

Original paper

Preterms in the Neonatal Care Unit at Babylon Maternity and Children Hospital: Prevalence, Morbidity, Mortality, and Risk Factors

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Abstract

Background: Prematurity and its complications are the major cause for neonatal morbidity and mortality. Often, the cause of preterm labor is unknown, but several etiological risk factors have been identified

Objective: Regardless the causes for hospitalization, this study was designed to determine the prevalence, mortality, morbidity (determined by duration of hospitalization and referral to pediatric intensive care unit PICU) of preterm baby among patients admitted into the neonatal care unit, and some of the possible underlying risk factors for preterm births.

Method: During a period of seven months from 2 December 2012 to 28 June 2013, a nonrandomized sample consisted of 200 neonates that had been admitted into neonatal care unit "NCU" at Babylon Maternity and Children Hospital was involved in this cross sectional descriptive study. Same questionnaire was applied for all cases, then patients were divided into 2 groups according to gestational age (<37w and ≥37). Test of proportion and chi-square were used to determine significant differences between the groups.

Results: Prematurity and its complications are responsible for 72/200 (36%) of neonatal hospitalization and 3/6 (50%) of neonatal death. Females constitute 35/72 (48.61%) of preterms and 44/138 (34.37%) of terms with p value < 0.05. 8/48 (16.66%) of preterms and 7/95 (7.36%) of terms need referral to PICU with p value > 0.05. Regarding hospitalization, preterms had longer duration than term neonates (p value <0.05). 51/187 (27.27%) of neonate had been discharged on their parents' responsibility, and 20/51 (39.21%) was preterm. Multiple gestation is a risk factor for death in preterm babies, while obstetrical factors had a correlation with the occurrence of preterm births (p value <0.05), with premature rupture of membrane being at the top of the list.

Conclusion: Prematurity and its complications are the major causes for neonatal hospitalization and death and need longer duration of hospitalization than terms. For preterm birth, females are at greater risk and the presence of obstetrical factors increase its occurrence.

Keywords: preterm, neonatal, prevalence, Babylon.

Introduction

There are three primary methods of gestational age estimation: dating based on last menstrual period (LMP), ultrasound-based dating, and neonatal estimates.¹ Liveborn infants delivered before 37 wk from the 1st day of the LMP period are termed premature by the World Health Organization,² and it is the most common cause of neonatal death (approximately 30-

36% of neonatal deaths are attributable to prematurity and its complications).^{2,3} Add to that, preterm birth is a significant cost factor in healthcare, not even considering the expenses of long-term care for individuals with disabilities due to preterm birth.⁴

Often, the cause of preterm labor is unknown, but several etiological risk

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factors have been identified including:^{2,5,6,7,8,9}

- Extreme age of the mother (younger than 16 or older than 35).
- Low level of educational achievement.
- Occupational issues.
- Smoking.
- Obstetrical factors (cervical incompetence, premature rupture of membrane, uterine malformation, abruption placenta, placenta previa, uterine or cervical trauma and vaginal bleeding).
- Disease during pregnancy (preclamsia, anaemia, genital and urinary tract infection).
- Disease before pregnancy (diabetes, hypertension, heart disease, thyroid and kidney disease).
- Previous history of abortion, stillbirth, or preterm.
- An interval of less than six months between pregnancies.
- Multiple gestations.

Increasingly primary interventions that are directed at all women, and secondary intervention that reduce existing risks are looked upon as measures that need to be developed and implemented to prevent the health problems of premature infants and children.¹⁰

Doctors sometimes need to deliver a baby early because of concerns for the health of the mother or the baby. An early delivery should only be considered when there is a medical reason to do so. If a pregnant woman is healthy and the pregnancy is progressing well, it is best to let the baby come naturally, in its own time.⁵

Patient and Method

A cross sectional descriptive study was conducted at the NCU in the Babylon Maternity and Children Hospital during the seven-month period from 2 December 2012 to 28 June 2013.

Patient

A nonrandomized sample consisted of 200 neonates that had been admitted into NCU during this period was involved in this study. Any patient whose mother did not remember her LMP or his/her mother not present with him/her was excluded from the study.

