

# Prevalence of Depression Among Women Using Hormonal Contraceptives in Mogadishu, Somalia: A Cross-Sectional Study

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**Background:** Depression is a global health concern with significant consequences, especially for women. Hormonal changes and gender disparities contribute to its prevalence. Hormonal contraceptives are widely used among women of reproductive age, but some users report mood-related side effects.

**Purpose:** This study aims to investigate the relationship between hormonal contraceptive use and depression among women in Mogadishu, Somalia.

**Methods:** An analytical cross-sectional study was conducted at two hospitals in Mogadishu, targeting married women aged 15–49 using hormonal contraceptives. A sample size of 227 participants was determined, and data was collected using semi-structured questionnaires, including the Patient Health Questionnaire-9 (PHQ-9) to assess depression. The data were analyzed using SPSS version 25, including multivariate logistic regression.

**Results:** The prevalence of depression among participants was 33.5%, with significant associations observed between depression and occupation, income level, type of hormonal contraceptive used, and duration of contraceptive use. Housewives, individuals with lower income, users of oral pills and implant methods, as well as those with shorter durations of contraceptive use, constituted the high-risk groups for depression.

**Conclusion:** Depression poses a concern among women using hormonal contraceptives in Mogadishu, Somalia. Healthcare providers should educate women about potential side effects and consider individualized contraceptive recommendations. Mental health support initiatives and awareness campaigns should be introduced. Future research is recommended to further understand and address depression in this context.

**Keywords:** hormonal contraceptives, HC, reproductive health, depression, Somali women, cross-sectional study

## Introduction

Depression has significant consequences for women and their families, often leading to increased rates of anxiety, social isolation, drug abuse, and child and spouse relationships.<sup>1</sup> Globally, depression ranks as the fourth most prominent cause of disability, and it is projected to become the second major cause of disability.<sup>2</sup> Hormonal changes are believed to play a role in depression, with specific brain alterations leading to hormonal imbalances that contribute to depressive symptoms.<sup>3</sup> Depression represents an immense problem that affects a vast number of women all over the world, such as those who use hormonal contraceptive drugs.<sup>4</sup>

Depression poses a significant global health burden, estimated to impact 350 million people worldwide.<sup>1</sup> A global mental health study across seventeen nations found that around one in twenty individuals experienced an episode of depression in recent years, with onset often occurring at a young age and leading to substantial disability.<sup>5</sup> Depression's impact is particularly pronounced among women in both high-income and low- and middle-income countries.<sup>6</sup>

Hormonal contraception is widely used among women of childbearing age, with over 100 million women using hormonal contraceptive pills (HC) worldwide.<sup>7</sup> Among 80% of women in the United States report using Oral Contraceptive Pills daily. These contraceptives, including combined oral pills, progestogen-only pills, vaginal rings, hormonal injectables, contraceptive skin patches, and hormone-releasing intrauterine devices (IUDs), are highly effective and practical for family planning.<sup>8,9</sup> Approximately 99% of sexually active women have used some form of contraception in their lifetime.<sup>10</sup> Combined oral contraceptives (COCs) are particularly popular due to their efficacy and tolerability.<sup>11</sup> Hormonal contraceptives are prevalent birth spacing methods in many countries, used by more than 80% of women at some point in their reproductive lives.<sup>12</sup> They are also associated with a lowered risk of endometrial and ovarian cancer.<sup>13</sup>

