RESEARCH PAPER

Risk factors of low birth weight in Basra city

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Abstract

Background Ready-to-use supplementary foods are high-energy, lipid-based provide energy, protein, fat, vitamins and minerals to treat acute malnutrition in children aged 6 -59 months.

Aim To evaluate the effect of ready-to-use supplement foods on the outpatient management of children with acute malnutrition.

Methods A prospective appropriate study was carried out on children with acute malnutrition who were referred to the nutritional rehabilitation center at Basra Teaching Hospital; were received ready-to- use supplementary foods at a quantity sufficient to meet their nutrient requirements for full catch- up growth and followed at two subsequent visits

Results Moderate wasting and underweight recorded in (66.7 %) and severe wasting in (33.33%) of the patients. Mean weight gain at the first and second follow-up visit was (5.78 ±2.43) and (6.52 ±2.75) g/kg/day respectively. There was a significant improvement in the weight for height Z score at the first and second follow-up visits after the administration of ready-to-use supplementary foods (P value < 0.05). Approximately 32% of the children aged 12-18-month experienced moderate weight gain. Bottle feeding with complementary feeding was reported in 24.19% of the children with moderate weight gain, and 9.52% and 34.68% of the children of illiterate parents and unemployed fathers respectively, showed moderate weight gain. Children belong to families with low income group accounted for 37.09% of those with moderate weight gain. Family income was the only variable that depend on the weight gain results (P value < 0.05). **Conclusion**: Ready-to-use supplementary food is significantly effective for outpatient management of acute malnutrition.

Keywords: Acute Malnutrition, Ready-to-Use Supplementary Food, Outpatients

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Introduction

Low birth weight (LBW) (a birth weight of less than 2500 grams), is one of the best indicators of health risk and the best predictor of mortality and morbidity in the neonatal, post neonatal and childhood periods. (1)

LBW is one of the leading causes of infant mortality and morbidity, and those infants are 40 times more likely to die in their first month of their life than normal birth weight infants. They are also twice as likely as other infants to exhibit health problems and serious developmental delays during childhood (2)

It's also associated with immediate and late sequaelae. Immediate complications include: hypoxia, ischemia, sensorineural injury, anemia, respiratory failure, and microcephaly. While late complications include: epilepsy, hydrocephalus, osteopenia, fractures, hearing and visual impairment (3)

very low birth weight (VLBW) is a birth weight less than 1,500 gm at birth and predominately

immature [3], is an accurate predictor of infant mortality rate (Relative risk of 93). VLBW infants in USA account for over 50% of neonatal deaths and 50% of handicapped infants; their survival is directly related to birth weight. [1]

In 2015 estimate that 20·5 million (uncertainty range 17·4–24·0) livebirths had a birthweight of less than 2500 g. Most (91%) were in low-income and middle-income countries. [4]

In Latin America and the Caribbean and Western Europe, there was no apparent change in low birthweight prevalence between 2000 and 2015. Similarly, reported data from 57 mostly high-income countries with relatively low baseline suggests almost no change in LBW prevalence. For the remaining countries, a 17% reduction in LBW prevalence was estimated over the years 2000–15, most notably in the countries with the highest prevalence. [4]

According to UNICEF the percentage of low birth weight infants in Middle East and South Africa in 2000 was 15 %. [2] Central and South America have, on average, much lower rates (10%), while in the Caribbean the level is 14 %. [4] In developing countries, approximately 70% of LBW infant have IUGR. [2] In Iraq Up to 1990, the 5% incidence of LBW was similar to industrialized countries. Since then, a marked increase to 22% in 1995 was reported. [2] In 2017, it was reported to be 20.2%. [5]

The aims of the study: The present study was carried out to study the association between birth weight and selected risk factors in Basrah governorate with special reference to socio-demographic factors, present and past obstetric history, and maternal medical history.

Methods

This is a hospital- based cross sectional study which was designed to study the association between LBW and selected risk factors. The study involved infants delivered and /or admitted to AL-Basrah-Maternal and Child Hospital during the period from the first of May to the 31st. of October 2007 on three selected days / week during the whole study period. A total of 400 infants were initially included, however 38 twins were excluded (because the study for birth weight of singleton births only)leaving 362 singleton births to be included in the study.

