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ORIGINAL ARTICLE

Risk Factors and Outcome of Preterm Labor in Pregnant Women Attending Zagazig Maternity University Hospital

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ABSTRACT

Background: Preterm birth (PTB) refers to the birth of a baby that occurs before 37 completed weeks of gestation. The aim of this work was to identify the risk factors leading to preterm labor and evaluation the outcome of both neonate and mother.

Methods: Observational prospective study was carried out to identify risk factors of preterm birth, at Obstetrics and Gynecology Department, Zagazig University Hospitals during the period from November 2017 to November 2018. The study 126 incident (45.5% of pregnant females with preterm pregnancy had preeclampsia compared to 20.5% of females with full term pregnancy) preterm labor cases (any labor between 28 and 37 completed weeks of gestation). Data were collected using a predesigned interviewing and record review. Ultrasonographic examination by abdominal ultrasound was done for all patients to confirm viability of fetus and to assess the accurate gestational age.

Results: The most predominant causes of preterm labor were premature rupture of membranes and preterm contractions in 31%, followed by Vaginal bleeding due to placental abnormalities 21.4% then preeclampsia in 17.5% and neonatal outcome was relatively good as 73.0% of studied pregnant females had good neonatal outcome, 20.6% of them their babes need to be incubated with poor outcome and the newborn died in 6.3% of them.

Conclusions: There was significant difference between maternal outcome in relation to age, gravidity and mode of delivery among the studied pregnant females where complicated maternal outcome was associated more with younger females or older than 35 years old and CS with hysterectomy.

Keywords: Risk Factors; Preterm birth (PTB); Low birth weight (LBW); Cesarean Section (CS); Hysterectomy

INTRODUCTION

Preterm birth (PTB) refers to the birth of a baby that occurs before 37 completed weeks of gestation[1]. PTB could be further categorized as late preterm delivery from 34 to 37 completed weeks of gestation, moderately preterm from 32 to 34 completed weeks, very preterm for those less than 32 completed weeks, and extremely preterm if less than 28 completed weeks[2]. According to The World Health Organization (WHO), preterm labor is defined as the onset of labor (regular uterine contractions and cervical effacement and dilatation) at a gestational age of less than 37 completed weeks (259days) from the first day of the last menstrual period [3].

Preterm birth was the second leading cause of death in children under 5 years old (WHO). The cost associated with providing care for preterm infants, who may spend numerous months in

hospital, has significant implications for the economy[4].

Despite the progress made in perinatal medicine over the past two decades, the problem of preterm labor continues to frustrate satisfactory reproductive outcome and its prevention still need improvements. The aim of this work was to identify the risk factors leading to preterm labor and evaluation the outcome of both neonate and mother.

METHODS

After obtaining approval of the ethics committee, an observational prospective study was carried out to identify risk factors of preterm birth, at obstetrics and gynecology department, Zagazig University hospitals during the period from November 2017 to November 2018. The study included 126 incident preterm labor cases (any labor between 28 and 37 completed weeks of gestation). Data were collected

using A predesigned interviewing and record review.

Written informed consent was obtained from all participants, the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University.

The work was carried out for studies involving humans in accordance with the World Medical Association's Code of Ethics (Helsinki Declaration). It included pregnant women with gestational age range from 28 weeks to 37 weeks calculated from first day of last menstrual period with a main complaint was lower abdominal pain and regular utrine contractions. And Exclusion of Pregnant women who had a gestational age less than 28 weeks or more than 37 weeks, Severe fetal congenital anomalies and Intrautrine fetal death.

In this present work some variables were found to be significant risk factors for Preterm birth (PTB). These were the extreme maternal age (<20 and >35), low socioeconomic status (due to the medical co-morbidities, poor nutrition, inadequate antenatal care and adverse behaviors), past medical history of some diseases including (hypertension,diabetes mellitus, anemia and cardiac diseases), obstetric conditions including short spacing between pregnancies, history of previous preterm delivery , history of previous abortion, gravidity and parity where the incidence of PTB increases in multipara.This was probably because multipara neglected good antenatal care.

STATISTICAL ANALYSIS:

The collected data were computerized and statistically analyzed using SPSS program (Statistical Package for Social Science) version 24. Qualitative data were represented as frequencies and percentages. Quantitative data were expressed as mean \pm SD (Standard deviation).

