

Original Research Paper

A Study on Age at Menarche with its Relation To Pregnancy Induced Hypertension

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Abstract

It is a well-established fact that the age at which a girl should attain menarche is dependent not only on hormonal factors of that particular female but a number of genetic, nutritional as well as environmental factors play significant role in the age of onset of the event. Often in our clinical set-up, we observe the similar age of onset of menstruation among girls of the same family. Now in this cross-sectional observational study with a study population of 260 pregnant women of varying age groups, we try to make an attempt to establish a relationship between the age at Menarche of this randomly selected study population with incidence of Pregnancy Induced Hypertension in the same population, though it is a well-known fact that all the three entity pregnancy induced hypertension, preeclampsia & eclampsia have a multi factorial etiology. It has been found out from the present study that there is a statistically significant association between menarche at an early age with occurrence of pregnancy induced hypertension especially in cases of the primigravida.

Key Words: Hypertension, Menarche, Multigravida, Pregnancy, Primigravida

Introduction:

Motherhood is bliss to the mankind since ages. To become a mother has been a dream come true to women. A child born brings new hope and happiness to the concerned family. But he or she is also the future of the country and the community.

So the health of the mother and the new born has remained an important parameter of the health status of each and every state. The balancing act of motherhood and a career, and being a wife, is something that I don't think I'll ever perfect, but I love the challenge of it. (Kerri Walsh) [1] However in the present era, with the development of civilization, and progress of science the working women population has increased in number.

We have seen due to career and job related constraints the age of first pregnancy is on the rise for most working women. We all know that pregnancy in elderly women is associated with a number of risk factors one of which is PIH. And in the present times we find a lot of mothers face this clinical problem which if not effectively managed poses a significant threat to the life of both mother and the child.

Menarche is the first onset of the menstruation in a girl. It is actually regarded as a girl's transition to womanhood. A number of genetic, nutritional as well as environmental factors play significant role in the age of onset of the event. Also the event has immense importance in the future reproductive as well as health status of the woman in days to come.

Two of the biggest physical milestones in a woman's life are menarche (pronounced "MEN-ar-kee"), the first menstrual period in girls, and menopause, when menstruation stops and female reproductive hormones slow. These milestones are universal and mark the beginning and end of a woman's reproductive cycle. [2]

Pregnancy-induced hypertension (PIH) is a form of high blood pressure in pregnancy. It occurs in about 7 to 10 percent of all pregnancies. [3]

Pregnancy-induced hypertension is also called toxemia or preeclampsia. It occurs most often in young women with a first pregnancy. It is

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DOR: 06.05.2014 DOA: 28.10.2014

more common in twin pregnancies, and in women who had PIH in a previous pregnancy.

In some foreign countries celebrating onset of the menstrual period has become a custom of the girls' transition into womanhood by offering gifts or lucky charms.

However in India due to strong conservative social norms this is not commonly observed. In most states of India the tradition goes as such that the mother or any senior woman member explains the events to the girl.

Barring a few exceptions the age of menarche is remembered by the girl throughout.

It has been found that that nearly all girls in the US menstruate by the age of 14, with the median age around 12 and one-half years.

These numbers haven't really changed over the last few decades, although girls today may show signs of puberty (breast growth and pubic hair display) at a younger age. The average age of menarche can vary by ethnicity, though, and African-American girls typically start menstruating before girls of European descent. [2]

Our study focuses on the common link between pregnancy induced hypertension with the age of onset of menarche as well as age of first pregnancy. Both early and delayed menarches have been associated with increased cardiovascular disease (CVD) risk factors (including metabolic syndrome) and disease in adolescent girls and young women. [1, 5–9] Furthermore, women with long and irregular menstrual cycles have been shown to have higher risk for CVD and type-2 diabetes. [7, 9, 10]

Materials and Methods:

This is a cross-sectional observational study conducted by gathering data from a number of pregnant women recorded as booked cases at different hospitals in Kolkata, West Bengal via Recall-Method & Analysis of the Hospital Documents provided by the study population.

The study population consists of 260 pregnant women selected randomly from pregnant women admitted for delivery in different Hospitals in Kolkata, West Bengal in a time period of March, 2013 to August, 2013. Among these 260 women, 155 are primigravida & the remaining 105 multigravida.