The data were collected using a special questionnaire form designed (by researchers) for the purpose of the study. The questionnaire was designed to provide information about the following aspects: socio-demographic characteristics of the parents (age, education, occupation), birth weight, birth order, preceding birth interval, history of twin, history of recent pregnancy complications, past medical history, past obstetric history and history of Antenatal care..

The questionnaire form was filled by one of the authors through direct interview of the mothers. Before each interview, the purpose of the study was clearly explained to the mothers and their verbal consent was obtained. No objection was faced by any woman giving a response rate of 100%. Each interview took about fifteen minutes. The birth weight for included infants were either measured by one of the authors for recent births delivered in the hospital by using the same weighing scale (uniscale) or recorded as reported by mothers for infants admitted to the hospital.

Statistical analysis: The data were analyzed using SPSS (Statistical Package for Social Sciences) program version 15. Chi squared test

was used to find out the significant associations between different variables. A P- value of < 0.05 was the criterion of statistical significance.

Results

Characteristics of the studied infants

Table 1 showed the characteristics of the studied infants. Out of the 362 infants included in the study, 215(59.4%) were males and 147(40.6%) were females. One-hundred and forty-five (40.1 %) were first born, while 79 (21.8 %) were fifth or later born. Nearly half (48.1%) were born with LBW, the mean birth weight of the studied infants was 2.49 kgm ± 0.49 SD.

TABLE (1) CHARACTERISTICS OF THE STUDIED INFANTS

Variable	No. (362)	%
Sex	215	59.4
Male		
Female	147	40.6
Birth order	145	40.1
1st		
2-4	138	38.1
≥5	79	21.8
Birth weight (kgm)		
<2.5	174	48.1
≥2.5	188	51.9
Mean± SD	2.49±0.49	
Total	362	100.0

Risk factors of LBW

Maternal age

Table 2 shows the association between birth weight and maternal age at time of birth. The highest percentage of LBW was for births to mothers in the age group 30- 39 years. However, the association between maternal age and birth weight was statistically not significant (P> 0.05).

Table (2) The relationship between birth weight and maternal age

Maternal age (years)	Birth weight (kgm)				Total	
	< 2.5		≥2.5			
< 20	No.	%	No.	%	No.	%
	38	47.5	42	52.5	80	100.0
20-29	71	42.8	95	57.2	166	100.0
30-39	58	58.6	41	41.4	99	100.0
≥40	7	41.2	10	58.8	17	100.0
Total	174	48.1	188	51.9	362	100.0
χ^2=6.587 df=3 p value= 0.086						

Maternal education and employment

A significant association between maternal education and birth weight was found (p < 0.01). A clear consistent decline in the incidence of LBW was observed with the highest incidence of LBW was found among births to low educated or uneducated mothers (finished their primary education or less including illiterate), while the lowest incidence was among births for mothers who had ≥10 years of education (Table 3). On the other hand, no significant association was found between maternal employment and low birth weight (P value> 0.05)

Complications during pregnancy

Table (4) shows the relationship between history of complications during pregnancy and

birth weight. It's evident that a higher percentage of mothers who had complications during pregnancy (hypertension, infection, bleeding) gave birth to babies with LBW (68.9%) compared to those who had no complication (24.3%) the association was statistically highly significant (p<0.001).

Previous history of LBW

Table (5) shows that mothers who had previous history of having LBW infants were more likely to report a LBW for the current birth (67.7 %) compared to those with no such a history (45.2 %). The association between previous history of LBW and subsequent risk of LBW was statistically significant (P < 0.01).

Gestational age

Table (6) shows that the percentage of LBW was markedly higher among preterm births (gestational age <37 weeks) than that among full term births (gestational age ≥ 37 weeks), 72.6 % and 34.0 % respectively. The association between gestational age and birth weight was statistically highly significant (p < 0.001).

