Effect of Oral Contraceptive Pills on Levels of Calcium and Vitamin D in women in Al-Najaf Province

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Abstract

Background: Combined oral contraceptives comprise of the steroid hormone oestrogen in combination with a progesterone, occupied principally to prevent pregnancy. Combined oral contraceptive pills commonly refer to pills in which an oestrogen and a progestogen are given concurrently in a monthly cycle. **Materials and methods**: The current study was undertaken over a period of six months from 2019/10/1 till 2020/3/1 in Al-Najaf province. Thirty women that take oral contraceptives pill participated in the study, Their ages ranged from (20-38) years divided into three groups(10/group) according to the ages (20-25, 26-31,32 -38) years. **Results:** Results of this study revealed, oral contraceptives pill cause no effect on serum levels of calcium in women that intake it at different age groups in compare with controls groups, and also causes a significant decrease in serum levels of vitamin D in women that intake it at different age groups in compare with controls groups. On the other hand, the results obtained there aren't apparent difference in these parameters when compared between age groups and group that use it for long period (3,6 and 9 year).

Conclusion: The present study concluded that oral contraceptives pill cause no effect on serum levels of calcium in women and little effect on vitamin D in women.

Keyword: *oral contraceptives pill, parameters, calcium and vitamin D.*

Introduction

Combined oral contraceptives involve of the steroid hormone oestrogen in mixture with a progesterone, taken mainly to avert pregnancy. Combined oral contraceptive pills commonly refer to pills in which an oestrogen and a progestogen are given parallel in a monthly cycle. Combined oral contraceptives (COCs) consume become a prevalent method of birth control because to their contraceptive effectiveness and good tolerability profile [1]. Combined oral contraceptives are so typically administered as a pill containing oestrogen and progestogen, which is taken daily for 20–22 days, followed by a seven-day pill-free interval (or seven days of placebo), during which time a withdrawal bleed is expected to happen. These pills comprise hormones that turn on the reproductive system of female leading to avert pregnancy such as estrogen and progesterone. Oral contraceptives are the combination of estrogen and progestin or only progestin. Throughout the years, oral contraceptives have created through progressively decreasing the portion of ethinylestradiol (EE) and presenting 17-β estradiol, and different ages of progestin [2]. There are numerous kinds of estrogen and progesterone being utilized in pills like mestranol is a class of estrogen, and the 3-methylether of EE and norethynodrel is a sort of progestin [3]. In clinical investigations, the efficiency of contraceptive was excellent, but this drug caused many side effects for example, nausea, dizziness, headaches, stomachaches, and vomiting [4]. However, the death of a female had been reported who was taking the contraceptive pills in 1961. Although after so many years, oral contraceptives have developed by decreasing the dose of estrogen and by discovering a new generation of progestins, and additional routes of combined oral contraceptives administration have been developed [5]. The progesterone is primarily responsible for preventing pregnancy. The main mechanism of action is the

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prevention of ovulation; they inhibit follicular development and prevent ovulation [6]. Progestogen negative feedback works at the hypothalamus to decreases the pulse frequency of gonadotropin releasing hormone [7].

Materials and Methods

No.	Instrument	Material
1	Centrifuges	Calcium Kit
2	ELISA Reader	vitaminD Kit
3	Spectrophotometer /UV	
4	Gel tube	
5	Micropipette	
6	Serum tube	
7	Sterile syringes (5ml)	
8	Eppendorf tube	

The current study was undertaken over a period of six months from 2019/10/1 till 2020/3/1 from women using oral contraceptive pill in Al-Najaf province. Thirty women that take oral contraceptives pill participated in the study, Their ages ranged from (20-38) years divided into three groups(10/group) according to the ages (20-25, 26-31,32 -38) years. women with anther diseases which may cause alteration in level of calcium and vitamin D were excluded from the study. About 5 ml of venous blood were taken from women and controls. Serum was separated by centrifugation and used for estimation level of calcium and vitamin.

Results:

3-1: Effect of contraceptive pill on calcium levels in serum

The results display no significant effect ($p< 0.05$) on calcium level in serum in the women at different age groups (20-25y ,26-31y and 32-38y) after intake oral contraceptive pill in compared with control group at different age groups (20-25y ,26-31y and 32-38y) respectively figure (1) and results also display no significant effect ($p< 0.05$) on calcium level in serum in the women between groups of ages.

