



## CAUSES OF NEONATAL (NEWBORN) DEATHS RELATED TO HEALTH SERVICE IN BAGHDAD

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### ABSTRACT

The aim of the research was to conduct an analytical study of mortality at Alwaiya Children Teaching Hospital (ACTH) in Baghdad governorate from June 1, 2019 to December 31, 2019, in order to find the ratio of general mortality to total acceptability. The results shown that 790 neonatal were death 53.19% from 1485 neonatal, the infection disease was 841 neonatal, 56.63% of all neonatal admitted to the hospital, and that 497 of the deceased's neonatal had an infection disease was 62.9% of the total death, however, respiratory disease was 295 neonatal, 37.34% of the total. Therefore, the mortality rate for respiratory patients is 81.71% of neonatal with respiratory diseases. Moreover, the number of death with a neurological disease is 182, 23.04% of the neonatal total deaths, and the percentage of deaths related to neurological diseases is 62.12% of those with neurological diseases. The risk factors affecting mortality are: masculinity, premature, birth weight loss and poor overall condition, so preterm birth and underweight should be avoided as much as possible with the ideal care of pregnant women. The parents should not be delay the hospital review before the neonatal condition gets worse. Therefore, there must be emphasis on methods and preventive measures that limit the spread of the infection, and there should be policies with written and clear instructions to all staff in the hospital indicating the role of each one and the procedures to be followed when dealing with neonatal. Infectious diseases are the leading cause or contributor to death, followed by respiratory diseases in the second rank, then congenital malformations in the third rank, then neurological diseases, surgical conditions and heart diseases.

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## INTRODUCTION

Neonatal mortality still occupies an important part of pediatrics, because a third of child deaths occur in the first year of life. Neonatal mortality has decreased in industrialized countries during the past century to reach less than 1.5 per thousand in many countries (Kumar, 2019). If we know that neonatal deaths contribute to more than 50% of infant deaths (Baqui, 2013). The major role of neonatal mortality in influencing the general incidence of neonatal mortality is clear to us (Bhutta, 2017). Therefore, there have been many studies around the world of childbirth mortality to show their rates, causes, factors affecting them, and ways to reduce them. Although there are death limits that cannot be exceeded, 5-6 per thousand (Mamba, 2018). Therefore, many researchers have devised modified methods to assess fate according to risk factors, or the severity of the medical or surgical illness before receiving medical care (H. Raobijaona, 2014). As the patient's risk factors (affecting the fate) are analyzed before receiving

medical care, then the external conditions and factors that lead to a difference in the final fate differ from the expected fate of these children (D. Chelo, 2012). The aim of the research was to conduct an analytical study of mortality at Alwaiya Children Teaching Hospital (ACTH) in Baghdad governorate, in order to find the ratio of general mortality to total acceptability: - to look for the causes and factors affecting them. - To know the frequency of each disease and the percentage of death in each disease - study the effect of the general condition in which the child reaches the hospital in the case of mortality.

## MATERIALS AND METHODS

A study was conducted from June 1, 2019 to December 31, 2019 in the Alwaiya Children Teaching Hospital in Baghdad, which includes 37 incubators and 20 beds. The occupancy rate is not less than 98%, accepted in the hospital by all children less than 6 weeks.

**Sample:** The sample included all children admitted to the hospital during the study period, filling out a form for each

patient upon admission by the medical therapist who conducts the interrogation, including the following information: patient identity, ID, birth date, pregnancy age, pregnancy and childbirth conditions, place of birth, weight at birth, method of transport to hospital, date of admission. The form was filled out and completed from the time the child arrived at the hospital until his logout or death by the attending physician. Additional, doctor will fill information from the child's examination, follow-up of the progress of the disease, the procedures and treatment measures provided to the child, the results of the laboratory and diagnostic solutions performed for the child such as: the general condition of the patient at the time of admission, the initial diagnosis, the creation of congenital delusions, surgical interference, intravenous feeding, mechanical ventilation or a doubling of the disease, and then the development of the final diagnosis or the cause of death.

