4- RESULTS AND DISCUSSION

4.1. Concentration of some blood plasma components in ewes during pregnancy:

4.1.1. Protein fractions (gm/dl):

Data presented in Tables (2 and 3) show that the effect of parity number on protein fractions was non significant. However mean of plasma total protein of the 1st parity was higher than mean level of 4th parity (7.45 vs. 6.78 gm /dl) (Fig. 1). The present results is in agreement with that found by Archer and Jeffecott, (1977) who stated that plasma total protein in blood of sheep was about 7.0 gm/dl and of adult goats which was around 7.2 gm/dl. The highest plasma albumin mean was in 2nd parity (4.18±0.45 gm/dl) and lowest mean level in the 3rd parity (3.44±0.44 gm/dl). The plasma globulin level decreased in 2nd parity (2.64±0.46 gm/dl). While it increased significantly in 3rd parity (3.54±0.38 gm/dl). These levels are less than the levels reported by Osblandiston (1972) and Hallford and Galyean (1982) as mean levels were 4.2 and 4.1 gm/dl, respectively. The ranges of albumin/globulin ratio were found to be from 1.03±0.27 in 3rd parity to 1.83±0.33 in 2nd parity. These ratios are somewhat more than the ratio reported by Abd-Elmoty et al., (1991) in Ossimi sheep and nearly similar (1.5) to the ratio reported by Usami et al., (1969) in goats.

The effect of sex of embryo on protein fraction levels (Tables 2 and 3) was not significant. The mean levels of total protein were nearly similar. The same results were obtained with respect to the albumin and globulin levels and also A/G ratio.

The effect of type of embryo on protein fraction levels (Tables 2 and 3) was not significant. The present results is in agreement with that

Table (2): Least squares means and standard error of factors affecting plasma total protein, albumin, globulin (gm/dl) and albumin/globulin ratio in blood plasma of Rahmani ewes during pregnancy period.

Factors	No. of obs.	Total protein (gm/dl)	Albumin(A) gm/dl	Globulin(G) gm/dl	A/G ratio
Overall mean	190	7.09±0.09	3.81±0.25	3.09±0.25	1.47±0.18
Parity number					
1st parity	25	7.45±0.21 c	3.97±0.58 ab	2.94±0.59 ab	1.57±0.43 b
2nd parity	40	7.14±0.16 b	4.18±0.45 b	2.64±0.64 a	1.83±0.33 b
3rd parity	50	6.98±0.14 ab	3.44±0.44 a	3.54±0.38 b	1.03±0.27 a
4th parity	75	6.78±0.15 a	3.64±0.40 ab	3.24±0.41 ab	1.45±0.29 b
Sex of embryo					
Male	100	7.08±0.09 a	3.68±0.25 a	3.18±0.25 a	1.41±0.18 a
Female	70	7.04±0.09 a	3.85±0.26 a	3.05±0.36 a	1.51±0.19 a
Male and Female	20	7.15±0.13 a	3.89±0.35 a	3.04±0.35 a	1.50±0.25 a
Type of embryo					
Single	125	7.12±0.09 a	3.89±0.25 a	3.05±0.26 a	1.52±0.19 a
Twins	65	7.05±0.10 a	3.73±0.27 a	3.12±0.27 a	1.43±0.20 a
Month of pregnancy					
1st month	38	7.34±0.12 b	3.70±0.33 a	3.28±0.34 a	1.41±0.24 a
2nd month	38	7.32±0.12 b	3.86±0.33 a	3.19±0.34 a	1.48±0.24 a
3rd month	38	7.26±0.12 b	4.20±0.33 a	2.72±0.34 a	1.76±0.24 a
4th month	38	6.67±0.11 a	3.73±0.31 a	2.96±0.31 a	1.42±0.22 a
5th month	38	6.85±0.11 a	3.56±0.30 a	3.28±0.30 a	1.29±0.22 a
Seasons					
Summer	113	6.87±0.07 a	3.16±0.21 a	3.70±0.21 a	0.97±0.15 a
Autumn	68	7.00±0.08 a	3.55±0.23 a	3.30±0.24 a	1.28±0.17 a
Winter	9	7.40±0.19 a	4.71±0.52 b	2.26±0.53 a	2.16±0.38 b

a , b, c Means not showing the same letter in the same column within each factor significantly differ ($P<0.05$).

Table (3): F-ratio of analysis of variance of factors affecting plasma total protein, albumin, globulin and A/G ratio in blood plasma of Rahmani ewes during pregnancy period.

S.O.V	d.f	Plasma total protein	Plasma albumin	Plasma globulin	A/G ratio
Parity (P)	3	1.860	0.527	0.777	1.224
Sex of embryo (Sex)	2	0.610	0.770	0.396	0.356
Type of embryo (TE)	1	1.152	0.833	0.140	0.496
Month of pregnancy (MP)	4	10.858***	1.08	1.267	1.083
Year season (S)	2	3.786*	4.393**	3.824*	4.834***
P×MP	12	4.186***	0.850	1.021	0.899
Sex × MP	8	0.287	0.818	0.919	0.824
TE × MP	4	0.219	0.085	0.126	0.184
P × S	6	2.699**	1.811	1.698	1.928
Regression on age of ewe:					
Linear	1	9.851***	1.504	1.507	1.536
Quadratic	1	8.524***	0.155	0.331	0.047
Remainder d.f	145				
Remainder M.S		0.1225	0.9331	0.9470	0.5009

* P< 0.05 , ** P< 0.001 and *** P< 0.001

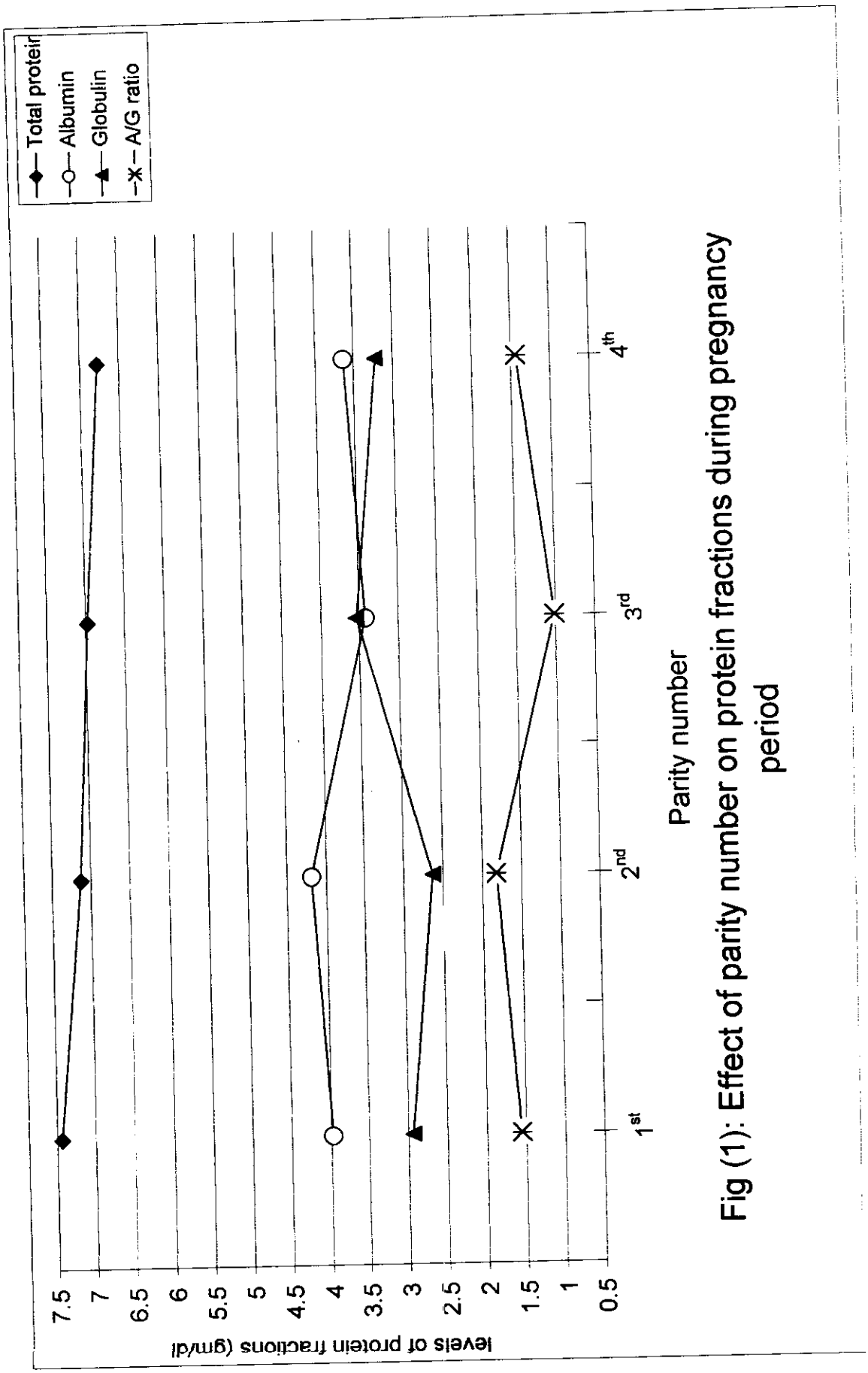

Fig (1): Effect of parity number on protein fractions during pregnancy period

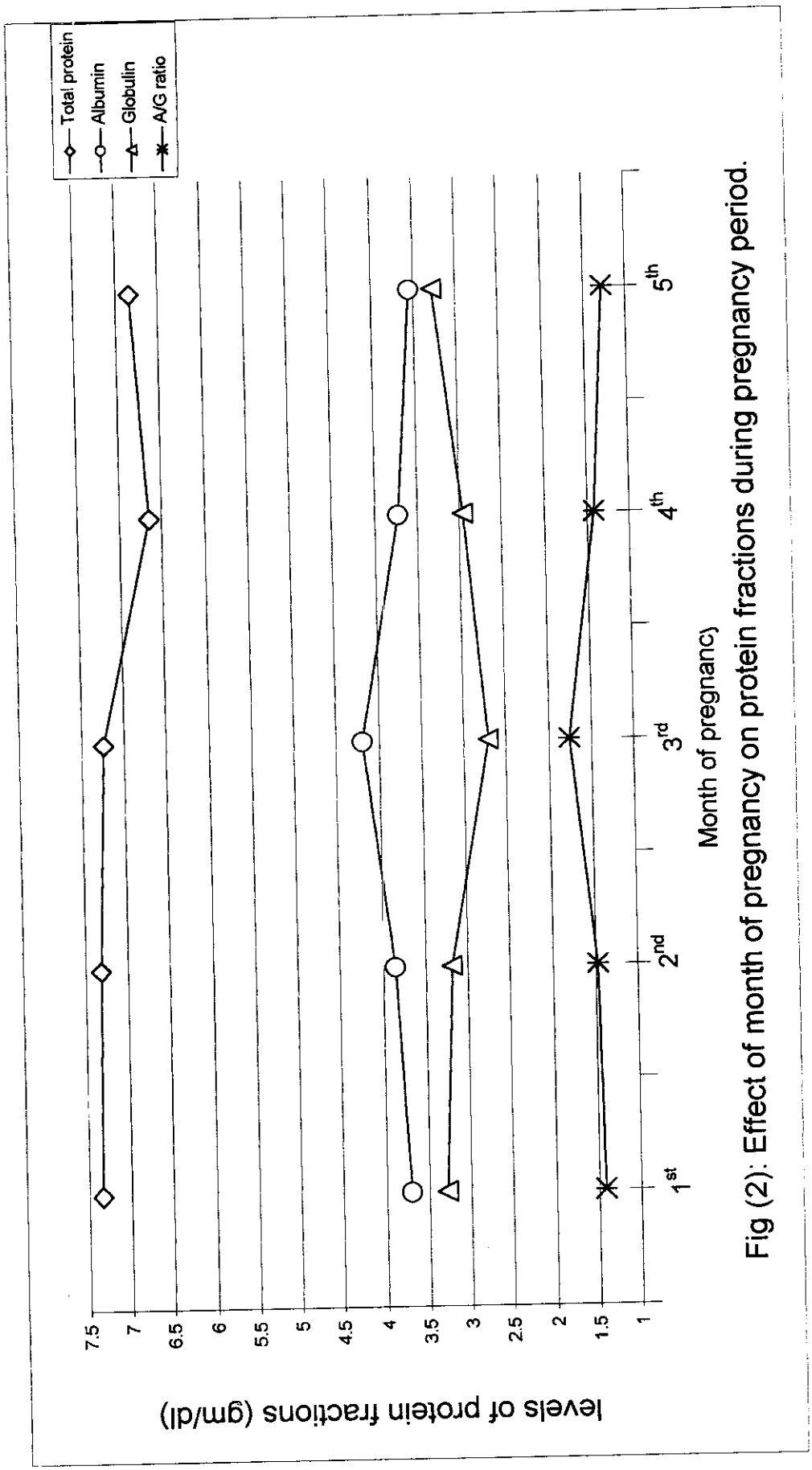

Fig (2): Effect of month of pregnancy on protein fractions during pregnancy period.

3.83 gm/dl), meanwhile level of globulin increased (3.43 vs. 2.95 gm/dl). Klos (1990) stated that, total protein was greater (7.67 gm/liter) in non pregnant ewes decreased slightly during pregnancy and lactation. Also, pre albumins were lower in non pregnant ewes and increased significantly during lambing and lactation period. He added that albumins decreased significantly compared with non pregnant ewes at day 90 of pregnancy and increased at day 135 of pregnancy. Globulins increased from day 90 to 135 of pregnancy and decreased significantly during lactation.

