Leading Risk Factors to Neonatal Mortality: A retrospective study in Iraqi sample

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Abstract: Background: The neonatal period is on the whole labeled as the initial 28 days of life which has the majority susceptible era for neonatal survival chance. Nowadays, the neonatal mortality is appeared to be declining worldwide. The international neonatal mortality incidence is decreased to about the half at the phase stuck between1990 - 2015. At the same period; the newborn death frequency within the initial 28 days of life diminished to more than half. **Aim:** This retrospective study was designed to assess risk factors for early neonatal mortality in Iraqi society. Nevertheless, recognizing of these risk factors; could help in managing next cases in order to prevent the chance of such health dilemma in the successive pregnancies. **Patients and Methods:** This retrospective work included all 15,837 neonates who were born either by vaginal deliveries or caesarean sections under general anesthesia at Fatima Al-Zahraa Administrative hospital, Baghdad, Iraq; at the period from 1st of June / 2011 to 1st of June / 2012. Data were obtained from the reserved case-sheets of all mothers admitted on labor at that time. The neonates were divided into two groups; the 1st group was consisted of neonates had been dead within the first 28th days of life and the 2nd group was consisted of alive neonates within the same period (control group). Planned data were: The neonatal age, sex, weight and Apgar score. The maternal risk factors data were: age, parity, antenatal healthcare, level of education and history of previous clinical risk factors. Mode of delivery: as vaginal deliveries or caesarean sections (only with general anesthesia). All data were represented in tables and figures. **Results:** The highest neonatal mortality frequency was seen within the 1st 7 days of life, mostly at male fetuses, more in group bellow 1000mg body weight, plus, infants with low Apgar scoring had neonatal death percentage about three folds as that of high Apgar scoring. Most of neonatal deaths according to maternal factors; were at groups belong to; mothers of 25-30 years, parity ≥ 5 children, deprived education and poor antenatal care. From history of previous clinical risk factors; the maximum neonatal deaths were for mothers at the group entitled as "no identified risk factors". The highest percentage of neonatal deaths according to direct apparent neonatal causes of death; proved that the respiratory distress syndrome (RDS) related to prematurity was the utmost one. The majority of these neonatal deaths cases had normal vaginal delivery (NVD) in comparison to less than half number with those born by caesarean sections. **Conclusion:** Iraqi mothers and neonates might had more or less, the same global known deadly risk factors, so as these facts may give a punctual hint for doctors and health-staff for instant identification of neonatal death related factors in order to assist for rapid managing the "at high risk fetuses"; so, this may help in decreasing the incidence of undesirable postnatal lethal outcomes.

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1. Introduction:

The neonatal period is normally defined as the early 28 days of neonatal life, which is the most important period, since, at this time; the principal part for the neonatal survival opportunity locates. For the present time, and due to incessant major efforts; the neonatal mortality is seemed to be dropped off worldwide. The international neonatal mortality incidence is in fact decreased to about "the half" at the time trapped between1990 - 2015. Also at the same period; the newborn death incidence at the initial 28 days of life had diminished to a degree further than half. The term referred to as "fetal mortality" denotes stillbirths or fetal death. It comprises any fetal death after 20th week of gestation or death of any fetus having a body weight ≥500 gm. (1). Neonatal Mortality is still an issue of importance worldwide (2). Doctor Virginia Apgar in 1952 had built a scoring arrangement to evaluate the clinical grade of born infant at early minutes of life. Nevertheless, till now

this scoring arrangement offers a practical lay down for assessment of the fetal status to decide if management is urgently needed. Apgar score encompasses 5 items: Appearance, Pulse, Grimace, Activity, and Respiration (3). It has a valuable significance in so many medical fields, for example; The Neonatal Encephalopathy and Neurologic Outcome reported that the estimated products of the 5-minutes Apgar score related to illness as the followings; scoring level of 7-10 is to be encouraging, that of 4-6 is rather moderate, and a scoring of 0-3 is a low one (4). Perinatal mortality incidence in Iraq had been exceptionally high at the period 1990-1999; it was calculated approximately to be more than 100 per 1000 live birth whereas the standard perinatal mortality incidence in Iraq was much less than one third per 1000 live birth at the period 1980 -1990, nevertheless, at the periods before exact authorizing; the perinatal mortality incidence was similar to the incidence in other nearby countries in the same given period (5).

