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Identification of preterm birth risk factors and appraisal of role of clinical pharmacist in preventing preterm births -a prospective interventional study

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Abstract

Background: Preterm birth is the leading cause of newborns deaths and second leading cause of the death in the children under five years old. It is continued to be a major cause of prenatal and neonatal morbidity. The aim of the present study was to identify the maternal risk factors associated with the preterm birth in the tertiary care hospital, a major target for obstetric health care.

Methods : A prospective- interventional study was conducted in the department of gynaecology during the period of November 2020- April 2021. Women who delivered a preterm baby (26-37 weeks gestation) were included in this study. Patients signed up into the study were put through a detailed history with respect to age, parity, previous pregnancy outcomes and other medical disorders ,including presence of GDH, PIH, anemia, infections to identify the presence of any risk factors in the pregnancy.

Results : The study showed the incidence of preterm to be 7.81%. The maximum number of cases belonged to maternal age group of 18-34 years and the mothers with consanguineous marriage. Around 26% of the women presents with PIH and 21% of women with history of abortions as a risk factor. The other major risk factors found to be associated to preterm labour are hypertensive disorders of pregnancy like preeclampsia, eclampsia , GDM, anemia, APH, polyhydraminos, oligohydraminos, mother own h/o PTB, psychological stress.

Conclusion : The commonest risk factor was pregnancy induced hypertension , followed by maternal history of abortions and consanguineous marriage. The other significant risk factors include eclampsia, preeclampsia, oligohydraminos, polyhydraminos, antepartum hemorrhage, leakage of amniotic fluid, mothers own history of prematurity, inadequate antenatal care, psychological stress.

Keywords: preterm birth, risk factors, consanguineous marriage, pregnancy induced hypertensive disorders, antepartum hemorrhage.

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Introduction

The World Health Organization (WHO) defined the premature birth or preterm birth (PTB) as birth

occurring after 20 weeks and before 37 weeks of gestation [1]. It is subdivided into extremely preterm (<28 weeks), very preterm (28-<32 weeks) and moderate preterm (32-<37) completed weeks of gestation [2]. Regardless of decades of research, PTB remains a major obstetric healthcare problem of worldwide significance. Preterm birth is the most important factor influencing neonatal morbidity and mortality [3]. Preterm birth can be the final result of multiple pathways. In some women, labor begins early for reasons such as multiple pregnancy or infection, or for no apparent reason. Some other women present with prelabor rupture of membranes (PROM), leakage of

amniotic fluid. The health of the mother or the fetus often leads physicians to induce labor early. A fourth group of infants are born after 37 weeks, but they are low birth weight. (i.e., the baby weighs less than 2500 grams or 5 pounds, 8 ounces) [4]. A great number of risk factors for premature births have been identified including hypertension, diabetes, prior history of PTBs, underweight mothers, obesity, smoking, drug abuse, infection, maternal age, genetics, twin gestation, and birth interval less than 18 months. Still, little is known about the interplay of these factors and other environmental and social factors in the causation of PTBs and in the majority of PTBs risk factors remain unexplained [5]. The leading causes of neonatal mortality the preterm birth and its long term neurologic and developmental problems which includes cerebral palsy, bronchopulmonary dysplasia, retinopathy of prematurity, and many other morbidities that come with the prematurity. Globally, 13 million babies are born preterm yearly. Generally low and middle income countries has the highest rates, and increasing in some middle and high income countries..India has the highest number of deaths due to PTBs accounting for 35% of neonatal deaths and ranks 36th globally [6]. The highest rates occurred in Africa and North America, where 11.9% and 10.6%, respectively, of the births were preterm. Europe, where 6.2% of the births were preterm, had the lowest rate. According to a meta-analysis reported by Philip Steer the overall estimates of preterm birth rates range from 5% in developed countries to 25% in developing countries [7]. Majority of the risk factors for PTB are modifiable. About 75% of PTB deaths can be prevented without intensive care. Over the past decade, seven countries have halved their deaths due to PTB by ensuring that the frontline workers are skilled in the care of premature babies and improving supplies of life-saving commodities and equipment. In spite of the advances in prenatal medicine and preterm preventive measures, other countries stepped up in PTB incidence with related morbidity and mortality [2]. Prevention is better than cure, holds true for many health problems.[8]A multifaceted approach is required for successful prevention of PTB, combining public health and educational programs, lifestyle modification, optimization of obstetric healthcare, effective prediction and diagnostic modalities, and the application of effective, targeted interventions [9]. Elucidating risk factors for prediction of PTB is a reasonable goal not only for identifying pregnant women at risk for preterm