Effect of year season is shown in Tables (2 and 3). The levels of TP, A and A/G ratio were significantly higher in winter than in summer and autumn seasons. The differences among levels of globulin in the seasons were non significant. The analysis of variance (Table 3) showed that year season effect was significant ($P<0.05$ and $P<0.01$) on levels of TP, A, G and A/G ratio. The effect of interaction between year season and parity number was significant ($P<0.01$) on TP only. The present results disagree with the findings of Mehrotra et al., (1954) who found that plasma protein was 0.4 gm/litre higher during summer than in winter. Madian, (1989) stated that in summer albumin level was higher (3.40 gm/dl) than in winter (2.26 gm/dl) while Moule, (1956) reported a decrease in plasma total protein of Rahmani ewes during summer. Madian (1989) with Ossimi, Rahmani, Finnish landrace ewes and their crosses found that, in summer values of plasma globulin (3.78 gm/dl vs. 3.22 gm/dl) were higher than the corresponding values in winter.

4.1.2. Plasma total lipids (L), cholesterol (C) (mg/dl) and L/C ratio:

Data presented in Tables (4 and 5) show that, the effect of parity number on total lipids was highly significant ($P<0.01$). The total lipids

levels increased, in general, gradually from the 1st to the 4th parity, however the low level of total lipids was observed in the 3rd parity (Fig. 3). Plasma cholesterol level increased slightly gradually from 1st parity (125.2±15.5 mg/dl) to 4th parity (130.2±10.8 mg/dl), however the differences among levels were non significant. The total lipids/cholesterol ratio increased gradually similar to plasma cholesterol levels but the differences between 1st parity and 4th parity was significant.

Analysis of variance (Table 5) showed that effect of parity number was significant for total lipids levels and non significant for cholesterol and L/C ratio. The present results disagree with the findings of Ramos et al., (1994) who found that, the cholesterol levels decreased significantly with advancing age. And agreement with that found by Mousa (1995) who stated that plasma total lipids increased gradually ($P<0.05$) with increasing the age of lambs.

Tables 4 and 5 show that the sex embryo effect on total lipids was non significant. The differences among levels of L, C and L/C ratios were non significant (Table 4). The effect of interaction between sex of embryo and month of pregnancy was significant ($P<0.05$) on cholesterol level and non significant on L and L/C ratios.

The effect of type of embryo on levels of total lipids and cholesterol was non significant, however the effect was significant on L/C ratio.

The effect of month of pregnancy period on total lipids (Table 4) was significant. The total lipids levels increased gradually from 1st month (266.6±10.7 mg/dl) to 5th month of pregnancy (319.2±9.6 mg/dl). However, the differences among levels of cholesterol and L/C ratio due to the effect of month of pregnancy were non significant (Table 5). The

plasma cholesterol level did not show a definite tendency during the period of pregnancy, while the L/C ratio were nearly similar (Fig. 4). The present results is partially in agreement with the finding of Kranicova et al., (1993) who found that, total lipids decreased on day of insemination then increased to fall again to a minimum value in the 3rd month of pregnancy. Rawal et al (1987) found higher levels of cholesterol than the levels obtained in the present study as they stated that, in Muzaffarngri sheep in the 1st, 2nd, 3rd, 4th, 5th month of pregnancy the upper limits of serum cholesterol were 198.00, 213.30, 210.00, 203.08 and 232.50 mg/100 ml, respectively. They added that, increasing level in serum cholesterol was observed with the advancement of pregnancy period. In the contrary Okab et al., (1993) stated that stage of pregnancy had significant effect on plasma cholesterol levels but not on plasma total lipids and values concentration of both compounds were low near parturition.

Analysis of variance (Table 5) show that the effect of season of the year was non significant on total lipid and cholesterol levels but significant on L/C ratio ($P<0.05$). From summer season to autumn and winter seasons, levels of total lipids insignificantly decreased and levels of cholesterol increased (Table, 4). The present results are in agreement with the findings of Madian (1989) with Ossimi, Rahmani, Finnish landrace ewes and their crosses, who reported that, total lipids in summer (123 mg/100 ml) was slightly higher than in winter (122.02 mg/100 ml).

Table (4): Least squares means and standard error of factors affecting plasma total lipids, cholesterol (mg/dl) and lipids/cholesterol ratio of Rahmani ewes during pregnancy period.

Factors	No. of obs.	Total lipids (L) (mg/dl)	Cholesterol (C) mg/dl	L/C ratio
Overall mean	190	288.3±0.18	128.3±6.68	2.22±0.13
Parity number				
1st parity	25	253.3±18.6 b	125.2±15.5 a	1.9±0.31 a
2nd parity	40	280.4±14.5 c	128.8±12.1 a	2.1±0.24 ab
3rd parity	50	223.3±11.9 a	128.8±10.0 a	2.2±0.20 ab
4th parity	75	314.4±12.9 d	130.2±10.8 a	2.4±0.22 b
Sex of embryo				
Male	100	287.9±7.8 a	130.5±6.6 a	2.1±0.13 a
Female	70	290.2±8.2 a	130.6±6.8 a	2.1±0.14 a
Male and Female	20	287.0±11.2 a	123.6±9.3 a	2.3±0.19 a
Type of embryo				
Single	125	290.7±8.2 a	124.1±6.8 a	2.3±0.14 a
Twins	65	285.9±8.7 a	132.5±7.3 a	2.1±0.15 a
Month of pregnancy				
1st month	38	266.6±10.7 a	118.9±8.9 a	2.1±0.18 a
2nd month	38	268.9±10.7 a	135.8±8.9 a	1.9±0.18 a
3rd month	38	284.2±10.6 ab	122.7±8.9 a	2.3±0.18 a
4th month	38	302.9±9.8 bc	127.8±8.2 a	2.3±0.16 a
5th month	38	319.2±9.6 c	134.3±8.02 a	2.3±0.16 a
Seasons				
Summer	113	302.2±6.7 a	123.6±5.6 a	2.5±0.11 b
Autumn	68	286.8±7.5 a	125.5±6.2 a	2.3±0.12 b
Winter	9	276.05±16.7 a	135.8±13.9 a	1.7±0.28 a

a , b, c Means not showing the same letter in the same column within each factor significantly differ (P<0.05).

Table (5): F-ratio of analysis of variance of factors affecting plasma total lipids, cholesterol (mg/dl) and lipids/cholesterol ratio in blood plasma of Rahmani ewes during pregnancy period

S.O.V	d.f	Total lipids	Cholesterol	L/C
Parity (P)	3	5.625***	0.026	0.412
Sex of embryo (Sex)	2	0.122	0.456	0.479
Type of embryo (TE)	1	0.711	3.203	6.066**
Month of pregnancy (MP)	4	6.846***	1.553	2.237
Season (S)	2	2.558	0.375	3.246*
P×MP	12	1.737	1.557	1.710
Sex × MP	8	0.435	2.013*	1.747
TE × MP	4	0.743	0.141	0.529
P × S	6	0.983	3.530***	2.473*
Regression on age of ewe:				
Linear	1	10.016***	0.036	2.508
Quadratic	1	11.683***	5.386*	0.074
Remainder d.f	145			
Remainder M.S		932.0379	649.8312	0.2760

* P< 0.05 , ** P< 0.001 and *** P< 0.001

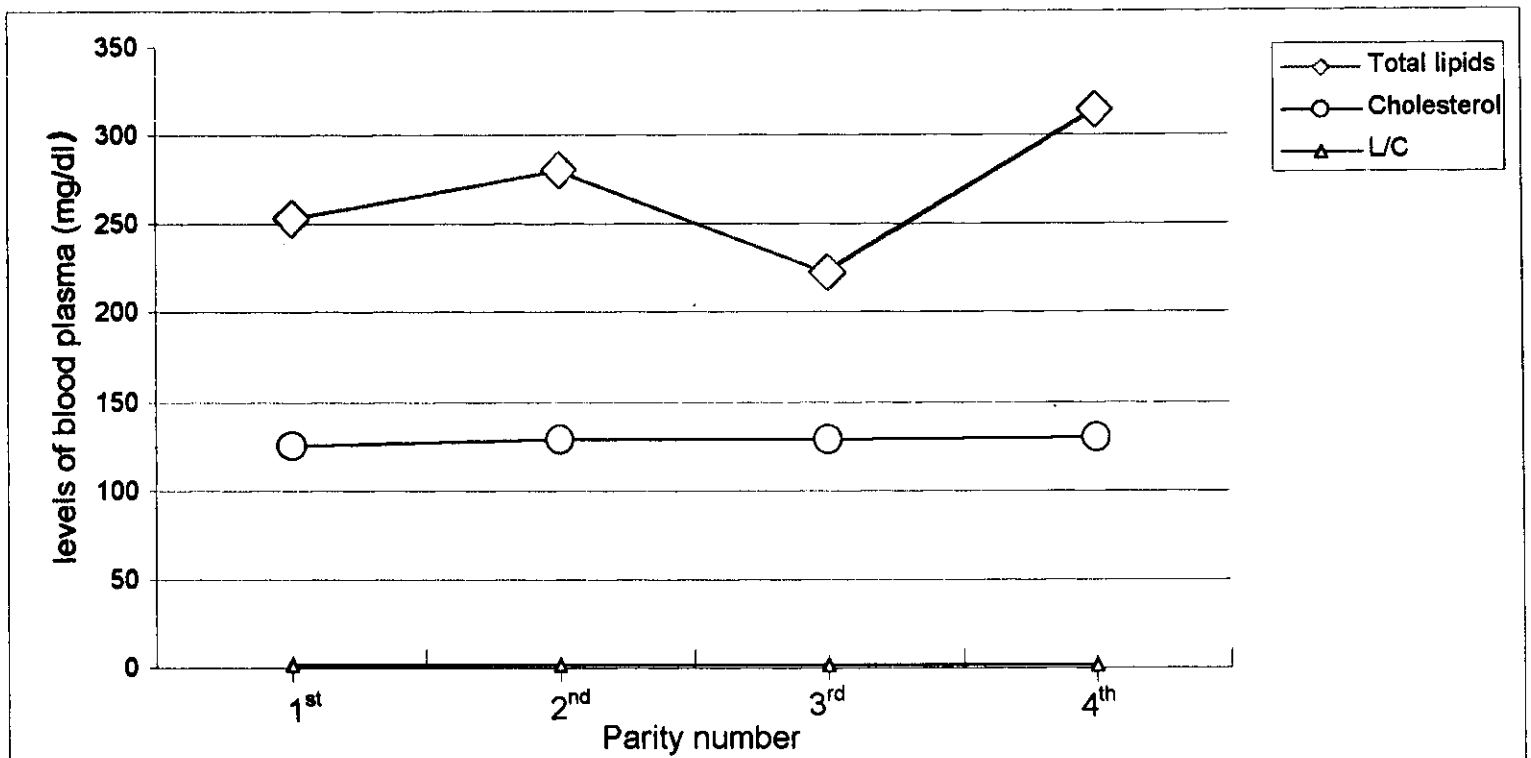

Fig (3): Effect of parity number on total lipids, cholesterol and L/C in blood plasma during pregnancy period.

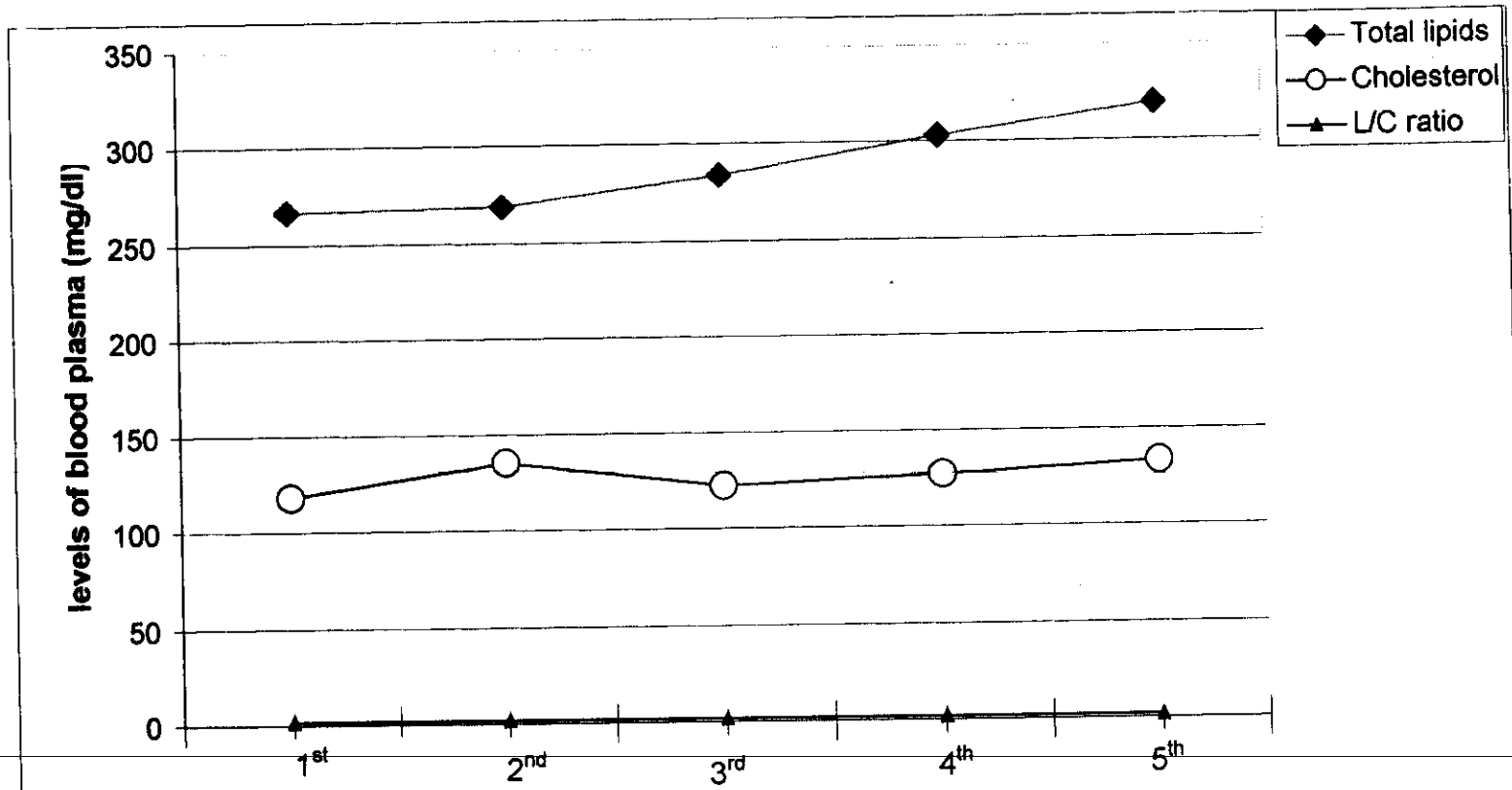

Fig (4): Effect of month of pregnancy on blood plasma total lipids, cholesterol and L/C ratio.

