

Maternal Risk Factors of Perinatal Mortality in Duhok

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Abstract

Background: Perinatal mortality (PM) rate is an important index of community health condition. A high-risk pregnancy is one that threatens the health or the life of the mother and her fetus, during or after the pregnancy and birth. **Objective:** This study aimed to identify the etiological maternal risk factors and other causes that lead to PM, to calculate the PM rate (PMR) in maternity hospital in Duhok, and to compare it with the previous rates, and to find out the relationship between maternal socio-demographic and obstetrics variables with PMR. **Materials and Methods:** During the study, which was from January to December 2013, the total deliveries were 20281, and the perinatal deaths were 496 cases. **Results:** The PMR was (24.5%/1000 births), the number of early neonatal deaths were 268 (54%), and it is higher than stillbirths deaths (fresh and macerated). The most common causes and associated risk factors behind the fresh stillbirths (30.5%). Macerated stillbirths 77 (15.5%), were the main causes of death. The most causes of early neonatal deaths were birth asphyxia (36.6%) and prematurity (34.3%). It was found that most important maternal risk factors for PM are preeclampsia, and obstructed labor. The results of the study revealed a significant association between mother's level of education, occupation, residential area, antenatal care, gestational age, parity, and PM, but revealed a nonsignificant association between the mother's age and PM. **Conclusions:** There was a significant relation between maternal risk factors and PM, the early diagnosis of these risk factors decreased the PM. The PMR was 24.5/1000 total births in 2013, at a maternity hospital in Duhok, It was lower than that of 2004 and 2005. Most of the PM were in the groups of poor antenatal care and their residence from the rural area.

Keywords: Early neonatal deaths, perinatal mortality rate, risk factors, stillbirths

INTRODUCTION

Perinatal mortality (PM) rate is an important index of community health condition.^[1] High-risk pregnancy is broadly defined as one in which the mother, fetus or newborn is at risk of morbidity or mortality before, during, or after delivery.^[2] Many factors are associated with high-risk pregnancies such as maternal age, period of gestation, complications during pregnancy and labor, previous bad obstetric history, maternal diseases such as diabetes mellitus, hypertension, heart disease, various types of maternal infection such as TORCH infection and sexually transmitted diseases are also a perinatal risk factors, poor economic condition, and cigarette smoking.^[3,4]

Maternal age <16 years is an increased risk for hypertension disorders as gestational hypertension, preeclampsia, eclampsia, intrauterine growth retardation, and maternal malnutrition. Women >35 years are at higher risk of pregnancy-induced hypertension and preeclampsia, diabetes and obesity, increased risk of cesarean section (C/S), placenta praevia, and abruption.

Primi (1st pregnancy) and grand multi (more than two children) have been associated with poor perinatal outcome.^[3]

Stillbirth is the delivery of fetus with no sign of life, there is no universally accepted definition of when the fetal death is called stillbirth, and the meaning of this word varies internationally. In the USA, it is a fetal death occurring after 20 weeks of gestation or when the fetus weighs more than 500 g. The stillbirth rate in the USA in 2002 was 6.4/1000 total births. Dark-skinned women have more than twice the rate of stillbirth than that of Caucasian females. A stillbirth is a major obstetrical catastrophe at any gestational age. In the UK and some of others countries like in Iraq and our region, the age of stillbirth is at 24 weeks and more.^[5]

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There are two types of stillbirth: Fresh stillbirth is an intrauterine death which occurring at or after the onset of labor or during delivery, and macerated stillbirth refers to the degenerative changes that take place while the fetus is dead *in utero*, these changes usually start to occur between 12 and 24 h after death.^[6]

The perinatal period is from the age of viability of the fetus to end of the 1st week after birth. PM rate (PMR) is defined as the number of stillbirths (fetal mortality or death at 24 weeks or more of gestation) and the 1st week deaths (early neonatal deaths) per thousand total births. It is the most sensitive index of maternal and neonatal care. PM is an important indicator for monitoring progress toward Millennium Development Goal. About 3.2 million stillbirths occur worldwide every year, 98% of these in the developing world, 5/1000 total births in the developed world, 25–32/1000 total birth in the developing world.^[2] Without reducing PM, it is not possible to reduce neonatal mortality rate, infant mortality rate and under 5 mortality rate. Among the main causes of PM, high-risk pregnancies comprise the most common one.^[7,8]

