Original Article

Effect of Combined Oral Contraceptive Pills on Body Mass Index (BMI) in Women Attending Family Planning Centres, Karachi, Pakistan

1. Mamoona Shafiq 2. Saleem-ul-Haque 3. Hafeez-ul-Hassan 4. Sikandar Ali Sheikh

1. Asstt. Prof. of Physiology, IMC, Sialkot 2. Assoc. Prof. of Biochemistry, AMC, Lahore 3. Prof. of Physiology, BMC, Karachi 4. Prof. of Physiology, BMC, Karachi.

ABSTRACT

Objective: To see the effect of combined oral contraceptive pills on Body Mass Index (BMI) of women.
Study Design: A descriptive study.
Place and Duration of the Study: The study was conducted at Family Planning Centers at social obstetrical unit Baqai Medical University and Reproductive and Health Sciences (RHS) Institute, a family planning unit, at Jinnah Post Graduate Medical Center Karachi, from November 2010 to April 2011.
Subjects and Methods: This study was carried out on 50 patients of reproductive age 20-40 years. Patients with Cardiac, Renal and Liver dysfunction were excluded. Diabetic women taking sedative and hypnotics, anti-tubercular treatment were also excluded. All routine investigations were performed. BMI was done on initial visit re-evaluated after one, three & six months and data was analyzed.
Results: Fifty women were selected. They were divided into four categories, Control (category 0) i.e. before the start of COCPs, after 1 month (category 1), 3 months (category 2) and 6 months (category 3). On initial visit mean BMI of control is found to be 22.53 ± 1.92. Category 1 showed mean BMI of 22.53 ± 1.92 kg/m2 while BMI of category 2 is 22.53 ± 1.92 kg/m2 category 3 is 22.91 ± 1.87.
After completion of study mean increase in BMI of category 3 was 0.38 kg/m^2.
Conclusion: Mean increase in BMI of category 3 is negligible.
Key words: Combined oral contraceptive pills, Body mass index (BMI), Ethinyloestradiol, Levonorgestrel.

INTRODUCTION

The oral contraceptives were first approved for contraceptive use in the United States in 1960, and are a very popular form of birth control [1]. The leading method of contraception in the United States is the oral contraceptive pill, used by 11.6 million women. Usage of oral contraceptives varies widely by country, age, education, and marital status [2], currently used by more than 100 million women worldwide [3]. Awareness of family planning is widespread in Pakistan. According to a survey by Pakistan Status of Women and Fertility Survey (PSWFS) 2003 show a contraceptive prevalence rate of 32% [4]. According to a survey in Karachi, only 8% of women are using oral contraceptive pills [5].

Weight gain is often attributed as a side effect of combined oral contraceptive pills (i.e., an estrogen plus progesterone) use [6], and many women and clinicians believe that an association exists [7, 8, 9]. Concern about weight gain can discourage the initiation of combination contraceptive use and cause early discontinuation among users. Weight gain was the most frequently cited reason for oral contraceptive discontinuation in a national study of adult women in the United States [10]. Furthermore, even the perception of weight gain can lead to contraceptive discontinuation. Thus, concern about weight gain limits the use of a highly effective method of contraception.

Nevertheless, a causal relationship between combination contraceptives and weight gain has not been established. Several mechanisms by which combination contraceptives could lead to weight gain have been hypothesized. In general, adults tend to gain weight with age [11]. The weight gain is due to an increase in one or more factors: fluid retention, muscle mass and fat deposition. Fluid retention could be induced by the mineralocorticoid activity that occurs when ethinyl estradiol (E2), the estrogen in combination oral contraceptives, impacts the renin–angiotensin–aldosterone system [12]. Estrogen has been associated with increased subcutaneous fat, especially in the breasts, hips, and thighs [6]. The anabolic properties of combination contraceptives could result in increased food intake through a pharmacologic effect on satiety and appetite [13]. Alternatively, progestins could cause stress, anxiety, or depression, and these conditions, in turn, could be responsible for increased appetite and caloric consumption [6]. However, the most likely reason for the growing girth of women is a combination of genetic, environmental and lifestyle factors that have nothing to do with OC use [14].

