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Contraceptive effects in hematological and biochemical parameters of healthy women at Al- Samawah city

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Abstract: The mechanism of negative feedback inhibition of estradiol or estrogen on the pituitary hormones has been used to fake the pregnancy that is a principle of contraceptive mode of action. Although, contraceptive pills used in widely range, no studies were carried out about effect of contraceptive pills administration in healthy women in samawah city. Therefore, the study had been concentrated on some biochemical and hematological parameters of women who administrated pills for six months at age between 30-40 years old. The results revealed no changes in Hct, WBCs, and RBCs values significantly, while there are significant increases in Hb content and iron level in blood of oral contraceptive women than the control groups with probability value P≤0.05. Lipid profile showed significant increases in cholesterol and triglyceride (TAG) had recorded in woman feeding the contraceptives in regular times, compared with control group P≤0.05. Consequently, there were highly recorded contributions of oral contraceptives and the metabolic products, since it had been elevated significantly when it's compared to control group P≤0.05. The sugar and uric acid were the values of interest in the present study. In order to evaluate having oral contraceptive and determine the risks among healthy women in AlSamawah city, the present study had recommended that the women should be screened for lipid profile and blood pressure before starting contraceptives course and followed up regularly to prevent the risk of cardiovascular diseases.

Keywards: Oral Contraceptives, Hemoglobin, Iron, Lipid profile, Sugar.

INTRODUCTION

Normally, adult women have a highly organized system of reproduction. Pituitary and some adrenal hormones help in growing up the sexuality behaviors and develop the organs, which are responsible for pregnancy and parturition. Follicle stimulating hormone (FSH) and Luteinizing hormone (LH) are stimulating hormones to direct the ovaries and uterus. FSH stimulates the follicles to grow up and enter the fallopian tube by rupturing the ovaries wall under the effect of LH. The uterus endothelium changes its thickness and supplements depending on the concentrations of estradiol and progesterone hormones of ovaries[1].

The mechanism of negative feedback inhibition of estradiol or progesterone or both of them, on the pituitary hormones LH and FSH has been used to fake the pregnancy that is a principle of contraceptive mode of action[2]. Many types of contraceptives had been manufactured as pharmaceutical pills to control the birth. In practical the women are feeding these types daily, weekly or monthly suffer a lot of changes in their body weights, cardiovascular disease, blood pressure, and high cholesterol levels[3].

Combination of contraceptive contains both estrogen and progesterone. These bills are synthetic hormones such as estrogens (mestranol, ethinyl estradiol) or progesterone (norgsetrel, norethindrone acetate). Progesterone only bills were used for breast feeding women because estrogen reduces milk production[4].

Although, contraceptive pills used in widely range, no studies were carried out about effects of contraceptives administration in healthy women in samawah city. The aim of this study, therefore, is to determine some biochemical and physiological values in healthy women, whose administrated bills for six months at least.

METHODOLOGY

Blood collection & sampling: A total of 20 blood samples were collected during the period at September 2006 to April 2007 from Al-Samawah hospital. Records of ages and sex obtained from the statistics unit of the hospital for 20 women using control bills and 20 non pregnant controls. Blood was collected with the 5cc syringe, collecting the blood in containers with EDTA-K_3 to a total volume of 2.5 ml, keeping the residual part without coagulant for biochemical tests[5].

Hemoglobin determination methods (HB %): Methods for hemoglobin determination are many and varied. The most widely used automated method is the cyanmethemoglobin method**.** To perform this method, blood is mixed with Drabkin's solution, a solution that contains ferricyanide and cyanide. The ferricyanide oxidizes the iron in the hemoglobin, thereby changing hemoglobin to methemoglobin. Methemoglobin then unites with the cyanide to form cyanmethemoglobin. Cyanmethemoglobin produces a color which is measured in a colorimeter, spectrophotometer, or automated instrument. The color relates to the concentration of hemoglobin in the blood. Place 5 ml of Drabkin`s solution in test tube; gets 0.02 ml of whole blood using Sahli pipette. Rinse the blood into Drabkin`s solution. Mix and let it stand for 10 min. Then read in a spectrophotometer at 540nm. Prepare a graph of the standard solutions and determine the concentration of each unknown. The normal values for hemoglobin determinations are 12.5- 15 g/dl in woman[6].

Complete Blood Picture: By using an automated system, the complete blood picture had been estimated. The paper results show a wide spectrum of blood tests: RBCs, WBCs, PCV.[5]

Pregnancy Test: Agglutination test in a slide of serology for hCG hormone should be negative, To hold the write answer of correct work contraceptive. All the tests had done by using Pregnancy Kits.