In developing countries, complications during pregnancy and labor such as prolonged or obstructed labor, abnormal fetal presentation, and hypertensive disorders of pregnancy are known to increase the risk of PM by more than five-fold and all these may account for more than one-third of all perinatal deaths. Among perinatal death, 70% were stillbirths, 15.5% in 24 h of birth and rest of deaths occurred between 2 and 7 days after birth. Pregnancy- and delivery-related causes were responsible for 21% of perinatal deaths.^[4]

The identification of maternal risk factors with effective and timed intervention help to reduce the PM.^[9]

The present study was conducted to find out PMR in a tertiary level hospital, to assess the etiological maternal risk factors and other causes responsible for PM to formulate the measures for prevention and to find out the relationship between maternal socio-demographic and obstetrics variables with PMR.

MATERIALS AND METHODS

A cross-sectional descriptive study was done at the maternity hospital in Duhok, it is the main obstetrical and maternity hospital in this governorate, which receives most of the referral cases from the rural areas, from January 1 to December 31, 2013. The medical records of 496 perinatal deaths among 20,281 total birth deliveries in the period study were retrospectively reviewed. The stillbirth deliveries were 228, and the early neonatal deaths were 268 in the intensive premature care unit.

A design was used to identify the maternal risk factors of the PM in Duhok. This study was approved by the scientific committee of the faculty of medical sciences, the director of maternity hospital, and the head of the statistic department. The study conducted on all the perinatal deaths through a checklist which was consisted of 7 parts included the following information: mother's demographic data, obstetrical

information, labor information, medical history, obstetric history, stillbirth information, and information regarding early neonatal death, the neonatal data (birth weight, Apgar score, gestational age at delivery, clinical diagnosis, and cause of death). In case of more than one reason for death, the last reason according to the physician's opinion was considered as the cause of death. Infants who were discharged or referred to other health services before 7 days after delivery were followed for prenatal death by mobile calls.

Statistical analysis

Data were analyzed using Statistical Package for the Social Sciences version 19 (SPSS, IBM Company, Chicago, USA), with utilization of descriptive statistics as frequency, percentage, and rate, as well as analytic statistic parameters such as Chi-square test and Fisher's exact test for testing the relationship between variables and PM, were tested on a $P < 0.05$ as a statistical significance.

RESULTS

During the study, the total deliveries were 20,281, the perinatal deaths were 496 cases, the number of early neonatal deaths (in the 1st week of life) were 268 (54%), and it is higher than the stillbirth deaths (fresh and macerated) which were 228 (45.5%). The fresh stillbirths were 151 (30.5%), and the macerated were 77 (15.5%). The PMR was 24.5%/1000 births.

Regarding the sociodemographic characteristics of the mothers, the majority of women (52.6%) and (35.3%) aged between 20–29 and 30–39 years old, respectively. More than half of the samples in the study (54.2%) were living in suburban areas, and most of them (85.5%) were housewives. About one-quarter of them (26.3%) were primary school graduates, while very low percentage (7.7%) were institute and college graduates, as shown in Table 1.

In Table 2, the women with a previous history of intrauterine death were 32 (6.5%) of the sample, those with fresh stillbirth were 22 (4.4%) while those of a history of previous neonatal death were 32 (6.5%). About one-third of the women (31.8%) were with poor antenatal care (0–1 visits), (48.2%) were (multipara 2–4), and (37.5%) of them were in the gestational age category of (36–39 weeks). The vaginal deliveries were in (75.6%) of the sample, while (24.2%) of sample delivered by C/S.

The main cause behind fresh stillbirths was prolonged labor (26.5%), while abnormal presentations were responsible for only (1.99%) of the sample. About the causes of macerated stillbirths, the Rh-immunization represented the main one (29.8%), (13%) of cases were due to an unknown cause and (36%) of the sample were with normal birth weight as shown in Table 3.

Regarding the etiological factors of early neonatal deaths as in Table 4, the birth asphyxia which represents (36.6%) was the main cause, while infections causes were (10.8%). Concerning the birth weights of early neonatal deaths group, the low birth

Table 1: Distribution of mothers according to their sociodemographic characteristics (age, educational level, occupation status, and residential area)

Variables (items)	Frequency (%)
Age of mothers (years)*	
<20	29 (5.8)
20-29	261 (52.6)
30-39	175 (35.3)
≥40	31 (6.3)
Mother's level education*	
Illiterate	114 (23)
Primary school graduate	148 (29.8)
Intermediate school graduate	109 (22)
Secondary school graduate	87 (17.5)
Institute + college graduate	38 (7.7)
Mother's occupation status*	
Employee	52 (10.5)
Homemaker	424 (85.5)
Student	20 (4)
Mother's residential area*	
Rural	48 (9.7)
Urban	179 (36.1)
Suburban	269 (54.2)
Total	496 (100)

