

Reproductive and behavioural risk factors of low birth weight among newborns in Al Thawra Hospital, Sana'a, Yemen

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Abstract

Background: Low birth weight can lead to infant death, especially during the first year of life.

Aims: To assess risk factors related to low birth weight babies in Sana'a, Yemen.

Methods: We conducted an unmatched case-control study of 252 women who came for delivery at Al Thawra Hospital, Sana'a, Yemen, between August and October 2016.

Results: Significant risk factors for low birth weight were: birth interval < 2 years; history of pre-eclampsia during current pregnancy; preterm gestational age < 37 weeks; and khat chewing or smoking during pregnancy. After controlling for all the confounders, only birth interval < 2 years was significantly associated with low birth weight.

Conclusion: Shorter birth interval is an important risk factor for low birth weight; therefore, improving maternal awareness of this should be emphasized during postnatal follow-up.

Keywords: low birth weight, prematurity, pre-eclampsia, khat chewing, smoking.

Citation: Idris I; Sheryan M; Ghazali Q; Nawi A. Reproductive and behavioural risk factors of low birth weight among newborns in Al Thawra Hospital, Sana'a, Yemen. *East Mediterr Health J.* 2020;26(11):1415-1419. <https://doi.org/10.26719/emhj.20.061>

Received: 14/05/19; accepted: 27/11/19

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Introduction

Low birth weight (LBW) is defined as birth weight < 2.5 kg (1). Two main factors cause LBW: preterm delivery (< 37 weeks' gestation) and growth restriction, or a combination of both (2). LBW is related to maternal biological, social and general health (3). Infants with LBW have almost 20 times greater risk of dying compared to normal-weight newborn infants (4). LBW is predictive of a newborn's health and survival, and can lead to death during the first year of life. Unfortunately, even if an LBW infant survives, they may face life-threatening conditions throughout their life and be exposed to chronic health issues in later life (4). According to the World Health Organization (WHO), there are an estimated 25 million LBW infants born each year worldwide, which comprise 17% of all live births, and about 95% of them are born in developing countries (5).

There is a high prevalence of LBW infants in Yemen, where 32% of all newborn infants have LBW (6). This study was conducted to assess the maternal sociodemographic, reproductive and lifestyle risk factors related to LBW in Sana'a City, Yemen.

Methods

Study design and sampling

This was an unmatched case-control study conducted at Al Thawra Modern General Hospital, located in Sana'a City, Yemen during August–October 2016. This hospital is one of the biggest referral hospitals in Yemen. The cases and controls were selected according to the inclusion cri-

teria, that is, women who gave birth to a single live infant and who were resident in Sana'a City for at least 1 year. Women who had given birth to newborns weighing < 2.5 kg were classified as cases, and women who had given birth to newborns weighing ≥ 2.5 kg were classified as controls. Exclusion criteria were newborns that weighed < 1.5 kg or > 4.0 kg, twins, stillbirths, and infants with a visible congenital anomaly. From the medical records, cases were selected by convenience sampling while controls were selected by simple random sampling. All newborns were weighed within 1 hour after birth. Sample size was calculated using Open Epi version 3.01 using a formula one proportion. Based on a previous study in Sudan, with a prevalence of LBW of 12.6% (7), the sample size calculated for this study was 252 mothers of newborns (126 cases and 126 controls).

Data collection

Data were collected from selected women through self-administered questionnaires and medical records. Questionnaires were administered via face-to-face interview and questions were closed-ended in nature (Yes/No answers). The questionnaires and medical records consisted of women's age, educational level, occupational status, birth parity, birth interval, history of previous abortion, history of pre-eclampsia during the current pregnancy, gestational age of the newborn, number of antenatal care visits, as well as khat chewing and smoking during the current pregnancy. Interviews were conducted by 2 well-trained female data collectors within the first 24 hours after delivery, and medical record data were extracted after the interview. The researchers trained the data collectors

and supervised them during data collection and checked all the questionnaires to ensure accuracy.

Ethical considerations

The study was approved by the Medical Research and Ethics Committee of the University of Science and Technology, Sana'a, Yemen. Before starting the interview, the participants were informed about the purpose of the study and its benefits. Verbal and signed consent were obtained from the participants before data collection. The respondents were assured that all the information would be confidential and only used for this study.

