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Neonatal complications and its treatment for the better health of neonates at shouq al-kameesh hospital, Libya

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Abstract
Common Neonatal Complications include Neonatal Jaundice, Respiratory distress, Hypoglycemia, sepsis etc. Certain ante-partum and intra-partum risk factors are associated with the need for resuscitation. The main aim of the present study is to assess the common complications of the Neonates in Libya and their managements for healthy sustainable life of the neonates born/admitted at the Shouq Al-kameesh hospital, Al-khoms, Libya. A prospective study was conducted among neonates attended (in-patients and out-patients) at the Shouq Al-kameesh hospital Al-khoms, Libya from April 2018 to March 2020.
A total of 294 babies were born/admitted during the period of study. The male-female ratio was 1:0.87. The majority of the babies were aged between 1-30 days. Average birth weights of neonates were 3.2kgs. And 72.10% neonates born with the birth weight of 3-4kgs. Neonatal jaundice (51.01%), sepsis17.00%), low birth weight, preterm birth, TTN, RDS and MAS were the most common morbidities. 89.77% of the babies were undergone phototherapy and 79.91% of babies treated with First line antibiotics. The overall mortality rate was 8.33% with more death during mechanical ventilation usage. Strengthening perinatal care, emergency obstetric care services and neonatal resuscitation skills are necessary to reduce the neonatal complications and mortality.

Keywords: neonatal jaundice, sepsis, neonatal mortality, shouq al-kameesh hospital, Libya

Introduction

Most of the newborns transition from fetal to extra-uterine life uneventfully. However, approximately 1 in 10 will require some assistance after delivery to initiate or sustain the health of Neonates. Common complications in neonates are Neonatal Jaundice, Respiratory distress, Hypoglycemia, sepsis etc. Intrapartum factors may also complicate fetal transition, including assisted delivery, cesarean delivery, abnormal fetal lie, presence of meconium and placental complications. Post-term and premature discrepancies pose additional risks for poor transition. An anticipated compromised birth warrants the presence of personnel who can initiate and sustain resuscitation, including use of ventilator support, chest compressions and selected medications. However, risk factors are not always apparent and providers must be able to anticipate and intervene quickly to support the compromised newborn. Three assessment prompts will assist with quick identification of newborns that will require support: Is the baby term? Is the baby breathing? Is there good muscle tone? (Lori O'keefe, 2011) [7]. A significant proportion of term and preterm infants develop neonatal jaundice. Jaundice is caused by an increase in serum bilirubin levels, largely as a result of breakdown of red blood cells. Bilirubin is conveyed in the blood as 'unconjugated' bilirubin, largely bound to albumin. The liver converts bilirubin into a conjugated form which is excreted in the bile. Very high levels of unconjugated bilirubin are neurotoxic. Phototherapy is a simple and effective way to reduce the bilirubin level (Mitra and Rennie, 2017) [9].
Neonatal sepsis is a kind of neonatal contamination and particularly includes to the nearness in an infant of a bacterial circulatory system disease (for example, meningitis, pneumonia, pyelonephritis, or gastroenteritis) in the setting of fever (Sowmya *et al*., 2016) [16]. Premature newborns face an increased risk of one or more complications. It might not be able to resist certain infections. Neonates are placed in an incubator to provide protection against these infections (Randis, 2008) [11]. Kim *et al*., (2020) [5] treated the neonatal sepsis with Streptococcus sp. by *ampicillin and ceftriaxone.*
Prior to birth, the fetus receives oxygen by diffusion from the mother's blood across the placental membranes. After birth, the placenta no longer supports fetal needs and the newborn must quickly establish ventilation, clear fluid from the alveoli and dilate the pulmonary vasculature to support ongoing oxygenation. Failure to do so results in hypoxemia and acidosis. The newborn may respond briefly to hypoxia with compensatory tachypnea, although this is quickly followed by primary apnea and a fall in heart rate (HR). If breathing is not quickly established, secondary apnea occurs, and assisted ventilation must be provided to reverse the process (Lori O'keefe, 2011) [7].
Neonatal resuscitation including the management of meconium exposure and the use of supplemental oxygen. Of the 13% of newborns born through meconium-stained amniotic fluid, less than 12% will go on to develop meconium aspiration syndrome (MAS). The latest recommendations for management of meconium-exposed infants include an assessment of infant behavior. For the meconium exposed infant who is vigorous (e.g., with normal respiratory rate, tone, and Heart rate), intrapartal suctioning and immediate neonatal tracheal suctioning are no longer recommended. However, for the meconium exposed infant who is depressed, direct suctioning of the trachea before establishment of respirations is indicated

