Profile of Fetal Deaths in Dhahira Region, Oman

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Abstract

Objective: To study the profile of reported fetal death cases and describe the circumstances under which these deaths occurred.
Methods: This is a retrospective case series study of 154 fetal deaths that occurred in the entire Dhahira region health institutions during a 5 year period (January 2000 and December 2004). The fetal death notification form and mortality meeting summaries were used to ascertain the possible causative factors of fetal death.
Results: There were a total of 16923 births and 154 fetal deaths in the region, with fetal death rate of 9.1/1000 total births for the study period. The mean age of the mothers at admission was 29.5 ± 7.3 years. The most common factors related to fetal deaths were congenital anomalies (18.2%) followed by, cord abnormalities (16.9%), IUGR (15.5%), hypertension (14.9%), polyhydramnios (13.6%), gestational diabetes (12.2%), Rh incompatibility (9.7%) and abruptio placentae (6.5%). Approximately 50% of the mothers had a previous pregnancy history of IUGR, preterm, LBW, polyhydramnios, abortion and fetal death. The important contributing factors of fetal death were anemia (47.9%) that needed further investigation. Advanced maternal age, grand multiparity and overweight were also the important associated factors of fetal death in Dhahira region.
Conclusion: The patients with a previous history of fetal demise should be managed under high risk category with close antepartum surveillance, especially in the last trimester, so as to reduce intrauterine fetal deaths which are mostly attributable to preventable causes.

Keywords: Fetal death; stillbirth; causes; Oman.

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Introduction

In any given menstrual cycle healthy couples, who have intercourse regularly, without the use of contraception, have only a 25 to 30 percent chance of beginning a pregnancy.[1] Only 70 to 75 percent of blastocysts created implant and only 58 percent of the blastocysts that implant survive past the second week of gestation.[2] In addition to these hurdles in early pregnancy, there are many variables that can affect the outcome of the pregnancy and delivery. Majority of pregnancies have no complications and result in the birth of a healthy child. Some pregnancies end prematurely and some develop normally to term only to end tragically during the birthing process. An estimated 10-15 percent of all recognized pregnancies end in unexpected loss.[3] A pregnancy loss can be extremely devastating at any stage for the expectant parents and these tragic events have lead many researchers to investigate the causes of specific pregnancy associated complications and the possible etiologies of these poor pregnancy outcomes.

Fetal death may be antepartum or intrapartum and is one of the most devastating complications of pregnancy. Fetal death rates vary among countries. In the United States the overall rate was 6.23/1000 total births in 2003 and accounts for approximately half the perinatal mortality (fetal and neonatal deaths).[4] However, The World Health Organization (WHO) mortality estimates for the year 2000 reported a fetal death rate of 3928.7 -29.9 /1000 total births for India and 10/1000 total births for Egyptians 1993-1995.[5]

Al Dhahira region is located in north-western side of Oman and has borders with the Kingdom of Saudi Arabia and United Arab Emirates. It has a population of 207,015 distributed in five Wilayats (Districts) and approximately 51% of the female population is in the child bearing age group (15-45 years) (census 2003). Ultra-sonographic screening for congenital anomalies is mandatory in Oman. During 2004, there were 3,312 births in Dhahira region, Ministry of Health institutions resulting in 3,276 live births and 36 still births.[6] All the fetal deaths in the region are notified in the fetal death notification form which was started in 1999 in an attempt to identify the possible causative factors.

Fetal death remains one of the areas of obstetrics in which improvements could be made. The major problem facing the obstetrician is the identification of women at risk as many cases appear to take place in the absence of recognized risk factors. Although the cause of stillbirths is poorly understood, fetal growth restriction may be one of the major determinants. Some of the known causes of fetal death are Maternal; Prolonged pregnancy, diabetes, hypertension, infection, preeclampsia, advanced maternal age, hemoglobinopathy, Rh incompatibility, uterine rupture, hereditary thrombophilias antiphospholipid syndrome, previous

history of abortion and intrauterine fetal death. Fetal; Multiple gestations, congenital abnormality, genetic abnormality, infection. Placental; Cord accident, placental abnormalities, and premature rupture of membranes.

Despite the above possible known causes, up to 50% of stillbirths have no identifiable etiology. Trying to determine the cause of fetal death is important because it may influence estimates of recurrence and future preconceptional counseling, pregnancy management and prenatal diagnostic procedures.[7] Hence, this study was planned to review the fetal death records to find out the various factors related to fetal death cases in Al Dhahira region, Oman.

