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Abstract

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This descriptive case series was conducted at the Gynaecology & Obstetrics Department from December 2023 to June 2024.

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PIH was present in 14.7% of cases. No significant association was noted between maternal age, gravidity, parity, and gestational age with PIH.

Younger maternal age is the other important risk factor for PIH.

Keywords: Pregnancy-Induced Hypertension, Teenage Pregnancy, Prevalence

Authors:

Zulfiqar Ali Khan: Assistant Professor, Head of Department, Department of Obstetrics Gynecology Swat Medical College and Allied Teaching Hospitals Saidu Shareef Swat, KP, Pakistan.

Salma Bibi: (Coprrespondant author)

MPhil Scholar, Department of Biochemistry Abdul Wali Khan University Mardan, KP, Pakistan.

(Email: bibisalma7393@gmail.com)

Shumaila Khawaja Khail: Assistant professor, Department of Obstetrics Gynecology, Swat Medical College and Allied Teaching Hospitals Saidu Shareef Swat, KP, Pakistan.

Usman Irfan Shukr: House Officer, Fauji Foundation Hospital Rawalpindi, Punjab, Pakistan.

Roomana Khawaja Khail: Consultant Cardiologist, Hayath Abad Medical Complex, Peshawar, KP, Pakistan.

Muhammad Sohail Khan: Consultant, Jinnah Medical College, Peshawar, KP, Pakistan.

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This descriptive case series was conducted at the Gynaecology & Obstetrics Department from December 2023 to June 2024.

A total of 163 pregnant women in the age range of 10-19 years with a gestation age of more than 20 weeks were enrolled in the study. PIH was diagnosed if blood pressure was ≥140/90 mmHg on at least two occasions. The participants were followed at different stages of pregnancy. Data analysis was done using SPSS-17 and Chi-square tests, where a p-value ≤0.05 was considered significant.

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Authors:

Zulfiqar Ali Khan: Assistant Professor, Head of Department, Department of Obstetrics Gynecology Swat Medical College and Allied Teaching Hospitals Saidu Shareef Swat, KP, Pakistan.

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(Email: bibisalma7393@gmail.com)

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Contents

Introduction

Teenage pregnancy is an essential issue of public health, especially in places with the unavailability of social support and proper care for the mother. According to the World Health Organization, adolescence is the age range from 10 to 19 years from childhood to adulthood. During these years, there are remarkable changes in the physical, psychological, and social dimensions of a person's life Bhattacharya, M. (2004). Teenage pregnancy is a common public health issue across the world and has very important medical implications. Poor maternal nutrition, stress, biological immaturity, insufficient care during the perinatal period, and unplanned pregnancies lead to adverse outcomes from an obstetric and neonatal standpoint in adolescents.

It has been associated with enhanced risks of adverse reproductive outcomes such as early neonatal death, maternal mortality, and anemia (Gilbert et al., 2004). Maternal anemia especially when diagnosed before mid-pregnancy has been observed to be related to pre-term delivery Gulrukh, Q. (2001). Pregnancy-induced hypertension, especially its more severe forms has significantly been related to increased perinatal and maternal morbidity (Hauth, 2000), although less directly to perinatal mortality, in comparison (Knuist et al., 1998). High levels of perinatal mortality have been found in women suffering from proteinuria preeclampsia, putting them at very high risk; the seriousness of PIH complications 9.

With a lot of research being done on PIH within hospitals in Pakistan, little attention has been paid to its specific incidence within teenage pregnancies (Mohanty et al., 2006). This paper aims to evaluate the incidence of PIH in teenage pregnancies within a tertiary care setting and assess the burden of this condition in Pakistan.

Literature Review

PIH poses significant threats not only to maternal but also to neonatal health and, therefore, is an important health problem, particularly in adolescent pregnancies. Adolescent pregnancies pose unique medical and sociological challenges, and PIH stands out among the most serious complications. Through this review, an attempt was made to summarize existing literature on the connection between teenage pregnancies and high risks for PIH, finding factors that contribute to its origination and the overall health effects.