Biochemical Variations: In principle, simple sugars, oligosaccharide, polysaccharide, and their derivatives, including the methyl ethers with free or potentially free reducing groups, give an orange-yellow color when treated with phenol and concentrated sulfuric acid. The reaction is sensitive and the color is stable. By use of this phenol-sulfuric acid reaction, a method has been developed to determine submicro amounts of sugars and related substances. In conjugation with paper partition chromatography the method is useful for determination of the composition of polysaccharide and their methyl derivatives. It has been well known developed apparatus (blood glucose monitoring type One Touch Ultra2), depending on this principle. Clinically, put one drop of blood in a strip in the apparatus. Read the sugar value. The normal value is equal to or greater than 160-180 mg/dl (10.0 mmol/L) [7].

Blood iron value was measured by colorimetric method, with commercially available kit (bio merriex, Frence). Principally, addition of acid HCl to sera release iron from transferrin (by lowering the pH and precipitation of sera proteins (FeIII), in the supernatant is reduced to (FeII) and determined quantitavily by photometric measurement at the absorbance of the colored complex formed between FeII and Ferrozine as chromogen (Ferrozine composed of 3-(2-pyridal)-5,6-bis(4-phynel sulfonic acid)-1,2,4-triazine, monosodium , monohydrate)[8] .The complex read spectrophotometrically. Non-coagulant blood should be used because EDTA chelating is changing the results mistakenly; moreover, avoiding hemolysis because of the affinity of iron to released hemoglobin molecules.

Sera uric acid was measured by enzymatic method, with commercially available kit (bio merriex, France). The reaction of uric acid with peroxide by activation of uricase produce a photometric chromagen could be measured in 520nm by UV-visible spectrophotometer[9].

Cholesterol and TAG analysis was carried out using commercially available diagnostic system (GmbH-Germany) test kits[10,11] .

Statistical analysis: Standard statistical methods were used to determine the mean and standard deviation (SD).Unpaired t-test was used to compare the results of different biochemical and hematological parameters with the controls. P-value $\leq$ 0.005 was considered to be statistically significant[12].

THE RESULTS

The present study served a wide spectrum of woman population attending the Hospital of Woman and Children in Al-Samawah. The average age of control woman was 33.75±5 years whereas that of the cases was 38.66±6. Consequently, the Oral contraceptive emerged many physical changes to their soma such as larger breasts**,** weight gain, reduced or increased acne**,** slight nausea**,** emotional sensitivity right before the period, mood swings throughout the cycle and irregular bleeding or spotting.

Hematological values: The contraceptive had a little effect on the blood values in dose manner, in contrast, the differences among the study population with respect to Hct, RBCs, WBCs, were not found to be significant, as illustrated in **Fig 1.**

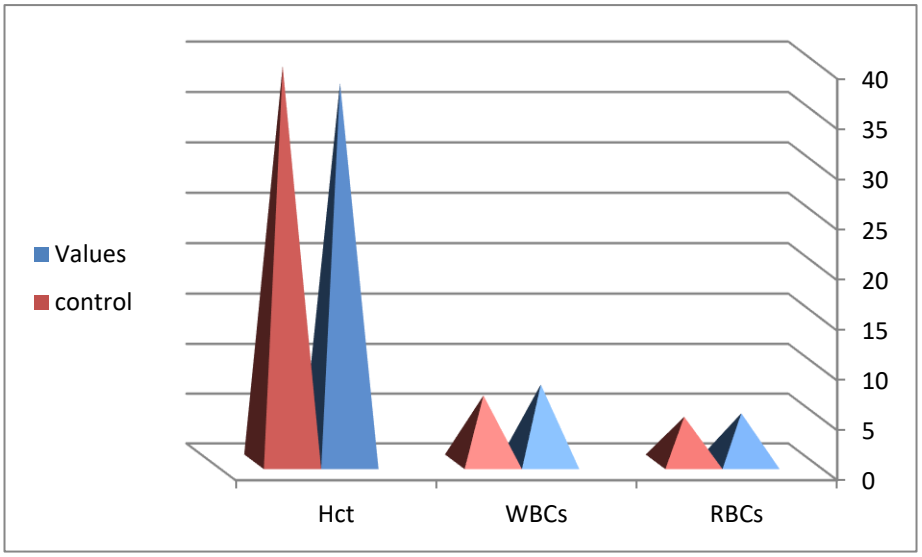

Fig.1: showed no significant changes in values of Hct, WBCs, and RBCs compared to control group. P≤0.05.

