



Case Study

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Oral Contraceptive Use and its Association with Depression among Women in Taif, Saudi Arabia

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ABSTRACT

The oral contraceptive pill (OCP) is a type of birth control pill that is taken orally. OCP is the world's most frequently used contraceptive method today. To estimate the prevalence of depression among hormonal contraceptive users in Taif city. The study was a cross-sectional questionnaire survey, based on a structured questionnaire that was developed by authors conducted in Taif city in the kingdom of Saudi Arabia. The required sample was calculated, which is approximately 384. The prevalence of using oral contraceptive pills (OCPs) was found to be 57.5%. The Beck Depression Inventory (BDI) score was calculated by adding the scores of all the items in the questionnaire. The mean scores for the BDI were found to be 14.1 ± 10.1 . A BDI score of 17 or more was considered to have clinical depression, and it was found that the prevalence of depression was 37.8%. The Levels of Depression were calculated based on the total score as Normal (1-10), Mild mood disturbance (11-16), Borderline clinical depression (17-20), Moderate depression (21-30), Severe depression (31-40), Extreme depression (>40). The analysis showed that 2.4% and 4.4% demonstrated extreme and severe depression, respectively. The findings showed that females' oral contraceptive pills were the most commonly used contraceptive methods. About 37.8% of the females who used OCPs had demonstrated depression symptoms.

Key words: Hormone contraception, Estrogen, Progesterone, Depressed mood, Depression

INTRODUCTION

Hormonal contraceptives (HCs) are one of the most influential discoveries of the twentieth century, with over 100 million users worldwide. HCs are an effective contraception and family planning strategy, as well as a way to manage cycle-related physiological symptoms (e.g., ovulation pain, acne, hirsutism). The data implies that HC use is good for many women, but a small percentage of women experience significant mood-related adverse effects [1, 2]. The most commonly reported adverse effects are mood disturbances and depression [3, 4]. Depression is defined as a type of mood illness characterized by a persistent sense of sadness and lack of interest. The study showed that women are about twice as likely as males to suffer from depression [5]. In addition to that women who started using a contraceptive patch experienced roughly twice the risk of subsequently starting an antidepressant or being diagnosed with depression [6]. Another study conducted in Denmark showed an association between oral contraceptive pills (OCPs) use and subsequent use of antidepressants and a diagnosis of depression [7]. In 2019, research has been conducted on the Effects of Hormonal Contraceptives on Mood and the result has shown that Hormonal contraceptives (HCs) appear to have the most detrimental effects on mood in women who have a history of depressive symptoms and/or a negative experience with HC use. Although inconsistent to some extent, current evidence suggests that HC users have a negativity bias in emotion

identification and reaction. However, some evidence suggests that certain HC users have a reduced reward response and a potential dysregulation of the stress response [1]. A study was performed on 354 young family planning patients and found that discrimination against oral contraceptive pills is associated with depression and mood disorders [8]. Finally, psychological research found that in the 60s and 70s when oral contraceptive pills were used in large amounts it will increase depressive symptoms [9-11]. Due to the limitation of published research in Saudia Arabia about oral contraceptives and their relationship with depression, we conducted this study to measure the association between oral contraceptive pills and depression.

MATERIALS AND METHODS

This is a cross-sectional analytic descriptive study, which is under approval. The study population included all females who are taking contraceptive methods in Taif, KSA. The sample size was estimated using the Qualtrics calculator with a confidence level of 95%, a sample size of 384, and a margin error of 5%. Inclusion criteria are as follows: females who have already used oral contraceptive pills Aged 15 and more, in Taif KSA and who agree to Participate. Exclusion criteria are as follows: females less than 14 years old, men, non-oral contraceptive users, living other than Taif city KSA, and who refuse to participate. The survey will be conducted between Oct 2021-Oct 2022. The instrument used was an electronic questionnaire in Arabic from Alfaifi, M. *et al.* (2021) [3], and we used a google questionnaire which included questions about using and duration of OCPs, depression symptoms, and their correlation. The survey instrument was a self-administered questionnaire. The questionnaire was divided into three main sections: the first section was for demographic data; the second section consists of questions about OCPs, and the third section consisted of questions about depression symptoms. After that by using the Microsoft Office Excel software program data was entered and statistically analyzed using the Social Science Software Statistical Package (SPSS), version 26.