RESULTS

This study showed that about 8.7% of pregnant female were less than 20 years; about 78.6% were from 20-35 years old and about 12.7% more than 35 years old. The median of gravidity among the studied group was with a range, from 1 to 9 times. About 1/3 of the studied group (27.8%) were primigravida. The median of parity with a range from 1 to 5 times. One third of the studied group (33.3%) were Nullipara Table (1).

This study showed that 3/4of studied group are residents of rural areas (75.4 %). As regard social

class, most of them have low socioeconomic status and middle socioeconomic status (32.5% and 51.6%) respectively. About 1/3 of them are secondary education (39.6%), and 28.6% of them have finished their university education, despite of that 2/3 of them are not working (60.3%) and only 11.9% are professionals Table (2).

The above graph demonstrates that 33.3 % of the studied females had history of preterm labor Figure (1)

This study showed that 81.8% of the studied mothers had safe delivery and, 46% of studied pregnant females improved without tocolysis, but outcome was complicated in 18.2% of them, 3.9% of them had CS hysterectomy (2 cases due to Placenta Previa and 3 cases due to Accidental hemorrhage) and 6.3% of them were admitted to ICU (3 cases due to severe preeclampsia and 5 cases due to severe bleeding), and 7.9 % of them received packed RBCs & plasma Table (3).

This study showed that the most predominant cause of preterm labor was premature rupture of membranes and preterm contractions in 31%, followed by Vaginal bleeding due to placental abnormalities 21.4% then preeclampsia either alone in 17.5% result in fetal distress, accidental hemorrhage and retroplacental hematomas which required early intervention due to maternal causes or fetal distress, or accompanied with Diabetes mellitus (DM) in 1.6% of cases and Urinary Tract Infection (UTI) were present in 15.1% of them Table (4).

This study showed that 73.0% of studied pregnant females had good neonatal outcome, 20.6% of them their babes need to be incubated with poor outcome (10 cases had respiratory distress syndrome (RDS) due to chest causes,4 cases had RDS due to cardio causes, 6cases had Low birth weight (LBW) <1.6kg, 4 cases had pathological jaundice and 2 cases had early onset sepsis)and the newborn died in 6.3% of them(2 of them died due to complex congenital heart diseases, 4 of them died due to sepsis and 2 died due to RDS)Table (5).

The above graph modes of delivery among the studied group were CS, Vaginal delivery and CS with hysterectomy in 59.5%, 36.5% and 3.9% respectively Figure (2).

Table (1): Frequency distribution of cases (studied group) according to age, gravidity and parity.

variable	Studied group (N=126)	
	No.	%
Age groups		
Less than 20 years	11	8.7

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variable	Studied group (N=126)	
	No.	%
20- 35	99	78.6
More than 35	16	12.7
Gravidity		
Primigravida	35	27.8
Multigravida	91	72.2
Median of gravidity (times)		
Median (Range)	3(1-9)	
Parity		
Nullipara	42	33.3
Multipara	84	66.7
Median of Parity (times)		
Median (Range)	2(1-5)	

Table (2): Sociodemographic characteristics of the Studied pregnant females (No=126).

Item	studied group (N=126)	
	No.	%
Residence		
• Slum areas	5	3.9
• Urban	26	20.6
• Rural	95	75.4
Occupation		
• Non-working /house wife	76	60.3
• Semiprofessional / clerk	35	27.8
• Professional	15	11.9
Education		
• Illiterate	7	5.6
• Primary/Preparatory education	10	7.9
• Secondary	50	39.6
• Intermediate/institute	16	12.6
• University	36	28.6
• Post graduate	7	5.6
Socioeconomic level		
• very low	15	11.9
• Low	41	32.5
• Middle	65	51.6
• High level	5	3.9

Table (3): Maternal outcome among the studied pregnant females (N=126).

