RISK FACTORS OF PRE-ECLAMPSIA, ECLAMPSIA AND ITS ADVERSE OUTCOMES IN LOW- AND MIDDLE-INCOME PREGNANT FEMALES

Asmat Shaheen[1]✉, Roshan Ali[2], Rubina Nazli[2], Muhammad Tahir Sarwar[2]

[1]✉ Khyber Medical University, Institute of Medical Sciences, Kohat, Pakistan
Email: asmatshaheen@yahoo.com
[2] Institute of Basic Medical Sciences, Khyber Medical University, Peshawar Pakistan

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ABSTRACT

OBJECTIVE: To identify the socio-demographic and other risk factors associated with pre-eclampsia, eclampsia and its adverse outcomes in low- and middle-income pregnant females.

METHODS: This cross-sectional study was conducted at three tertiary care hospitals of Peshawar, Pakistan on 113 pregnant women (43 with pre-eclampsia, 37 with eclampsia and 33 without pre-eclampsia/eclampsia). Data was collected by interviewing study subjects using a pre-tested questionnaire incorporating important risk factors of pre-eclampsia and eclampsis. Data was analyzed using SPSS.

RESULTS: Majority (89.4%) of women were >20 years of age. Out of 113 study participants, 78 (69.02%) were from low-income (Rs<8500) and 35 (30.98%) were from middle-income (Rs= 8501-103900) group. Thirty one (83.78%) patients of eclamptia, 32 (74.42%) of pre-eclampsia and 15 (45.45%) normotensive pregnant women were from low-income group (p<0.01). Forty-nine of 113 (43.3%) antenatal women had no antenatal visits and 48 (42.5%) had 1-3 antenatal visits. About half of women with low-income (n=40/78, 51.3%) had no antenatal visits as compared to middle-income (n=9/36; 25.7%). Out of 49 women with no antenatal visits, 23 (46.94%) were eclamptic, 25 (51.02%) were having pre-eclampsia and 1 (2.04%) was normotensive. In this study, 23/37 (62.26%) of eclampsia, 25/43 (58.14%) of pre-eclampsia and 1/33 (3.03%) of normotensive pregnant women had no antental visits. Twenty (17.7%) antenatal women had history of >2 still-births and majority (n=16/20; 80%) were from low-income group.

CONCLUSION: Lower class socio-economic status and lack of antenatal visit are associated with pre-eclampsia and eclampsia and related adverse outcome. Interventions at primary care level are in need.

KEY WORDS: Pregnancy Outcome (MeSH), Eclampsia (MeSH), Pre-eclampsia (MeSH), Pregnancy (MeSH), Hypertension (MeSH), Low Income Population (MeSH), Poverty (MeSH).

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INTRODUCTION

Pre-eclampsia and eclampsia are the major causes of perinatal and maternal mortality and morbidity which equally prevails, in poor and rich countries of the world. About 3-8% pregnancy complication attributes to pre-eclampsia. The rate of occurrence is on higher side in developing countries because of poor diet. On the whole, death ratio of mothers is estimated to 10-15% due to pre-eclampsia and eclampsia.[1]

In the developing world, pre-eclampsia has bad impact on maternal and perinatal health in low- and middle-income settings. It is a major cause of almost one third of a million maternal deaths. It is the broad complication of pregnancy and this incidence showing perpetual increase annually in the world. Approximately 50,000 deaths occur due to dominant causes of maternal morbidity and mortality.[2,3] In addition, pre-eclampsia is a disorder in the developing countries and major cause for loss of lives over six million perinatal deaths, about eight million preterm births[4] and nearly 20 million low-birth weight infants.[5]

Globally, women die greater than half a million each year of pregnancy related causes and 99% of these deaths occur in developing countries.[4] Eclampsia accounts for 50,000 maternal deaths in a year.[6] There is limited research assessing the level of risks in pre-eclampsia's poor maternal and peri-natal outcomes. In low-resource setting where the impact is thought to be more severe.[7] Moreover, small sample sizes for some important confounders are notable weaknesses that have restricted prior research.[8,9] Various studies reveal that at average in the world, 13% maternal death occur due to hypertensive disorders during pregnancy.[10,11]

The incidence of pre-eclampsia increases due to many risk factors which contain multi fetal gestations, nulli parity, previous history of pre-eclampsia, age >35 years at first pregnancy, African American race and smoking. Some other medical disorder like vascular and connective tissue disorders like systemic lupus erythematosus and antiphospholipid antibodies can also increases the incidence of pre-eclampsia. With the primi parous women, there is a discrep-

ancy among ethnic groups as the risk in African American women is twice that of Caucasian women, and in women of India and Pakistan the same risk is also very high.[12]

Maternal and neonatal health is adversely affected by pre-eclampsia and eclampsia especially in low and middle income countries. The aim was to identify the socio-demographic and other risk factors associated with pre-eclampsia, eclampsia and its adverse outcomes in low- and middle-income pregnant females.