Table 2: Distribution of mothers according to obstetric characteristics (total=496 perinatal mortality cases)

Variable (items)	Frequency (%)
Antenatal care (visits during pregnancy)*	
Poor (0-1)	158 (31.8)
Acceptable (2-3)	221 (44.6)
Good (4 and more)	117 (23.6)
Parity*	
Primip	128 (25.8)
Multipara (2-4)	239 (48.2)
Grand multipara (5 and more)	129 (26)
Gestational age (weeks) at delivery*	
24-27	96 (19.4)
28-31	105 (21.2)
32-35	91 (18.3)
36-39	186 (37.5)
40 more	18 (3.6)
Previous stillbirth and early neonatal deaths*	
Fresh death	151 (30.5)
Macerated death	77 (15.5)
Early neonatal death	268 (54)
Mode of delivery*	
C/S	120 (24.2)
V/D	375 (75.6)
Instrumental delivery	1 (0.2)

C/S: Cesarean section, V/D: Vaginal delivery

weight group was (27.6%), while only two cases (0.75%) were in the high birth weight group.

In Table 5, There were significant associations between the mother's occupation status, mother's level of education,

mother's residential area, antenatal care visits and PM as the P value was: ($P = 0.049$), ($P = 0.037$), ($P = 0.048$), ($P = 0.052$) respectively. There were a high significant association between PM and the mode of delivery ($P = 0.001$), parity ($P = 0.005$), and gestational age ($P = 0.001$). However, there was not in relation to the age of the mother.

DISCUSSION

The rate of PM is higher in developing than in developed countries: 10 perinatal deaths/1000 total births in developed regions; 50/1000 in developing; and above 60/1000 in least developed ones. It is highest in Africa, with 62 deaths/1000 births, especially in middle and western Africa, which have rates as high as 75/1000. The PMR in Asia is 50/1000 total births, with a peak of 65,1000 in South-central Asia, the third-highest rate among the subregions, lower only than those of Middle and Western Africa. Those in the Latin America and Caribbean area, the rate is 31 in the Caribbean and around 20 in Central and South America.^[2]

The PMR in this study was 24.5/1000 total births, and stillbirth mortality was 11.3/1000 total birth, it was significantly lower than that previously reported rate in 2004, 2005 in Azadi teaching hospital/Duhok, which were 39.2, 45.4/1000 total births, respectively,^[10] and in another study which was done in maternity teaching hospital in Erbil city/2014, in which the incidence of stillbirth was 20.4/1000 total births.^[11] The same results in other studies, first one in Moreover, it was less than the results of others 3 studies which were done in different areas, the first one in West Africa which found that the SMR was 25.9/1000 total births,^[12] the second one in Ghana, which revealed the PMR and SMR were 39/1000, and 23/1000 total births respectively,^[13] and the third one in 2015 in India, Ahmedabad, the PMR and SMR were 79/1000 births, and 46.6/1000 births.^[7] According to the WHO report, PMR of Ethiopia in 2004 was 41/1000 total births, and to Ethiopian Demographic and Health survey 2011, PMR was 46/1000 total births.^[14,15]

Due to the impact of improvement in the antenatal care system, hospital equipment and the mode of delivery, so in British (the United Kingdom), the PMR were 5.6/1000 total births in 2000 and 4.68/1000 in 2007.^[16] The similar rate was in Stockholm, Sweden, as it was 3.2/1000 total birth according to a study in 2000.^[17] The PM is reported to be five times higher in the developing than in the developed nations.^[18]

The higher PMR was reported in this study related to the level of education and residency, so low level of education status was going with increased PM, the highest percentage of sample were in primary school graduates which was (73%). This result was not similar to the study was done in Ethiopia, on 193 perinatal deaths, in which the aim of the study was to find out various causes of PM and the risk factors associated with perinatal deaths, (48.7%) of the sample were illiterate. However, they found a significant association between mother's level of education and PM which is similar to this study as there was

Table 3: Etiological risk factors behind stillbirths (fresh and macerated) (total cases=228)

