Results

The present prospective longitudinal controlled study was carried out during the period from October,2005 till October,2008.

The study comprised 90 primigravidae attending the outpatient OB\GYN clinic of kafr shokr general hospital ,Qalubeyia.

The subjects were booked and followed up all through out ante-natal period till delivery.

Subjects are devided into 2 groups:

Group I (study group) : included subjects who developed preeclampsia during the follow up period.

Group II (control group) : included subjects who remained normotensive till delivery.

Follow up continued at regular antenatal care intervals until delivery .

Among the 90 subjects,8 cases developed preeclampsia, while 82 remained normotensive, giving an incidence of preeclampsia of 8.9%.

Results are tabulated and statistically analyzed as shown in tables 1-9.

Table- 1 : Clincio epidemidogical data of study and control groups at 20-24 weeks gestation :

There was no statistically significant difference regarding mean age, weight , measurement of systolic and diastolic blood pressure and plasma creatinine, SGOT and SGPT .

Table- 1 : Clincio epidemidogical data of the study and control groups at 20-24 weeks period :

	Study group (n=8) Mean ± SD	Control group (n=82) Mean ± SD	P
Age (years)	21.5 ± 3.5	21.02 ± 1.9	>0.05
WT (Kg)	74 ± 9.9	69.1 ± 4.1	>0.05
Syst. Bl.P. (mmHg)	118.8±12.2	114.6±8.2	>0.05
Dias. Bl.P. (mmHg)	73.2 ± 9.8	70.8 ± 5.5	>0.05
Plasma creatinine (mg\dl)	0.57 ± 0.22	0.51 ± 0.09	>0.05
SGOT (U\L)	15.4 ± 10.4	8.8 ± 2.5	>0.05
SGPT (U\L)	7.2 ± 6.6	5.1 ± 2.2	>0.05

Table- 2 : Shows the biochemical parameters in the study and control groups at 20-24 weeks and at 32-36 weeks gestation.

In this study, we measured urinary microprotein for all subjects, between 20 – 24 weeks gestational period (at the time of registration), three subjects showed positive results among those who developed PE later compared to one positive result in the controls .

Between 32 – 36 weeks, all preeclampsia group showed positive results , and the one positive result remained in the control group. These results are shown in table (2).

Serum uric acid level between 20 – 24 weeks, five of preeclampsia group showed positive results and two positive results appeared in control group. Between 32 – 36 weeks all preeclampsia group showed positive results and positive results in control group reached four cases.

Plasma endothelin -1 results between 20 – 24 w. showed one positive results in both diseased and control group, and increased to seven cases in diseased group and two cases in control group.

Table- 2 : Biochemical parameters in the study and control groups at 20-24 and at 32-36 weeks gestation.

		20-24 w.			32-36 w.		
		ET	MP	UA	ET	MP	UA
preeclampsia	1	+	+	+	+	+	+
	2	-	+	+	-	+	+
	3	-	+	+	+	+	+
	4	-	-	+	+	+	+
	5	-	-	+	+	+	+
	6	-	-	-	+	+	+
	7	-	-	-	+	+	+
	8	-	-	-	+	+	+
Normotensive	9	+	+	+	+	-	+
	10	-	-	-	+	+	+
	11	-	-	+	-	-	+
	12	-	-	-	-	-	+
	13	-	-	-	-	-	-
	Till-	-	-	-	-	-	-
	90	-	-	-	-	-	-

- **ET :** endothelin -1 (+ve if > 30 pg/ml)
- **MP:** microprotein (+ve if > 25 mg/dl)
- **UA:** uric acid (+ve if > 5.9 mg/dl)

Table- 3 : Shows the biochemical values in the study and control groups at 20-24 weeks and at 32-36 weeks gestation.

Endothelin-1 : Mean (ET-1) was significantly elevated in the study group compared to controls at 20-24 weeks (P=0.045) and at 32-36 weeks gestation (P=0.025).

Microproteinuria : Mean microprotein level was significantly elevated in the study group compared to controls at 20-24 weeks (P<0.05) and highly significant at 32-36 weeks gestation (P<0.001) .

