS-D ≥ 11) in 5.6% (n = 11). Most participants (76.9%, n = 150) waited less than one month for colposcopy.

Table 1. Demographic and clinical characteristics of participants (n = 195).

Characteristics	n = 195 (%)
Age (years), mean ± SD	42.2 ± 10.0
Marital status,	56 (28.7%)
Single	98 (50.3%)
Married	15 (7.7%)
Divorced	26 (13.3%)
Widow	0.068
Smoking	5 (2.6%)
Sex partner	
1	86 (44.1%)
> 1	109 (55.9%)
Parity	130 (66.7%)
Comorbidity	47 (21.1%)
History of depression	5 (2.6%)
History of Cancer	
No	180 (92.3%)
Cervical cancer	10 (5.1%)
Breast cancer	2 (1.0%)
Other cancer	3 (1.5%)
Family history	
No	119 (61.0%)
Yes	76 (39.0%)
Religion	
Buddhist	190 (97.4%)
Christ	1 (0.5%)
Muslim	4 (2.1%)
Education	
University level	91 (46.7%)
Below university level	104 (55.3%)
HPV Vaccine	31 (15.9%)
Cervical cancer understanding	
None	47 (24.1%)
Little	83 (42.6%)
Moderate	64 (32.8%)
Good	1 (0.5%)
Colposcopy understanding	
None	95 (48.7%)
Little	72 (36.9%)
Moderate	27 (13.8%)
Good	1 (0.5%)
Income (Baht/month)	
< 10,000	43 (22.1%)
> 10,000	152 (77.9%)
History of Pap smear	
routine	89 (45.6%)
occasional	42 (21.5%)
Never before	64 (32.8%)
Waiting time	
< 1 month	150 (76.9%)
> 1 month	45 (23.1%)
HADS-A score, mean (SD)	6.4 (3.9)
HADS-A score ≥ 11	30 (15.4%)
HADS-D score, mean (SD)	3.5 (3.3)
HADS-D score ≥ 11	11 (5.6%)

Baseline demographic and clinical data of women referred for colposcopy after abnormal cervical cytology.
Data are shown as mean ± standard deviation (SD) for continuous variables and frequency (percentage) for categorical variables.
HPV: human papilloma virus, HADS-A: hospital anxiety and depression scale – anxiety subscale, HADS-D: hospital anxiety and depression scale – depression subscale

Univariate regression analysis showed only HADS-D score was associated with anxiety ($p < 0.01$) and no significant associations between anxiety and demographic or clinical factors, including age, marital status, income, education, parity, smoking status, or comorbidities. Although not statistically significant, occasional/never cancer screening tended to be associated with anxiety (66.7% vs 52.7%, $p = 0.15$) (Table 2).

Table 2. Univariate analysis of factors associated with clinically significant anxiety (HADS-A ≥ 11).

Factor	HADS-A ≥ 11 (n = 30)	HADS-A < 11 (n = 165)	p value
Age (years), mean ± SD	40.7 ± 9.5	42.5 ± 10.1	0.35
Marital status			0.38
Married	19 (63.3%)	79 (47.8%)	
Single	6 (20.0%)	50 (30.3%)	
Widow/Divorced	5 (16.7%)	36 (21.8%)	
Parity	20 (66.7%)	110 (66.6%)	0.55
Smoking	1 (3.3%)	4 (2.4%)	0.57
Lifetime sexual partners			0.45
1	14 (46.7%)	72 (43.6%)	
≥ 2	16 (53.3%)	93 (56.3%)	
Underlying disease	8 (26.7%)	39 (23.6%)	0.72
History of malignancy	1 (3.3%)	19 (11.5%)	0.19
History of depression	1 (3.3%)	4 (2.4%)	0.57
Family history of cancer	10 (33.3%)	66 (40.0%)	0.88
HPV vaccination	5 (16.7%)	26 (15.7%)	0.54
Religion			0.56
Buddhist	29 (96.7%)	161 (97.5%)	
Other	1 (3.3%)	4 (2.4%)	
Education			0.27
University level	12 (40.0%)	79 (47.8%)	
Below university level	18 (60.0%)	86 (52.1%)	
Income ≥ 10,000 THB	22 (73.3%)	130 (78.7%)	0.32
Waiting time > 1 month	5 (16.7%)	40 (24.2%)	0.25
Cervical cancer knowledge			0.39
None/Low	23 (76.7%)	107 (64.8%)	
Medium/Good	7 (23.3%)	58 (35.1%)	
Colposcopy knowledge			0.45
None/Low	27 (90.0%)	140 (84.8%)	
Medium/Good	3 (10.0%)	25 (15.1%)	
Cervical cancer screening			0.15
Routine	10 (33.3%)	78 (47.2%)	
Occasional/Never	20 (66.7%)	87 (52.7%)	
HADS-D ≥ 11	3 (1.8%)	8 (4.8%)	< 0.01

