

Research Article

Evaluation of the Incidence, Possible Risk Factors and Maternal & Neonatal Morbidity & Mortality in Cases of Preterm Labour at El Minya Maternity University Hospital

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Abstract

Background: Preterm labor is a leading cause of morbidity and mortality for preterm infants; they will be at risk for developing numerous medical problems. The aim of the study is to evaluate the incidence, possible risk factors and maternal, neonatal morbidity and mortality in cases of preterm labour. **Methods:** The study had been conducted at the obstetrics and gynecology department, Minia University Hospital during the period from November, 2021 to April, 2022. **Result:** Successful tocolysis was reported in 149 cases (37.3%). More than half women (52.8%) were delivered by C.S while vaginal delivery was done in 47.3% women. However, less than third of neonates (31.1%) needed incubation. The neonatal mortality rate was 1.2%. **Conclusion:** It is necessary to make better clinical decisions with accurate assessment of risk factors, complications, and realistic predictions related to PTB and ETB, which should ultimately provide a way forward for precision health and to help reduce the burden and the consequences associated with PTB and ETB.

Keywords: Preterm; Neonatal; Mortality; Risk.

Introduction

Preterm delivery (PTD) is defined as delivery before 37 weeks completed gestation. It represents a major cause of neonatal morbidity and mortality in both developed and developing countries with European and North American figures ranges between 5–10% of all deliveries⁽¹⁾ The majority of preterm birth is unfortunately located in Africa and Asia, where about 85% of all preterm births occur (31 % and 54%, respectively), mostly in developing countries. The causes are thought to be multifactorial including medical conditions of the mother or fetus, genetic effects and environmental exposure, infertility treatment, behavioral factors, social, economic and iatrogenic causes⁽²⁾

The PTD in Egypt is estimated to be less than 10% in the general population⁽³⁾. The etiology of preterm labour is multifactorial with a common pathway resulting in increased release of prostaglandins and cytokines within the cervix, myometrium and fetal membranes. The release of prostaglandins is triggered by infective or inflammatory process, uterine overdistension as in cases with polyhydramnios and multiple pregnancy or choriodecidual hemorrhage as in cases with abruption⁽⁴⁾.

Although many risk scoring systems have been developed, their ability to identify at-risk women and subsequently prevent a preterm delivery has not been evaluated. In

the absence of such evidence, risk recognition and subsequent management of contributing factors are the best strategy to prevent preterm delivery⁽⁵⁾. Identifying high risk patients is crucial in managing and preventing preterm labour. Prediction of preterm labour is possible through; risk assessment, uterine activity monitoring, cervical length assessment and fetal fibronectin assessment⁽¹⁾.

The risk of preterm births was higher among mothers younger than 20 years. Several other studies have also reported linking both younger and older maternal age with preterm births. However, a study conducted in Bangladesh found women aged <20 years to be protective for preterm, contrary to our findings⁽⁶⁾. Also, the risk of preterm births was also higher among women who had severe anemia during pregnancy⁽⁷⁾. Further, mothers who had multiple deliveries had a higher risk of having preterm births. A Korean study and a cohort study in Bangladesh also showed similar findings⁽⁸⁾.

Globally, the proportion of women receiving antenatal care at least once during pregnancy was 83% between 2007 and 2014. However, only 64% of pregnant women attended the WHO-recommended minimum of four or more antenatal care (ANC) visits⁽⁹⁾. Babies born to mothers who seek ANC visits during second and third trimesters also had a higher risk of being preterm. Other studies have shown that seeking ANC visits later in pregnancies can increase the risks of preterm births⁽¹⁰⁾. ANC visits should focus on improved screening of at-risk pregnant women together with the ability to treat and manage infections and provide dietary support and counseling services and further research is needed⁽¹¹⁾.