Statistical analysis

All the data were analysed by SPSS version 24.0. Qualitative variables were described by calculation of frequency, and quantitative variables were represented by mean and standard deviation. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated to measure the risk. χ^2 and Fisher's exact tests were used to show significant associations between cases and controls, as well as association of various risk factors and LBW. We used multiple logistic regression to calculate the adjusted ORs (aORs) after controlling for all possible confounders, with the corresponding 95% CIs, for LBW concerning exposure of interest.

Results

A total of 126 cases and 126 controls were included in the study (Table 1). The mean age in the cases and controls was 25.9 (standard deviation; 7.06) and 25.2 (5.48) years, respectively. Most cases and controls were aged 20–29 years. In the case group, 67 (53.2%) women did not complete their primary education and 59 (46.8%) who did. In the control group, 58 (46%) women did not complete their primary education and 68 (54%) did. In terms of occupation, 116 (92.1%) women in the case group were housewives and 10 (7.9%) worked outside the home. In the control group, 113 (89.7%) women were housewives and

13 (10.3%) worked outside the home. There was no significant association between cases and controls concerning sociodemographic and socioeconomic characteristics.

Birth interval < 24 months, history of pre-eclampsia, preterm delivery, chewing khat, and smoking were significant risk factors for LBW (Tables 2 and 3). However, in multivariate analysis, the only significant risk factor for LBW was birth interval < 24 months (aOR = 2.24, 95% CI = 1.017–4.952, $P = 0.045$) after controlling for the effect of other predictors.

Discussion

LBW is a significant cause of morbidity and mortality among neonates and children (8). Infants' gestational age has a vital role in determining BW. There is an increased risk of LBW for premature infants (< 37 weeks' gestation). According to WHO, prematurity is the cause of LBW in about one third of LBW infants (8). The present study showed that LBW was significantly associated with preterm delivery, which was consistent with previous studies (5,7,8). The reason for this might be that most of the fetal growth and weight gain is in the late period of pregnancy; thus, preterm infants receive fewer nutrients, which can lead to LBW. In this study, khat chewing during pregnancy was a significant risk factor for LBW, which was consistent with other studies (9,10). This might be due to the influence of khat on reducing maternal food intake, which affects proper weight gain during pregnancy and fetal growth. Smoking during pregnancy was a significant risk factor for LBW, which is supported by most studies worldwide (11,12). The harmful components of cigarettes or hubble-bubble get into the maternal circulation and then to the placenta, affecting fetal growth and weight.

Recommendations can be made to reduce the prevalence of LBW. Screening should be conducted by healthcare professionals of pregnant women with high risks of delivering LBW infants, especially if the mothers have a birth interval < 24 months. Furthermore, awareness

Table 1 Maternal sociodemographic characteristics of study participants

Sociodemographic characteristics	Cases, n = 126			Controls, n = 126			P*	OR	95% CI
	Mean (SD)	n	%	Mean (SD)	n	%			
Age (years)	25.92 (7.06)			25.26 (5.48)					
< 20		21	16.7		17	13.5	0.301	1.45	0.71–2.96
20–29		70	55.6		82	65.1		Ref	
≥ 30		35	27.8		27	21.4		1.52	0.84–2.75
Educational level									
Did not complete basic education		67	53.2		58	46.0	0.257	1.33	0.81–2.18
Completed basic education and more		59	46.8		68	54.0		Ref	
Occupational status									
Housewife		116	92.1		113	89.7	0.512	1.33	0.56–3.17
Work outside		10	7.9		13	10.3		Ref	

*Statistically significant at $P < 0.05$.

CI = confidence interval; OR = odds ratio; SD = standard deviation.

Table 2 Maternal reproductive factors for low birth weight

Reproductive factors	Cases, n = 126		Controls, n = 126		P	OR	95% CI
	n	%	n	%			
Birth parity							
1	57	45.2	50	39.7	0.655	1.19	0.60–2.36
2	23	18.3	24	19.0		Ref	
3 or more	46	36.5	52	41.3		0.92	0.46–1.85
Birth interval							
< 24 months	33	47.8	20	26.7	0.009*	2.52	1.26–5.06
≥ 24 months	36	52.2	55	73.3		Ref	
History of abortion							
Yes	27	21.4	23	18.3	0.527	1.22	0.66–2.27
No	99	78.6	103	81.7		Ref	
History of pre-eclampsia							
Yes	27	21.4	10	7.9	0.002*	3.16	1.46–6.86
No	99	78.6	116	92.1		Ref	
Gestational age							
Preterm (< 37 weeks)	38	30.2	1	.8	< 0.001*	53.98	7.27–400.53
Full term	88	69.8	125	99.2		Ref	
No. of antenatal care visits							
< 4	44	34.9	35	27.8	0.222	1.40	0.82–2.38
≥ 4	82	65.1	91	72.2		Ref	

* χ^2 Statistically significant at $P < 0.05$.
CI = confidence interval; OR = odds ratio.