METHODS

This comparative study was conducted in between March-October, 2014 in the Department of Obstetrics and Gynecology, in three tertiary care hospitals (Hayatabad Medical Complex, Khyber Teaching Hospital and Lady Reading Hospital) of Peshawar, Pakistan. Sample size was calculated from WHO calculator which was 113. Equal numbers of pregnant females were selected from three hospitals and consecutive sampling method was used. Data was collected from pregnant females through a pre-tested questionnaire about socio demographic and other risk factors. Pre-eclampsia, eclampsia and normotensive were defined on the basis of doctor's diagnosed prescription. Socio-economic status was defined into low income (Rs. <8500) and middle income (Rs.=8501-103900) class on the basis of World Bank Classification of per capita income. The pregnant females with prior history of renal disease, cardiovascular diseases and chronic hypertension were excluded from the study. Prior collecting data, informed written consent was obtained from all the study participants and ethical approval was taken from Khyber Medical University Ethical Board. Data was compiled in Microsoft excel and analyzed using chi square test in SPSS 17.

RESULTS

Pregnant women of age more than 20 years were at risk of developing pre-eclampsia and eclampsia compared to age of less than 20 years (Table I).

Out of 113 study participants, 78 (69.02%) were from low-income (Rs<8500) and 35 (30.98%) were from middle-income (Rs.= 8501-103900) group (Table II). Thirty one (83.78%) of eclamptic, 32 (74.42%) of pre-eclamp-

TABLE I: DISTRIBUTION OF SAMPLES ACCORDING TO AGE

Age Group (years)	Pre-eclampsia		Eclampsia		Control	
	Frequency (n=43)	Percentage	Frequency (n=37)	Percentage	Frequency (n=33)	Percentage
15-20	4	9.3	6	16.2	2	6.1
21-25	9	20.9	12	32.4	8	24.2
26-30	5	11.6	4	10.8	9	27.3
31-35	11	25.6	5	13.5	6	18.2
36-40	7	16.3	5	13.5	6	18.2
41-45	7	16.3	5	13.5	2	6.1

TABLE II: SOCIOECONOMIC CLASSES OF THE STUDY GROUPS

Socio-economic status	Eclampsia		Pre-eclampsia		Normotensive		P-value
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
Low income (Rs <8500) (n=78)	31	83.78	32	74.42	15	45.45	0.002
Middle income (Rs = 8501-103900) (n=35)	6	16.22	11	25.58	18	54.55	

TABLE III: FREQUENCY OF ANTENATAL VISITS BY THE DIFFERENT GROUPS

	Characteristics	n (%)	n (%)	n (%)	P-value
	Socio-economic status	0 visit (n=49)	1-3 visit (n=48)	>3 (n=16)	
Eclampsia (n=37)	Low income (Rs<8500)	19 (82.61)	9 (81.82)	3 (100)	0.728
	Middle income (Rs= 8501-103900)	4 (17.39)	2 (18.18)	0 (0.00)	
Pre-eclampsia (n=43)	Low income (Rs<8500)	20 (80)	11 (73.33)	1 (33.33)	0.215
	Middle income (Rs= 8501-103900)	5 (20)	4 (26.67)	2 (66.67)	
Normotensive (n=33)	Low income (Rs<8500)	1 (100)	10 (45.45)	4 (40)	0.517
	Middle income (Rs= 8501-103900)	0 (0.00)	12 (54.55)	6 (60)	

TABLE IV: AVERAGE FETAL OUTCOME ACCORDING TO PRE-ECLAMPSIA, ECLAMPSIA AND CONTROL

	Socio-economic status	Live birth n (%)			Stillbirth n (%)		
		0-4	>4	Value	0-2	>2	P-value
Eclampsia	Low income (Rs<8500)	28 (82.35)	3 (100)	0.43	23 (79.31)	8 (100)	0.160
	Middle income (Rs= 8501-103900)	6 (17.65)	0 (0.00)		6 (20.69)	0 (0.00)	
Pre-Eclampsia	Low income (Rs<8500)	24 (72.73)	8 (80)	0.64	25 (71.43)	7 (87.50)	0.35
	Middle income (Rs= 8501-103900)	9 (27.27)	2 (20)		10 (28.57)	1 (12.50)	
Normotensive	Low income (Rs<8500)	12 (44.44)	3 (50)	0.81	14 (48.28)	1 (25)	0.38
	Middle income (Rs= 8501-103900)	15 (55.56)	3 (50)		15 (51.72)	3 (75)	

sia and 15 (45.45%) of normotensive pregnant women were from low-income group (p<0.01).