Data regarding age at menarche were assembled from the hospital records, mainly the BHT (Bed Head Ticket) available blood reports & OPD ticket (wherever available).

They ascertained that they were not taking any contraceptive precautions & never

took Oral Contraceptive Pills for any other purpose. There is no prior history of any abortions, still birth or intra-uterine fetal deaths in the study group. Their blood test reports revealed a healthy Hb% of > 11 mg% at different stages of their pregnancy with no other sings of any abnormality regarding Lipid Profile, Complete Hemogram, Blood Urea Nitrogen levels, Protein levels or Blood Sugar levels. The routine urine tests were within normal limit in each of the 260 patients as noticed from the documents provided.

Regarding analysis of the collected data ratios & proportions were used to interpret & compare the relationship. Tables & Bar Diagrams depict a comprehensive way of determining the relationship between the age at menarche with incidence of PIH.

Inclusion & Exclusion Criteria:

The major risk factors to be exclude includes, previous history of eclampsia, diabetes, proteinuria, chronic hypertension, renal disease, hypothyroidism, anemia. Only those records were included whose blood test reports revealed a healthy Hb% of > 11 mg% at different stages of their pregnancy with no other sings of any abnormality regarding Lipid Profile, Complete Hemogram, Blood Urea Nitrogen levels, Protein levels or Blood Sugar levels. The routine urine tests were within normal limit in each of the 260 patients as noticed from the documents provided.

Regarding exclusion, those records which showed history of accidental pregnancy despite use of oral contraceptive pills or other contraceptive procedures are excluded. Cases with prior history of any abortions, still birth or intra-uterine fetal deaths were also excluded.

Results:

Amongst the study population about 57.7% had their age at menarche within the range of 12-14 years, followed by 26.9% in the interval of 14-16 years & rest 15.4% population in the interval of 10-12 years. (Table 1)

The lowest age at menarche in the described study population is as early as 10 years (in case of 10 women) & in other 10 women the age of first menstrual bleeding was 15 years, which is the highest age in the study population. The mean age however was 12.7 years for menarche. In the majority of the population, in about 95 women out of this 260 this age was 13 years. (Table 2)

As per the age distribution of the population (Table 3) the women (primigravida & multigravida) in the age group 25-30 years have

the maximum incidence of PIH in their present as well as past pregnancies.

Interestingly the age at menarche within this age group of population ranges from as low as 11 years to a maximum of 14 years with majority having 13 years followed by 11 years, thus depicting a trend of PIH in women with early onset of menstruation.

As in case of Age at First pregnancy the multigravida women of age at first pregnancy in 18-20 years range have less incidence of PIH in their present pregnancy compared to their past pregnancy (es), while it is reversed in women who had first conception in the age group of 20-22 years. Whilst in case of primigravida mothers, the women with first pregnancy in the age range of 24-26 years have maximum incidence of PIH. (Table 4) In a Seattle based study it has been shown that early onset of menarche is associated with an increased risk of preeclampsia and pre-pregnancy weight modifies associations of cycle length with risk of preeclampsia. [10]

Now, again coming back to the age at menarche, primi mothers with age at menarche in the range 12-14 years have maximum incidence of PIH compared to other age ranges of first menstruation.

On the other hand, in case of multigravida mothers the range of 14-16 years has maximum incidence of PIH. (Tables 5A & 5B) Finally, this study clearly depicts the higher incidence of PIH in primigravida mothers having menarche between 12-14 years, however in case of multigravida mothers there is a steady increase in incidence of PIH in their first pregnancy in the menarche age range of 10-12 years, 12-14 years & 14-16 years. (Fig. 1)

Discussion:

In the study group the mean age of menarche was 12.7 years and majority of the population the age of menarche was 13 years.

So our study findings is similar to the data obtained from the US based study which shows that medium age of menarche for US base girls is 12.5 years. [2]

The early age of menarche is seen to be associated with pregnancy induced hypertension. We have found a similar result in the study carried out in Swedish medical centre Seattle where an inverse relationship between age at menarche and increased risk of preeclampsia was established. [2]

Primigravida in the age range of 12-14 years of age at the onset of menarche have been shown to have maximum incidence of pregnancy induced hypertension.

As per observation from other studies young women in first pregnancy and more so in twin pregnancies the incidences of pregnancy induced hypertension is more.

