

# Causes of Childhood Mortality at Pediatric Hospital, Benghazi- Libya 2013-2016

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## ABSTRACT

In the Eastern Mediterranean Region 12.2% of the population comprise children less than 5 years of age. An estimated 923 000 children under 5 years die every year in the region and under-five mortality has decreased by only 41% since 1990 to 2011.

The current study aimed to find out the causes of child deaths at Pediatric Hospital in Benghazi (2013-2016).

A retrospective hospital based study was conducted at pediatric hospital in Benghazi (2013-2016). The data were collected from the department of statistics, including age, sex and residency, causes of deaths. Data analyzed by SPSS version 20.

The total number of childhood deaths at pediatric Hospital in Benghazi during the three years (2013-2016) was 1475 child. The infant mortality represent 57% , 87% of them were neonatal death. The overall causes of childhood mortality were due to infection (21%), cardiac arrest (21%), congenital anomalies and syndromes (15%), non-communicable diseases (11%), and perinatal causes (8%), 72(63.2%) of perinatal cause were due to prematurity, 28(24.6%) birth asphyxia and hypoxia.

The most common causes of fewer than five deaths were infections, and congenital diseases; and the majority of perinatal deaths were due to prematurity and birth asphyxia.

**Key words-** Childhood mortality; Hospital based; Causes.

## INTRODUCTION

World health organization (WHO) reported that the leading causes of death among children under five in the world in 2015 were preterm birth complications, pneumonia, intra-partum-related complications, diarrhea, and congenital abnormalities. Neonatal deaths accounted for 45% of under-five deaths in 2015. The three major causes of neonatal deaths worldwide were: infections (36%, which includes sepsis/pneumonia, tetanus and diarrhea), pre-term (28%), and birth asphyxia (23%).<sup>1,3</sup> In 2000, world leaders agreed on the Millennium Development Goals (MDGs) and called for reducing the under-five mortality rate by two thirds between 1990 and 2015-known as the MDG 4 target.<sup>1,4</sup> The global under-five mortality rate dropped 53 percent, from 91 deaths per 1,000 live births in 1990 to 43 in 2015.<sup>3</sup> Despite these encouraging trends, challenges *still* remain, including reducing the number of deaths from childhood diseases (particularly among neonates); providing safe drinking water and other sanitation facilities; improving healthcare services in remote areas, and raising the efficiency of assistant medics; raising awareness on improving mother's nutritional status; establishing national integrated management of childhood diseases; and reducing birth complications as a result of endogamy (caused by close inter-familial marriage).<sup>3</sup> The child mortality rates declined in the Middle East and North Africa (MENA) from a level

of 206 per 1,000 live births in 1970 to only 27 in 2010. This was the biggest absolute reduction (179 points) among world regions as well as the biggest percentage reduction (87 points). Ten MENA countries (Oman, Saudi Arabia, Iran, Algeria, UAE, Egypt, Tunisia, Libya, Qatar and Bahrain) rank in the top twenty-five countries in the world (out of 165) All but two MENA countries (these being Iraq and Jordan) rank above the global median. Even Yemen, which has the highest child mortality rate currently.<sup>5</sup>

## MATERIALES AND METHODS

Retrospective hospital based study conducted at pediatric Hospital in Benghazi, to identify fewer than five deaths during period (2013-2016). The study carried out in December 2016. The data were collected from the department of statistics at pediatric Hospital in Benghazi. Only personal data age, sex and residency, causes of deaths were found in the files and on the electronic copies of patient's files. The data were coded, classified and analyzed by SPSS program version 20. A descriptive statistics were used.

**Limitations:** Inaccessibility of data from civil registry at Benghazi therefore death rates were not calculated at that time. Data from pediatric Hospital not classified and not coded by ICD -10 also poor file information and data collection was not easy.

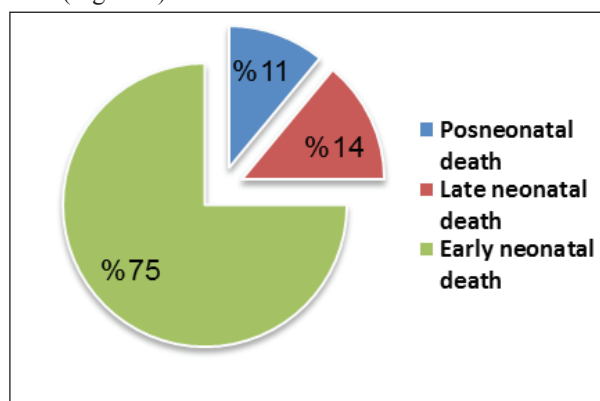


## RESULTS

The total number of deaths during the three years (2013-2016) was 1475 child. The study revealed that more than half 855(58%) of deaths were males and (620,42%) were females.