Comparison of demographic, clinical, and psychosocial factors between women with and without clinically significant anxiety symptoms based on HADS-A scores. P values were calculated using chi-square test for categorical variables and independent t-test for continuous variables.
HPV: human papilloma virus, HADS-A: hospital anxiety and depression scale – anxiety subscale, HADS-D: hospital anxiety and depression scale – depression subscale

In contrast, depression (HADS-D ≥ 11) was significantly associated with smoking status (p = 0.02), limited knowledge of cervical cancer (p = 0.01), and lack of routine cervical screening (p =

0.05) (Table 3). Multivariate regression analysis identified three independent predictors of depression: current smoking (adjusted odds ratio [aOR] 7.6, 95%CI 2.20–98.72; p < 0.01), limited cervical cancer knowledge (aOR 24.98, 95%CI 2.78–224.67; p = 0.01), and concurrent clinically significant anxiety (aOR 23.0, 95%CI 4.3–121.0; p < 0.01) (Table 4).

Table 3. Univariate analysis of factors associated with clinically significant depression (HADS-D ≥ 11).

Factor	HADS-D ≥ 11 (n = 11)	HADS-D < 11 (n = 184)	p value
Age (years), mean ± SD.	41.4 ± 7.7	42.3 ± 10.2	0.78
Marital status			0.68
Married	7 (63.6%)	91 (49.5%)	
Single	3 (27.3%)	53 (28.8%)	
Widow/Divorced	1 (9.1%)	40 (21.7%)	
Parity	7 (63.6%)	123 (66.8%)	0.82
Smoking	2 (18.2%)	3 (1.6%)	0.02*
Lifetime sexual partners			0.47
1	6 (54.5%)	80 (43.5%)	
≥ 2	5 (45.5%)	104 (56.5%)	
Underlying disease	3 (27.3%)	44 (23.9%)	0.80
History of malignancy	0 (0.0%)	15 (8.2%)	0.32
History of depression	0 (0.0%)	5 (2.7%)	0.58
Family history of cancer	2 (18.2%)	74 (40.2%)	0.12
HPV vaccination	2 (18.2%)	29 (15.8%)	0.56
Religion			0.92
Buddhist	10 (90.9%)	180 (97.8%)	
Other	1 (9.1%)	4 (2.2%)	
Education			0.15
University level	3 (27.3%)	88 (47.8%)	
Below university level	8 (72.7%)	96 (52.2%)	
Income ≥ 10,000 THB	7 (63.6%)	145 (78.8%)	0.20
Waiting time > 1 month	3 (27.3%)	42 (22.8%)	0.73
Cervical cancer knowledge			0.01*
None/Low	11 (100.0%)	119 (64.7%)	
Medium/Good	0 (0.0%)	65 (35.3%)	
Colposcopy knowledge			0.60
None/Low	10 (90.9%)	157 (85.3%)	
Medium/Good	1 (9.1%)	27 (14.7%)	
Cervical cancer screening			0.05*
Routine	2 (18.2%)	86 (46.7%)	
Occasional/Never	9 (81.8%)	98 (53.3%)	
HADS-A ≥ 11	8 (72.7%)	22 (12.0%)	< 0.01*

Comparison of demographic, clinical, and psychosocial factors between women with and without clinically significant depression symptoms based on HADS-D scores. P values were calculated using chi-square test for categorical variables and independent test for continuous variables.
HPV: human papilloma virus, HADS-A: hospital anxiety and depression scale – anxiety subscale, HADS-D: hospital anxiety and depression scale – depression subscale

Table 4. Multivariable logistic regression analysis of factors associated with clinically significant depression (HADS-D ≥ 11).