RESULTS AND DISCUSSION

Table 1. Baselines characteristics of the participant

		n	%
Age	18-25 years	74	29.7
	26-35 years	84	33.7
	36-45 years	70	28.1
	46-55 years	19	7.6
	>55 years	2	0.8
Marital status	Married	201	80.7
	Separated or divorced or widowed	48	19.3
Smoking	No	230	92.4
	Yes	19	7.6
Number of children	No children	82	32.9
	1-2	73	29.3
	3 and more	94	37.8
Family type	Small family	207	83.1
	Large family	42	16.9
Educational level	No primary education	2	0.8
	Primary	3	1.2
	Middle	8	3.2
	Secondary or higher	236	94.8
Workforce Participation	Employed	115	46.2
	Unemployed	134	53.8
Family Income (Salary)	Very weak	6	2.4
	Weak	14	5.6

	Average	207	83.1
	High	22	8.8
	3-6 months	90	36.1
Duration of Oral contraceptive use	>6-12 months	35	14.1
	>1 year	124	49.8

Table 1 shows the baseline characteristics of the participants showed that 84 (33.7%) belonged to the age group of 26-35 years, 201 (80.7%) were married, 230 (92.4%) were smokers, 94 (37.8%) had children three or more, 207 (83.1%) belonged to small family type, 236 (94.8%) had secondary or higher education, 134 (53.8%) were unemployed, 207 (83.1%) had average family income, and 124 (49.8%) were using OCPs for more than one year.

Table 2. Depression and related factors

		N	%
Received any treatment for depression in the past	No	234	94.0
	Yes	15	6.0
Social support	Lots of social support	119	47.8
	Little social support	130	52.2
Recording cases of living problems in the past two months	No	172	69.1
	Yes	77	30.9
Relationship with the husband	Not comfortable at all	38	15.3
	Somewhat convenient	129	51.8
	Comfortable-very comfortable	82	32.9
Having health problems in the past two months	No	99	39.8
	Yes	150	60.2
Type of health problems (n=150)	Muscle and bone pain	17	11.3
	Limb problems	4	2.7
	Backache	16	10.7
	Gastrointestinal symptoms	5	3.3
	Headache	21	14.0
	Multiple health problems	87	58.0
Husband experiences chronic disease(s)	Nothing	192	77.1
	One disease	46	18.5
	2 or more	11	4.4
Self-assessment of health	Good / very good	191	76.7
	Exposition	52	20.9
	Too bad	6	2.4

It was reported by 15 (6%) participants that they received some treatment for depression in the past, and 52.2% mentioned that they received little social support. It was observed that 69.1% had cases of living problems in the past two months, and 15.3% had an uncomfortable relationship with their husband. About 150 participants reported that they were suffering from some health problems, whereas 58% had multiple health problems. It was reported by 18.5% and 4.4% of the participants that their husbands suffered from one or two or more chronic diseases, respectively. About 76.7% of the participants self-assessed their health as good or very good (**Table 2**).

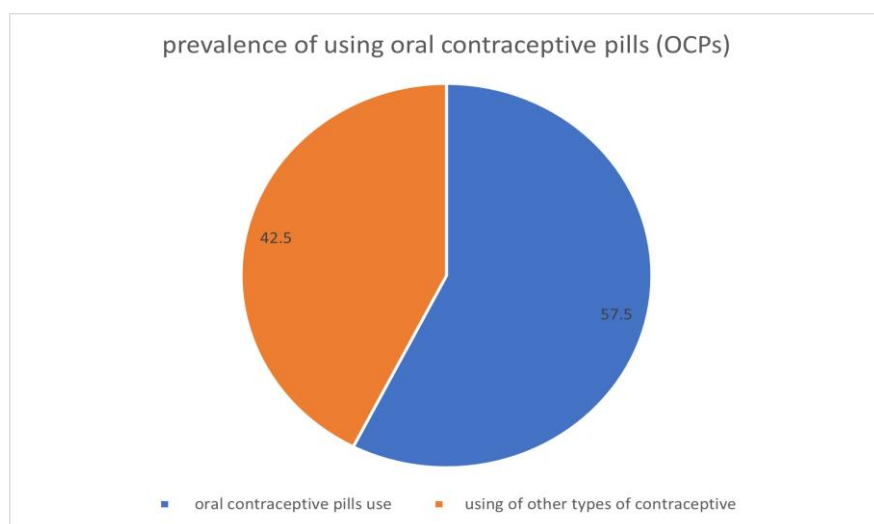


Figure 1. Prevalence of oral contraceptives using

We received a total response from 433 participants who were using some form of contraceptive methods and out of this, the prevalence of using oral contraceptive pills (OCPs) was found to be 57.5% (n=249) (**Figure 1**).