In the clinical setting, simply weight measurement is insufficient; therefore one of the current recommended measures for weight gain and obesity is Body Mass Index [15]. BMI is defined as medical standard for obesity measurement and is employed by WHO obesity statistics. BMI is primarily a statistical tool designed for

public health study which enables the investigation & comparison of any medical data set in which the height and weights of subject are recorded, to determine whether obesity correlates with health outcomes. It was developed by Belgian Polymath Adoophe Quetlet in 1830-1850. It is calculated as follows. 2 BMI=Weight in Kg/Height in cm. Ideal normal range is 18.5 to 22.9 kg/m2 [16].

Detailed studies of the effect of combined hormonal contraceptives on weight gain have not been completed as it is difficult to control for factors such as caloric intake and activity level in women during long-term trials. In this study, we sought to investigate whether COCPs influence body weight in normal weight women while measuring BMI.

The reason of calculating BMI instead of weight is that BMI is the better indicator of total body fat & correlates more closely with adverse effects of excess weight than, body weight alone [16].

MATERIALS AND METHODS

The overall goal of this study was to determine if the use of COCPs has an effect on body weight. Two hundred & thirty women were attended in the hospital but only Sixty two met the inclusion criteria, out of which only 50 were followed till six months. Six of them were dropped from the study due to change of contraceptive method, four due to improper use of combined oral contraceptivve pills (COCPs) like missing one or more pills and two of them got pregnant so COCPs were discontinued.

Inclusion Criteria

- Women aged 20-40 years who were interested in contraception not desiring pregnancy for the duration of the study.
- Women with history of any or active uterine bleeding disorder like menorrhagia or polymenorrhea, to which other methods of contraception were not preferred.
- Carefully evaluated by clinical examination to be labeled as normal & healthy before starting the COCPs.
- Written or verbal consent was taken before enolment in the study.

Exclusion criteria

- Patients with hypertension & heart disease.
- Renal and hepatic dysfunction
- Diabetes mellitus
- The women not willing to take the COCPs.
- Patients who were already on COCPs.
- Post menopausal women.
- Women having Depot medroxyprogesterone acetate (DMPA) hormonal contraceptive injection in the past 90 days.

Obstetrical history was taken. General and systemic examination including Gyneacological examination was performed. A COCP with Ethinyloestradiol: 0.03mg, Levonorgestrel: 0.15mg was prescribed. The subjects were divided into four categories, Control (category 0) i.e. before the start of COCPs, after 1 month (category 1), 3 months (category 2) and 6 months (category 3).

Experimental Measures

Body weight and length: Body length was measured once at the beginning of the study. Body weight was measured after 1 month, 3 months and 6 months between 9 – 12 a.m.

Statistical Analysis

Compaison of BMI was done before and after the treatment by finding the means, calculating the standard deviation and standad error of mean. Student T- test was applied to check the difference between control and different categories BMI. Data has been analyzed using SPSS (version 10.0). Level of Significance $P < 0.05$.

RESULTS

Recipient age ranged from 22 to 36 years. Mean age was 28.8± 3.63. Height ranged from 150 to 163 cm with (mean 157.34 ± 3.99). On initial visit weight of the recipient in control group i.e. category 0 ranged from 44 to 65 kg, while BMI range was 17 to 26 kg/m^2 with mean BMI 22.53 ± 1.92. Category 1 showed mean BMI of 22.53 ± 1.92. On comparing control with category 1 non significant correlation (P>0.05) is observed.

