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Risk Factors Associated with Intrauterine growth Retardation (IUGR) in Bandar Abbas

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Children who are born with Intrauterine Growth Retardation (IUGR) have higher rates of seizures, sepsis, respiratory failure and neonatal mortality. The aim of this study was to determine risk factors associated with IUGR. This was a case-control study that carried out in Shariati Hospital of Bandar Abbas. Sixty IUGR and 60 normal birth weight infants were selected in the delivery room. The first normal birth weight baby born, after an IUGR baby, was taken as a control. A structured questionnaire was used to collect socio-demographic data, maternal data including past obstetric history, current pregnancy and delivery data, as well as data about the newborns. Data were analyzed using SPSS version 13 software. Risk factors associated with IUGR in this study were maternal work (OR = 10.2, CI 95% = 1.2-87.3), to have hypertension (OR = 7.4, CI 95% = 1.5-36.9), to use hookah during pregnancy (OR = 3.5, CI 95% = 1.1-12.6) and not to use antenatal care (OR = 3.9, CI 95% = 1.2-13.7). Screening women for known risk factors of IUGR, counseling, health education about risks of IUGR and the ways of prevention is necessary to reduce the rate of it.

Key words: Intrauterine growth retardation, risk factors, birth weight, Bandar Abbas

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INTRODUCTION

The growth of the fetus in pregnancy is indicated by its anthropometric measurements at birth, particularly weight. In fact, the birth weight of an infant is the most important determinant of its morbidity and mortality (Patrica and Andrew, 1996). Birth weight is one of the most important of health indicators of healthy infants in all of countries and is considered as the unique indicator for pregnancy outcomes. Low Birth Weight (LBW) is defined as a birth weight of <2500 g. LBW is of public health importance because of the strong relationship between birth weight and infant mortality and morbidity. LBW infants are at a considerably increased risk of neonatal mortality. Neonatal death is 40 times more likely among LBW infants than it is among infants of normal birth weight (John *et al.*, 2005).

Infants who are born with LBW are divided into 2 categories: those born too early and those born too small. Those born too early or preterm infants have LBW primarily because they did not have adequate gestational time to develop and grow fully. Term infants (greater than or equal to 37 weeks' gestation), who, despite having adequate time to grow, are born too small and weigh <2500 g, have intrauterine growth retardation (Sharon and Gilberto, 2003). Intrauterine growth retardation (IUGR), defined as babies with a birth weight under the 10th percentile for gestational age (Imma *et al.*, 1996). In a simple definition, IUGR infants are considered those who are gestationally full-term, but of a low birth weight. When an investigator does not have birth weight-for-gestation percentiles for a population, this definition of IUGR is quite useful (John *et al.*, 2005).

The higher the prevalence of LBW babies, the higher the percentage of IUGR. In developing countries there is an excess of IUGR babies within their LBW populations. IUGR seems to be associated with an increased risk of development of infection, due to a lowered level of immunity (Patrica and Andrew, 1996). Children who are born with IUGR have higher rates of seizures, sepsis, respiratory failure and neonatal mortality. These infants also have more problems with learning. Furthermore, IUGR has been implicated as a risk factor for health problems in adulthood, such as diabetes, hypertension and cardiovascular disease (Sharon and Gilberto, 2003). Birth weight is an important determinant of the chances of the newborn to survive and experience healthy growth and development. Globally, almost 25 million per year are LBW. Over 90% of these infants are born in developing countries. Birth weight data are needed for monitoring and evaluating progress towards achieving national strategies for lowering LBW and IUGR, as well as global child survival goals of reducing infant and under-5 child mortality (Mansour *et al.*, 2002).

Sharon and Gilberto (2003) in a study in California found that mothers with infants who had IUGR were more likely to be younger than 20, to have less than a high school education, to have smoked during pregnancy and to have a history of having an infant with LBW. Factors not statistically associated with IUGR in this study included income, alcohol consumption during pregnancy, pregnancy weight and weight gain during pregnancy.

Vega *et al.* (1993) in a study about risk factors for LBW an IUGR in Santiago (Chile) found that IUGR in previous pregnancies, maternal smoking, month of first prenatal visit, number of visit, maternal pregnancy weight and maternal height were significantly associated with IUGR.

Knowledge about risk factors of IUGR will help to design locally and culturally appropriate interventions to reduce the occurrence of it. The aim of this study was to determine risk factors associated with IUGR in Bandar Abbas, south of Iran.