Although depression affects women of all ages worldwide, its incidence is reported to be twice as high in females compared to males, including in neighboring country Ethiopia.<sup>1</sup> The commonly used contraceptive method among young women is the combined oral contraceptive pill.<sup>14</sup> While most women using combined oral contraceptives report stable or improved moods, some individuals experience mood-related side effects, such as irritability, mood swings, and depressive symptoms. These side effects can lead to discontinuation of contraceptive use, with rates varying by age.<sup>15</sup> Gender differences in the lifetime prevalence of depression have been observed, with women being more than twice as likely as men to experience depression.<sup>16</sup> However, depression is a complex disorder influenced by various factors, including genetic, and a definitive explanation for this gender difference remains elusive.<sup>17</sup> Additionally, combined hormonal contraceptives and progestin-only hormonal contraceptives are available globally; effectively preventing pregnancy and achieving proper cycle control.<sup>18</sup> The type of hormonal contraceptive used, the combination of estrogen and progestin, and the specific progestin type can all influence the side effects experienced.<sup>19</sup> Studies conducted in various countries, including Ethiopia,<sup>20</sup> Kenya,<sup>21</sup> Saudi Arabia,<sup>22</sup> Tanzania,<sup>23</sup> Nigeria<sup>24</sup>, Iran,<sup>8</sup> and Somalia,<sup>25,26</sup> have reported associations between hormonal contraceptive use and mood changes, as well as concerns about side effects leading to discontinuation.

In Somalia, limited studies have explored the relationship between depression and hormonal contraceptives among women. This study aims to investigate the connection between the use of hormonal contraceptive methods and depression.

## Methods and Materials

### Study Design and Site

This study was an analytical cross-sectional study design, which assessed the prevalence of depression among women using hormonal contraceptive drugs in Mogadishu, Somalia. This study was conducted at two selected health service facilities: the first being a private hospital named Somali Sudanese Hospital, and the second a public hospital known as Benadir Mother & Child Hospital. These hospitals are in Hodan and Wadajir Districts, Mogadishu, respectively.

### Study Population

The target populations for this study comprised all married women of reproductive age (15–49 years) who were using hormonal contraceptive methods and seeking health services at the selected hospitals in Mogadishu, Somalia.

### Inclusion Criteria and Exclusion Criteria

For inclusion criteria, we included married women using hormonal contraceptives and seeking care at the selected hospitals in Mogadishu, Somalia. However, married women who refused to participate in the study and those who had been diagnosed with common mental illnesses, such as schizophrenia and pregnant women, were excluded from the study. We did not exclude women with gynecological co-morbidities. Also, non-married women were excluded because, the selected hospital only provided hormonal contraceptives to married women.

### Sample Size and Sampling Technique

To collect data from the participants, a simple random sampling approach was employed. A sample frame was created, listing women who used hormonal contraceptives from each hospital. For a 10% non-response rate, 23 participants were added to the calculated sample size:  $204 + 23 = 227$ . Therefore, the final sample size for this study was determined to be

227 participants. A single proportional-to-size allocation method<sup>27</sup> was used to select a representative sample from each sector, resulting in a total of 227 reproductive-age women who were not pregnant and were using hormonal contraception for the study.

Since the exact number of study population was unknown, we considered the appropriate formula for sample size determination was Cochran's single population proportion formula which is calculated as:

$$n = \frac{Z^2PQ}{e_2}$$

$n = 204$  that is the sample size. We added 10% of non-responses rate which was equal 23.

So, the last sample size was 227.

$n$  = the desired sample size.

$Z^2$  = is the squared critical value of the desired confidence level.

$P$  = is the estimated attribute proportion which is present in the population under study based on previous or pilot studies.  $q$  = is the estimated attribute proportion which is not present in the population under study based on previous or pilot studies, calculated as  $(1-p)$ .

$e_2$  = is the squared value of the desired level of precision error, also known as margin of error.

In this study, as we know from the Somali demography and health survey of 2020, showed that only 7% of married reproductive aged women in Somalia use pregnancy spacing services.<sup>28</sup> So, we have 7% (0.07) as  $P$ , while  $q = 1-p (1-0.07) = 0.93$  (93%).  $Z^2$  = the standard squared critical value usually set at 1.96 which corresponds to 95% confidence level.