(Bowen and Bowen, 2015) [3].
Maternal factors may be chronic or acute and include such conditions as diabetes, hypertension, cardiopulmonary disease, substance exposure, late trimester bleeding, and infection. Infants born to mothers with diabetes have been at significantly greater risk for perinatal morbidity and mortality. Practitioners have sought to improve the outcome of diabetic pregnancies through proper maternal glycemic control (Salima *et al*., 2018) [14].
Premature neonates have an increased incidence of congenital anomalies and major congenital anomalies are an independent risk factor for pre-term birth (Macharia and Huddart 2010) [8]. Neonatal the first 28 days of life is the most vulnerable period of childhood and almost half of all neonatal deaths are in the first 24 hours of life (Chaudhary *et al*., 2017) [4]. The main aim of the present study is to assess the common complications of the Neonates in Libya and their managements for healthy sustainable life of the neonates born/admitted at the Shouq Al-kameesh hospital, Al-khoms, Libya.

Neonates and Methods
A facility-based in prospective study was conducted among neonates born at the Shouq Al-kameesh hospital and some mother delivered at other hospital and came for the treatment as out-patient or in-patient to the same Shouq Al-kameesh hospital, Al-khoms, Libya from April 2018 to March 2020. The previous consent about the research has obtained from both the Director of the Hospital and parents of the Neonates to maintain the ethics of the study.

Sample size and sampling technique
In-patients and Out-patients born/attended the Hospital during the study period were about 294 neonates. The researcher included all the Neonates born/attended at the hospital (Normal delivery or by Caesarean) in this study.

Data collection methods
Data were collected using a questionnaire by an expert nurses and Pediatrician and from the follow-up checklist. The main outcomes and causes of death were set by pediatrician (researcher) and medical residents.
Maternal and demographic data were obtained by interviewing the mothers or reviewing the referral records by neonatal nurses and each neonate was monitored daily until discharged or died. A final assessment of the Neonates health was determined by a pediatrician or pediatric resident after conducting the necessary laboratory investigation and a thorough review of medical records. Complete Blood Count (CBC) data like C-reactive protein (CRP), White Blood Corpuscles (WBC) and Platelets (PLT) were measured using full automatic CBC analyzer (Mindray BC-5150, China).

Results and Discussions
Neonatal care provided within the first few minutes of life plays a major role in the reduction of neonatal morbidity and mortality. The main reasons of admission to neonatal unit were preterm delivery, sepsis, meconium delivery, birth asphyxia, and congenital malformation. This study was carried out as to assess the common complications of the Neonates in Libya and their managements for healthy sustainable life of the neonates born/admitted at the Shouq Al-kameesh hospital, Al-khoms, Libya from April 2018 to March 2020.
Total In-patients and Out-patients born/attended the Hospital during the study period were about 294 neonates. Male ratio was higher than the female ratio in the present study. The male-female ratio was 1:0.87. Regarding Neonates age, the highest percentage (male-41.83% and female-39.62%) was observed during the stay in the hospital is in 1-5 days group (average mean value was 39.62). In other age groups, the percentages were very low (Table 1). More care taken only in this period to avoid the unnecessary risks for the neonates. Reason for the less number of neonates other than 1-5 days of age group may be due to discharge after better health treatment.

Table 1: Distribution of Neonates in Age (Days) and Gender.

