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Mortality and Morbidity Among Preterm Neonates Admitted To Al-Mukalla Maternity and Childhood Hospital, Yemen

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Abstract

Globally, preterm birth is a major clinical problem associated with significant mortality and morbidity in the perinatal, neonatal, and childhood periods and even in adulthood. The study aimed to evaluate the mortality and morbidity of preterm neonates admitted to Maternity and Childhood Hospital (MCH) in Al-Mukalla. A retrospective case-control study at a ratio of 1:1 was conducted in the neonatal unit of pediatric ward from October 2012 to October 2013. The study included records of 104 preterm neonates as cases and equal numbers of full term neonates as control. The results showed high mortality rate (22.6%) among the neonates. The main causes of death among cases were respiratory disorders 62.5% and Sepsis 35% while in controls were birth asphyxia 42.9% and congenital anomalies 42.9%. There were statistically significant association between neonatal mortality rate and body weight and gestational age of the neonate (p value = 0.000 and 0.001 respectively). Regarding morbidity, there were statistically significant association between cases and controls in the following complications: respiratory distress, apnea, feeding problems, jaundice (p value = 0.016, 0.000, 0.014, 0.020 respectively) As well as (hypoglycemia, sepsis, gastrointestinal bleeding and Birth asphyxia (p value = 0.006, 0.000, 0.010 and 0.006 respectively). The mortality rate was high among preterm infants. We concluded that urgent improvement is needed in prenatal and neonatal care to reduce death and complications.

Key words: preterm neonate, mortality, morbidity, Al-Mukalla hospital, Yemen.

Introduction:

Globally, preterm birth (PTB) is a major clinical problem associated with significant mortality and morbidity in the perinatal, neonatal, and childhood periods and even in adulthood [27,32]. It can affect physical health, cognitive and behavioral dimensions, making it one of the most significant challenges for modern public health [1]. PTB is an obstetric complication of complex etiology associated with significant neonatal mortality and morbidity worldwide. Numerous morbidities among infants born preterm have been reported to lead to both neonatal mortality

and late sequelae such as respiratory distress syndrome, retinopathy of prematurity, neurological and neuro-developmental abnormalities, and lifelong vision and hearing impairment [2]. Globally, more than 20 million infants are born every year with a birth weight less than 2500 g, with Asia and Africa witnessing the largest numbers, India alone accounts for 40% of the cases of low birth weight (LBW) in the developing world, and more than half of those in Asia [30].

Worldwide, 15.5% of all infants are born with low birth weight, 95.6% of them in the developing countries [30]. Birth weight may be a predictor for survival as low birth weight infants have a greater risk of morbidity and mortality [10,31]. Prematurity as an indicator of neonatal

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immaturity accounts for 10% of neonatal mortality globally [22]. Previous studies have estimated that 11.1% of all live births are preterm worldwide, ranging from about 5% in several European countries to 18% in some African countries [3]. The Brazilian rate of preterm birth was nearly twice that found in European countries [17,20].

Improved care of preterm babies has resulted in reduced mortality in developed countries [34,27]. This is not so in developing countries where the management of preterm birth babies is fraught with difficulties arising from scarcity of resources typified by poorly-equipped specialized newborn care units [8], consequently the burden of the complications and mortality from preterm births remains a significant potential challenge to newborn health in resource-poor settings like ours.

The study aimed to evaluate the mortality and morbidity and the association factors among preterm neonates admitted to Maternity and Childhood Hospital in Al-Mukalla.

Materials and methods:

This is a retrospective case-control study with ratio of 1: 1 cases and controls. It conducted at the neonatal care unit of the pediatric ward at the Maternity and Childhood Hospital (MCH) in Al-Mukalla city the capital of Hadhramout Governorate, Yemen. This Hospital is a tertiary care teaching hospital responsible for the care of all children and mothers patients coming from three Governorates; Hadhramout, Shabow and Al-Mahra.

A total of 104 preterm neonates and equal numbers of full term neonates 104 as controls who were admitted during the study period from October 2012 to October 2013 were included in

the study. Cases were defined as a live preterm neonates aged (< 37 weeks). Pre-term cases have been diagnosed by the resident specialist in the hospital.

Controls were defined as a full-term live neonate aged ($\geq 37 - 42$ weeks).