## Data Collection and Procedures

Semi-structured questionnaires were administered using English and Somali versions to the study participants from the women of two hospitals who use hormonal contraceptive methods in Mogadishu-Somalia. A standard questionnaire was used to collect the data, which included Patient Health Questionnaire-9 (PHQ-9). For the previous two weeks, patient depression was assessed using the PHQ-9 with a 3-point severity scale. Based on the standard PHQ-9 instrument<sup>29</sup> interpretation of total scores ranging from 0 to 4 Non-depression (Minimal depression), 5–9 Mild depression, 10–14 moderate depression, 15–19 moderately severe depression, and severe depression score ( $\geq 16$  scores were considered significant for meeting the symptoms of depression). Major depression was diagnosed when a study participant experienced five or more of the nine depressive symptoms on most days over the past two weeks. Other forms of depression were assessed when respondents exhibited symptoms related to the primary symptoms of depression (symptoms one, two, three, and four) in addition to other symptoms.<sup>29</sup> The questionnaire also gathered socio-demographic information, including age, occupation, degree of education, monthly income, number of children, duration of contraceptive use, and self-reported health status. The primary outcome was the prevalence of depression among women using hormonal contraceptives. Secondary outcome was associated factors with hormonal contraceptive use and depression among Somali married women in selected hospitals, Mogadishu, Somalia. The data was collected between July and September 2022.

## Data Management Plan and Analysis

A well-designed data collection tool was meticulously developed to ensure data quality in this study. The lead investigator conducted a thorough review of the collected data each day. Any issues or challenges encountered during the data collection process were promptly addressed, with corrective actions implemented as needed. The data collectors were given guidance to ensure the accuracy of the responses provided by participants. Additionally, a field supervisor carried out a double-check of the completed questionnaires immediately after each field interview and during the submission process. This rigorous quality control process ensured that the data collected was accurate, complete, and consistent on a daily basis. Following the data collection phase, the collected data, including samples and completed questionnaires, underwent thorough cleaning to eliminate any inconsistencies or errors. Subsequently, the data was subjected to analysis using the Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics were employed to present the data, which was summarized using frequency and percentage distributions. This approach allows

readers to easily discern trends in the data distribution. For statistical significance, a p-value equal to or less than 0.05 was considered as the threshold. Multivariate analysis was conducted, with all variables adjusted to assess potential confounding factors.

## Ethical Consideration

The study was approved by the ethics committee of the Postgraduate Ethical Review Committee of the School of Public Health and Research (SPHR) of the Somali National University and the selected hospitals. This study followed the ethics stated in the Declaration of Helsinki. Additionally, verbal informed consent was obtained from all the participants or their parents/legal guardians, which the Ethical Review Committee of the SPHR also approved.

## Results

### Socio-Demographic Characteristics of the Study Participants (n=227)

In the study, a total of 227 female participants were included, with a 100% response rate. More than half of the women, 54.2%, were in the age range of 25 to 34 years old. The majority of women were housewives, accounting for 68.7% of the respondents and 37% had completed a secondary-level education. Regarding income, 87.7% of participants reported a monthly income of less than 500 dollars. Approximately 31.3% of the respondents were employed, as shown in Table 1.

The prevalence of depression was calculated using the Patient Health Questionnaire-(PHQ-9). The respondents who answered yes to more than 16 questions were classified as having depression, while those who answered no to less than 16 questions were considered as not experiencing regular depression. Figure 1 illustrates the distribution of depression levels among the participants, categorized into five groups. The majority of the respondents, 27%, had moderate depression based on the PHQ-9 scale, while 22% had mild depression. Moreover, 19% of the participants experienced moderately severe and severe depression respectively and the lowest rate of depression was observed in 13.1% of the participants.

