SUMMARY AND CONCLUSION
The present work has been carried out in the department of Paediatrics, M.L.B. Medical College and Allied Hospital, Jhansi with active collaboration of departments of Obstetrics and Gynaecology. Fifty newborns and their mothers belonging to various clinical groups were subjected to complement profile studies for the purpose of the present study. Out of these, 30 were full term normal neonates and their mothers, 10 were premature and their mothers and 10 were intrauterine growth retarded (symmetrical) neonates and their mothers. Among 10 premature babies, 8 were appropriate for gestational age (AGA) and remaining 2 were small for gestational age (SGA). All the cases were selected only after satisfying the selection criteria for each study group. A detailed history and physical examination of the mother was done along with special stress over the antenatal and natal factors. All the newborns and their mothers were subjected to various complement profile test for assessment of complement according to the method given by Mancini et al (1965).

Brief account of work conducted in the present study is being summarised here:

**GROUP I : FULLTERM NORMAL NEWBORNS AND THEIR MOTHERS**

Thirty full term normal newborns and their mothers constituted this group for the present study. Following are the values of complement C₃ & C₄ obtained in present study.
Serum Complement C₃ Level

The mean serum complement C₃ in the cord blood of full term newborns was 44.4±6.0 mg/100 ml with a range of 36.2 - 55 mg/100 ml.

The mean serum complement C₃ in blood of mothers of full term newborns was 90.3±9.46 mg/100 ml with a range of 86-108 mg/100 ml. It is evident from these observations that the concentration of C₃ in newborns was 49.1% (44.4±6.0 mg/100 ml) of that in mothers (90.3±9 mg/100 ml), signifying the time proven fact that complement is not passively transferred from the mothers but is synthesized in the fetus.

Serum Complement C₄ Levels

The mean serum complement C₄ in the cord blood of full term newborns was 14.78±2.79 mg/100 ml with a range of 11-22 mg/100 ml. The mean serum complement C₄ in blood of mothers of full term normal newborns was 29.48±4.11 mg/100 ml with a range of 22-42 mg/100 ml.

It is evident that C₄ level in term babies was 50±1% when compared to their mothers.

GROUP II : PREMATURE BABIES AND THEIR MOTHERS

Ten premature babies and their mothers were selected for present study. Among 10 premature babies 8 were AGA while remaining 2 were SGA. The values of serum C₃ and C₄ observed in present study are as below :
Serum Complement C₃ Level

The mean serum complement C₃ level in premature babies was 31.3±1.97 mg/100 ml with a range of 28-35 mg/100 ml.

The mean serum complement C₃ level in mothers of premature babies was 97.3±5.89 mg/100 ml with a range of 86-102 mg/100 ml. It is evident that the premature babies had 32.2% of serum complement C₃ level when compared to the values observed in mothers.

Our observations reveal that premature babies had lesser value of serum C₃ (33.3±1.97 mg/100 ml) in comparison to the values in full term normal neonates (44.4±6.01 mg/100 ml), values being statistically significant as determined by student 't' test (p <0.05).

Among the premature babies a significant finding observed was that premature small for gestational age babies had lower values of serum C₃ (28.5±0.71 mg/100 ml) when compared to the values observed in premature appropriate for gestational age babies (32.86±1.45 mg/100 ml).

The decrease being more pronounced in preterm babies having intrauterine malnutrition. Various hypothesis have been put forward from time to time for the lower C₃ levels in newborns, which approximates the maternal level by 6 months of age. Tandon et al (1984) attributed the decrease level to (a) decrease hepatic protein synthesis, (b) absence of transplacental transfer and (c) presence of an anticomplimentary substance in cord blood.
Thus it is evident from present study that preterm babies had significantly decreased concentration of complement C₃ as compared to full term babies.

**Serum Complement C₄ Level**

The mean serum complement C₄ level in cord blood of premature babies was $9.8 \pm 1.67$ mg/100 ml with a range of 8-13 mg/100 ml.

The mean serum complement C₄ levels in mothers of premature babies was $24.9 \pm 2.25$ mg/100 ml with a range of 22-29 mg/100 ml.

It was observed that the premature babies had 39.7% of serum complement C₄ when compared to values observed in their mothers.

Premature babies had lesser value of serum complement C₄ ($9.8 \pm 1.67$ mg/100 ml) in comparison to that of full term babies ($14.78 \pm 2.79$ mg/100 ml), values were found to be statistically significant ($p < 0.05$).

