

RISK FACTORS FOR LOW BIRTH WEIGHT IN SANA'A CITY, YEMEN

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Background: Low birth weight (LBW) represents the third leading cause of death in children in Yemen, and is the most significant predictor of death, health, growth and development. The aim of this study was to estimate the birth weight distribution and prevalence of low birth weights in Sana'a City of Yemen, and to determine some of the contributing risk factors.

Subjects and Methods: A descriptive cross-sectional design was used to study women who delivered in the four main hospitals in Sana'a City during the study period. Respondents were 2256 mothers ranging in age from 14-45 years, with a mean age of 29.55 years. The mean age at the time of marriage was 22.38 years. Anthropometric measurements and interviews were used to determine the risk factors. The birth weights and anthropometric measurements of all babies born alive to mothers interviewed in the four hospitals during the period were collected. Post-delivery weight and other measurements of respondents were also collected. The data collected were entered into a computer using Statistical Package for Social Science (SPSS).

Results: The mean birth weight of the newborns in the study was 2812 g. Twenty-two percent of the newborns weighed between 700 and 2499 g. About 39% of respondents had urinary tract infection while 29% suffered from anemia, and 10% had bleeding during pregnancy. All anthropometric measurements were significantly associated with LBW.

Conclusion: Mothers who were younger in age at their first delivery, had low post-delivery weight, and bled during pregnancy, were more likely to have LBW babies. There is a need for national prospective research project to study the low birth weight problem at the national level. There is also a need to discourage teenage pregnancies and to encourage utilization of mother and child health services, and treat concomitant illnesses during pregnancy.

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Key Words: Low birth weight, teenage pregnancies, anemia, urinary tract infection, bleeding.

The definition of low birth weight (LBW) was endorsed by the First World Health Assembly in 1948 as a birth weight of 2500 g or less. This definition was altered by the Twenty-Ninth Health Assembly in 1976 to a birth weight of less than 2500 g (up to and including 2499 g). LBW is a global health problem whose incidence has a varying geographic distribution. In South Asia, LBW is said to account for 30% of all births, while only 7% of births in North America are LBW. The mean birth weight varies between 2900 and 3100 g in Asia and Africa, and is about 3200 g in Europe and North America. Birth weight has served as primary operational index of maturity of the infant at birth for the past 50 or more years.

The importance of low birth weight (LBW) as a public health problem and its impact on infant and child morbidity and mortality is not yet well understood or recognized in

Yemen, as in most developing countries, but is suspected to be considerably high. In April 1990, the office of UNICEF in Sana'a estimated an incidence of 35% in LBW in Yemen.¹

Low birth weight including pre-maturity represents the third leading cause of death in children in Yemen after the two major killers, diarrheal diseases and acute respiratory infections (ARI).² LBW in Yemen is not systematically documented for the country as a whole, though it is certainly a major contributing factor in childhood morbidity and mortality.³ The 1998 Rural Dhamar Study found that 22% of infants were described by their mothers as being small from birth. A 1984 hospital study in North Yemen found that 26% of newborns had birth weight of less than 2500 g.

Subjects and Methods

A descriptive cross-sectional study using a questionnaire was conducted, whereby 2256 mothers were interviewed and their anthropometric measurements and those of their babies taken in the participating hospitals.

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TABLE 1. *Distribution of low birth rate and age of mothers.*

Characteristic	No.	Percent	LBW		
			%	OR	CI %
Current age of mother (years)					
19 or less	353	16.6	31.4	1.5	1.2-2.0
20-24	627	29.5	25.5	1	-
25-29	503	23.7	19.3	0.7	0.6-1
30-30	389	18.3	16.5	0.7	0.5-1
35 or more	251	11.8	18.3	0.7	0.5-1
Age at menarche (years)					
12 or less	394	17.5	27.7	1	-
	394	17.6	21.8	1	0.7-1.3
	426	19	20.7	0.9	0.7-1.2
15 or more	667	29.7	22.7	1	0.8-1.3
Unknown	362	16.1	15.5	1.2	0.1-11.6
Age at marriage (years)					
10-14	411	18.3	20.7	0.8	0.6-1
15-19	1304	58.2	24.8	1	-
20-29	372	16.6	16.7	0.6	0.5-0.8
Unknown	155	6.9	12.9	0.5	0.3-0.7
Age at first birth (years)					
11-14	111	5	30.6	1.4	0.9-2.1
15-19	1210	54	24.2	1	-
20-24	529	23.6	20	0.8	0.6-1
25 or more	90	4	10.8	0.4	0.2-0.7
Unknown	302	13.4	15.9	0.6	0.4-0.8

Chi-square=33.10 (4df), *p*=0.0001; Chi-square=17.45 (4df), *p*=0.0077; Chi-square=19.95 (3df), *p*=0.0017; Chi-square=23.66 (4df), *p*=0.009.

TABLE 2. *Distribution of low birth weight and associated concomitant illnesses.*

Characteristics	No.	Percent	LBW %	OR	CI 95%
Anemia					
Yes	648	28.9	25.5	1.3	1-1.7
No	1594	71.1	20.4		
Urinary tract infection					
Yes	867	38.7	24.2	1.3	1-1.5
No	1375	61.3	20.4		
Bleeding					
Yes	217	9.7	38.2	2.5	1.8-3.3
No	2025	90.3	20.1		

Chi-square=6.94 (1df), *p*=0.0084; chi-square=4.61 (1df), *p*=0.031; chi-square=37.80 (1df), *p*=0.001.