4.1.3. Plasma uric acid and creatinine (mg/dl):

Data presented in Tables (6 and 7) show that the effect of parity number on plasma uric acid and creatinine was non significant. The mean levels of plasma uric acid did not show a definite trend while the lowest mean level (1.6 mg/dl) of creatinine was in the 4th parity which was significantly differed from the other three parities (Fig. 5). Analysis of variance (Table 7) showed significant effect on the level of plasma uric acid due to interaction between parity number and month of pregnancy ($P<0.05$) and non significant effect on plasma creatinine. Ramos et al., (1994) found that, in Aragonese ewes serum uric levels increased with advancing of age. Behera et al., (1993) who found that, using concentrate feeding, plasma creatinine in blood serum of sheep ranged from 0.52 to 0.95 mg/100 ml, and the differences between levels were significant due to age effect and non-significant due to sex effect.

The effect of sex of embryo on plasma uric acid was significant ($P<0.05$) and non significant with respect to level of creatinine (Tables 6 and 7) . The mean level of uric acid was significantly higher for twins (the two sex) than for each single males and females. The present result is in agreement with Behera et al., (1993) who found that, using concentrate feeding the plasma creatinine ranged from 0.52 to 0.95 mg/100 ml and differences between values were non significant due to sex effect.

The effect of type of embryo on plasma uric acid was non significant while it was significant ($P<0.05$) in case of creatinine levels (Tables 6 and 7). The mean level of plasma creatinine was higher in single than twins.

The effect of month of pregnancy period on plasma uric acid and creatinine was non significant (Tables 6 and 7). The levels of plasma

creatinine slightly increased form the 1st month to the 5th month (Fig. 6). The obtained results agree with the finding of Shetaewi and Daghash, (1993) who found that, the differences between means of serum urea did not show a significant effect during months of pregnancy.

The effect of seasons of the year on plasma uric acid and creatinine was non-significant (Tables 6 and 7). The levels of uric acid were slightly decreased from summer (1.8±0.13 and 1.7±0.15) to autumn and winter, however, the level of creatinine decreased from summer to autumn and increased in winter (2.2±0.33). The obtained results disagree with the findings of Pemthaner et al., (1993) who stated that, the levels of creatinine differences due to breed, age and season effects were significant ($P<0.05$).

4.1.4. Plasma glutamic oxaloacetic transaminase (GOT) and glutamic pyruvic transaminase (GPT):

The effect of parity number on plasma (GOT) and (GPT) was non significant (Tables 8 and 9). The levels of each of GOT and GPT did not show definite trend (Fig. 7). The linear regression coefficient of GOT on age of ewe was significant ($P<0.05$) and indicate that as age increased the level of GOT also increased. The value of linear regression coefficient of GPT on age of ewe was non significant and markedly less than the coefficient of GOT.

The effect of sex of embryo on plasma GOT was non significant and significant on GPT ($P<0.05$) (Tables 8 and 9). The mean levels of plasma GOT and GPT in single male and single female were less than the mean levels of twins especially with respect to GPT as the mean level of twins was significantly higher than the other two single levels (Table 8).

Table (6): Least square means and standard error of factors affecting plasma uric acid and creatinine (mg/dl) in blood plasma of Rahmani ewes during pregnancy period.

Factors	No.	Uric acid (mg/dl)	Creatinine mg/dl
Overall mean	190	0.69±0.03	1.94±0.15
Parity number			
1st parity	25	0.66±0.07 a	1.9±0.37 b
2nd parity	40	0.61±0.05 a	2.1±0.28 b
3rd parity	50	0.75±0.04 a	1.9±0.23 b
4th parity	75	0.73±0.05 a	1.6±0.25 a
Sex of embryo			
Male	100	0.65±0.03 a	1.8±0.15 a
Female	70	0.67±0.03 a	1.9±0.16 a
Male and Female	20	0.75±0.04 b	2.0±0.22 a
Type of embryo			
Single	125	0.68±0.03 a	2.0±0.16 b
Twins	65	0.70±0.03 a	1.8±0.17 a
Month of pregnancy			
1st month	38	0.65±0.04 a	1.7±0.21 a
2nd month	38	0.73±0.04 a	1.8±0.21 a
3rd month	38	0.69±0.04a	2.0±0.21 a
4th month	38	0.67±0.03 a	2.0±0.19a
5th month	38	0.70±0.03 a	2.0±0.19 a
Seasons			
Summer	113	0.72±0.02 a	1.8±0.13 a
Autumn	68	0.69±0.03 a	1.7±0.15 a
Winter	9	0.66±0.06 a	2.2±0.33 a

a , b, c Means not showing the same letter in the same column within each factor significantly differ ($P<0.05$).

Table (7): F-ratio of analysis of variance of factors affecting plasma uric acid and creatinine in blood plasma of Rahmani ewes during pregnancy period.

S. O. V	d.f	Plasma uric acid	Creatinine
Parity (P)	3	1.085	0.551
Sex of embryo (Sex)	2	4.459*	0.345
Type of embryo (TE)	1	0.543	6.279*
Month of pregnancy (MP)	4	1.573	0.837
Season (S)	2	0.540	1.317
P × MP	12	2.044*	0.864
Sex × MP	8	1.055	0.556
TE × MP	4	0.285	1.069
P × S	6	0.180	0.587
Regression on age of ewe:			
Linear	1	2.062	0.222
Quadratic	1	2.323	0.073
Remainder d.f	145		
Reminder M.S		0.1488	0.3700

* $P < 0.05$

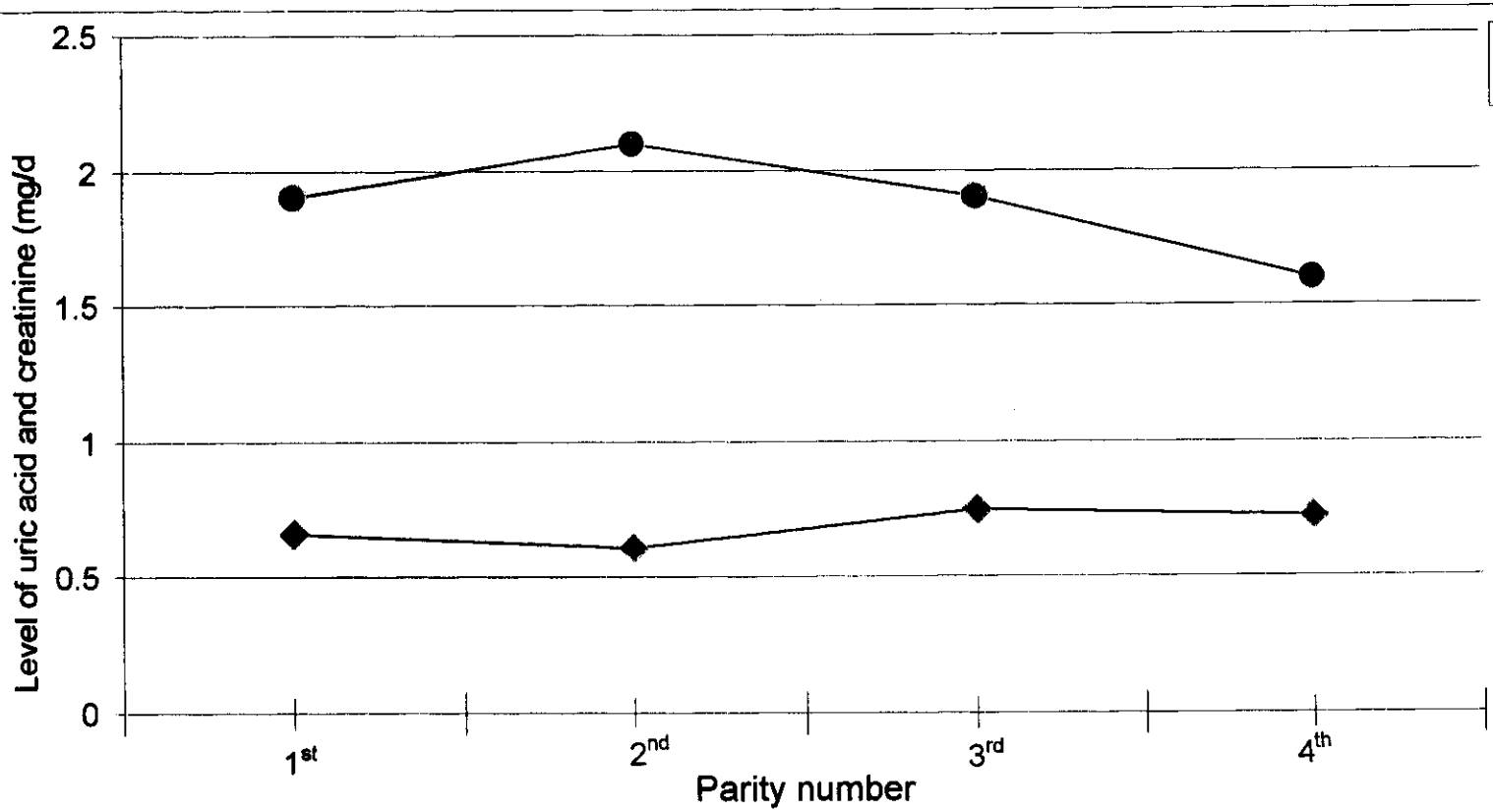

Fig (5): Effect parity number on plasma uric acid and creatinine during pregnancy period

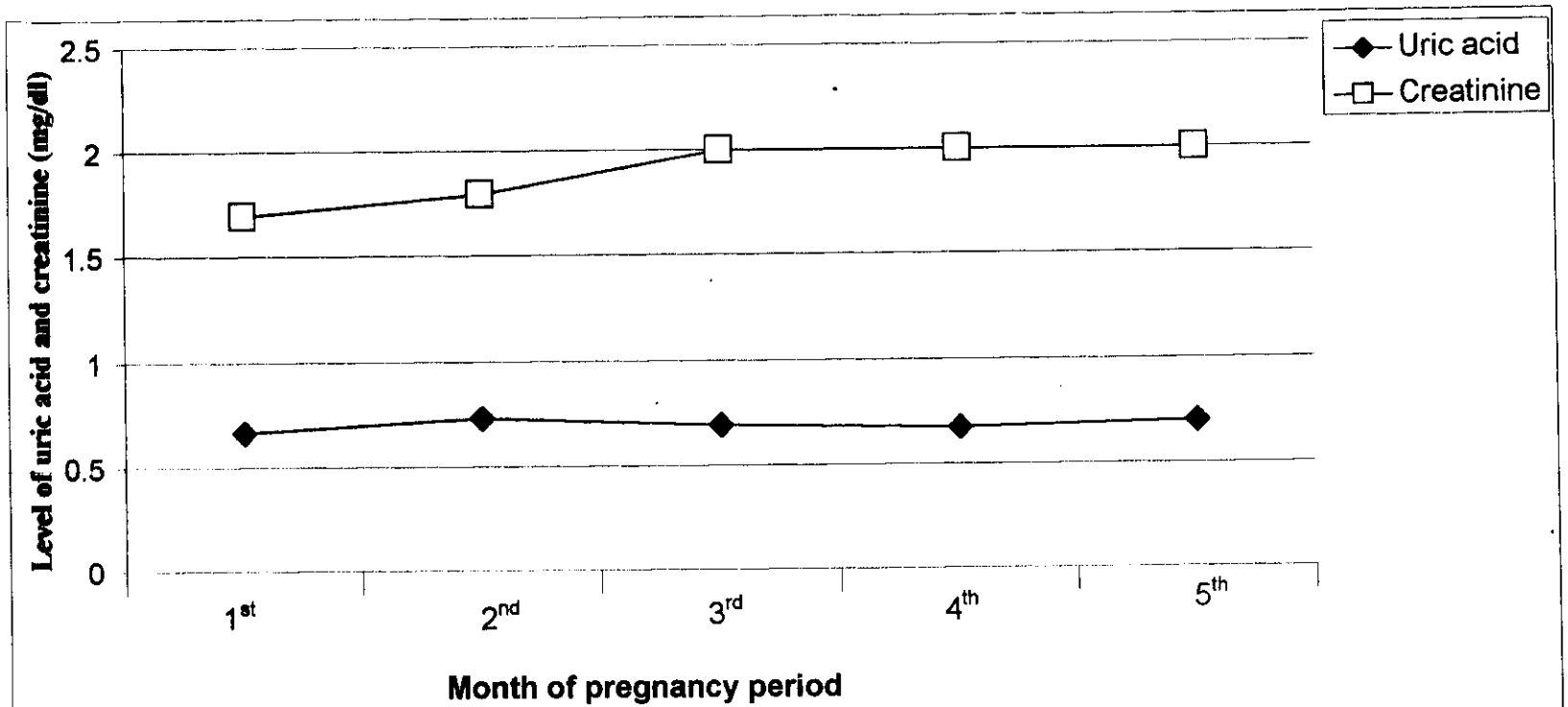

Fig (6): Effect of month of pregnancy on plasma uric acid and creatinine during pregnancy period.

The effect of type of embryo on plasma GOT was non significant however on GPT was significant ($P<0.05$). The mean level of plasma GOT and GPT was higher in single (50.0±3.4 and 10.4±0.87(μ/L), respectively) than twins.

The effect of month of pregnancy period was non significant on plasma GOT and GPT. Mean levels of plasma GOT increased slightly from the 1st months of pregnancy up to 4 month and decreased slightly in the 5th months of pregnancy (Table 8 and Fig. 8). The present results are in agreement with Okab et al., (1993) who found that, highest overall mean values for serum GOT and GPT were noted after mid pregnancy but values dropped significantly ($P<0.01$) shortly before parturition and after post partum.