Uric acid : Mean uric acid level was significantly elevated in the study group compared to controls at 20-24 weeks (P<0.05) and significant at 32-36 weeks gestation (P<0.05) .

When we compared the results of mean plasma ET-1 in the study group at 20-24 weeks and at 32-36 weeks, there was no significant differences ,this was also found in the control.

When we compared the results of mean microproteinuria in the study group at 20-24 weeks and at 32-36 weeks, there was a highly significant higher mean results (P<0.001). There was a significant higher mean results between controls (P<0.05).

When we compared the results of mean serum uric acid in the study group at 20-24 weeks and at 32-36 weeks, there was a significantly higher levels at 32-36 weeks, however there was no significant difference in the control group.

Table- 3 : Biochemical data in study and control cases at 20-24 weeks and 32-36 weeks period.

	Plasma Endothelin-1 (pg/ml)	Urinary microprotien (mg/dl)	Uric acid In blood (mg/dl)
20-24 w Study (n=8) Control (n=82)	 1.08 ± 0.43 0.54 ± 0.56	 53 ± 29.7 19.8 ± 10.8	 5.95 ± 0.07 4.21 ± 3.4
P value	<0.045	<0.05	<0.05
32-36 w Study (n=8) Control (n=82)	 1.15 ± 2.21 0.61 ± 0.33	 445.5 ± 94.04 24.4 ± 13.2	 9.65 ± 0.49 4.7 ± 0.68
P value	<0.025	<0.001	<0.05
P1 value	>0.05	<0.001	<0.05
P2 value	>0.05	>0.05	>0.05

P1 : Comparison of the study group at 20-24 weeks versus at 32-36 weeks.

P2 : Comparison of the control group at 20-24 weeks versus at 32-36 weeks.

Table- 4 : Shows the predictive values of elevated mean levels of the biochemical parameters at 20-24 weeks gestation :

The positive and negative predictive values of **ET-1** for PE were 50% and 93.1% respectively, and the sensitivity and specificity were 12.5% and 98.7% respectively.

The positive and negative predictive values of **microproteinuria** for PE were 75% and 94.2% respectively, and the sensitivity and specificity were 37.5% and 98.7% respectively.

The positive and negative predictive values of **uric acid** for PE were 71.4% and 96.4% respectively, and the sensitivity and specificity were 62.5% and 97.5% respectively.

Table- 4 : Predictive values of elevated values of biochemical parameters at 20-24 weeks gestation :

Test	Sensitivity	Specificity	PPV	NPV
Endothelin-1 (pg/ml)	12.5%	98.7%	50%	93.1%
U.microprotien (mg/dl)	37.5%	98.7%	75%	94.2%
Uric acid (mg/dl)	62.5%	97.5%	71.4%	96.4%

Table 5: Shows the results at 20-24gestational weeks:

At 20-24 weeks period :

ET-1 : It was elevated in 1 out of 8 primigravidae who developed preeclampsia later .

It was elevated in 1out of 82 primigravidae who remained normotensive.

MP : It was elevated in 3 out of 8 primigravidae who developed preeclampsia later .

It was elevated in 1out of 82 primigravidae who remained normotensive.

UA : It was elevated in 5 out of 8 primigravidae who developed preeclampsia later .

It was elevated in 2out of 82 primigravidae who remained normotensive.

Table 5: Results between 20-24gestational weeks:

		Blood pressure		Total no. of tested samples
		+ Ve	-Ve	
Endothelin-1	+Ve	1	1	2
	-Ve	7	81	88
total		8	82	90
Urinary microprotein	+Ve	3	1	4
	-Ve	5	81	86
total		8	82	90
Uric acid	+Ve	5	2	7
	-Ve	3	80	83
total		8	82	90

Table-6 : Shows the predictive values of elevated mean biochemical data at 32-36 weeks gestation :

The positive and negative predictive values of ET-1 for PE were 77.78% and 98.7 % respectively, and the sensitivity and specificity were 87.5% and 97.5% respectively.

The positive and negative predictive values of microproteinuria for PE were 88.89% and 100% respectively, and the sensitivity and specificity were 100% and 98.7% respectively.

The positive and negative predictive values of uric acid for PE were 66.67% and 100% respectively, and the sensitivity and specificity were 100% and 95.1% respectively.

