Adverse Pregnancy Outcomes: Prevalence in the North of Jordan

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ABSTRACT

Objective: The aim of the study was to estimate the prevalence of the adverse pregnancy outcomes among Jordanian women.

Methods: A cross sectional study was carried out in five major hospitals in the north of Jordan. Women who gave birth in the five Hospitals during the period from April to June 2007 were included in the study. Data were collected within 24 hours of delivery; the mother answered a pilot tested structured questionnaire administered by trained personnel on the maternity ward through face to face interview, which lasted for 10 to 15 minutes.

Result: This study included a total of 3,269 women. More than half of them (57%) were living in urban areas, and 41.3% had an education of higher than high school. Only 1% gave birth to a very low birth weight baby and 10.9% gave birth to a moderately low birth weight baby. The prevalence of low birth weight baby was the highest for women aged above 40 years. Only 1.4% gave stillbirth with the rate being the lowest for those aged between 20 and 34 years. Prevalence of giving birth with any congenital anomaly was more evident for the oldest age group where about 40% of cases occurred among women aged above 40 years.

Conclusions: Adverse pregnancy outcomes including preterm delivery, low birth weight delivery, congenital anomalies, and stillbirth are common among Jordanian women compared with those in developed countries. Older women (age > 40) are at high risk of such adverse pregnancy outcomes.

Key words: Congenital anomalies, Low birth rate, Preterm labour

Introduction

The controversy surrounding the causes of adverse pregnancy outcomes especially congenital anomalies and stillbirth has been the subject of many studies in recent years. Several studies gave rise to the hypothesis that there is a higher rate of adverse pregnancy outcomes within the developing countries like Jordan; however there is no specific data about baseline data of some pregnancy outcomes in Jordanian population. Preterm birth is a major public health problem all over the world, but little is

known about the size of this problem in developing countries like Jordan. [1] Worldwide, preterm labor occurs in 6-8% of pregnancy and preterm labor is responsible for more than 80% of neonatal deaths and more than 50% of long term morbidity in the surviving infants.[2] There are no accurate recent worldwide data, but estimates of preterm birth rates range from 5% in developed countries to 25% in developing countries.[3] The prevalence of preterm birth has remained relatively constant over the past three decades and there are worrying trends that it is on the increase.[4] The rate of low birth weight (LBW) differ markedly around the world with 98% are in developing countries.[5] In both developed and developing countries, low birth weight is an important cause of perinatal mortality and both short- and long-term infant and childhood morbidity.[6] Birth weight is a reliable index of intrauterine growth retardation (IUGR) and a major factor determining child survival, future physical growth and mental development.[7] Organization estimates that 16% of neonates, or nearly 20 million, are born LBW each year. The highest prevalence is observed in South Asia, where an estimated 31% of neonates are born LBW and IUGR is responsible for nearly two-thirds of neonatal deaths occur among LBW babies.[8] A congenital abnormality is any defect in form, structure or function. The prevalence of major congenital abnormal is 2-3% of all births.[9] In Jordan, data on the prevalence of adverse pregnancy outcomes including preterm labor, low birth weight delivery, stillbirth and congenital anomalies are lacking. Therefore this study is intended to provide baseline data on adverse pregnancy outcomes among Jordanian women. The main objective of this study was to assess the adverse pregnancy outcomes among women in north Jordanian and to determine their association with maternal age.

Methods

A cross- sectional study was carried out at the main five governmental hospitals dealing with deliveries in the north of Jordan. All women who delivered in the five hospitals over a period of three months in 2007 were included in the study. The sample size was calculated using level of significant of 0.05 and power of 80%. The expected prevalence of any congenital anomalies of 2% was used in sample size calculation. The estimated sample size using the null hypothesis value of 3% was 2042. Epicac 2000 was used to calculate the sample size. A larger sample size was intended to increase the power of the study. Approval for the study was obtained from the administrator of each hospital. All participants agreed to participate and gave inform consent at the time of data collection. Non- Jordanian women, women with multiple pregnancies, and women who were referred from hospitals other than the previously mentioned hospitals due to a complicated pregnancy were excluded.