Preceding birth interval

The relation between preceding birth intervals and birth weight is shown in Table (7). The highest incidence of LBW (73.5%) was for infants born after a very short preceding birth interval (≤6 months). The incidence gradually decreased to its lowest level when the preceding birth interval was in the range between 13-24 month (37. 9%).The incidence of LBW then increased again when the preceding birth interval was > 24 months. Statistically there is significant association between preceding birth intervals and birth weight (P < 0.05)

Logistic regression Analysis

When the logistic regression analysis was carried out, it was found that only preterm labour and complications during pregnancy were independently and significantly affected the birth weight. Table (8)

Discussion

Risk factors

Maternal age

The present study showed that the highest percentage of LBW was for births of older mothers. Worldwide some studies reported a higher risk of LBW among older mothers. [6,7] While others found that teenage mothers (mothers less than 20 years of age) were more likely to have LBW than mothers in other age groups. [8,9,10] There were many factors that contribute to this risk for example, young teenagers often have poor eating habits, poor weight gain, and neglect to take their vitamin supplements, and fail to seek prenatal care early in pregnancy. They may also smoke. As women get older their chance of multiple gestation (twin, triple, etc.) increases, old women are also prone to have hypertension, DM, and cardiac disease, these diseases can complicate her pregnancy and make her more prone to have LBW baby. [8,11]

Maternal education and employment

Regarding maternal education, the present study showed that the highest percentage of LBW in births for mothers with low educational level. This is comparable to the results of a study carried out in north – west Russia [6], which showed the effect of patient's education on the risk of LBW. This might be explained by the fact that the educated mothers were more aware about their diet during pregnancy, the importance of

early and adequate (Antenatal care) ANC and the importance of spacing between pregnancies [12].
While some studies found that maternal occupation was one of the risk factors for LBW, others found that maternal occupation did not influence the risk of LBW [13,14]. In the present study, the risk of LBW was higher among births for employed mothers. This may be due to the physical stress associated with some occupations for example, mothers who stand for long periods of time or involved in hard work may have chance of increase uterine contraction, premature rapture of membrane and a higher rate of preterm delivery and LBW. [13]

Complications during pregnancy

It was evident in the present study that a higher percentage of mothers who had complications during pregnancy gave birth to babies with LBW compared to those who didn't develop such complication. The association between complications during pregnancy and the risk of LBW was statistically significant and independent on other risk factors. This is expected and it agrees with many other studies. [15,16,12,17] Hypertension can constrict the blood vessels in the uterus that supply the fetuses with oxygen and nutrients, when this occurs before term, it can slow the fetus growth, sometimes resulting in low birth weight, hypertension also increases the risk of preterm delivery. [18] Infections especially those involving the genito-urinary tract, may increase the risk of preterm delivery. [17] Infection with certain viruses, including cytomegalovirus, rubella and chickenpox can also slow fetal growth and cause birth defects. [19]

Gestational age

Many factors affect the duration of gestation and fetal growth, thus birth before 37 weeks of gestation (preterm birth) is a major component of low birth weight. [14] The present study showed that a higher percentage of LBW among preterm births, the association between preterm delivery and the risk of LBW was statistically significant and independent on other risk factors. This is in agreement with other studies. [20, 21] Preterm delivery leads to LBW because those births had restricted period of intrauterine growth. [22]

Previous history of LBW

Mothers who had previous LBW babies had higher rate of having another LBW baby. [12, 23] This may be due to the fact that those mothers may be still exposed to the same risk factors which lead in LBW in the previous pregnancies.

Preceding birth intervals

A very short preceding birth interval could be a leading cause for LBW, in this study a higher percentage of LBW was found among mothers with very short preceding birth intervals. This was identical to the finding of a study in Nevada in USA, which found that an infant born within 12 months of previous birth was more likely to be of LBW than infants born 24 months after a previous live birth. This can be explained that mother body did not get enough time to recover after last pregnancy and this exposed her to risk of anemia and low pregnancy weight gain. [5]

Limitations of the study:

This study is a cross sectional study based on 362 newly born infants. The study was carried out in AL – Basrah Maternity and child hospital which is the main maternity hospital in Basrah city. However, the studied births may not be representative of all births in the city.
A recall bias may also be a problem in obtaining information on variables such as birth weight and frequency of ANC visits. The effect of recall bias

was minimized by extracting some of the information from the ANC card or from the case sheet.
Another source of bias is the non-response bias, but fortunately in the present study, the response rate was 100%because all women were willing to participate in the study.