The data of the cases and controls were collected from medical records. Information extracted from the neonates' records include: sex, gestational age at delivery, birth weight, morbidity, and outcome.

For the purpose of this study, prematurity was subdivided on the basis of gestational age into three groups: group 1(G1) extremely preterm (<28 weeks), group 2(G2) very preterm (28 - <32 weeks), and group 3(G3) moderate or late preterm (32to <37 weeks of gestation) (34).

Birth weight classification was based on the classification defined by the Centers for Disease Control [21]. Group 1(G1) extremely low-birth-weight (ELBW) with birth weight <1000g, group 2(G2) very low-birth-weight (VLBW) with birth weight ranging between 1000-1499g, group 3(G3) low-birth-weight (LBW) with birth weight ranging between 1500-2000g, group 4(G4) with birth weight ranging between 2000- 2500 and group 5 (G5) with birth weight ranging between 2500-3999g. Mortality was defined by death as a result of prematurity and/or at least one of its short-term complications during the hospitalization period.

The study was approved by the Ethics Committee of the Al-Mukalla city hospital.

Statistical Analysis: Collected data were checked for accuracy and completeness and were coded and entered into the Statistical Package for

Social Sciences (SPSS) software version 20 and Excel. Descriptive statistic such as Mean \pm Standard Deviation, frequencies and percentages were calculated. Comparisons were done with the Chi-square test and p-value level < 0.05 was considered significant throughout the study.

Results:

Out of 208 neonates studied, 109 (52.4%) were

males of them 55 (50.5%) were preterm, and 99 (47.6%) were females, of them 49 (49.5%) were preterm (Table 1). Table1 also shows that the total mortality rate and mortality rate by gender. Forty seven (22.6%) of the babies were died. Of them 27 (13%) were males and 20 (9.6%) females. The neonatal mortality rate by gender was not significant ($p = 0.08$).

Table 1: Distribution of maturity and mortality rate among cases and controls by gender

Gender	Preterm		Full Term		Mortality rate		P-value
	No	(%)	No	(%)	No	(%)	
Male	109	(52.4)	55	50.5	54	49.5	0.08
Female	99	(47.6)	49	49.5	50	50.5	
Total	208	(100)	104	100	104	100	

The study found that the main causes of death among cases (Preterm) neonates were respiratory disorders 62.5% (respiratory distress syndrome,

apnea) followed by Sepsis 35% while in controls (Full term) were birth asphyxia 42.9% followed by congenital anomalies 42.9% (Table 2).

Table 2: Main causes of death among cases and controls neonates admitted to Mukalla MCH (no = 47)

Causes of death	Preterm (no=40)		Full term (no=7)	
	N	%	N	%
Respiratory disorders	25	62.5	0	0.0
Sepsis	14	35	1	14.2
Birth asphyxia	1	2.5	3	42.9
Congenital anomalies	0	0.0	3	42.9

As shown in Table 3 the mean birth weight of the preterm and full-term neonates was 1.54 ± 0.54 kg and 2.78 ± 0.62 kg respectively. The mean of

gestational age was 32.17 ± 2.9 weeks and 40.29 ± 1.59 weeks respectively (Table 3).

Table 3: Distribution of mean birth weight, mean gestational age and mortality rate among preterm and full term neonates

	Mean \pm SD* of Birth Weight (KG)	Gestational age (weeks)	Mortality rate	
			N	%
Full term	2.78 \pm 0.62	40.29 \pm 1.59	7	6.7
Preterm	1.54 \pm 0.54	32.17 \pm 2.9	40	38.5
Categories				
group 1	0.72 \pm 0.156	26.57 \pm 1.8		
group 2	1.23 \pm 0.25	31.06 \pm .96		
group 3	1.69 \pm 0.14	34.31 \pm 1.03		
group 4	2.18 \pm 0.16			
group 5	3.10 \pm 0.45			

SD* = Standard Deviation

The results of the study showed that, there were statistically significant association between neonatal mortality rate and body weight as well as with gestational age of the neonate (p-value =

0.000 and 0.001 respectively), where the mortality rate was increased with low body weight or gestational age of the neonate, (Table 4 and 5).

