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ASSESSMENT OF MATERNAL MORBIDITY AND MORTALITY AMONG PATIENTS WITH SEVERE PREECLAMPSIA ECLAMPSIA AND HELLP SYNDROME

Prachi Sood*[1], Abhishek Chhibber*[2], Mandeep Kaur[3] and Amit Sharma[4]

[1,2]Research Scholar, PharmD 6th year, Department of Pharmacy Practice, ISF College of Pharmacy, Moga, Punjab-142001, India.

[3]Assistant Professor, Department of Pharmacy Practice, ISF College of Pharmacy, Moga, Punjab-142001, India.

[4]Associate Professor and Head PharmD, Department of Pharmacy Practice, ISF College of Pharmacy, Moga.

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***Corresponding Author**
Prachi Sood & Abhishek Chhibber
Research Scholar, Pharm D 6th Year, Department of Pharmacy Practice, ISF College of Pharmacy, Moga, Punjab-142001, India.

1. ABSTRACT

Hypertension is the most common medical complication in pregnancy. Major cause of maternal and neonatal morbidity and mortality. The hypertensive disorder in pregnancy is defined and classified. An update of the literature pertinent to hypertension in pregnancy is presented but the term pre-eclampsia still is mysterious, difficult to understand and its present management focus on treatment of its manifestations. The proteinurea is no more considered the diagnostic test for hypertension in pregnancy. The existing tests that have been proposed for screening preeclampsia, eclampsia and HELLP syndrome are broadly described. Finally, the goals of treatment, current management guidelines are reviewed and the benefits, risks associated with various antihypertensive drug classes are described.

2. KEYWORDS: Pre-eclampsia; HELLP syndrome; Blood pressure; Proteinuria; Chronic hypertension.

3. INTRODUCTION

Hypertension is the most prevalent medical condition of pregnancy, affecting an estimated 240,000 women in the United States each year and complicating up to 1 in 10 pregnancies. Although preeclampsia has been recognised by physicians for millennia, little is known about

its aetiology and prevention. The main worry with high blood pressure is the potential for damage to both the mother and the foetus. The severity of these possible side effects ranges from minor to life-threatening.

3.1 Classification of hypertensive disorders of pregnancy

National High Blood Pressure Education Program divides hypertensive diseases of pregnancy into four categories: gestational hypertension, chronic hypertension, preeclampsia, and preeclampsia with pre-existing hypertension.

Table 1: Classification of hypertension in pregnancy.

Chronic hypertension	(i) increased BP before week 20 (or known to exist prior to pregnancy) (ii) hypertension persistent for more than 12 weeks after pregnancy
Preeclampsia-eclampsia	(i) hypertension after mid-pregnancy (ii) proteinuria at least 300 mg/24 hr
Preeclampsia superimposed upon existing hypertension	(i) new onset proteinuria
Gestational hypertension	(i) transient hypertension appearing after mid-pregnancy (ii) confirmed by return to normal BP postpartum (iii) no proteinuria

3.2 Normal pregnancy vascular physiology during pregnancy

systemic hemodynamic undergo dramatic alterations. When attempting to evaluate blood pressure during pregnancy, it is critical to recognise the changes from the nonpregnant condition. Mean arterial pressure falls throughout an uncomplicated pregnancy, reaching a trough between the 16th and 20th weeks of pregnancy. The drop in diastolic pressure is a little faster than the drop in systolic pressure. The drop in blood pressure is generally 8–10 mm Hg, or less than 10% of pre-pregnancy values. Blood pressure drops during the luteal phase of menstruation and continues to drop if pregnancy occurs. Blood pressure drops during the luteal phase of menstruation and continues to drop if pregnancy occurs. At around 40 weeks gestation, mean arterial blood pressure steadily recovers to pre-pregnancy values after the 20th week. Ambulatory blood pressure monitoring shows that the circadian variations in blood pressure are maintained during pregnancy.

3.3 The kidney in a normal pregnancy

Glomerular hyperfiltration is seen in healthy pregnant women. In human investigations, the fast rise in renal blood flow and glomerular filtration rate was reported. GFR begins to rise in

the first trimester of pregnancy and peaks in the second half of pregnancy, when it is 40–60 percent higher than nongravid levels.

Table 2: Laboratory tests of renal function during pregnancy.

	Nonpregnant	Pregnant
BUN	-	-
Creatinine	-	-
Creatinine clearance	80-120	125
Serum uric acid	Greater than 4	Less than 4
Urinalysis	Normal	Normal

3.4 Volume and Hemodynamic alterations in preeclampsia

It's difficult to research preeclampsia that hasn't been treated, because preeclampsia is frequently identified in people with underlying chronic medical problems. Preeclamptic individuals who have been treated or who have underlying renal illness, diabetes, or hypertension may not have data that truly reflect the simple preeclamptic patient. Putting these issues aside, the existing evidence shows that systemic hemodynamic preeclamptic differ significantly from women who are pregnant without complications.

3.5 Renal alterations in preeclampsia

In women who develop preeclampsia, the significant increase in renal function that occurs during a normal pregnancy is lost. GFR and renal blood flow both decreases. The degree of the decrease varies widely and is related to the illness's overall severity. If proteinuria develops, as it often does, and a kidney biopsy is performed, glomerular endotheliosis is usually seen.

3.6 Pathophysiology of preeclampsia

Preeclampsia, or de novo hypertension and proteinuria in pregnancy, has a mostly unknown aetiology. The possibility of immunologically mediated vascular damage as the starting cause will be investigated.

The delivery of the placenta generally triggers the remission of preeclampsia's acute clinical symptoms, suggesting that the placenta plays a key role in the disease's aetiology. The placenta undergoes significant vascularization throughout normal pregnancy to provide circulation between the foetus and the mother.

3.7 The role of uteroplacental ischemia

The pathogenesis of preeclampsia has long been focused on altered uteroplacental blood flow. Clinicians and researchers have gathered a large amount of evidence to support the theory that a decrease in uterine blood flow is the most important component in the etiopathogenesis of this disease (Table 3).

Table 3: Observations supporting uteroplacental ischemia as a key factor in preeclampsia.