delivery but also for initiation of risk-specific preventive interventions. Therefore, the present community-based study was conducted to identify possible risk factors for PTBs in selected districts of Andhra Pradesh, India [10].

Aim

- To assess the maternal risk factors for preterm births.

Objectives

- To evaluate the risk factors for preterm births
- Educating and counseling the pregnant women.
- Promote social awareness in pregnant women by explaining risk factors of preterm births.
- Assessing the role of clinical pharmacist in preventing preterm births.

Materials and Methods

A hospital based prospective interventional study was carried out at King George Hospital (KGH) located in Andhra Pradesh, India. The study population consisted of the newly delivered women and their babies who had born preterm. The proposed sample size was 100 subjects. All women who gave birth to preterm babies in the hospital during the period of November 2020 to April 2021 were included in the study. The inclusion criteria were women who newly delivered a preterm baby (26-37 weeks gestation). The exclusion criteria were women who delivered term baby, cases with insufficient data. Data were collected through the indirect method through highly structured interviews. The following were included in the questionnaire: maternal demographic data, medical disorders, and current pregnancy details, gynecological and obstetrical details, past history of previous pregnancies, family history and social history.

Results

This study shows obvious variations in demographic factors, medical disorder factors, current pregnancy related factors, gynecological and obstetric factors, past pregnancy factors, family history factors and social factors.

Demographic factors

The preterm births in the maternal age below 18 yrs were 6% , 18- 34 years were 83% and equal to or above 35 years were 7% of all the participants in the study. The preterm births in the women of Body Mass Index (BMI) less than 18.5 is 14%, 18.5- 24.5 is 58% and greater than

25 is 28%. The preterm births in Normal Vaginal Delivery (NVD) type of delivery is 48% , Assisted Vaginal Delivery (AVD) type of delivery is 32% and Lower Segment Caesarean Section (LSCS) type of delivery is 20 %. The preterm births in working women were found to be 18% and not working women was 82%. Concerning consanguineous marriage, the cases of preterm births were 20%.

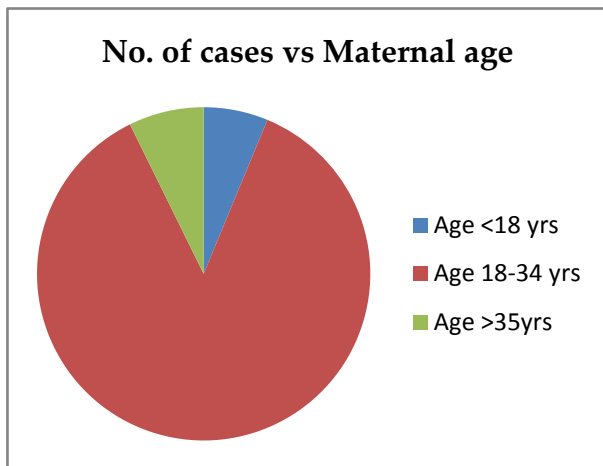
Table 01: Demographic Distribution

S.no	Maternal age	No.of cases
1.	Age < 18years	6
2.	Age 18-24 years	83
3.	Age > 35 years	7

