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Impact of the New ISSHP Definitions on the Incidence of Preeclampsia

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Abstract
Background: *The traditional definitions of pre-eclampsia based on hypertension and proteinuria has been recently revised by the International Society for the Study of Hypertension in Pregnancy (ISSHP) and the American College of Obstetrics and Gynecology (ACOG). To study the impact of new ISSHP definitions on the incidence of pre-eclampsia*
Materials and Methods*: This was an observational study on 430 subjects. Subjects with gestational age ≥ 24 weeks and hypertension in pregnancy were classified as per the ISSHP (old) and the ISSHP (new) classification.*
Results*: The incidence of preeclampsia increased from 1.48 % (Old classification) to 5.7% (new classification); 268 additional cases were reclassified as preeclampsia as per the ISSHP (new) definition. Of these, 236 (88.0%) had non proteinuric hypertension. Neonatal NICU admission rates were almost three times higher in the proteinuric preeclampsia group compared to the non-proteinuric preeclampsia group. Eighty seven out of 268 new cases had obstetric complications, of which, 55 (20 %) were non proteinuric and 32 (11 %) were proteinuric.*
Conclusion*: Use of the new ISSHP classification led to an increase in the incidence of preeclampsia. This increase is caused due to inclusion of subjects with non proteinuric hypertension. Obstetric complications and NICU admission were seen in subjects with non proteinuric hypertension, although the numbers were less as compared to subjects with proteinuric hypertension.*
Keywords: *gestational hypertension, preeclampsia, ISSHP, maternal, neonatal, outcomes*

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I. Introduction

The traditional definitions of pre-eclampsia based on hypertension and proteinuria has been recently revised by the International Society for the Study of Hypertension in Pregnancy (ISSHP) and the American College of Obstetrics and Gynecology (ACOG). [1,2]

The traditional definition of pre-eclampsia (PE) according to ISSHP (2001) ncluded new onset of hypertension- systolic blood pressure (SBP) ≥140 mmHg and diastolic blood pressure (DBP) ≥ 90 mmHg at ≥ 20 weeks gestation along with proteinuria (≥300mg/24/protein-creatinine ratio > 30mg / mmol or ≥ 2+ on dipstick testing).

New definitions of PE have been revised to include cases without proteinuria but with renal, hepatic, hematological dysfunction, neurological dysfunction and uteroplacental changes. The new definitions will eventually be adopted into clinical practice. The new definitions of gestational hypertension and pre-eclampsia are as under:

A) Gestational Hypertension (GHTN) is persistent de novo hypertension that develops at or after 20 weeks of gestation in the absence of features of pre-eclampsia.

B) Transient Gestational Hypertension is de novo hypertension that develops at any gestation that resolves without treatment during pregnancy.

C)Pre-eclampsia is gestational hypertension accompanied by one or more of the following new-onset conditions at or after 20 weeks gestation.

1. Proteinuria
2. Other maternal organ dysfunction

- Acute Kidney Injury (AKI) (Creatinine ≥ 90 µmol / L ; 1mg / dl)

- Liver involvement (elevated transaminases e.g ALT or AST > 40IU/L with or without right upper quadrant or epigastric pain)
- Neurological complications (eclampsia, altered mental state, blindness, stroke, clonus, severe headache, persistent visual scotomata)
- Hematological complication (thrombocytopenia, platelet count below 1,50,000 / µL, DIC, hemolysis)
- Uteroplacental dysfunction (fetal growth restriction, abnormal umbilical artery doppler or still birth)

Khan et al [3] found that new definitions resulted in an increase in pregnancies, classified as having pre-eclampsia, but additional cases had milder disease and a nonsignificant decrease in the performance of first trimester screening.

This prospective study was conducted with the following objectives:

1. To classify pre-eclampsia as per the traditional "old" (2001 ISSHP) and "new" (2018) ISSHP classification and to study its impact on incidence of pre-eclampsia.
2. To examine the effect of the new definition on maternal and neonatal outcomes.