Effect of season of the year on plasma GOT and GPT was non significant (Tables 8 and 9). Mean level of plasma GOT and GPT decreased from summer to autumn then increased in winter season. The present results agree with the findings of Okab et al., (1993) who found that, the serum GOT did not affected by season of the year and serum GOT and GPT levels were higher ($P<0.05$) in summer than in autumn.

Tables 3, 5, 7 and 9 show that during pregnancy period, the coefficients of linear and quadratic regression equations of the levels of total protein, total lipids on age of ewe were statistically significant ($P<0.01$). Also the coefficient of linear regression equation of the level of GOT and quadratic regression equation of the cholesterol on age of ewe were statistically significant ($P<0.05$), while the coefficients of all other blood parameters were statistically non-significant.

The significance of linear regression equations means that for each additional year of ewe age, the levels of total protein, total lipids and

Table (8): Least square means and standard error of factors affecting plasma Glutamic oxaloacetic transaminase (GOT) and glutamic pyruvic transaminase (GPT) µ/litre in blood plasma of Rahmani ewes during pregnancy period.

Factors	No.	GOT (µ/L)	GPT (µ/L)
Overall mean	190	48.3±3.32	10.2±0.79
Parity number			
1st parity	25	59.6±7.7 a	8.9±1.8 a
2nd parity	40	44.5±6.0 a	10.0±1.4 a
3rd parity	50	50.1±4.9 a	9.1±1.1 a
4th parity	75	38.9±5.3 a	12.9±.1.2 a
Sex of embryo			
Male	100	47.9±3.2 a	9.4±0.79 a
Female	70	47.8±3.4 a	9.6±0.81 a
Male and Female	20	49.1±4.6 a	11.6±1.1 b
Type of embryo			
Single	125	50.0±3.4 a	10.4±0.81 b
Twins	65	46.5±3.6 a	9.5±0.87 a
Month of pregnancy			
1st month	38	43.6±4.4 a	9.4±1.0 a
2nd month	38	49.4±4.4 a	10.4±1.0 a
3rd month	38	50.3±4.4 a	11.1±1.0 a
4th month	38	52.5±4.0 a	10.6±0.98 a
5th month	38	45.6±3.9 a	9.4±0.95 a
Seasons			
Summer	113	49.0±2.8 a	9.8±0.67 a
Autumn	68	45.0±3.6 a	9.6±0.75 a
Winter	9	48.0±4.2 a	11.1±1.6 a

a , b **Means not showing the same letter in the same column within each factor significantly differ (P<0.05).**

Table (9): F-ratio of analysis of variance of factors affecting plasma Glutamic oxaloacetic transaminase (GOT) and glutamic pyruvic transaminase(GPT) μ/litre in blood plasma of Rahmani ewes during pregnancy period.

S. O. V	d.f	GOT	GPT
Parity (P)	3	2.160	1.584
Sex of embryo (Sex)	2	0.063	3.182*
Type of embryo (TE)	1	2.164	6.025*
Month of pregnancy (MP)	4	1.684	1.299
Season (S)	2	0.115	0.474
P × MP	12	0.849	0.682
Sex × MP	8	1.008	0.773
TE × MP	4	1.945	0.890
P × S	6	0.823	1.660
Regression on age of ewe:			
Linear	1	5.215*	0.016
Quadratic	1	0.264	0.029
Remainder d.f	145		
Remainder M.S		160.4213	9.2715

* $P < 0.05$

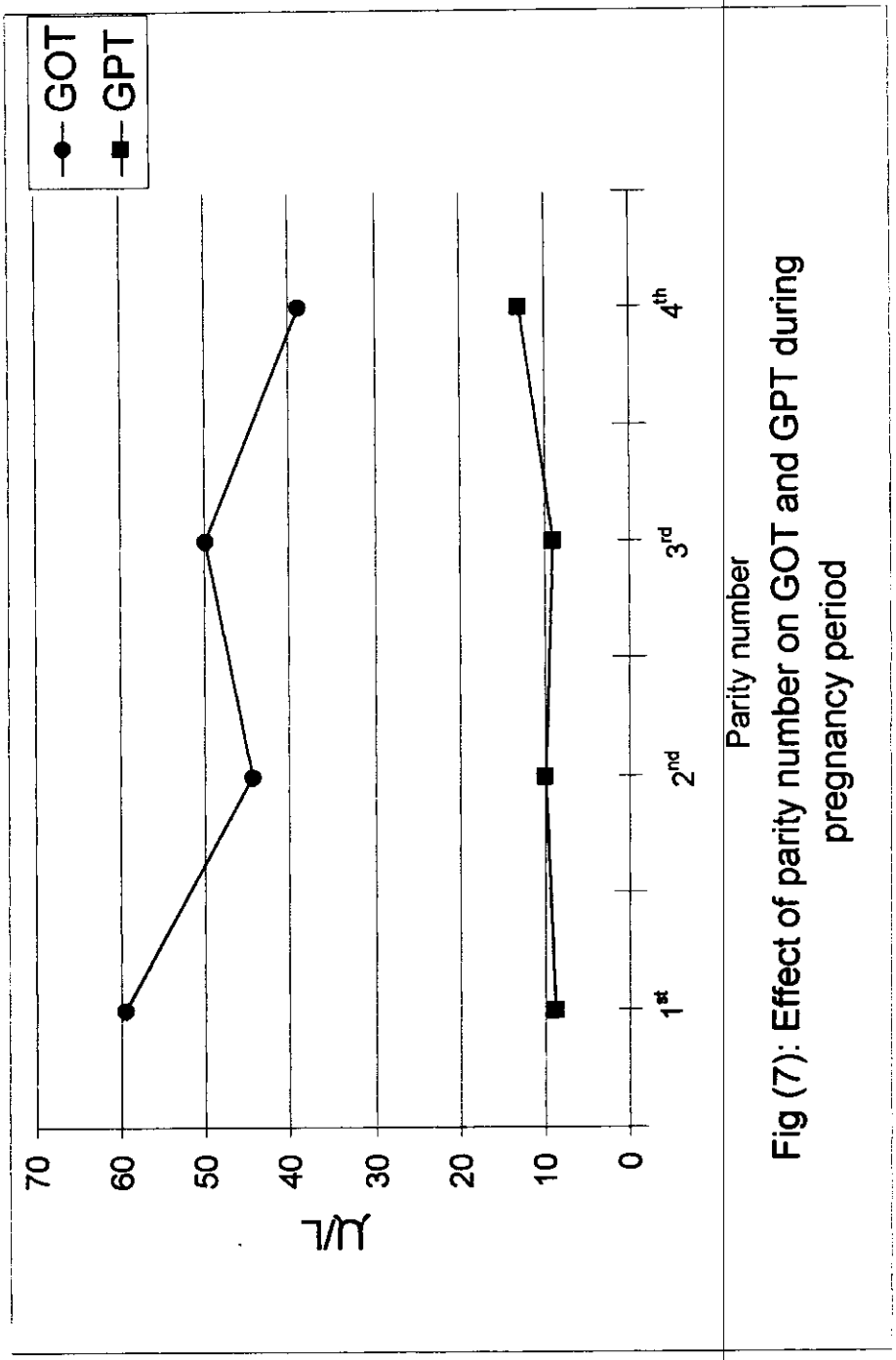

Fig (7): Effect of parity number on GOT and GPT during pregnancy period

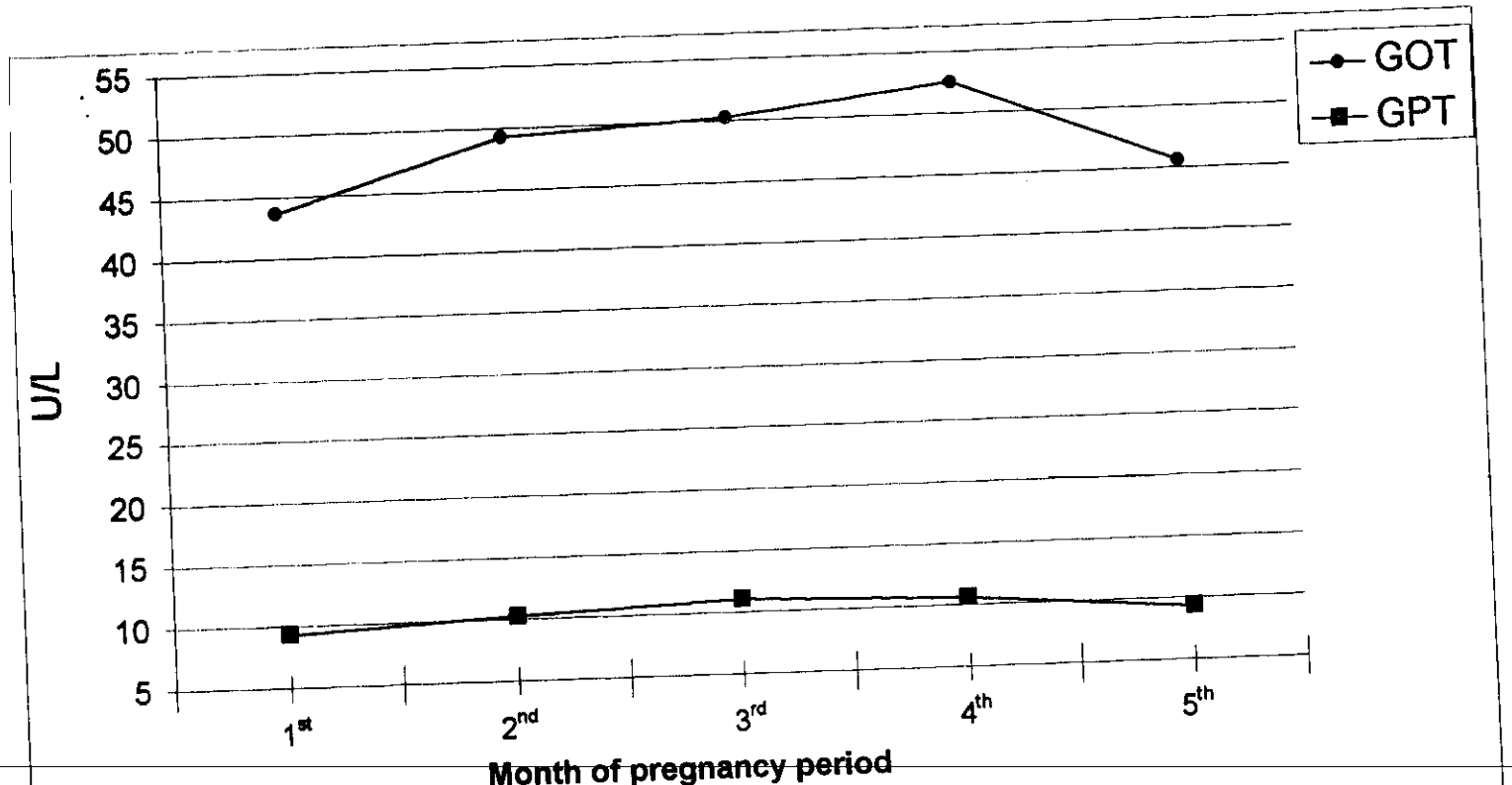

Fig (8): Effect of month of pregnancy on the GOT and GPT during pregnancy period

GOT, in serum blood of Rahmani ewes during pregnancy, increased by 9.851 gm/dl, 10.016 mg/dl and 5.215 µg/L, respectively.

The significant curvilinearity or the departure from linearity in the regression means that for each squares of ewe age, the levels of total protein, total lipids and cholesterol in serum blood of Rahmani ewes increased by 8.524 gm/dl, 11.683 mg/dl and 5.386 mg/dl, respectively.

4.2. Concentration of some blood plasma components in ewes during the first 2 month post- partum:

4. 2. 1. protein fractions:

Data presented in Tables (10 and 11) show that the differences between means of TP, A, G and A/G ratio due to parity number effect were non significant. The obtained results are in agreement with the findings of Shetaewi and Daghash, (1993) who found that, non significant differences were detected between pregnant and lactation ewes in serum total protein (TP). However, serum TP levels fall to as low as 0.676 g/dl during lactation and elevated at the end of lactation and found that, during lactation level albumin decreased ($P<0.05$) when compared with pregnancy (3.43 vs. 3.83 gm/dl). And disagree with what they found that, serum globulin concentration was 16% higher during lactation than during pregnancy.

The mean values albumin increased from the 1st parity to the 3rd parity and decreased in the 4th parity. The opposite result was obtained in globulin means (Fig. 9).

The effect of sex of birth on protein fractions was non significant. Means of TP of males was less than mean of females, while the opposite result was obtained in globulin means.

Means of TP and G of ewes having single lambs were less than means of ewes having twin lambs. The opposite results were obtained with A means.

Due to the effect of month of post partum, the 1st month show higher levels of TP and A than 2nd month while the levels of G show the opposite trend compared to the level of A.

Due to the effect of seasons of the year the differences between means of TP were non-significant and the levels increased gradually from summer to autumn and winter. While the differences between means of A, G and A/G were significant ($P<0.01$) and the levels of A increased significantly ($P<0.05$) from summer to the autumn and winter. The opposite result was obtained with G levels. The present results disagree with Madian (1989) who found that summer had slightly higher albumin level (3.42 vs. 2.96 gm/dl) compared with winter ones inagreement with the same authors for globulin who stated that, summer showed higher values of globulin (3.78 vs. 3.22 gm/dl) than winter.

The coefficient of linear and quadratic regression of TP, A, G and A/G on age of ewes were small in values. Except the quadratic regression coefficient of TP, however all coefficient were statistically non-significant (Table 11). Ibrahim et al., (1993) found that, only age was an important factors influencing total protein values in blood plasma lambs.

4. 2. 2. Plasma total lipids (L), cholesterol (C) and L/C ratio:

Data presented in Tables (12 and 13) show that, parity number had significant ($P<0.01$) effect on total lipids and the mean levels of plasma total lipids increased significantly from 1st to 3rd parity and decreased non significantly in the 4th parity. The differences between means of C and L/C ratio were non significant, and means of C gradually

Table (10): Least square means and standard error of factors affecting plasma total protein, albumin, globulin (gm/dl) and albumin/globulin ratio in blood plasma of Rahmani ewes during post partum period.

