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Prevalence of Anxiety and Depression Among Women Using Oral Contraceptives: A Cross-Sectional Study from Madurai, India

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ABSTRACT

Background: Hormonal contraceptives, though highly effective, may influence mood and psychological well-being. Limited data exist from India regarding the prevalence of anxiety and depression among oral contraceptive (OC) users. **Objective**: To estimate the prevalence of anxiety and depression among women using oral contraceptives in Madurai and to determine associated sociodemographic and contraceptive-related factors. **Methods**: A community-based cross-sectional study was conducted among 800 women aged 18–45 years who used OCs for at least six months, between January and December 2024. Participants were selected through multistage random sampling from urban and rural areas of Madurai district. The Hospital Anxiety and Depression Scale (HADS) was used to screen for anxiety and depression. Statistical analyses included chi-square tests and multivariate logistic regression using SPSS version 26. **Results**: The prevalence of anxiety and depression among OC users was 28.6% and 22.1%, respectively. Anxiety was significantly associated with combined oral contraceptive (COC) use (AOR = 1.67; 95% CI 1.08–2.56) and use beyond one year (AOR = 1.82; 95% CI 1.22–2.71). Depression was significantly associated with age > 35 years (AOR = 1.91; 95% CI 1.19–3.05) and rural residence (AOR = 1.64; 95% CI 1.07–2.52). **Conclusion**: Nearly one-third of OC users in Madurai experienced anxiety and one-fifth experienced depressive symptoms. Integrating mental health screening into contraceptive services can promote holistic reproductive care for Indian women.

Keywords: *Oral contraceptives, Anxiety, Depression, Women's health.*

INTRODUCTION

Oral contraceptives (OCs) remain a cornerstone of family planning, offering women autonomy and control over reproduction. Globally, over 150 million women use OCs, primarily combined estrogen–progestin pills.[1] However, hormonal modulation through exogenous estrogen and progestin can alter neurotransmitter pathways, potentially affecting mood.[2]

While some studies report neutral or beneficial effects of OCs on mood,[3] others suggest an increased risk of depressive and anxiety symptoms, particularly among adolescents and long-term users.[4–6] The inconsistency may be attributed to variations in hormonal composition, dosage, cultural context, and preexisting psychological vulnerability.

In India, where contraceptive counseling often focuses on efficacy and side effects, emotional well-being is rarely discussed. Evidence on the mental health impact of OCs among Indian women is sparse. Hence, this study aimed to estimate the prevalence of anxiety and depression among women using OCs in Madurai and to identify factors associated with these conditions.

MATERIALS AND METHODS

Study design and setting

A community-based cross-sectional study was carried out from January to December 2024 in the urban and rural field practice areas under Madurai Medical College, Tamil Nadu.

Study population

Women aged 18–45 years who had been using OCs for at least six months were eligible. Women with diagnosed psychiatric disorders, postpartum depression, or on psychotropic medications were excluded.

Sample size and sampling

Assuming 30% prevalence of anxiety among OC users,[7] with a 5% margin of error and 95% confidence level, the required sample was 800. A multistage random sampling technique selected four primary health centre (PHC) areas (two urban, two rural). From each, 200 participants were recruited proportionately.

Data collection

Data were collected via face-to-face interviews using a structured questionnaire covering sociodemographic details, type and duration of contraceptive use, and psychological screening with the Hospital Anxiety and Depression Scale (HADS).[8] A score ≥ 8 on either subscale indicated the presence of anxiety or depression.

Statistical analysis

Data was entered in Microsoft Excel and analyzed using SPSS v26.0. Categorical variables were expressed as frequencies and percentages. Bivariate analysis used the chi-square test. Factors significant at $p < 0.10$ were included in multivariable logistic regression to obtain adjusted odds ratios (AORs) with 95% confidence intervals. Significance was set at $p < 0.05$.

Ethical approval

Institutional Ethical Committee approval was obtained (MMC/IEC/2024/FP/022). Written informed consent was secured from all participants.

RESULTS

Participant profile

Of 800 participants, the mean age was 31.2 ± 6.8 years. Most were married (94%), homemakers (56.9%), and urban residents (61.5%). Over half (58.4%) used combined oral contraceptives (COCs), while 41.6% used progestin-only pills (POPs). Approximately 39% had used OCs for more than one year (Table 1).