**Table 1** Socio-Demographic Information of the Study Participants (n=227)

Variable	Frequency (n)	Percentage %
<b>Age</b>		
15–24	64	28.2
25–34	123	54.2
≥ 35	40	17.6
<b>Occupation</b>		
Housewife	156	68.7
Employee	71	31.3
<b>Education level</b>		
Informal Education	82	36.1
Secondary Level	84	37.0
≥ Others	61	26.9
<b>Income Level</b>		
≤ 500	199	87.7
≥ 600	28	12.3

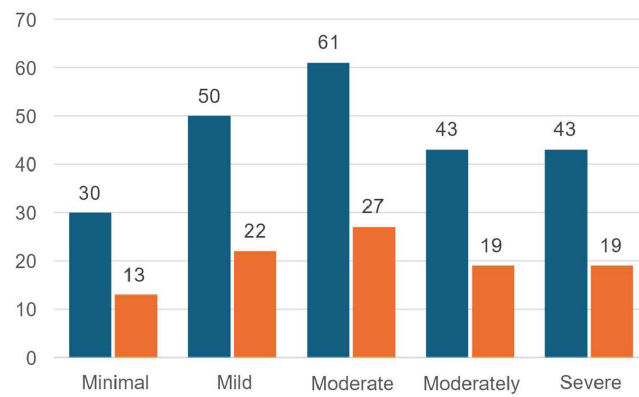


Figure 1 Scores of Patient Health Questionnaire-(PHQ-9).

Figure 2 shows the prevalence of depression among study participants was 33.5% and respondents without depression was 66.5%.

The types of contraceptives, 44% of respondents used the implant method inserted in the upper arm for approximately three years, 38.3% used Norplant, and 18.1% used oral contraceptive pills for child spacing as shown in Figure 3.

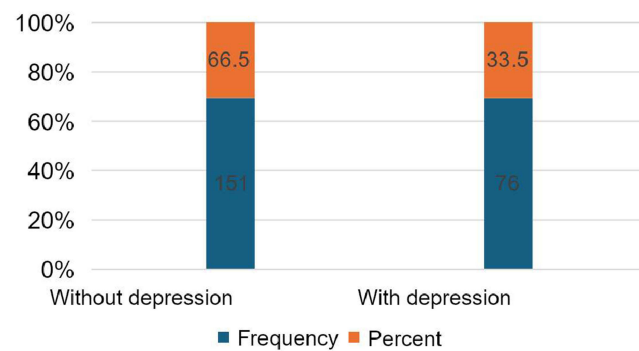


Figure 2 Prevalence of depression among Somali women in Mogadishu.

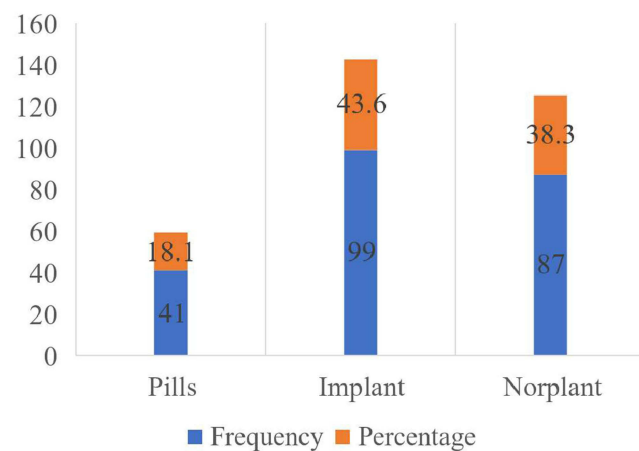


Figure 3 Types of contraceptives used by Somali married women in Mogadishu.

## Hormonal Contraceptive Uses Characteristics

Table 2 shows the characteristics of the participants using hormonal contraceptive methods. The number of children per family, 50.2% had less than three children, but 33.9% of the mothers had 4–7 children, while 15.9% had eight children. Additionally, 44.1% of participants had been using hormonal contraceptives for family planning for over one year, while 53.9% had used them for less than six months. Approximately 39.6% of the participants had taken depression therapy in the past six months. A significant proportion, 78.9%, reported good self-related health status.