Data collection

Data were collected from women within 24 hours of delivery. Mothers answered a pilot tested structured questionnaire administered by a group of well trained personnel on the maternity ward through face to face interview, which lasted for 10 to 15 minutes. The questionnaire consisted of 75 questions. The first part of the questionnaire sought information about socio- demographic characteristic and selected behaviors: mother's age, education, employment, total family income, area of living, active and passive smoking during pregnancy, blood group, consanguinity with partner, coffee and tea consumption. The second part included questions about the obstetric and medical history; history of preterm birth delivery, history of low birth weight delivery, history of pre-eclampsia, history of caesarian delivery, plan and acceptance of pregnancy, self-reported emotional status during pregnancy, regular use of medication, history of urinary tract infections or candidal vaginosis during pregnancy, interpregnancy interval, parity, gravidity, number of prenatal care visits, onset of prenatal care, history of miscarriages, information regarding family history of preterm birth, low birth weight, and pre-eclampsia. Chronic illnesses were abstracted from maternal records. Complicated pregnancies by one or more antenatal medical conditions, including diabetes (pre-existing and gestational), hypertension, and anemia were evaluated. Prepregnancy height in cm and weight in Kg were self- reported. Several studies have reported that recalled pre-pregnancy weight reflects actual weight in women. Maternal age was defined as the age of mother in completed years at the time of delivery.

Estimated gestational age was calculated based on the recalled last menstrual period as the interval between the date of delivery and the date of last normal menstrual period. When the last normal menstrual period date was missing, a clinical estimate of gestational age was used instead. Parity was categorized into no previous pregnancies, one or two previous pregnancies, and three or more previous pregnancies. Information on pregnancy complications, pregnancy and neonatal outcomes were collected as part of clinical work by the nurses and midwives who took care of delivery and neonatal care. The mode of delivery was registered to the database as: spontaneous, instrumental or cesarean section. The admission rate to the neonatal intensive care unit (NICU) was recorded as infants requiring more than 22 hours surveillance. Neonates needing only observation are also treated in the NICU in hospital. Birth weight, outcome of pregnancy (live or stillbirth), gender of the baby and gestational age at birth were obtained from obstetric records. Miscarriage / spontaneous abortion were defined as the involuntary loss of the products of conception prior to 24 weeks' gestation. Preterm delivery was defined as birth before 37 weeks of gestation. Moderately preterm (live infant delivered between 28-37) and very pre-term delivery (live infant delivered at less than 28 weeks' gestation, LBW (live infant weighting <2500 g at birth), moderate LBW (live infant weighting 1500- 2500 g at birth), very LBW (live infant weighting <1500 g at birth) were recorded. Stillbirth was defined as delivery of a baby after 24 weeks of gestation with no signs of life. Congenital malformations included any minor or major abnormality in the structure or function of any organ.

Statistical analysis

The Statistical Package for Social Sciences software (SPSS, version 15) was used for data processing and analysis. Characteristics of subjects' variables were described using frequency distribution for categorical variables and mean and standard deviation for continuous variables. Chi-square test was used wherever appropriate. Rates of adverse birth outcomes were calculated for each maternal age group. The adjusted Odds ratios (ORs) along with their 95%

confidence intervals (CIs) associated for age groups, with reference to the 20–24 years olds were derived through multivariate logistic regression models with adjustment for potential confounders. Crude and adjusted odds ratios and their 95% confidence intervals were calculated. The significance of the associations between maternal age and adverse pregnancy outcomes were adjusted for possible predictors using binary logistic regression. At the first step of analysis, factors that were significantly associated with selected outcomes in the univariate analysis were entered in the regression equation. A variable was entered into the model if the probability of its score statistic was less than the entry value of 0.05, and was removed if the probability was greater than the removal value of 0.1. At this step, all variables that remained significant in the multivariate analysis constituted the reference model. The second step was repeated for each outcome variable. A p-value of less than 0.05 was considered statistically significant.

Results

Participants' characteristics:

This study included a total of 3,296 women. Their age ranged from 14 to 49 years with a mean of 27.2 years. More than half of women (57.1%) were living in urban areas, and 41.3% had an education of higher than high school. Their socio-demographic and relevant characteristics according to age are shown in Table I.

Adverse pregnancy outcomes:

Table II shows the distribution of pregnancy outcomes for Jordanian women according to age. Only 1% gave birth to a very low birth weight baby and 10.9% gave birth to a moderately low birth weight baby. The prevalence of low birth weight delivery was the highest for women aged above 40 years. About 16.0% of deliveries were premature (9.8% very preterm and 6.2% moderately preterm). Only 1.4% gave stillbirth with the rate being the lowest for those aged between 20 al 34 years. The prevalence of giving birth with any congenital anomaly was 2.4% being extremely high for women aged above 40 years where 40% of cases occurred in this age group.