MATERIALS AND METHODS

This was a case-control study that carried out in Shariati Hospital of Bandar Abbas in south of Iran. Mothers and their infants constituted the target population of the study. Sixty IUGR and 60 normal birth weight infants were selected in the delivery room, according to their birth weight. Newborns were classified as being IUGR if were gestationally full-term but of a low birth weight. Although, preterm infants may also have IUGR, for this study we focus on term infants with IUGR. Only live births with a gestational age higher than 37 weeks and lower than 42 weeks were included in this study. Exclusion criteria consisted of infant with multiple births and stillbirths. The first normal birth weight baby born, after an IUGR baby, was taken as a control. Weight of the newborns was determined up to 10 min of delivery utilizing a digital baby scale. The scale was calibrated before each measurement and checked with standard weights. A structured questionnaire was used to collect socio-demographic data, maternal data including past obstetric history, current pregnancy and delivery data, as well as data about the newborns. Data were analyzed using SPSS version 13 software. We calculated odds ratios with 95% Confidence Interval (CI) for the association of IUGR and each potential risk factor. All risk factors associated with IUGR in univariate analysis at $p \leq 0.05$ were included in the initial model. Using a multivariate logistic regression analysis, we modified the model to obtain the best fit.

RESULTS

The mean number of pregnancy of mothers in case group was 2.34 ± 1.8 and in control group was 1.94 ± 1.5

and there was no significant difference between them ($t = 0.98, p = 0.33$). The mean age of mothers in case group was 26.2 ± 6.1 and in control group 25.1 ± 5.3 and there was no significant difference between them ($t = 1.1, p = 0.29$). There was 29 male and 31 female in each group. None of mothers in case and control group smoked and used alcohol during pregnancy and none of them had diabetes.

In univariate analysis mothers with infants who had IUGR were more likely to have a history of an infant with LBW, to be less than 50 kg, to work for cash, to have unwanted pregnancy, to have hypertension, pre-eclampsia and bleeding during pregnancy, to use hookah during pregnancy and not to use antenatal care (Table 1). Factors not statistically associated with IUGR

Table 1: Crude odds ratio and 95% confidence interval of potential risk factors of IUGR

Risk factor	Frequency		Crude odds ratio	95%CI	p
	Case	Control			
Maternal age (year)					
<20	11	13	0.60	0.19-1.89	NS
21-30	35	37	0.67	0.26-1.71	NS
>30	14	10	1.00		
Maternal Education					
Illiterate and primary school	32	29	1.04	0.45-2.4	NS
Secondary school	10	14	0.67	0.23-1.92	NS
High school and university	18	17	1.00		
Father Education					
Illiterate and primary school	21	19	1.45	0.59-3.56	NS
Secondary school	23	20	1.50	0.62-3.65	NS
High school and university	16	21	1.00		
Maternal work					
Housewife	53	59	11.80	1.46-95.4	0.021
Work for cash	7	1			
Place of residence					
Urban	37	37	1.00	0.47-2.1	NS
Rural	23	23			
History of abortion					
Yes	7	9	0.74	0.25-2.16	NS
No	53	51			
History of stillbirth					
Yes	1	2	0.49	0.04-5.57	NS
No	59	58			
History of LBW					
Yes	10	2	5.80	1.21-27.7	0.028
No	50	58			
Maternal weight (kg)					
<50	28	22	2.32	1.03-5.23	0.042
>50	17	31			
Spacing (year)					
<3	7	6	0.78	0.28-2.2	NS
>3	25	24			
Weight gain during pregnancy (kg)					
<9	20	12	2.80	1.15-6.67	NS
>9	24	40			
Pregnancy intention					
Wanted	43	53	2.99	1.13-7.87	0.026
Unwanted	17	7			
Using hookah during pregnancy					
Yes	13	4	3.87	1.18-12.67	0.024
No	47	56			
Hypertension during pregnancy					
Yes	11	2	6.50	1.37-30.8	0.018
No	49	58			
Pre-eclampsia					
Yes	8	1	9.10	1.1-75.1	0.04
No	52	59			
Anemia					
Yes	5	11	0.40	0.3-3.3	NS
No	55	49			
Bleeding during pregnancy					
Yes	9	1	10.40	1.27-84.9	0.029
No	51	59			
Antenatal care					
No	13	4	3.90	1.18-12.7	0.025
Yes	47	56			