2. Patients and Methods:

This retrospective research was done at Fatima Al-Zahraa Administrative hospital, Baghdad, Iraq; the data were belonged to the period from 1st of June / 2011 to 1st of June / 2012. It included 15,837 neonates who were born either by normal vaginal deliveries (with or without episiotomy); or they were born by caesarean sections under general anesthesia, while those which were gotten other approach of anesthesia, were excluded. The early fetal mortality prior to 27th week of gestation is not included here. The notifications and all informative data were obtained retrospectively from the case-sheets of inpatient hospital admission, at that period. These neonates were divided into two groups; the 1st group was consisted of 213 cases of early neonatal deaths (only the cases of death within the first 28th days of life) and the 2nd group was consisted of 15624 alive fetuses within the same period which was regarded as the control group. Consideration data were the followings: The neonatal age at which death had occurred, sex, weight, Apgar score at 1st minute of age and direct cause of neonatal death. The Apgar score was assessed by pediatrician doctor and/or anesthetist doctor. The maternal risk factors as; age, parity (number of children), antenatal healthcare for the mother during her pregnancy, maternal level of education and maternal history of previous clinical risk factors (before being pregnant by that dead newborn) also were recorded. Mode of delivery; as normal vaginal deliveries or caesarean sections (only with general anesthesia) with attention of course that general anesthesia was of the safest type for the fetuses during caesarean sections, Data were represented as tables and figures.

3. Results:

The highest percentage number of dead neonates according to age, gender, birth weight and Apgar scoring was seen at the age below 7 days and most cases were males. Also low birth weight bellow 1000mg was seemed to be considerable and low Apgar score had neonatal death percentage about three folds as that of high Apgar scoring (tab.1, Fig.1-4).

Table 1: Number and percentage of dead neonates according to fetal birth age, Apgar score, birth- weight and gender.

	Grouping subdivisions	No. of Neonatal deaths	% of neonatal deaths
Death age (day) at time of death (post-natally)	< 7days (1st week)	197	92.49%
	7-14 (2nd week)	11	5.16%
	14-21(3rd week)	3	1.41%
	21-28 (4th week)	2	0.94%
Apgar scoring	High Apgar score ≥ 7	56	26.29%
	Low Apgar score < 7	157	73.71%
Body wt (gm)	750-1000	119	55.87%
	1000-2500	48	22.54%
	2500-3000	29	13.62%
	> 3000	17	7.89%
Gender	Male	117	54.93%
	Female	96	45.07%

Most of neonatal deaths according to maternal factors; were at groups belong to; mothers of 25-30 years, parity ≥ 5 children, mother with deprived education and poor antenatal care during their pregnancies (Tab.2, Fig.5-8). The distribution of the studied samples of neonatal deaths according to history of maternal risk factors had demonstrated a highest percentage at the group entitled as "no identified risk factors", then came the percentage of the group entitled as "pervious abortion", while the

lowest percentage had apparent viral infections (Tab.3, Fig.9).

Data of neonatal deaths in accordance with direct causes of death; had proved that the respiratory distress syndrome (RDS) related to premature birth comprised the highest rate (tab. 4, Fig.10-11). The distribution of data of neonatal deaths due to the variety of delivery confirmed that; the majority of these neonatal death cases had normal vaginal delivery (NVD) compared to less than half number with the caesarean sections (tab.5, Fig.12).

Table 2: Neonatal deaths according to maternal age, parity, antenatal care and level of education

		No. of Neonatal deaths	Percentage
Maternal age (years) (Mothers of dead Neonates)	<20	24	11.27%
	20—24	51	23.94%
	25—29	72	33.80%
	30—34	41	19.25%
	35—39	15	7.04%
	≥40	13	6.10%
Antenatal health care	**Yes**	47	22.07%
	No	166	77.93%
Level of education	uneducated	146	68.55%
	Primary	17	7.98%
	Intermediate	38	17.84%
	Secondary	12	5.63%
Parity	0	24	11.27%
	1	21	9.86%
	2	33	15.49%
	3	38	17.84%
	4	44	20.66%
	5+	53	24.88%

