

Risk factors of preterm babies: Regarding to gestational age, maternal medical history, delivery mode and influences

Zainab Abubaker Elzaroug ¹, Intisar Idrees Eldug ², Maryem Elbahier Ismail ¹, Mohamed Abdelfatah Abdelmalek ¹, Ibrahim Suliman Hanaish ² and Ayman Balla Mustafa ^{3,*}

¹ Pediatric Department, Faculty of Medicine, Misurata University, P.O. Box:2478, Libya.

² Department of Statistics, Libyan Academy, Misurata Libya.

³ Therapeutic Nutrition Department, Faculty of Health Sciences, Misurata University, P.O. Box:2478, Libya.

World Journal of Biology Pharmacy and Health Sciences, 2022, 09(02), 028–032

Publication history: Received on 07 January 2022; revised on 10 February 2022; accepted on 12 February 2022

Article DOI: <https://doi.org/10.30574/wjbphs.2022.9.2.0036>

Abstract

Background: The World Health Organization defines preterm birth as any birth before 37 completed weeks of gestation or fewer than 259 days since the first day of woman's last menstrual period.

Objectives: To identify antepartum, intrapartum, and fetal risk factors of preterm delivery and their effect on neonatal survival.

Methods: A cross-sectional study conducted on 185 neonates delivered preterm in neonatal intensive care unit of Misurata Central Hospital, Libya. Retrospective analysis of hospital recorded over a period of one year have be done, that from January to December 2019. Data include the babies' and mother demographic characteristics; antepartum, intrapartum, postpartum risk factors; and APGAR scores of such babies at 1 min; and survival for preterm baby were analyzed.

Results: Majority of cases are born to mothers aged 18-35 years (80%) and that is not significant $P \geq 0.05$, while the mode of delivery, C\ S was 70% and Antepartum risk factors infection was took the upper hand 40%, and that is highly statistically significant. There is no significant correlation regarding gestational age and gender where $P \geq 0.05$, while the weight and APGAR score are highly significant relationship with gestational age ($P < 0.05$) as shown in.

Conclusion: Majority of cases are borne to mothers aged 18-35 years while the mode of delivery, vaginal delivery was the upper hand in extreme preterm while C\ S is of priority of others. Antepartum risk factors were took the upper hand 40%. Male and female equally at risk to be delivered prematurely. APGAR score and birth weight improved with increase the gestational age. The mechanical support is one of the early respiratory in extreme babies that improve survival rate.

Keywords: Preterm delivery; Risk factor; Survival; Neonate

1. Introduction

The World Health Organization (WHO) defines preterm birth (PTB) as any birth before 37 completed weeks of gestation or fewer than 259 days since the first day of woman's last menstrual period (LMP) [1]. PTB can be sub-categorized as late preterm delivery- 34 to 36 completed week's gestation, moderately preterm- 32 to 34 completed weeks, very

* Corresponding author: Ayman Balla Mustafa

Therapeutic Nutrition Department, Faculty of Health Sciences, Misurata University, P.O.Box:2478, Libya.

preterm- less than 32 weeks, and extremely preterm- less than 28 weeks gestation [2]. Being born preterm is a risk factor that put infants at higher risks of chronic diseases and death later in life [3]. Babies born preterm have continued to remain below the standard growth curve and demonstrate the reduced ability for catch-up growth in their life [4]. Moreover, preterm delivery and its consequences contribute to subsequent disabilities and neurological abnormalities to the infant's potential that may persist all over their lives amongst survivors [2,4,5].

In the USA, 70% of preterm births were idiopathic and the rest were due to preeclampsia (50%), fetal distress (25%) and abruption (25%). In another study, preterm multifetal pregnancies and hypertension introduced as the major factors affecting preterm birth [5]. There is an intense survival gap for premature babies depending on where they are born [5,6]. Preterm birth is becoming the cause for economic instability in the family, community and the nation at large. It is not only resulted in economic burdens due to initial neonatal treatment but also in substantial costs to health services after discharge from the neonatal unit [5]. This paper was aimed to identify antepartum, intrapartum and fetal risk factors of preterm delivery and their effect on neonatal survival.

2. Material and methods

2.1. Study setting

This study conducted as cross-sectional study at the neonatal intensive care unit of pediatric department at Misurata Central Hospital, one of the largest public sector tertiary care hospitals in Libya. We retrospectively analyzed the hospital records over a period of one year from January to December 2019. Outcome was analyzed as cross-sectional comparative study.

2.2. Inclusion criteria

Newborn babies were considered.

