Original Article

The Role of Obesity in Hypertensive Disorders Development During Pregnancy; A Comparative Analysis

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Abstract

Objective: To determine the association of maternal obesity and pregnancy induced hypertension in a tertiary care hospital, South Punjab.
Methodology: A comparative cohort study was carried out in obstetrics and gynecology department, of Nisthar Hospital Multan, Feb 2021 to Aug 2021. Pregnant women aged 18-45 years, gestational age from 9 to 40 weeks, singleton pregnancy and who have been diagnosed with or are at risk for hypertensive disorders during their pregnancy were included. Obesity was defined as (BMI > 30 kg/m²). The development of hypertensive diseases, such as gestational hypertension and pre-eclampsia, were documented using medical records and routine measurements of blood pressure during antenatal visits. All the information was entered and analyzed using SPSS version 26.
Results: overall mean age of the women was 28.33±2.41 years and mean gestational age was 31.20+2.44 weeks. According to the data, 37.9% of obese women developed pregnancy induced hypertension, compared to only 9.7% of non-obese women, with a statistically significant p-value of 0.001. Incidence of pregnancy induced hypertension was statistically insignificant basis on age and parity (p->0.05).
Conclusion: Based on study observations, obese women are at a substantially higher risk of developing Pregnancy-Induced Hypertension compared to their non-obese counterparts, with nearly four times the incidence rate observed in the obese group.
Keywords: PIH, BMI, Obesity, Pregnancy.

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Introduction

Hypertensive disorder during pregnancy is a condition that causes significant maternal, fetal, and newborn deaths and complications in developing as well as developed nations.[1] It is crucial to differentiate between pre-existing hypertension and gestational hypertension, which develops after 20 weeks of gestation and typically resolves within 6 weeks after childbirth.[1] It affects around 10% of pregnancies,[2] and around 12% of maternal deaths are linked to hypertensive disorders during pregnancy, like as the pregnancy-induced hypertension.[3]

Regardless of substantial studies, the exact cause of hypertension problems in pregnancy remains unknown.[4] It is a complex, multisystem disorder that progresses in several ways. Development of these illnesses is thought to be influenced by a mix of immunological, dietary, and genetic factors, as well as inflammation and the vascular changes.[4,5] Although, numerous studies have looked into the effects of weight increase during the pregnancy and in the period between pregnancies. In terms of hypertensive disorders, significant weight gain during pregnancy seems to be associated to an increased chance of developing pregnancy-related hypertension and the pre-eclampsia.[6,7] According to a systematic review, overweight remains an important contributory factor for hypertension during gestation, accounting for 27.8% of all determined risk factors.[8] Furthermore, abdominal obesity has been associated to an increased risk of

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arterial hypertension following pregnancy, emphasizing the long-term consequences of obesity.[9] Obesity considerably raises the probability of high blood pressure during gestation via a number of pathophysiological processes. Like obesity causes insulin resistance, exacerbating metabolic problems and promoting inflammation. Such inflammatory response is associated to vascular problems, which can lead to hypertension and preeclampsia during gestation.[10,11] Abdominal fat accumulation stimulates the renin-angiotensin-aldosterone pathway, raising renal salt reabsorption and arterial pressure.[12] It is exacerbated by the narrowing of renal structures because of the accumulation of fat. However, the women having obesity are more likely to develop preeclampsia, a severe hypertension condition, due to common pathways of oxidative stress and inflammation of the vessels.[13] Considering the limited national data on the association between maternal weight gain and PIH, the current research seeks to exploring this link in a tertiary healthcare facility in South Punjab. Assessing the influence of obesity on hypertensive complications during pregnancy is critical for improving maternal health outcomes in this region, where data is limited and the findings may differ from those in other communities. The study may helpful to improve clinical practice and educate public health efforts.

Methodology

A comparative cohort study was carried out in obstetrics and gynecology department, of Nisthar Hospital Multan. Duration of the study was 6 months from Feb 2021 to Aug 2021. Non-probability *consecutive* sampling technique was used. All the pregnant women aged 18-45 years, gestational age from 9 to 40 weeks, singleton pregnancy and who have been diagnosed with or are at risk for hypertensive disorders during their pregnancy were included. All the underweight women, chronic hypertension, renal disease, or other chronic medical disorder and who refuse to participate in the study were excluded. After obtaining written informed consent, individuals were divided into two groups depending on their BMI: obese (BMI > 30 kg/m²) and non-obese (BMI < 30 kg/m²). Obesity was determined employing pre-pregnancy BMI and current body weight measures. The collection of data included demographic information which included age, parity, and gestational age, in addition to clinical information gleaned from healthcare records and conversations with patients. The development of hypertensive diseases, such as gestational hypertension and pre-eclampsia, were documented using medical records and routine measurements of blood pressure at antenatal appointments. All the information was collected using study proforma and analysis was done using SPSS version 26.