PTD has been associated with an increased risk for cardiovascular mortality and morbidity, typically years after the delivery due to unclear reasons⁽¹²⁾. PTD is associated with significant neonatal morbidities such as respiratory distress syndrome, necrotizing enterocolitis, retinopathy of prematurity, neonatal sepsis,

intraventricular hemorrhage and periventricular leucomalacia. Long-term impact of prematurity is mainly cognitive and motor impairment which are more prevalent in extreme preterm births. Prolongation of pregnancy with tocolytic agents and administration of antenatal steroids significantly reduces the neonatal morbidities in preterm births⁽¹³⁾.

In Egypt, maternal mortality rates declined to 49/100000 live births in 2015 and still going down due to the disseminated coverage and the judicious use of the antenatal care services. The main causes of death were postpartum hemorrhage (25%), hypertensive disease (16%), ante-partum hemorrhage (8%), sepsis (8%) and rupture uterus (7%). Additionally, neonatal and perinatal mortalities were 14 and 15/1000 live births, respectively; perinatal mortalities were mainly caused by congenital anomalies, prematurity, asphyxia, and a considerable percentage of unknown causes, however, the neonatal deaths were attributed to prematurity, respiratory distress, infections, and unknown causes⁽²⁾. The management of preterm labour fall into five areas; the use of tocolysis, administration of antibiotics, administration of antenatal steroids, magnesium sulfate for neuroprotection and finally the considerations for the mode of delivery⁽¹⁾.

The aim of this study is to evaluate the incidence, possible risk factors and maternal & neonatal morbidity & mortality in cases of preterm labor at El- Minia Maternity University Hospital.

Patients and methods

The study had been conducted at the obstetrics and gynecology department, Minia University Hospital during the period from November, 2021 to April, 2022. The study protocol was approved by the local ethics committee of Medicine, Minia University. Inclusion criteria consisted of: pregnant women who delivered after completed 28 weeks and before completed 37 weeks, spontaneous

onset preterm labor, intrauterine fetal death, and major congenital malformations.

Data was collected from files of all preterm delivered mothers comprising of complete history, rate of preterm delivery of births, and antepartum hemorrhage [early pregnancy bleeding, (before 28 weeks) and late pregnancy (bleeding after 28 weeks)]. Univariable and multivariable logistic regression analysis were used to examine the associations between preterm birth and each risk factor.

Risk factors and maternal morbidity included: maternal age, height, weight (at delivery), parity, history of previous stillbirth, abortion, nonviable pregnancies including ectopic pregnancies, smoking, social class, maternal hemoglobin at first antepartum visit, bacteriuria, proteinuria, hypertension, preeclampsia, diabetes, chronic renal disease, and incompetent cervix,

The frequencies of neonatal death were documented. We also examined presumed cause of death among neonates who died. Research staff reported the cause or causes of death for each neonate as applicable if available in the neonate's chart. Any neonatal admission to PICU was noted and documented. Neonatal weight measurement was done using digital weight scale with the patient in standing position. The reading was noted to the nearest kilogram. Apgar score was calculated according to: Breathing Effort, Heart Rate, Muscle Tone, Grimace Response or Reflex Irritability in Response to Stimulation, and Color

Statistical analysis

The collected data will be, tabulated, and statistically analyzed using SPSS program (Statistical Package for Social Sciences) software version 26.0, Microsoft Excel 2016. Descriptive statistics were done for numerical parametric data as mean±SD (standard deviation) and minimum & maximum of the range and for numerical non parametric data as median and 1st& 3rd inter-quartile range, while they were

done for categorical data as number and percentage.

Inferential analyses were done for quantitative variables using independent t-test in cases of two independent groups with parametric data and Mann Whitney U in cases of two independent groups with non-parametric data. Inferential analyses were done for qualitative data using Chi square test for independent groups. The level of significance was taken at P value <0.05 is significant, otherwise is non-significant. The p-value is a statistical measure for the probability that the results observed in a study could have occurred by chance.