Forty-nine of 113 (43.3%) antenatal women had no antenatal visits, 48 (42.5%) had 1-3 antenatal visits and 16 (14.2%) had >3 antenatal visits (Table III). About half of women with low-income (n=40/78, 51.3%) had no antenatal visits as compared to middle-income (n=9/36; 25.7%).

Out of 49 women with no antenatal visits, 23 (46.94%) were eclamptic, 25 (51.02%) were having pre-eclampsia and 1 (2.04%) was normotensive. In 48 women with 1-3 antenatal visits, 11 (22.92%) had eclampsia, 15 (31.25%) had pre-eclampsia and 22 (45.83%) were normotensive. In this study, 23/37 (62.26%) of eclampsia, 25/43 (58.14%) of pre-eclampsia and 1/33 (3.03%) of normotensive pregnant women had no antenatal visits. Twenty (17.7%) antenatal women had history of >2 still births and majority (n=16/20; 80%) were from low-income group (Table IV).

DISCUSSION

Our study suggests that the chances of a woman having pre-eclampsia and eclampsia is associated with low socio-economic status, age at pregnancy, antenatal visits and fetal outcome. In addition to others, the poor socio-economic background is crucial in accelerating the risk of eclampsia due to non-provision of balanced nutrition, unplanned ante-natal care coupled with poor sanitation and hygienic conditions. Mexico is a practical example where women social and economic status is deteriorated and attendant threat for pre-eclampsia and eclampsia has become double.[13] In our study pregnant women low income were at increased risk of being pre-eclamptic and eclamptic compared to those with middle income group and the association is significant.

Older maternal age has been found to be an independent risk factor for pre-eclampsia and eclampsia, whereas in this study most of the cases were in the age group 21–25. In advanced ages, the frequency of villous reaction increases which ultimately become a cause for pre-eclampsia in women of about 20 years of age. Many studies have confirmed the same findings.[14] There is, however, a need to focus on the incidence of pre-eclampsia in women below 20 years of age which is yet a major challenge that remain ahead for the researchers.

The study conducted by Hernandez et al[15] found that incidence of pre-eclampsia is 4.1% in primigravida while it is 1.7% in subsequent pregnancies. Incidence in multiparous women is calculated to be 1% without a history of pre-eclampsia.

Due to unawareness of women the incidence of abruption and eclampsia are higher when compared to other studies who delay visits to the hospital. Some people do not trust expert medical care and feel hesitant by using the available facilities. The women sometimes cannot afford paying the cost for necessary health care. They are the ones most likely to develop complications in the absence of resources.

Main factors determining perinatal mortality was the lack of normal antenatal checkups, pre-eclampsia and lack of awareness about significance of symptoms like decreased fetal movements and delay visits to hospital, all causative to stillbirths.[16] In epidemiologic studies, reports reveal that three million stillbirths take place annually worldwide.[17,18] A study from Iran also reports 12% of stillbirth cases.[19] Lack of antenatal care is associated with increased number of stillbirth in resource-poor settings.[20] In this context the outcome of our study are reliable and conform to the findings of Jehan et al[21] in Pakistan and Wilson et al[22] in the USA.

Limitation of Study: It was a comparative study carried out in three tertiary care hospital of provincial metropolis Peshawar. The results of this study cannot be generalized on the whole Khyber Pakhtunkhwa, Pakistan. Population based study with large sample size should be conducted to know the actual burden of pre-eclampsia and eclampsia in pregnant females and its association with socio-economic class.

CONCLUSION

Lower class socio-economic status and lack of antenatal visit are associated with pre-eclampsia and eclampsia and related adverse outcome. Early diagnosis and treatment can play a vital role. In low- and middle-income settings, health care interventions at primary care level are required to reduce the burden of maternal and perinatal death.