II. Materials And Methods

This was an observational study on 430 subjects over a period of one year. All subjects with viable gestational age ≥ 24 weeks coming to the labour ward with hypertension in pregnancy and fulfilling the inclusion and exclusion criteria were recruited.

INCLUSION CRITERIA: All subjects detected to have blood pressure ≥ 140/90 mmHg after 20 weeks
EXCLUSION CRITERIA: Chronic hypertension or Hypertension preceding Pregnancy.
Data was collected as follows:

- Basic Demographic data : age, gravidity, parity, body mass index, religion, place of residence (urban / rural), Family H/o eclampsia , H/o eclampsia in previous pregnancy.
- Obstetric History : gestational age, inter pregnancy interval, methods of conception (natural/ IVF)
- Medical History of Diabetes Mellitus, Chronic hypertension, renal disease, other.
- Blood sample was collected to assess CBC, platelet count, serum levels of creatinine, blood urea, uric acid and liver enzymes.

GHTN and PE were diagnosed based on the ISSHP (old) and ISSHP (new) classification as shown below:
Categorization of Subjects by ISSHP [old] and ISSHP [new] criteria was performed based on the criteria recommended by Brown et al (2018) [1]:

ISSHP [old] [3]	**ISSHP [new] [1]**
Gestational hypertension new onset hypertension BP (≥ 140/90mmHg) at ≥ 20 weeks gestation	Transient Gestational hypertension De-novo hypertension that develops at any gestation and resolves without treatment
Pre- eclampsia new onset hypertension BP (≥ 140/90mmHg) at ≥ 20 weeks gestation and proteinuria	Gestational hypertension De-novo hypertension that develops at ≥20weeks in absence of features of Pre- eclampsia
	Pre- eclampsia De-novo hypertension that develops at ≥20 weeks with or without proteinuria but with evidence of renal, hepatic or hematological and feto placental dysfunction.

- Blood Pressure was measured using a liquid crystal sphygmomanometer at least 4 times/ day
- Proteinuria was measured using dipstick method and a cut-off of ≥ 1 considered positive.
- HELLP syndrome was diagnosed as platelet count < 100,000 / µL, ALT or AST > 70 IU/L and LDH > 600 IU/L [4]
- Fetal well-being was assessed by ultrasound examination to determine estimated fetal weight, doppler indices in umbilical artery (UA), middle cerebral artery (MCA) and ductus venosus (DV) if indicated. Cerebroplacental ratio (CPR) was calculated [CPR=MCA PI/UAPI]
- Non stress test (CTG) was performed once / twice a day during hospitalization.
- Pre-eclampsia / GHTN was further classified as early onset in case of delivery at < 34 weeks and as late onset in case of delivery ≥34 weeks [4,5]
- The anti hypertensive drug of first choice in our practice is Labetalol, with Nifedipine as second line, both given orally. For emergency treatment of hypertension, intravenous labetalol is used. Magnesium sulphate is used for seizure prophylaxis as a routine. Steroid therapy for lung maturation is used for gestation < 34 weeks.

- Fetal weight centiles were calculated based on the online calculator available on fetalmedicinebarcelona [4].

Induction of labour was performed as per departmental guidelines.
New born characteristics such as birth weight, Apgar score < 7 at 5 minutes, NICU admission, duration of NICU stay, perinatal death and other neonatal complications were noted.

STATISTICAL ANALYSIS
Patient characteristics were calculated as mean and SD and as percentage for categorical variables. Chi-Square / Fishers exact test were used for comparison of categorical variables. A p value <0.5 was considered as significant. Continuous variables were analyzed using Student t.test.
STUDY OUTCOMES
1. Incidence of GHTN and PE as per ISSHP (old) and ISSHP(new) Classification
2. Maternal outcomes by ISSHP (old) and ISSHP (new) categories
3. Neonatal outcome by ISSHP (old) and ISSHP (new) categories

III. Results

Four hundred and thirty (n=430) subjects fulfilling the inclusion and exclusion criteria were included in the study. During this period there were a total of 6331 deliveries. Thus the incidence of preeclampsia was 6.79%.