Methods

It is a retrospective study of fetal deaths occurred during a five year period from January 2000 to December 2004. This study was carried out in all the Ministry of Health institutions of Dhahira region, Oman, between January 2000 and December 2004. Data was collected from the fetal death notification form and mortality meeting summaries to ascertain the possible causative factors of fetal death. Doctors (Obstetricians and Pediatricians) were responsible for determining the causative factors and record in the fetal death notification form. Fetal death notification records and ultrasound reports were analyzed at the end of this study period. No post-mortem examination was carried out for any of the cases.

Fetal deaths were defined as birth weight of 500 g or more with no signs of life irrespective of the gestational age (stillbirth=fetal death).[7] A standardization workshop was held for the health staff (doctors and staff nurses) after the introduction of the fetal death notification in the region. The health staff collected the information on a standardized fetal death notification form. Weight and length were recorded to the nearest 50 gms and 0.5 cms respectively. The Body Mass Index (BMI) was calculated using the formula weight (kgs) /height^2 (Meter) * 100 and values between 18.5 and 24.9 were considered normal.[8] Maternal haemoglobin <11 gm% was considered as anemia in pregnancy, random blood sugar > 8 mmol/L as gestational diabetes, blood pressure more than 140 and/or 90 mm Hg as pregnancy induced hypertension and birth weight <2500 gms as low birth weight (LBW).[9] The data was computed and analyzed using Statistical Package for Social Sciences (SPSS-9) software to calculate the rates and percentages. 95% Confidence interval for proportions were also calculated.

Results

During the 5 year study period, 154 fetal deaths were reported in the region. The overall fetal death rate was 9.1/1000 total births for the study period. The rates were 8.6, 6.5, 8.8, 10.9 and 10.8/1000 total births for the year 2000 – 2004 correspondingly. Majority of the mothers were Omani (89%). The majority were housewives (96.1%) and belonged to Ibri wilayat (50%). Approximately 7% of the mothers were unbooked and 25.3% of the mothers had no visit to the health facility 4 weeks prior to hospital admission. The mean total antenatal visits were 6.7 ± 3.6. The mean gestational age at admission was 34.5 ± 5.3 weeks and 60.4% of mothers were < 37 weeks at the time of delivery. The late fetal death rate (≥ 28 weeks of gestation) was 7.9/1000 total births. Nearly 17% of the mothers were primigravida and 72% were multigravida (>2 gravida). Likewise 62.3% of the mothers were multiparous and grand multiparty (parity 8 or more) was as high as 19.5%. The mean mothers height and weight was 151.5 ± 8.1 and 62.6 ± 14.8 respectively. The mean mothers BMI was 27.4 ± 6.6 and 58.8% were overweight and obese (BMI ≥ 25.0).

Ninety-six percent of the mothers delivered in the hospital. The mode of delivery was spontaneous vaginal in 75.3% of mothers and the remainder were either assisted or operated. Just about 51% of the delivered fetuses were males and the total mean weight was 2162 ± 1144 gms with 61% of the fetuses weighing between 500 and 2499 gms (LBW). Nearly 58% of the fetuses were macerated. A noteworthy observation was 76.6% had no fetal heart sound felt by the obstetrician at the time of admission to hospital. The detailed maternal and fetal characteristics and proportion of fetal deaths are depicted in Table 1.

The mean hemoglobin, random blood sugar, and systolic and diastolic blood pressure were 11.0 ± 1.2 gms %, 5.6 ± 1.8 mmol and 123.3 ± 13.5 and 76 ± 10.9 mm of Hg in that order. The common causative factors associated with fetal deaths in Dhahira region is shown in table 2. The leading were Congenital anomaly (18.2%) followed by, cord abnormalities (16.9%), IUGR (15.5%), hypertension (14.9%), polyhydromnias (13.6%), gestational diabetes (17/139) (12.2%), Rh incompatibility (9.7%) and abruptio placentae (6.5%).

Discussion

The fetal death notification system gives us sufficient desired information in Dhahira region. The fetal death rate varies in different countries from 2.6 to as high as 29.9/1000 total births and the rate of 9.1/1000 total births fits in this wide range (table 3). An extensive literature search has been done by Joy Lawn's team and reported stillbirth rates in various countries around the globe.[10] This wide variation in the fetal death rates could be due to different

case definitions used for stillbirth, maternal and fetal characteristics and health care settings of a particular region.