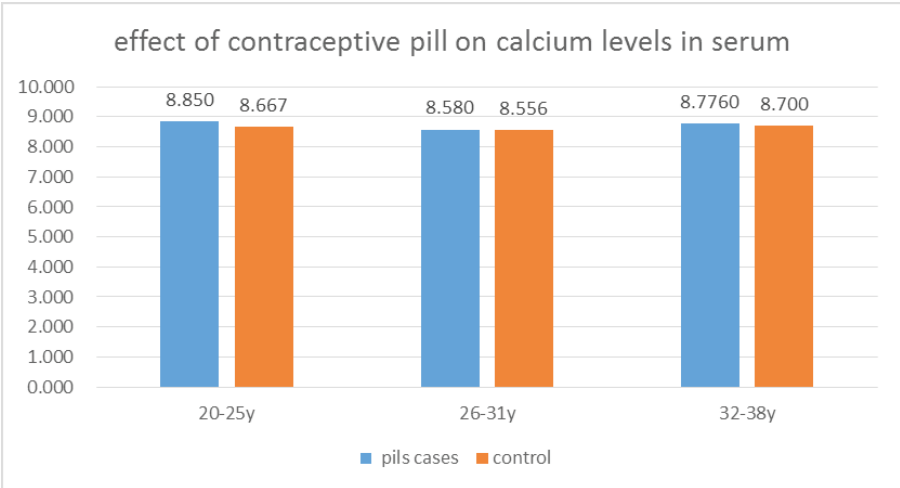
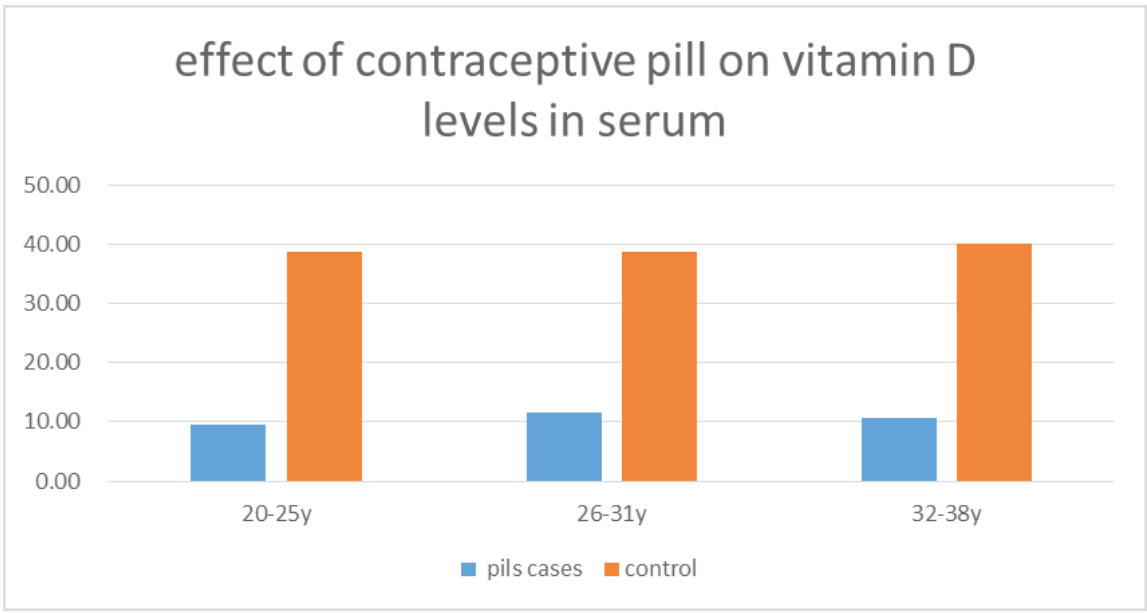