Factors	No. of obs.	Total protein (gm/dl)	Albumin (A) gm/dl	Globulin (G) gm/dl	A/G ratio
Overall mean	76	7.11±0.25	4.13±0.28	2.95±0.29	1.75±0.24
Parity number					
1st parity	12	7.06±0.62 a	4.07±0.71 a	2.93±0.73 a	1.98±0.59 a
2nd parity	14	7.16±0.42 a	4.29±0.48 a	2.94±0.49 a	1.87±0.40 a
3rd parity	20	7.12±0.30 a	4.46±0.35 a	2.52±0.36 a	1.96±0.29 a
4th parity	30	7.08±0.36 a	3.68±0.41 a	3.42±0.43 a	1.19±0.35 a
Sex of birth					
Male	40	7.04±0.24 a	3.88±0.27 a	3.25±0.28 a	1.49±0.23 a
Female	28	7.17±0.26 a	3.88±0.30 a	3.12±0.31 a	1.62±0.25 a
Male and Female	8	7.11±0.41 a	4.62±0.47 a	2.49±0.48 a	2.14±0.39 a
Type of birth					
Single	50	6.96±0.27 a	4.22±0.31 a	2.81±0.32 a	1.84±0.26 a
Twins	26	7.25±0.27 a	4.04±0.31 a	3.10±0.32 a	1.67±0.26 a
Month of post partum					
1st month	38	7.21±0.29 a	4.22±0.33 a	2.81±0.34 a	1.82±0.28 a
2nd month	38	7.09±0.26 a	4.04±0.29 a	3.09±0.30 a	1.68±0.25 a
Seasons					
Summer	49	6.86±0.21 a	3.37±0.24 a	3.59±0.25 b	1.24±0.20 a
Autumn	18	7.01±0.30 a	4.46±0.35 b	2.46±0.36 a	2.07±0.29 b
Winter	9	7.44±0.43 a	4.55±0.49 b	2.81±0.50 a	1.94±0.41 b

a , b Means not showing the same letter in the same column within each factor significantly differ ($P<0.05$).

Table (11): F-ratio of analysis of variance of factors affecting plasma total protein, albumin, globulin and A/G ratio in blood plasma of Rahmani ewes during post partum period.

S.O.V	d.f	Plasma total protein	Plasma albumin (A)	Plasma globulin(G)	A/G ratio
Parity number(P)	3	0.019	0.849	0.988	0.996
Sex of birth (Sex)	2	0.211	1.584	1.520	1.737
Type of birth (T)	1	1.483	0.467	1.174	0.556
Month of post partum (MPP)	1	0.012	0.412	0.912	0.337
Season (S)	2	1.039	7.245***	6.142**	5.335**
P×MPP	3	0.951	0.041	0.065	0.141
Sex × MPP	2	0.214	1.805	1.913	1.141
T × MPP	1	0.832	0.537	0.408	0.180
P × S	6	0.401	1.358	1.208	0.990
Regression on age of ewe:					
Linear	1	0.187	0.024	0.007	0.479
Quadratic	1	0.734	0.075	0.055	0.275
Remainder d.f	52				
Remainder M.S		0.5775	0.7546	0.8026	0.5368

** P< 0.001 and *** P< 0.001

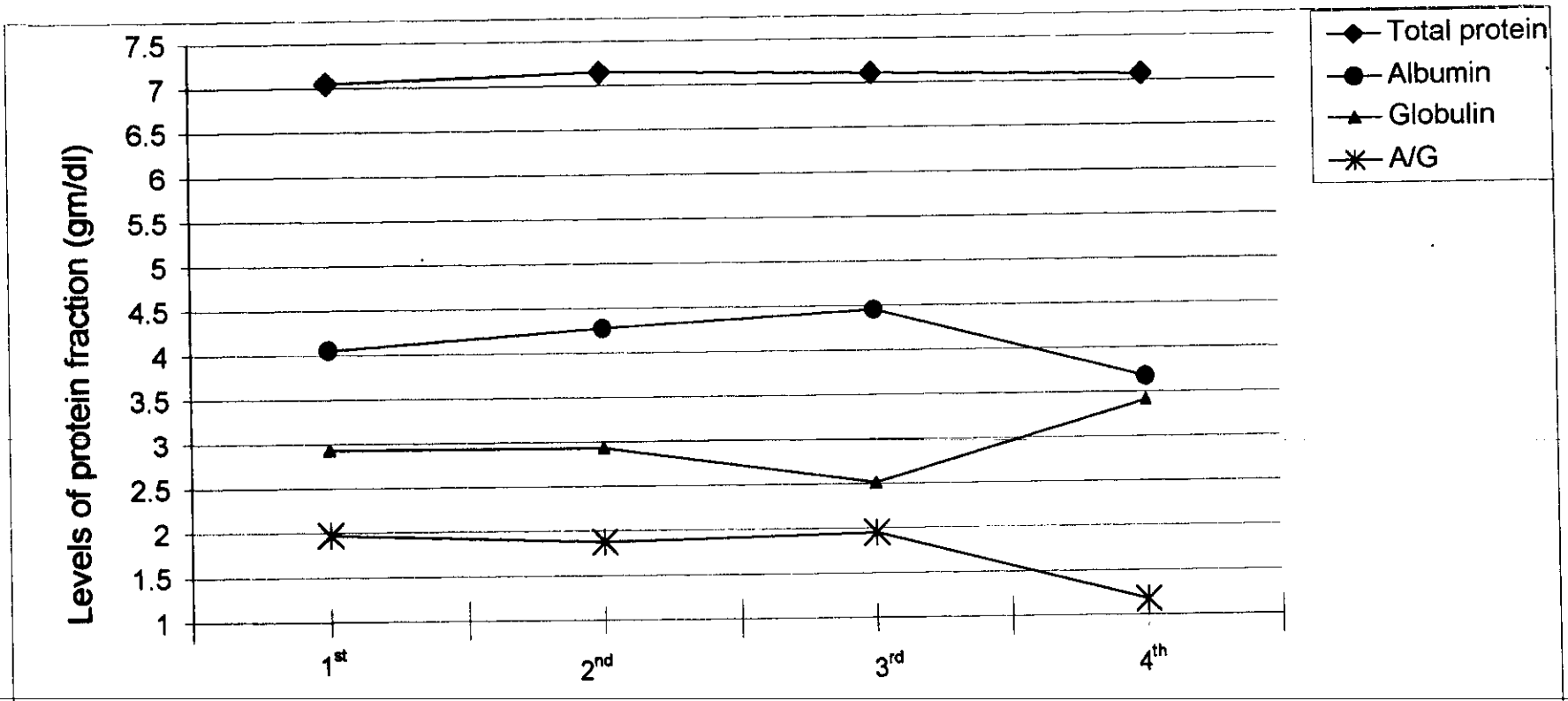

Fig (9): Effect of parity number on protein fractions during post- partum period.

decreased and L/C ratio gradually increased (Fig 10).

Coefficients of linear and quadratic regression of L on age of ewe were significant which explain that L is expected to increase with 3.903 mg/dl per month unit added to the age of ewe in case of linear relationship and to increase with 3.29 mg/dl in case quadratic relationship. The values of coefficient of linear regression of C or L/C ratio were markedly higher than the values of quadratic regression, however the coefficients were statistically non significant. The differences between means of L, C and L/C ratios due to the effect of sex of birth type of birth, post partum month and year of seasons, and the interaction between all factors studied were non significant. Means of L and C ewes having males were slightly higher than ewes having females. Also ewes having single lambs showed slightly higher levels of L and C than ewes having twins. Means of C in blood plasma in ewes in the 1st month of lactation period was lower than mean of C ewes in 2nd month of lactation. Means of each of L and C decreased in autumn compared to summer and the increased in winter especially with C level. The obtained results are inagreement with Okab et al., (1993) who found that, the overall mean of plasma total lipids concentration were higher in summer than in winter. The mean level of plasma cholesterol in this experiment is lower than that, obtained by Rawal et al., (1991) who determined cholesterol levels during 4 seasons (hot dry, humid hot, temperate and cold) of the year, using Muz affarnagri sheep of different ages and in different reproductive phases and they found that, the values were 197.58±1.01, 204.13±1.85, 190.29±1.68 and 209.00±3.55 mg/100 ml, respectively.

Table (12): Least square means and standard error of factors affecting plasma total lipids, cholesterol and lipids/cholesterol (L/C)ratio in blood plasma of Rahmani ewes during post partum period.

Factors	No. of obs.	Total lipids (mg/dl)	Cholesterol (mg/dl)	L/C ratio
Overall mean	76	310.57±9.09	146.59±10.07	2.25±0.20
Parity number				
1st parity	12	266.43±22.85 a	158.41±25.29 a	1.76±0.51 a
2nd parity	14	288.68±15.48 a	154.40±17.13 a	1.90±0.34 a
3rd parity	20	348.13±11.25 b	148.76±12.48 a	2.48±0.25 a
4th parity	30	339.01±13.38 b	124.81±14.81 a	2.85±0.29 a
Sex of birth				
Male	40	311.82±8.74 a	140.89±9.67 a	2.28±0.19 a
Female	28	300.42±9.69 a	133.38±10.73 a	2.36±0.21 a
Male and Female	8	319.48±15.04 a	165.51±16.65 a	2.10±0.33 a
Type of birth				
Single	50	310.92±10.04 a	152.13±11.12 a	2.17±0.22 a
Twins	26	310.22±10.05 a	141.06±11.13 a	2.32±0.22 a
Month of post partum				
1st month	38	310.78±10.75 a	140.67±11.90 a	2.32±0.24 a
2nd month	38	310.37±9.52 a	152.52±10.54 a	2.17±0.21 a
Seasons				
Summer	49	315.85±7.73 a	147.26±8.55 a	2.32±0.17 a
Autumn	18	307.28±11.19 a	135.28±12.38 a	2.40±0.25 a
Winter	9	308.59±15.74 a	157.23±17.42 a	2.02±0.35 a

a , b Means not showing the same letter in the same column within each factor significantly differ (P<0.05).

Table (13): F-ratio of analysis of variance of factors affecting plasma total lipids, cholesterol and lipids/cholesterol ratio in blood plasma of Rahmani ewes during post partum period

S. O. V	d.f	Total lipids (L)	Cholesterol (C)	L/C ratio
Parity number(P)	3	4.372**	0.627	1.232
Sex of birth (Sex)	2	1.540	2.061	0.346
Type of birth (T)	1	0.007	1.373	0.684
Post partum period (MPP)	1	0.002	1.404	0.549
Season (S)	2	0.387	1.028	0.657
P × MPP	3	0.376	1.645	1.182
Sex × MPP	2	0.044	0.586	0.651
T × MPP	1	1.285	0.039	0.015
P × S	6	1.264	0.593	0.681
Regression on age of ewe:				
Linear	1	3.903*	1.029	2.539
Quadratic	1	3.291**	0.030	0.729
Remainder d.f	52			
Remainder M.S		782.3099	958.7194	0.3881

* P< 0.05 , and ** P< 0.001

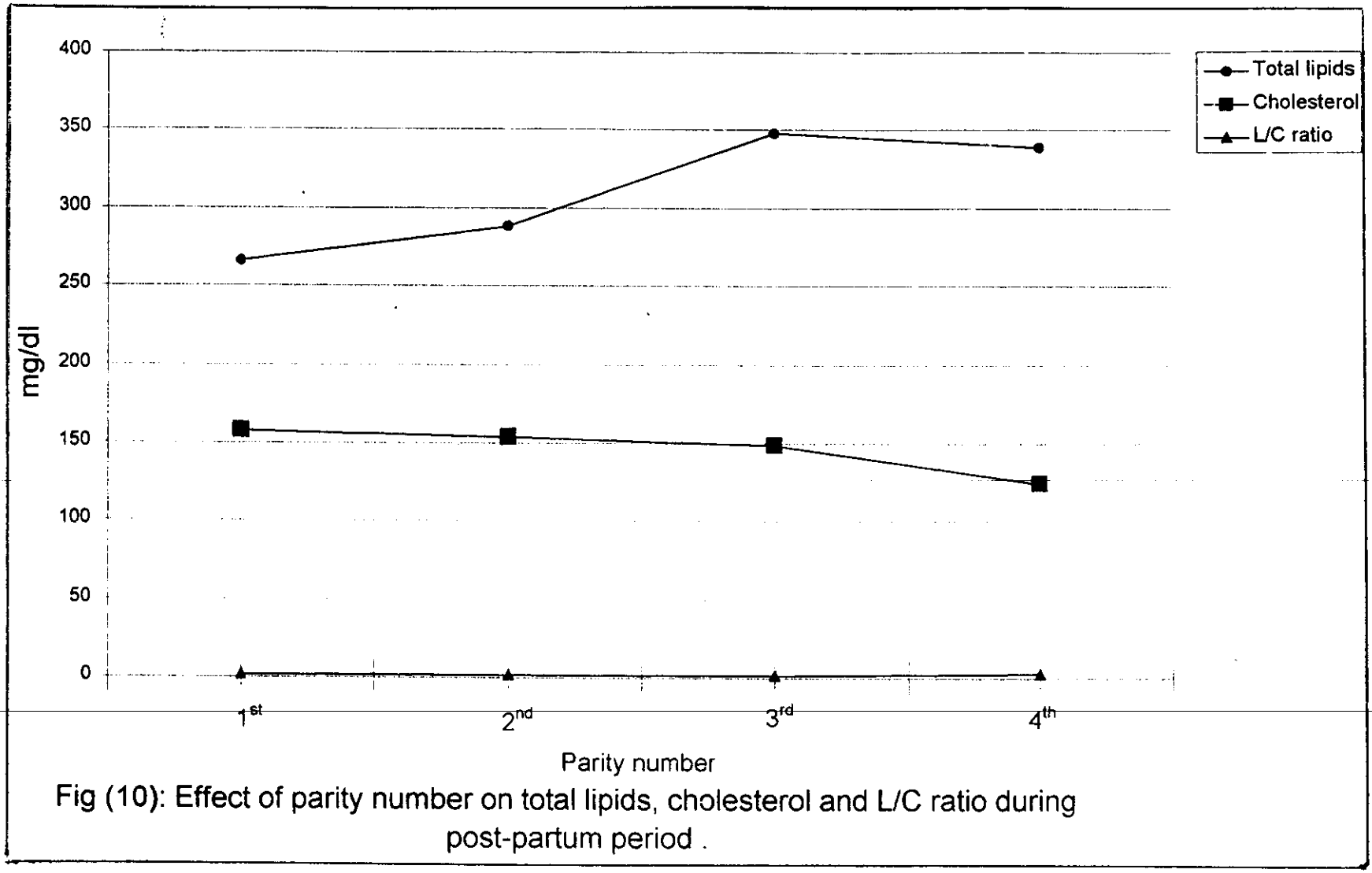

Fig (10): Effect of parity number on total lipids, cholesterol and L/C ratio during post-partum period .