Table 1. Sociodemographic and contraceptive characteristics (n = 800)

Variable	Category	n (%)
Age (years)	18–25	154 (19.3)
	26–35	404 (50.5)
	>35	242 (30.2)
Residence	Urban	492 (61.5)
	Rural	308 (38.5)
Education	≤Secondary	286 (35.8)
	Graduate or above	514 (64.2)
Type of OC used	COC	467 (58.4)
	POP	333 (41.6)
Duration of use	≤1 year	486 (60.8)
	>1 year	314 (39.2)

Prevalence of anxiety and depression

Overall, 28.6% (229/800) screened positive for anxiety and 22.1% (177/800) for depression (Table 2). Anxiety was more prevalent among COC users (32.1%) than POP users (23.7%) and among those using OCs for more than a year (37.6% vs 22.8%). Similarly, depression was more frequent in older (>35 years) and rural participants.

Table 2. Prevalence of anxiety and depression among OC users

Variable	Anxiety n (%)	Depression n (%)
Overall prevalence	229 (28.6)	177 (22.1)
Type of OC		
COC (n = 467)	150 (32.1)	116 (24.8)
POP (n = 333)	79 (23.7)	61 (18.3)

Duration of use		
≤ 1 year	111 (22.8)	85 (17.5)
> 1 year	118 (37.6)	92 (29.3)

Factors associated with anxiety and depression

In multivariable logistic regression (Table 3), COC use (AOR = 1.67; 95% CI 1.08–2.56; p = 0.021) and OC use > 1 year (AOR = 1.82; 95% CI 1.22–2.71; p = 0.004) were significantly associated with anxiety.

For depression, significant predictors included age > 35 years (AOR = 1.91; 95% CI 1.19–3.05; p = 0.007) and rural residence (AOR = 1.64; 95% CI 1.07–2.52; p = 0.023).

Table 3. Multivariable logistic regression analysis of factors associated with anxiety and depression

Variable	Adjusted OR (95% CI)	p-value
Anxiety		
COC vs POP	1.67 (1.08–2.56)	0.021
Duration > 1 year	1.82 (1.22–2.71)	0.004
Depression		
Age > 35 years	1.91 (1.19–3.05)	0.007
Rural residence	1.64 (1.07–2.52)	0.023

DISCUSSION

This study demonstrated that approximately one in three OC users in Madurai experienced anxiety and one in five experienced depression. These prevalences are comparable to findings from Lebanon (33% anxiety, 29% depression)[9] and Turkey (34% anxiety, 26% depression),[10] but higher than rates reported in Western cohorts, such as Denmark (16% depression among OC users).[11] The difference may reflect cultural variations in health-seeking behavior, psychosocial stressors, and reporting practices.

The significant association between combined oral contraceptive use and anxiety aligns with earlier reports by Skovlund et al.[11] and Anderl et al.,[4] which linked estrogen-progestin formulations to altered serotonergic activity. Estrogen modulates tryptophan hydroxylase and monoamine oxidase, influencing serotonin metabolism.[12] Progestins may further impact GABAergic signaling, thereby affecting mood regulation.[13]

The finding that longer duration of OC use correlates with greater anxiety and depression is consistent with longitudinal evidence from the UK Biobank study,[14] suggesting a cumulative neuroendocrine effect over time. Conversely, some studies (e.g., Keyes et al.)[15] reported protective or neutral mood outcomes, indicating inter-individual variability due to hormonal sensitivity and life stress.

Depression in older (>35 years) and rural women may reflect compounded social roles, limited healthcare access, and greater stigma toward psychological symptoms. Rural women in Tamil Nadu often have reduced mental health literacy and constrained access to counseling services, as documented in the National Mental Health Survey (2016).[16-18]

Overall, the current findings underscore that psychological well-being must be viewed as an integral component of contraceptive safety. Reproductive health programs in India should incorporate routine screening for anxiety and depression using validated tools such as HADS or PHQ-9 and provide referral pathways to mental health professionals.
Strengths and limitations

The study's strengths include a large, community-based sample, use of a validated screening instrument, and multivariable analysis controlling for confounders. Limitations include its cross-sectional nature (precluding causal inference), reliance on self-reported mood states, and lack of hormonal level assessment. Future longitudinal research could clarify temporal associations and dose–response effects.

CONCLUSION

This study found that 28.6% of women using OCs in Madurai exhibited anxiety and 22.1% exhibited depression, with higher risk among users of combined pills, those using OCs for > 1 year, older women, and rural residents. These results achieve the study objectives of estimating prevalence and identifying associated factors.Integrating mental health screening and counseling into routine family planning services can enhance the safety and acceptability of OCs. Public health strategies should ensure that reproductive autonomy includes emotional well-being as an essential dimension of women's health.

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Conflicts of Interest: NIL

Ethical Approval / IRB Approval
The study received approval from the Institutional Ethics Committee (IEC) of Madurai Medical College. IEC Reference Number: **MMC/IEC/2024/FP/022**

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