Figure (1): Effect of contraceptive pill on calcium levels in serum

3-2: Effect of contraceptive pill on vitamin D levels in serum

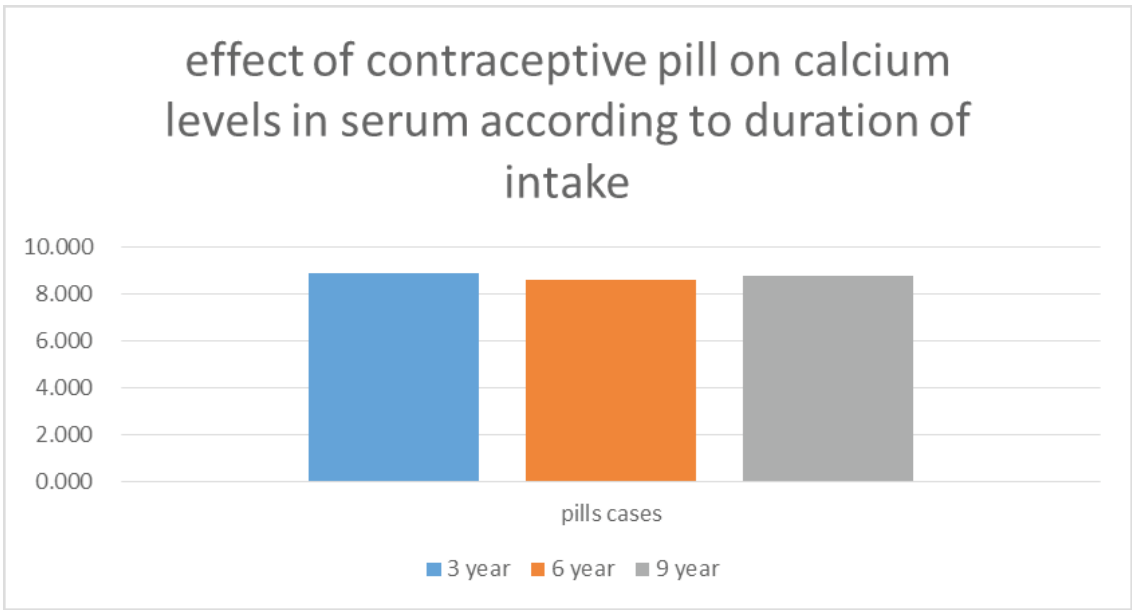
The results display significant decrease ($p > 0.05$) in vitamin D level in serum in the women at different age groups (20-25y ,26-31y and 32-38y) after intake oral contraceptive pill in compared with control groups at different age groups (20-25y ,26-31y and 32-38y) respectively figure (2) and results also display no significant effect ($p < 0.05$) on vitamin D level in serum in the women between groups of ages figure (2).



Figure(2): Effect of contraceptive pill on vitamin D levels in serum

3-3: Effect of contraceptive pill on calcium levels in serum according to duration of intake

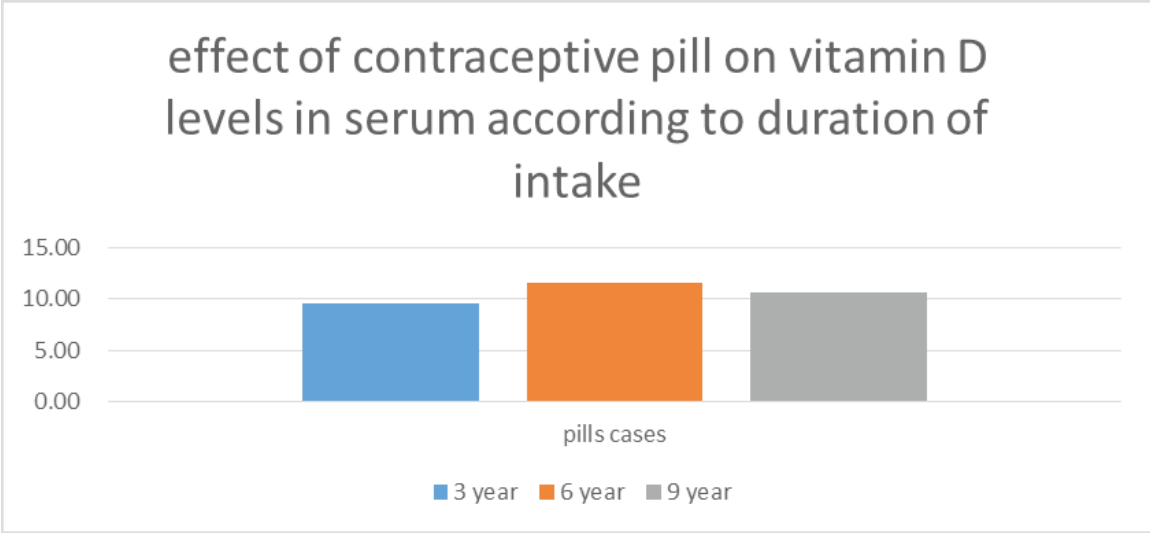
The results display no significant effect ($p < 0.05$) on calcium level in serum in the women at different duration of intake of oral contraceptive pill groups (3 y ,6 y and 9 y) figure (3).



Figure(3): Effect of contraceptive pill on calcium levels in serum according to duration of intake.

3-4: Effect of contraceptive pill on vitamin D levels in serum according to duration of intake

The results display no significant effect ($p< 0.05$) on vitamin D level in serum in the women at different duration of intake of oral contraceptive pill groups (3 y ,6 y and 9 y) figure (4).



Figure(4): Effect of contraceptive pill on vitamin D levels in serum according to duration of intake

Discussion

4-1: Effect of contraceptive pill on calcium levels in serum

The results of the present study displayed no significant effect ($p<0.05$) on calcium levels in serum in women that intake contraceptive pills at different age groups in compared with control group at different age groups, also this study indicate no significant effect ($p<0.05$) between the groups of ages of women that intake contraceptive pills.