(i)	Predominantly occurs in primigravidas with immature uterine vasculature
(ii)	Consistent abnormalities of the placentae and uteroplacental vascular interface
(iii)	Increased risk with more fetuses and placentas (twins)
(iv)	Disease occurs late in gestation
(v)	Labor aggravates
(vi)	High incidence with large, rapidly growing hydatidiform moles
(vii)	Increase incidence in patients with underlying vascular disease (diabetes, hypertension and lupus (SLE))
(viii)	Findings in animals subjected to uteroplacental ischemia mimic those of preeclampsia

3.8 Maternal endothelial dysfunction

Although preeclampsia appears to start in the placenta, the maternal endothelium is the most afflicted tissue. Preeclampsia is characterised by extensive endothelial dysfunction, including vasoconstriction and end organ ischemia. Severe preeclampsia is characterised by systemic hypertension, renal, hepatic, and brain vascular disease. They point out that endothelial "activity" and dysfunction are represented in inappropriate vasoconstriction and its proclivity for hypercoagulability, as well as extensive microvascular thrombi, most notably in the placentas of preeclamptic.

3.9 Antiangiogenic factors in preeclampsia

Since 2003, there has been an almost exponential increase in published research showing that circulating angiogenic agents play a major role in the pathophysiology of preeclampsia. The first anomalies discovered were increased expression of soluble fms-like tyrosine kinase (sFlt1) and reduced placental growth factor (PGF) and vascular endothelial growth factor (VEGF) signalling.

3.10 sFlt1: A Circulating antagonist to VEGF and PGF

The extracellular ligand-binding domain of sFlt1 is present, but the transmembrane and intracellular signalling domains are absent. As a result, it is released into the blood, where it

binds to and antagonises both VEGF and placenta growth factor (PGF). Both are powerful stimulants for vascular expansion, which is required for the formation of the uteroplacental unit, and operate on endothelial cells. Even more recent clinical data has been obtained to support the idea that preeclampsia patients have greater circulation and placental levels of this soluble receptor blocker than women who had an uncomplicated pregnancy. PGF and VEGF levels have also been shown to be lower in these hypertensive women. Several weeks before the beginning of clinical illness, circulating levels of sFlt1 and PGF are changed, and the severity of the disease is linked. Several days after birth, sFlt1 levels return to normal, corresponding with a reduction in proteinuria and hypertension.

3.11 Soluble endoglin: A circulating antagonist to transforming growth Factor-B

Blocking the activity of these growth factors alone was inadequate to explain all of the clinical symptoms found in severe eclampsia, according to proponents of the vascular endothelial growth factor-receptor antagonist hypothesis, or so-called anti-angiogenic theory. Another component, soluble endoglin (sEng), has now been discovered to be elevated in the same way as sFlt1 in preeclampsia. TGF-B binds and antagonises sEng, a shortened version of endoglin (CD 105), a cell surface receptor for transforming growth factor B (TGF-B). This chemical not only enhances the anti-angiogenic effects of s-Flt-1 kinase, but also reduces the generation of nitric oxide.

4. MATERIALS AND METHODS

4.1 Study site: The study will be conducted in gynaecological department.

4.2 Study duration: Study will be carried out for a period of six months.

4.3 Study design: A prospective observational study.

4.4 Study approval: The study will be approved from Institutional Ethics Committee (IEC).

4.5 Study criteria: Pregnant women are enrolled into study by considering the following criteria –

4.6 Inclusion criteria

- Pregnant women with history of hypertension.
- Pregnant women currently diagnosed with hypertension.
- Pregnant women who are willing to participate in study.
- Pregnant women of age above 18 years.

4.7 Exclusion criteria

- Pregnant women below the age of 18 years.
- Pregnant women associated with other diseases.

4.8 Sources of data

- Patient case sheet and medication chart.
- Laboratory test reports.

4.9 Morbidity and mortality analysis: The pregnant women were enrolled into study and different stages of hypertension, pregnancy trimesters were seen and concluded that only some of the cases were for neonatal death. Maternal mortality rate was zero.

4.10 Statistical analysis: Statistical analysis of the data was done by SPSS (Statistical package for the social sciences) software, version 26.

5. RESULTS AND DISCUSSION

5.1 Demographic details of the respondents

5.1.1 Age of the respondents

The age distribution of enrolled pregnant women is as follows; the maximum proportion of pregnant women were 45 (42.5%) between the age group of 23-27 of age followed by 26 (24.5%) between the age group of 33-37 of age. Age distribution of pregnant women are shown in table 6.1.1

Table 6.1.1 Age *of the respondents.*

Age of the respondents in years	*Frequency*	*Percent*
18-22	23	21.7
23-27	45	42.5
28-32	12	11.3
33-37	26	24.5
Total	106	100.0

5.1.2 Pregnancy trimesters of the respondents

Among 106 respondents enrolled in the study, 1st and 3rd pregnancy trimesters of women were having equal proportions i.e. 43(40.6%) and 20 (18.6%) women were from second trimester. Details of pregnancy trimesters of the respondents are mentioned in table 6.1.2

Table 6.1.2 ***Pregnancy trimester of the respondents.***

Pregnancy trimesters	*Frequency*	*Percent*
1st Trimester	43	40.6
2nd Trimester	20	18.9
3rd Trimester	43	40.6
Total	106	100.0

Table 6.1.2.1 ***Age of the respondents * Pregnancy trimesters crosstabulation.***

Age of the respondents * Pregnancy trimesters Crosstabulation			**Pregnancy trimesters**		
			First Trimester	**second Trimester**	**Third Trimester**
Age of the respondents	18-22	Count	3	9	11
		% within Age of the respondents	13.0%	39.1%	47.8%
	23-27	Count	37	5	3
		% within Age of the respondents	82.2%	11.1%	6.7%
	28-32	Count	1	3	8
		% within Age of the respondents	8.3%	25.0%	66.7%
	33-37	Count	2	3	21
		% within Age of the respondents	7.7%	11.5%	80.8%

The highest proportion was observed in respondent having age between 23-27 years 37(82.2%) having first trimester followed by 21(80.8%) in respondents having age between 33-37 years having third trimester as shown in table no 6.1.2.1

Table 6.1.2.2: ***Chi-Square tests.***

Parameters	*Value*	*df*	*Asymptotic Significance (2-sided)*
Pearson Chi-Square	66.384[a]	6	.001
Likelihood Ratio	71.889	6	.001
Linear-by-Linear Association	13.573	1	.001

a. 5 cells (41.7%) have expected count less than 5. The minimum expected count is 2.26.