Table 1 shows the classification of these subjects by the old and new classification systems.

According to the new ISSHP classification, (362(84.19%)) subjects had pre-eclampsia and (68(15.81%) had gestational hypertension. The additional cases as per the new ISSHP classification were 268 (4.2%); 223 subjects with GHTN by old classification were re classified as PE as per new ISSHP classification and 45 subjects with eclampsia were included in this group giving the new additional cases of 268. There was an increase in the incidence of PE from 1.48 % (Old classification) to 5.7% (new classification). There were no differences in maternal characteristics such as age and gestational age between the groups.

Table 1:-Distribution of parameters of study subjects.

Parameters	Frequency (%) (n=6331)		KHAN et AL (2020) (n=66964)
ISSHP (old) (n=430)			
Gestational hypertension	291 (4.59)		2182 (3.3)
Pre-eclampsia	94 (1.48)		1870 (2.8)
Eclampsia	45 (0.7%)		
ISSHP (New)			
Pre-eclampsia	362 (5.7)		2301 (3.4%)
Gestational hypertension	68 (1.07)		
No	162		
Yes	268 (4.2)		

Table 2 shows the comparison of pregnancy characteristics between the subjects of preeclampsia classified as per the old and new ISSHP classification. Significant difference was seen in systolic blood pressure(mmHg), diastolic blood pressure(mmHg), mean arterial pressure(mmHg) between pre-eclampsia according to ISSHP Old and additional new cases of pre-eclampsia by new ISSHP definition.(p value <.05) Mean ± SD of systolic blood pressure(mmHg), diastolic blood pressure(mmHg), mean arterial pressure(mmHg) in pre-eclampsia according to ISSHP Old was 161.7 ± 16.7, 99.57 ± 8.28, 120.31 ± 10.09 respectively which was significantly higher as compared to the corresponding values in the additional new cases of pre-eclampsia by new ISSHP definition (151.68 ± 12.44(p value<.0001), 94.1 ± 6.5(p value<.0001), 113.43 ± 7.75(p value<.0001)) respectively.

Table 2:-Comparison of pregnancy characteristics between pre-eclampsia according to ISSHP Old and additional new cases of pre-eclampsia by new ISSHP definition.

Pregnancy characteristics	Pre-eclampsia according to ISSHP Old(n=94)	Additional new cases of pre-eclampsia by new ISSHP definition(n=268)	Total	P value	Test performed
Parity					
Nulliparous	55 (58.51%)	168 (62.69%)	223 (61.60%)	0.704	Fisher's exact test
1-3	39 (41.49%)	98 (36.57%)	137 (37.85%)		
>=4	0 (0%)	2 (0.75%)	2 (0.55%)		

Number of fetuses					
Singleton	94 (100%)	260 (97.01%)	354 (97.79%)	0.118	Fisher's exact test
Twins	0 (0%)	8 (2.99%)	8 (2.21%)		
Systolic blood pressure(mmHg)					
Mean ± SD	161.7 ± 16.7	151.68 ± 12.44	154.28 ± 14.34	<.0001	t test;5.324
Median(25th-75th percentile)	160(150-170)	150(140-160)	150(140-160)		
Range	140-200	140-200	140-200		
Diastolic blood pressure(mmHg)					
Mean ± SD	99.57 ± 8.28	94.1 ± 6.5	95.52 ± 7.4	<.0001	t test;6.514
Median(25th-75th percentile)	100(90-100)	90(90-100)	90(90-100)		
Range	90-120	90-120	90-120		
Mean arterial pressure(mmHg)					
Mean ± SD	120.31 ± 10.09	113.43 ± 7.75	115.22 ± 8.93	<.0001	t test;6.016
Median(25th-75th percentile)	117(113-127)	110(107-117)	113(107-120)		
Range	107-147	107-147	107-147		

Table 3 shows that number of subjects with maternal complications were significantly higher in additional new cases of pre-eclampsia by new ISSHP definition (27.61%) as compared to pre-eclampsia according to ISSHP Old (12.77%). (p value=0.004).