Fig 01: Analysis of No. of cases vs Maternal age

Table -2 BMI verses no of Cases Distribution

S.No	BMI	No.of Cases
1.	<18.5	14
2.	18.5-24.9	58
3.	>25	28



1.	<18.5	14
2.	18.5-24.9	58
3.	>25	28

Fig 02: Analysis of No. of cases vs Body Mass Index

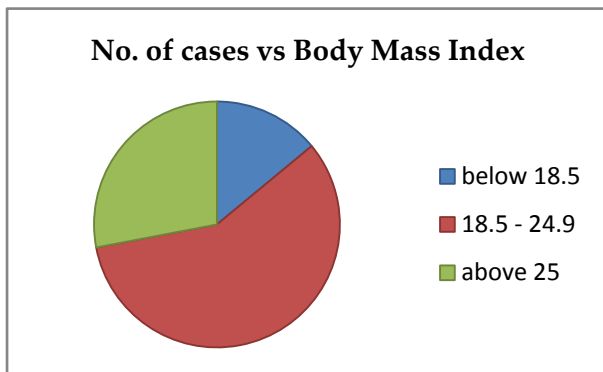


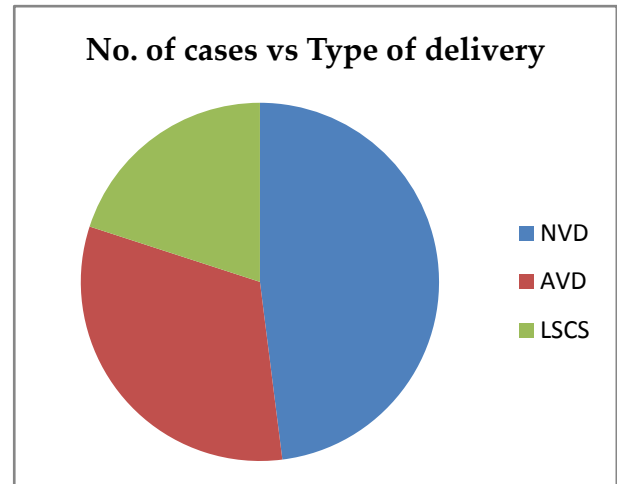
Table 03: Distribution of Type of Deleveries vs No Cases

S.No	Type of Deleveries	No. of Cases
1.	NVD	48
2.	AVD	32
3.	LSCS	20

1.	NVD	48
2.	AVD	32
3.	LSCS	20

Fig 03: Analysis of No. of cases vs Type of delivery

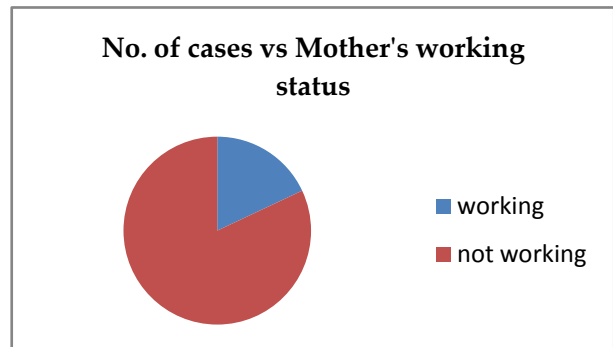
Table : 4 Distribution Mother Working Status



S.no	Mother Working Status	No.of Cases
1.	Working	18
2.	Not working	82

Fig 04: Analysis of No. of cases vs Mother's working status

Maternal medical disorder factors



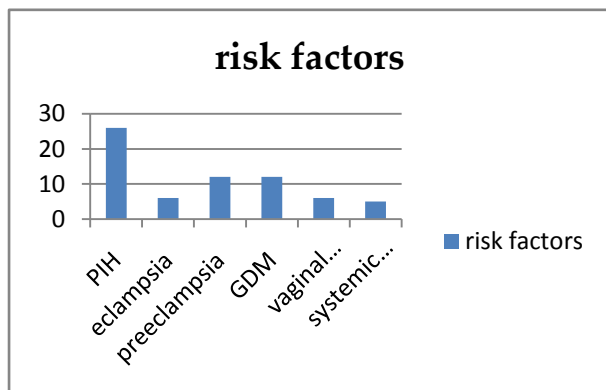
Of all the women in the study 26% had Pregnancy Induced Hypertension (PIH) as a risk factor, followed by anemia with 19%, preeclampsia and gestational diabetes mellitus with 12%, eclampsia with 6%, vaginal infections with 6%, systemic infections and thyroid disorders with 5%.