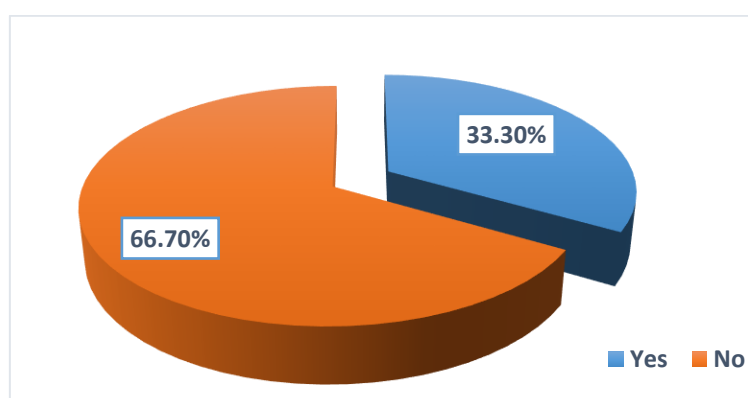
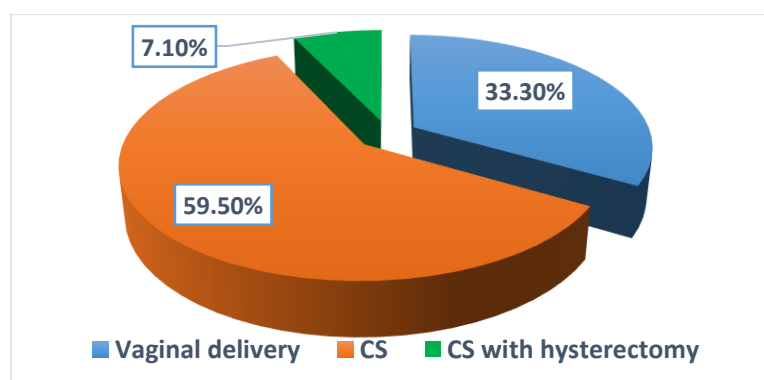
Maternal outcome	studied pregnant females (N=126)	
	No.	%
Safe delivery	103	81.8
• Improved after Tocolysis	45	35.7
• Improvement without tocolysis	58	46.03
Complicated delivery	23	18.2
• CS hysterectomy	5	3.9
• ICU	8	6.3
• Received packed RBCs & plasma	10	7.9

Table (4): Causes of preterm labor among the studied pregnant females (N=126).

Causes of preterm labor	studied pregnant females (N=126)	
	No.	%
Idiopathic	7	5.6
PROM, preterm contraction	39	31.0
Vaginal bleeding due to placental abnormalities	27	21.4
Hypertension, Preeclampsia*	22	17.5
UTI	19	15.1
Hypothyroidism	2	1.6
DM + PET	2	1.6
Multiple gestation	5	4.0
UTI + DM	1	.8
DM + Polyhydramnios	3	2.4
Hyperthyroidism	1	.8

Table (5): Neonatal outcome among the studied pregnant females (N=126).

Neonatal outcome	studied pregnant females (N=126)	
	No.	%
Neonatal outcome		
• Poor (NICU) with APGAR SCORE <5	26	20.6
• Good with APGAR SCORE>5	92	73.0
• Died	8	6.3


Figure (1): Pie diagram showing history of preterm labor among the studied pregnant females (N=126).

Figure (2): Pie diagram showing mode of delivery among the studied pregnant females (N=126).

DISCUSSION

Considering maternal age, the results of the study showed that extremes of reproductive age (<20y and ≥35y) were associated with increased risk of PTB. (Less than 20 years 8.7% , 20- 35 years 78.6% , more than 35 years 12.7%).

This was in general agreement with Shrim et al., [5] who found that there was an increased risk of PTB in women under 20 and over 35 years of age and stated that teenage mothers carry an increased risk of adverse pregnancy outcomes including an increased risk of delivering earlier than mothers between 20 to 35 years old. Moreover, there is more likelihood to have higher rates of extreme prematurity.

Several studies have examined the relationship between advancing maternal age and preterm delivery, with PTB occurring in 8% of mothers more than 35 years compared to less than 4% of births among mothers younger than 35 years [6,7]. These findings were inconsistent with Meis et al., [8] who did not find an association between advanced maternal age and preterm delivery.

Concerning the gravidity and parity the present work showed that cases significantly increase incidence of PTB in multipara (66.7%). This was probably because multipara neglected good antenatal care.

It is agreement with Berkowitz et al., [9] who concluded that multigravidas were 1.7 times more at risk of PTB than those who are not Similarly, Mueller-Heubach et al., [10] found that multigravidas had higher rates of PTB.

In contrast to study made by Etuk and Ekanem et al., [11] who found that nulliparity is associated with highly significant increases in the incidence of PTB.

In this study, high parity (five deliveries or more) was significantly associated with higher risk of preterm labor. This finding was in agreement with some studies [12,13].