Method

A specially designed questionnaire was used. In addition to general background information, questionnaire contains questions about suspected risk factors. Obstetrical factors included in this study were cervical incompetence, premature rupture of membrane, uterine malformation, abruption placenta, placenta previa, uterine or cervical trauma and vaginal bleeding. Disease during pregnancy were preclamsia, anaemia, genital and urinary tract infection, and disease before pregnancy were diabetes, hypertension, heart disease, thyroid and kidney disease).

Most informations were interviewed face-to-face with babies' mothers. Others were obtained from:

- Ultrasonic reports during pregnancy for placental abnormalities.
- Direct baby examination for congenital malformation, and
- Babies' hospital records after discharge for data regarding duration of hospitalization, admission to PICU, discharge on parents' responsibility, and improvement or death.

Regarding diseases during and before pregnancy and most of obstetrical factors we depend on the history obtained from mothers as their gynecologist told them basing on examination and investigations done for them.

About premature rupture of membrane we ask the mothers directly is the membrane had been ruptured before the onset of labour pain or no, and considered positive cases if answered "yes".

For uterine and cervical trauma, mothers had been asked about direct abdominal trauma or cervical medical intervention during pregnancy.

After collection of data, patients were divided into two groups; those with gestational age GA (calculated from the LMP) <37 weeks and considered as preterms and those with GA \geq 37 weeks and considered as mature babies.

- Complete data were available for 136 patients.
- 51 patients (20 preterm and 31 term) were discharge on the responsibility of their families (deficient data regarding duration of hospitalization, outcome and admission to PICU)
- 6 patients (4 preterm and 2 term) had missed hospital records (deficient data regarding duration of hospitalization, outcome, admission to PICU and compliance for hospitalization)
- 7 patients (3 preterm and 4 term) referred to other words such as PICU and not returned back to the NCU (deficient data regarding duration of hospitalization, outcome and compliance for hospitalization)

The net studied cases become as follow:

1. 200 cases (72 preterm and 128 mature babies) involved in the interpretations of data regarding risk factors for premature delivery.
2. 187 cases (65 preterm and 122 mature babies) involved in the interpretations of data regarding compliance for admission.

3. 143 cases (48 preterm and 95 mature babies) involved in the interpretations of data regarding admission to PICU.
4. 136 cases (45 preterm and 91 mature babies) involved in the interpretations of data regarding duration of hospitalization and outcome.

We mean by compliance for hospitalization is that the baby remains in the hospital until the doctor discharge him or he passed, while noncompliant is that who discharge from hospital on parent's responsibility.

Statistical analysis

Test of proportion and chi-square were used to determine significant differences between the groups. P value < 0.05 considered significant.

Results

Total number of patients included in this study was 200; of them 72 patients were preterms. The percentage of preterm babies was 36%.

Table (1) shows that 35/72 (48.61%) of preterm and 44/138 (34.37%) of term are females. Females are at greater risk for preterm births (P value <0.05).

Table (2) explores that the mortality rate of neonates at the NCU is 6/136 (3%), and 3/6 (50%) are preterms.

Table 1. Sex distribution of term and preterm babies

	<37 w		\geq 37 w		P value
	No.	%	No.	%	
Total	72		138		
Male	37	51.38	84	65.62	<0.05
Female	35	48.61	44	34.37	

Table 2. Numbers and percentages of death at NCU

Total No of neonate	Neonatal death		Preterm death		Term death	
	No	%	No	%	No	%
136	6	3	3/6	50	3/6	50

Table (3) reveals that 8/48 (16.66%) of preterms and 7/95 (7.36%) of terms need referral to PICU. There is no relation between gestational age and PICU admission (p value >0.05). Duration of hospitalization presented in table (4).

Preterms had longer duration than term neonates (p value <0.05).

Table (5) shows that 51/187 (27.27%) of neonates had been discharged from NCU on their parents' responsibility and preterms constitute 20/51 (39.21%) of them.

Table (6) shows that there is no relation between any studied variable and parents' compliance for hospitalization (all p values > 0.05). A significant correlation between multiple gestation and death in preterm

babies (p value < 0.05) is evident in table (7).

Table (8) reveals that obstetrical factors had a correlation with the occurrence of preterm births (p value < 0.05).

Table 3. Relation between admission to the PICU and gestation age.

	<37 w		≥37 w		P value
	No.	%	No.	%	
Total	48		95		
Admission to ICU	8	16.66	7	7.36	>0.05

Table 4. Relation between days of hospitalization and gestational age.