Table 1a. Distribution of fetal deaths according to various maternal and fetal characteristics

Maternal characteristics	Number	%	Mean ± SD
Age (years) (N=154)			
<20	9	5.8	
20-24	36	23.4	
25-29	41	26.6	29.5 ± 7.3
30-34	24	15.6	
35-39	33	21.4	
≥40	11	7.2	
BMI (N=143)			
<18.5 (Underweight)	2	1.4	
18.5 – 24.9 (Normal)	57	39.8	
25.0 – 29.9 (Overweight)	50	35.0	27.4 ± 6.6
30.0 – 39.9 (Obesity)	24	16.8	
≥ 40 (Morbid obesity)	10	7.0	
Gestational age (weeks) (N=154)			
20-27	21	13.6	
28-36	72	46.8	34.5 ± 5.3
≥ 37	61	39.6	
Parity (N=154)			
0	32	20.8	
1-7	91	59.1	4.1 ± 3.5
≥ 8	31	20.1	
Birth weight (gms) (N=154)			
500-2499	94	61.0	
2500-3999	50	32.5	2162 ± 1144
≥ 4000	10	6.5	

SD: Standard Deviation; BMI: Body Mass Index

The leading maternal factors related to fetal death in this series were maternal hypertension (14.9%) followed by polyhydramnios (13.6%), gestational diabetes (17/139) (12.2%) and Rh incompatibility (9.7%). It was also notable that 2.3% (3/128) and 3.9% (5/128) had previous pregnancy history of polyhydromnias and anti D administration respectively. Studies conducted elsewhere have also shown that polyhydromnias,[11] pregnancy induced hypertension, gestational diabetes and Rh incompatibility,[12] as a risk factor for fetal death.

Of the 128 multigravida patients, 27 (21.1%) had a history of abortion and 12 (9.3%) had a previous history of fetal death. History of previous IUGR, preterm and LBW contributed 28.1% of the fetal deaths in our study. A higher percentage of mothers with current fetal death had history of previous abortion (34.6%) and fetal death (34.6%) in a study conducted in Turkey.[13] Likewise, a study conducted in Latin America has also highlighted the importance of previous history of fetal death, abortion, IUGR and LBW.[14] Additional research into the pathophysiology is required to understand and prevent recurrent fetal deaths.

It was appealing to examine that (67/144) 46.5% of the women were anemic. Even though studies have acknowledged anemia as risk factor,[15] the pathophysiological relation between anemia and fetal death is inconclusive. However, it could contribute to it because of well established relation between anemia in pregnancy and preterm delivery,[16] low birth weight,[17] and IUGR,[18] which are in tern responsible for fetal death. It is worth investigating whether there is any direct relation between anemia during pregnancy and fetal death.

Nearly 9% (14/154) of women suffered from maternal diseases like maternal infection, cardiovascular and chronic renal disease. Studies have shown that maternal conditions especially infection, influence the growth of fetus sometimes leading to death.[19] Researches have shown that advanced maternal age (≥35 years), multiparity (≥ 4) and obesity (≥29.0) as a risk factor for fetal death.[12] In our study 28.6% women were more than 35 years, 20.1% were grand multiparity and 58.8% (84/143) were overweight (BMI ≥25.0).

Congenital anomaly, cord abnormalities,[19, 20] and IUGR,[19, 21] is well documented in literature as a cause of fetal death and that is the case in our study also. Similar to other studies,[21] low birth weight was an important contributory factor in the causation fetal death in our region (53.1%). To support the genetic causes of fetal death, the consanguine marriages in our study was 38.3% (59/154) and of them 30.55 (18/59) had congenital anomaly as a cause of fetal death. Pre and post marital genetic counseling is considered necessary since the consanguinity is high among Arab Muslims in this part of the world.[22]

Though placental abnormalities accounted for 7.8% in our study, placental abnormality especially abruptio placentae is an important factor in causing fetal death.[12, 19, 21]

The causes of fetal death are often complex and at times the cause is unknown. Similar to other studies,[23] in our study 44 patients (28.5%), the cause of fetal death could not be explained suggesting a scope of close monitoring during pregnancy so as to identify the unknown causes and to prevent the fetal death.