Table 2: Multivariate logistic regression analysis for risk factors of IUGR

Risk factor	B	SE	p	Odds ratio	95% CI
Maternal work	2.32	1.1	0.035	10.2	1.2-87.3
Using hookah	1.26	0.65	0.04	3.5	1.1-12.6
Hypertension	1.99	0.82	0.015	7.4	1.5-36.9
Antenatal care	1.36	0.64	0.035	3.9	1.2-13.7
Constant	-13.20	3.32	0.000	-	-

in this study included maternal age, maternal education, father education, place of residence, to have the history of abortion and stillbirth, spacing(year) and anemia (Table 1).

Table 2 shows the results of the multivariate logistic regressions for risk factors of IUGR. In this model risk factors associated with IUGR were maternal work, to use hookah, to have hypertension during pregnancy and not to use antenatal care.

DISCUSSION

The aim of this study was to determine risk factors associated with IUGR. Among socio-demographic factors in this study (maternal education, father education, maternal work and maternal age), maternal work was one of risk factors of IUGR. Mansour *et al.* (2002) found that maternal work was associated with low birth weight and mothers with infants who had LBW were more likely to be more than 35 years old. Parker *et al.* (1994) found that maternal education, father education and maternal work were associated with low birth weight. Sharon and Gilberto (2003) found that mothers with infants who had IUGR were more likely to have less than a high school education and to be younger than 20 years. Phung *et al.* (2005) found that mothers delivering LBW infants were more likely to have lower education and to be at young age (<20 years old) and advanced age (>35 years old).

Although in this study none of mothers smoked cigarettes during pregnancy but some of them used hookah that was one of risk factors of IUGR. Smoking during pregnancy has reported as one of risk factors of IUGR in many studies (Sharon and Gilberto, 2003; Parker *et al.*, 1994; Kramer, 1997). Probably the effects of hookah are similar to smoking.

Although maternal weight was associated with IUGR, but in multivariate logistic regression it was not as a risk factor. The result is in agreement with the result of Vega *et al.* (1993), but doesn't support the result of Sharon and Gilberto (2003).

Although unwanted pregnancy was associates with IUGR, but in multivariate logistic regression it was not as a risk factor. Sharon and Gilberto (2003) found that there was no significant relationship between pregnancy intention and IUGR. Bitto *et al.* (1997) found no association between having an unplanned pregnancy and having an IUGR birth, which is difference from our findings.

Among problems during current pregnancy in univariate analysis hypertension, pre-eclampsia and bleeding was associated with IUGR and in multivariate logistic regression analysis hypertension was one of risk factors of IUGR. Mansour *et al.* (2002) found that hypertension and pre-eclampsia was associated with low birth weight.

Another risk factor associated with IUGR in this study was not to use antenatal care during pregnancy. Phung *et al.* (2005) found that mothers with infants who had IUGR were more likely to have less than three antenatal cares during pregnancy. Antenatal care is one of the most generalized health activities of modern medicine. Its main objectives are to identify women at risk of having an adverse pregnancy outcome, prevent complications, provide treatment for current pathological conditions and provide health education for mothers.

Among factors related to obstetric history, to have a history of an infant with LBW was associated with IUGR. The result is in agreement with the results of Sharon and Gilberto (2003) and Vega *et al.* (1993).

There was no significant relationship between weight gain during pregnancy and IUGR in this study. The result of this study supports the result of Sharon and Gilberto (2003).

Another factors not statistically associated with IUGR in this study included place of residence, to have the history of abortion, to have the history of stillbirth, spacing (year) and anemia. Phung *et al.* (2005) found that living in rural areas is associated with IUGR. Mansour *et al.* (2002) found that anemia is associated with low birth weight.

Most of risk factors associated with IUGR in this study are preventable. Programs aimed at lowering the IUGR rate should continue to focus on women who are known to be at risk for IUGR, namely, women with previous LBW infants, women work for cash, women who use hookah during pregnancy, women who have problems during pregnancy such as hypertension, pre-eclampsia and bleeding, women who do not use antenatal care and women who have unwanted pregnancy. Prenatal care providers should continue to screen women for these easily identifiable risk factors to assess the risk of IUGR. By screening women for known risk factors of IUGR, counseling, health education about risks of IUGR and the ways of prevention can reduce the rate of it.

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