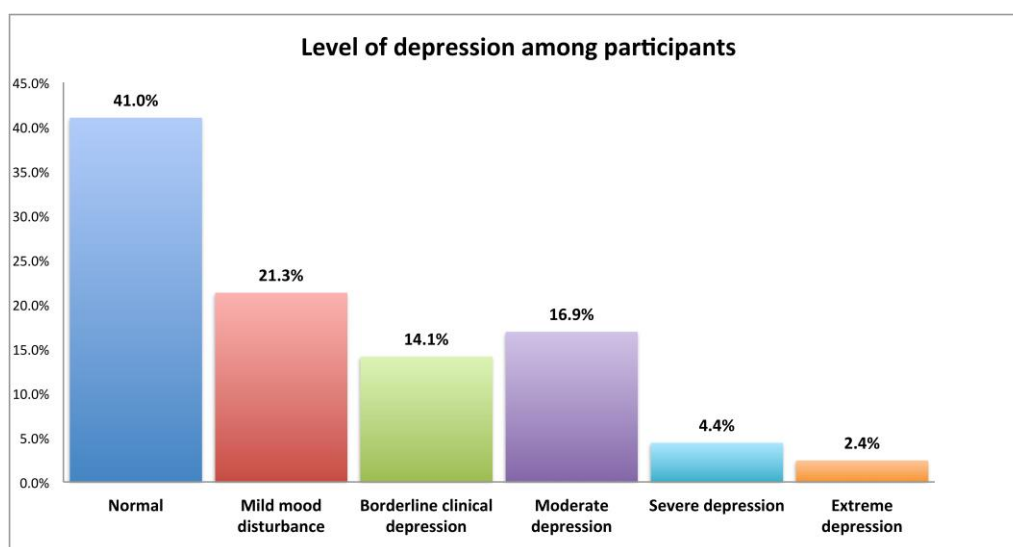


Figure 2. Level of depression among the participants

The Beck Depression Inventory (BDI) score was calculated by adding the scores of all the items in the questionnaire. The mean scores for the BDI were found to be 14.1 ± 10.1 . A BDI score of 17 or more was considered to have clinical depression, and it was found that the prevalence of depression was 37.8%. The Levels of Depression were calculated based on the total score as Normal (1-10), Mild mood disturbance (11-16), Borderline clinical depression (17-20), Moderate depression (21-30), Severe depression (31-40), Extreme depression (>40). The analysis showed that 2.4% and 4.4% demonstrated extreme and severe depression, respectively (**Figure 2**).

Table 3. Relationship between Depression Levels and baseline characteristics

		Depression Levels						P value
		Normal	Mild mood disturbance	Borderline clinical depression	Moderate depression	Severe depression	Extreme depression	
Age (years)	15-25	31	12	7	17	5	2	0.840
		41.9%	16.2%	9.5%	23.0%	6.8%	2.7%	
	26-35	33	19	14	10	5	3	