Results

The study sample included 206 pregnant women, with the majority (55.3%) aged between 25 and 30 years and the rest 44.7% aged 31 to 40 years. In terms of parity, the majority of women (73.3%) had one or two previous births, while 16.5% had three or four. A lesser percentage was nulliparous (4.9%) or had more than four previous births (5.3%). The average age of participants was 28.33±2.41 years, and the average gestational age at data collection was 31.20±2.44 weeks. Table I

Table I: Demographic information of the patients. (n=206)

Variables		Frequency	Percent
Age groups	25-30 years	114	55.3%
	31-40 years	92	44.7%
Parity	Nulliparous	10	4.9%
	Parity 1-2	151	73.3%
	Parity 3-4	34	16.5%
	Parity >4	11	5.3%
	Total	206	100.0%
Mean age		28.33±2.41 years	
Mean gestational age		31.20+2.44 weeks	

According to the data, 37.9% of obese women developed PIH, compared to only 9.7% of non-obese women, with a statistically significant p-value of 0.001. Table II

Table II. Incidence of PIH among obese and non-obese women. (n=206)

PIH	Study groups		Total	p-value
	Obese	Non-obese		
Yes	39	10	49	0.001
	37.9%	9.7%	23.8%	
No	64	93	157	
	62.1%	90.3%	76.2%	
Total	103	103	206	
	100.0%	100.0%	100.0%	

Furthermore, the incidence of pregnancy induced hypertension was statistically insignificant basis on age and parity (p->0.05). Table III

Discussion

Obesity has become a global pandemic, carrying significant economic, social and medical, consequences.[14] Several studies suggest a causal link

Table III: Incidence of PIH according to age groups and parity. (n=206)

Variables		PIH		Total	p-value
		Yes	No		
Age group	25-30 years	27	87	114	0.969
		55.1%	55.4%	55.3%	
	25-30 years	22	70	92	
		44.9%	44.6%	44.7%	
Parity	Nulliparous	4	6	10	0.305
		8.2%	3.8%	4.9%	
	Parity 1-2	38	113	151	
		77.6%	72.0%	73.3%	
	Parity 3-4	6	28	34	
		12.2%	17.8%	16.5%	
	Parity >4	1	10	11	
		2.0%	6.4%	5.3%	

between being overweight or obese and an increased risk of adverse pregnancy outcomes,[14,15] including macrosomia, gestational diabetes, hypertension and preeclampsia. This study included 206 pregnant women, with the majority (55.3%) aged between 25 and 30 years with an overall mean age of 28.33±2.41 years and average gestational age of 31.20±2.44 weeks, to evaluate the association of maternal obesity and pregnancy induced hypertension. In aligns to this study Senbanjo OC et al[14] reported that the mean of the women was 30.9 ± 4.2 years. In the study by Islam S et al[15] mean age of the obese pregnant women was 28.87+3.92 years and average gestational age was 37.48 + 2.47 weeks. In the comparison of this study Hanif S et al[16] reported that the overall average age was 28.67 ± 3.30 years and average gestational age was 37.11±1.64 weeks. The average age of obese women with hypertension is approximately 30 years, which can be explained by a variety of variables, including the fact that this age group is frequently connected with the peak of reproductive activity, when women are the most likely to become pregnant.

In this study, according to the data, 37.9% of obese women developed PIH, compared to only 9.7% of non-obese women, with a statistically significant p-value of 0.001. Furthermore, the incidence of pregnancy-induced hypertension was not statistically significant based on age and parity ($p > 0.05$). These findings were supported by the Hanif S et al[16] where rates of preeclampsia and eclampsia were significantly higher among obese women compared to those with normal weight, with preeclampsia occurring at 30.9% versus 14.5% and eclampsia at 21.8% versus 7.3%, respectively. According to another study by Machado C et al[18] the overweight and obese groups exhibited a higher incidence of gestational hypertension with rates of 4.0% and 8.5% respectively compared to those with normal weight 2.1%. In aligns to this series Rafiq T et al[19] reported that the preeclampsia occurred with an higher incidence of 43.33% in the primigravida obese group and compared to the primigravida non-obese group 13.33%. Furthermore, numerous studies have explored the systemic impacts of obesity, its contribution to various comorbidities, and the influence of a high BMI on death rate.[20,21] This study explored that the obesity is a significant risk factor for PIH, while also observed as the potential biomarkers that could predict the onset and progression of pre-eclampsia in overweight mothers compared to those of normal weight. However, due to several study limitations, the findings cannot be considered definitive. To obtain more accurate results, further large-scale local studies are recommended. Additionally, it is important to closely monitor obese women during antenatal visits to reduce the associated morbidity and mortality.

Conclusion

Pregnancy-Induced Hypertension compared to their non-obese counterparts, with nearly four times the incidence rate observed in the obese group. The findings of the study underscore not just the essential need for successful weight-control techniques before and during pregnancy, but additionally the importance of timely screening and close monitoring of obese women during pregnancy. Regarding the strong link between PIH and the obesity, healthcare practitioners should emphasize interventions to reduce obesity linked risks and enhance the outcome of pregnancy. Moreover, further additional studies recommended investigating potential preventive interventions and learning more about the fundamental mechanisms linked obesity to hypertension problems during pregnancy.

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