Globally, the risks of adverse maternal outcomes like PIH, preeclampsia, and eclampsia are higher in adolescent pregnancies. According to WHO, young teenagers under 20 years of age are at increased risk due to biological immaturity, inappropriate prenatal care, and low levels of nutrition, which increases the risk of the development of PIH during pregnancy (World Health Organization, 2018). The physiological immaturity of teen-age mothers means their bodies may not respond to the demands of pregnancy properly, thus the chances of complications are high like PIH (Chen et al. 2007).

PIH is characterized by blood pressure elevation above 20 weeks of gestation. The consequences of this can be very adverse to the well-being of the mother and the fetus. Studies have consistently proven that younger maternal age has been one of the predictable risk factors for hypertensive disorders during pregnancy. Bhattacharya (2004) was one of the recent studies that stated teenage pregnancies to be a high-risk group for developing PIH. Lack of access to proper health care and late antenatal care is contributing largely to such conditions. PIH often goes undetected and untreated and subsequently results in complications like preeclampsia and eclampsia. A systematic review by Ayele et al. (2016) also has reported that the risk of PIH was increased in connection with adolescent pregnancies, thereby establishing a need for early medical interventions.

Early marriages, adolescent pregnancy, and then teenage mothers are most vulnerable in Pakistan because healthcare infrastructures are lacking in rural areas and these factors are found most frequently in females undergoing early marriages, adolescent pregnancy, and eventually becoming teenage mothers. Yadav et al. (2014) observed in their study that young pregnant women hardly ever reach resource-scarce settings for prenatal services, which may lead to delaying proper diagnosis and management of PIH thereby resulting in adverse outcomes such as maternal and neonatal mortality. Teenagers in such areas also have social and cultural restrictions, such as poor educational standards and liberty, which keep them away from proper medical care at the right moment (Qureshi et al., 2016).

Maternal age, parity, and gravidity were studied through sociodemographic factors. There has been some evidence found that among these teenagers, younger maternal age is strongly associated with PIH, yet other works deny the existence of relevant and meaningful associations. For example, Magee et al. (2014) pointed out that although maternal age younger than 20 years carries the risk for PIH, in most cases, factors such as parity and gravidity do not show significant correlations. This might be due to variation in populations selected in different studies combined with disparity in healthcare settings where the research was carried out and with the particular sociocultural context of those places.

In conclusion, current literature suggests the need for early and consistent prenatal care in reducing the risks of PIH associated with teenage pregnancies. Although risks of developing PIH are indeed higher among adolescent mothers attributable to a combination of biological, social, and healthcare-related factors, the determinants of these hypertensive disorders can be remarkably attenuated with medical interventions. Future studies should involve larger and more diverse populations to better establish the risk

factors for PIH in adolescent pregnancies, especially in resource-poor countries like Pakistan, where access to healthcare continues to be a challenge.

Materials and Methods

This was a Descriptive case series carried out at the Department of Gynaecology & Obstetrics from December 2023 to June 2024. Using the WHO Calculator, the sample size was determined based on an assumed PIH prevalence of 12%, a 95% confidence level, and a precision requirement of 5%. A total of 163 pregnant teenage women, aged 10–19 years, with a gestational age of 20 weeks or more, were included. Pregnancies were confirmed to be singleton via ultrasound, and women with major illnesses such as diabetes, chronic hypertension, or renal disease were excluded Parmar et al., 2012).

PIH was diagnosed based on clinical examination, and blood pressure was measured using a calibrated sphygmomanometer. A BP reading of 140/90 mm Hg or more, recorded on two or more occasions, was considered hypertensive (Scholl & Reilly, 2000). Patients were followed at various stages of pregnancy, including at 24, 28, 34, 36, and 38 weeks, until delivery. Data was recorded on pre-designed forms and analyzed using SPSS-17. Chi-square tests were applied for post-stratification, with $p \leq 0.05$ considered significant.

Study Results

The mean maternal age was 16.53±1.94 years, and the average gestational age was 31.17±3.52 weeks. A total of 49 women were aged 15 years or younger, while the remaining 114 were older than 15 years. Of the total, 113 women had a gravidity of 3 or less, while 50 had a gravidity of more than 3. PIH was observed in 24 women (14.7%). Among those with PIH, the mean age was 16.46±2.14 years, and the mean gestational age was 30.83±3.26 weeks. No statistically significant relationship was found between maternal age, gravidity, parity, or gestational age with the occurrence of PIH.