Table 4: Association between mortality rate and birth weight categories among cases and controls

Body weight category (KG)	Total number admitted (n=208)	Mortality (n= 47)		P-value
		N	%	
G1 < 1	14	14	100	0.000
G 2 1- < 1.5	32	12	37.5	
G3 1.5-< 2	43	11	25.6	
G 4 2 < 2.5	44	6	13.6	
G5 2.5-more	75	4	5.3	

Table 5: Association between mortality rate and gestational age among cases and controls

Gestational age (in weeks)	Total number of admitted cases and controls (n =208)	Mortality rate (n=47)		P-value
		N	%	
G1 <28	14	13	92.9	0.001
G2 28 - <32	35	13	37.1	
G3 32 – 37	55	14	25.5	
Full term >37	104	7	6.7	

Regarding morbidity, it was found that, there were statistically significant association between the cases (preterm neonate) and controls (full term neonate) in the following complications that occur during hospital admission: Respiratory distress p-value = 0.016, Apnea p-value = 0.000,

Feeding problems p-value = 0.014, Jaundice p-value = 0.020, Hypoglycemia p-value = 0.006, Sepsis p-value = 0.000 as well as gastrointestinal bleeding (GIT Bleeding), convulsion and birth asphyxia (p-value = 0.010 ; 0.005 and 0.006 respectively) (Table 6).

Table 6: Morbidity among cases and controls

Complications		Preterm (n=104)		Term (n=104)		P-value
		No	(%)	No	(%)	
Respiratory distress	Yes	40	38.5	24	23.1	0.016
	No	64	61.5	80	76.9	
Apnea	Yes	41	39.4	8	7.7	0.000
	No	63	60.6	96	92.3	
Feeding problems	Yes	27	26	13	12.5	0.014
	No	77	74	91	87.5	
Jaundice	Yes	36	34.6	21	20.2	0.020
	No	68	65.4	83	79.8	
Convulsion	Yes	3	2.9	14	13.5	0.005
	No	101	97.1	90	86.5	
Hypoglycemia	Yes	25	24	10	9.6	0.006
	No	79	76	94	90.4	
Sepsis	Yes	27	26	8	7.7	0.000
	No	77	74	96	92.3	
Anemia	Yes	13	12.5	7	6.7	0.120
	No	91	87.5	97	93.3	
Birth asphyxia	Yes	1	0.96	6	5.8	0.006
	No	103	99.4	98	94.2	
GIT Bleeding	Yes	11	10.6	2	1.9	0.010
	No	93	89.4	102	98.1	

Discussion:

Most data on preterm neonatal death and morbidity come from older studies, in addition, many studies have been limited to include only very preterm neonates, often focused on results by reducing birth weight [19,23]. Results by birth weight may be tended by incorporating more mature neonates with growth restriction [6,11,19]. Gestational age at birth is one of the major determinants of neonatal survival and morbidity [19].

Our study aimed to evaluate the mortality and morbidity and associated factors among preterm neonates admitted to Al Mukalla Maternity and Childhood Hospital.

The results showed that neonatal mortality rate was 22.6%, this is similar with study done in

Uganda where the rate was 22% [14] but the rate is higher than that of other studies such as Jordan where rate was 8.7% [28] and in north- central Nigeria, the overall mortality rate was 4.3% [24]. While in China the mortality rate among preterm and full-term infants was only 1.7% and 0.7% respectively [13]. These differences between countries in the mortality rate of preterm infants are mainly determined by the complexity of the care that countries can provide [2,18].

The study showed a statistically significant association between neonatal mortality rate with gestational age <37 weeks and those over 37 weeks. Ilyoke et al [15] in their study which conducted in south east Nigeria found that mortality rate among preterm neonate was higher than that among full term, and this corresponding with other

studies [24]. Even in late preterm, Rather et al [25] found that the mortality rate was statistically significantly higher in late preterm neonates compared to full term neonates with $P = 0.02$.

Celik et al [5], also found that the mortality rate in late preterm significantly higher as compared to full term neonates $p < 0.001$.

This high mortality rate in our study may be reflects poor of perinatal health care in our hospital (poor prenatal care, shortage of ventilators, absence of lung surfactant therapy and total parental nutrition in neonate care unit).

The results showed that mortality was inversely associated with gestational age and birth weight in neonates. This finding is consistent with the results of many other studies [4,7,10,12,14,15,26,31] where mortality was found to be high among the younger and more premature children born (less than 1 kg or 28 weeks of pregnancy). Improvements in access to prenatal care, and interventions to prevent preterm delivery and low birth weight are urgently needed and improvements in facility based neonatal care may also offer a survival advantage. There was no statistically significant association was found between the neonatal mortality rate and gender in this study, which is consistent with the results of other studies [24,9,16] and in contrast to other studies [26].