**Procedure:** The sample size was (n=1485 neonatal) that was divided to 853 males and 236 females, where premature babies (less than 37 weeks) were 668 and (over 37 weeks) were 817.

The weight of the neonatal at the time of birth was divided into:

Less than 1000 grams	31 neonatal
Between 1000 - 1500 grams	140 neonatal
Between 1501 - 2500 grams	352 neonatal
Over 2501 grams	962 neonatal

Pregnancy was monitored in 44.3% of the total sample (we considered that the pregnancy was observed if the pregnant woman visited the doctor more than three times during pregnancy).

The place of birth was distributed as follows: in a public hospital in 763, in a private hospital 313, in clinic 73, and in the home of 346 neonatal. A total of 103 neonatal were transport to hospital by ambulance with a medical escort (6.9% of the total number of neonatal) and the rest in a regular car without a doctor's escort. The general condition of the neonatal at the time of hospital admission were 156 neonatal as accepted condition, with a median condition of 583 neonatal, bad conditions 550 neonatal and 196 neonatal very bad. The general condition of neonatal was assessed based on clinical examination, neurological, biomarkers, skin color, muscle tonic and autoimmune reflexes. After the study was completed, we calculated the overall mortality rate, studied the impact of pregnancy monitored, gestational age, birth weight, place of birth, sex, transportation of neonatal, neonatal conditions and mortality.

**Statistical Analysis:** The statistical study was conducted at the percentage and p-value of each variable using the chi square distribution.

## RESULTS

**Mortality:** A total of 1485 neonatal were hospitalized during the study period, which 790 neonatal were death 53.19% as shown in Table 1.

**Mortality & Risk Factors:** The study was examined the effect of sex, gestational age, birth weight, pregnancy monitor, place of birth, patient transport method and general condition of neonatal at admission (as risk factors) in mortality, as shown in Table 2. From Table 2, it is noted that there is a moral difference in the mortality rate between males and females, between preterm infants and neonatal, that there is a direct

**Table 1. Total mortality rate**

Month	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Entrants	222	217	230	209	192	188	227	1485
Deaths	116	106	124	113	107	95	129	790
Percentage	52.25	48.48	53.91	54.06	55.73	50.95	56.83	53.19

**Table 2. Risk Factors**

Risk Factors		Entrants		deceased		p-value
		Freq.	%	Freq.	%	
Sex	Male	853	57.4	487	57.1	<0.001
	Female	632	42.6	303	47.9	
Gestational age (weeks)	<37	668	45	430	64.4	<0.001
	>37	817	55	360	44.1	
Birth Weight (gram)	<1000	31	2.1	31	100	<0.001
	1000-1500	140	9.4	135	96.4	
	1501-2500	352	22.7	289	82.1	
	>2500	962	64.8	335	34.8	
Pregnancy Monitor	Monitor	658	44.3	346	52.6	<0.001
	Not Monitor	827	55.7	444	53.7	
Birth Place	Public Hospital	763	51.4	404	52.9	<0.001
	Private Hospital	313	21.1	166	53	
	Clinic	73	4.9	39	52.4	
	Home	346	23.3	181	52.3	
Patient Transport method	Ambulance with Doctor	103	6.9	51	49.5	<0.001
	Car without Doctor	1382	93.1	739	53.5	
General Entry Status	Acceptable	156	10.5	9	5.8	<0.001
	Medium	583	39.3	173	29.7	
	Bad	550	37	412	74.9	
	Very Bad	196	13.2	196	100	

correlation between the mortality rate and both the underweight at the birth and the general poor condition of neonatal upon hospital admission. Monitoring of pregnancy, the place of birth or the method of transportation of neonatal did not appear to have a clear impact on neonatal mortality.