A chi-square test was applied to compare age of the respondents with pregnancy trimesters of the respondents. The result was found significant (X^2= (6) 66.38, N = 106, p = *0.001*) as shown in the table no. 6.1.2.2

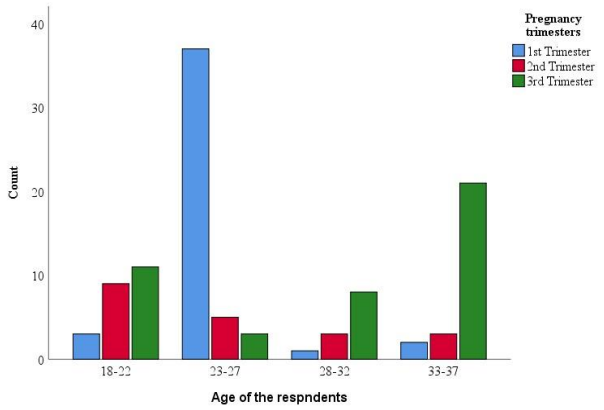

Figure 1: Details of age of the respondents with pregnancy trimesters.

5.1.3 Educational status of the respondents

Table shows the educational status of the respondents enrolled in the study. The results showed that a maximum number of respondents belonged to literacy up to 12 class 50 (47.2%) followed by graduated 41 (38.7%) as shown in the table 6.1.3

Table 6.1.3.1: ***Education of the respondents.***

Education of the respondents	*Frequency*	*Percent*
Uneducated	11	10.4
Up to 9 class	4	3.8
up to 12 class	50	47.2
Graduated	41	38.7
Total	106	100.0

Table 6.1.3.2*: Age of the respondents * Education.*

Age of the respondents * Education Crosstabulation			**Education**				**Total**
			Uneducated	**Up to 9 class**	**Up to 12 class**	**Graduated**	
Age of the respondents	18-22	Count	7	3	7	6	23
		% within age of the respondents	30.4%	13.0%	30.4%	26.1%	100.0%
	23-27	Count	1	0	39	5	45
		% within age of the respondents	2.2%	0.0%	86.7%	11.1%	100.0%
	28-32	Count	1	1	2	8	12
		% within age of the respondents	8.3%	8.3%	16.7%	66.7%	100.0%
	33-37	Count	2	0	2	22	26
		% within Age of the respondents	7.7%	0.0%	7.7%	84.6%	100.0%
Total		Count	11	4	50	41	106
		% within Age of the respondents	10.4%	3.8%	47.2%	38.7%	100.0%

The highest proportion was observed in respondents having age between 23-27 years 39 (86.7%) who belonged to up to 12 class followed by respondents having age between 3337 years 22 (84.6%) who were graduated as shown in table no 6.1.3.2

Table 6.1.3.3: *Chi-Square tests.*

Parameters	*Value*	*df*	*Asymptotic Significance (2-sided)*
Pearson Chi-Square	74.212[a]	9	.001
Likelihood Ratio	75.224	9	.001
Linear-by-Linear Association	20.947	1	.001

a. 9 cells (56.3%) have expected count less than 5. The minimum expected count is .45.

A chi-square test was conducted to compare age of the respondents with the education of the respondents. The results were found to be Significant (X^2= (9), 74.212, N = 106), *p =0.001*) as shown in the table 6.1.3.3

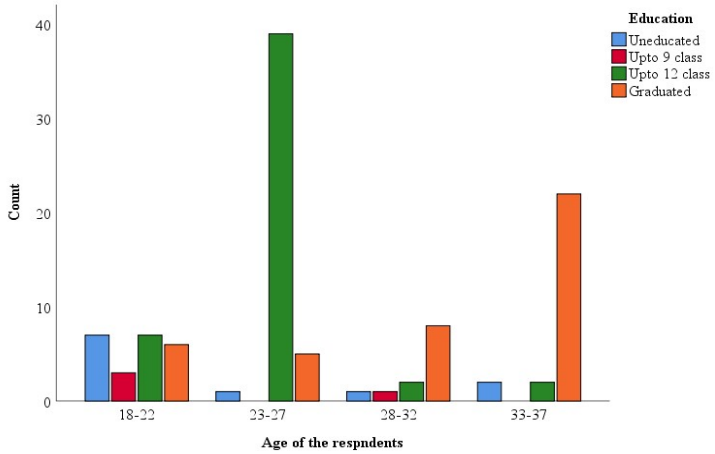

Figure 2: Details of the age of the respondents with education.

5.1.4 Region of the respondents

Among 106 pregnant women enrolled in the study, 54 (50.9%) were from rural area and 52(49.1%) were from urban areas as shown in table 6.1.4

Table 6.1.4.1: *Region of the respondents.*

Region of the respondents	*Frequency*	*Percent*
Rural	54	50.9
Urban	52	49.1
Total	106	100.0

Table 6.1.4.2*: Age of the respondents * Region.*

Age of the respondents * Region Crosstabulation			Region		Total
			Urban	Rural	
Age of the respondents	18-22	Count	16	7	23
		% within Age of the respondents	69.6%	30.4%	100.0%
	23-27	Count	3	42	45
		% within Age of the respondents	6.7%	93.3%	100.0%
	28-32	Count	8	4	12
		% within Age of the respondents	66.7%	33.3%	100.0%
	33-37	Count	25	1	26
		% within Age of the respondents	96.2%	3.8%	100.0%
Total		Count	52	54	106
		% within Age of the respondents	49.1%	50.9%	100.0%

The highest proportion was observed in respondents having age between 23-27 years 42(93.3%) belonged to rural area followed by 25(96.2%) in respondents having age between 33-37 years belonged to urban area as shown in the table 6.1.4.2

Table 6.1.4.3: *Chi-Square tests.*

Parameters	***Value***	***df***	***Asymptotic Significance (2-sided)***
Pearson Chi-Square	60.793[a]	3	.001
Likelihood Ratio	72.845	3	.001
Linear-by-Linear Association	15.419	1	.001

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.89.

A chi-square test was applied to compare Age of the respondents with the region of the respondents. The results were found to be significant (X^2 = *(3)*, 60.793, N = 106), *p =0.001*) as shown in the table 6.1.4.3

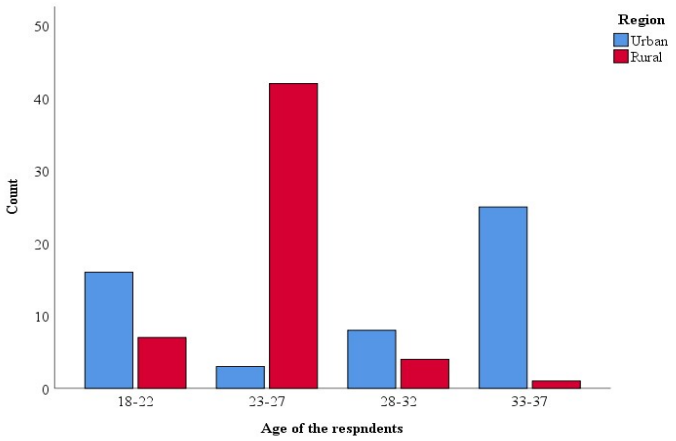

Figure 3: Details of the age of the respondents with region.