While the Hemoglobin content increase significantly in parallel pattern with iron level in blood and sera compared to control group p≤0.05, as they dragged in **Fig.2.**

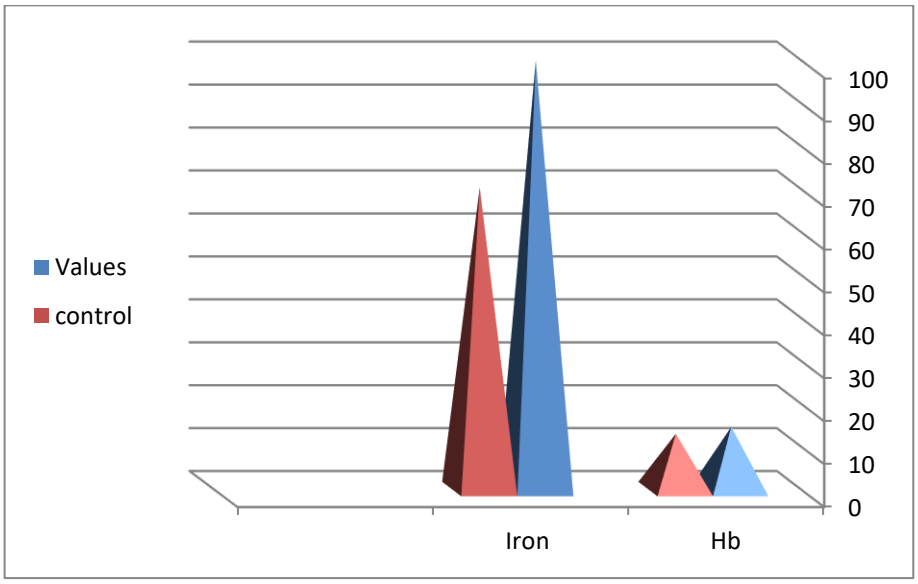

Fig. 2: reveled the significant increasing in Hb content (g/dl) and Iron level (mg/l) in blood of oral contraceptive woman significantly compared with control group P ≤0.05.

Lipid profile: It seem there are a direct relations between the hormonal bills of contraceptives in different concentrations and the lipid profile, significant increases in cholesterol and triglyceride (TAG) had recorded in woman feeding the contraceptives in regular times, compared with control group P≤0.05. as its shown in **Fig3.**

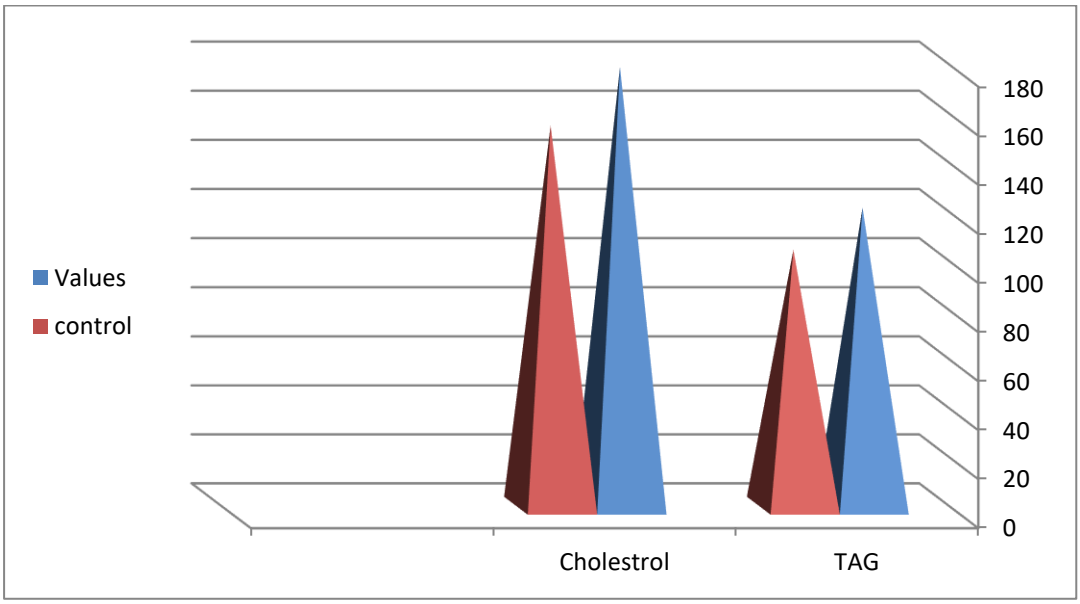

Fig.3: illustrated the significant increasing by cholesterol and TAG (mg/dl)in sera of oral contraceptive women in contrast to control group P≤0.05.