### Causes of death

**Infection reasons:** The following are the causes of the disease that led or contributed to the death, with the incidence of each disease and the percentage of deaths as shown in Table 3.

**Table 3. Infection disease**

Diseases	Septicemia	Meningitis	Pneumonia	DIC	Necrotizing Enterocolitis (NEC)	Endometrium	Septic shock	Total
Amount	532	100	56	88	27	21	17	841
Deaths	303	50	30	65	17	15	17	497
Prec.	35.82	6.73	3.77	5.92	1.82	1.41	1.14	56.63
Death %	56.95	50	53.57	73.86	62.96	71.43	100	59.09
Total Death %	38.35	6.33	3.8	8.23	2.15	1.89	2.15	62.9

**Table 4. Respiratory reasons**

Diseases	IRDS	AP	PL	PN	MAS	Total
Amount	93	100	129	24	15	361
Deaths	295	10	15	129	53	88
Prec.	6.26	6.73	8.68	1.61	1.01	24.3
Death %	94.62	53	100	62.5	66.66	81.71
Total Death %	11.14	6.7	16.33	1.89	1.26	37.34

**Table 5. Neurological Reasons**

Diseases	TBI	BH	K	M	VLBW	Total
Amount	166	26	29	34	38	293
Deaths	101	20	14	9	38	182
Prec.	11.18	1.75	1.95	2.29	2.56	19.73
Death %	60.84	76.92	48.27	26.47	100	62.12
Total Death %	12.78	2.52	1.77	1.14	4.8	23.04

**Table 6. Causes cardiac, surgical and congenital malformations**

Diseases	Cardiac	Surgical	Congenital malformations
Amount	82	184	314
Deaths	54	98	183
Prec.	5.52	12.39	21.14
Death %	65.85	53.26	57.96
Total Death %	6.83	12.4	23.16

From Table 3, it is noted that the total number of neonatal with infection disease was 841 neonatal, 56.63% of all neonatal admitted to the hospital, and that 497 of the deceased's neonatal had an infection disease was 62.9% of the total death. The mortality rate of the infection disease is 59.09% of those who are infected with diseases.

**Respiratory reasons:** The Table 4 shows the most important respiratory reasons that contributed or led to death:

IRDS: Infant respiratory distress syndrome of neonatal  
 AP: Aspiration pneumonia  
 PL: Pulmonary laceration  
 PN: Pneumothorax  
 MAS: Meconium Aspiration Syndrome

From Table 4, the total number of neonatal with respiratory disease was 361, 24.3% of the total number of neonatal admitted to hospital, where the number of death with respiratory disease was 295 neonatal, 37.34% of the total. Therefore, the mortality rate for respiratory patients is 81.71% of neonatal with respiratory diseases.

**Neurological Reasons:** The Table 5 shows the most important neurological reasons that led to death.

TBI: Traumatic brain injury  
 BH: Brain hemorrhage  
 K: Kernicterus

M: Meningocele  
 VLBW: very low birth weight

From the Table 5, the total number of neonatal with neurological disease was 293, 19.73% of the total hospital admission, that the number of death with a neurological disease is 182, 23.04% of the neonatal total deaths, and the percentage of deaths related to neurological diseases is 62.12% of those with neurological diseases.

**Causes cardiac, surgical and congenital malformations:**  
 From Table 6, the 6.83% of the death had heart disease, and the death rate in heart disease is 65.85% of the total number of neonatal with heart diseases. Additionally, the 12.4% of the

death had surgical cases, that the death rate in surgical cases was 53.26%, and that the proportion of those with congenital malformations was 21.14% of the total hospital admission and 23.16% of the deceased had one or more birth defects. The death rate in birth defects is 57.96%.

