

## EFFECT OF ORAL AND INJECTABLE CONTRACEPTIVES ON SERUM ELECTROLYTES, WEIGHT AND BLOOD PRESSURE

ABDUL HAMEED\*, T. MAJEED, SHAHID RAUF, ASHRAF AND NASRULLAH

\*Frontier Medical College, Abbottabad and Postgraduate Medical Institute, Lahore, Pakistan

**Background:** Since the introduction of oral and injectable contraceptives, many metabolic side effects have been reported. The use of oral contraceptive has been shown to be associated with increased level of serum electrolytes, but decrease in levels of serum electrolytes has been reported in women using injectable contraceptives. This study evaluated serum electrolytes, weight and blood pressure in women taking oral and injectable contraceptives because these changes have adverse effects on the health and economy of the subject. **Methods:** Serum electrolytes, weight and blood pressure were measured in 50 women taking oral contraceptive (Lofeminal) and 50 women taking injectable contraceptives (Depomedroxy progesterone acetate and Norigest). The same women served as control before starting these contraceptives. **Results:** There was a significant increase in serum sodium and chloride but significant decrease in serum potassium and bicarbonate level in women taking oral contraceptive. There was non-significant decrease in serum electrolytes in women taking injectable contraceptives. There was significant increase in weight and blood pressure of women taking these contraceptives.

### INTRODUCTION

Since the introduction of oral and injectable contraceptives, many metabolic side effects have been reported.<sup>1</sup> The use of oral contraceptive has been shown to be associated with increased level of serum electrolytes. A decrease in level of serum electrolytes in women using injectable contraceptives has been reported.<sup>2</sup> The use of oral and injectable contraceptives has been shown to have positive relationship with increase in weight and blood pressure.<sup>3,4,5</sup> The present study aims to evaluate serum electrolytes, weight and blood pressure in women taking oral and injectable contraceptives because these changes have bad effects on the health and economy of the subject.

### MATERIALS AND METHODS

Healthy women attending the family planning units of Lahore for contraceptive advice were randomly selected for study. Cases were comprised of 50 women receiving oral contraceptive (group A), 25 women taking injectable contraceptive (Depomedroxy progesterone acetate (group B) and 25

women taking another injection (Norigest) i.e. group C for a period of 3-6 months.

The group A was further divided into group A-1 (25 women) and group A-2 (25 women) receiving Lofeminal pills for 3 and 6 months respectively. Group B (25 women) was further divided into group B-1 (15 women) and Group B-2 (10 women) taking Depomedroxy progesterone acetate 150 mg/ml I/M at 3 months' interval for 3 and 6 months respectively. Group C was also divided into group C-1 (15 women) and group C-2 (10 women) taking Norigest 100 mg/ml deep I/M at 2 months' interval for 3 and 6 months respectively. All the subjects were married, multipara, age ranged between 25-45 years. Control groups were the same women before starting the contraceptives.

Blood samples were collected from all the cases. Serum was extracted and analyzed for estimation of electrolytes by Nova-4 instrument (Electrolyte analyzer). Weight and blood pressure were recorded at the beginning of study and at intervals. Statistical significance of the results, was assessed by paired "T" test.

**Table-1: Variation in weight and blood pressure in women taking oral contraceptive for 3-6 months (group A-1 and group-A-2). Values are given as Mean  $\pm$  SEM. Number of cases is given in parenthesis.**

Groups	Duration of Drugs (Months)	Weight (Kg)	Blood Pressure (mmHg) Systolic Diastolic	
Control group-A (25)	-	56.48 $\pm$ 1.18	108.48 $\pm$ 1.49	67.40 $\pm$ 0.82
Group A-1(25)	3 months	58.64 $\pm$ Q.94	112.16 $\pm$ 1.33	70.16 $\pm$ 0.92
Comparison of Group A with group A-1	-	P***	P****	P****
Group Aa (25) (Control)	-	55.64 $\pm$ 1.16	111.60 $\pm$ 1.25	70.24 $\pm$ 1.06
Group A-2 (25)	6 months	57.36 $\pm$ 1.08	116.80 $\pm$ 1.13	72.48 $\pm$ 0.91
Comparison of Group Aa with group A-2	-	P****	P****	P****

P\*\*\*\* indicates P<0.001 (significant difference).