TABLE 3. *Distribution of low birth weight and associated maternal anthropometric indices.*

Characteristics	No	Percent	LBW %	OR	CI 95%
Weight (kilograms)					
30-39	73	3.3	47.9	3.7	2.3-6
40-49	694	31	29.7	1.7	1.3-2.1
50-59	820	36.6	16.6	1	-
60-69	433	19.3	13.6	0.6	0.5-0.9
70 or more	122	5.4	5.7	0.2	0.1-4.5
Height (centimeters)					
100-149	426	19	32.9	1.8	1.4-2.3
150-159	1185	52.9	21.9	1	-
160-169	504	22.5	12.5	0.5	0.4-0.7
170 or more	75	3.3	8	0.3	0.1-0.7
Mid-arm circumference (centimeters).					
19 or less	51	2.3	43.1	2.2	1.2-3.9
20-24	1205	54.2	25.3	1	-
25-29	866	39	15.8	0.5	0.4-0.7
30 or more	100	4.5	13	0.4	0.2-0.8

Chi-square=77.22 (4df), *p*=0.0001; Chi-square=115.78 (5df), *p*=0.0001; Chi-square=62.9 (5df), *p*=0.001.

Problems identified with the questionnaire during a pilot study were addressed so that the questions were made

clearer in the local Arabic dialect. In addition, interviewer deficiencies were corrected and logistical problems resolved. One of the problems was the calibration of new weighing scales for mothers and newborns, which were distributed by the project to the delivery rooms of the participating hospitals. All consecutive births from August to November 1995 in the four hospitals, namely, Athawra, Al-Sabeen, Al-Umm and Kuwait, were recorded. All the above-mentioned hospitals are government-owned which charges only a nominal fee for services provided to the public. The sample size of 2256 represented about 25% of all births of urban women occurring in the four hospitals in 1995. There was a 100% response rate and women who were not residing in Sana'a City were excluded from the study. They represented about 10% of all mothers delivering in the hospitals during the study period.

Adequate protection of the subjects was achieved by adhering to confidentiality safeguards and informed consent to ensure the risks and benefits of the study were explained to study participants before each interview. The interviewer read the Arabic consent statement, explaining the survey objectives and procedures to the respondents. Respondents gave their verbal consent and then either signed or put their thumb impressions on the consent forms in case of illiterate respondents. The questionnaire was administered by trained local female interviewers to obtain information on age of mother, concomitant illnesses, and anthropometric measurements of respondents and their babies. Descriptive univariate analyses were performed to inspect the frequency of the various factors. Descriptive statistics including means and standard deviations for continuous variables were computed and internal consistency checks done. To test for collinearity, a correlation matrix was generated to investigate inter-correlations among independent variables. Bivariate analysis was used to examine the associations of individual factors with low birth rate. Multivariate logistic regression was run to assess the independent correlation of each factor on low birth rate, and *t*-test was used to assess differences in means of continuous variables. The chi-squared statistics with its corresponding probability level, odds ratio (OR), and 95% confidence intervals (CI), were computed to examine the magnitude and significance of the bivariate associations between pairs of dichotomous variables.

Results

The mean birth weight of the newborns in the study was 2812 g. Twenty-two percent of newborns weighed between 700 and 2499 g. Of the 2256 respondents, 1321 mothers (59%) had their first babies when they were teenagers, and 5% of them had theirs between 11 and 14 years of age (Table 1). The age of the mothers at the time of study ranged from 14 to 45 years, with a mean age of 29.55 years.

About 76% of respondents were married in their teens and 18% of them were married when they were less than 15

years of age. The mean age at the time of marriage was 22.38 years.

Discussion

In the current study, younger respondents (19 years or less) who comprised 16.6% of the subjects were found to be more likely to have low birth weight babies. Other studies have also confirmed this finding. Lee et al. found that the incidence of low birth weight at term was highest in mothers <17 years of age (3.2%).⁴ A possible explanation for this high observation is the fact that in Yemen, girls get married at a very early age. Of the 2256 respondents, 1715 (76.5%) were married at 19 years of age or less, and 411 (18.3%) were married between 10 and 14 years of age. Women in Yemen are also expected to have children as soon as possible after marriage. A total of 1321 mothers (59.0%) had their first babies at age 19 years or less, and 111 (5.0%) had theirs between 11 and 14 years of age. This group of respondents had the highest relative risk of having low birth weight babies. Age at first birth may also be a marker for low socio-economic status.^{5,6}

In this study, concomitant illnesses, namely anemia, urinary tract infection and bleeding were significantly associated with low birth weight. These respondents were more likely to have low birth weight babies, however, only bleeding was significantly related to LBW in the multivariate analysis. These findings are consistent with the findings of various studies.⁷⁻⁹ Urinary tract infections, based on severity could spread to the placenta and amniotic fluid, thereby affecting gestational duration. In a study from Guatemala,⁹ Lechtig et al. found that symptoms of anorexia, headache and diarrhea were significantly associated with birth weight after controlling for several factors. In a study from Brazil, gestational and intrapartum complications were significantly associated with preterm LWB. For IUGR, only gestational complications were important.¹⁰ It is important to mention that the high prevalence of low birth weight in Sana'a City could also be influenced by the fact that the city is located at a high altitude (approximately 3500 meters above sea level). An increase in altitude of as little as 500 meters can affect not only the proportion of birth under 2500 g, but can cause the entire birth weight distribution to shift downward. An

increase of 2000 meters has been shown to nearly double the percentage of low birth weights.¹¹⁻¹³

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