## DISCUSSION

The mortality rate was 53.19% which was high compared to literature reviews. In most European countries, the percentage of neonatal deaths whose weight ranges between 1500 - 2000 grams does not exceed 20% and it is less than that in neonatal who weigh more than 3000 grams (Ntambue, 2013). Additional, there are numerous reports from different research centers indicating a mortality rate up to 10% for preterm who range their weight is between 1000 - 1500 grams and 50% for preterm whose weight is less than 1000. Similarly, in America, the proportion of preterm deaths whose weight ranges between 701-800 grams decreased from 47% in 1988 to 5.6% in 2015. The high mortality rate in Iraq compared to international studies may be due to the quality of the admitted neonatal and the risk factors they have, or to other factors related to the service provided to these neonatal, depending on the capabilities available and in terms of the number of beds, the medical staff, nursing staff and hospital equipment.

### Mortality & Risk Factors

**Mortality & Sex Relationship:** The mortality rate among males was 57.1%, while among females was 47.9%, and these results are consistent with all previous studies that say that sex is a risk factor as the ratio of male deaths to female deaths when vaccinated ranges between 120-150 males to 100 females (Khatun, 2012). The proportion of death at birth due to the increase in male were projections for females, to reach 107-106 males, compared to 100 females.

**Mortality & Weight Relationship:** The current study shows the relationship of mortality to the weight that there is an inverse proportion between mortality and gestational age with birth weight. The premature infant mortality rate was about 20% higher than the neonatal mortality rate, while the death rate for neonatal whose weight exceeds 2500 grams (NBW) is 34.82%. The mortality rate for neonatal weighing less than 2500 g (LBW) was 86.99% and the death rate for those weighing less than 1500 g (VLBW) was 97.07%. Our results are consistent with all previous studies that say prematurity and low birth weight are a risk factor that the death rate is inversely proportional to both gestational age and birth weight.

**Mortality & Gestational age and birth place Relationship:** Monitoring pregnancy is important in monitoring the development of the fetus, detecting pathological conditions and distortions that affect the warning, and in detecting high-risk pregnancies. Preferably also the birth place meets the conditions necessary for neonatal resuscitation, and that the birth be as soon as possible to the intensive care units in Baghdad, additional, the birth are the existence of a specialized medical staff in the event of newborn revitalizing the presence of high-risk pregnancy. This study did not show that to monitor of the pregnancy and the birth place were great influence in the warning, as the mortality rate was a close both between the two categories of pregnancies control and non-control or between children born in different places. Most

births were carried out in public hospitals by 51%, followed by home deliveries by 23.29% and births in private hospitals then private clinics. The distribution of births between the public hospitals, home and private hospitals may be due to physical considerations rather than a return to choose the best in terms of medical equipment and facilities. Births in public hospitals are free and at home are less expensive than private hospitals.

**Patient transfer method and general condition:** The transportation of pregnant women or neonatal to hospital has been studied because of the importance of affecting the neonate's condition, general condition before arriving at the hospital and receiving medical attention. All Western countries have systems for the pregnant women or neonatal and preterm infants where all preterm infants are transported by ambulances equipped with all the necessary means of resuscitation and surveillance by a medical team specialized in the transfer of preterm infants (Grünebaum, 2017). The percentage of those transported by an ambulance equipped with an incubator and accompanied by a doctor did not exceed 7%, although the mortality rate of these neonatal was lower than the rate of deaths of those transported by a normal car and without a doctor 4%, but this difference was not statistically confirmed, and therefore this study did not show that the method of transmission of the neonatal has a clear effect in the warning, this may be due to the small number of people transported by ambulance, or that there are other factors more important in raising the alarm, such as the general condition of the neonatal, the quality of the disease and the medical service provided.