4. 2. 3. Plasma uric acid and creatinine (mg/dl):

Data presented in Tables (14 and 15) show that the differences between mean levels of creatinine in blood serum of Rahmani ewes during post partum due to parity number were non significant and mean levels decreased from 1st and 2nd parties to 3rd and 4th parities while the differences between mean levels of uric acid were significant ($P<0.05$) due to parity number and levels increased gradually from the 1st parity to the 3rd parity (Fig. 11).

Differences between levels of creatinine and uric acid during post partum due to sex of birth, type of birth and months of post partum were non significant and levels of each factor were nearly similar in values.

The mean levels of creatinine increased significantly from summer to autumn and winter (Table 14) while the differences between mean levels of uric acid were non significant and levels ranged from 0.60 to 0.68 mg/dl.

The coefficient of linear regression of uric acid and creatinine levels on age of ewe were non significant. McCutcheon et al., (1990) with Border Leicester Romney ewes reported that, 2 year old ewes had significantly lower plasma creatinine than old ewes.

4. 2. 4. Plasma GOT and GPT (μ/L):

Data presented in Tables (16 and 17) show that, the differences between mean levels of GOT due to parity number, sex of birth, type of birth, month of post partum and season of the year were non significant. Mean level of GOT in blood plasma of ewes having males was higher than females and of ewes having twins higher than ewes having single

Table (14): Least square Means and standard error of factors affecting plasma creatinine and uric acid in blood plasma of Rahmani ewes during post partum period.

Factors	No.	Uric acid (mg/dl)	Creatinin mg/dl
Overall mean	76	0.64±0.03	2.26±0.19
Parity number			
1st parity	12	0.58±0.06 a	2.39±0.49 a
2nd parity	14	0.58±0.06 ab	2.38±0.33 a
3rd parity	20	0.77±0.04 c	2.08±0.24 a
4th parity	30	0.68±0.05 bc	2.18±0.28 a
Sex of birth			
Male	40	0.67±0.03 a	2.33±0.18 a
Female	28	0.61±0.04 a	2.17±0.21 a
Male and Female	8	0.64±0.05 a	2.28±0.32 a
Type of birth			
Single	50	0.62±0.04 a	2.33±0.21 a
Twins	26	0.66±0.04 a	2.31±0.21 a
Month of post partum			
1st month	38	0.63±0.04 a	2.21±0.23 b
2nd month	38	0.65±0.04 a	2.31±0.20 a
Seasons			
Summer	49	0.64±0.03 a	1.74±0.16 a
Autumn	18	0.60±0.04 a	2.42±0.24 b
Winter	9	0.68±0.06 a	2.63±0.33 b

a , b, c Means not showing the same letter in the same column within each factor significantly differ (P<0.05).

Table (15): F-ratio of analysis of variance of factors affecting plasma uric acid and creatinine in blood plasma of Rahmani ewes during post-partum period.

S. O. V	d.f	Uric acid	Creatinin
Parity number (P)	3	3.270*	0.198
Sex of birth (Sex)	2	2.879	0.533
Type of birth (TE)	1	1.764	0.706
Month of post partum (MPP)	1	0.239	0.273
Season (S)	2	1.032	6.915**
P×(MPP)	3	0.111	0.878
Sex × (MPP)	2	0.310	1.333
TE × (MPP)	1	0.123	1.754
P × S	6	1.140	0.692
Regression on age of ewe:			
Linear	1	2.662	1.062
Quadratic	1	2.212	0.533
Remainder d.f	52		
Remainder M.S		0.0108	0.3565

* P< 0.05 , and ** P< 0.001

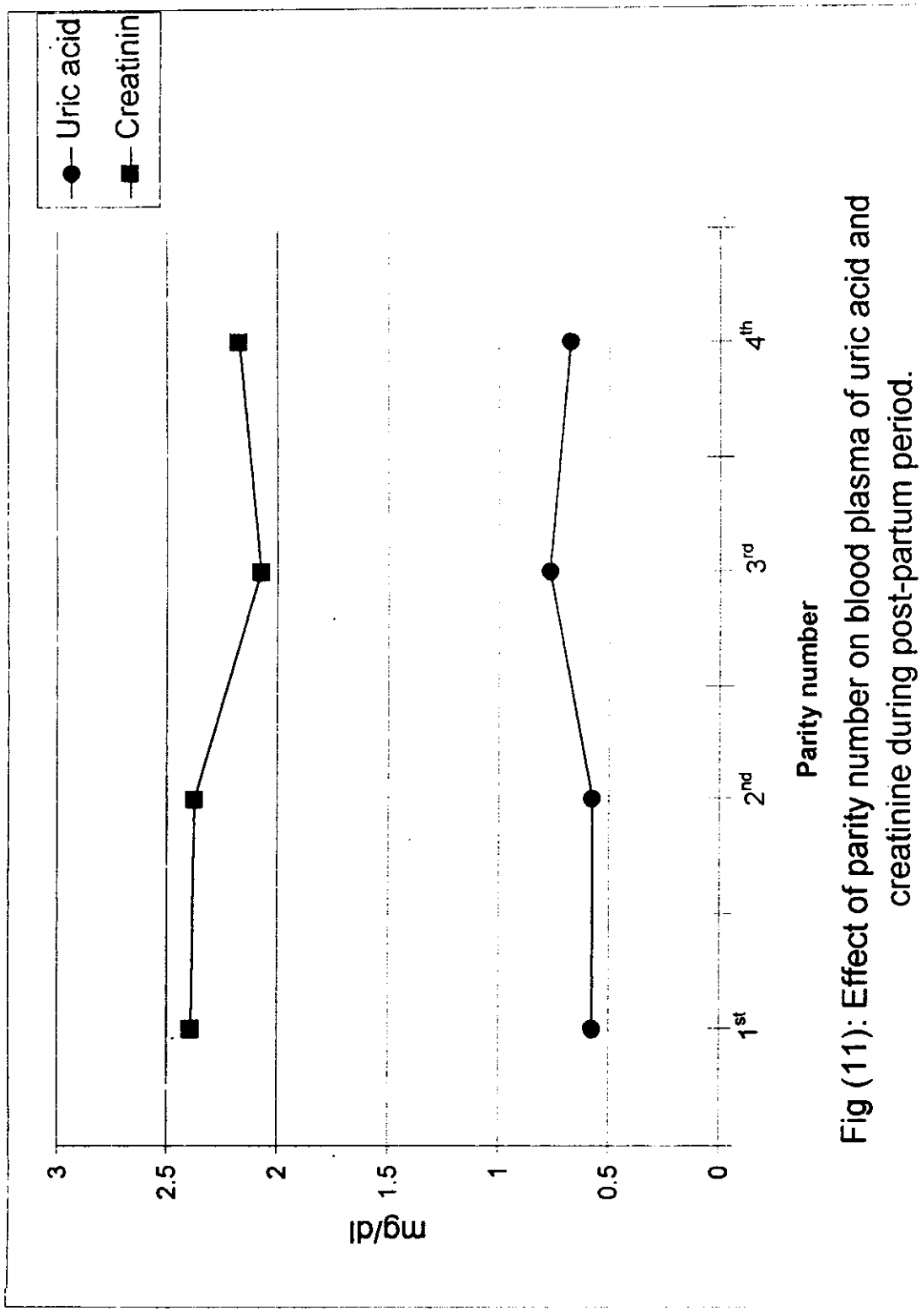

Fig (11): Effect of parity number on blood plasma of uric acid and creatinine during post-partum period.

Table (16): Least square means and standard error of factors affecting plasma Glutamic oxalatic transaminase and glutamic pyruvic transaminase (μ/litre) in blood plasma of Rahmani ewes during post partum period.

Factors	No.	GOT (μ/L)	GPT (μ/L)
Overall mean	76	44.19±4.19	11.47±0.64
Parity number			
1st parity	12	47.58±10.53 a	14.35±1.59 b
2nd parity	14	41.31±7.13 a	10.85±1.08 a
3rd parity	20	43.76±5.19 a	9.90±0.78 a
4th parity	30	44.14±6.16 a	10.78±0.94 a
Sex of birth			
Male	40	47.99±4.03 a	10.47±0.61 a
Female	28	45.60±4.46 a	10.75±0.67 a
Male and Female	8	38.99±6.93 a	13.17±1.05 b
Type of birth			
Single	50	43.46±4.63 a	11.96±0.70 a
Twins	26	44.93±4.63 a	10.97±0.70 a
Month of post partum			
1st month	38	42.66±4.95 a	11.46±0.75 a
2nd month	38	45.73±4.38 a	11.47±0.67 a
Seasons			
Summer	49	48.02±3.56 a	10.57±0.54 a
Autumn	18	43.67±5.15 a	12.13±0.78 a
Winter	9	40.89±7.25 a	11.71±1.10 a

a , b Means not showing the same letter in the same column within each factor significantly differ (P<0.05).

Table (17): F-ratio of analysis of variance of factors affecting plasma (GOT) and (GPT) in blood of Rahmani ewes during post partum period.

S. O. V	d.f	plasma GOT	Plasma GPT
Parity number (P)	3	0.204	3.163*
Sex of birth (Sex)	2	1.151	4.043*
Type of birth (TE)	1	0.139	2.706
Month of post partum (MPP)	1	0.541	0.001
Season (S)	2	0.764	2.525
P×(MPP)	3	0.814	1.211
Sex × (MPP)	2	0.497	0.805
TE × (MPP)	1	0.193	0.913
P × S	6	1.083	3.129**
Regression on age of ewe:			
Linear	1	0.152	5.572*
Quadratic	1	0.701	2.905
Remainder d.f	52		
Remainder M.S		166.1120	3.8315

* P< 0.05 and ** P< 0.001

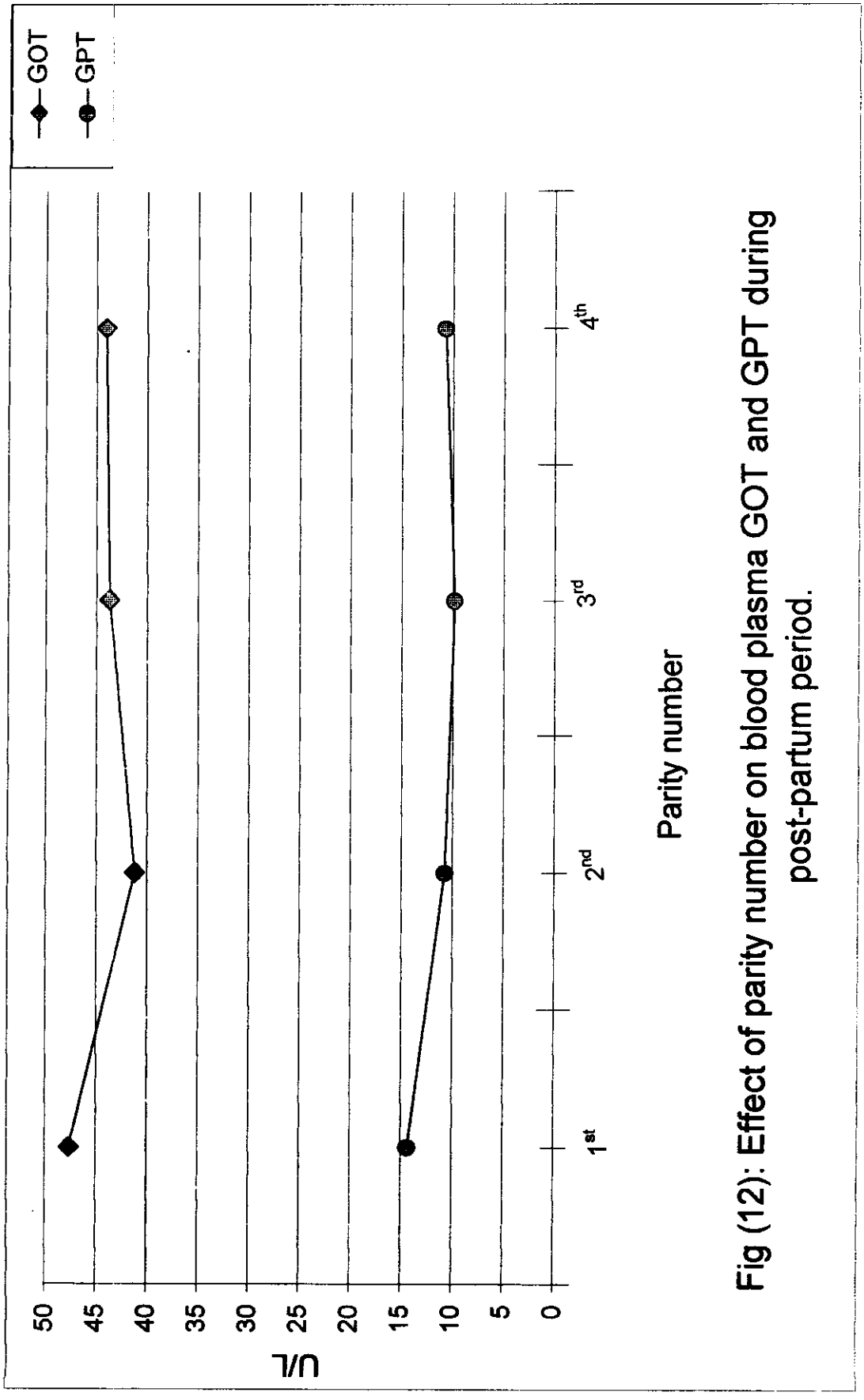

Fig (12): Effect of parity number on blood plasma GOT and GPT during post-partum period.

lambs. GOT level was higher in the 2nd month than 1st month. GOT level decreased gradually from summer season to autumn and winter.