Other studies, on the contrary to the present study, showed no association between high parity and PTB [14].

The significant association between high parity and PTB in the current study may be explained by the presence of other factors common in multiparous woman (e.g., antepartum hemorrhage and low socioeconomic status) interacting to increase the risk of PTB [15].

Regarding the socioeconomic status, there were high percentage of low socioeconomic status in PTB in this study (32.5%), this may be due to the medical co-morbidities, poor nutrition, inadequate antenatal care and adverse behaviors (e.g.,

smoking) which are more commonly founded in parents of lower socioeconomic status.

In consistence with the results of the present work, studies from industrialized countries demonstrated an association between socioeconomic inequalities (e.g., low education level of mothers) and PTB [16,17].

Thompson et al. reported in 2006 that the risk of PTB has an inverse association with educational level of mothers in Danish and Norwegian populations [7].

These results are consistent with Morgen et al. in Denmark who did not find any association between risk of PTB and some indicators of socioeconomic status, such as household income and parental occupation [17].

Recording to the residence, this study reported that 3/4 cases are residents of rural areas (75.4%).

In consistence with the results of the present work, other studies have also shown that women living in areas of lower education levels, with manual work and far from health facilities like rural areas are more likely to have poor birth outcomes [18].

This is contrary to a study in Beijing which found women in cities and urban centres are more likely to have preterm births [19].

Past medical diseases as diabetes, chronic hypertension, thyroid disorders & rheumatic heart disease were more commonly found in mothers of preterm babies.

In agreement with these results, Goldenberg reported that maternal medical conditions, such as preexisting diabetes and essential hypertension, were associated with a higher rate of PTB [20]. Similarly, two studies reported that the rate of preterm deliveries was increased in mothers who have pre-gestational diabetes [6].

As regards history of preterm birth, this study showed significant difference between patient with and without history of preterm birth (33.3% of cases had history of preterm labor) This result was in agreement with Iams et al., [21] who found that the risk of PTB was high among women who have had a previous PTB.

Previous PTB is a strong risk factor for repeated PTB and recurrences often occur at a similar gestational age, with around 70% delivering within 2 weeks of the gestational age of their first preterm delivery [22]. However, the majority of mothers who have had a preterm delivery would go on to have a subsequent term delivery. Term births decrease the risk of PTB in subsequent pregnancies.

Other studies showed the effect of the number of previous PTB on the subsequent pregnancy fate, Bakketeig et al., [23] gave high estimates, where

the risk of preterm birth in the 2 pregnancy was 14.3% if the first birth was preterm and 28.1% for third pregnancy if both prior births were preterm, so the risk increased with more than one previous preterm birth and the more preterm the first birth, the less likely the subsequent pregnancy will go to term.

Concerning previous stillbirth(s) or neonatal death(s) there was a significant difference between cases. (History of fetal deaths 53 out of 91 females (58.2%) had no history of fetal deaths and 41.8% had history of fetal deaths).

In agreement to this result, some researchers have reported that prior stillbirth or neonatal death increased the risk of PTB as the birth of a stillbirth and the subsequent risk of small for gestational age may be explained by the fact that similar factors may underlie the two conditions [24,25].

As regards History of miscarriages, there was a significant difference between cases, history of miscarriage increased the risk of PTB (31.7% of cases had history of miscarriage).

In agreement to this result, a study from Finland reported that among women who have never had miscarriage, three in 1,000 would have a PTB. This figure rises to 11 in 1,000 for women who have had one or more miscarriages [26].

Similarly, Di Renzoin Italy and a Swedish study of over 600,000 women in 2004 reported that a history of prior miscarriage was a risk factor for PTB [27].

Other studies also have found that there was an increased risk, even after controlling for confounding variables, and that the risk increases with the number of prior miscarriages or induced miscarriages, from 1.3 after one previous miscarriage to 1.9 after 2 or more [28,29].

In this study maternal outcome was variant, as 35.7 of cases improved after tocolysis, and 46.03% improved spontaneously without tocolysis with good maternal outcome, unfortunately there were 5 cases had hysterectomy due to variant causes of controlled bleeding (cervical uterus, placenta previa accrete), and 8 cases had ICU admission, and 10 received blood transfusion.