		39.3%	22.6%	16.7%	11.9%	6.0%	3.6%	
		28	17	11	12	1	1	
	36-45	40.0%	24.3%	15.7%	17.1%	1.4%	1.4%	
		9	5	3	2	0	0	
	46-55	47.4%	26.3%	15.8%	10.5%	0.0%	0.0%	
		1	0	0	1	0	0	
	>55	50.0%	0.0%	0.0%	50.0%	0.0%	0.0%	
Marital status	Married	81	51	29	30	7	3	0.006
		40.3%	25.4%	14.4%	14.9%	3.5%	1.5%	
	Separated or divorced or widowed	21	2	6	12	4	3	
		43.8%	4.2%	12.5%	25.0%	8.3%	6.3%	
Smoking	No	93	51	34	38	9	5	0.404
		40.4%	22.2%	14.8%	16.5%	3.9%	2.2%	
	Yes	9	2	1	4	2	1	
		47.4%	10.5%	5.3%	21.1%	10.5%	5.3%	
Number of children	Nothing	35	12	9	18	5	3	0.377
		42.7%	14.6%	11.0%	22.0%	6.1%	3.7%	
	1-2	34	15	9	10	3	2	
		46.6%	20.5%	12.3%	13.7%	4.1%	2.7%	
	3 and more	33	26	17	14	3	1	
		35.1%	27.7%	18.1%	14.9%	3.2%	1.1%	
Family type	Small family	87	46	30	30	10	4	0.240
		42.0%	22.2%	14.5%	14.5%	4.8%	1.9%	
	Large family	15	7	5	12	1	2	
		35.7%	16.7%	11.9%	28.6%	2.4%	4.8%	
Educational level	Nothing	2	0	0	0	0	0	0.947
		100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Primary School	1	0	1	1	0	0	
		33.3%	0.0%	33.3%	33.3%	0.0%	0.0%	
	Middle School	4	2	0	2	0	0	
		50.0%	25.0%	0.0%	25.0%	0.0%	0.0%	
	Secondary or higher	95	51	34	39	11	6	
		40.3%	21.6%	14.4%	16.5%	4.7%	2.5%	
Workforce Participation	Worker	54	19	18	18	3	3	0.274
		47.0%	16.5%	15.7%	15.7%	2.6%	2.6%	
	Not worker	48	34	17	24	8	3	
		35.8%	25.4%	12.7%	17.9%	6.0%	2.2%	
Family Income (Salary)	Very weak	2	0	1	3	0	0	0.142
		33.3%	0.0%	16.7%	50.0%	0.0%	0.0%	
	Weak	5	2	1	3	1	2	
		35.7%	14.3%	7.1%	21.4%	7.1%	14.3%	
	Average	87	43	30	34	10	3	
		42.0%	20.8%	14.5%	16.4%	4.8%	1.4%	
	High	8	8	3	2	0	1	
		36.4%	36.4%	13.6%	9.1%	0.0%	4.5%	

Duration of Oral contraceptive use	3-6 months	38	15	13	18	4	2	0.755
		42.2%	16.7%	14.4%	20.0%	4.4%	2.2%	
	6-12 months	14	7	5	4	3	2	
		40.0%	20.0%	14.3%	11.4%	8.6%	5.7%	
	>1 year	50	31	17	20	4	2	
		40.3%	25.0%	13.7%	16.1%	3.2%	1.6%	

When we assessed the relationship of levels of depression with baseline characteristics of the participants, there was no statistically significant relationship observed with age ($p=0.840$), smoking ($p=0.404$), number of children ($p=0.377$), family type ($p=0.240$), educational level ($p=0.947$), workforce ($p=0.274$), family income (0.142), and duration of use of OCPs (0.755). But, there was a statistically significant association observed for marital status where females who were Separated/divorced or widowed had comparatively higher percentages of moderate (25%), severe (8.3%), and extreme (6.3%) depression levels ($p<0.006$) (**Table 3**).

It was observed that participants who received any treatment for depression in the past had significantly higher depression than those who didn't receive it ($p<0.001$). Moderate and severe depression levels (19.2% & 7.7%) were significantly more seen among participants who had little social support ($p=0.001$). Participants who had some living problems in the past had significantly more moderate, severe, and extreme depression levels than those who didn't ($p<0.001$). Females who reported that they were comfortable with their husbands demonstrated no depression symptoms compared to those who were not comfortable at all ($p=0.002$). Moderate, severe, and extreme levels of depression were seen significantly higher among females who had some health problems ($p<0.001$). Females who self-rated 'too bad for their health status had significantly demonstrated more moderate, severe, and extreme levels of depression than those who rated good/very good health ($p<0.001$).

We did a multinomial logistic regression model, where a BDI score of 17 or more was considered the presence of depression symptoms. It was found that 94 participants (37.8%) had demonstrated depression symptoms. The analysis showed that history of treatment for depression [OR= 1.35 (0.97- 3.13), $p=0.008$] cases of living problems in the past two months [OR= 2.14 (1.09- 4.29), $p=0.005$], uncomfortable relationship with husband [OR= 2.69 (1.20- 6.01), $p=0.016$], and self-rated too bad health status [OR= 9.4 (3.85- 12.87), $p<0.001$] were independently associated with depression.