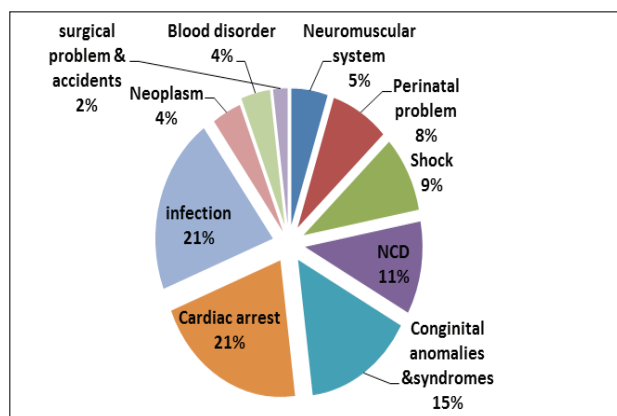
The infant mortality represent 57% as compared to 1-4 childhood mortality represented 43% of childhood deaths during this period (2013-2016)

The neonatal deaths represented 87% of infant deaths, early neonatal deaths (0-7 days) represented 75% of total infant deaths, late neonatal deaths 14% and post-neonatal deaths 11% (Figure 1).



**Figure 1:** Infant deaths at pediatric hospital Benghazi (2013-2016).

The most common causes of childhood mortality in pediatric hospital at Benghazi were (21%) of child death due to cardiac arrest, 309 (21%) due to infections, 228 (15%) Congenital Anomalies and syndromes, and (11%) non-communicable diseases (Figure 2).



**Figure 2:** Common cause of death at pediatric hospital Benghazi (2013-2016)

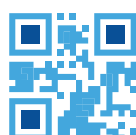
The study found that from 309 childhood mortality due to infections, 156(52%) were due to sepsis and septicemia, 110 deaths (36%) were due to chest infections and pneumonia, 20(7%) of children's deaths were due to meningitis. Among 57 childhood death due to neoplasm, 39(68%) were due to leukemia, 8(14%) due to brain and CNS tumors, 7(12.2%) due to respiratory tumors (Table 1). The non-

communicable diseases (NCDs) caused 161(11%) of total deaths in the childhood, 35(21.7%) of childhood mortality related to NCDs were due to renal failure, 27(16.8%) due to metabolic disorders and diabetes (DKA), 26(16.2%) due to chest diseases and pneumothorax, 24(14.9%) due to respiratory failure, and 18(11.2%) of childhood mortality due CVS (Table 1).

**Table1:** Communicable and non-communicable causes of childhood mortality at Pediatric Hospital at Benghazi, Libya 2013-2016

Common causes of childhood deaths	No.	%	Total No(%) N =1475
<b>1. Cardiac arrest</b>			302 (21%)
<b>2. Infections</b>	309	100	309(21%)
Chest Infection and pneumonia	110	35.5	
Sepsis and Septicemia	156	50.5	
Meningitis	20	6.5	
Carditis and pericarditis	6	2	
Other Infections	10	3.2	
Gastro-enteritis	7	2.3	
<b>3. Neoplasm</b>			57(4%)
Leukemia	39	68.5	
Brain and CNS tumors	8	14.0	
Lung and ENT tumors	7	12.2	
Renal tumors	3	5.3	
<b>4. Non-communicable diseases (NCDS)</b>			161(11%)
Renal failure	35	21.7	
Respiratory failure	24	14.9	
Chest problems & Pneumothorax	26	16.2	
Metabolic disorder &DKA	27	16.8	
CVS (cardiac muscle disease, failure and hypertension)	18	11.2	
Acute dehydration	15	9.3	
Hepatic failure and jaundice	16	9.9	

The blood disorders and immunity represented 64(4%) of childhood mortality, 42(65.6%) of them due to bleeding disorders 20(31.3%) due to anemia, and 2(3.1%) of them due to immunity disorders. The current study reported that



the surgical problems and accidents form 29(2%) of overall cause of childhood death, 10 (34.5%) of them due to G.I. and biliary obstruction, poisoning, foreign body inhalation and burns represented 4(13.8%) for each. Shock contributed to 137(9%) of overall under-five mortality (Table 2).