S.No.	Age (Days)	Male		Female		Mean	P-Value
		No.	%	No.	%		
1.	1-5	123	41.83	110	37.41	39.62	0.0234
2.	6-10	008	02.72	004	01.36	02.04	
3.	11-15	005	01.70	004	01.36	01.53	
4.	16-20	005	01.70	010	03.40	02.55	
5.	21-25	002	00.68	003	01.02	00.85	
6.	26-30	014	04.76	006	02.04	03.40	
	Total	157	53.39	137	46.59	49.99	

(% calculated from the total 294 Neonates)

In the study area, most of the ladies (90.10%) were delivered their babies in term (47.61% males and 43.19% females). But less percentage of ladies delivered with preterm babies (4.42% males and 4.76% of females) (Table 2).

Table 2: Distribution Neonates Birth in Terms or Preterm.

S. No.	Birth	Male		Female		Mean	P-Value
		No.	%	No.	%		
1.	Term	140	47.61	127	43.19	45.4	0.0012
2.	Preterm	013	04.42	014	04.76	04.59	
	Total	153	52.03	141	47.95	49.99	

(% calculated from the total 294 Neonates)

Table 3 denotes the relationship of Birth weight of neonates and gender of the neonates. Highest percentage (72.10%) of neonates (33.67% of male and 38.43% of females) has the birth weight of 3-4kgs and followed by 1-2 kgs. Very few neonates were born with 5-6kgs at birth weight. Average birth weights of the neonates are 3.2kgs.

Table 3: Relationship of Birth Weight with Gender of the Neonates.

S.no.	Birth weight (kg)	Male		Female		Mean	P-Value
		No.	%	No.	%		
1.	1-2	38	12.92	041	13.94	13.43	0.0038
2.	3-4	99	33.67	113	38.43	36.05	
3.	5-6	02	00.68	001	00.34	00.51	
	Total	139	47.27	155	52.71	49.99	

(% calculated from the total 294 Neonates)

During correlation of the birth weight with the CBC parameters of neonates, the maximum percentages of neonates with all parameters (CRP, WBC and PLT level) were observed normal (Table 4). It indicates normal CBC value present in the normal neonates. In some low birth weight neonates, CRP level and WBC level increased due to an increased infection rate.

Table 4: Relationship of Birth Weight with the CBC parameters level of the Neonates.

S.No.	Birth weight (kg)		CRP level		WBC Level		PLT Level	
			No.	%	No.	%	No.	%
1	1-2	Low	022	07.48	018	6.12	23	07.82
		Normal	036	12.24	042	14.28	34	11.56
		High	021	07.14	019	6.46	22	07.48
2	3-4	Low	066	22.44	052	17.68	62	21.08
		Normal	103	35.05	123	41.83	98	33.33
		High	043	14.62	037	12.58	52	17.68
3	5-6	Low	002	00.68	00	00	00	00
		Normal	001	00.34	001	00.34	01	00.34
		High	000	00	002	00.68	02	0.68
	Total		294	99.99	294	99.97	294	99.97

(% calculated from the total 294 Neonates)

Risk factors like Neonatal Jaundice, Neonatal Sepsis, Infant Daibetic Mother, Transient Tachypnea, Respiratory Distress Syndrome, Meconium Aspiration Syndrome were observed in this study either alone or mixed complications. Neonatal Jaundice place first with the mean value of 25.05 in the Neonatal complications in this study. Sepsis alone and joint with Neonatal jaundice stand in the second risk factors (average mean value of 8.50 for Sepsis and 9.35 for the combined complications of Sepsis and Neonatal jaundice) among the neonates warrant more attention of Pediatricians care and treatment. (Table 5). Many early neonatal infections can be prevented by avoiding unnecessary separation of the newborn from the mother e.g.. baby unit (Shane and Stoll, 2014) [15]. Hand-washing before delivering and handling the infants, good basic hygiene and cleanliness during delivery (e.g. chlorhexidine cream for all maternal vaginal examinations) (Puopolo *et al*., 2011) [10]. Appropriate umbilical cord care and appropriate eye care (Turin *et al*., 2014) [17].