Etiological risk factors	Frequency (%)
Etiological risk factors for fresh stillbirth*	
Preeclampsia	21 (13.9)
Placental abruption	9 (5.96)
Placenta previa	4 (2.65)
Congenital anomaly	29 (19.21)
Prolonged labor	40 (26.5)
Abnormal presentation	3 (1.99)
Cord accident	6 (3.97)
Diabetes mellitus	5 (3.31)
Multiple gestation (twin)	4 (2.65)
Meconium aspiration	30 (19.9)
Etiological risk factors for macerated stillbirth*	
Preeclampsia	17 (22.1)
Diabetes mellitus	13 (16.9)
Congenital anomaly	14 (18.2)
Unknown causes	10 (13)
Rh-immunization	23 (29.8)
Weight of stillbirth (g)*	
Extremely low birth weight (<1500)	20 (8.8)
Very low birth weight (1500-1.999)	55 (24.1)
Low birth weight (1.500-2.499)	60 (26.3)
Normal birth weight (2.500-4.000)	82 (36.0)
High birth weight (>4.000)	11 (4.8)
Total	228 (100)

Table 4: Distribution of early neonatal deaths cases according to their causes of death, Apgar score, and birth weight (total=268 cases)

Variables	Frequency (%)
Causes of early neonatal death	
Prematurity	92 (34.3)
Birth asphyxia	98 (36.6)
Congenital anomaly	49 (18.3)
Infections	29 (10.8)
Apgar score after 1 min	
1-3	163 (60.8)
4-6	82 (30.6)
7-10	23 (8.6)
Apgar score after 5 min	
1-3	96 (35.8)
4-6	112 (41.8)
7-10	60 (22.4)
Birth weight of early neonatal death (g)	
Extremely low birth weight (<1500)	54 (20.1)
Very low birth weight (1500-1.999)	70 (26.15)
Low birth weight (1.500-2.499)	74 (27.6)
Normal birth weight (2.500-4.000)	68 (25.4)
High birth weight (>4.000)	2 (0.75)
Total	268 (100)

a significant association between them ($P = 0.037$).^[14] About the residential area, 54.2% were from the suburban area; this

result disagreed with the study which was done by Abdullah and Al-Hadithi in Erbil, their result was 83.2%.^[19]

The association of lack of antenatal care with a high risk of PM has been noted in many studies. In this study, 31.8% of mothers were with poor antenatal care, this disagree with the study in India,^[20] which found that 40% of mothers had no antenatal care, and another study done in Ghana, found that the highest percentage of women (63.9%) had poor antenatal care.^[13] Hence, the developing countries need more improvement in advance antenatal care system.

The fresh stillbirth in this study was twice times higher than the macerated stillbirth. The same results reported in a study from Nepal.^[21] However, disagree with a study in Erbil/Iraq, in which macerated stillbirth rate was four times higher than the fresh stillbirth.^[11]

The common cause of fresh stillbirth in this study was prolonged labor 26.65%, meconium aspiration 19.87%, congenital anomalies 19.21%, and preeclampsia 13.9%. One study was done in Kenya found that the main cause of the PM complications is eclampsia, prematurity, and prolonged labor.^[4]

A lot of risk factors during pregnancy and delivery, such as hypertension disorders, diabetes, antepartum hemorrhage, abnormal presentation, meconium aspiration, cord problems, and prolonged labor are responsible for perinatal death, so identification of risk factors for stillbirth assists the clinician in performing a risk assessment for each patient. Concerning the mode of delivery, it shows that about three-quarters of the women (75.6%) were delivered vaginally, and they need for good intrapartum monitoring to prevent prolonged labor and to have a less fetal loss. This result supported by the study done in India which found that most of the women (56.5%) who delivered vaginally.^[22] Regarding the parity, the finding presented that about half of the sample was multipara (48.2%). This result agreed with the study done in Iraq which showed that most of the sample were multipara (64.6%).^[23]

Unexplained stillbirths and stillbirths related to growth restriction that contributes the most of late fetal losses. The value of antepartum testing is related to the underlying risk of stillbirth and although the strategy of antepartum testing in patients with increased risk will decrease the risk of late fetal loss.^[22] In this study, about 13% of the stillbirth were due to an unknown cause. However, it was the most common cause in another study.^[23] The reason for not detecting the unknown etiology of stillbirth this could be due to congenital fetal anomalies. Considering the absence of accurate diagnostic equipment, so fetal internal abnormalities cannot be diagnosed.