Table 3:-Comparison of overall maternal complications between pre-eclampsia according to ISSHP Old and additional new cases of pre-eclampsia by new ISSHP definition.

Overall maternal complications	Pre-eclampsia according to ISSHP Old(n=94)	Additional new cases of pre-eclampsia by new ISSHP definition(n=268)	Total	P value	Test performed
None	82 (87.23%)	194 (72.39%)	276(76.24%)	0.004	Chi square test,8.468
Yes	12 (12.77%)	74 (27.61%)	86 (23.76%)		
Total	94 (100%)	268 (100%)	362 (100%)		

Table 4 shows the neonatal outcomes between the groups. Early neonatal deaths and still births were significantly higher in pre-eclampsia according to ISSHP Old as compared to additional new cases of pre-eclampsia by new ISSHP definition. (Early neonatal death:- 18.09% vs 6.88% respectively with odds ratio of 0.311(0.153 to 0.632), Still Birth:- 11.70% vs 7.25% respectively with odds ratio of 0.506(0.231 to 1.110)).

Table 4:-Comparison of neonatal outcome between pre-eclampsia according to ISSHP Old and additional new cases of pre-eclampsia by new ISSHP definition.

Neonatal outcome	Pre-eclampsia according to ISSHP Old (n=94)	Additional new cases of pre-eclampsia by new ISSHP definition (n=276)	Total	P value	Odds ratio (95% CI)	Test performed
Birth weight(g)						
<2.5	69 (73.40%)	190 (68.84%)	259 (70%)	0.404	1.000	Chi square test, 0.695
>=2.5	25 (26.60%)	86 (31.16%)	111 (30%)		0.800 (0.474 to 1.351)	
Mean ± SD	2040.39 ± 651.57	2148.42 ± 612.2	2120.98 ± 623.32	0.147	-	t test; 1.453
Median (25th-75th percentile)	2020 (1500-2570.5)	2222.5 (1700-2613.25)	2176.5 (1663.25-2603.5)		-	
Range	700-3386	665-3496	665-3496		-	
Fetal outcome						
Early neonatal death	17 (18.09%)	19 (6.88%)	36 (9.73%)		0.311 (0.153 to 0.632)	
Still Birth	11 (11.70%)	20 (7.25%)	31 (8.38%)		0.506 (0.231 to 1.110)	
NICU admission						

No	52 (55.32%)	156 (56.52%)	208 (56.22%)	0.839	1	Chi square test, 0.041
Yes	42 (44.68%)	120 (43.48%)	162 (43.78%)		0.952 (0.595 to 1.526)	

IV. Discussion

In 2018, Brown et al published the ISSHP classification, diagnosis and management recommendations for clinical practice for hypertensive disorders in pregnancy. This set of recommendations provides practical advice on classification, diagnostic criteria, and management for all clinicians, everywhere, who are involved in the management of women with hypertension in pregnancy [1].

The current observational study was conducted on 430 subjects (with gestational age $\geq$24 weeks) coming to the labour ward with hypertension in pregnancy to study the impact of new ISSHP definitions on the incidence of pre-eclampsia . There was an increase in the incidence of PE from 1.48 % (Old classification) to 5.7% (new classification) as 268 additional cases were reclassified as preeclampsia as per the ISSHP (new) definition. Neonatal NICU admissions were almost three times higher in the proteinuric preeclampsia group compared to the non-proteinuric preeclampsia group. Perinatal deaths and low birth weight were not significantly different across the two groups. Maternal complications (abruption, HELLP syndrome, Acute Kidney Injury, eclampsia, pulmonary edema.), were seen in both non proteinuric and proteinuric PE, with the incidence being higher in the proteinuric PE cases.