Table 2a. Common factors related to fetal death cases in Dhahira region

	Observed Number	Total number	Percent	95 % CI
Unexplained	44	154	28.5	22.0 – 36.1
MATERNAL				
Pregnancy induced hypertension	23	154	14.9	10.1 – 21.4
Gestational Diabetes (> 8 mmol/L)	17	139	12.2	7.7 – 18.7
Polyhydromnias	21	154	13.6	9.1 – 19.9
Rh anti D positive	15	154	9.7	5.9 – 15.4
Maternal disease during pregnancy including infection	14	154	9.1	5.4 – 14.6
Past pregnancy H/o IUGR, preterm and LBW	36	128	28.1	21.0 – 36.4
Past pregnancy H/o polyhydromnias, abortion and fetal death	41	128	32.0	24.5 – 40.5
Past pregnancy H/o anti D administration	5	128	3.9	1.6 – 8.8
Anemia during pregnancy (<11 gms %)	67	144	46.5	38.5 – 54.6
Advanced maternal age (≥ 35 years)	44	154	28.6	22.0 – 36.1
Over weight and obesity (BMI ≥ 25.0)	84	143	58.7	50.5 – 66.5
Grand multiparity (parity 8 or more)	30	154	19.5	14.0 – 26.4

Note: The total does not correspond to 100% because of multiple factors involved
CI: Confidence Interval; IUGR: Intra Uterine Growth Retardation; LBW: Low Birth Weight; BMI: Body Mass Index

Table 2b. Common factors related to fetal death cases in Dhahira region

	Observed Number	Total number	Percent	95 % CI
FETAL				
Congenital anomaly	28	154	18.2	12.8 – 25.0
IUGR	24	154	15.5	10.7 – 22.1
Multiple pregnancy	4	154	2.6	1.0 – 6.4
Low birth weight (500 – 2499 gms)	94	154	61.0	53.2 – 68.4
PLACENTAL				
Placental abnormalities including abruption	12	154	7.8	4.5 – 13.1
Cord abnormalities	26	154	16.9	11.7 – 23.5
Malpresentations	4	154	2.6	1.0 – 6.4
Premature rupture of membrane	3	154	1.9	0.6 – 5.5

Note: The total does not correspond to 100% because of multiple factors involved
CI: Confidence Interval; IUGR: Intra Uterine Growth Retardation

Approximately 7% of the mothers were un-booked and 25.3% of the mothers had no visit to the health facility 4 weeks prior to admission for delivery. At the time of admission 76.6% had no fetal heart sound felt, indicative of the need for more awareness to recognize the danger signs and report early to the health facility. The importance of antenatal care in causing fetal death has also been reported by many others.[12]

Since there are many instances of more than one maternal, fetal and placental factors involved in the causation, it is appealing to study weather the risk increases with multiple factor involvement. Fetal demise can be attributed to many different single causes, or to a combination of causes. Some causes are difficult or impossible to eliminate, such as multiple pregnancies, cord anomalies, fetal malformations, and placental anomalies. Hence, efforts should be made to bring down the fetal deaths by controlling the preventable causes of fetal death and minimize causalities due to non preventable causes by high-quality antenatal and intranatal care.

Further studies among cases and controls involving fetal autopsy, histopathology of placenta and fetal chromosomal analysis findings will possibly help in determining the particular causes of fetal death in Dhahira region which was a limitation of this study.

Table 3. Fetal death rates in various countries

Fetal death rate	Case definition abstracted
9.1/1000 total births (95% CI- 7.8 – 10.7)	Fetal weight 500 gms or more irrespective of gestational age
2.6/1000 births [10]	≥ 28 weeks [10]
6.8/1000 births [4]	≥ 20 weeks [4]
15/1000 births [11]	≥ 500 g or ≥ 20 weeks [11]
17.6/1000 births [12]	≥ 20 weeks [12]
29.9/1000 births (cases) [5] 28.7/1000 births (controls) [5]	>28 weeks [5]

CI: Confidence Interval

Conclusion

The fetal death rate in Dhahira region remains reasonably high. The majority of the ascertained causes of death are preventable. Efforts to further reduce the mortality should be directed at prevention and early treatment. The patients with a history of fetal demise should be managed under high risk category with close antepartum surveillance, especially in the last trimester, so as to reduce intrauterine fetal deaths which are mostly attributable to preventable causes.

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