Concerning the gestational age, this study showed that the (37.5%) of the sample had gestational age between 36 and 39 compared with (48.2%) at the same gestational age in the study was done in Anbar Province, west of Iraq.^[23] It suggested that preterm labor complications as one of the most important causes of early neonatal mortality as more than two third of the sample were delivered between 28 and

Table 5: Association between perinatal mortality with sociodemographic and obstetric characteristics of the mother

Variable	Perinatal deaths			Total	P
	Stillbirth		Early neonatal death		
	Fresh death	Macerated			
Age group					
<20	10	7	12	29	0.173
20-29	82	46	133	261	
30-39	48	19	108	175	
≥40	11	5	15	31	
Mother's occupation status					
Employee	11	7	34	52	0.049
Homemaker	137	69	218	424	
Student	3	1	16	20	
Mother's education level					
Illiterate	35	15	64	114	0.037
Primary school graduate	57	18	73	148	
Intermediate school graduate	34	16	59	109	
Secondary school graduate	14	23	50	87	
Institute + college graduate	11	7	20	38	
Mode of delivery					
C/S	8	5	107	120	0.001
V/D	142	72	161	375	
Instrumental delivery	1	0	0	1	
Mother's residential area					
Rural	15	11	22	48	0.048
Urban	42	27	110	179	
Suburban	94	39	136	269	
Antenatal care (visits)					
Poor (0-1)	41	53	64	158	0.052
Acceptable (2-3)	69	57	95	221	
Good (4 and more)	40	24	53	117	
Gestational age category					
24-27	26	26	44	96	0.001
28-31	29	19	57	105	
32-35	15	15	61	91	
36-39	77	17	92	186	
40 more	4	0	14	18	
Parity					
Primp (1)	44	27	57	128	0.005
Multipara (2-4)	59	31	149	239	
Grand multipara (5 and more)	48	19	62	129	
Total	151	77	268	496	

C/S: Cesarean section, V/D: Vaginal delivery

36 weeks. Recently, an African study reported asphyxia and preterm labor as the most common causes of early neonatal death.^[1] These findings indicate that despite higher accessibility of perinatal care in the recent years that has led to a great reduction in pregnancy complications, but the prevalence of preterm labor was not reduced. This may be due to improvement in infertility treatments, leading to an increased the risk of pre-term labor.

In some studies, the most prevalent causes of neonatal mortality were low birth weight (prematurity), asphyxia during labor, and congenital anomalies, respectively.^[1] In other studies, educational level and quality of perinatal care were considered

as the leading causes of PM as mother's educational level can affect their use of perinatal care.^[24]

Our results showed that there were statistically nonsignificant association between mother's age and PM, the ($P = 0.173$), this study supported by a study done in Ghana, the results showed the same association.^[13]

The present study showed that there was a highly significant association between gestational age and PM, the ($P = 0.001$) and it was supported by the study in 2010, which showed there was high significant association between gestational age and PM ($P = 0.001$).^[25]

Hence, a good quality of perinatal care can have a great impact on timely diagnosis and choice of proper way of management for the risk factors of PM.