5.1.5 Stage wise blood pressure classification of the respondents

Among 106 pregnant women enrolled in the study 70 (66%) were having Mild hypertension and remaining36 (34%) were having Severe hypertension. Details of stage wise blood pressure classification are mentioned in table 6.1.5

Table 6.1.5.1: S*tage wise blood pressure classification*.

Blood pressure of the respondents	***Frequency***	***Percent***
(sBP:140-159/dBP:90-109)	70	66.0
(≥sBP:160/dBP:110)	36	34.0
Total	106	100.0

Table 6.1.5.2: *Age of the respondents * Blood pressure*.

Age of the respondents * Blood pressure crosstabulation			**Blood pressure**		**Total**
			(sBP:140-159/dBP:90-109)	**(≥sBP:160/dBP:110)**	
Age of the respondents	18-22	Count	13	10	23
		% Within Age of the respondents	56.5%	43.5%	100.0%
	23-27	Count	26	19	45
		% Within Age of the respondents	57.8%	42.2%	100.0%
	28-32	Count	7	5	12
		% Within Age of the respondents	58.3%	41.7%	100.0%
	33-37	Count	24	2	26
		% Within Age of the respondents	92.3%	7.7%	100.0%
Total		Count	70	36	106
		% Within age of the respondents	66.0%	34.0%	100.0%

The highest proportion was observed in respondents having age between 33-37 years 24 (92.3%) having blood pressure (sBP: 140-159/dBP:90-109) mmHg followed by 26 (57.8%) in respondents having age between 23-27years having blood pressure (sBP:140-159/dBP:90-109) mmHg as shown in the table 6.1.5.2.

Table 6.1.5.3: *Chi-Square test.*

Parameters	***Value***	***df***	***Asymptotic Significance (2-sided)***
Pearson Chi-Square	10.615[a]	3	.014
Likelihood Ratio	12.662	3	.005
Linear-by-Linear Association	7.989	1	.005

a.1 cells (12.5%) have expected count less than 5. The minimum expected count is 4.08.

A chi-square test was applied to compare Age of the respondents to the blood pressure of the respondents. The results were found to be significant (X^2= (3) 10.61, N = 106), *p =0.014)* as shown in table 6.1.5.3.

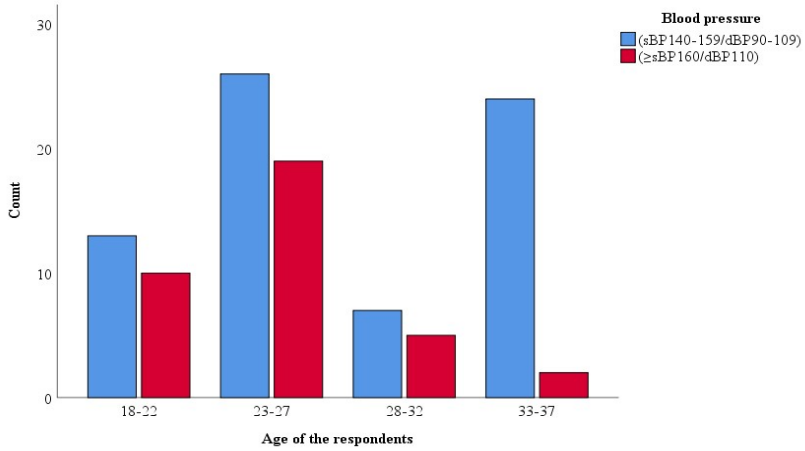

Figure 4: Details of the blood pressure of the respondents with Age of the respondents.

5.1.6 Hemoglobin of the respondents

Among 106 pregnant women enrolled in the study 64 (60.4%) were having Hemoglobin from 6-10.5 and remaining 42 (39.6%) were having Hb from 10.6-14. Details of hemoglobin as shown in table 6.1.6

Table 6.1.6.1: *Hemoglobin of the respondents.*

Hemoglobin of the respondents	***Frequency***	***Percent***
6-10.5	64	60.4
10.6-14	42	39.6
Total	106	100.0

Table 6.2.1: ***Pregnancy trimester of the respondents *Education.***

Pregnancy trimester of the respondents*Education crosstabulation			Education				Total
			Uneducated	Up to 9 class	Up to 12 class	Graduated	
Pregnancy trimesters	First Trimester	Count	2	0	38	3	43
		% within Pregnancy trimesters	4.7%	0.0%	88.4%	7.0%	100.0%
	Second Trimester	Count	5	2	5	8	20
		% within Pregnancy trimesters	25.0%	10.0%	25.0%	40.0%	100.0%
	third Trimester	Count	4	2	7	30	43
		% within Pregnancy trimesters	9.3%	4.7%	16.3%	69.8%	100.0%
Total		Count	11	4	50	41	106
		% within Pregnancy trimesters	10.4%	3.8%	47.2%	38.7%	100.0%

The highest proportion was observed in respondents having first trimester 38(88.45%) belonged to up to 12 class of education followed by 30 (69.8%) in respondents having third trimester who was graduated as shown in table no 6.2.1.

Table 6.2.2: ***Chi-Square test.***

Parameters	***Value***	***df***	***Asymptotic Significance (2-sided)***
Pearson Chi-Square	57.478[a]	6	.001
Likelihood Ratio	61.565	6	.001
Linear-by-Linear Association	6.198	1	.013

6 cells (50.0%) have expected count less than 5. The minimum expected count is .75.

A Chi-square test was conducted to compare pregnancy trimesters of the respondents with the education of the respondents. The results were found significant *(X^2= (6)* 57.47, N = 106), *p =0.001)* as shown in table 6.2.2.