Results

This Retrospective observational study was conducted on 400 pregnant females who delivered after completed 28 weeks and before completed 37 weeks and presented to Obstetrics and Gynecological Department of Minia Maternity University Hospital. According table (1), more than half of cases (52.3%) were in the age group 18 – 29 years, while 78 (19.5%) women between 30 and 34 years and 113 (28.2%) women were between 35 and 39 years, with the mean age ±SD was 27.16± 6.51 years. Regarding residence, 68.3% women were from rural areas while 31.8% women were from urban areas. It was found that 82.5% women didn't work while 8.3% were teachers, 8.5% of them were workers and 0.8% were employees. The mean gestational age was 34.49± 2.87weeks. The mean gravidity was 3.22± 1.81 with range from 1 to 6 while the mean parity was 1.82± 1.74 with range from 0 to 4.

Table (2) illustrated that 122 cases (30.5%) had previous history of abortion and 128 cases (32%) had previous scar. Previous history of C.S was found in 128 cases (32%). It was found that 2.8% of pregnant women had gestational DM, 2.5% of pregnant women had gestational hypertension, two women had epilepsy and one case was Positive for COVID in 1st trimester. Regarding history of chronic

diseases, 2.5% women had history of hypertension, 1.3% women had history of cardiac disease and 1% women had history of hyperthyroidism, 0.5% women had history of epilepsy and HCV and one woman had renal hydronephrosis, chronic calcular cholecystitis and piles. Five women had history of open-heart surgery and two women underwent D& C. More than half cases (57.3%) had history of using Dexa during previous pregnancy.

Concerning table (3), during current pregnancy, 14 cases (3.5%) had gestational hypertension, 3.3% of pregnant women had gestational DM and four women had hyperthyroidism. 143 cases (35.8%) had urinary tract infection. 13 cases (3.3%) had vaginal bleeding. 150 women (37.5%) suffered from PROM while 36 women (9%) suffered from oligohydramnios. The majority of women (85.3%) received Dexa at admission. In regard to table (4), less than third of neonates (31.1%) needed

incubation. The neonatal mortality rate was 1.2%.

Figure (1) demonstrated that the most common complaint in the studied women was low back pain in 145 cases (36.3%) followed by vaginal infection in 85 cases (21.3%) then abdominal pain in 74 cases (18.5%) and tender scar in 44 cases (11%). Figure (2) showed that Successful tocolysis was reported in 149 cases (37.3%). More than half women (52.8%) were delivered by C.S while vaginal delivery was done in 47.3% women. Regarding maternal complication during delivery, figure (3) described that postpartum hemorrhage was reported in 17 cases (4.3%), 15 women of them were managed by blood transfusion. Maternal fits were reported in 10 cases (2.5%) and they managed by neurill and sulphate. Extended vaginal tear was found in two cases (0.5%) and they managed by vaginal pack dressing.

Table (1): Basic demographic characteristics in the studied pregnant women.

		Studied women (n= 400)	
		N	%
Age (years)	Mean± SD	27.16± 6.51	
	Median	28.0	
	Range	19.0- 39.0	
	18-29 years	209	52.3%
	30-34 years	78	19.5%
	35-39 years	113	28.2%
Residence	Rural	273	68.3%
	Urban	127	31.8%
Occupation	Housewife	330	82.5%
	Employee	3	0.8%
	Teacher	33	8.3%
	Worker	34	8.5%
Gestational age (weeks)	Mean± SD	34.49± 2.87	
	Median	35.0	
	Range	28.0- 37.0	
Gravidity	Mean± SD	3.22± 1.81	
	Median	3.0	
	Range	1.0- 6.0	
Parity	Mean± SD	1.82± 1.74	
	Median	1.0	
	Range	0.0- 4.0	

Table (2): Clinical and obstetric history in the studied women.