From Tables (16 and 17) it is show that, the differences between mean levels of GPT, due to parity number and sex of birth were significant ($P<0.05$). Mean levels of GPT decreased from the 1st parity to the 3rd parity (Fig. 12). While the differences between mean levels of GPT, due to type of birth, month of post partum and season of the year, were non significant and levels for each factor were nearly similar. The interaction between parity number and season of the year was significant ($P<0.01$) which indicate that parity had its effect in combination with season of the year.

The coefficient of linear regression of GPT level on age of ewe was significant and the value explain that level of GPT is expected to increase with 5.572 U/L per month unit added to the age of ewe (Table 17).

4. 3. Clinical parameters:

Rectal temperature (RT), skin temperature (ST), respiration rate (RR) and pulse rate (RT) during pregnancy and post-partum periods at morning (8 a.m.) and afternoon (4 p.m.)

Tables 18 and 19 show the averages of rectal temperature (RT), skin temperature (ST), respiration rate (RR) and pulse rate (PR) affected by parity number, sex of embryo, type of embryo, month of pregnancy and post-partum and year seasons at the morning 8 a.m. and at afternoon 4 p.m., during pregnancy and post partum periods.

During pregnancy period, parity number had significant ($P<0.001$) effect on RT at morning (8 a.m) and at afternoon (4. P.m) and RR ($P<0.05$) at afternoon (4 p.m.) and it had non significant effect on ST, PR

and RR (at morning only). While during post-partum, parity number had significant ($P<0.001$) effect on RR and PR at 8 a.m and 4 p.m and it had non significant effect on RT and ST.

During pregnancy period, sex of embryo had significant ($P<0.001$) effect on RT at 8 a.m and on PR at 16 p.m and non significant effect on RT (at 4 p.m.), ST, RR and PR (at 8 a.m.). While during post-partum sex of birth had significant effect ($P<0.01$) on RR at morning (8 a.m) and it had non significant effect on RT, ST, RR (at afternoon (4 p.m) and PR. Sleiman and Abisaab, (1995) found that sex of sheep affected respiration (79.9 vs. 49.6 breaths/minute) for young male and female Awassi sheep, respectively.

During pregnancy period, type of embryo had significant ($P<0.05$) effect on RR at (4. P.m) and non significant effect on RT, ST, RR (at 8 a.m only) and PR. While during post-partum type of birth had non-significant effect on all above traits studied.

During pregnancy period, biweekly intervals had significant effect on RT, RR and each of ST and PR at 4. am only. While during post-partum period biweekly intervals had significant ($P<0.001$) effect on all above traits studied. Eyal, (1963 b) stated that, PR in sheep is directly related to both RT and ambient temperature.

During pregnancy and post-partum periods season of the year had significant ($P<0.001$) , ($P<0.05$) effect on RR at 4. P.m, 8 a.m during post partum only and non significant effect on the other traits studied. The present results about RT are in agreement with the findings of Hafez et al., (1956) in their studies on the fluctuations of body temperature of Rahmani and Ossimi sheep during the year, as they found that, the fluctuation in body temperature were not closely associated with the

changes in environmental temperature or relative humidity. On the contrary the findings of Thomposen et al., (1981) and Guerrini and Bertchinge, (1983), Shalaby, (1985) revealed that body temperature was influenced by environmental temperature. Abisaab and Sleiman, (1995) found that, body temperature was higher in spring and summer than autumn. Khalil (1980) and Shoukry, (1981) reported that, Egyptian fat tailed sheep breeds exhibited significant seasonal and diurnal variation in rectal temperature. With respect to skin temperature, Marai et al., (1992) with Ossimi sheep found that skin temperature was higher in summer than in winter. Sleiman and Abisaab, (1995) reported that the highest respiration rates were reached by young Awassi females during summer (90.7 breaths/minute). Taneja, (1966) stated that the environmental temperature during summer is not the major factor which cause the increase in RR. While, Shalaby, (1985) found that, PR increased during summer. On the contrary to the later results Singh and Roy, (1963) in India and El-Sherif, (1983) in Egypt reported that, PR value were higher during winter than during summer. Shalaby, (1985) stated that, the minimum PR values was recorded at 8 p.m. in all seasons, while during summer it was maximum at noon at 4 p.m. (90 beats/minute) in Ossimi and Rahmani sheep.

The interaction between the two factors parity number and season of the year during pregnancy period had significant ($P<0.001$) effect only on RT. While during post-partum period the same interaction had significant ($P<0.001$) effect only on RR and PR at 8 a.m and 4 p.m.

During pregnancy period, linear coefficients of regression of each of RR and PR at 4 p.m, RR at 8 a.m on age of ewe were significant ($P<0.001$), ($P<0.01$) which indicate that increasing age of ewe for one

Table (18): Least square mean and standard error of factors affecting rectal temperature (RT), skin temperature (ST), respiration rate (RR) and pulse rate (PR) of Rahmani ewes during pregnancy and post partum period at morning (8 a.m) and afternoon (4 p.m).

Factors	No. of Obs.	Pregnancy period							
		RT		ST		RR		PR	
		8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m
Overall mean	380	38.61±0.01	39.71±0.008	36.62±0.06	37.69±0.033	53.82±0.77	65.65±0.61	89.83±0.86	99.69±0.515
Parity number									
1st parity	50	38.59±0.02 a	39.69±0.019 b	36.64±0.19 a	37.69±0.33 bc	53.55±1.79 ab	65.79±1.42 a	90.46±1.99 a	101.25±1.20 ab
2nd parity	80	38.67±0.02 b	39.74±0.015 c	36.67±0.10 a	37.64±0.025 a	54.41±1.38 b	65.36±1.09 b	89.78±1.53 a	99.24±0.92 a
3rd parity	100	38.61±0.01a	39.70±0.012 b	36.57±0.08 a	37.68±0.021 b	51.96±1.14 a	63.88±0.89 d	89.51±1.26 a	98.64±0.76 a
4th parity	150	38.60±0.02 a	39.67±0.013 a	36.59±0.09 a	37.73±0.022 c	54.85±1.22 b	67.57±0.96 c	89.56±0.84 a	99.64±0.82 a
Sex of embryo									
Male	200	38.63±0.01 b	39.70±0.008 a	36.64±0.06 a	37.69±0.041 a	54.52±0.76 a	65.66±0.59 a	90.47±0.84 a	100.44±0.506 b
Male	140	38.6±0.01 ab	39.71±0.008 a	36.60±0.06 a	37.69±0.014 a	54.29±0.79 a	65.82±0.62 a	89.57±0.88 a	99.68±0.53 ab
Male and Female	40	38.60±0.01 a	39.71±0.012 a	36.62±0.08 a	37.68±0.020 a	52.63±1.08 a	65.47±0.85 a	89.43±1.19 a	98.96±0.72 a
Type of embryo									
Single	250	38.62±0.01 a	39.71±0.008 a	36.64±0.06 a	37.68±0.014 a	54.14±0.78 a	65.22±0.62 a	89.47±0.87 a	99.67±0.52 a
Twins	130	38.60±0.11 a	39.70±0.00 a	36.59±0.0 a	37.69±0.015 a	53.49±0.84 a	66.08±0.66 b	90.18±0.94 a	99.71±0.56 a

Table (18): Contin.

Factors	No. of Obs.	Pregnancy period							
		RT		ST		RR		PR	
		8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m
Month of pregnancy									
At 15 days of pregnancy	38	38.62±0.02 d	39.74±0.013 e	36.67±0.09 ab	37.73±0.22 cde	55.12±1.20 de	68.42±0.95 ef	90.51±4.33 a	101.15±0.80 c
At 30 days of pregnancy	38	38.75±0.02 f	39.89±0.13 k	36.84±0.09 b	37.89±0.022 f	61.79±1.20 ef	76.33±0.95 h	92.23±1.33 a	105.53±0.80 d
At 45 days of pregnancy	38	38.69±0.02 e	39.74±0.013 ed	36.70±0.09 ab	37.74±0.022 cde	58.48±1.20 e	71.40±0.95 fj	89;61±1;33 a	100;68±0.80 bc
At 60 days of pregnancy	38	38.70±0.02 f	39.78±0.013 f	36.72±0.09 ab	37.75±0.022 e	60.25±1.20 f	72.66±0.95 j	91.46±1.33 a	101.23±0.80 c
At 75 days of pregnancy	38	38.63±0.02 d	39.83±0.013 j	36.57±0.09 ab	37.78±0.022 e	57.22±1.20e	73.24±0.95 jk	89.11±1.33 a	101.64±0.80 c
At 90 days of pregnancy	38	38.62±0.02 d	39.73±0.013 e	36.63±0.09 ab	37.68±0.022 c	55.23±1.20 de	67.39±0.95 e	89.96±1.33 a	98.45±0.80 ab
At 105 days of pregnancy	38	38.62±0.01 d	39.68±0.012 d	36.60±0.09 ab	37.65±0.021 c	52.56±1.13 cd	63.24±0.89 d	89.34±1.25 a	97.36±0.76 a
At 120 days of pregnancy	38	38.54±0.01 c	39.62±0.012 c	36.53±0.09 ab	37.59±0.021 b	49.33±1.13 c	58.05±0.89 c	88.48±1.25 a	96.90±0.76 a
At 135 days of pregnancy	38	38.50±0.01 b	39.55±0.012 b	36.50±0.08 a	37.55±0.021 b	45.77±1.10 b	54.02±0.88 b	88.40±1.23 a	96.47±0.74 a
At 150 days of pregnancy	38	38.46±0.01 a	39.50±0.012 a	36.44±0.08 a	37.51±0.021 a	42.41±1.10 a	51.75±0.88 a	88.18±1.23 a	97.49±0.74 a
Season									
Summer	226	38.60±0.008 a	39.69±0.006 a	36.61±0.05 a	37.70±0.011 a	52.83±0.64 a	63.61±0.51 a	89.61±0.71 a	99.69±0.43 a
Autumn	136	38.61±0.009 a	39.70±0.007 a	36.62±0.05 a	37.17±0.013 a	53.24±0.73 a	66.38±0.57 b	89.91±0.81 a	99.84±0.48 a
Winter	18	38.62±0.02 a	39.72±0.017 a	36.63±0.12 a	37.69±0.029 a	55.38±1.60 b	66.96±0. b	89.96±1.8 a	99.54±1.07 a

Table (18): Contin.

Factors	No. of Obs.	Post partum period							
		RT		ST		RR		PR	
		8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m
Overall mean	152	38.46±0.012	39.50±0.012	36.46±0.030	37.44±0.014	38.61±0.26	43.08±0.42	88.21±0.14	94.95±0.12
Parity number									
1st parity	24	38.47±0.01 a	39.50±0.029 a	36.46±0.030 a	37.43±0.034 a	39.58±0.67 b	42.36±1.06 a	88.24±0.35 b	94.76±0.31 b
2nd parity	28	38.45±0.021 a	39.50±0.019 a	36.46±0.020 a	37.44±0.023 a	38.74±0.45 b	42.51±0.72 a	88.38±0.23 bc	95.15±0.21 c
3rd parity	40	38.45±0.015 a	39.51±0.014 a	36.47±0.015 a	37.45±0.017 a	39.06±0.33 b	45.61±0.52 b	88.79±0.17 c	95.69±0.15 d
4th parity	60	38.47±0.018 a	39.50±0.017 a	36.45±0.017 a	37.46±0.019 a	37.06±0.39 a	41.84±0.62 a	87.41±0.20 a	94.19±0.17 a
Sex of birth									
Male	80	38.47±0.01 a	39.49±0.011 a	36.46±0.011 a	37.45±0.013 a	38.13±0.25 a	43.04±0.40 a	88.21±0.13 a	94.83±0.12 a
Male	56	38.46±0.01 a	39.50±0.012 a	36.47±0.013 a	37.43±0.014 a	38.03±0.28 a	42.51±0.45 a	88.11±0.15 a	94.99±0.13 a
Male and Female	16	38.45±0.02 a	39.51±0.019 a	36.45±0.019 a	37.45±0.022 a	39.67±0.43 b	43.69±0.69 a	88.30±0.23 a	95.03±0.20 a
Type of birth									
Single	100	38.46±0.041 a	39.49±0.013 a	36.53±0.016 a	37.44±0.015 a	38.67±0.29 a	43.43±0.46 a	88.29±0.15 a	94.99±0.13 a
Twins	52	38.47±0.14 a	39.51±0.013 a	36.46±0.013 a	37.45±0.015 a	38.55±0.29 a	42.73±0.47 a	88.13±0.15 a	94.91±0.13 a

Table (18): Contin.

Factors	No. of Obs.	Post partum period							
		RT		ST		RR		PR	
		8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m
Month of post partum									
At 15 day of lactation	38	38.53±0.017 c	39.58±0.016 c	36.53±0.016 c	37.51±0.018 c	42.11±0.36 c	47.26±0.57 c	89.33±0.19 d	95.74±0.16 c
At 30 day of lactation	38	38.49±0.017 b	39.49±0.016 b	36.49±0.016 b	37.45±0.018 b	39.60±0.36 b	44.13±0.57 c	88.37±0.19 c	95.00±0.16 b
At 45 day of lactation	38	38.41±0.015 a	39.48±0.014 ab	36.40±0.015 a	37.37±0.017 a	36.08±0.33 a	40.45±0.52 a	87.24±0.17 a	94.41±0.15 a
At 60 day of lactation	38	38.42±0.015 a	39.45±0.014 a	36.41±0.015 a	37.45±0.017 b	36.66±0.33 a	40.48±0.52 a	87.88±0.17 b	94.65±0.15 ab
Season									
Summer	96	38.46±0.010 a	39.51±0.009 a	36.44±0.010 a	37.45±0.012 a	38.63±0.23 ab	43.27±0.36 b	88.15±0.12 a	94.90±0.10 a
Autumn	38	38.48±0.015 a	39.50±0.014 a	36.46±0.014 a	37.46±0.017 a	38.08±0.33 a	41.85±0.52 a	88.10±0.17 a	94.79±0.14 a
Winter	18	38.45±0.012 a	39.49±0.020 a	36.48±0.021 a	37.42±0.024 a	39.12±0.46 b	44.12±0.73 b	88.37±0.24 a	95.16±0.21 a

a , b, c, d, e, f, g, h, I, j, k Means not showing the same letter in the same column within each factor significantly differ (P<0.05).