The study showed, that the common neonatal morbidities occur during admission were respiratory disorders (apnea and respiratory distress syndrome), jaundice, sepsis, feeding difficulty, hypoglycemia and gastrointestinal

bleeding and there are significant difference between the preterm and full term babies in these complications. Rather et al [25] found that late preterm infants were at significantly higher risk for overall morbidity due to any cause ($p < 0.0001$), and respiratory morbidity ($p < 0.0001$), jaundice ($p < 0.0001$), hypoglycemia ($p < 0.0001$), and sepsis ($p < 0.0001$).

Iyoke et al (15) in 2014 mentioned that the commonest complications of prematurity across the years of study were Jaundice (58.1%), sepsis (50.4%), and respiratory difficulties (43.0%).

In our study birth asphyxia and convulsion more in full term than preterm with significant difference ($p = 0.006$ and $p = 0.005$), and this was corresponding to Feng et al [13] from China. Wang et al [33] reported that the prematurity complications as pulmonary diseases, severe infection, and neurologic diseases were common and remain the most frequent causes of neonatal death and this corresponding to our study, but different to some previous studies in China in which birth asphyxia (24.5–28.6%) was the most frequent cause [29].

Conclusion and recommendations: We conclude that mortality rate was high among the preterm neonates and affected by their weight and gestational age. The common complications that cause death were respiratory disorders and sepsis in preterm neonate and birth asphyxia and congenital anomalies in full-term neonate. An urgent improvement in prenatal and newborn care is therefore needed in the hospital to decrease the death and complications.

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الوفيات والمراضة بين حديثي الولادة (الخدج) في مستشفى المكلا للأمومة والطفولة، اليمن

حنان سعيد بن غوث صالح عوض بحول مازن أحمد جواس
علي سالم باحارثه فوزية فرج بامطرف

الملخص

تعد الولادة المبكرة مشكلة سريرية رئيسية ترتبط مع وفيات كبيرة ومراضة بين حديثي الولادة، ومرحلة الطفولة وحتى في سن البلوغ. استهدفت الدراسة تقييم وفيات ومراضة لحديثي الولادة (الخدج) في مستشفى الأمومة والطفولة في المكلا. أجريت دراسة استرجاعية لحالات مع شواهد بنسبة 1:1 في وحدة حديثي الولادة بقسم الأطفال من أكتوبر 2012 إلى أكتوبر 2013. شملت الدراسة سجلات 104 مواليد غير مكتملين (خدج) كحالات وأعداد متساوية من حديثي الولادة مكتملين كضوابط، وتم جمع بيانات الحالات والضوابط من السجلات الطبية. أظهرت النتائج ارتفاع معدل الوفيات (22.6%) بين المواليد. وكانت الأسباب الرئيسية للوفاة بين الحالات هي اضطرابات الجهاز التنفسي 62.5% والإنتان 35% بينما كانت في الضوابط الاختناق في أثناء الولادة 42.9% والشذوذ الخلقي 42.9%. كان هناك ارتباط ذو دلالة إحصائية بين معدل وفيات حديثي الولادة ووزن الجسم والعمر الحلمي للوليد) قيمة $p = 0.000$ و 0.001 على التوالي). فيما يتعلق بالمراضة، كانت هناك ارتباطات ذات دلالة إحصائية بين الحالات والضوابط في المضاعفات الآتية: اضطرابات الجهاز التنفسي، انقطاع التنفس، مشاكل التغذية، اليرقان (قيمة $p = 0.016$ ، 0.014 ، 0.000 ، 0.020 على التوالي) كما أن (نقص السكر في الدم، الإنتان، نزيف الجهاز الهضمي و اختناق الولادة) (قيمة $p = 0.006$ ، 0.010 ، 0.006 على التوالي). معدل الوفيات كان عاليا بين حديثي الولادة (الخدج). نستنتج أن هناك حاجة إلى تحسين عاجل في الرعاية قبل الولادة وحديثي الولادة للحد من الوفاة والمضاعفات.

الكلمات المفتاحية: حديثي الولادة، الوفيات، المراضة، مستشفى المكلا، اليمن