4-2: Effect of contraceptive pill on vitamin D levels in serum

The results of the present study displayed significant decrease ($p>0.05$) on vitamin D levels in serum in women that intake contraceptive pills at different age groups in compared with control group at different age groups, this study disagree with many studies that indicate increase in level of vitamin D levels in serum in women that intake contraceptive pills such as the study of [8] this study result is that the use of contraceptive pill increases the circulating levels of 25(OH)D in premenopausal, healthy, adult women and the study of [9] this study result is contraceptive pill use increases circulating levels of 25OHD in plasma. There are many other studies agree with present study such as the study of [10]. This study seems to be the first prospective trial revealing the effect of contraceptive pills use on serum 25(OH)D levels in women with Polycystic ovary syndrome. show the decrease in serum 25(OH)D levels in patients with Polycystic ovary syndrome with the use of contraceptive pills alone. Vitamin D deficiency, which arises due to insufficient exposure to sunlight and dermal synthesis from 7-dehydrocholesterol and limited intake from food and supplements, disrupts the function of all systems of the body and increases the risk of osteoporosis, cancer, cardiovascular disease, autoimmune disease, and mental disorders such as depression and chronic pain syndrome [11], [12] also this study indicate no effect when compare between the groups of ages of women that intake contraceptive pills.

4-3: Effect of contraceptive pill on calcium levels in serum according to duration of intake

The results display no effect on calcium level in serum in the women at different duration of intake of oral contraceptive pill groups when compare between groups.

4-4: Effect of contraceptive pill on vitamin D levels in serum according to duration of intake

The results display no effect on vitamin D level in serum in the women at different duration of intake of oral contraceptive pill groups when compare between groups.

Conclusions

The present study concluded that oral contraceptives pill cause no effect on serum levels of calcium in women and little effect on vitamin D in women.

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Conflict of Interest: None to declare.

Ethical Clearance: All data was approved and carried out in accordance with approved guidelines.

References

1. Klipping, C., Duijkers, I., Parke, S., Mellinger, U., Serrani, M., & Junge, W. Hemostatic effects of a novel estradiol-based oral contraceptive. Drugs in R & D, 11(2). 2011; 59-170.
2. Christin-Maitre, Sophie. History of oral contraceptive drugs and their use worldwide. Best practice & research Clinical endocrinology & metabolism 27. 2013; 3-12.
3. Coney, PonJola, et al. Weight change and adverse event incidence with a low-dose oral contraceptive: two randomized, placebo-controlled trials. Contraception 63.6. 2001; 297-302.
4. Moreau, Caroline, et al. Oral contraceptive tolerance: does the type of pill matter? Obstetrics & Gynecology 109.6. 2007; 1277-1285.
5. Hugon-Rodin, Justine, Anne Gompel, and Genevieve Plu-Bureau. Mechanisms in endocrinology: epidemiology of hormonal contraceptives-related venous thromboembolism. European journal of endocrinology 171.6. 2014; R221-R230.
6. Frye, C. A. An overview of oral contraceptives: mechanism of action and clinical use. Neurology, 2006; 66(66 suppl 3), S29-S36.
7. Gemzell-Danielsson, Kristina, Cecilia Berger, and P. G. L. Lalitkumar. Emergency contraception—mechanisms of action. Contraception 87.3. 2013; 300-308.
8. Ciebiera, Michał, et al. Vitamin D serum levels in women using contraception containing drospirenone–a preliminary study. Archives of medical science: AMS 15.2. 2019; 554.
9. Harris, Susan S., and Bess Dawson-Hughes. The association of oral contraceptive use with plasma 25-hydroxyvitamin D levels. Journal of the American College of Nutrition 17.3. 1998; 282-284.
10. Namli Kalem, M., Hizli, D., Kamalak, Z., Kösüs, A., Kösüs, N., Turhan, N., & Kafali, H. Effect of combined oral contraceptive use on serum 25-hydroxy vitamin D levels and ultrasound parameters in patients with polycystic ovary syndrome. Gynecological Endocrinology, 32(4), 2016; 281-284.
11. Burt, M. G., Mangelsdorf, B. L., Stranks, S. N., & Mangoni, A. A. Relationship between vitamin D status and autonomic nervous system activity. Nutrients , 2016 ;8(9), 565.
12. Voulgaris, N., Papanastasiou, L., Piaditis, G., Angelousi, A., Kaltsas, G., Mastorakos, G., & Kassi, E. Vitamin D and aspects of female fertility. Hormones, 2017;16(1), 5-21.