**Table-2: Variation in Weight and Blood Pressure in Women Taking Depomedroxy progesterone Acetate Injection for 3-6 Months (Group B-1 and Group-B-2) As Compared to Control Groups (Group B and Group Bb). The Values Are Given as Mean± S.E.M. Number of Cases Are Given in Parenthesis.**

Groups	Duration of Drugs (Months)	Weight (Kg)	Blood Pressure (mmHg)	
			Systolic	Diastolic
Group-B (15) (Control)		56.73±1 16	108.48±1 25	66 67±1.22
Group B-1 (15)	3 months	57.40±1 20	110. 27±1 15	71 20±2.03
Comparison of Group B with Group B-1	-	P****	P****	P****
Group Bb (10) (Control)	-	58.00±1 67	111.00±2 08	70 70±1.75
Group B-2 (10)	6 months	60. 20± 1 68	1 1 5 50±2 04	74 80±1.86
Comparison of Group Bb with Group B-2		P****	P****	P***

P\*\*\* and P\*\*\*\* indicate P<0.01 and P<0.001 (Significant difference)

**Table – 3: variation in weight and blood pressure between women of control groups (group c and group cc) and women taking Norigest injection for 3-6 months (group c-1 and group c-2) respectively. The values are given as Mean± S.E.M. Number of cases are given in parenthesis**

Groups	Duration of Drugs (Months)	Weight (Kg)	Blood Pressure (mmHg)	
			Systolic	Diastolic
Group-C (15) (Control)		58.33±1.10	107.47±1.26	88. 80±1.22
Group C-1 (15)	3 months	59.07±1.77	110. 60±1.05	71.13±1.18
Comparison of Group C with Group C-1	-	P****	P****	P****
Group Cc(10) (Control)	-	59.20±1.34	108.80±1.45	69.00±2.00
Group C-2 (10)	6 months	61. 50± 1 06	113. 30±1.43	72.60 ±2.09
Comparison of Group C with Group C-2	-	P****	P****	P***

P\*\*\* and P\*\*\*\* indicate P<0.01 and P<0.001 (Significant difference)

**Table-4: Variation in Serum Electrolytes in Women Taking Oral Contraceptive (Lofeminal) For 3-6 Month\* (Group A-1 and Group-A-2) As Compared with Control Groups (Group A and Group Aa). The Values Are Given as Mean ±S.E.M. Number of Cases Are Given in Parenthesis.**

Groups	Duration of Drugs (Months)	Sodium (mmol/l)	Potassium (mmol/l)	Chloride (mmol/l)	Bicarbonate (mmol/l)
Group A (25) Control	-	142.28±0.83	4.16±0.07	103.88±0 37	27±10-0.52
Group A-1 (25) Control	3 months	144.95±0 88	4 06±0.08	109.32±0 34	26 ±39±0 52
Comparison of Group A with group A-1	-		N.S	P****	N.S
Group Aa (25) Control	-	142 81±0 56	111±0.05	104.50±0 35	27 49±0.57
Group A-2 (25) Control	6 months	147.47±0 39	4 06±0.05	110.06±0 33	27 35±0 58
Comparison of Group Aa with group A-2					N S

P\*\*\* and P\*\*\*\* indicate P<0.01 and P<0.001 (Significant difference)

**Table-5: Variation in Serum Electrolytes in Women Taking Depomedroxy progesterone Acetate Injection for 3-6 Months (Group B-I and Group-B-2) And Their Control Groups (Group B and Group Bb) Respectively. The Values Are Given as Mean ± S.E.M. Number of Cases Are Given in Parenthesis**

Groups	Duration of Drugs (Months)	Sodium (mmol/l)	Potassium (mmol/l)	Chloride (mmol/l)	Bicarbonate (mmol/l)
Group-B Control (15)	-	141.01±0.92	4.19±6 r.	103.81±0.73	27±55- 0.77
Group B-1 (15)	3 months	140.73±0 95	4.1 5±0.7	103.51± 0.77	27.42 ±076
Comparison of Group B with group B-1		N S.	NS.	P****	N.S
Group Bb (10) (Control)	-	142.10±1 34	4.30±0 13	104.51±0.11	27.09 ± 0.97
Group B-2 (10)	6 months	141.95±1 32	4.27±0 14	110.06 ± 0.96	26.73±0.94
Comparison of Group Bb with group B-2		N S	N S		N.S