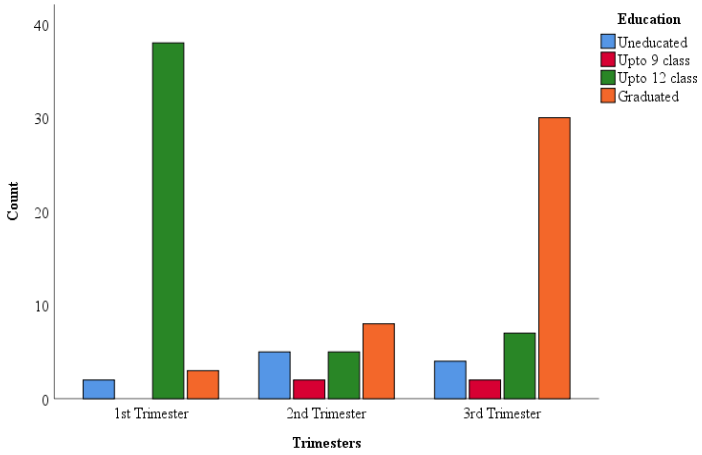

Figure 5: Details of education of the respondents with pregnancy trimesters.

Table 6.3.1: *Pregnancy trimesters of the respondents*Region.*

Pregnancy trimesters of the respondents*Region Crosstabulation			Region		Total
			Urban	Rural	
Pregnancy trimesters	first Trimester	Count	4	39	43
		% within Pregnancy trimesters	9.3%	90.7%	100.0%
	second Trimester	Count	11	9	20
		% within Pregnancy trimesters	55.0%	45.0%	100.0%
	Third Trimester	Count	37	6	43
		% within Pregnancy trimesters	86.0%	14.0%	100.0%
Total		Count	52	54	106
		% within Pregnancy trimesters	49.1%	50.9%	100.0%

The highest proportion was observed in respondents having first trimester 39(90.7%) belonged to rural area followed by 37 (86%) in respondents having third trimester belonged to urban area as shown in table 6.2.3.

Table 5.3.2: *Chi-Square tests.*

Parameters	***Value***	***df***	***Asymptotic Significance (2-sided)***
Pearson Chi-Square	51.018[a]	2	.001
Likelihood Ratio	58.015	2	.001
Linear-by-Linear Association	50.191	1	.001

0 cells (.0%) have expected count less than 5. The minimum expected count is 9.81.[a]

A Chi-square test was conducted to compare Pregnancy trimesters of the respondents with the region. The results were found to be significant *(X^2= (2)* 51.01, N = 106), *p =0.001)* as shown in table 6.2.4.

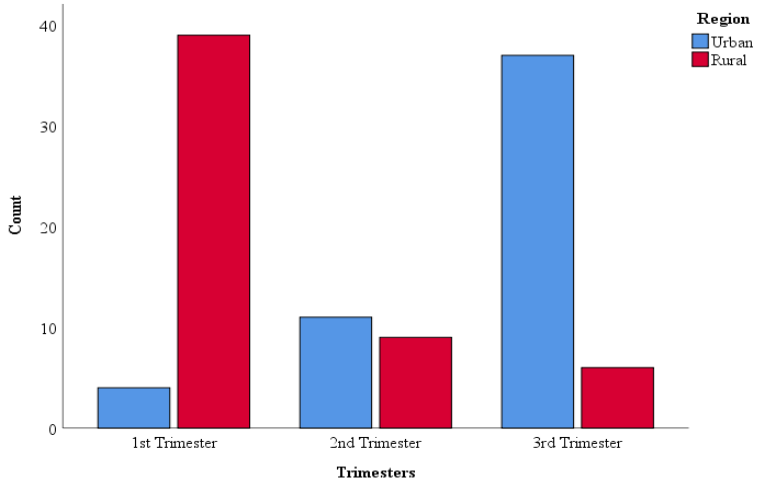

Figure 6: Details of pregnant women with pregnancy trimesters with region.

5.1.7 Comparison of education of the respondents with region

Table 6.9.1: ***Education of the respondents*Region.***

Education of the respondents*region crosstabulation			**Region**		**Total**
			Urban	**Rural**	
Education	Uneducated	Count	7	4	11
		% within Education	63.6%	36.4%	100.0%
	Up to 9 class	Count	3	1	4
		% within Education	75.0%	25.0%	100.0%
	Up to 12 class	Count	8	42	50
		% within Education	16.0%	84.0%	100.0%
	Graduated	Count	34	7	41
		% within Education	82.9%	17.1%	100.0%
Total		Count	52	54	106
		% within Education	49.1%	50.9%	100.0%

The highest proportion was observed in respondents up to 12 class of education 42 (84%) belonged to rural area followed by 34 (82.9%) in respondents who were graduated belonged to urban area as shown in table no 6.3.1.

Table 6.9.2: ***Chi-Square tests.***

Parameters	*Value*	*df*	*Asymptotic Significance (2-sided)*
Pearson Chi-Square	42.696[a]	3	.001
Likelihood Ratio	46.546	3	.001
Linear-by-Linear Association	4.241	1	.039

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 1.96.

A Chi-square test was conducted to compare Education of the respondents with the region. The results were found to be significant *(X^2= (3)* 42.69, N = 106), *p =0.001*) as shown in table 6.9.2.

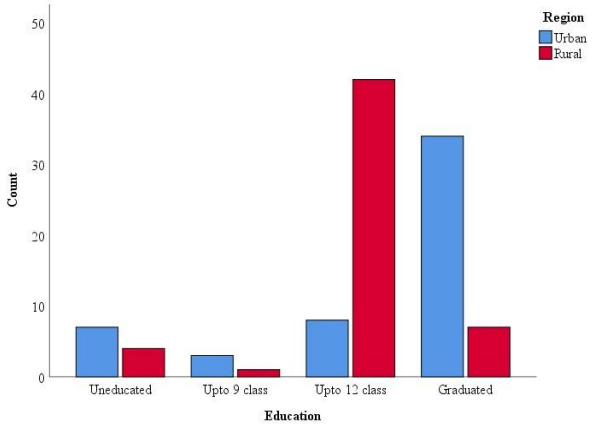

Figure 7: Details of education of the respondents with region.

5.1.8 Comparison of region of the respondents with blood pressure

Table 6.10.1: ***Region of the respondents * Blood pressure.***

Region of the respondents * Blood pressure Crosstabulation			**Blood pressure**		**Total**
			(sBP:140-159/dBP:90-109)	**(≥sBP:160/ dBP:110)**	
Region	Urban	Count	40	12	52
		% within Region	76.9%	23.1%	100.0%
	Rural	Count	30	24	54
		% within Region	55.6%	44.4%	100.0%
Total		Count	70	36	106
		% within Region	66.0%	34.0%	100.0%

The highest proportion was observed in respondents 40 (76.9%) belonged to urban area having blood pressure (sBP: 140-159/dBP: 90-109) mmHg followed by 24 (44.4%) having blood pressure (≥sBP:160/dBP: 110) mmHg belonged to rural area as shown in table no 6.10.1.