Table I: Socio–demographic and relevant characteristics of participant according to age

Variable	Age (year)				
	< 20 N (%)	21-34 n (%)	35-39 n (%)	> 40 n (%)	Total n (%)
Education					
< high school	163 (74.8)	693 (28.3)	81 (25.5)	63 (39.1)	1000 (30.6)
high school	105 (30.8)	688 (28.1)	92 (28.9)	33 (20.5)	918 (28.1)
> high school	73 (21.4)	1068 (43.6)	145 (45.6)	65 (40.4)	1351 (41.3)
Income					
< 200	218 (63.9)	1117 (45.6)	143 (45)	54 (33.5)	1532 (46.9)
> 200	123 (36.1)	1332 (54.4)	175 (55)	107 (66.5)	1737 (53.1)
Occupation					
Employed	20 (5.9)	369 (15.1)	96 (30.2)	23 (14.3)	508 (15.5)
Unemployed	321 (94.1)	2080 (84.9)	222 (69.8)	138 (85.7)	2761 (84.5)
Residence area					
Urban	206 (60.4)	1390 (56.8)	176 (55.3)	94 (58.4)	1866 (57.1)
Rural	135 (39.6)	1059 (43.2)	142 (44.7)	67 (41.6)	1403 (42.9)
Parity					
0	213 (62.5)	686 (28)	24 (7.5)	12 (7.5)	935 (28.60)
1 or 2	114 (33.4)	969 (39.6)	49 (15.4)	17 (10.6)	1149 (35.15)
> 2	14 (41)	794 (32.4)	245 (77)	132 (82)	1185 (36.25)

Table II: The distribution of adverse pregnancy outcomes for Jordanian women according to age

Variable	Age (year)					P-Value
	< 20 No. (%)	20-34 No. (%)	35-39 No. (%)	> 40 No. (%)	Total No. (%)	
Gestational age						
Very preterm	39 (11.4)	194 (7.9)	47 (14.8)	41 (25.5)	321 (9.8)	<.0005
Moderately preterm	31 (9.1)	138 (5.6)	21 (6.6)	13 (8.1)	203 (6.2)	<.0005
Full term	271 (79.5)	2117 (86.4)	250 (78.6)	107 (66.5)	2745 (84.0)	<.0005
Birth weight						
very low	0 (0.0)	22 (1.0)	3 (1.1)	5 (3.9)	30 (1.0)	<0.0005
moderately low	36 (11.9)	252 (11.0)	21 (7.6)	17 (13.4)	326 (10.9)	
normal	267 (88.1)	2012 (88.0)	253 (91.3)	105 (82.7)	2637 (88.1)	
Stillbirth	28 (1.2)	1 (0.3)	8 (2.9)	4 (3.1)	41 (1.4)	0.015
Any congenital anomalies	26 (1.3)	3 (1.2)	7 (3.0)	24 (27.9)	60 (2.4)	<0.0005
Need for admission to NICU*	25 (10.1)	206 (10.7)	13 (14.2)	30 (34.5)	292 (11.7)	<0.0005
Child treated with antibiotic	8 (3.3)	80 (4.2)	14 (0.6)	10 (11.8)	112 (4.5)	<0.0005

*Neonatal intensive care unit

Table III: Distribution of congenital anomalies among 60 newborns in north of Jordan

Congenital anomalies	Total	
	No.	%
Multiple congenital anomalies	28	46.6
Lower limb deformity / club foot	10	16.7
Imperforated anus	8	13.3
Down syndrome	6	10.0
Facial palsy	4	6.7
Cleft lip/palate	4	6.7

The distribution of congenital anomalies is presented in Table III. In 11.7% of deliveries, babies were admitted in NICU. The multivariate analysis of the differences between women in adverse pregnancy outcomes according to maternal age are shown in Table IV. Compared to women aged 20 – 34 years, those aged above 20 years were more likely to give preterm baby. When compared to age of 20 – 34 years, age of 35-39 was significantly associated with increased

Table IV: Multivariate analysis of the association between maternal age and adverse pregnancy outcomes among women in north of Jordan