Table- 6 : Predictive values of elevated values of biochemical parameters at 32-36 weeks gestation :

Test	Sensitivity	Specificity	PPV	NPV
Endothelin-1 (pg/ml)	87.5%	97.5%	77.78%	98.7%
U.microprotien (mg/dl)	100%	98.7%	88.89%	100%
Uric acid (mg/dl)	100%	95.1%	66.67%	100%

Table 7 : Shows the Results between 32-36 gestational weeks.

Table 7-A :

ET-1 : It was elevated in 7 out of 8 primigravidae who developed PE later .

It was elevated in 2out of 82 primigravidae who remained normotensive.

Table 7-B :

MP : It was elevated in 8 out of 8 primigravidae who developed PE later .

It was elevated in 1out of 82 primigravidae who remained normotensive.

Table 7-C:

UA : It was elevated in 8 out of 8 primigravidae who developed PE later .

It was elevated in 4out of 82 primigravidae who remained normotensive.

Table 7 : Results between 32-36 gestational weeks.

		Blood pressure		Total no. of tested samples
		+ Ve	-Ve	
Endothelin-1	+Ve	7	2	2
	-Ve	1	80	88
total		8	82	90
Urinary microprotein	+Ve	8	1	4
	-Ve	0	81	86
total		8	82	90
Uric acid	+Ve	8	4	7
	-Ve	0	78	83
total		8	82	90

Table- 8 : Shows the positive predictive values of combined tests :

When the tests were combined serially (i.e. cases who show positive results of both tests), the combined positive predictive values of plasma endothelin-1 and microproteinuria was 50% at 20-24 weeks gestation and was 87.5% at 32-36 weeks gestation.

The combined positive predictive values of plasma endothelin-1 and serum uric acid was 50% at 20-24 weeks and was 77.78% at 32-36 weeks gestation.

The combined positive predictive values of plasma endothelin-1 ,microproteinuria and serum uric acid was 50% at 20-24 weeks and was 87.5% at 32-36 weeks gestation.

When the tests were combined in parallel (i.e. cases who show positive results of any one of tests), the combined positive predictive value of plasma endothelin-1 and microproteinuria was 75% at 20-24 weeks and was 80% at 32-36 weeks gestation.

The combined positive predictive values of plasma endothelin-1 and serum uric acid was 71.4% at 20-24 weeks and was 66.67% at 32-36 weeks gestation.

Table- 8: Positive predictive values of combined testes :

	Applied serially		Applied in parallel	
	20-24 w.	32-36 w.	20-24 w.	32-36 w.
ET+MP	50%	87.5%	75%	80%
ET+UA	50%	77.78%	71.4%	66.67%
ET+MP+UA	50%	87.5%	62.5%	75%

The combined positive predictive values of plasma endothelin-1 , microproteinuria and serum uric acid was 62.5% at 20-24 weeks and was 75% at 32-36 weeks gestation.

Table-9: Shows the clincio-epidemidogical data of the study and the control groups at 32-36 weeks gestation :

The table showed no statistically significant difference (P>0.05) between the study and control groups as regards plasma creatinine ,SGOT and SGPT, which evaluate the kidney and liver functions.

The table showed statistically significant more weight gain in the study group compared to the control group (P<0.05).

The mean systolic and diastolic blood pressures were significantly higher in the study group compared to the control group (P<0.001).

Table-9 : Clincio-epidemidogical data of the study and control groups at 32-36 weeks :

	Study group (n=8)	Control gr. (n=82)	P
WT (Kg)	87.1 ± 7.1	74.4 ± 4.01	<0.05
WT gain (Kg)	15.9 ± 4.7	8.9 ± 0.96	<0.05
Syst. Bl.P.(mmhg)	131.76±14.7	115.1±11.0	<0.001
Dias. Bl.P.(mmhg)	83.83 ± 10.4	71.3 ± 7.4	<0.001
Plasma creatinine (mg\dl)	0.63 ± 0.14	0.55 ± 0.08	>0.05
SGOT (U\L)	11.5 ± 10.3	8.3 ± 2.5	>0.05
SGPT (U\L)	6.7 ± 9.7	4.9 ± 2.0	>0.05