Depressive and anxiety conditions are one of the primary causes of disability worldwide [12]. Evidence shows that women are 70% more likely than men to have depressive episodes and 60% more prone to encounter anxiety problems. Approximately 12 % of women will experience clinical depression in their lifetime; 8.4 % will encounter symptoms of depression annually [13, 14]. Many studies have found that women with depression, anxiety, and other stress-related symptoms are more likely to take, abuse, or discontinue contraception than those without these symptoms [13, 15]. Thus, our study evaluated the relationship between OCPs use and depression symptoms among women of reproductive age in Taif city.

Numerous studies have been conducted in Saudi Arabia to determine the prevalence of contraceptive use [16, 17]. However, there are limited studies that assess the impact of OCPs on mental health. A study similar to ours conducted in Jazan province of Saudi Arabia aimed to estimate the prevalence of depression among Hormonal contraceptives (HC) users reported a prevalence of 57.3%, where mood disturbance was observed in one-third of the woman [3]. But, our study included females who used only OCPs as the method of contraception, and the prevalence of depression was found to be 37.8%. A Norwegian and Australian study reported a prevalence of 24% and 30%, respectively, which are somewhat lesser compared to our findings [18, 19]. We observed that a history of treatment for depression was independently associated with depression. OCPs contain synthetic sex steroids, and these steroids cause alterations in brain functioning that impair cognitive performance, behavior, personality, and thoughts. Several mechanisms have been proposed to explain the effect of these pills on the brain and emotions. i) Synthetic HCs act on estrogen and progesterone receptors, which may affect cognitive functioning and behavior patterns. ii) By increasing the amount of sex hormone-binding globulin, OCPs can make testosterone less available, which can make estrogen more dominant [20]. iii) Similarly, OCPs can also cause a decline in the total of natural estradiol and progesterone in the body. In certain scenarios, this could result in increased activation of testosterone in the body, which could have caused a masculinizing effect on the brain [21]. iv) OCPs decrease serotonin and GABA levels in the brain by suppressing the Vitamin B6 and B12 metabolism [22]. v) OCPs decrease serotonin levels mainly through monoamine oxidase (MAO) activity in the endometrial

gland. Conversely, OCPs have also been found to boost and stabilize mood, and it is believed that this is due to an increase in serotonin due to the suppression of the MAO [23].

The current study findings showed that lack of social support and an uncomfortable marital relationship was associated with depression among females who used OCPs. Evidence shows that factors that predict better mental adjustment among women include having good social support, better adaptation or management of stressful events, resilient personality, no history of depression, and use of mental coping techniques [24, 25]. Thus it can be argued that among women who have a lack of social support and poor marital relationship, the use of OCPs could have worsened their mental health compared to those who didn't use OCPs. Some women develop depression or mood swings with OCPs use, and this is known as 'OC dysphoria.' It was reported by Sanders *et al.* that one-third of the OCPs user discontinued their usage after six months due to emotional and behavioral side effects [26]. Another study from the UK reported a 30% incidence of depression and mood changes among OCP users [27]. Other contrasting findings from the National Longitudinal Study of Adolescent Health, which assessed depressive symptoms among 6,654 sexually active non-pregnant women reported that HC users had lower levels of depression than non-users [28]. Even though the above study may bring some consolation to women concerned about the impact of OCPs on their mood, there are still a lot of unanswered questions. Depression is multifactorial, and thus it is difficult to rule out the effect of OCPs on depression and mood swings [29]. Therefore based on our findings, it can be assumed that OCP-using women become more vulnerable than those who are not using any contraceptive methods [30].

One of the strengths of the study is that we used a valid and reliable to assess mood changes and their level of severity. The cross-sectional nature of this study was a limitation, which could have failed to prove the causal relationship between OCPs and depression. The use of a self-reported questionnaire might have called upon recall bias and social desirability bias. Finally, we didn't assess whether these women discontinued or continued taking OCPs despite their intolerance effect of mood changes.

CONCLUSION

The findings showed that females' oral contraceptive pills were the most commonly used contractive methods. About 37.8% of the females who used OCPs had demonstrated depression symptoms. History of treatment for depression, cases of living problems in the past two months, uncomfortable relationship with husband, and poor self-rated health status were independently associated with depression. Women who have mood problems while taking OCPs should see a physician. It is crucial to fully understand the effects of such a common exposure and the risk factors for such a common and debilitating disorder because such findings can significantly impact the quality of life.

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CONFLICT OF INTEREST : None

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ETHICS STATEMENT : The study was approved by the research ethics commtee of Taif University with approval letter Number (44-038).

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