**Table 2:** Blood and surgical problems lead to childhood death at Pediatric Hospital at Benghazi, Libya 2013-2016.

Common causes of childhood death	No.	%	Total No.(%) N=1475
<b>1. Blood disorders and immunity</b>			64(4%)
Severe anemia	20	31.3	
Bleeding disorder	42	65.6	
Low immunity	2	3.1	
<b>2. Surgical causes and accidents</b>			29(2%)
GI and biliary obstruction	10	34.5	
Diagrammatic hernia	2	6.9	
Poisoning and CO <sub>2</sub> toxicity	4	13.8	
No O <sub>2</sub> at hospital	1	3.4	
On ventilator	3	10.3	
Car accident	1	3.4	
Foreign body inhalation	4	13.8	
Burns	4	13.8	
<b>3. Shock</b>			137(9%)

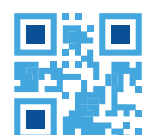
Congenital anomalies and syndromes lead to 228(15%) of overall childhood mortality, more than half (103, 57%) of them due to CVS anomalies, nearly one fifth (32, 18%) due to multiple-congenital anomalies, 16(9%) due to esophagus and GI anomalies, and 6(12%) of childhood mortality due to brain and neuromuscular problems. The congenital syndromes represented one fifth (47, 20.6%) of childhood mortality due to congenital problems, of which 36(77%) were due to Down syndrome, 4(9%) due to Edward syndrome, and 3(6%) other syndromes (congenital nephrotic syndrome, Noonan, and Hoffmann's) (Table 3).

The present study revealed that 114(8%) of overall causes of childhood mortality were causes related to perinatal problems, of which 72(63.2%) due to prematurity, 28(24.6%)

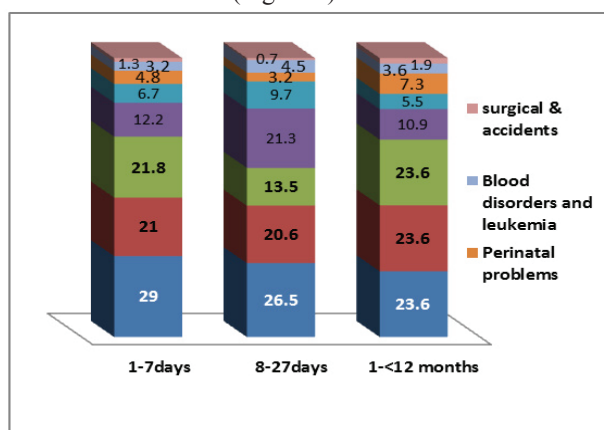
due to birth asphyxia and hypoxia, and 7(6.1%) of under five deaths due to pregnancy complications (bleeding, pregnancy induced hypertension and intra-uterine growth retardation) (Table 3).

**Table 3:** Congenital anomalies and perinatal causes leading to childhood death at pediatric hospital at Benghazi, Libya 2013-2016

Causes of death	No.	%	N=1475
<b>1. Congenital anomalies and syndromes</b>			<b>228(15)</b>
a) Congenital anomalies	181	79.4	
• Cardio-vascular anomalies	103	57	
• Multiple congenital anomalies	32	18	
• Hepatic and biliary system	2		
• Diaphragm	7	4	
• Esophagus and GI	16	9	
• Brain, CNS, Skeletal syst. and Growth retardation	12	6	
• Respiratory system	5	3	
• Renal and genital system	4	2	
b) Syndromes	47	(20.6)	
• Down syndrome	36	77	
• Edward Syndrome	4	9	
• Patau's Syndrome	2	4	
• Turner Syndrome	2	4	
• Others (Congenital nephrotic syndrome, Noonan, and Hoffmann's)	3	6	
<b>2. Brain and CNS diseases</b>			<b>74(5)</b>
• Convulsion	37	50.0	
• Brain edema, and death	18	24.3	
• Paralysis	10	13.5	
• Hydrocephalous	9	12.2	
<b>3. Perinatal causes :</b>			<b>114(8)</b>
• Prematurity	72	63.2	
• Birth asphyxia and hypoxia	28	24.6	
• Pregnancy complications (bleeding, PET and IUGR)	7	6.1	
• Intracranial bleeding	5	4.4	
• Intracranial infection	2	1.7	



According to the age in the early neonatal period (birth -7 days) 29% of child death due to cardiac arrest, 21.8% due to congenital anomalies and syndromes, 20% of death due to infections, and 12.2% due to medical diseases. While, neuromuscular and perinatal disorders were responsible for 6.0% and 4.8% respectively of early neonatal deaths. In the late neonatal period (8-27 days), the current study reported that 26.5%, 21.3%, 20.6% of deaths were due to cardiac arrest, medical problems and infections respectively. In post neonatal period (28-<year), nearly three quarters (70.6%) of death were due to cardiac arrest, infections and congenital anomalies and syndromes with the same percentage of 23.6% for each cause (Figure 3).