2.3. Data collection

A retrospective study conducted on 185 neonates delivered preterm in neonatal intensive care unit of Central Hospital at Misurata. The hospital records retrospectively analyzed for one year, investigating the distribution of cases according to risk factors and then comparing the risk factors according to subsequent baby survival or died. The babies' and mothers' demographic characteristics; antepartum, intrapartum, postpartum risk factors; and APGAR (activity (tone), pulse, grimace, appearance, and respiration) scores of such babies at 1min; and survival for preterm baby were analyzed. Maternal characteristics and antepartum risk factors obtained, regarding maternal age, parity, antenatal visits, history of abortion and prior neonatal death, antepartum hemorrhage, anemia, hypertension, toxemia of pregnancy, diabetes mellitus, polyhydramnios and oligohydramnios. In addition, intrapartum risk factors obtained, including vaginal bleeding, umbilical cord prolapse, multiple pregnancy, prolonged labor, malpresentation, PROM (premature rupture of membrane), meconium stained amniotic and mode of delivery. Moreover, postpartum and fetal risk factors were obtained, regarding sex, gestational age and birth weight.

2.4. Statistical analysis

The collected data analyzed by SPSS software version 21. The results summarized as frequencies and percentage for qualitative data, (not found in analysis) and then data presented and displayed in suitable tables. In addition, the associated relationship for qualitative data was performed using Chi-square test. The non-parametric Mann-Whitney test used for quantitative measurements. Results were accepted as significant when ($p < 0.05$).

3. Results

Majority of cases are borne to mothers aged 18-35 years (80%) and that is not significant while the mode of delivery, C/S was 70% and Antepartum risk factors (Infections, maternal disease, none) infection was took the upper hand 40%, and that is highly statistically significant ($p < 0.05$) as shown in (Table, 1).

There is no statistically significant (p -value > 0.05) of relationship among preterm babies gestational age and gender, while the weight and APGAR score are highly statistically significant associated relationship with gestational age (p -value < 0.05) as shown in (Table, 2).

There is significant different regarding gestational age and, respiratory supportive measure, hospital stay, antibiotics use and survival outcomes of preterm neonates in this study thus shown in (Table, 3).

Table 1 Maternal baseline data of the study population' mother

Mothers' characteristics		Gestational age			Total	%	P. value
		<30 wks.	30-34 wks.	>34wks			
Mother age	<18yrs	0	0	1	1	5%	0.909
	18-35yrs	18	45	92	155	80%	
	>35 yrs.	4	7	18	29	15%	
	Total	22	52	111	185	100	
Mode of delivery	C\S	6(27%)	37(71%)	86(77%)	129	70%	0.000
	Vaginal	16(73%)	15(29%)	25(23%)	56	30%	
	Total	22(100)	52(100)	111(100)	185	100	
Antepartum risk factors	Infections	17	26	32	75	40%	0.000
	Maternal disease	5	25	35	65	35%	
	None	0	1	4	43	23%	
	Total	22	52	111	185	100	

Table 2 Baseline data of the preterm babies regarding their gestational age

Babies characteristics		Gestational age			Total	%	P. value
		<30 wks.	30-34 wks.	>34wks			
Sex	Male	9	28	55	93	50%	0.596
	Female	13	24	55	92	50%	
	Total	23	52	110	184	100	
Weight	<1Kg	7	0	0	7	4%	0.000
	1-1.5 Kg	11	8	1	20	11%	
	1.5-2.5 Kg	4	32	42	78	42%	
	>2.5 Kg	0	12	68	80	43%	
	Total	22	52	111	185	100	
APGAR	<7	7(32%)	5(10%)	3(3%)	15	8%	0.000
	>7	15(68%)	47(90%)	108(97%)	170	92%	
	Total	22	52	111	185	100	

Table 3 Short-term complications of preterm babies regarding their gestational age

Babies characteristics		Gestational age			Total	%	P. value
		<30 wks.	30-34 wks.	>34wks			
Respiratory Supportive measure	Oxygen	1(4%)	6(12%)	22(20%)	29	16%	0.000
	CPAP	7(32%)	24(46%)	13(12%)	44	24%	
	Mechanical ventilator	14(64%)	11(21%)	7(6%)	32	17%	
	None	0(0%)	11(21%)	69(62%)	80	43%	
	Total	22	52	111	185	100	
Hospital stays	Non	0	5	63	68	37%	0.000
	<3 days	4	11	26	41	22%	
	3-5 days	3	16	6	25	14%	
	>5days	15	20	16	51	27%	
	Total	22	52	111	185	100	
Antibiotics	Yes	0	9	68	77	42%	0.000
	No	22	43	43	108	58%	
	Total	22	52	111	185	100	
Survival Outcome	Died	14	9	4	27	15%	0.000
	Alive	8	43	107	158	85%	
	Total	23	52	111	185	100	

4. Discussion

PTB is a prevalent obstetric complication associated with significant neonatal mortality and morbidity worldwide. Addressing the burden of PTB in developing countries is of public health importance due to its high (9 to 16%) prevalence [7].