Table (19): F ratio of analysis of variance of factors affecting rectal temperature (RT), skin temperature (ST), respiration rate (RR) and pulse rate (PR) during pregnancy and post partum period at morning (8 a.m) and afternoon (4 p.m.).

Source of variation	d.f	Pregnancy period							
		RT		ST		RR		PR	
		8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m
Parity number (P)	3	6.452***	4.628**	0.0171	2.480	1.549	2.935*	0.066	1.710
Sex of embryo (Sex)	2	5.889***	0.706	0.0767	0.029	2.529	0.150	1.797	5.391***
Type of embryo (TE)	1	11.466	2.344	1.338	1.786	1.474	4.160*	1.446	0.018
Month of pregnancy (MP)	4	9.899***	100.748***	2.101*	32.644***	30.767***	88.578***	1.288	17.108***
Season (S)	2	0.813	2.569	0.018	2.907	1.260	13.376***	0.081	0.107
P × MP	27	0.814	1.185	0.946	1.463	0.747	0.829	0.608	2.427***
Sex × MP	18	1.306	0.938	0.472	0.974	0.619	0.575	0.865	1.672*
TE × MP	9	1.174	1.717	1.163	0.350	0.285	1.679	0.601	0.492
P × S	6	4.279***	0.515	0.104	1.753	1.782	0.705	0.205	0.288
Regression on age of ewe									
Linear	1	2.003	2.597	0.553	0.218	7.345**	19.896***	0.292	7.282***
Quadratic	1	1.703	1.248	0.076	0.27	10.766***	30.697***	0.082	5.057*
Remainder d.f	300								
Remainder M.S		0.00296	0.0019	0.0996	0.0058	16.8103	10.4910	20.7474	7.5107

Table (19): Contin.

Source of variation	d.f	Post partum period							
		RT		ST		RR		PR	
		8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m	8 a.m	4 p.m
Parity number (P)	3	0.504	0.052	0.111	0.118	5.757***	10.789***	10.482***	17.483***
Sex of embryo (Sex)	2	0.863	0.714	0.567	1.316	8.210**	2.080	0.607	1.617
Type of embryo (T)	1	0.080	0.694	0.509	0.456	0.237	3.215	1.455	0.540
Month of post partum (MPP)	3	22.488***	27.254***	28.504***	19.024***	114.427***	62.478***	42.972***	24.051***
Season (S)	2	1.131	0.283	2.894	1.086	3.296	7.108***	0.671	1.690
P × MPP	9	1.176	0.880	0.260	1.132	1.091	1.353	1.494	1.423
Sex × MPP	6	1.790	1.184	0.401	0.616	0.223	0.107	0.283	0.341
T × MPP	3	0.308	0.341	0.115	0.206	0.339	0.045	0.362	0.069
P × S	6	0.651	0.863	0.969	1.470	3.959***	3.406***	5.222***	3.362***
Regression on age of ewe:									
Linear	1	1.632	0.054	0.111	2.806	0.051	8.469***	3.107***	2.902
Quadratic	1	0.617	6.081***	0.734	0.83	6.117**	0.602	0.364	0.504
Remainder d.f	114								
Remainder M.S		0.0029	0.0026	0.0027	0.0035	1.3367	3.713	0.3609	0.2798

* P< 0.05 , ** P< 0.001 and *** P< 0.001

year, will lead to increasing by 7.345, 19.846 breathes in RR 8 a.m, 4 p.m, respectively and 7.282 beats in PR. While during post-partum period linear regression coefficients of RR (at 4 p.m) and PR (at 8 a.m) on age of ewe were significant ($P<0.001$) which indicate that increasing age of ewe for one year will lead to increasing by 8.469 breathes in RR at 4 p.m and 3.107 beats in PR at 4 p.m.

During pregnancy period quadratic coefficients of regression of RR (at 8 a.m and 4 p.m) on age of ewe were significant ($P<0.001$). While during post-partum period quadratic coefficients of regression of RT (at 4 p.m) and RR (at 8 a.m) on age of ewe were significant ($P<0.001$).

Coefficient of correlation between blood components (Table 20) and between clinical parameters (Table 21) during pregnancy and post partum periods.

1- Coefficients of correlation in table 20, show that the correlation between majority of blood components, during pregnancy period, were low and some of them were possitive and values ranged from 0.004 to 0.19 and others were negative and values ranged from –0.001 to -0.16. However, the coefficients of correlation between CR and A was possitive and moderate in value(0.25) and the same coefficient but negative between CR and G. The coefficient of correlation between A and A/G was high and possitive (0.91) and the same coefficients but negative were between G and each of A and A/G. The coefficients of correlation between L/C and each of L and C were high but different in direction as the values were 0.41 and –0.85, respectively.

Table (20): Coefficients of correlation between blood components during pregnancy period(above diogonal) and during post partum period (below diagonal).

	TP	A	G	A/G	L	C	L/C	GOT	GPT	CR	URIC
TP	1	0.06	0.14	-0.07	0.004	-0.05	0.08	-0.13	0.07	0.02	-0.02
A	0.09	1	-0.9	0.9	-0.004	0.05	-0.08	-0.11	0.11	0.25	0.09
G	0.10	0.97	1	-0.9	-0.02	-0.07	0.09	0.08	-0.11	-0.25	-0.10
A/G	-0.08	0.92	-0.95	1	-0.11	0.09	-0.16	-0.02	0.06	0.19	0.10
T	-0.03	-0.05	0.12	-0.14	1	0.01	0.41	-0.03	-0.02	-0.02	0.17
C	0.14	-0.05	0.03	-0.01	0.02	1	-0.85	0.13	-0.14	-0.001	0.03
L/C	-0.18	-0.01	0.05	-0.06	0.28	-0.91	1	-0.11	0.10	-0.01	0.05
GOT	0.12	-0.21	0.22	-0.17	0.19	0.05	-0.05	1	0.10	-0.05	0.06
GPT	0.04	0.15	-0.19	0.11	0.18	-0.14	0.17	-0.02	1	0.17	-0.15
CR	0.03	0.01	-0.01	-0.00	0.06	0.16	-0.13	0.09	0.12	1	0.05
URIC	0.02	0.11	-0.08	0.08	0.24	-0.07	0.11	-0.08	-0.03	-0.08	1

2- Coefficients of correlation in table 20 show that, the correlation between majority of blood components, during post-partum period, were low and some of them were possitive and values ranged from 0.01 to 0.19 and the other were negative and values ranged from –0.01 to –0.18.

However the coefficients of correlation between A and A/G was high and positive (0.92) but moderate, negative value (-0.21) and high negative value (-0.97) were between A and each of GOT and G, respectively. The coefficient of correlation between G and A/G was high and negative (-0.95) while between G and GOT was moderate and positive (0.22). The coefficients of correlation between TL and each of L/C and uric acid were positive and moderate as values were 0.28 and 0.24 respectively, while the coefficient of correlation between L/C and CH was high and negative (-0.19).

3- Coefficient of correlation in table 21, show that the correlation between most of clinical parameters, during pregnancy period were low and some of them were positive and values ranged from 0.003 to 0.16 and the other were negative and values ranged from –0.002 to –0.10. However the coefficients of correlation between RR (at 8 a.m) and each of RR (at 4 p.m) and St (at 4 p.m) were relatively high and possitive as values were 0.45 and 0.36, respectively.

4- Coefficients of correlation in (Table 21) show that, the correlation between majority of clinical parameters, during post-partum period, were low and some of them were possitive and values ranged from 0.01 to 0.19 and the other were negative and values ranged from –0.002 to –0.10. However the coefficient of correlation between ST (at 8 a.m) and ST (at 4 p.m) was possitive and moderate in value (0.29). The coefficient of correlation between RR (at 8 a.m) and RR (at 4 p.m) was possitive and

Table (21): Coefficients of correlation between clinical parameters during pregnancy period (above diagonal) and during post partum period (below diagonal).

	RT 8a.m	RT 4p.m	ST 8a.m	ST 4 p.m	RR 8a.m	RR 4 p.m	PR 8 a.m	PR 4 p.m
RT 8a.m	1	0.003	0.14	-0.01	0.15	0.16	0.02	-0.02
RT4 p.m	0.01	1	0.01	0.003	-0.10	-0.02	0.02	-0.002
ST 8 a.m	-0.11	-0.10	1	0.03	0.08	0.04	-0.02	-0.10
ST 4 p.m	-0.05	0.09	0.29	1	0.36	0.02	0.03	0.01
RR 8 a.m	-0.01	0.03	0.17	0.06	1	0.45	-0.03	-0.05
RR 4 p.m	-0.08	0.01	0.04	-0.01	0.66	1	0.01	-0.03
PR 8 a.m	0.10	-0.02	-0.06	-0.10	0.26	0.27	1	0.07
PR 4 p.m	0.19	-0.002	-0.03	-0.06	0.37	0.45	0.39	1

high (0.66). The coefficients of correlation between PR (at 8 a.m) and each of RR (at 8 a.m) and RR (at 4 p.m) were possitive and moderate as values were 0.26 and 0.27 respectively. A possitive and high correlation was between PR (at 4 p.m) and each of RR (at 8 a.m , 4 p.m) and PR (at 8 a.m).

Comparison between the overall means of blood serum components of Rahmani ewes during pregnancy and post-partum periods:

Table (22) show that the difference between TP overall means during pregnancy and post partum periods of Rahmani ewes was non significant. This result is in accordance with the finding of Shetaewi and Daghash (1993) using Egyptian coarse wool sheep.

The overall means of serum albumin concentration of ewes indicate that the significant increase in albumin level from pregnancy to lactation was about 10.4% ($P<0.05$) while in globulin level the difference between overall means was non significant. Shetaewi and Daghash (1993) found that during lactation period level of albumin and cholesterol decreased ($P<0.05$) compared with pregnancy period (for albumin 3.43 vs. 3.83 gm/dl, for cholesterol 72.8 vs118.5 ml/dl), while the serum globulin concentration was 16% higher during lactation than during pregnancy.

The increase in concentration of total lipids and cholesterol from pregnancy to lactation periods were about 7.7% and 14.3%, respectively ($P<0.01$) which may be due to metabolic changes in ewes during these two reproductive periods. The level of cholesterol, in the present study, during pregnancy, is higher (128.3 mg/dl) than the level found by Shetaewi and Daghash (1993) which was 118.5 mg/dl.

Table (22): Overall means and standard error of blood plasma components of Rahmani ewes during pregnancy and post partum period.

Traits		During pregnancy	During post partum
Total protein		7.09±0.09 a	7.11±0.25 a
Albumin		3.81±0.25 a	4.13±0.28 b
Globulin		3.09±0.25 a	2.95±0.29 a
A/G		1.47±0.18 a	1.75±0.24 b
Total lipids		288.3±0.18 a	310.57±9.09 b
Cholesterol		128.3±6.68 a	146.59±10.07 b
L/C ratio		2.22±0.13 a	2.25±0.20 a
Uric acid		0.69±0.03 b	0.64±0.03 a
Creatininc		1.94±0.15 a	2.26±0.19 b
GOT		48.3±3.32 b	44.19±4.19 a
GPT		10.2±0.79 a	11.47±0.64 b
RT	8 a.m	38.61±0.01 a	36.46±0.012 a
	4 p.m	39.71±0.008 b	39.50±0.012 b
ST	8 a.m	36.62±0.06 a	36.46±0.12 a
	4 p.m	37.69±0.033 b	37.44±0.014 b
RR	8 a.m	53.82±0.77 a	38.61±0.26 a
	4 p.m	65.65±0.61 b	43.08±0.42 b
PR	8 a.m	53.82±0.77 a	88.21±0.14 a
	4 p.m	65.65±0.61 b	94.95±0.12 b

a, b means not showing the same letter in the same row for each blood plasma components, significantly differ ($P<0.05$). a, b means not showing the same letter in the same column for clinical parameters RT, ST, RR and PR significantly differ ($P<0.05$). A, B means not showing the same letter in the same row for each clinical parameter significantly differ ($P<0.05$).

The levels of serum urea and GOT during pregnancy were significantly ($P<0.01$) higher than the levels during post partum. This result is in accordance with the result obtained by Shetaewi and Daghash (1993) and disagree with Shetaewi and Ross, (1991) with respect to urea level. Okab et al., (1993) stated that the overall means of plasma lipids, GOT and GPT were higher at mid-pregnancy and declined significantly at the pregnancy and post partum. The low levels of urea and GOT during post partum may be due to protein demand for milk production and for foetal growth after conception.

The low rate of albumin, total lipids and cholesterol catabolism during lactation compared with pregnancy period (4.13 vs. 3.81 for Albumin, 310.57 vs. 288.3 for total lipids and 146.59 vs 128.3 for cholesterol) may be due to that Rahmani ewes are not considered high milk producer and therefore the rate of catabolism of these blood serum components was higher during pregnancy for the development of the foetus.

Serum blood of Rahmani ewes had significantly lower creatinine and GPT levels during pregnancy than during post partum. Sarma and Ray, (1985) stated that both enzymes GOT and GPT are necessary for accelerating the rate of metabolism and protein biosynthesis needs for foetal growth.

Table (22) show that overall means of RT, ST, RR and PR of Rahmani ewes during pregnancy period was significantly ($P<0.01$) higher than overall means during post partum period and at 8 a.m was significantly ($P<0.01$) lower than at 4 p.m. Jager-Bloh, (1986) with East Friesian ewes found that the differences between the value each of RT and RR significantly differed due to stage of reproduction of ewes.