Table 3: Neonatal deaths associated with previous maternal risk factors

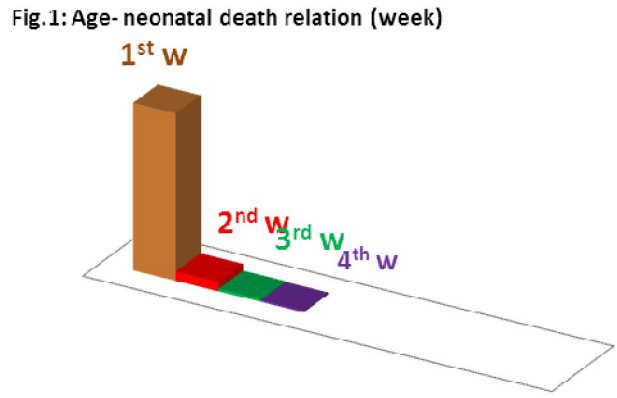
Maternal risk factors	No. of Neonatal deaths	Percentage
Previous abortion	39	18.31%
Congenital anomalies	5	2.35%
Cord prolapse	1	0.47%
IUD	3	1.41%
Large baby	4	1.88%
Neonatal death	5	2.35%
Old age	6	2.82%
Postmaturity	2	0.94%
Placenta Previa	3	1.41%
Prolong labor	5	2.35%
PROM	7	3.29%
PUO	3	1.41%
Twin	3	1.41%
Vaginal bleeding	7	3.29%
Viral infection	2	0.94%
Anemia	38	17.84%
UTI	22	10.33%
No identified risks	58	27.23%

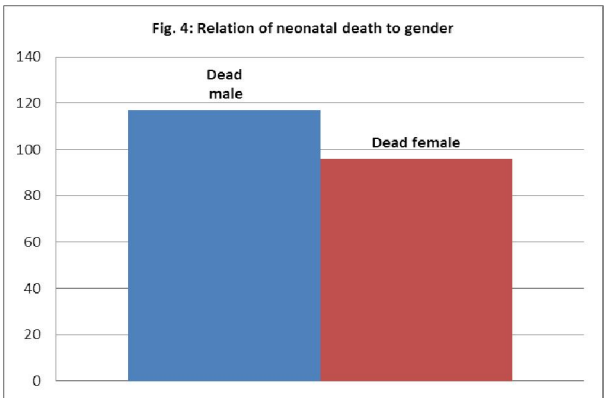
Table 4: Neonatal deaths according to direct causes of death

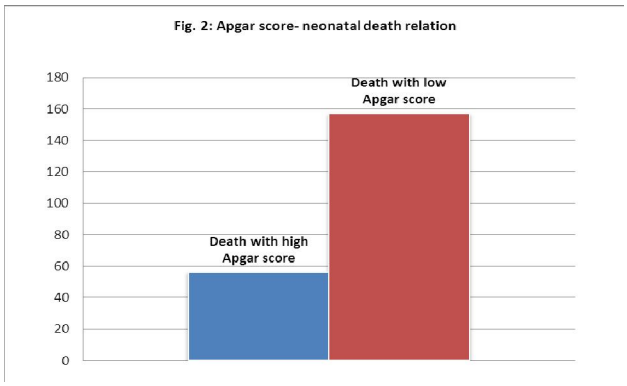
Causes of neonatal death		No. of Neonatal deaths	Percentage
Full term dead fetus	Birth Asphexia	31	14.55%
	SEPSES	7	3.29%
	Congenital anomaly	12	5.63%
	Neonatal jaundice	5	2.35%
Premature dead fetus	RDS	83	38.97%
	Congenital anomaly	6	2.82%
	Apnea	46	21.59%
	Sepsis	23	10.79%

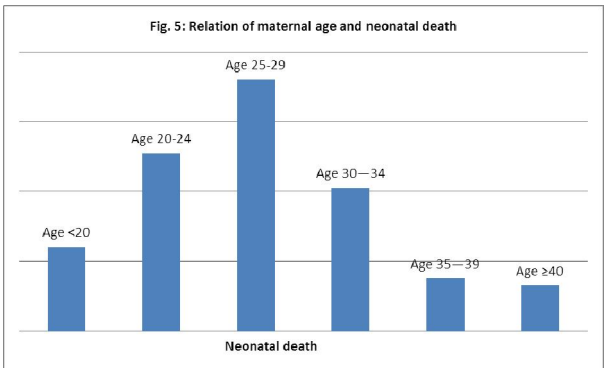
Table 5: Neonatal deaths according to mode of delivery.