	<37 w		≥37 w		P value
	mean	SD	mean	SD	
Hospitalization days	5.76	± 5	4.25	± 3	<0.05

Table 5. Numbers and percentages of neonates discharged on parents' responsibility

Total No of neonate	Neonates discharge on parents' responsibility		Preterms discharge on parents' responsibility		Terms discharge on parents' responsibility	
	No	%	No	%	No	%
187	51	27.27	20/51	39.21	31/51	60.78

Table 6. Relation between compliance for hospitalization of premature babies and studied variables.

Variables	compliant		noncompliant		P value
	No.	%	No.	%	
Total	45		20		
Sex: male	27	60	9	45	>0.05
female	18	40	11	55	
Number of gestation:					>0.05
Singletone	40	88.88	17	85	
Multiple gestation	5	11.11	3	15	
Mode of delivery:					>0.05
C/S	18	40	9	45	
Vaginal	27	60	11	55	
At home	8	29.62	2	18.18	
At hospital	19	70.37	9	81.81	
Congenital malformation	2	4.44	0	0	>0.05
Maternal age: <16y	3	6.66	0	0	>0.05
16-35y	37	82.22	19	95	
>35y	5	11.11	1	5	
Education: Illiterate	6	13.33	1	5	>0.05
Primary	21	46.66	13	65	
Secondary	12	26.66	4	20	
Higher	6	13.33	2	10	
Work: Employee	5	11.11	1	5	>0.05
Housewife	40	88.88	19	95	
multiparty	35	77.77	16	80	>0.05
Previous stillbirth	6	13.33	0	0	>0.05
Previous preterm	7	15.55	3	15	>0.05
Previous abortion	11	24.44	4	20	>0.05
Space between pregnancies <6months	7	15.55	3	15	>0.05

Table 7. Relation between mortality of premature babies and studied variables.

Variables	dead		improved		P value
	No	%	No	%	
Total	3		42		
Sex: male	2	66.7	25	59.52	>0.05
female	1	33.3	17	40.47	
Number of gestation:					<0.05
Singletone	1	33.3	39	92.85	
Multiple gestation	2	66.7	3	7.14	
Mode of delivery:					>0.05
C/S	2	66.7	16	38	
Vaginal	1	33.3	26	62	
At home	0	0	8	30.76	
At hospital	1	100	18	69.23	
Congenital malformation	0	0	2	4.76	>0.05
Maternal age: <16y	0	0	3	7.14	>0.05
16-35y	2	66.7	35	83.33	
>35y	1	33.3	4	9.52	
Education: Illiterate	0	0	6	14.28	>0.05
Primary	0	0	21	50	
Secondary	1	33.3	11	26.19	
Higher	2	66.7	4	9.52	
passive-smoker	2	66.66	28	66.66	>0.05
Obstetrical factors	2	66.7	16	38	>0.05
Disease during pregnancy	2	66.7	34	80.95	>0.05
Disease before pregnancy	1	33.3	9	21.42	>0.05
multiparty	2	66.7	33	78.57	>0.05
Previous stillbirth	1	33.3	5	11.9	>0.05
Previous preterm	1	33.3	6	14.28	>0.05
Previous abortion	1	33.3	10	23.8	>0.05
Space between pregnancies <6months	1	33.3	6	14.28	>0.05

Discussion

This study shows that 72/200 (36%) of neonatal hospitalization is attributed to prematurity, which is consistent with other study that considered prematurity is one of the major causes for neonatal hospitalization (35.5%).¹¹

Our study reveals that female gender is at greater risk for preterm birth (p value <0.05), while other studies revealed the reverse.¹² This discrepancy may be attributed to sample size.

In our study, there was a low mortality rate 6/136 (3%) at NCU as compared with that of other Teaching Hospitals NCU (28.5%).¹¹ this low result may be explained by the fact that critically ill

neonates are referred to PICU and their faith is out of our hand.

In spite of low mortality rate in our NCU as aforementioned, prematurity and its complications is responsible for 3/6 (50%) of neonatal death. Stabilization in the delivery room with prompt respiratory and thermal management and at the hospital, round-the-clock care in NICU is crucial to the immediate and long-term outcome of premature infants.^{13,14,15,16} In spite of this special care, prematurity and its complications is responsible for 36% of neonatal death.^{2,3} Our higher percentage may be attributed to poor health services directed toward premature babies at the delivery room and at hospital as there is no NICU in our hospital.