## Logistic Regression Bivariate and Multivariate Analysis Model

In our study, we conducted a multivariate logistic regression analysis to account for potential confounding factors. This analysis was performed on the predictors that had shown significant associations at the bivariate analysis level. In the multivariate analyses, several variables including occupation, income level, types of hormonal contraceptives, and duration of contraceptive use exhibited statistically significant associations with depression among women who used hormonal contraceptives.

In Table 3, those who identified as housewives had a 1.91-fold increased likelihood of experiencing depressive illness compared to those who were employed (95% CI=1.10–3.34), with a statistically significant p-value of 0.022. Despite the occupational status, housewives had a 1.91 times higher risk of depressive disorder than those who worked (95% CI=1.10–3.34) with a p-value of 0.022. That means housewives are more susceptible to develop depression once they use hormonal contraceptive methods compared those who are employed. Family income was statistically associated with depression, particularly those earning less than \$500 with AOR 0.45 (95% CI=0.26–0.80) per month with a p-value of 0.007, compared to families with more than \$600.

On the other hand, the type of hormonal methods was adjusted and statistically reported significance for both oral contraceptive pills with AOR 2.25 (95% CI=1.18–4.32) and implant methods performed AOR 2.26 (95% CI=1.11, 4.63). The oral contraceptive pills p-value was recorded as 0.014. Similarly, implant methods ranged in a p-value less than 0.024.

Therefore, duration was confirmed to be significantly strongly associated with depression of mothers who used hormonal contraceptives for child spacing. In fact, less than three months duration of performed hormonal contraceptives

**Table 2** Hormonal Contraceptive Uses Characteristics of Participants (N= 227)

Variable	Frequency	Percent
<b>Number of children</b>		
0–3	114	50.2
4–7	77	33.9
8 and above	36	15.9
<b>Duration of hormonal contraceptives usage</b>		
More than 3 months	75	33.0
More than 6 months	52	22.9
1 year and more	100	44.1
<b>Have you taken any depression therapy in the past</b>		
Yes	90	39.6
No	137	60.4
<b>Self-related health</b>		
Good	179	78.9
Poor	48	21.1

**Table 3** Logistic Regression Bivariate and Multivariate Analysis Model (N= 227)

Variable	Prevalence of depression		Bivariate analysis	Multivariate analysis	P-value
	With depression	Without depression	OR (95% CI)	AOR (95% CI)	
Age					
15–24	43	21	Reference	Reference	
25–34	84	39	0.48 (0.29,0.82)	1.43 (0.50,4.07)	0.503
≥ 35	24	16	0.46 (0.31,0.67)	0.87 (0.42, 1.81)	0.725
Occupation					
Housewife	96	60	0.62 (0.45–0.86)	1.91 (1.10–3.34)	<b>0.022</b>
Employee	55	16	Reference	Reference	
Education level					
Informal	42	40	0.95 (0.61,1.46)	1.47 (0.90,2.40)	0.116
Secondary	58	26	0.44 (0.282,0.71)	0.88 (0.50, 1.55)	0.670
Bachelor and more	51	10	Reference	Reference	
Income Level					
≤ 500	127	72	0.56 (0.42–0.75)	0.45 (0.26–0.80)	<b>0.007</b>
≥ 600	24	4	Reference	Reference	
Type of hormonal methods					
Pills	36	5	0.13 (0.05–0.35)	2.25 (1.18–4.32)	<b>0.014</b>
Implant	60	39	0.65 (0.43,0.97)	2.26 (1.11, 4.63)	<b>0.024</b>
Norplant/Others	55	32	Reference	Reference	
Contraceptive duration					
≥ 3 months	55	20	0.36 (0.21, 0.60)	0.35 (0.19, 0.64)	<b>0.001</b>
≥ 6 months	39	13	0.33 (0.17, 0.62)	0.30 (0.15,0.60)	<b>0.001</b>
≥ 1 year	57	43	Reference	Reference	

**Note:** Bold values indicate P<0.05.

was a high risk of developing depression AOR 0.35 (95% CI=0.19–0.64) with a p-value of 0.001, and six-month duration was AOR 0.30 (95% CI= 0.15–0.60) presented p-value for 0.001.