Table 1 provides a summary of the socio-demographic characteristics of the study participants. The average maternal age was 16.53 years, with a standard deviation of 1.94 years. When stratified by age, women aged 15 years or younger had an average age of 14.06 years, while those older than 15 years had a mean age of 17.59 years. Additionally, the average number of pregnancies (gravidity) was 2.80, and the average number of deliveries (parity) was 3.03. The mean gestational age of the participants was 31.17 weeks, with women in earlier stages of pregnancy (≤30 weeks) averaging 28.01 weeks and those later in pregnancy (>30 weeks) averaging 33.72 weeks. The 95% Confidence Interval (CI) for each parameter shows the range in which the true values are likely to lie, providing a sense of variability within the data.

Table 1

Socio-demographic Parameters

Parameter	Mean ± SD	95% CI (LB - UB)
Maternal Age	16.53±1.94	16.23 – 16.83
≤ 15 years	14.06±1.16	13.73 – 14.40
> 15 years	17.59±1.04	17.39 – 17.78
Parity	3.03±1.44	2.81 – 3.25
Gravidity	2.80±1.44	2.58 – 3.03
Gestational Age	31.17±3.52	30.62 – 31.71
≤ 30 weeks	28.01±2.11	27.52 – 28.51
> 30 weeks	33.72±2.06	33.29 – 34.16

Table 2 presents the frequency distribution of blood pressure levels and pregnancy-induced hypertension (PIH) in the study population. A nearly even split was observed in the blood pressure readings, with 51.5% of the women having normal blood pressure (≤140/90 mmHg), while 48.5% exhibited elevated readings (>140/90 mmHg). Among the women studied, 14.7% developed PIH, while 85.3% did not. This indicates that while a significant portion of the participants had elevated blood pressure, the proportion that developed PIH was smaller.

Table 2

Frequency of Blood Pressure and Pregnancy-Induced Hypertension

Parameter	Frequency	Percentage (%)
Blood Pressure ≤ 140/90 mmHg	84	51.5
Blood Pressure > 140/90 mmHg	79	48.5
Pregnancy Induced Hypertension (Yes)	24	14.7
Pregnancy Induced Hypertension (No)	139	85.3

Table 3 shows the stratification of pregnancy-induced hypertension based on maternal age, gravidity, and gestational age. Among women aged 15 or younger, 9 out of 49 developed PIH, while the majority (40 women) did not. For women older than 15 years, 15 out of 114 developed PIH, with 99 showing no signs of hypertension. When considering gravidity, those with three or fewer pregnancies had a higher incidence of PIH (17 cases), while those with more than three pregnancies exhibited a lower incidence (7 cases). Lastly, the stratification by gestational age shows a similar distribution of PIH, with 11 cases occurring in women with gestational ages of 30 weeks or fewer, and 13 cases in those with gestational ages beyond 30 weeks.

Table 3

Stratification of Pregnancy-Induced Hypertension by Age, Gestational Age, and Gravidity

Parameter	PIH (Yes)	PIH (No)	Total	P-value
Age ≤ 15 years	9	40	49	0.389
Age > 15 years	15	99	114	0.389
Gravidity ≤ 3	17	96	113	0.862
Gravidity > 3	7	43	50	0.862
Gestational Age ≤ 30 weeks	11	62	73	0.911
Gestational Age > 30 weeks	13	77	90	0.911

Discussion

Managing pregnancy-induced hypertension (PIH) and preeclampsia presents significant challenges, particularly in resource-constrained settings where access to prenatal care may be limited. This study adds to the growing body of literature indicating that teenage pregnancies are associated with a higher risk of PIH. Previous studies have demonstrated that a significant proportion of PIH cases occur in women under the age of 20 Sudarsan, S., et al. (2002). The results concurred with studies that show gestational hypertension affects between 2% to 4% of multiparity women and 6% to 17% of healthy nulliparous women (Sultana et al., 2012).

Early onset PIH-a condition that, in most cases, is related to more severe preeclampsia-typically occurs after the 20th week of gestation. Teenage pregnancies are at higher risk for PIH based on factors such as biological immaturity, low nutritional status, and stress 16. Sociological challenges encompass limited access to healthcare services, weak health literacy, and inadequate prenatal care.