Table 6.10.2*: Chi-Square tests.*

Parameters	*Value*	*df*	*Asymptotic Significance (2-sided)*
Pearson Chi-Square	5.393[a]	1	.020
Continuity Correction	4.482	1	.034
Likelihood Ratio	5.473	1	.019
Linear-by-Linear Association	5.342	1	.021

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 17.66.

A Chi-square test was conducted to compare region of the respondents with the blood pressure of the respondents. The results were found to be significant (X^2 = *(1)*, 5.393, N = 106, *p =0.20*) as shown in table 6.10.2.

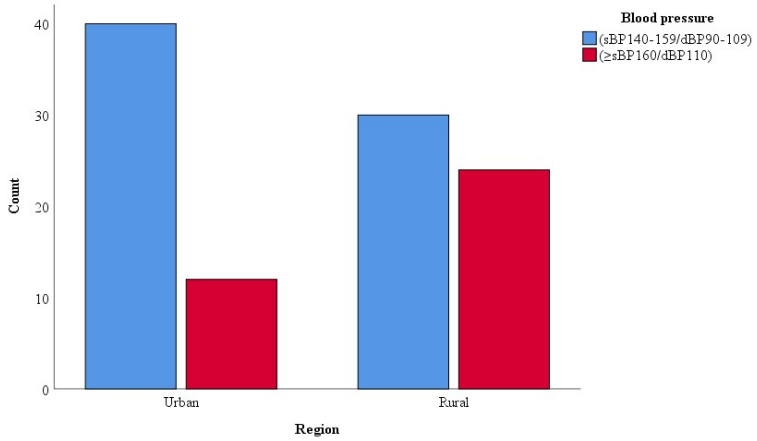

Figure 8: Details of region of the respondents with blood pressure.

5.1.9 Comparison of Blood pressure of the respondents with Hemoglobin

Table 6.11.1: *Blood pressure of the respondents*Hemoglobin*.

Blood pressure of the respondents *Hemoglobin Crosstabulation			**Hemoglobin**		**Total**
			6-10.5	**10.6-14**	
Blood pressure	(sBP:140-159/dBP:90-109)	Count	55	15	70
		% within Blood pressure	78.6%	21.4%	100.0%
	(≥sBP:160/dBP:110)	Count	9	27	36
		% within Blood pressure	25.0%	75.0%	100.0%
Total		Count	64	42	106
		% within Blood pressure	60.4%	39.6%	100.0%

The highest proportion was observed in respondents belonged to (sBP: 140159/dBP: 90-109) mmHg of blood pressure having 55(78.6%) (6-10.5) g/dl hemoglobin followed by 27 (75%) having belonged to blood pressure (≥sBP: 160/dBP: 110) mmHg as shown in table no 6.11.1.

Table 6.11.2: ***Chi-square tests.***

Parameters	*Value*	*df*	*Asymptotic Significance (2-sided)*
Pearson Chi-Square	28.520[a]	1	.001
Continuity Correction	26.324	1	.001
Likelihood Ratio	29.118	1	.001
Linear-by-Linear Association	28.251	1	.001

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.26

A Chi square test was conducted to compare Region of the respondents with the Blood pressure of the respondents. The results were found to be significant *(X^2 = (1),* 5.393, N = 106, *p =0.02)* as shown in table 6.11.2.

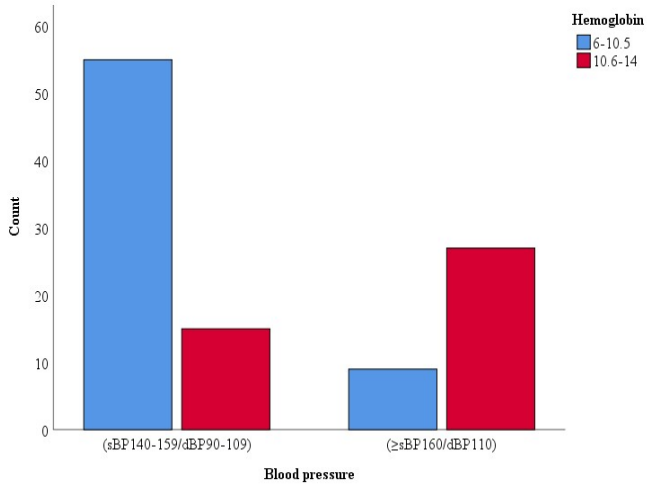

Figure 9: Details of blood pressure of the respondents with hemoglobin.

5.1.10 Comparison of blood pressure of the respondents with number of pregnancies

Table 6.12.1: ***Blood pressure of the respondents*Number of pregnancies.***

Blood pressure of the respondents*Number of pregnancies crosstabulation			**Number of pregnancies**				**Total**
			First pregnancy	**Second pregnancy**	**Third pregnancy**	**Mor e than3**	
Blood pressure	(sBP:140-159/dBP: 90-109)	Count	31	26	10	3	70
		% within Blood pressure	44.3%	37.1%	14.3%	4.3%	100.0%
	(≥sBP:160/ dBP:110)	Count	6	20	7	3	36
		% within Blood pressure	16.7%	55.6%	19.4%	8.3%	100.0%
Total		Count	37	46	17	6	106
		% within Blood pressure	34.9%	43.4%	16.0%	5.7%	100.0%

The highest proportion was observed in respondents having blood pressure (≥sBP:160/dBP: 110) mmHg 20 (55.6%) having second pregnancy followed by 31 (44.3%) in respondents having blood pressure (sBP: 140-159/dBP: 90-109) mmHg having first pregnancy as shown in table no 6.12.1.

Table 6.12.2: *Chi-Square tests.*

Parameters	***Value***	***df***	***Asymptotic Significance (2-sided)***
Pearson Chi-Square	8.135[a]	3	.043
Likelihood Ratio	8.710	3	.033
Linear-by-Linear Association	5.388	1	.020

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.04.