**Infection:** Infection in a neonatal is an important cause of death and long-term hospital stay, especially for those who were underweight at birth. The incidence of infections and mortality rates vary from country to country. The incidence of neonatal sepsis ranges between 1-10 cases per thousand live births. In previous studies in neonate's was entering a hospital belonging to the percentage of infection is 28.5%. (Halim A., 2016). As for current study, the incidence of infectious diseases, whether primitive or acquired, was 56.63% of the total number of entrants. The rate of septicemia was 35.82%, meningitis rate was 6.73%, and pneumonia was 3.77% of the total neonatal. The difference in numbers and rates of occurrence of infection in current study from previous studies is due to the fact that previous studies were limited to those admitted with some infection, whereas in our study, 56.63% represented those who were admitted with an infection disease and who had developed an infection disease while in the hospital. The incidence of bacterial meningitis is 0.4 per thousand live neonatal, but the proportion rises to more than 1 per thousand in case of premature. As for current study, the incidence of meningitis was 6.73% of the total, and it constituted 11.8% of infections.

As for pneumonia, it is considered an important cause for neonatal and it can be detected by 20% of the deceased neonatal. In previous studies, the incidence of pneumonia in a newborn ranged from 5.1% to 5.6%, while in current study 3.77% formed 6.6% of all infections (Kamal, 2015). The incidence of DIC was 5% in previous studies, while in current study it was 5.92%, which is a close ratio. High incidence of infectious diseases may be due to our special septicemia to the diagnostic criteria adopted for septicemia (clinical suspicion and strong laboratory regardless of the outcome of blood

transplant). Or it may be due to a lack of protective measures against infection, whether at home, in hospitals, or both

**Respiratory reasons:** Infant respiratory distress syndrome of neonatal disease affects 50% of preterm infants whose pregnancy ranges between 25 to 28 weeks, and 20-30% of preterm infants whose pregnancy ages between 30 to 31 weeks. The difficulty of breathing the most important cause of death in previous studies (Mitra, 2018), but current study, the Infant respiratory distress syndrome of neonatal had first priority with 6.26% of the total neonatal in the hospital, death accounted for 11.14% of the total. As for aspiration pneumonia, it constituted 5.6% of the total in previous studies, while the death rate was 56.9%, while in current study, the aspiration pneumonia rate was 6.73% of all hospital admissions, and the death rate was 53% and 6.7% of all deaths, which are close to results. The incidence of pneumothorax among hospital admissions ranges between 2 to 8%, while in current study, it accounted for 1.61% of the total, 1.89% of all deaths, and 62.5% of all deaths from respiratory diseases. As for pulmonary laceration, its incidence ranges between 0.8 to 1.2 per thousand live births as shown in previous studies (Kamal S. M., 2012), while in current study, it accounted for 8.68% of the total neonatal in the hospital, As for people with meconium aspiration syndrome, they constituted only 1% of the total number of neonatal, 1.26% of the total deaths, but the death rate for those with meconium aspiration syndrome was 66.66%, perhaps due to the lack of optimal management of neonatal with amniotic fluid disinfection during and immediately after delivery in terms of sucking secretions and endotracheal intubation.

**Neurological Reasons:** Among the most important neurological causes is traumatic brain injury and may occur during neonatal. The rate of suffocation in developed countries ranges between 2 to 4 thousand and the death rate is 0.44 per thousand while in developing countries to 20%. The neonatal mortality rate was close to previous studies and current study (Kent, 2012).

**Causes cardiac, surgical and congenital malformations:** The rate of cardiac cases was 5.52% of the total, whether congenital malformations, such as the exchange of the origin of the vessels or the opening between the ventricles and others, or if they were cardiomyopathy, cardiomyopathy or heart failure. In current study, no surgical or palliative surgery was performed for any of the congenital heart defects due to the lack of a surgical medical center specializing in pediatric cardiac surgery today.

As for the surgical cases that required surgical intervention, whether the surgical procedure was conducted or not for one reason or another, it reached 184 cases, or 12.39% of the total number of children. The most common surgical cases were congenital esophageal atresia and bowel obstruction. Additionally, the death rate in surgical cases was 53.29%. Surgical cases have formed a high percentage of the total number of children, because the hospital is a specialized center to which most complex surgical cases are transferred to perform the surgical work. As for congenital malformations, including chromosomal syndromes and surgical conditions, such as congenital esophageal atresia or heart disease, they reached 314 cases, 21.14% of the total number of neonatal. The mortality rate in congenital malformations was 57.96%,

and it accounted for 23.16% of all deaths. These ratios are close to previous studies.