## Discussion

This study revealed that the prevalence of depression among women who used hormonal contraceptives was 33.5%. Another study with a prevalence of depression among hormonal contraceptives conducted in South Africa<sup>30</sup> was reported a similar result, 33.5%. Additionally, a cross-sectional study conducted in Ethiopia<sup>1</sup> was roughly 34.1%, and other studies conducted in Jeddah, Saudi Arabia<sup>22</sup>, was about 34.6%.

Therefore, a high prevalence of depression was reported in a cross-sectional study conducted in Jazan province, Saudi Arabia, which was higher than the Jeddah study 43.3%.<sup>4</sup> Moreover, similar studies on hormonal contraceptives in Iran was reported 37.7%<sup>8</sup> and 47.8%<sup>3</sup> respectively. For instance, a low prevalence of depression disorders was reported in studies in Thailand<sup>31</sup> and the Gambia.<sup>32</sup> The findings of this study indicate that those with a higher income level have

a decreased likelihood of developing depression in comparison to those with a lower income level (Adjusted Odds Ratio [AOR] = 0.45, 95% Confidence Interval [CI] = 0.26–0.80). Nevertheless, the research findings conducted in Ethiopia<sup>1</sup> supported our study results.

Furthermore, the findings of this research shows that there is a higher likelihood of women experiencing depression when utilizing the implant technique or oral pills compared to those who use Norplant. The adjusted odds ratio (AOR) for the implant method is 2.26 (95% CI=1.11–4.63), while the AOR for oral pills is 2.25 (95% CI=1.18–4.32). Despite this study identified mothers who use hormonal contraceptives for one year or more had less chance of getting depression compared with those who use hormonal contraceptives for approximately three months or six months, with AOR 0.3 (95% CI=0.15–0.60), and AOR 0.30 (95% CI=0.15–0.60). Other researchers from Saudi Arabia<sup>4</sup> and Iran<sup>3</sup> presented similar findings regarding the duration of hormonal contraceptives. While other studies have suggested a potential link between hormonal contraceptives and depression in women, others have not found a significant association. The decision to use hormonal contraceptives should be made individually in consultation with a healthcare provider, considering the potential benefits and risks. Due to the evidence not being convincing, it is clear that depression is a severe health concern for women, and healthcare providers must be aware of the risks associated with hormonal contraceptive use. It is recommended that women who utilize hormonal contraceptives and exhibit symptoms of depression or other mood disorders should promptly consult their healthcare providers in order to determine the most effective course of treatment.

This study has limitations. Firstly, this study is a cross-sectional study which does not allow for determining causation. Secondly the data collected from the questionnaire were self-reported which could subject to recall bias. Despite these limitations, the study determined the prevalence of depression among married women who use hormonal contraceptives in selected hospitals in Mogadishu, Somalia.

Further studies need to be conducted and patients with gynecological comorbidities using hormonal contraceptive use can be explored.

## Conclusion and Recommendations

The study conducted at selected hospitals in Mogadishu, Somalia, revealed a significant frequency of depression among married women who use hormonal contraceptives. This study identified a correlation between depression and the use of hormonal contraceptive methods. The significant variables were included occupational, particularly housewives, low income, type of hormonal contraceptive, and first six months of using hormonal contraceptives. Also, this study presented the statistical significance of oral contraceptive pills and the usage of implant methods.

Finally, we recommend that women be aware of hormonal contraceptive side effects before beginning contraception; customized, patient-centered decisions that consider the individual's history and predispositions are advised. For this study, depression is one of the leading public health issues affecting women during childbearing, and therefore, starting mental health care support innovations in childbearing-age women and awareness raising is crucial. In this regard, we advised conducting a comparable study in Somalia to reduce the prevalence of depression of hormonal contraceptives to fill the research gap.

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## Disclosure

The authors report no conflicts of interest in this work.

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