A Chi square test was conducted to compare blood pressure of the respondents with the number of the pregnancies of the respondents. The results were found to be significant *(X^2 = (3),* 8.135, N = 106, *p =0.43)* as shown in table 6.12.2

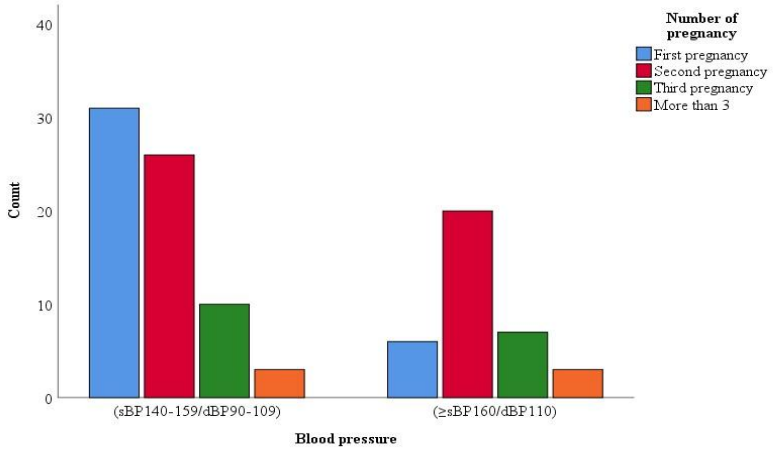

Figure 10: Details of the blood pressure of the respondents with number of pregnancies.

5.1.11 Comparison of blood pressure of the respondents with Anti-hypertensive drugs

Table 6.13.1: *Blood pressure of the respondents*Anti-hypertensive drugs*.

Blood pressure of the respondents with Antihypertensive drugs crosstabulation			**Anti-hypertensive drugs**			**Total**
			Selective beta receptor antagonist	**Calcium channel blocker**	**Tocolytics**	
Blood pressure	(sBP:140-159/dBP: 90-109)	Count	33	25	12	70
		% within Blood pressure	47.1%	35.7%	17.1%	100.0%
	(≥sBP:160/ dBP:110)	Count	4	22	10	36
		% within	11.1%	61.1%	27.8%	100.0%

		Blood pressure				
Total		Count	37	47	22	106
		% within Blood pressure	34.9%	44.3%	20.8%	100.0%

The highest proportion was observed in respondents having blood pressure (≥sBP: 160/dBP: 110) mmHg 22 (61.1%) prescribed calcium channel blockers followed by 33 (47.1%) in respondents having blood pressure (sBP: 140-159/dBP: 90-109) mmHg prescribed selective beta receptor antagonist as shown in table no 6.13.1

Table 6.13.2: ***Chi-square tests***.

Parameters	***Value***	***df***	***Asymptotic Significance (2-sided)***
Pearson Chi-Square	13.596[a]	2	.001
Likelihood Ratio	15.218	2	.000
Linear-by-Linear Association	9.558	1	.002

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.47.

A Chi-square test was conducted to compare Blood pressure of the respondents with the anti-hypertensive drugs of the respondents. The results were found to be Significant (X^2 = (2), 13.596, N = 106, p =0.001) as shown in table 6.13.2

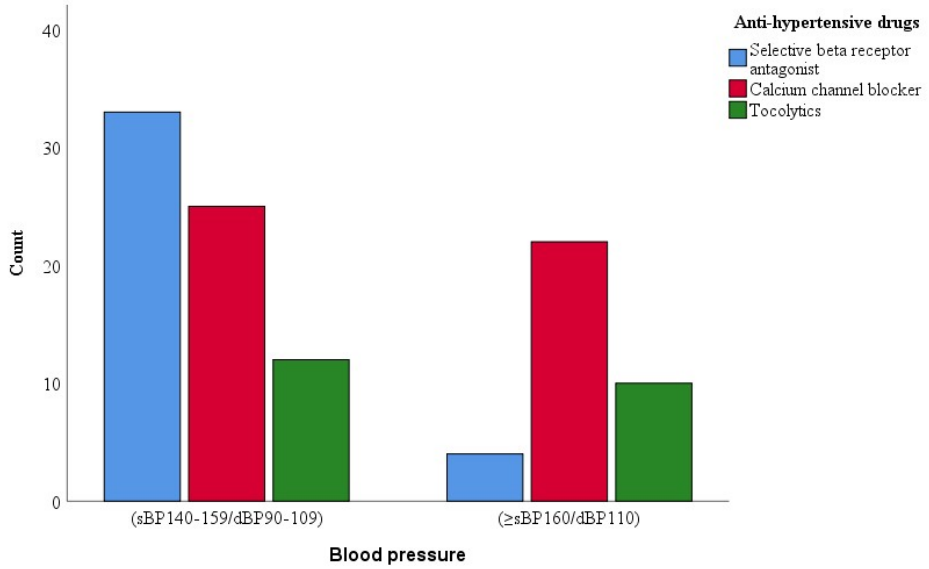

Figure 11: Details of respondents blood pressure with Anti-hypertensive drugs.

5.1.12 Comparison of Number of pregnancies of the respondents with Anti-hypertensive drugs

Table 6.14.1: ***Number of pregnancies of respondents *Anti-hypertensive drugs*.***

Number of pregnancies of the respondents* Anti-hypertensive drugs Crosstabulation			Anti-hypertensive drugs			Total
			Selective beta receptor antagonist	Calcium channel blocker	Tocolytics	
Number of pregnancies	First pregnancy	Count	26	8	3	37
		% within Number of pregnancies	70.3%	21.6%	8.1%	100.0%
	Second pregnancy	Count	9	31	6	46
		% within Number of pregnancies	19.6%	67.4%	13.0%	100.0%
	Third pregnancy	Count	2	3	12	17
		% within Number of pregnancies	11.8%	17.6%	70.6%	100.0%
	More than 3	Count	0	5	1	6
		% within Number of pregnancies	0.0%	83.3%	16.7%	100.0%
Total		Count	37	47	22	106
		% within Number of pregnancies	34.9%	44.3%	20.8%	100.0%

The highest proportion was observed in respondents having first pregnancy 26 (70.3%) prescribed selective beta receptor antagonist followed by 31(67.4%) in respondents having second pregnancy prescribed calcium channel blocker as shown in table no 6.14.1.

Table 6.14.2: ***Chi-Square tests.***

Parameters	***Value***	***df***	***Asymptotic Significance (2-sided)***
Pearson Chi-Square	60.228[a]	6	.001
Likelihood Ratio	54.587	6	.001
Linear-by-Linear Association	27.359	1	.001

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 1.25

A Chi-square test was conducted to compare number of the pregnancies of the respondents with the anti-hypertensive drugs of the respondents. The results were found to be Significant (X^2*= (6),* 60.228, N = 106, *p =0.001*) as shown in table 6.14.2.