The mean BMI of category 2 was 22.53 ± 1.92. Non significant (P>0.05) correlation was observed on comparison of control with category 2. While comparing control with category 3 still non significant

Table 1: BMI changes with pre and post Combined Oral Contraceptives administration

	Number (N)	**BMI** (kg/m^2) **Mean ± SEM**	**P value**
Control Category 0 (0 month)	50	22.53± 1.92	
Category 1 (1 month)	50	22.53± 1.92	P>0.05$^{\Delta}$
Category 2 (3 month)	50	22.53± 1.92	P>0.05$^{\Delta}$
Category 3 (6 month)	50	22.91± 1.87	P>0.05$^{\Delta}$

* P <0.05 S (Significant)
****** P <0.001 H.S (Highly significant)
Δ P >0.05 N.S. (Non significant)

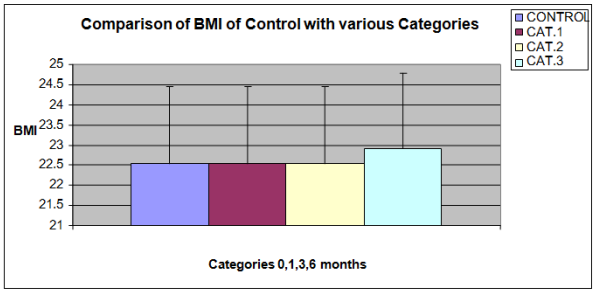

Figure 1: BMI changes with pre and post Combined Oral Contraceptives administration

(P>0.05) correlation is observed. It is due to very little rise in mean BMI which is 22.91 ± 1.87 (Table 1 & Figure 1).

After completion of study mean gain in weight was 1 kg while Mean increase in BMI was 0.38 kg/m^2.

DISCUSSION

Obesity is now recognized as a complex condition, resulting from interaction between genetic and environmental factors. In the clinical setting, simply weight measurement is insufficient; therefore one of the current recommended measures for obesity is Body Mass Index [15]. BMI is primarily a statistical tool designed for public health study which enables the investigation & comparison of any medical data set in which the height and weights of subject are recorded, to determine whether obesity correlates with health outcomes. Normal BMI range for females is 18.5 kg/m^2 to 22.9 kg/m^2. BMI < 18 kg/m^2 is under weight while BMI > 30 kg/m^2 is obese. Cut off values for Asian BMI for obesity is 27.5 Kg/m^2 [17].

Despite the popular notion that COCPs lead to weight gain, 42 randomized trials provided insufficient evidence to determine if COCPs have any effect on weight [18].

In general, adult female tend to gain weight with age [11]. However, the most likely reason for the growing girth of women in our population is a combination of genetic, environmental and lifestyle factors that have nothing to do with COCP use [14].

However, there are a number of studies with similar findings to our study demonstrating few Kg weight gain or no weight gain [19, 20].

Other researches on the use of steroid hormones during menopause have also been reported to cause no effects on body weight [21, 22, 23].

A study conducted in Thailand Based on field investigations of 391 married women aged 20 years or over, concluded that the use of contraceptive pills, which contain estrogen and progestin and were provided free of charge, tend to increase BMI [24].

Two studies showed mean weight gain greater than 2 kg as mentioned by Olerker et al [25] in 1995 and Endrikat et al [26] in 2001.

In our study small increase in weight may be due to an estrogenic effect which is responsible for increase in subcutaneous fat specially breast thighs and hips, and fluid retention due to Mineralocorticoid activity. Anabolic properties of COCPs could result in an increase in food intake due to its effect on satiety center [13].

CONCLUSION

Our study reveals that there is minimal effect of COCPs on BMI of the recipient. Weight gain is not an adverse effect of these preparations. Slight increase might be due to change in life style of the women using combined oral contraceptive pills. Misconception should be removed. Awareness should be promoted to continue COCPs.

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Address for Corresponding Author:
Dr. Mamoona Shafiq
Asstt. Prof. of Physiology,
Islam Medical College Sialkot.