Table 8. Relation between prematurity and possible risk factors.

Studied risk factors	<37 w		≥37 w		P value
	No.	%	No.	%	
Total	72		128		
Multiple gestation	6	8.33	8	6.25	>0.05
Congenital malformation	3	4.16	8	6.25	>0.05
Maternal age: <16y	3	4.16	0	0	>0.05
16-35y	63	87.5	117	91.4	
>35y	6	8.33	11	8.59	
Education: Illiterate	7	9.72	18	14	>0.05
Primary	37	52.38	58	45.31	
Secondary	20	27.77	30	23.43	
Higher	8	11.11	22	17.18	
Work: Employee	7	9.72	12	9.37	>0.05
Housewife	65	90.27	116	90.62	
Passive smoking	44	61.11	65	50.78	>0.05
Obstetrical factors	31	43	34	26.56	<0.05
Disease during pregnancy	58	80.55	99	77.34	>0.05
Disease before pregnancy	15	20.83	30	23.43	>0.05
multiparty	56	77.77	93	72.65	>0.05
Previous stillbirth	6	8.33	9	7	>0.05
Previous preterm	10	13.88	9	7	>0.05
Previous abortion	19	26.38	30	23.43	>0.05
Space between pregnancies <6months	11	15.27	12	9.37	>0.05
C/S:	30	41.66	60	46.87	>0.05
Elective	18	60	38	63.33	

As there is no NICU at our hospital, all neonates who need hospitalization were admitted into NCU and only critically ill neonate had been admitted into PICU. Our study shows that the percentages of term and preterm neonates who referred from NCU to PICU were 7.36% and 16.66%, respectively, with p value > 0.05. There is no similar data to compare our result with it.

There was significant difference in duration of hospitalization between terms and preterms (p value < 0.05), and this go with the fact that premature babies may have more health problems and may need to stay in the hospital longer than babies born later.¹⁷

In this study, 51/187 (27.27%) of neonates had been discharged from the hospital on their parents' responsibility, and from those, 20/51 (39.21%) were preterms. Poor compliance with hospitalization for preterm babies was not associated with any studied variable as indicated by p value >0.05. When we put in our mind that this hospital is the major pediatric hospital in Babylon province and there is no private

hospital with such facilities to deal with neonate, these patients either had been taken at home or to other province. Whatever where they had been, it may give us an impression that either there is a family neglection to their neonates or there is parents' unsatisfaction toward medical services introduced to their babies.

Our study show, among the studied variables, only multiple gestation is a risk factor for preterm death (p value <0.05). There are controversies about the effect of multiple gestation on preterm neonatal mortality. Some mention that there is no significant difference between the neonatal mortality rates of twin births and single births in comparable weight and gestational age groups,² while David Bader et al postulated in their study that one of the major risk factors for preterm neonatal mortality was multiple gestation,¹⁸ on the other hand other studies illustrate that multiple gestation have lower gestational-age-specific mortality than singletons during most of the preterm period.¹⁹⁻²³

From all factors well documented worldwide and mentioned in table (8), we found that only obstetrical factors have been a risk for preterm labor in our community (p value <0.05). This may be attributed to performance of different studies at different communities.^{2,5,6,7,8,9}

Regarding maternal smoking, we cannot draw a valid conclusion as there was not any case reported smoking during pregnancy or even ex-smoker. We have only passive smoker mothers, and their relation to occurrence of preterm labor or to preterm death was not significant (table 7 and 8).

Conclusion

Prematurity and its complications are the major causes for neonatal hospitalization and death and need longer duration of hospitalization than terms. For preterm birth, females are at greater risk and the presence of obstetrical factors increase its occurrence.

Recommendations

1. Improve management of newborn at delivery room through training of medical staff and only a well trained and expert staff allowed to deal with those babies.
2. Foundation of neonatal intensive care unit in the hospital, so all premature babies who need hospitalization are admitted here.
3. Identification and solving of those problems behind neonatal discharges on the responsibility of their parents.
4. Educate the women about the importance of antenatal care.

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