Table 05: Distribution of Maternal Risk Factors Vs No.of Cases

S. No	Maternal Risk Factors	No.of Cases
1.	PIH	26
2.	Eclampsia	6
3.	Pre eclampsia	12
4.	GDM	12
5.	Vaginal infection	6
6.	Systemic infection	5

Fig 04: Analysis of Risk Factors

Current pregnancy related factors



The prevalence of women with inadequate antenatal care was 8%, hyper emesis gravid arum was 9%, working women during pregnancy was 18%.

Gynecological and obstetrical factors

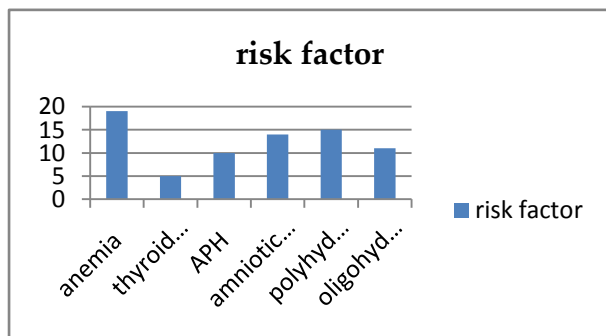
The percentage of women with antepartum haemorrhage as risk factor were 10%, leakage of amniotic fluid were 14%, polyhydramnios were 15%, oligohydramnios were 11% cervical cerclage were 4%.

Table 06: Distribution of Maternal Risk Factors vs No of Cases

S.NO	Maternal Risk Factors	No.of Cases
1.	Anemia	19
2.	Thyroid disorder	5
3.	APH	10
4.	Amniotic fluid leak	14
5.	Polyhydramnios	15
6.	oligohydramnios	11

Fig 06: Analysis of Risk Factors

Maternal previous pregnancy factors



Of all the women in the study population 21% had the history of abortions, 3% presented with the history of caesarean section, 4 % with intrauterine deaths , 4 % with the irregular menstrual cycles, birth interval greater than 4 years were 12%.

Family history factors

The women with a family history of prematurity are 5 % and the mother's own history of prematurity was 12%.

Social factors

Of all the women in the study the women subjected to stress during the pregnancy was 17%.

Table 07: Distribution of No.of Cases vs Maternal Risk Factors

S.No	Maternal Risk Factors	No.of Cases
1.	Previous abortions	21
2.	Previous caesarean	3
3.	Previous IUD	4
4.	Family history of PTB	5
5.	Mother own history of PTB	13
6.	Twin gestation	4

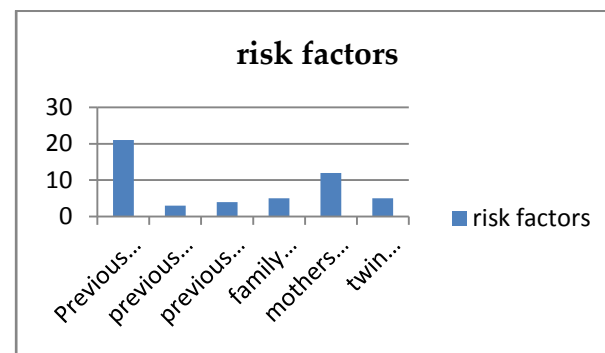


Fig 07: Analysis of Risk Factors

Table 07: Distribution of No.of Cases vs Maternal Risk Factors

S.No	Maternal Risk Factors	No. of Cases
1.	Maternal age(>35)	9
2.	Consanguineous marriage	20
3.	Inadequate antenatal care	8
4.	Hyperemesis gravidarum	9
5.	Stress	17
6.	Longer Birth interval	12