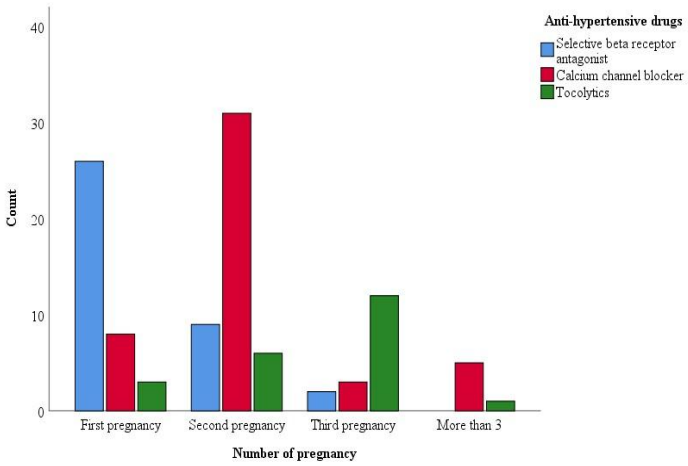

Figure 12: Details of Anti-hypertensive drugs of the respondents with number of pregnancies.

6. CONCLUSION

Many of the available guidelines like NISE, Midwives, State-wide, JNC and NHBPEP suggests the use of other anti-hypertensive drugs are diuretics like hydrochlorothiazide, peripheral vasodilator like hydralazine and β-blocker like pindolol are safe to treat hypertension in pregnancy.

The study points out that there was no use of such type of anti-hypertensive drugs to treat hypertension in pregnancy. The study also reveals that there are no guidelines available for the management of hypertension in pregnancy nor they follow any available standard guidelines.

These guidelines can be established by the hospital in collaboration with clinical pharmacist that may be useful tool for the effective management of the hypertension in pregnancy which in turn improves the therapeutic outcome and positive influence on healthcare and quality of life of the patients.

Among 106 pregnant women were enrolled into study and different stages of hypertension, pregnancy trimesters were seen and concluded that only some of the cases were for neonatal death. Maternal mortality rate was zero.

Conflict of interest statement: The authors have declared that no competing interests exist.

Statement of ethics: Informed consent was obtained from the patients.

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8. REFERENCES

1. Kumar et dl; Prescription pattern of drugs in pregnancy induced hypertension in a tertiary care hospital, 2013; 2: 6 - 783.
2. Gasnier Eclampsia: an overview clinical presentation, diagnosis and management Volume, 2016; 3: 2 – 2016.
3. Balser et dl; Analysis of maternal morbidity and mortality among patients admitted to Obstetric Intensive Care with severe preeclampsia, eclampsia or HELLP syndrome, 2011.
4. Karnad et dl; (2004) Prognostic factors in obstetric patients admitted to an Indian intensive care unit Crit Care Med, 2004; 32: 6.
5. Bhattacharya and Campbell (2005) The incidence of severe complications of preeclampsia. Hypertensin Pregnancy, 2005; 24: 181-90.
6. Kaaja et dl; (2005) Regional differences in the prevalence of pre-eclampsia in relation to the risk factors for coronary artery disease in women in Finland. Eur Heart J, 2005; 26: 44-50.
7. Cubero (2000) Diagnostic de preeclampsia, eclampsia, 2000; 58: 61 - 3.
8. Williams and Wilkins Pregnancy-induced hypertension. In: Professional guide to diseases, 2005; 8.
9. Abroug et dl; (1992) HELLP syndrome: incidence and maternal---fetal outcome. A prospective study. Intensive Care Med, 1992; 18: 274 - 7.
10. CDC. Health, United States, 2008. Hyattsville, MD: National Centre for Health Statistics, 2008.
11. Sibai BM et dl; Eclampsia IL Clinical significance of laboratory findings. Obstet Gynaecol, 1982; 59: 153 – 157.
12. Mosa and Pina Use of diuretics during pregnancy. Canadian Family Physician, 2009; 55: 44-5.
13. Jabeen et dl; (2011) Impact of interventions to prevent and manage preeclampsia and eclampsia on stillbirths. BMC Public Health, 2011; 11: S6.
14. Anjana et dl; (2010) Management of pregnancy induced hypertension. IJRAP, 2010; 1(2): 390-8.
15. Folic et dl; (2008) Antihypertensive drug therapy for hypertensive disorders in pregnancy. Acta Medica Mediante, 2008; 47(3): 65-72.
16. Begum and Parveen (2008) Antihypertensives in Hypertensive Disorders of Pregnancy.

Bangladesh J Obstet Gynaecol, 2008; 23(2): 65-72.

17. Seely and Maxwell (2007) Chronic Hypertension in Pregnancy. Circulation, 2007; 115: e188-e190.
18. Sibai (2002) Chronic Hypertension in Pregnancy. Obstet Gynaecol, 2002; 100 (2): 369 - 77.
19. Sibai (2003) Diagnosis and Management of Gestational Hypertension and Preeclampsia. Obstet Gynaecol, 2003; 102(1): 181–92.
20. Sucak et dl; (2010) Leptin levels and antihypertensive treatment in preeclampsia. Singapore Med, 2010; 51(1): 39.
21. Kumar (2010) Drug utilization study of antihypertensives in obstetric practice in a tertiary care hospital. IJABPT, 2010; 1(3): 1006-10.
22. Alissa et dl; (2009) Antihypertensive Medication Use During Pregnancy and the Risk of cardiovascular malformation Hypertension, 2009; 54: 63-70.
23. Sharma et dl; (2004). Glaucoma Therapy: Prescribing Pattern and Cost Analysis. JK Science, 2004; 6(2): 88-92.
24. Gupta et dl; (2000) A Clinic-Pharmacological Study of Out-Patient Prescribing pattern of Dermatological Drugs in an Indian tertiary Hospital. Indian Journal of Pharmacology, 2000; 32: 384-5.
25. Joshi et dl; (2006) An overview of over the counter drugs in pregnancy and lactation. Kathmandu University Medical Journal, 2006; 4(16): 545-51.
26. Jacobsen et dl; (2001) Drug use during early pregnancy. Eur J Clin Pharmacal, 2001; 57: 259-63.
27. Verma (2006) Drug Utilization Pattern During Pregnancy In north India. Indian J Med Sci, 2006; 60(7): 277-84.
28. Widens (2009) Drug use in pregnancy-physician's evaluation of quality and clinical impact of drug information centers. Eur J Clin pharmocol, 2009; 65: 303-8.
29. Rohra et dl; (2008) Drug Prescribing Patterns During Pregnancy In Tertiary Care Hospitals Of Pakistan: a cross sectional study. BMC Pregnancy and Childbirth, 2008; 8: 24.
30. Shehata and Nelson (2000) Drugs to avoid in pregnancy. Current Obstetrics & Gynecology, 2000; 10: 44-52.