The Metabolic indicators: there were highly recorded contributions of oral contraceptives and the metabolic products, since it had been elevated significantly when it's compared to control group P≤0.05. The sugar and uric acid were the values of interest in the present study, as likely appear in the **Fig.4.**

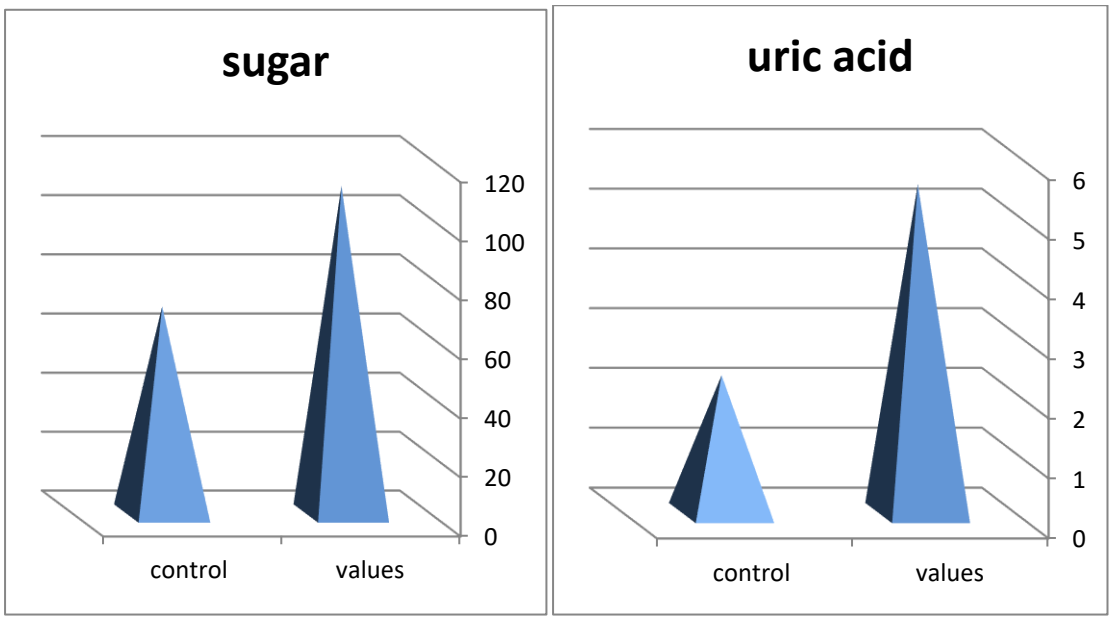

Fig.4: illustrates the significant increasing of metabolic indicators (sugar, Uric acid mg/dl) in sera of oral contraceptive women in contrast with control group P≤0.05.

THE DISCUSSION

The oral contraceptive hormone, since its discovering in 1960, have used worldwide, in its both types, combined oral contraceptives containing both estrogen and progesterone, and progestin containing only progesterone. Increasing risk factor of cardiovascular diseases with higher doses of estrogen, led to combine 3 generations by decreasing the concentrations of ethinyl estradiol less than 50µg. Birth control pills have used in preventing pregnancy 40 years ago in AlSamawah city. The manufactured steroidal hormones have various metabolic effects, including abnormality in sugar metabolism, lipid metabolism impairment, and inhibit the ovulation by feedback mechanisms of end products cascades of, brain master, pituitary gland [13.]

The present study revealed that continuous uptake of contraceptives did not change the blood indicators of Hct, WBCs, and RBCs, as higher than normal values, fig 1., but the Hb content and Iron showed clear increases in values comparing with control groups, Fig 2. This finding was very consistent with other studies[14, 15] improved that contraceptives induces variations in the hematological values.

The results showed significant differences among both contraceptives and control groups with respect to lipid profile, It's been recorded that cholesterol and triglyceride TAG were higher among oral contraceptive women (178.9 mg/dl, 121.6 mg/dl) than control groups (155.05 mg/dl, 104.5 mg/dl). The higher lipid parameter increased risk to cardiovascular disease because estrogens inhibit hepatic lipase activity, the enzyme responsible for clearing cholesterol from blood[16].