Table 5: Risk factors of Neonates in the study.

S.No.	Risk Factors	Male		Female		Mean	P-Value
		No.	%	No.	%		
1	Neonatal Jaundice	82	27.89	68	23.12	25.05	0.00112
2	Sepsis	29	09.86	21	7.14	08.50	
3	IDM	05	01.70	02	0.68	01.19	
4	NJ+Sepsis	26	08.84	29	9.86	09.35	
5	NJ+TTN	02	00.68	07	2.38	01.53	
6	NJ+RDS	01	00.34	05	1.70	01.02	
7	NJ+MAS	05	01.70	02	0.68	01.19	
8	MAS+TTN	00	00	00	00	00	
9	NJ+Sepsis+TTN	03	01.02	02	0.68	0.85	
10	NJ+Sepsis+IDM	04	01.36	01	0.34	0.85	
	Total	157	53.39	137	46.58	39.48	

(% calculated from the total 294 Neonates); (NJ-Neonatal Jaundice, IDM-Infant Daibetic Mother, TTN-Transient Tachypnea, RDS-Respiratory Distress Syndrome, MAS-Meconium Aspiration Syndrome).

Table 6: Relationships of Neonates' Risk factors and Treatments.

S.No.	Risk factors	Light		Blood Transfusion		Exchange Transfusion		Antibiotics					
								I Line		II Line		III Line	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	NJ	119	40.47	06	2.04	03	1.02	77	26.19	18	6.12	00	00
2	Sepsis	030	10.20	02	0.68	00	00	38	12.92	12	4.08	00	00
3	IDM	008	02.72	00	00	00	00	04	01.36	00	00	00	00
4	NJ+Sepsis	039	13.26	04	1.36	03	1.02	52	17.68	04	1.36	02	0.68
5	NJ+TTN	012	04.08	00	00	02	0.68	06	02.04	01	0.34	00	00
6	NJ+RD	007	02.38	01	0.34	00	00	03	01.02	02	0.68	00	00
7	NJ+MAS	012	04.08	01	0.34	02	0.68	02	00.68	00	00	00	00
8	MAS+TTN	011	03.74	01	0.34	01	0.34	11	03.74	08	2.72	00	00
9	NJ+Sepsis+TTN	020	06.80	04	1.36	00	00	22	07.48	07	2.38	01	0.34
10	NJ+Sepsis+IDM	006	02.04	00	00	00	00	20	06.80	04	1.36	00	00
	Total	264	89.77	19	6.46	11	3.74	235	79.91	56	19.04	03	1.02

(% calculated from the total 294 Neonates)

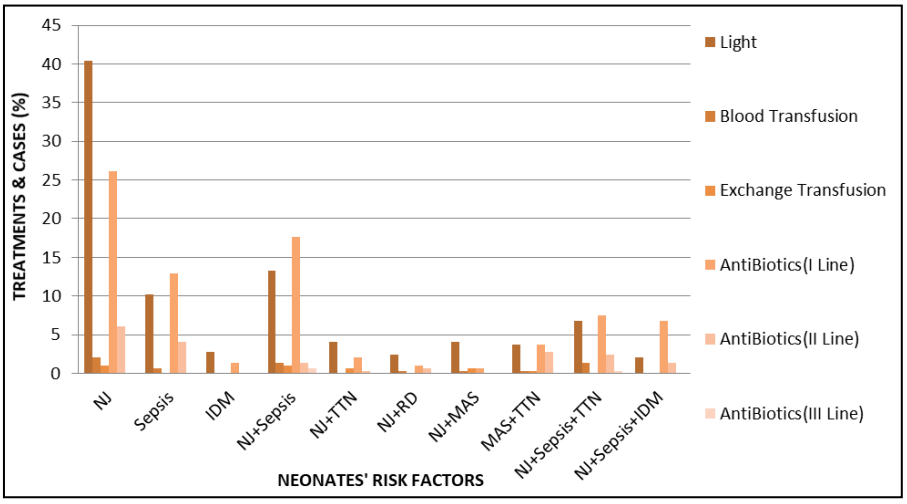

Fig 1: Relationships of Neonates' Risk factors and Treatments.