In our study the most predominant cause of preterm labor was premature rupture of membranes and preterm contractions in 31%, followed by Vaginal bleeding due to placental abnormalities 21.4% then preeclampsia either alone in 17.5% result in foetal distress, accidental hemorrhage and retroplacental hematomas which required early intervention due to maternal causes or fetal distress, or accompanied with DM 1.6% and, and UTI were present in 15.1% of them.

Also this study showed there was statistically significant difference between safe delivery and complicated maternal outcome in relation to causes of preterm labor.

On agreement to the results of the current study, other studies reported the importance of preeclampsia as a cause of early preterm delivery. In mainland France, 15.3% of induced preterm births were the result of preeclampsia; in the U.S.A., preeclampsia led to preterm delivery in 30 to 43% of women; in Holland, the proportion was 41.1%; whereas in French Guiana the proportion was the highest at 65.3% (32/49) of induced early preterm deliveries [30].

On agreement to the results of the current study other study in Uganda reported that Preterm premature rupture of membranes was associated with 40 to 45% of all preterm deliveries This could be due to the reduced ability to prolong pregnancies due to facility and individual factors in low-income countries [31].

In the present study, nearly one third (21%) of mothers of preterm neonates had antepartum hemorrhage (APH) due to abruptio placenta that cause titanic uterine contraction and placental hematomas. Moreover, APH was identified to have a significant association with PTB. This result was in agreement with previous studies which revealed that APH is associated with a high risk of PTB [32]. In this study there was significant difference between neonatal outcome in relation to Gestational age and Gestational age at time of delivery among the studied pregnant females.

In this study neonatal outcome was relatively good as 73.0% of studied pregnant females had good neonatal outcome, 20.6% of them their babies need to be incubated with poor outcome (10 cases had RDS due to chest causes, 4 cases had RDS due to cardio causes, 6 cases had LBW < 1.6 kg, 4 cases had pathological jaundice and 2 cases had early onset sepsis) and the newborn died in 6.3% of them (2 died due to complex congenital heart diseases, 4 died due to sepsis and 2 died due to RDS).

The neonatal complications of PTB arise from immature organ systems that are not yet prepared to support life in the extrauterine environment. The response of the infant's organ systems to the demands of the extrauterine environment and the life support provided have an important impact on the infant's short-term and long-term health and neurodevelopmental outcomes [33].

It was noticed that there was a high percentage of caesarian section delivery as compared to vaginal delivery, and 5 cases ended by CS hysterectomy in Zagazig University Hospital as it is a tertiary care level hospital which received any complicated

pregnant females referred from different primary and secondary care level hospitals in the rural and urban areas. Vaginal delivery was the mode of delivery among 1/3 of the studied pregnant females (36.5%) and about 2/3 of them (59.5%) had CS as CS delivery was found to decrease the risk of developing IVH in extremely preterm infants including the most severe grades of IVH.

On agreement to this result Two studies investigated the association between the mode of delivery and Intraventricular hemorrhage (IVH) in preterm infants which included infants with gestational age equal to 28 weeks, Caesarean delivery was found to decrease the risk of developing IVH in extremely preterm infants including the most severe grades of IVH [34].

In contrary to our study a study from a district General Hospital in United Kingdom included all infants weighing < 1,250 g born between January 1995 and December 2003 and followed up at two years of age for assessment of the neuro developmental status by an independent pediatrician. 213 infants were analyzed, of which 103 were born by vaginal delivery and 110 by Caesarean section They did not find any significant difference in the overall incidence of neuro disability in the infants born by Caesarean section as compared to those delivered vaginally [35].

In the future, a multifactorial assessment of patients at risk for preterm delivery should improve the positive predictive value of our testing schema. Specific therapeutic regimens depending upon the etiology or etiologies of preterm labor will be required and should improve our current limited success in inhibition of preterm labor [36].

CONCLUSIONS

The following criteria were associated with a high probability of PTB being multipara, Premature rupture of membrane, hypertensive disorders of pregnancy, antepartum hemorrhage and previous history of preterm birth.

There was significant difference between maternal outcome in relation to age, gravidity and mode of delivery among the studied pregnant females where complicated maternal outcome was associated more with younger females or older than 35 years old and CS with hysterectomy.

We recommend motivation of mothers to seek regular antenatal care (ANC) and to improve the quality of ANC, also we recommend for further research on a large number of population to study risk assessment and long term consequences of preterm birth.

DECLARATION OF INTEREST

The authors report no conflicts of interest. The authors along are responsible for the content and writing of the paper.

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