Table 3 Lifestyle risk factors for low birth weight

Lifestyle risk factors	Cases		Controls		P	OR	95% CI
	n	%	n	%			
Khat chewing							
Yes	83	65.9	66	52.4	0.029*	1.76	1.06–2.92
No	43	34.1	60	47.6		Ref	
Smoking							
Yes	41	32.5	17	13.5	< 0.001*	3.09	1.64–5.82
No	85	67.5	109	86.5		Ref	

* χ^2 Statistically significant at $P < 0.05$.
CI = confidence interval; OR = odds ratio.

raising and health education on how to carry on a healthy pregnancy should be focused individually. Improvement of lifestyle by all means, and avoiding smoking and chewing khat during pregnancy are essential. Pregnant women need access to suitable maternal health services, including antenatal care and nutritional counselling services.

Conclusion

Risk factors for LBW identified in this study can be reduced and prevented by improving maternal health education, especially on pregnancy spacing.

Funding: None

Competing interests: None declared.

Facteurs de risque reproductifs et comportementaux liés au faible poids de naissance chez les nouveau-nés de l'hôpital Al Thawra de Sanaa au Yémen

Résumé

Contexte : Un faible poids de naissance peut entraîner la mort du nourrisson, en particulier pendant la première année de vie.

Objectifs : La présente étude visait à évaluer les facteurs de risque liés au faible poids de naissance des enfants nés à Sanaa au Yémen.

Méthodes : Nous avons mené une étude cas-témoins non appariés auprès de 252 femmes venues accoucher à l'hôpital Al Thawra de Sanaa, au Yémen, entre août et octobre 2016.

Résultats : Les facteurs de risque significatifs du faible poids de naissance étaient un intervalle entre deux naissances inférieur à deux ans, des antécédents de pré-éclampsie pendant la grossesse concernée, l'âge gestationnel prématuré inférieur à 37 semaines et la consommation de khat ou le tabagisme pendant la grossesse. Après contrôle de tous les facteurs de confusion, seul un intervalle entre deux naissances inférieur à deux ans était significativement associé à un faible poids de naissance.

Conclusion : La réduction de l'intervalle entre les naissances représente un facteur de risque important de faible poids de naissance ; par conséquent, il convient de mettre l'accent sur une meilleure sensibilisation des mères sur ce point à l'occasion du suivi postnatal.

عوامل الخطر الإنجابية والسلوكية لانخفاض وزن المواليد في مستشفى الثورة في صنعاء باليمن

إيدايو إدريس، منال شريان، قستينا غزالي، أزماواتي ناوي

الخلاصة

الخلفية: يمكن أن يؤدي انخفاض الوزن عند الولادة إلى وفاة الرضيع، وخاصة خلال السنة الأولى من أعمارهم.

الأهداف: هدفت هذه الدراسة إلى تقييم عوامل الخطر المتعلقة بالأطفال المصابين بانخفاض الوزن عند الولادة في صنعاء باليمن.

طرق البحث: أجرينا دراسة حالات وشواهد فريدة من نوعها لما مجموعه 252 امرأة حضرن للولادة في مستشفى الثورة في صنعاء باليمن، في الفترة بين أغسطس/ آب وأكتوبر/ تشرين الأول 2016.

النتائج: من بين عوامل الخطر المهمة للإصابة بانخفاض الوزن عند الولادة تدني الفترة الفاصلة بين مرات الولادة إلى أقل من عامين؛ ووجود تاريخ سابق لمقدمات تسمم الحمل أثناء الحمل الحالي، والعمر الحملي المبكر الذي يقل عن 37 أسبوعاً، ومضغ القات أو التدخين أثناء الحمل. وبعد السيطرة على جميع عوامل الإرباك، لم يكن هناك ارتباط مهم سوى بين تدني الفترة الفاصلة بين مرات الولادة إلى أقل من عامين وانخفاض الوزن عند الولادة.

الاستنتاجات: يُعد قصر الفترة الفاصلة بين مرات الولادة عامل خطر مهماً لنقص الوزن عند الولادة؛ ولذا، ينبغي التأكيد على تعزيز وعي الأمهات بهذا الأمر أثناء متابعة ما بعد الولادة.

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