Parameters		Studied women (n= 400)	
		N	%
Previous abortion	No	278	69.5%
	Yes	122	30.5%
Previous scar	No	272	68.0%
	Yes	128	32.0%
Previous C.S	No	272	68.0%
	Yes	128	32.0%
Medical disorders related to pregnancy	No	376	94.0%
	Gestational DM	11	2.8%
	Gestational HTN	10	2.5%
	Epilepsy	2	0.5%
	Positive COVID in 1 st trimester	1	0.3%
Chronic disease	No	376	94.0%
	HTN	10	2.5%
	Hyperthyroidism	4	1.0%
	Cardiac	5	1.3%
	Epilepsy	2	0.5%
	HCV	2	0.5%
	Renal hydronephrosis, chronic calcular cholecystitis, piles	1	0.3%
History of operations	No	265	66.3%
	CS	128	32.0%
	Open heart surgery	5	1.3%
	D&C	2	0.5%
History of using Dexa during previous pregnancy	No	171	42.8%
	Yes	229	57.3%

Table (3): Distribution of the studied cases as per current pregnancy data.

		Studied women (n= 400)	
		No.	%
Medical disorders related to pregnancy*	No	371	92.8%
	Gestational HTN	14	3.5%
	Gestational DM	13	3.3%
	Hyperthyroidism	4	1.0%
UTI	No	257	64.3%
	Yes	143	35.8%
Vaginal bleeding	No	387	96.8%
	Yes	13	3.3%
PROM	No	250	62.5%
	Yes	150	37.5%
IUGR	No	364	91.0%
	Yes	36	9.0%
Oligohydramnios	No	364	91.0%
	Yes	36	9.0%
Received Dexa at admission	No	59	14.8%
	Yes	341	85.3%

**One case may have more than one disease*

Table (4): neonatal morbidity and mortality in the studied neonates.

		Studied neonates (n= 409)	
		N	%
Incubation	No	282	68.9%
	Yes	127	31.1%
Death	No	404	98.8%
	Yes	5	1.2%

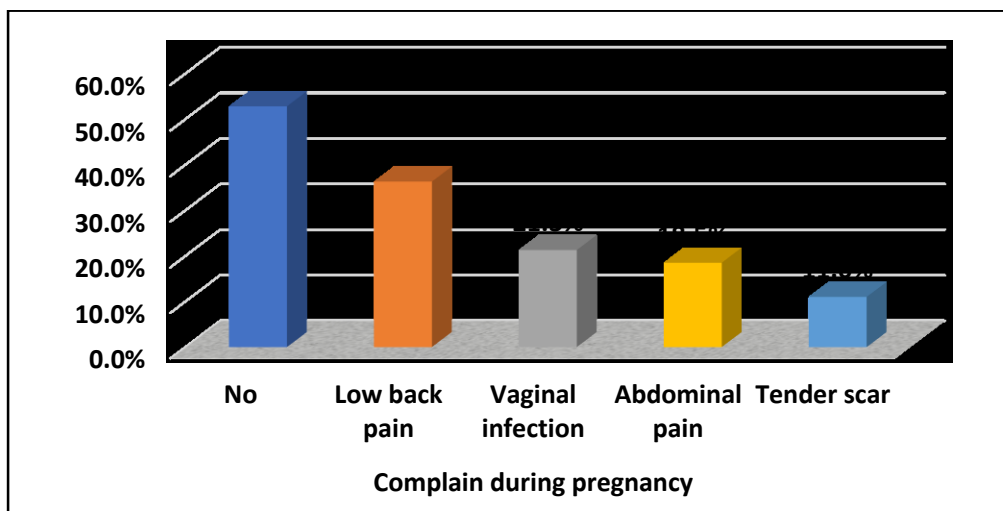


Figure (1): Complain during current pregnancy in the studied women.