As with C₃ levels among premature babies a significant finding observed was that premature SGA had lower value of complement C₄ ($9+1$ mg/100 ml) in comparison to the value observed in premature AGA babies ($9.9+1.76$ mg/100 ml).

Both these groups had lesser values of serum C₄ in comparison to that of full term neonates.

The depression of complement C₄ in preterm babies has been attributed in the literature to the same hypothesis as has been hypothesized for C₃ by various
authors.

Thus in nutshell our observations on the complement profile of preterm babies reveal a depression of both 
$C_3$ and $C_4$ activity which is one of the factor accounting for the increased incidence of infection observed in these infants.

GROUP III: INTRAUTERINE GROWTH RETARDED 
BABIES AND THEIR MOTHERS.

Ten intrauterine growth retarded babies 
(symmetrical IUGR) and their mothers were included in 
this group. Details of the values of complement $C_3$ and 
$C_4$ are given below:

**Serum Complement $C_3$ Levels**

The mean serum $C_3$ in cord blood of IUGR babies 
was $38.9\pm1.83$ mg/100 ml with a range of 36-42 mg/100 ml.

The mean serum $C_3$ in the mothers of IUGR babies 
was $90\pm5.13$ mg/100 ml with a range of 84-102 mg/100 ml.

It is thus evident that IUGR babies had 43.2% 
of complement $C_3$ in comparison to that of mothers.

A comparison of the $C_3$ values in the IUGR group, 
to the values observed in full term babies revealed a 
statistically significant decrease of $C_3$ complement in the 
former group ($p \leq 0.05$).

However, the concentration of $C_3$ was signifi-
cantly higher in the IUGR group as compared to that of 
premature babies ($p \leq 0.05$).
It was further seen that both the groups of premature babies viz AGA as well as SGA had lesser values of \( C_3 \) in comparison to that of IUGR babies. While the values in premature AGA and SGA babies were 32.06±1.45 and 28.5±0.71 mg/100 ml respectively, it was observed that the corresponding \( C_3 \) values in IUGR babies was much higher viz. 38.9±1.83 mg/100 ml which was statistically significant (p <0.05).

**Serum Complement \( C_4 \) Level**

The mean serum \( C_4 \) in cord blood of IUGR babies was 10.5±2.15 mg/100 ml with a range of 9-15 mg/100 ml.

The mean serum \( C_4 \) in the mothers of IUGR babies was 27.8±2.73 mg/100 ml with a range of 22-32 mg/100 ml.

It is evident from these observations that the concentration of \( C_4 \) in newborns was 42.4% (10.5±2.15 mg/100 ml) of their mothers (27.8±2.73 mg/100 ml).

Similar to the \( C_3 \) values, it was observed that the IUGR babies had also lesser values of serum \( C_4 \) (10.5±2.79 mg/100 ml) in comparison to the value observed in full term newborns (14.78±2.14 mg/100 ml). Statistical significant difference was also observed between these values.

However, it was observed that IUGR babies had higher values of serum \( C_4 \) in comparison to that of premature babies. Values of serum \( C_4 \) in IUGR babies and premature babies were 10.5±2.5 and 9.8±1.67 mg/100 ml respectively. However, no statistical different value
was observed between these two groups.

Among premature babies, premature AGA babies as well as premature SGA babies had lower values of serum $C_4$ in comparison to IUGR babies. However, no statistical significant difference was observed between the two groups ($p > 0.05$).

It can be suggested that this lower value of serum $C_3$ and $C_4$ in IUGR babies to that of full term babies is due to their liver immaturity ($p < 0.05$).

**COMPLEMENT PROFILE ACCORDING TO BIRTH WEIGHT**

An attempt was also made to correlate the complements $C_3$ and $C_4$ levels according to birth weight groups in both preterm and term babies irrespective of their gestational age. Accordingly our babies were divided in various birth weight groups viz. 1000-1500, 1500-2000, 2000-2500 and 2500-3000 gms.

**Serum Complement C3 Profile in Full Term Babies according to Their Birth Weight**

Full term babies weighing between 1000-1500 gms had lesser values of serum $C_3$ ($35.1 \pm 1$ mg/100 ml) as compared to that of babies weighing between 1500-2000 gms, 2000-2500, and 2500-3000 gms, values being $39.9 \pm 1.81$, $43.90 \pm 6.94$ and $46.56 \pm 5.38$ mg/100 ml respectively. A statistical significant value was found in all these groups ($p < 0.05$).