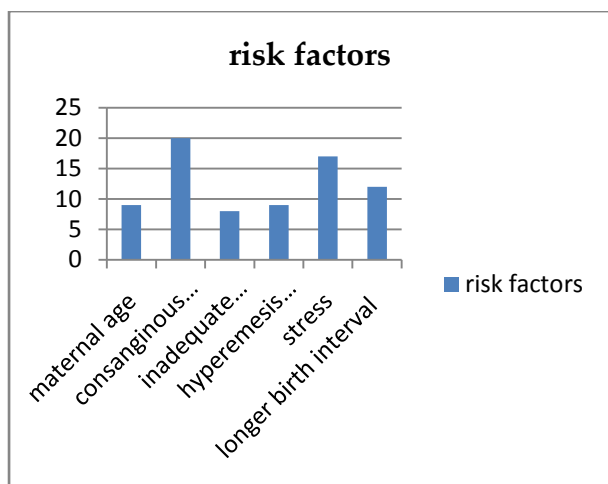


Fig 07: Analysis of Risk Factors

Discussion

The present study was designed to evaluate the maternal risk factors that contributed to the preterm in selected district of Andhra Pradesh, India. Hypertensive disorders of pregnancy were present in 54%, which is the commonest risk factor. Extremes in the volumes of the amniotic fluid- oligo or polyhydraminos are also associated with the preterm labor. Among all the several risk factors found in the study pregnancy induced hypertension was highest with 26% followed by maternal history of abortions with 21% and consanguineous marriage with 20%. In contradictory to the work done by Chytra R. Rao et.al. in which the pregnancy induced hypertension was found to be 21.1%, our study reported PIH as risk factor of 26% [11]. In contrast to the work done by Theresta et. Al in which there is a increased risk of preterm delivery in women with a history of history of abortions was found to be 11%, but our present study reported 21% of risk in womens with a history of abortions [12]. The other risk factors associated with the preterm birth are anemia with 19%, psychological stress with 17%, polyhydraminos with 15%, leakage of amniotic fluid with 14%, mother's own history of preterm birth with 13%,.The conditions like preeclampsia accounts for 12% as a risk factor for preterms, in contrast to the study done by LivG Kvalvik in which risk for preeclampsia was found to be 2.1% [13]. In this study oligohydraminos was found to be 11%, antepartum hemorrhage with 10%. High and low maternal age is also associated with the preterm labor with 6% and 7% respectively. Inadequate antenatal care during pregnancy accounts for 8% of the preterm births. Systemic infections like sickle cell anemia and nephrolithiasis accounts for 4% and 1% of preterm

labors. Vaginal infections account for 6%. Women with a birth interval of more than 4 years are prone to preterm labor with of 12%. Working women during pregnancy accounts for 18% of the preterm births, but the work done by Theresia et.al in which working women has the increased risk of preterm was found to be 20% increase risk in preterm birth compared in our study which was 18% [14]. In contradictory to the work done by Peter Waguva in which mothers age < 20 years had increased risk in preterm birth was found to be 11% compared in our study which was 17% [15]. The present study identified women with previous preterm delivery as a risk factor of 9 %, in contrast to the work done by Rahele Alijahan in which women with previous preterm delivery was found to be 15% [16]. In contradictory to the work done by Bianca Karenina Brito de Medeiros in which women with twin gestations was found to be 12.2% increase risk in preterm birth compared in our study which was 4% [17]. The study done by Candice S. Lengyel in which low BMI [<18.5] contribute to the 25% increase risk in preterm birth compared in our study which was 42% [18]. In contradictory to the work done by Paraskein Stylianou- Rega in which the pregnant women reporting stress during pregnancy was found to be 50% increase risk in preterm birth compared in our study was 17% [19]. The study done by Jacques Lepercq et.al revealed that the rate of preterm delivery remains high in women with type I diabetes is compared with our present study which had reported that 12% of women were presented with the risk for preterm delivery due to diabetes mellitus type I [20]. Unfortunately, there is no substantial evidence of intercourse during pregnancy, periodontal infections in our study.

Conclusion

The commonest risk factor was pregnancy induced hypertension, followed by maternal history of abortions and consanguineous marriage. The other significant risk factors include eclampsia, preeclampsia, oligohydraminos, polyhydraminos, antepartum hemorrhage, leakage of amniotic fluid, mothers own history of prematurity, inadequate antenatal care, psychological stress.

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Conflicts of Interest

The authors declare that there is no conflicts of interest regarding the publication of this paper.

Author contributions

All the authors are involved in the data collection, data analyzation and drafting of the paper.

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