Factors	Adjusted odds ratio	95% CI	p value
Smoking	7.6	2.20, 98.72	< 0.01*
Cervical cancer knowledge	24.98	2.78, 224.67	0.01*
Cervical cancer screening	4.1	0.3, 10.3	0.06
HADS-A score ≥ 11	23.0	4.3, 121	< 0.01*

Results of multivariable logistic regression identifying independent predictors of clinically significant depression (HADS-D ≥ 11). Variables included were those with $p < 0.05$ in univariate analysis.
CI: confidence interval, HADS-A: hospital anxiety and depression scale – anxiety subscale, HADS-D: hospital anxiety and depression scale – depression subscale

Discussion

This study evaluated psychological distress in women referred for colposcopy after abnormal cervical cytology in a Thai tertiary cancer center. Using the HADS, we found that 15.4% of participants exhibited clinically significant anxiety and 5.6% met the threshold for depression. These findings aligned with previous research in both Thai and international settings, highlighting the psychological vulnerability associated with abnormal cytological findings and diagnostic colposcopy[8,13].

Consistent with our aim to identify predictors of psychological distress, we found that current smoking, limited knowledge about cervical cancer, and co-existing anxiety were independently associated with depressive symptoms. Although we observed significant wide confidence intervals reflect limited precision of the estimates. This imprecision is likely due to small sample size and low event rate, which reduces the statistical stability of the odds ratio.

Smoking's association with depression has been widely reported[14], and our findings reinforce the potential of smoking history as a clinical flag for emotional vulnerability in this setting and support smoking cessation. Knowledge deficits also played a significant role in mental health outcomes. Women with little or no understanding of cervical cancer were far more likely to experience depression. This supports evidence suggesting that uncertainty about medical conditions, particularly cancer, significantly contributes to distress and impairs emotional resilience[4,7,15]. Given the relatively high proportion of women in our study with limited knowledge of cervical cancer and colposcopy. We should improve patient education as part of pre-procedure counseling.

In our study, HADS-A score and HADS-D score were associated with each other. This supports the critical relationship between anxiety and depression, and it is important to emphasize that the presence of comorbid anxiety symptoms and disorders matters in relation to treatment[16].

Interestingly, social and demographic factors including age, income, education, and marital status were not significantly associated with anxiety in this study and other Thai literatures[8,17]. This finding diverges from some studies conducted in Western populations, where lower socioeconomic status and younger age have been linked to increased distress[10]. Several factors may explain this discrepancy. First, the relative homogeneity of our sample, particularly in terms of socioeconomic background, may have reduced the variability needed to identify significant predictors. Second, anxiety was measured at a single point immediately before colposcopy, which likely reflected situational distress and may have masked the influence of more stable sociodemographic predictors. Third, cultural factors may play a role: Thai women may experience anxiety differently than women in Western settings, possibly due to differing perceptions of illness, support systems, and coping strategies.

While many participants reported poor

understanding of colposcopy, this variable was not independently associated with psychological outcomes. It is possible that anxiety is more closely tied to perceptions of cancer risk rather than the diagnostic procedure itself, echoing prior studies showing that the emotional burden often stems from fear of cancer rather than procedural discomfort[7,13].

Our study benefits from a prospective design, use of a validated screening tool (HADS-T)[11], and a well-defined sample. However, limitations include it was a single center study which limited generalizability and possible selection bias. Its cross-sectional nature, which prevents causal inference, and the modest number of patients who met criteria for anxiety and depression, which may limit statistical power. Further studies with larger sample sizes are warranted to provide more reliable estimates. Additionally, reliance on self-reported data may introduce bias.

Our findings indicated that a significant proportion of women referred for colposcopy experience emotional distress, with smoking, poor cancer knowledge, and anxiety serving as key predictors of depression. These results highlight the importance of integrating psychological and educational interventions into cervical cancer diagnostic pathways to improve patient outcomes and engagement with care.

Conclusion

A substantial proportion of women referred for colposcopy following abnormal cervical cytology experienced clinically significant anxiety and, to a lesser extent, depression. Independent predictors of depression included smoking, poor knowledge of cervical cancer, and concurrent anxiety symptoms. These findings underscore the importance of integrating psychological screening and education into colposcopy services. Tailored interventions addressing patient knowledge and mental well-being may improve care experiences and compliance with follow-up. Further studies should explore the effectiveness of pre-procedure counseling and mental health support in reducing emotional distress among this population.

Potential conflicts of interest

The author declares no conflicts of interest.

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