Full term babies weighing between 1500-2000 gms had lesser value of serum $C_3$ ($39.9 \pm 1.87$ mg/100 ml) in comparison to that of babies weighing between 2000-2500
gms and 2500-3000 gms values being 43.90±6.94 and 46.56±5.38 mg/100 ml respectively. Difference in the values was found to be statistically significant in all the groups (p \( \leq 0.05 \)). While full term babies weighing between 2000-2500 gms had lesser value of serum C\(_3\) (43.90±6 mg/100 ml) in comparison to that of babies weighing between 2500-3000 gms (46.56±5.38 mg/100 ml). However, no statistical difference was found between these groups (p \( \geq 0.5 \)).

**SERUM COMPLEMENT C\(_3\) PROFILE IN PREMATURE BABIES ACCORDING TO BIRTH WEIGHT**

Among premature babies, babies weighing between 1500-2000 gms had higher value of serum C\(_3\) (32.06±1.45 mg/100 ml) as compared to that of babies weighing between 1000-1500 gms (28.5±0.71 mg/100 ml). The values were found to be statistically significant as determined by student 't' test (p \( \leq 0.05 \)).

**SERUM COMPLEMENT C\(_4\) PROFILE IN FULL TERM BABIES ACCORDING TO BIRTH WEIGHT**

Full term babies weighing between 1000-1500 gms had lesser value of serum C\(_4\) as compared to that of babies weighing between 1500-2000 gms, 2000-2500 and 2500-3000 gms values being 9.5±0.5, 12.0±1.80, 14.54±2.18 and 16.9±2.90 mg/100 ml respectively. A statistically significant difference was observed between all these groups (p \( \leq 0.05 \)).
Babies weighing between 1500-2000 gms had lesser values of serum $C_4$ ($12.0\pm1.8$ mg/100 ml) as compared to that of babies weighing between 2000-2500 and 2500-3000 gms values being $14.54\pm2.18$ and $16.9\pm2.9$ mg/100 ml respectively. A statistically significant difference was observed between babies weighing between 1500-2000 and 2500-3000 gms. However no statistically significant difference was observed between babies weighing between 1500-2000 and 2000-2500 gms.

Babies weighing between 2000-2500 gms had lesser value of serum $C_4$ ($14.54\pm2.18$ mg/100 ml) as compared to that of babies weighing between 2500-3000 gms ($16.9\pm2.9$ mg/100 ml). However no statistically significant difference was observed between these groups.

**SERUM COMPLEMENT C$_4$ PROFILE IN PREMATURE BABIES ACCORDING TO BIRTH WEIGHT**

Premature babies weighing between 1500-2000 gms, had higher values of serum $C_4$ ($9.9\pm1.76$ mg/100 ml) as compared to that of babies weighing between 1000-1500 gms ($9\pm1$ mg/100 ml). Difference was not statistically significant as determined by student 't' test ($p > 0.5$).

A significant finding of present study was that a linear correlation, was observed between the increasing birth weight of babies to the increasing serum level of serum complement $C_3$ and $C_4$ levels. Babies having least birth weight had least values of serum complement $C_3$ and $C_4$ in both term and preterm babies in comparison to their
counterpart who had more birth weight.

CONCLUSIONS

Following inferences have been drawn from the present study.

1. Concentration of serum $C_3$ in full term neonates was 49.1% of their mothers, while premature babies had 32.2% and IUGR babies had 43.2% of serum $C_3$ in comparison to its value in mothers. Concentration of serum $C_4$ in full term neonates was 50.1% of their mothers while premature babies had 39.7% and IUGR babies had 42.4% of serum $C_4$ in comparison to its value in mothers, signifying the time proven fact that complement is not passively transferred from the mothers but is synthesized in the fetus.

2. Premature babies had lesser value of serum $C_3$ and $C_4$ in comparison to that of full term and IUGR babies.

3. Premature small for gestational age babies had least value of serum complement $C_3$ and $C_4$.

4. A linear correlation was found between increasing birth weight and increasing value of serum complement $C_3$ and $C_4$. It was found that babies having lesser birth weight had lesser values of serum complement $C_3$ and $C_4$ in comparison to their counterpart having more birth weight.