## Conclusion

The study was conducted from June 1, 2019 to December 31, 2019 in the Alwaiya Children Teaching Hospital in Baghdad, which includes 37 incubators and 20 beds. The occupancy rate is not less than 98%, accepted in the section by all children less than 6 weeks. The risk factors affecting mortality are: masculinity, premature, birth weight loss and poor overall condition, so preterm birth and underweight should be avoided as much as possible with the ideal care of pregnant women. The parents should not be delay the hospital review before the neonatal condition gets worse. Pregnancy monitoring, birth places or transport hadn't a clear impact on mortality. Infectious diseases are the leading cause or contributor to death, followed by respiratory diseases in the second rank, then congenital malformations in the third rank, then neurological diseases, surgical conditions and heart diseases. Therefore, there must be emphasis on methods and preventive measures that limit the spread of the infection, and there should be policies with written and clear instructions to all staff in the hospital indicating the role of each one and the procedures to be followed when dealing with neonatal.

## REFERENCES

- Baqi, A. H. 2013. Preterm birth and neonatal mortality in a rural Bangladeshi cohort: implications for health programs. *Journal of Perinatology*, 33(12), 977–981.
- Bhutta, Z. 2017. Profile and outcome of the respiratory distress syndrome among newborns in Karachi: risk factors for mortality. *Journal of Tropical Pediatrics*, 235- 240.
- D. Chelo, F. M. 2012. Early neonatal mortality and its determinants in a Level 1 maternity in Yaounde. *The Pan African medical journal*, 13 / 67-67.
- Grünebaum, A. M. 2017. Underlying causes of neonatal deaths in term singleton pregnancies: home births versus hospital births in the United States. *Journal of Perinatal Medicine*, 243- 250.
- H. Raobijaona, J. R. 2014. Déterminants de la mortalité néonatale précoce dans la maternité de Befelatanana, Antananarivo. *Rev. anesth.-réanim. med*, 1-4.
- Halim A., D. J. 2016. When, Where, and Why Are Babies Dying? Neonatal Death Surveillance and Review in Bangladesh. *PLOS ONE*, 11(8).
- Kamal, S. M. 2012. Risk Factors of Neonatal Mortality in Bangladesh. *Journal of Nepal Paediatric Society*, 32(1), 37–46.
- Kamal, S. M. 2015. What Is the Association Between Maternal Age and Neonatal Mortality? *Asia Pacific Journal of Public Health*, 1106– 1117.
- Kent, A. L. 2012. Mortality and Adverse Neurologic Outcomes Are Greater in Preterm Male Infants. *PEDIATRICS*, 129(1), 124–131.
- Khatun, F. R. 2012. Causes of neonatal and maternal deaths in Dhaka slums: Implications for service delivery. *BMC Public Health*, 12(1).
- Kumar, A. 2019. Risk factors and trends in neonatal mortality in a special care newborn unit in a tertiary care hospital in bangladesh. Baltimore, Maryland: Johns Hopkins University.

- Mamba, C. 2018. Factors associated with neonatal mortality: A case study of the Luebo Health Zone Hospitals in the Democratic Republic of Congo. *International Journal of Science and Research (IJSR)*, 896-901.
- Mitra, D. K. 2018. Incidence and risk factors of neonatal infections in a rural Bangladeshi population: a community-based prospective study. *Journal of Health, Population and Nutrition*, 37 (1)
- Ntambue, F. M. (2013). Mortality: extent and causes in Lubumbashi, Democratic Republic of Congo, *Revue d'epidemiologie et de sante publique*, 519-529

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