The literature reflects that the chances of PIH are increased among teenagers, particularly in a resource-poor setup. According to a previous study, teenage pregnancies have in general resulted in deprivation of antenatal care, likely to result in undiagnosed or untreated PIH (Bhattacharya 2004). This is reflected in other findings where the main risk factors for PIH include obesity, a family history of hypertension, and poor access to healthcare World Health Organization. (2006).

The study also discovered that no significant relationship exists in maternal age, parity, and gravidity in relation to the development of PIH. Indeed, other studies have also stated that none of them are significant predictors of PIH as they do not consider maternal age, parity, and gravidity (13, 16). Although this is a reality, it must not be forgotten that teenage pregnancies are more prone to complications, including

PIH, due to the general lack of access to health services and the earlier beginnings of reproductive activity.

The hospital-based results of this study are of importance to healthcare providers and policymakers, indicating that teenagers at an increased risk for PIH and associated severities of maternal and perinatal outcomes might be essential in devising health strategies that can improve maternal health. Teenage mothers require early and frequent prenatal care to monitor blood pressure and detect potential complications before they become alarming.

However, there were several limitations to the study. The sample was small and based on a single center wherein results cannot be generalized for a large population. Future studies must work on large populations coming from more diverse backgrounds in order to establish a stronger statistical correlation of PIH with teen pregnancies. Socio-demographic factors including health care access and education should also be studied to add to gaining a much more detailed perspective of risk factors for PIH in teen pregnancies.

Recommendations

In view of the findings of this study, henceforth regarding the prevalence of pregnancy-induced hypertension among teenage pregnancies, several imperative recommendations could be made for the enhancement of maternal health outcomes and reduced incidence of hypertensive disorders during pregnancy. This must consist of health interventions, education, and policy reforms in resource-limited settings where most teenage pregnancies are found to occur.

Comprehensive Prenatal Care Programs: Early and regular prenatal care would diagnose and monitor PIH, especially in the context of teenage pregnancies. Systems of health should also back a broad prenatal care profile that focuses on early antenatal diagnosis and monitoring of PIH, among other complications. Blood pressure measurement should be incorporated as part of routine prenatal care programs with educational outreach regarding the potential benefits to accrue from regular prenatal check-ups. Only then can the risks of PIH be reduced when pregnant teenagers are given easily accessible, regular, and high-quality care.

Community-Based Health Education: Many teenage mothers are ignorant of the risks associated with PIH and other pregnancy complications. Efforts targeted towards community health education should be taken to raise awareness concerning the importance of early detection of pregnancy, the danger of PIH, and medical care sooner in time. Health providers are better placed to mobilize and educate the rural areas where initial marriage and teenage pregnancies have occurred. Equipped with information, young women will be on time to seek care before their delivery and from there, prevent such instances.

Policy Reforms Aimed at Teenage Pregnancy Govts should enact policies that decrease the rate of teenage pregnancies. Most of these pregnancies are associated with undesirable pregnancy outcomes such as PIH for the mother. The policies would entail sexual education in schools, reproductive health services, and laws criminalizing early marriages. The policymakers ought to embrace cooperation with health care and learning institutions to ensure that teenagers are adequately informed about reproductive health and risks associated with pregnancies before reaching the age.

Reinforcement of the Rural Health Infrastructure The study reveals the vulnerabilities of teenage mothers in low-resource settings with relatively less developed healthcare provisions. Investments by the government and nongovernmental agencies must therefore be channeled into the reinforcement of rural and underserved health service infrastructure. In this regard, training on the management of hypertensive disorder for health professionals and adequate availability of medical equipment, such as blood pressure monitoring apparatus, should be availed.

Research into the causes, prevalence, and management of PIH in teenage pregnancies should be continued. The collection of data on maternal health, mainly for the rural setup, has a lot of significance in that it helps understand trends of health problems and thus improves health strategies. Investigations to determine other factors could be carried out on larger populations in the future. Such factors including socio-economic status and education could be influencing factors in PIH.

Conclusion

This research concludes that young maternal age is one of the major risk factors for PIH. Regions where early marriage and teenage pregnancies are prevalent occur, predominantly in rural settings, where the prevalence of PIH is also particularly high among the younger reproductive age groups. There is a need to access better health care and sensitization as a means to mitigate some of the risks associated with PIH in teenage pregnancies.

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