N.S Indicates Non – Significance

**Table-6: Variation in Serum Electrolytes in Women Taking Norigest Injection for 3-6 Months (Group C-I and Group-C-2) And Control Groups (Group C and Group Cc). The Values Are Given as Mean ± S.E.M. The Number of Cases Are Given in Parenthesis**

Groups	Duration of Drugs (Months)	Sodium (mmol/l)	Potassium (mmol/l)	Chloride (mmol/l)	Bicarbonate (mmol/l)
Group-C Control (15)	-	142.10±0.90	4.21±0.10	103.94±0.99	27.02±0.86
Group C-I (15)	3 months	141.87±0.89	3.99±0.10	103.67±0.92	27.19±0.92
Comparison of Group C with group CM	-	N.5L	N.S.	N.S.	N.S.
Group Cc (10) (Control)	-	141.73±1.42	4.30±0.07	104.33±1.03	27.03±0.77
Group C-2 (10)	6 months	140.50±1.14	4.23±0.07	103.92±1.31	27.16±0.77
Comparison of Group Cc with group C-2	-	N.S. <sup>1</sup>	N.S.	NE	N.S.

NS Indicates Non-Significance

## RESULTS

Tables 1-3 indicate that weight and blood pressure were significantly increased ( $P < 0.001$ ) in women taking oral and injectable contraceptives as compared to their control groups.

Tables 4-6 indicate that serum electrolytes were significantly different ( $p < 0.001$ ,  $p < 0.01$  and  $p < 0.02$ ) in women taking oral contraceptives as compared to their control groups. But non-significant difference in serum electrolytes was found in women using injectable contraceptives.

## DISCUSSION

Metabolic alteration and side effects of oral and injectable contraceptives are beginning to be studied in Pakistan, with gradual increase in the use of contraceptives. In this study the changes in weight and blood pressure found in women taking oral and injectable contraceptives are in agreement with study of other research workers.<sup>2,5</sup>

The changes in serum electrolytes in females taking oral and injectable contraceptives are also in agreement with the study of other research workers.<sup>2,8,9</sup>

1. Horwitt MK., Harvey CC and Dahm CH. Relationship between levels of blood lipids, vitamins C, A and E, serum copper compounds, and urinary excretion of tryptophan metabolites in women taking oral contraceptive therapy. *Am. J. Clin. Nutr.* 1975; 28:403.
2. Tawil N.Z, Shabban AH., Ibrahim A and Garcia CR. Effect of a new low dosage oral contraceptive pills on blood electrolytes. *J. Felt, Sterility.* 1969; 20:403-23.
3. Crosland J. Weight gain and fluid retention in oral contraceptives taking women. *Lewis's Pharma*, 1980; 5: 749.
4. Preedy J.R.K. Salhanick HA, Kipnis DM and Vanda Wiele RL. The effects of gonadal hormones on water and electrolyte metabolism. In *metabolic effects of gonadal hormones and contraceptive steroids*. New York: Plenum, 1969.
5. Bano KA, Haidar Z. and Rana I A. Study of blood pressure in women taking oral contraceptives. *JPMA*, 1980; 30:157-59.
6. Shafique and Majeed T. Serum lipid and lipoproteins in females taking oral and injectable contraceptives. *J Pure and Applied Sciences*, 1984;3:33-39.
7. Khoo KJ and Peart WS. Blood pressure and oral contraceptives. *Br. Med. J.* 1982; 285:403-5.
8. Thom GW, Nelson KR. and Thom DW. A study of mechanism of edema associated with menstruation. *J. Endocrinology*, 1938;22:155.
9. Katz, F.H. and Kappas, A. The effect of estradiol and estrion on plasma level of cortisol and aldosterone their secretion rates in man. *J. Clin. Invest.* 1967; 46:1768.