Multigravida mothers in the age range of 14 -16 years of age of menarche has higher incidence of pregnancy induced hypertension. A Karachi based study conducted on 1000 pregnant women showed that pregnancy induced hypertension incidence is more among the primigravida. The next most susceptible group is the elderly multigravida. [12] So our study also corroborated with the finding of Karachi based study.

Another Pakistan based study also concludes that Primigravida, previous pre-eclampsia, diabetes mellitus, chronic hypertension, obesity and large placenta are major risk factors of PIH. HELLP, convulsions and pulmonary edema were recorded as major complication of PIH. [13]

Analysis:

Early age at menarche is evidently common in the study population. With that it is also to be noticed, the incidence of PIH is relatively higher in the population with menarche age range 10-12 years & 12-14 years, though there is a reciprocal variation of incidence of PIH in cases of Primigravida & Multigravida having those age groups of menarche as mentioned earlier. With extremes of menarche age PIH is commoner with more evidence of multigravida mothers. This certainly bears a socio-cultural relevance.

With advancing birth order but comparatively later age range of menarche (14-16 years) there is comparative increase in incidence of PIH (occurrence of PIH in more than one pregnancy in a woman and more incidence of PIH in their first pregnancy). However in primi-mothers maximum incidence of PIH is in the menarche range of 12-14 years.

Conclusion:

Majority of the contributing factors of PIH were set as exclusion criteria for the study population to compare the genetic input in relating the age at menarche & PIH. It is clearly evident from this study that with comparatively earlier age at menarche there is also comparatively higher incidence of PIH.

If we consider birth order then Primigravida females have higher incidence of PIH with earlier age at menarche, while multigravida mothers have it in reverse order.

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Table 2: Variations in Age at Menarche

Parameters	Age (years)	
Lowest Age at Menarche	10	
Highest Age at Menarche	15	
Central Tendencies	Mean	12.7
	Median	13
	Mode	13

Table 3: Relation of Age Distribution in the Population with PIH (n=260)

Age of the Population (years)	H/O PIH in at least 1 of the previous pregnancies*	Active PIH*	Both*
<18	0	0	0
18 – 20	0	1.9	0
20 – 25	3.8	9.6	0
25 – 30	11.5	17.3	5.7
30 – 35	1.9	0	0
≥35	0	0	0

* given in % values

Table 4: Relation of Age at First Pregnancy with PIH (n=260)

Age at First Pregnancy (years)	H/O PIH in at least 1 of the previous pregnancies*	Active PIH*	Both*
<18	0	0	0
18 – 20	3.8	1.9	0
20 – 22	5.8	7.7	0
22 – 24	7.7	5.8	5.8
24 – 26	0	9.6	0
26 – 28	0	1.9	0
28 – 30	0	1.9	0
≥ 30	0	0	0

* given in % values

Fig. 1: Comparison of PIH at First Pregnancy as per Age at Menarche (n=85*)

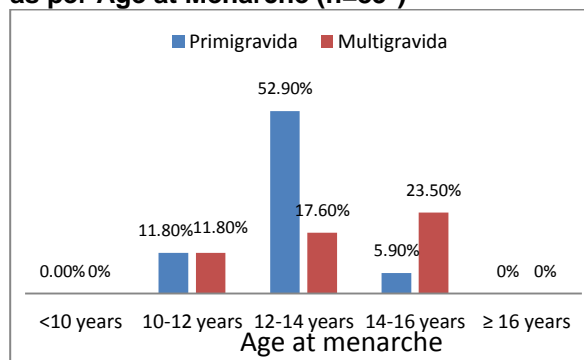


Table 1: Age at Menarche of the Study Population (n= 260)

Age at Menarche (yrs)	% population
< 10	0
10 – 12	15.4
12 – 14	57.7
14 – 16	26.9
≥ 16	0

Table 5A: Relation of Age at Menarche with incidence of PIH in Primigravida (n=155)

Age at Menarche (years)	Active PIH (in %)
<10	0
10 – 12	6.5
12 – 14	32.3
14 – 16	0
≥ 16	0

Table 5B: Relation of Age at Menarche with incidence of PIH in Multigravida (n=105)

Age at Menarche (yrs)	H/O PIH (%)	Active PIH (%)	Both (%)
<10	0	0	0
10 – 12	9.5	0	0
12 – 14	14.3	4.8	4.8
14 – 16	19.0	9.5	9.5
≥ 16	0	0	0