In contrast to the metabolic products, the results showed a significant increase of sugar and uric acid in sera of contraceptive group compared to control. This indicated that sex steroids have an impact ($P \leq 0.05$) on metabolic pathway in those women related to its control groups. Oral contraceptives induce modification of hormonal levels; reversely affect the pituitary- adrenal cascades ending with cortisol releasing, a hormone of glucocorticoides effects. However, this study was consistent with another study which showed that oral contraceptive elevate the carbohydrates, body mass index, uric acid due to increasing the level of cortisol in blood [17].

n order to evaluate having oral contraceptive and determine the risks among healthy women in AlSamawah city, the present study had to recommend that those in oral contraceptive course to carry out biochemical examinations, body weight, blood pressure, in order to predict any further complications.

REFERENCES

1. A.Hasin, R.Begum , M.R.Khan , F.Ahmed, Relationship between birth weight and biochemical measures of maternal nutritional status at delivery in a Bangladeshi urban poor. Int. J. Food Sci. & Nutr., 1996, 47(3):273-9.
2. J.C.King, Physiology of pregnancy and nutrient metabolism. Am. J. Clin. Nutr., 2000,71 (5):1218S - 1225S.
3. A.B.Edelman, S.L.Koontz, M.D.Nichols, J.T.Jensen, Continuous oral contraceptives: are bleeding patterns dependent on the hormones given? Obstet Gynecol, 2006, 107(3):657-665, 2006.
4. P.Sulak, S.Willis, T.Kuehl, A.Coffee, J.Clark, Headaches and oral contraceptives: impact of eliminating the standard 7-day placebo interval. Headache, 2007, 47(1):27-37, 2007.

5. N.W.Tietz, Specimen Collection and Processing; Sources of Biological Variation in Textbook of Clinical Chemistry, 2nd Ed. Philadelphia; W.B. Saunders; USA, 1994.
6. R.G.Cable, Hemoglobin Determination in Blood Donors. Transfusion Med Ver.; 1995, 9:131-44, 1995.
7. Michel. DuBois, K. A. Gilles, J. K. Hamilton, P. A. Rebers, Fred. Smith. Colorimetric Method for Determination of Sugars and Related Substances. *Anal. chem.*, 1956, 28 (3), pp 350–356.
8. O.W.Assendelft, B.T. Doumas, V.F.Fairbanks, E.W.Gunter, D.A. Nealon, Determination of the serum iron, total iron-binding capacity and percent transferrin saturation; approved standard. Clinical and laboratory standards institutes, 18,(19): H17-A,1998.
9. S. Cipriani, X.Chen, M.A.Schwarzschild, Urate: a novel biomarker of Parkinson's disease risk, diagnosis and prognosis. Biomark Med.2010; 4:701–12, 2010.
10. T.G.Cole, S.G. Klotzsch, J.R. McNamara, Measurement of triglyceride concentration. Handbook of Lipoprotein Testing. AACC Press Washington, DC.P:1997, 115-126.
11. M.F.Lopes-Virella, P. Stone, S.Eillis and J.A.Colwell, Cholesterol determination in high density lipoproteins separated by three different methods. Clinical chemistry, 23: 882-884, 1977.
12. B.R.Kirkwood, Essential of medical statistics 1st edition-Blackwell Scientific Publication, Oxford, 1989, 43-56.
13. S.Agha, Intentions to use contraceptives in Pakistan: Implications for behavior change campaigns. J *BMC Public Health*, 2010*;* 10:450.
14. S.Kamyab, S.D. Kamyab, Variations in serum iron and total iron binding capacity with the time of intake of combined oral contraceptives. Clin Chim Acta 1976, 66:439-452.
15. F.Wahed , S.Latif , M.Uddin , M.Mahmud, Fact of low hemoglobin and packed cell volume in pregnant women are at a standstill Mymensingh Med J, 2008; 17(1): 4-7.
16. M.A.Ulla, M. Anttilat, K.Mäenpää-Liukko, R.Maija-Liisa, H.Rautiainen, W.F.Sommer, et al. Effects of a monophasic combined oral contraceptive containing nomegestrol acetate and 17β-oestradiol compared with one containing levonorgestrel and ethinylestradiol on haemostasis, lipids and carbohydrate metabolism. Eur J Contracept Reprod Health Care, 2011, 16(6): 444–57.
17. C.Kirschbaum, B.M. Kudielka, J. Gaab, N.C.Schommer, D.H.Hellhammer, Impact of gender, menstrual cycle phase, and oral contraceptives on the activity of the hypothalamus-pituitary-adrenal axis. Psychosom Med, 1999, 61:154-162.

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