Conclusion

The factors which showed a significant independent association with LBW were complications during pregnancy and preterm delivery.

Conflict of interest: The authors declare no conflict of interest.
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TABLE (3) THE RELATIONSHIP BETWEEN BIRTH WEIGHT AND MATERNAL EDUCATION & EMPLOYMENT

Educational level(years)	Birth weight (kgm)				Total	
	<2.5		≥2.5			
	No.	%	No.	%	No.	%
≤6	110	51.5	98	48.5	208	100.0
7-9	45	48.9	48	51.1	93	100.0
≥10	19	31.1	42	68.9	61	100.0
Total	174	48.1	188	51.9	362	100.0
χ^2=13.098	df= 2		p value = 0.01			
Maternal employment	Birth weight (kgm)				Total	
	<2.5		≥2.5			
	No.	%	No.	%		
Non emplyed	158	47.0	178	53.0	326	100.0
Employed	16	61.5	10	38.5	26	100.0
Total	174	48.1	188	51.9	362	100.0
χ^2 =2.037	df = 1		p value = 0.154			

Table (4) the relationship between complications during pregnancy and birth weigh

Complications during pregnancy	Birth weight (kgm)				Total	
	< 2.5		≥ 2.5			
	No.	%	No.	%	No.	%
Positive	133	68.9	60	31.1	193	100.0
Negative	41	24.3	128	75.7	169	100.0
Total	174	48.1	188	51.9	362	100.0
χ2=71.965	df= 1		p value =0.00			

Table (5) The relationship between previous and subsequent history of LBW						
History of LBW	Birth weight(kgm)				Total	
	< 2.5		≥2.5			
	No.	%	No.	%	No.	%
Yes	32	67.7	16	32.3	48	100.0
NO	142	45.2	172	54.8	314	100.0
Total	174	48.1	188	51.9	362	100.0
$\chi 2 = 7.670$		df= 1		p value =0.006		

Table (6) The relationship between gestational age and birth weight						
Gestational age(weeks)	Birth weight(kgm)				Total	
	< 2.5		≥ 2.5			
	No,	%	No.	%	No.	%
< 37	92	72.6	29	27.4	121	100.0
≥ 37	82	34.0	159	66.0	241	100.0
Total	174	48.1	188	51.9	362	100.0
χ^2=36.264		df = 1		p value=0.00		

Table (7) The relationship between preceding birth interval and birth weight						
Preceding birth interval(months)	Birth weight(kgm)				Total	
	<2.5		≥2.5			
	No	%	No	%	No	%
First	60	45.8	79	54.2	139	100.0
≤ 6	25	73.5	9	26.5	34	100.0
7-12	35	50.7	34	49.3	69	100.0
13- 24	22	37.9	36	62.1	58	100.0
> 24	32	51.6	30	48.4	62	100.0
Total	174	48.1	188	51.9	362	100.0
$\chi 2 = 13.063$		df = 4		p value = 0.01		

TABLE (8) THE LOGISTIC REGRESSION ANALYSIS			
Variables in the Equation	OR	95%CI	P
Age	0.975	0.975-1.041	0.445
Parity	1.210	0.999-1.466	0.051
Education	1.054	0.973-1.141	0.198
occupation(1)	0.774	0.238-2.519	0.670
Birth interval	0.995	0.978-1.012	0.547
preterm(1)	28.994	12.436-67.599	0.000
Baby sex(1)	0.841	0.475-1.489	0.552
Antenatal care(1)	0.846	0.382-1.875	0.681
Previous low birth weight (1)	1.818	0.821-4.024	0.141
Present complication during pregnancy (1)	6.634	3.740-11.769	0.000
Constant	0.194		0.120

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