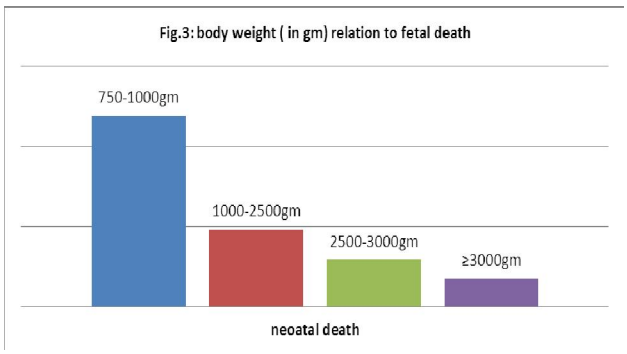
Type of delivery	No. of neonatal deaths	Percentage of neonatal deaths
NVD	127	59.62%
CS	86	40.38%

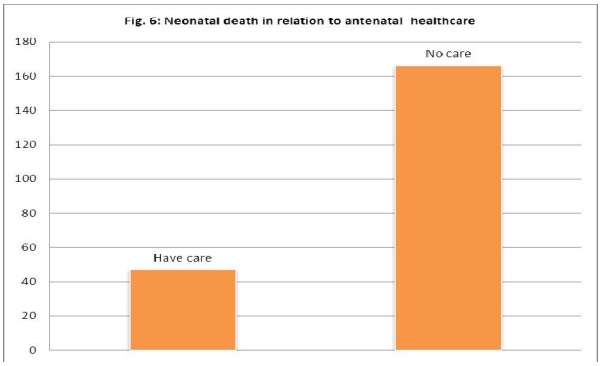


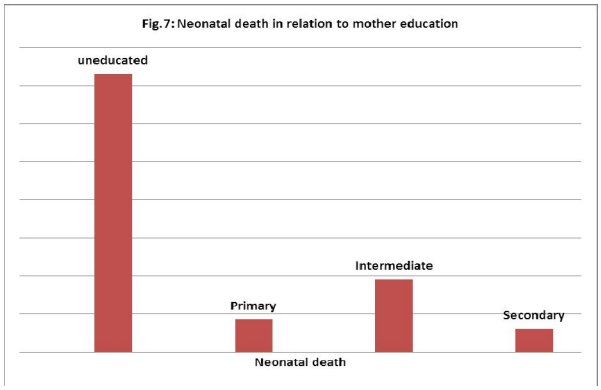


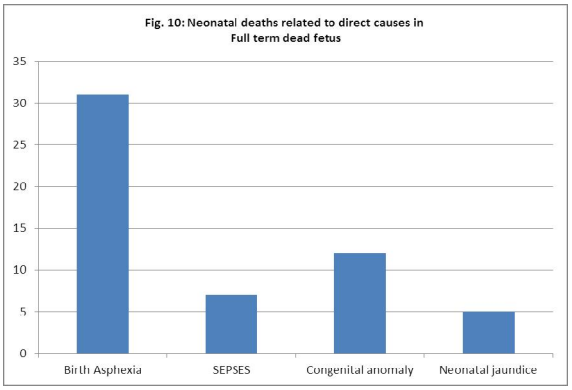


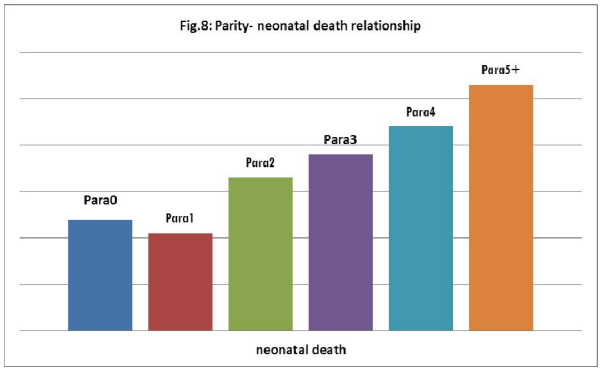


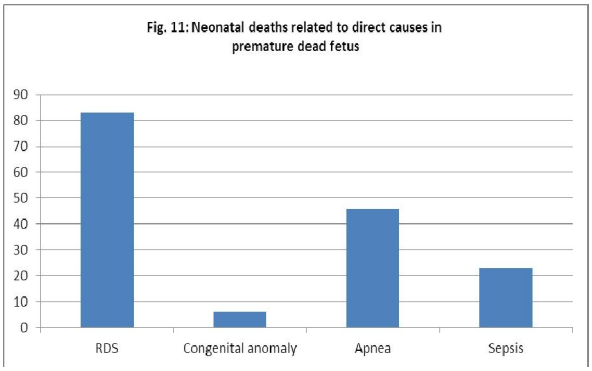


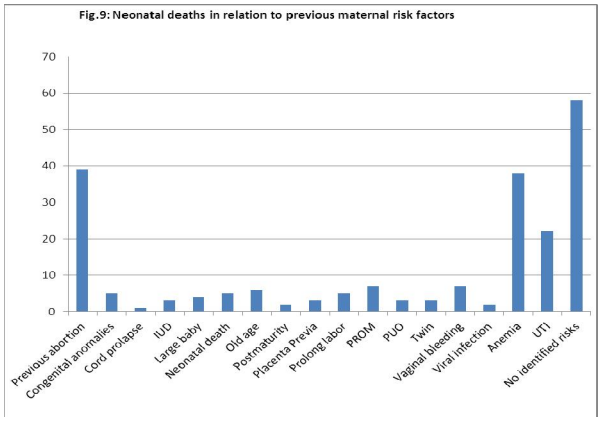


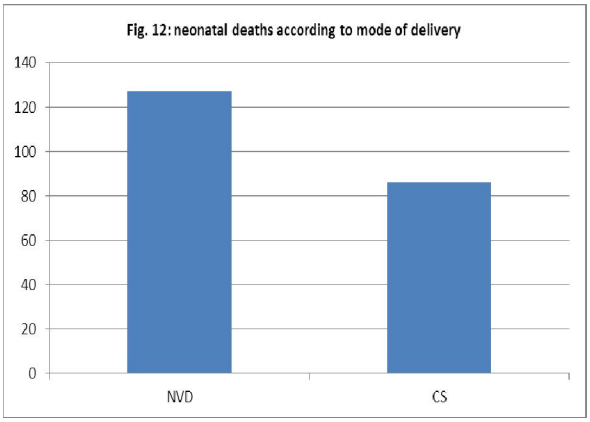












4. Discussion:

This research was designed to collect data retrospectively, since this way of medical analysis of data seems to be very valuable in medical fields and it was dependant in so many previous medical studies (6-8). Fatima Al-Zahraa Administrative hospital was selected because it is the foremost hospital in Iraq with such overcrowd of labor admissions; according to official records of Iraqi ministry of health. At this work; the 1st four weeks were selected because this is the period of the maximal risky postnatal events and about two thirds of deaths within the first year take place at these four weeks (9). The highest proportion of neonatal deaths; that seen within the 1st seven days of age; as it was well documented that three quarters of these neonatal deaths come about the first 7 days of their life (1,2,10,11). In the ongoing study; there was significant elevated mortality percentage of male infants compared to that of female ones, which was more than that of the countries of a propos comparable community standard level and civil society to the Iraqi society; like for example Pakistan society (12, 13). The present data had recorded high incidence of mortality with low Apgar scoring and it is a well known fact that low Apgar scoring is strongly correlated to high mortality rate occurrence (14) and it was just like the effect of low birth weight (15). In the current work; it was very practical that the Apgar