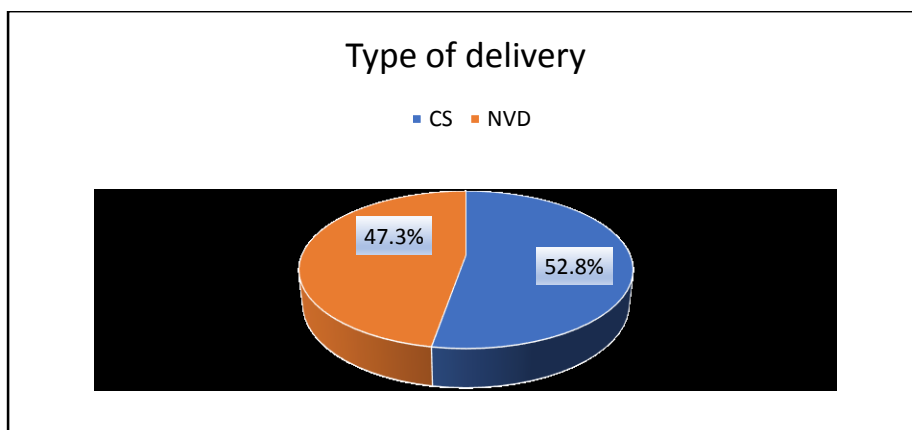


Figure (2): Type of delivery in the studied women.

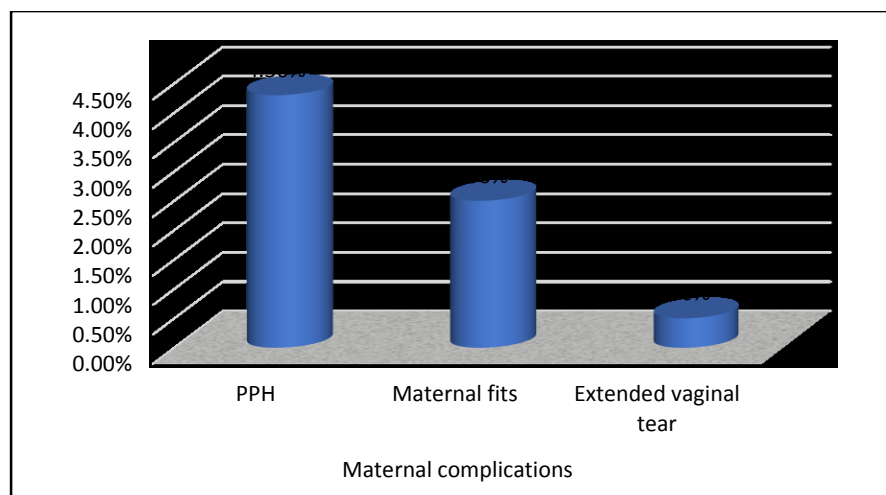


Figure (3): Maternal complications in the studied women.

Discussion

Preterm birth (< 37 weeks of gestation) is one of the leading causes of neonatal morbidity and mortality and a significant public health burden. In order to achieve the Sustainable Development Goal 3 target of reaching the neonatal mortality rate to 12 per 1000 live birth by 2030, it is critical to address the burden of preterm births⁽¹⁴⁾. Babies born preterm have a higher risk of dying as reported from a multi-country study conducted in low- and middle-income countries (LMICs). The greater risk of dying has been mostly associated with neonatal infections. In comparison to term infants, they are more prone to short and long-term neurocognitive and motor impairments together with increased risk of malnutrition, chronic diseases and early deaths⁽¹⁵⁾.

Several factors have been identified as risks for preterm birth. Socio-demographic factors such as ethnicity, older age of mothers and smoking have been reported as risk factors for preterm birth. Further, poor access to antenatal care services during pregnancy leads to poor pregnancy outcomes like preterm births⁽¹⁶⁾.

More than half of cases (52.3%) were in the age group 18 – 29 years, while 78 (19.5%) women between 30 and 34 years and 113 (28.2%) women were between 35 and 39

years, with the mean age \pm SD was 27.16 ± 6.51 years. In (Gurung et al., 2020)⁽¹⁷⁾, a total of 63,099 women were admitted and 60,742 deliveries were conducted during the study period. Among the deliveries, 54,778 were term babies while 5964 babies were born preterm. The incidence of preterm births was found to be 98 per 1000 total births and 93 per 1000 live births. In a systematic review conducted with data available from 107 countries, the global preterm birth rate was reported at 10.6%⁽¹⁸⁾