Bouter et al in 2019 [5] found that the new ISSHP definitions caused a significant increase in patients with superimposed preeclampsia from 272 (6.2%) patients by old definition to 360 (8.2%) patients by new definition. This increase was due to non protinuric cases.

The results of the present study regarding maternal and neonatal outcomes are in agreement with those of Lai et al (2021|) [6] who found that a broad definition of preeclampsia can better identify women and babies at risk of adverse outcomes.

Reddy et al [7], found that the additional 97 women identified by International Society for the Study of Hypertension in Pregnancy 2018 exhibited a milder form of disease with lower rates of severe hypertension (62.4% vs 44.3%; P<.01) and magnesium sulfate use (11.9% vs 4.1%; P<.05) and a trend toward lower rates of adverse maternal outcomes (9.8% vs 4.1%). These women also delivered at a later gestation, and their babies had a lower number of neonatal intensive care unit admissions and adverse perinatal outcomes.

Khan et al (2020) [3], studying the impact of the new classification on first trimester screening, found that there was an increase of cases classified as having preeclampsia, but the additional cases had milder disease and a nonsignificant difference in the performance of first trimester screening.

This was a prospectively conducted study to assess the clinical impact of the new ISSHP 2018 classification. The limitation of this study is it's small sample size of 430 subjects. Implementation of the ISSHP 2018 classification, found that subjects earlier classified as gestational hypertension, were reclassified as preeclampsia, thus increasing the incidence of preeclampsia. These subjects diagnosed as gestational hypertension, could in fact be having an underlying biochemical disorder which might go undetected. By reclassifying these cases as PE as per the new classification, these underlying biochemical derangements could be identified and subjects can be managed appropriately. The number of subjects requiring induction of labour is likely to increase.

V. Conclusion

Use of the new ISSHP classification led to an increase in the incidence of preeclampsia. This increase is caused due to inclusion of subjects with non proteinuric hypertension. Obstetric complications and NICU admission were seen in subjects with non proteinuric hypertension, although the numbers were less as compared to subjects with proteinuric hypertension.

References

[1]. Brown MA, Magee, La, Kenny LC, Karumanchi SA, McCarthy FP, Saito S, et al. International Society for study of Hypertension in Pregnancy (ISSHP). The hypertensive disorders of pregnancy ISSHP classification, diagnosis and management recommendation for international practice. Pregnancy Hypertension 2018; 13:291-308

[2]. ACOG Practice Bulletin NO 202: Gestational hypertension and Pre-eclampsia. ObstetGynec 2019; 133: e1-25

[3]. Khan N, Andrade W, De Castro H, Wright A, Wright D, Nicolaides KH. The impact of new definitions of pre-eclampsia on the incidence and performance of first trimester screening. Ultrasound Obstet Gynecol 2020; 55:50-57 https://medicinafetalbarcelona.org/calc/

[4]. Bouter A R, Duvekot J J. Evaluation of the clinical impact of the revised ISSHP and ACOG definitions on preeclampsia. Pregnancy Hyper 2019; 19:206-211

[5]. Lai J, MD; Syngelaki A, Nicolaides K, von Dadelszen P, Magee L A. Impact of new definitions of preeclampsia at term on identification of adverse maternal and perinatal outcomes. Am J Obstet Gynecol 2021;224: 518e1-11

[6]. Reddy M, Fenn S, Rolnik DL, Mol BW, Da Silva Costa F, Wallace EM, Palmer KR . The Impact of the definition of preeclampsia on disease diagnosis and outcomes: a retroscpective cohort study. Am J Obstet Gynecol 2021; 224(2): 217.e1-217.e11. doi: 10.1016/j.ajog.2020.08.019.

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