scoring was done by a pediatrician and/or an anesthetist (16). Novel studies set the association between a neonatal welfare, maternal age, parity, antenatal care and parental education with neonatal mortality rate just like those of this study. The group of maternal age of 25-30 years had the highest percentage of neonatal death; which might mean that; it is the period of the highest fertility age in Iraqi people. Also, for maternal level of education and neonatal care were seemed to be adversely proportionate to the incidence of neonatal death occurrence and that was in agreement with other articles reviewed the risk factors at early neonatal death and studied the effect of prenatal health care and public health services on prevention of the neonatal mortality prevalence (17-19). The maternal history of risk factors that showed the higher percentage of neonatal deaths was seen at the category of "no identified risk" which means these neonatal deaths were happened with unknown apparent cause; whereas in previous works, neonatal deaths were exceedingly associated with multiple births, maternal smoking, hypertensive and bacterial infections (18, 19). The causes of neonatal death according to direct fetal reason of death showed that; these within the group of respiratory distress syndrome which definitely related to prematurity had the highest rate and was just the same as those results of previous researches as neonatal deaths commonly result from problems of prematurity such as trauma on birth, asphyxia, infections and deformities (18-21). The samples delineated the neonatal death in relation to mode of delivery; highlighted the significant low death incidence at the group born by caesarean sections when compared to those ones born via normal vaginal deliveries, hence, there is now a rising trend in most of urban regions towards hospital deliveries and caesarean deliveries because they are much safer than the normal vaginal deliveries, moreover the U.N guidance had recognized that increasing caesarean sections rate have minimized optimally both of the maternal and neonatal mortality rate significantly (22-24).

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