**Figure 3 :** Common causes of child death according to age at Benghazi pediatric hospital.

## DISCUSSION

Most under-five deaths were caused by diseases that are readily preventable or treatable with proven, cost-effective interventions. Infectious diseases and neonatal complications are responsible for the vast majority of under-five deaths globally.<sup>6</sup>

The present study reported that the most common infections attributed to childhood mortality were sepsis and septicemia (52%), (36%) chest infections and pneumonia, (7%) meningitis. In Iraq Awqati NA *et al* (2009)<sup>7</sup> reported that the main killers of children under age of five were preterm birth complications (18%), pneumonia (16%), intra-partum related events (12%), diarrhea (8%), neonatal sepsis (7%) and malaria (5%).<sup>7</sup> Baqui H *et al* (1998)<sup>8</sup> reported that, about 25% of the deaths were associated with acute lower respiratory infections (ALRI) and about 20% with diarrhea.<sup>8</sup> While, neonatal tetanus and measles remained important causes of death, and drowning was a major cause for 1-4-year-old children.<sup>8</sup>

The first 28 days of life are the most vulnerable time for a child's survival. Children face the highest risk of dying in their first month of life, at a global rate of 19 deaths per 1,000 live births.<sup>3</sup> Globally, 2.6 million children died in the first month of life in 2016, most of which occurred in the first week, with about 1 million dying on the first day and close to 1 million dying within the next six days. Neonatal mortality declined globally and in all regions but more

slowly than mortality among children aged 1-59 months.<sup>3</sup>

In the current study infant mortality represent 57% as compared to 12-59 months mortality represented 43% of childhood deaths. The neonatal deaths represented 87% of infant deaths. In Nigeria as a whole, 73.9% of neonates died in the first week of life, 26.0% of under-fives died as neonates, and 61.5% of 1-59 month olds died before their second birthday.<sup>9</sup>

The present study revealed that most common causes of death among infants according to the age in the early neonatal period were 29% due to cardiac arrest, 21.8% due to congenital anomalies and syndromes, and 20% of death due to infections. In the late neonatal period, the current study reported that 26.5%, 21.3%, 20.6% of deaths were due to cardiac arrest, NCDs and infections respectively. In the post- neonatal period, the present study reported that nearly three quarters of death were due to cardiac arrest, infections and congenital anomalies and syndromes with the same percentage of 23.6% for each.

In Nigeria the leading causes of death among under-five children were found to be childhood illnesses in 81.2%, followed by sudden death in 8.9% and accidents in 3.3%. Among neonates the leading causes were cough/and or difficulty in breathing in 42.3%, followed by sudden death in 11.9%, congenital abnormalities in 10.3% and prematurity in 10.2%. Diarrhea was the leading cause of death among infants in 49.8%, followed by cough and/or difficulty in breathing in 26.6%.<sup>9</sup> For the post- neonatal period the most common causes of death were congenital and chromosomal abnormalities, respiratory, infectious and parasitic and cardiovascular diseases. Meanwhile unintentional accidents, CNS disorders and cancers are the most common causes in childhood period. These findings are well adapted to pediatrics texts and other studies including Singh in India and Liu L in Bangladesh.<sup>10-12</sup> In Qatar, the leading causes of infant mortality were congenital malformations (all types) (34.5%), low birth weight (LBW) (27%), and respiratory distress of newborns (2.8%).<sup>13</sup>

## CONCLUSION

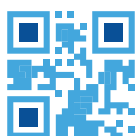
The most common causes of death of under-five at pediatric hospital in Benghazi include: the infections, congenital anomalies, syndromes and NCDs. At neonatal period the most common causes prematurity and birth asphyxia.

## RECOMMENDATIONS

Improvement of maternal and child health care services especially premarital, antenatal, natal, and post-natal care. Improve the quality of pediatric health care facilities for children. Improvement of health information system at pediatric hospital and encourage use of ICD-10 for classification of causes of mortality is recommended.

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