About 89.77% (40.47% of neonates suffer with Neonatal jaundice, 10.20% with Sepsis, 13.26% with combined

Sepsis and Neonatal jaundice etc.,) of neonates treated with phototherapy (Table 6 and Graph 1). Antibiotic treatment was done mainly with First line antibiotics to 79.91% of Neonates. 6.46% of neonates from this study population got blood transfusion. Rarely 3.74% of neonates got Exchange transfusion. Exchange transfusion is commonly used in newborns for immediate treatment of severe hyperbilirubinemia to prevent bilirubin encephalopathy and kernicterus (Sabzehei *et al*., 2015) [13].

A woman with premature rupture of membranes is at risk of intra-amniotic infection, postpartum infection, endometritis, and death. A neonate born from premature rupture of membranes mother is at high risk of respiratory distress syndrome, sepsis, intraventricular hemorrhage and death. The incidence of premature rupture of membranes ranges from about 5% to 10% of all deliveries (Assefa *et al*., 2018) [2].

Table 7: Reason of Mortality Rate of Neonates during the Study.

S.No.	Neonatal Mortality	Male		Female		Mean	P-Value
		No.	%	No.	%		
1	Congenital Anomalies	02	0.68	01	0.34	0.51	0.0027
2	Septic Shock	01	0.34	00	0	0.17	
3	Mechanical Ventilation	04	1.36	03	1.02	1.19	
4	Others	06	2.04	06	2.04	2.04	
	Total	13	4.42	10	3.4	3.91	

(% calculated from the total 294 Neonates)

Neonatal mortality in this study is about 4.42% in males and 3.91% in females. Females' mortality rate is observed lower than the male (Table 7). The total mortality rate is 8.33%. In addition, more mortality rate (2.38%) was observed with the known cause like Mechanical ventilation. This result is very much similar to the study result of Alburke *et al*., (2015) [1] at Misurata Teaching Hospital, Libya. Low neonatal mortality incorporate Europe, the Western Pacific, and the Americas, which have sepsis rates that record for 9.1% to 15.3% of the aggregate neonatal passing's around the world. This is interestingly with the 22.5 to 27.2% rate of aggregate passing's in asset poor nations, for example, Nigeria, the Democratic Republic of the Congo, India, Pakistan, and China (Sowmya *et al*., 2016) [16].

Since the introduction of neonatal care service in the year 1981 in Libya, Perinatal Mortality Rate (PMR) declined from 37.4 to 27.5. According to UNICEF (2015) [18] report, the neonatal mortality rate in Libya was 9. It has declined from the rate 37 on 1990. With an improvements in basic neonatal care such as thermoregulation and breastfeeding (Rhee *et al*., 2008) [12], the provision of advanced care for neonates in need of hospital care is increasingly important for the reduction of neonatal mortality in low- and middle-income countries (Zaidi *et al*. 2012) [19].

Conclusion and recommendations

Macrosomia, preterm birth, congenital anomalies, CHD, RDS, TTN, hypoglycemia, hypocalcaemia and hyperbillirubinaemia are significant complications among IDMs. A total of 294 babies were born/admitted during the period of study. The majority of the babies were aged between 1-30 days. A total of 294 babies were born/admitted during the period of study. The male-female ratio was 1:0.87. The majority of the babies were aged between 1-30 days. Average birth weights of neonates were 3.2kgs. Neonatal jaundice (51.01%), sepsis17.00%), low birth weight, preterm birth, TTN, RDS and MAS were the most common morbidities. 89.77% of the babies were undergone phototherapy and 79.91% of babies treated with First line antibiotics. The overall mortality rate was 8.33% with more death during mechanical ventilation usage. Strengthening perinatal care, emergency obstetric care services and neonatal resuscitation skills are necessary to reduce the neonatal complications and mortality. Strengthening perinatal care, emergency obstetric care services and neonatal resuscitation skills are necessary to reduce the neonatal complications and mortality.

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