Regarding residence, 68.3% women were from rural areas while 31.8% women were from urban areas. It was found that 82.5% women didn't work while 8.3% were teachers, 8.5% of them were workers and 0.8% were employees. The mean gestational age was 34.49 ± 2.87 weeks. The mean gravidity was 3.22 ± 1.81 with range from 1 to 6 while the mean parity was 1.82 ± 1.74 with range from 0 to 4. Several other studies have also reported linking both younger and older maternal age with preterm births. However, a study conducted in Bangladesh found women aged < 20 years to be protective for preterm⁽¹⁹⁾. (Gurung et al., 2020)⁽¹⁷⁾ reported that the risk of preterm births was also higher among mothers with education lower than secondary level. Other studies have also

shown similar associations related to lower education levels. This suggests that better educational status of mothers has a protective effect on birth outcomes. Further, mothers with a history of smoking had higher risk for preterm births.

Regarding history of chronic diseases, 2.5% women had history of hypertension, 1.3% women had history of cardiac disease and 1% women had history of hyperthyroidism, 0.5% women had history of epilepsy and HCV and one woman had renal hydronephrosis, chronic calcular cholecystitis and piles. Five women had history of open-heart surgery and two women underwent D& C. More than half cases (57.3%) had history of using Dexa during previous pregnancy. During current pregnancy, 14 cases (3.5%) had gestational hypertension, 3.3% of pregnant women had gestational DM and four women had hyperthyroidism. 143 cases (35.8%) had urinary tract infection. 13 cases (3.3%) had vaginal bleeding. 150 women (37.5%) suffered from PROM while 36 women (9%) suffered from oligohydramnios. Most women (85.3%) received Dexa at admission.

Kim et al. (2017)⁽⁸⁾ reported that the risk of preterm births was also higher among women who had severe anemia during pregnancy. The finding is corroborated by other studies which showed severe anemia increased the risk of preterm births significantly. Further, mothers who had multiple deliveries had a higher risk of having preterm births⁽¹⁹⁾. (Shah et al., 2014) a cohort study in Bangladesh also showed similar findings. However, a systematic review and meta-analyses assessing interventions aimed at preventing preterm births among twin pregnancies found that no interventions reduced the risk significantly⁽²⁰⁾.

The most common complaint in the studied women was low back pain in 145 cases (36.3%) followed by vaginal infection in 85 cases (21.3%) then urinary tract infection in 80 cases (20%), abdominal pain in 74 cases (18.5%) and tender scar in 44 cases (11%).

Successful tocolysis was reported in 149 cases (37.3%). More than half women (52.8%) were delivered by C.S while vaginal delivery was done in 47.3% women. Regarding maternal complication during delivery, postpartum hemorrhage was reported in 17 cases (4.3%), 15 women of them were managed by blood transfusion. Maternal fits were reported in 10 cases (2.5%) and they managed by neurill and sulphate. Extended vaginal tear was found in two cases (0.5%) and they managed by vaginal pack dressing. It worth mentioning that 9 women were pregnant in twins, so the number of neonates were 409.

Gurung et al. (2020)⁽¹⁷⁾ also analyzed the consequences of preterm birth. Pre-discharge mortality was 11 times higher for preterm babies. More than half of neonates (59.2%) were males while 167 (40.8%) were females. Neonatal weight was ranged between 400 and 4000 grams with the mean weigh (\pm SD) was 2828.26 (\pm 722.94) grams. APGAR score at 1st min was ranged between 5 and 8 with the mean (\pm SD) was 7.34 (\pm 1.06) while APGAR score at 5th min was ranged between 6 and 10 with the mean (\pm SD) was 8.92 (\pm 1.34). Less than third of neonates (31.1%) needed incubation. The neonatal mortality rate was 1.2%.

Conclusion

In our study, successful tocolysis was reported in 149 cases (37.3%). More than half women (52.8%) were delivered by C.S while vaginal delivery was done in 47.3% women. However, less than third of neonates (31.1%) needed incubation. The neonatal mortality rate was 1.2%.

Conflict of interest: None.

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