Variable	20-34	Age		
		< 20 OR (95% interval) P value	35 – 39 OR (95% interval) P value	> 40 OR (95% interval) P value
Preterm birth	1	2.2 (1.4,3.5) <0.0005	2.2 (1.5, 3.5) <0.0005	5.1 (3.0, 8.7) <0.0005
Low birth weight	1	0.6 (0.4,1.1) 0.100	0.8 (0.2, 1. 8) 0.054	1.4 (0.7, 2.7) 0.367
Stillbirth	1	1.2(05, 2.4) 0.005	3.8 (1.5, 9.8) 0.005	7.5 (1.8, 30.6) 0.005
Congenital anomalies	1	3.3 (0.7,17.0) 0.146	1.1 (0.3, 3.8) 0.919	35.5 (10.6, 119.5) < 0.0005
Admission of the baby to NICU	1	0.9 (0.6, 1.11) 0.223	1.6 (1.001,2.6) 0.050	4.6 (2.5, 8.5) <0.0005
Treatment of the baby by antibiotics	1	0.5 (0.2, 1.02) 0.052	2.0 (1.0, 4.1) 0.052	3.7 (1.4, 9.3) 0.007

Table V: Distribution of maternal complications during delivery

Any complication during delivery	Total	
	No.	%
Tear	147	46.2
Failure to progress (FTP)	135	42.4
Failed induction	7	2.2
Post partum hemorrhage (PPH)	4	1.3
Internal bleeding	9	2.8
Anti partum hemorrhage (APH)	3	0.9
Hypoxia	5	1.6
Abruption placenta	7	2.2
Hysterectomy	1	0.3
Total	201	100

Table VI: Distribution of newborn complications during delivery

Complications	Total	
	No.	%
Respiratory distress syndrome (RDS)	257	72.0
Fetal distress (FD)	30	8.5
Hypoglycemia	11	3.0
Asphyxia	2	0.6
Fracture	3	0.8
Cord prolapsed	2	0.6
Pathological jaundice	6	1.7
Hypoxia	21	6.1
Meconium aspiration	19	5.3
Amniotic fluid Aspiration	5	1.4
Total	376	100

odds of preterm delivery, stillbirth and admission of babies to NICU. Age above 40 was significantly associated with increased odds of all studied adverse pregnancy outcomes.

The distribution of complications occurred for mothers and newborns during delivery are shown in Table V and Table VI. Tear and failure to progress were the most common complications occurred for women during delivery. Respiratory distress syndrome was the most common complication occurred for newborn.

Discussion

Preterm birth is an important perinatal health problem across the globe. Developing countries, especially those in Africa and Southern Asia,

incur the highest burden in terms of absolute numbers, although a high rate is also observed in North America.[10] In our study about 16.0% of deliveries were premature in contrast to a study by Martin et al.[11] which showed following a long period of fairly steady increase, the U.S. preterm birth rate declined for the second straight year in 2008 to 12.3 percent, from 12.8 percent in 2006.

In contrast to our study, Olausson et al.[12] found that the prevalence of preterm birth was inversely correlated with maternal age, being highest in the 13 – 15 years age group. The findings were consistent with those of previous literature[13,14] in which young mothers were at more risk of preterm delivery and this is due to young maternal gynecological age.

In Jordan a retrospective study by Al-Ramahi[15] comparing the obstetric outcome of 267 adolescent pregnancies to 500 adult women pregnancies during the same period at University hospital, there was a significant increase of preterm labor in adolescent pregnancies, compared to adult pregnancies (14.6 and 8% respectively).

This study revealed that only 1.4% gave stillbirth with the rate being the lowest (0.3%) for those aged between 20-34 years and highest for those aged > 40 years (3.1%). A Swedish study observed that perinatal mortality, intrauterine fetal death, and neonatal death increased with age. There was also an increase in intercurrent illnesses and pregnancy complications with increasing age, but this did not entirely explain the observed increase in perinatal mortality with age.[16]

The prevalence of giving birth with any congenital anomaly was highly evident for the oldest age group where about 40% of cases occurred among women aged above 40 years and also babies needed to be admitted in NICU in 11.7% of deliveries with the highest rate of admission to NICU occurred among women aged above 40 years. The majority of previous studies on the association between maternal age and congenital anomalies have focused on the strong association between advanced maternal age and chromosomal defects, Reefhuis et al.[17] found that the overall prevalence of all congenital anomalies across the age distribution was shown

as a J shape, with women aged 20–29 years having the lowest prevalence, teenage women having an intermediate prevalence and women more than 40 years old having the highest prevalence. While a study by Chen et al. have explored the association between younger maternal age and congenital anomalies, and various congenital anomalies have been identified to be associated with younger maternal age.[18]

Limitations of the Study

The study was based on self reported information. Bias should be taken into consideration in the interpretation of findings of the study, except for the measurement which was based on clinical records like objective data. Using many trained personal and not the researcher, and cannot be generalized to the total population of Jordan.

