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Title: Effect of the short inter-pregnancy interval on preeclampsia/eclampsia in India: Evidence from National Family Health Survey (2015-16)

Introduction: Preeclampsia/eclampsia is a severe disorder in pregnant women, and it remains one of the prominent causes of maternal mortality worldwide and is associated with adverse pregnancy outcomes including perinatal death, preterm birth, and intrauterine growth retardation. Whereas, the risk of preeclampsia/eclampsia were higher among short interpregnancy interval. Globally, almost 800 million women perish due to pregnancy complications and at the time of childbearing. Out of this 20% of deaths happened in India. UNICEF has estimated that in India, annually 44,000 women's die due to pregnancy complications. Preeclampsia is a pregnancy-induced hypertensive disorder characterized by high blood pressure and proteinuria after the 20th week of pregnancy. Whereas, Eclampsia is defined as the incidence of generalized seizures/convulsions and/ or unexplained coma during pregnancy or postpartum in a preeclamptic woman in the absence of other neurologic conditions. And further inter-pregnancy interval is the gap between conception of a recent pregnancy and previous pregnancy outcome. Therefore the present study is looking forward to another aspect of the preeclampsia/eclampsia. Which is a mention in the following objective.

Objective: The present study aims to examine the effect of short IPI on preeclampsia/eclampsia in India.

Data and Methods: The study uses the national representative data from the fourth round of the Indian National Family Health Survey (NFHS) conducted during 2015-16. In the calendar data, the full reproductive and contraceptive information of the women has been collected from the previous five years of the survey, and the inter-pregnancy interval was calculated from the calendar data. In the calculation of the IPI, only recent two pregnancies have been considering for the study because, in the data, only recent pregnancy-related information was available. After calculating the IPI we got 83,166 women those have at least two pregnancies information from previous five years of survey. IPI is divided into five categories (<6, 6-11, 12-23, 24-36 and >36 months). Below six months IPI has the short pregnancy interval in the study. According to the WHO criteria for assessing the occurrence of preeclampsia symptoms. Women who reported difficulty with vision during daylight, and swelling of the legs, body, or face were coded as having symptoms of preeclampsia. Although those who stated experiencing convulsions (not from fever) were coded as symptomatic of eclampsia by using preeclampsia and eclampsia we have estimated preeclampsia/eclampsia as a single variable. We used this as a representative measure of maternal health. Preeclampsia/eclampsia is the outcome variable, and IPI is the independent variable. The multivariate logistic regression was used to examine the effect of short inter-pregnancy interval on preeclampsia/eclampsia among women age 15-49 years.

Results: The finding of the present study shows in Figure 1 which is based on a study sample of 83,166 women, and their inter-pregnancy interval is categorized among a different IPI categories. 12.1% of women have less than six months IPI. However the highest percentage of women (42.4%) having IPI between 12-23 months. Moreover, 19.6%, 19.5% and 6.5% of women have IPI between 6-11 months, 24-36 months and above 36 months respectively.

Figure 1 Distribution on inter-pregnancy interval among women, India 2015-16
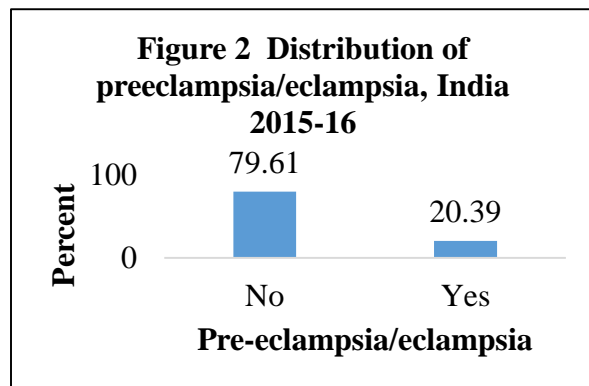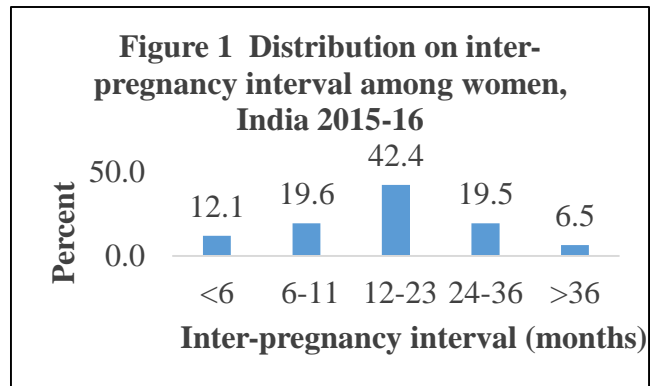
Further, Figure 2 shows the distribution of estimated preeclampsia/ eclampsia among women. About 20% of women have recorded preeclampsia/eclampsia.