The studies done so far in Libya in this regard were only a few as reported. Therefore, there is no updated reviews in Libya for support the current findings. In this study, (50 %) are girls and (50%) are boys. This nearly approaches other studies. Independent of biomedical risk, maternal prenatal stress factors are significantly associated with infant birth weight and with gestational age at birth [4].

Majority cases in current study are born to mothers aged 18-35 years (80%) and that is not significant while the mode of delivery, C\S was 70% and Antepartum risk factors (Infections, maternal disease, none) infection was took the upper hand 40%, and that is highly statistically significant.

While, the mode of delivery, vaginal delivery was reached the upper hand the proper cause most likely, the mode of delivery not organized, in other studies; Cesarean delivery was not associated with improved neonatal outcomes in preterm SGA newborns and was associated with an increased risk of respiratory distress syndrome [4].

In this study there is significant associated relationship regarding gestational age and, respiratory supportive measure, hospital stay, antibiotics use and survival outcome of PTB. When, other studies stated that, infants (<28 weeks) can be supported non-invasively at birth with either higher or lower pressures and while higher-pressure support may require less oxygen, it does not eliminate the need for oxygen supplementation [8]. Whereas, some studies demonstrated that, the Major neonatal morbidity increases with decreasing gestational age and birth weight [9].

5. Conclusion

Majority of cases are born to mothers aged 18-35 years and that is not significant while the mode of delivery, vaginal delivery was the upper hand in extreme preterm while C\S is of priority of others. Antepartum risk factors (Infections, maternal disease, none) infection was took the upper hand 40%, and that is highly statistically significant. Male and female equally affected with the risk factors. APGAR score and birth weight improved with increase the gestational age, and they are highly significant. The mechanical support is one of the early respiratory in extreme babies that improve survival rate.

Recommendations

Since preterm delivery is a common problem, while its subsequent sequelae and neonatal death could be prevented once baby delivered preterm, so it is very important to develop strategies for early identification and management of the risk factors associated with preterm birth through community-based interventions involving families, community, health professionals and policy makers. A safe motherhood policy recommended through a minimum of three antenatal visits during pregnancy, screening for high risk, anemia prophylaxis and management, and proper neonatal care and resuscitation.

Compliance with ethical standards

Acknowledgments

We acknowledge the staff of department of “Pediatrics” at Misurata central hospital, for their efforts in the completion of this research.

Disclosure of conflict of interest

All authors declare that they have no conflicts of interest.

Statement of informed consent

All participants were informed about the purpose of study prior survey then Informed consent was obtained from all individual participants included in the study.

References

- [1] Chythra R, Rao, Lara EE, de Ruitter, Parvati Bhat. A Case-Control Study on Risk Factors for Preterm Deliveries in a Secondary Care Hospital, Southern India. Hindawi Publishing Corporation ISRN Obstetrics and Gynecology. 2014.
- [2] Ifeoma OK, O'Donoghue, LC Kenny. Clinical Risk Factors for Preterm Birth. Annul Research Centre, Cork University Maternity Hospital Ireland. 2012.
- [3] Girmay Teklay T, Teshale H, Tasew Teklewoini Mariye. Risk factors of preterm birth among mothers who gave birth in public hospitals of central zone, Tigray, Ethiopia: unmatched case-control study 2017/2018. Teklay. BMC Res Notes. 2018; 11: 571.
- [4] Pathik D, Wadhwa, Curt A, Sandman, Manuel Porto, Christine Dunkel-Schetter Thomas J Garite. The association between prenatal stress and infant birth weight and gestational age at birth: A prospective investigation 1, 2. American Journal of Obstetrics and Gynecology. 2012; 169(4).
- [5] Ali AH, ASL, Saeed S, Mohsen PH. Epidemiology and Related Risk Factors of Preterm Labor as an Obstetrics Emergency, Shahid Beheshti University of Medical Sciences. 2017.
- [6] Damien B, Jean-Claude F, Loïc B. Risk Factors and Outcomes of Preterm Premature Rupture of Membranes in a Cohort of 6968 Pregnant Women Prospectively Recruited. Journal of clinical medicine. 2019.
- [7] Chaitanya T, Vandana Kalwaje E, Parvati B. Risk Factors for Preterm Birth and Low Birth Weight among Pregnant Indian Women: A Hospital-based Prospective Study. Journal of Preventive Medicine & Public Health. 2016.
- [8] Tessa M, André O, Janneke D. Comparison of Two Respiratory Support Strategies for Stabilization of Very Preterm Infants at Birth: A Matched-Pairs Analysis. 2019.
- [9] Maureen Hack AA. Outcomes of children of extremely low birthweight and gestational age in the 1990's. Early Human Development. 1998.