CONCLUSIONS

There was a relationship between most of maternal risk factors and PM. The PMR was 24.5/1000 total births in 2013 in maternity hospital in Duhok. It is lower than that of 2004, 2005, but it is still higher than other developed countries. The main causes of fresh stillbirth deaths which were twice times than the macerated group were prolonged labor, meconium aspiration, congenital anomalies, and preeclampsia. However, the main causes of macerated stillbirth deaths in the study were Rh-immunization and preeclampsia. Birth asphyxia and prematurity were the major causes of early neonatal death. The majority of perinatal deaths are preventable, there should be increase the awareness about the risk factors of the stillbirths that can be avoided by proper diet, adequate rest, and regular antenatal checkup.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Kiasari AZ, Kabirzadeh A, Saravi BM, Rezazadeh E, Khadamlou M, Biazar T. Rate and causes of perinatal mortality in Imam Hospital, Sari 2007. *Iran J Obstet Gynecol Infertil* 2009;12:23-30.
2. World Health Organization. Neonatal and perinatal mortality: Country, regional and global estimates. Geneva, Switzerland: WHO Press, 2006.
3. Ezzati M, Lopez AD, Rodgers A, Vander Hoorn S, Murray CJ; Comparative Risk Assessment Collaborating Group. Selected major risk factors and global and regional burden of disease. *Lancet* 2002;360:1347-60.
4. Weiner R, Ronsmans C, Dorman E, Jilo H, Muhoro A, Shulman C. Labour complications remain the most important risk factors for perinatal mortality in rural Kenya. *Bull World Health Organ* 2003;81:561-6.
5. Silver RM, Varner MW, Reddy U, Goldenberg R, Pinar H, Conway D, *et al.* Work-up of stillbirth: A review of the evidence. *Am J Obstet Gynecol* 2007;196:433-44.
6. Msemo G, Massawe A, Mmbando D, Rusibamayila N, Manji K, Kidanto HL, *et al.* Newborn mortality and fresh stillbirth rates in Tanzania after helping babies breathe training. *Pediatrics* 2013;131:e353-60.
7. Behal M, Vinayak R. Maternal risk factors for perinatal mortality. *Indian J Obstet Gynecol Res* 2015;2:92-6.
8. Kristensen J, Vestergaard M, Wisborg K, Kesmodel U, Secher NJ. Pre-pregnancy weight and the risk of stillbirth and neonatal death. *BJOG* 2005;112:403-8.
9. Kyeong K, Shim J, Lee M, Lee K, Won H, Lee P. Comparison of outcomes of triplet pregnancy with twin pregnancy. *Int J Obstet Gynaecol (Abstract book)*: 2012. p. 26.
10. Abdulkhalik A, Malik E. Perinatal mortality in Azadi Teaching Hospital/ Duhok city. *Duhok Med J* 2007;1:4-14.
11. Alrahman SH, Al-Alaf SH. Incidence and probable risk factors of stillbirth in maternity Teaching Hospital in Erbil city. *Zanco J Med Sci* 2015;19:1057-62.
12. Chalumeau M, Bouvier-Colle MH, Breart G; MOMA Group. Can clinical risk factors for late stillbirth in West Africa be detected during antenatal care or only during labour? *Int J Epidemiol* 2002;31:661-8.
13. Engmann C, Walega P, Aborigo RA, Adongo P, Moyer CA, Lavasani L, *et al.* Stillbirths and early neonatal mortality in rural Northern Ghana. *Trop Med Int Health* 2012;17:272-82.
14. Bellad MB, Srividhya K, Ranjet K, Dhaded SM. Factors associated with perinatal mortality: A descriptive observational study. *J South Asian Fed Obstet Gynecol* 2010;2:49-51.
15. Central Statistics Agency, Ethiopia and ICF International. Ethiopian Demographic and Health Survey. Addis Ababa, Ethiopia: Central Statistics Agency, Ethiopia and ICF International; 2012.
16. Knight M. Eclampsia in the United Kingdom 2005. *Int J Obstet Gynaecol BJOG* 2007;114:1072-8.
17. Petersson K, Stray-Pedersen B, Malm G, Forsgren M, Evengård B. Seroprevalence of *Toxoplasma gondii* among pregnant women in Sweden. *Acta Obstet Gynecol Scand* 2000;79:824-9.
18. Stanton C, Lawn JE, Rahman H, Wilczynska-Ketende K, Hill K. Stillbirth rates: Delivering estimates in 190 countries. *Lancet* 2006;367:1487-94.
19. Abdulla SY, Al-Hadithi T. Perinatal Outcome of breech presentation at maternity Teaching Hospital in Erbil city. *J Sulaimani* 2005;112:205-9.
20. Yousuf NA, Yousuf IA, Talukder NU, Kutubi A, Nahar PA, Hena SB. Maternal risk factors for perinatal mortality. *Bangladesh J Obstet Gynaecol* 2013;26:86-91.
21. Manandhar SR, Ojha A, Manandhar DS, Shrestha B, Shrestha D, Saville N, *et al.* Causes of stillbirths and neonatal deaths in Dhanusha district, Nepal: A verbal autopsy study. *Kathmandu Univ Med J (KUMJ)* 2010;8:62-72.
22. Srivastava S, Sharma S, Kharkwal S, Chaudhary V. A study of causes of perinatal mortality in tertiary center in Bundelkhand region. *Infection* 2015;4:43-6.
23. Abdulghani TS, Sirhan TY, Lawas KA. Perinatal and neonatal mortality in Fallujah General Hospital, Fallujah city, Anbar province, West of Iraq. *Health* 2012;4:597-600.
24. Fretts RC. Etiology and prevention of stillbirth. *Am J Obstet Gynecol* 2005;193:1923-35.
25. Rahman S, Salameh K, Bener A, El Ansari W. Socioeconomic associations of improved maternal, neonatal, and perinatal survival in Qatar. *Int J Womens Health* 2010;2:311-8.