Moreover, the figure 3 shows the higher percentage of preeclampsia/eclampsia occurred among women had IPI between 24 to 36 months (21.2 percent) followed by less than six months (20.9 percent) IPI and least proportion were found

Figure 2 Distribution of preeclampsia/eclampsia, India 2015-16

Figure 3 prevalence of preeclampsia/eclampsia, India 2015-16
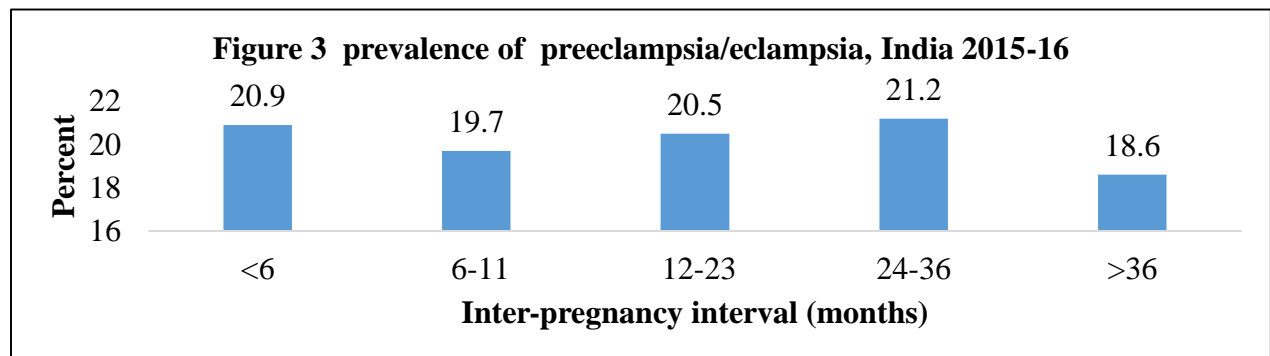
when the women had interval more than 36 months (18.6 percent).

Whereas table 1 result of multivariate logistic regression shows the odds of preeclampsia/eclampsia were less likely among all the categories of the interpregnancy interval as compared to less than six months interval when others variable remaining controlled. The odds of having preeclampsia/eclampsia were 0.90 (95% CI: 0.85-0.96) among women having IPI between 6-11 months. Moreover, odds of preeclampsia/eclampsia were 0.91 (95% CI: 0.86-0.97) among women having IPI between 12-23 months, 0.95 ; (95% CI: 0.89-1.01) among women having IPI between 24-36 months and 0.83 ; (95% CI: 0.76-0.9) among women having IPI more than 36 months and another interesting finding also shows that those women did not desire recent pregnancy among them preeclampsia/eclampsia were found 1.17; (95% CI: 1.11-1.23) more likely in comparision to those women were desire recent pregnancy.

Table 1: The odds of pre-eclampsia/eclampsia, India, NFHS-4, 2015-16

	Preeclampsia/eclampsia Odds Ratio (95% CI)
Interpregnancy interval<6®	
6-11	0.9**(0.85,0.96)
12-23	0.91***(0.86,0.97)
24-36	0.95*(0.89,1.01)
>36	0.83***(0.76,0.9)
Household level	
Place of residence Urban®	
Rural	1.17***(1.12,1.23)
Wealth quintiles Richest®	
Poorest	1.37***(1.27,1.49)
Poorer	1.23***(1.14,1.32)
Middle	1.08**(1.01,1.17)
Richer	1.05(0.97,1.13)
Religion Hindu®	
Muslim	1.32***(1.26,1.39)
Other	0.71***(0.66,0.76)
Caste Others®	
SC	1.22***(1.15,1.29)
ST	0.97(0.91,1.04)
OBC	1.22***(1.16,1.28)
Women level	
Women's age (year) 20-29®	
<20	0.93*(0.87,1)
≥30	1.02(0.98,1.07)
Women's education Higher®	
No education	0.95(0.87,1.03)
Primary	0.93*(0.85,1.01)
Secondary	0.87***(0.81,0.94)
Pregnancy wanted Yes®	
No	1.17***(1.11,1.23)
Maternal/delivery care and other interventions level	
≥4 antenatal visit Yes®	
No	1.09***(1.05,1.13)
≥2 times TT injection Yes®	
No	0.82***(0.79,0.86)
≥100 days IFA tablet/syrup Yes®	
No	1.16***(1.11,1.21)
Took intestinal parasite drug Yes®	
No	0.7***(0.67,0.73)
Constant	0.24***(0.21,0.26)

Note: ® Reference category, OR Odds Ratio, CI Class Interval, * P <0.1, ** P <0.05, *** P < 0.01, SC Scheduled caste, ST Scheduled tribe, OBC Other backward class, Women age at conception of recent pregnancy

Conclusion: The results conclude that the odds of pre-eclampsia/eclampsia reduced by 9% when the interpregnancy interval was a shift from less than six months (short) to 12-23 months interval, and it was also decreased by 17% when IPI was shifted short interval to more than 36 months interval. Therefore we can conclude that a short interpregnancy interval has more effect on preeclampsia/eclampsia in compare to their following categories. Hence there is a need for more attention to the existing policy of gap between two births. By which women's and child's life can be saved by only giving some attention.