Recommendations

- Further studies on the adverse pregnancy outcomes are required among other populations and on the national level to support the present findings.
- Further studies are recommended to compare adverse pregnancy outcomes observed in governmental hospitals with others like private, military, and tertiary hospitals in the north of Jordan.
- Educational programs that emphasize the effect of adverse pregnancy outcomes and ways to minimize them are needed, to increase the awareness of pregnant women and all health workers in order to facilitate

Conclusion

Adverse pregnancy outcomes including preterm delivery, low birth weight delivery, congenital anomalies, and stillbirth are common among Jordanian women compared with that in developed countries. The rate of caesarian section is high and exceeding the acceptable rate. Older women (age > 40) are at high risk of such adverse pregnancy outcomes. Preventive measures to improve both maternal and neonatal health are needed.

References

1. **Abu-Salah O.** Unfavourable outcomes associated with late preterm birth: observations from Jordan. *J Pak Med Assoc* 2011 Aug; 61(8):769-72 .

2. **Wei Yuan, Anne M Duffner, Lina Chen, *et al.*** Analysis of preterm deliveries below 35 weeks' gestation in a tertiary referral hospital in the UK. A case-control survey. *BMC Research Notes* 2010, 3:119.

3. **Steer P.** The epidemiology of preterm labour. *BJOG* 2005 Mar; 112 Suppl 1:1-3.

4. **Langhoff-Roos J, Kesmodel U, Jacobsson B, *et al.*** Spontaneous preterm delivery in primiparous women at low risk in Denmark: population based study. *BMJ* 2006 Apr 22; 332(7547):937-9.

5. **Carlo WA, Goudar SS, Jehan I, Chomba E, *et al.*** Newborn-care training and perinatal mortality in developing countries. *N Engl J Med.* 2010 Feb 18; 362(7):614-23.

6. **Goldenberg RL, Culhane JF.** Low birth weight in the United States. *Am J Clin Nutr* 2007 Feb; 85(2):584S-590S.

7. **Negi KS, Kandpal SD, Kukreti M.** Epidemiological factors affecting low birth weight. JK Science. *Journal of Medical Education* 2006; 8 (1): 31-34.

8. **Bang AT, Baitule SB, Reddy HM, Deshmukh MD, *et al.*** Low birth weight and preterm neonates: can they be managed at home by mother and a trained village health worker? *J Perinatol* 2005 Mar; 25 Suppl 1:S72-81 .

9. **Munim S, Nadeem S, Khuwaja NA.** The accuracy of ultrasound in the diagnosis of congenital abnormalities. *J Pak Med Assoc* 2006 Jan; 56(1): 16-18.

10. **Beck S, Wojdyla D, Say L, Betran AP, *et al.*** The worldwide prevalence of preterm birth: a systematic review of maternal mortality and morbidity. *Bull World Health Organ* 2010 Jan; 88(1):31-8.

11. **Martin J, Osterman MJK, Sutton PD.** Are preterm births on the decline in the United States? Recent data from the National Vital Statistics System. NCHS Data Brief No. 39. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; 2010.

12. **Olausson PO, Cnattingius S, Haglund B.** Does the increased risk of preterm delivery in teenagers persist in pregnancies after the teenage period? *BJOG* 2001 Jul; 108(7):721-5.

13. **Khashan AS, Baker PN, Kenny LC.** Preterm birth and reduced birthweight in first and second teenage pregnancies: a register-based cohort study. *BMC Pregnancy Childbirth.* 2010 Jul 9; 10:36.

14. **Ziadeh S.** Obstetric outcome of teenage pregnancies in North Jordan. *Arch Gynecol Obstet* 2001 Mar; 265(1):26-9.

15. **Al-Ramahi M, Saleh S.** Outcome of adolescent pregnancy at a university hospital in Jordan. *Arch Gynecol Obstet.* 2006 Jan; 273(4):207-10.

16. **Jacobsson B, Ladfors L, Milsom I.** Advanced maternal age and adverse perinatal outcome. *Obstet Gynecol* 2004 Oct; 104(4):727-33.

17. **Reefhuis J, Honein MA.** Maternal age and non-chromosomal birth defects, Atlanta--1968-2000: teenager or thirty-something, who is at risk? *Birth Defects Res A Clin Mol Teratol* 2004 Sep; 70(9):572-9.

18. **Chen XK, Wen SW, Fleming N, *et al.*** Teenage pregnancy and congenital anomalies: which system is vulnerable? *Hum Reprod* 2007 Jun; 22(6):1730-1735.