REFERENCES

1. Carty DM, Delles C, Dominiczak AF. Pre-eclampsia and future maternal health. J Hypertens 2010; 28(7): 1349-55.
2. Lozano R, Wang H, Foreman KJ, Rajaratnam JK, Naghavi M, Marcus JR, et al. Progress towards Millennium Development Goals 4 and 5 on maternal and child mortality: An updated systematic analysis. Lancet 2011; 378(9797): 1139-65.
3. Khan KS, Wojdyla D, Say L, Gulmezoglu AM, Van Look PF. WHO analysis of causes of maternal death: a systematic review. Lancet 2006; 367(9516): 1066-74.
4. Beck S, Wojdyla D, Say L, Betran AP, Merialdi M, Requejo JH, et al. The worldwide incidence of preterm birth: a systematic review of maternal mortality and morbidity. Bull World Health Organ 2010; 88(1): 31-8.
5. Wardlaw TM. Low birth weight: country, regional and global estimates: UNICEF; 2004.
6. Duley L. Maternal mortality associated with hypertensive disorders of pregnancy in Africa, Asia, Latin America and the Caribbean. Br J Obstet Gynaecol 1992; 99(7): 547-53.
7. Duley L. The global impact of pre-eclampsia and eclampsia. Semin Perinatol 2009; 33(3): 130-7.
8. Hsieh T, Hung T, Lee C, Hsu J, Lo L, Chin T. Risk factors for pre-eclampsia in an Asian population. Int J Gynaecol Obstet 2000; 70(3): 327-33.
9. Jammeh A, Sundby J, Vangen S. Maternal and obstetric risk factors for low birth weight and preterm birth in rural Gambia: A hospital-based study of 1579 deliveries. Open J Obstet Gynecol 2011; 1(03): 94.
10. Ganesh KS, Unnikrishnan B, Nagaraj K, Jayaram S. Determinants of Pre-eclampsia: A Case-control Study in a District Hospital in South India. Indian J Community Med 2010; 35(4): 502-5.
11. Lamminpaa R, Vehvilainen-Julkunen K, Gissler M, Heinonen S. Pre-eclampsia complicated by advanced maternal age: a registry-based study on primiparous women in Finland 1997-2008. BMC Pregnancy Childbirth 2012; 12: 47.
12. Rao AK, Daniels K, El-Sayed YY, Moshesh MK, Caughey AB. Perinatal outcomes among Asian American and Pacific islander women. Am J Obstet Gynecol 2006; 195(3): 834-8.
13. Najman JM, Morrison J, Williams GM, Keeping JD, Andersen MJ. Unemployment and reproductive outcome. An Australian study. Br J Obstet Gynaecol 1989; 96(3): 308-13.
14. Lamminpää R, Vehviläinen-Julkunen K, Gissler M, Heinonen S. Pre-eclampsia complicated by advanced maternal age: A registry-based study on primiparous women in Finland 1997–2008. BMC Pregnancy Childbirth 2012; 12(1): 1.
15. Hernandez-Diaz S, Toh S, Cnattingius S. Risk of pre-eclampsia in first and subsequent pregnancies: prospective cohort study. Br Med J 2009; 338: 2255.
16. Ayaz A, Muhammad T, Hussain SA, Habib S. Neonatal outcome in pre-eclamptic patients. J Ayub Med Coll Abbottabad 2009; 21(2): 53-5.
17. McClure EM, Saleem S, Pasha O, Goldenberg RL. Stillbirth in developing countries: A review of causes, risk factors and prevention strategies. J Matern Fetal Neonatal Med. 2009; 22(3): 183-90.
18. Stanton C, Lawn JE, Rahman H, Wilczynska-Ketende K, Hill K. Stillbirth rates: Delivering estimates in 190 countries. Lancet 2006; 367(9521): 1487-94.
19. Shahghibi S, Ghadami NS. Study of still birth rate in Rasol hospital in Sanandagh, Iran, 1995-96. Kurdestan Univ Med Sci J 1998; 2(7): 16-20.
20. Yakoob MY1, Menezes EV, Soomro T, Haws RA, Darmstadt GL, Bhutta ZA. Reducing stillbirths: behavioural and nutritional interventions before and during pregnancy. BMC Pregnancy Childbirth. 2009 May 7; 9 Suppl 1:S3. doi: 10.1186/1471-2393-9-S1-S3.
21. Huang L, Sauve R, Birkett N, Fergusson D, van Walraven C. Maternal age and risk of stillbirth: a systematic review. CMAJ 2008; 178(2): 165-72.
22. Wilson RE, Alio AP, Kirby RS, Salihu HM. Young maternal age and risk of intrapartum stillbirth. Arch Gynecol Obstet 2008; 278(3): 231-6.

CONFLICT OF INTEREST

Authors declare no conflict of interest

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NIL

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

AS: Conception, acquisition of data, drafting the manuscript, final approval of the version.

RA: Analysis & interpretation of data, final approval of the version.

RN: Study design, critical review, supervision, final approval of the version.

MTS: Drafting the manuscript, final approval of the version.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

KMUJ web address: www.kmuj.kmu.edu.pk

Email address: kmuj@kmu.edu.pk