



Association of early excessive maternal weight gain with hypertensive disease of pregnancy

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Abstract

There are many risk factors that precipitate Hypertensive Disease of Pregnancy (HDP). Management is usually done at secondary prevention level. However, aim should be to identify primary maternal modifiable risk factors, gestational weight gain being one of them. The study was done to see association between early and total excessive gestational weight gain and hypertension in pregnancy. Women were enrolled at first visit. Weight, blood pressure measurements and routine examination were done at all visits. 45 developed HDP and were considered as cases. Equal number of normotensive women were taken as controls. Weight gain at 20, 28 weeks and at delivery was noted. Early excessive and total gestational weight gain were significantly associated with HDP. Thus, weight gain in pregnancy should be kept under control. Counseling should be done regarding the benefits of appropriate weight gain during pregnancy and the potential harms of excessive weight gain.

Keywords: early onset, gestational weight gain, hypertensive disease of pregnancy

1. Introduction

HDP contributes to 12.3% of all maternal deaths [1]. It is a major contributor to fetal prematurity, too, resulting from appropriate induced delivery due to impending eclampsia, eclampsia, abruptio placentae, abnormal doppler studies, persistent severe oligohydramnios or even fetal death [2]. It is also the leading cause of fetal growth restriction [3]. The etiology of HDP still remains unclear. There are many risk factors that precipitate HDP. Management is usually done at secondary prevention level which includes early detection and screening. However, the aim should be to identify the primary maternal risk factors which are modifiable. Studies show an association between total excessive gestational weight gain and hypertension in pregnancy. However, this may be a reflection of excessive water retention associated with the pathophysiology of hypertensive disorders of pregnancy. Early excessive weight gain, prior to the third trimester, results in greater maternal fat deposition and inflammation, which has also been associated with the development of hypertension. By focusing on early excessive weight gain, the association between maternal weight gain and the development of hypertension in pregnancy could be examined. Hence, the objective of the study was to evaluate the associations between early excessive as well as total gestational weight gain with hypertensive disease of pregnancy.

2. Materials and methods

The descriptive study was done at a referral centre over six months. Approval from an Institutional Review Board was obtained. Singleton women at their first antenatal visit were included and followed till delivery. Blood pressure measurements, investigations and routine examination were done at all visits. Women with pre-existing or gestational diabetes mellitus, chronic disease were excluded from the

study.

HDP was labeled if a women with no previous history developed systolic >140mm of Hg and diastolic >90mm of Hg after 20 weeks of gestation on two readings taken 6 hrs apart. 45 women developed HDP and were considered as cases. Equal number of normotensive women were taken as controls. Early onset HDP occurred at less than 34 weeks period of gestation and late onset occurred at more than 34 weeks period of gestation.

The rate of maternal weight gain is usually slowest during the first trimester, fairly constant during the second and third trimester and slightly slower towards the end of third trimester. Institute of Medicine (IOM) 2009 recommends different range of gestational weight gain for different BMI range. Early excessive maternal weight gain was defined as weight gain/week at 28 weeks that exceeded the Institute of Medicine (IOM) guidelines based on the patient's starting BMI (normal: 0.45 kg; overweight: 0.32 kg; obese: 0.27 kg) [2]. Institute of Medicine (IOM) 2009 recommends different range of total gestational weight gain too for different BMI range. Adequate GWG for BMI <18.5 kg/m² is 12.5-18 kg., for BMI 18.5 to 24.9 kg/m² is 11.5-16 kg and for BMI 25-29.9 kg/m² is 7-11.5 kg [4]. Data collected was analysed.

3. Results and Discussion

In our study, mean maternal weight gain at 28 weeks was 6.95 ± 0.56 kg in women who later developed HDP as compared to 5.72 ± 0.42 kg in normotensives. These women had higher weight gain at 20 weeks too but then it was not statistically different. Women whose weight gain before third trimester exceeded the IOM guidelines were more likely to develop hypertension. Table 1.

Weight gain is attributed to uterus, its contents (fetus, fluid, placenta), interstitial fluid, plasma volume expansion, blood, maternal new protein and fat deposition [5]. Kazemian E *et al*

[6] also observed a slight difference in weight gain at 20 weeks which was statistically not significant but gestational weight gain (difference of weight gain before delivery and pre-conceptional weight) was found to have greater difference. Bodnar *et al.* [7] in their study noted that over-gaining weight was associated with higher rates of HDP. Hutcheon *et al.* in their study on singleton pregnant women found that higher pregnancy weight gain was associated with increased odds of preeclampsia but weight gain patterns in their study were similar in the first half of pregnancy for women with versus without preeclampsia. The weight gain trajectories of women with and without preeclampsia diverged at a later gestational age, with no significant differences at 25 weeks' gestation (0.20 kg [-0.18, 0.59]), but a difference of 0.81 kg emerging by 30 weeks, and a difference of 2.02 kg at 40 weeks [8].

Mean total gestational weight gain of women with HDP was significantly higher than the mean GWG of normotensive women. 92% of all the women who had excessive GWG developed HDP whereas 80% of all the women with inadequate GWG remained normotensive. There was statistically significant association between excess weight gain and HDP. Table 2

In our study, mean GWG in women with early onset HDP was significantly more than those with late-onset HDP (13.84±1.20 vs 12.89±0.76). Table 3

Ruhstaller *et al* observed in their study that 53.2% of women in their study had weight gain that exceeded the IOM guidelines in the first 28 weeks. Of the 10.8% who developed hypertension during pregnancy, 75% had excess gestational weight gain [9].

Table 1: Comparison of Weight Gain upto 28 Weeks in Normotensive and HDP Women

Mean ± SD(kg)	Normotensive (n=45)	HDP (n=45)
Maternal wt. gain at 20 wks (kg)	3.72 ±0.42	3.95 ± 0.56
Maternal wt. gain at 28 wks (kg)	5.72 ±0.24 kg	6.95 ± 0.32
Total Gestational wt. gain (kg)	11.89 ± 0.36	13.56 ± 0.47

Table 2: Correlation of Gestational Weight Gain with HDP

	Normotensive	HDP
	n= 45	n = 45
GWG inadeg	20	5
GWG adeq	23	17
GWG excess	2	23

Table 3: Correlation of Gestational Weight Gain with Time of Onset of HDP

	Early onset HDP	Late onset HDP
	n	n
GWG inadeg	2	3
GWG adeq	3	14
GWG excess	7	16
Mean ±SD (kg)	13.84±1.20	12.89±0.76

4. Conclusion

Early excessive maternal weight gain is independently associated with the hypertensive disorder of pregnancy. Women should be counseled regarding the benefits of achieving a normal BMI prior to pregnancy and appropriate

weight gain during pregnancy, as well as the potential harms of excessive weight gain related to HDP and the perinatal outcome.

5. References

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