

## Low Birth Weight in Sidi Bel Abbes Region (West of Algeria): Retrospective Study of 10008 Deliveries

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### Abstract

**Introduction:** Low birth weight is a widely used indicator of newborn health. It is generally recognized that the etiology of LBW is multifactorial. It is a major problem of public health in both developing countries and developed countries.

**Aim:** This study investigates the association of birthweight <2.5 kg (LBW) with a wide range of factors related with LBW and their contribution to the problem.

**Methods:** A descriptive retrospective study using existing data from January 2011 to January 2012 of 10200 pregnant women and their newborns was done at maternity in Sidi Bel Abbes City of west Algeria.

**Results:** At the end of this work, it appears a prevalence of 10008 live infants, including 554 newborns with low birth weight, or a rate of 5.53%. LBW was strongly associated with primiparous.

This study confirms the close association between low birth weight newborn and maternal age between 20 and 34 years, gestational age less than 37 weeks, and the APGAR score <7. Other complications and diseases which contributed to high prevalence of LBW included hypertension and gestational diabetes.

**Conclusion:** There is need of increasing promotion of reproductive health services in relation to safe motherhood at community level in order to reduce risk factors of LBW.

**Keywords:** Low birth weight; Risk factors; Algeria

### Introduction

Low birth weight (LBW) represent major public health problem in developing countries, and are major determinants of perinatal survival as well as infant morbidity and mortality [1,2]. Data on LBW rate tend to be quite diverged. Every year it is estimated that 18 million LBW babies are born globally, making up nearly 16% of all live births [3,4]. More than 95% of the low birth weight babies are born in developing countries. The estimated level of LBW in developing countries (16.5%) is two-fold higher than the level observed in developed countries (7%) [5,6]. Of the 20 million LBW infants born in 2005, more than half were born in South Asia; representing a low birth weight rate of 29% [7].

The frequency of LBW is an indicator of the risk of prenatal death as well as the populations health [8]. Low birth weight babies are at a greater risk of neurological disorders, such as seizures, cerebral palsy, severe mental retardation, hearing and visual impairment [9]. Thus, data on the frequency and risk factors of LBW are crucial for the design of maternal and child health programmers, particularly in developing countries [10].

In Algeria the activities of national and international programs (WHO, UNICEF) protection of maternal and child health have contributed to the decline in the frequency whose incidence has decreased from 5.4% in 2000 to 3.7% in 2005 with slight variations across the region [11].

Thus, the aim of this study was to determine the major risk factors for Low Birth Weight in western Algeria.

### Materials and Methods

A retrospective study of all newborns weighing less than 2.5 kg born was carried at a maternity in Sidi bel Abbes (West of Algeria) for a period of one year from January 2011 to January 2012.

A total of 10.008 deliveries were recorded during the study period. Multiple pregnancies and stillbirths were excluded. Maternal factors like age, gravidity and parity, anthropometric parameters, gestational age associated pathologies and mode of deliveries were studied.

Statistical analysis was performed by the software STAT-VIEW (1998), and of all the quantitative parameters was summarized in terms of descriptive statistics. Fisher Exact test, the t-test were used to evaluate the significance differences between 2 groups and ANOVA (among all groups) for medium.  $P \leq 0.05$  was considered significant

### Results

During the study period from January 2011 to January 2012, 554 (5.53%) pregnancies resulted in LBW neonates out of total 10008 singleton pregnancies.

### Influence of maternal characteristics, pregnancy and maternal history of the birth weight of newborns

Table 1 shows the results of the statistical analysis establishing the

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Variable	Newborns LBW	Newborns normal birth weight	P value
<b>Age of mother</b>	<b>n (%)</b>	<b>n (%)</b>	
<20 years	21 (3,79)	362 (3,83)	0,005
20-34 years	398 (71,84)	7013 (74,18)	0,001
≥ 35 years	135 (24,37)	2079 (21,99)	0,006
<b>Parity</b>			
Primiparous	451(81,41)	7624 (80,64)	0,0001
Paucipares	83 (14,98)	1527 (16,15)	0,0413
Multiparous	20 (3,61)	303 (3,20)	0,094
<b>Gestational Age</b>			
<28 weeks	7 (1,26)	6 (0,063)	0,0001
28-32 weeks	86 (15,53)	27 (0,28)	0,0577
32-36 SA weeks	189 (34,11)	343 (3,63)	0,0001
≥ 37 SA weeks	272 (49,10)	9053 (95,76)	0,0001
<b>Mode of delivery</b>			
Vaginal	383 (69,13)	6727 (71,15)	
Caesarean	170 (1,80)	2502 (26,46)	
Forceps	1 (0,01)	225 (2,38)	0, 272 NS
<b>Pathology of the mother</b>			
Hypertension	45 (8,12)	259 (2,74)	0,0002
Gestational diabetes	9 (1,62)	93 (0,98)	0,0605
Anemia	11 (1,98)	104 (1,10)	0,0001 S
Sterility	1 (1,18)	112 (1,18)	0,0001
Other (Appendectomy, myopia, goiter, breast removal ....)	25 (4,51)	278 (2,94)	0,0033

**Table 1:** Distribution of birth weight according to maternal characteristics, pregnancy and maternal history.

relationship between on the one hand, the characteristics of the mother during pregnancy and maternal history which are the independent variables and on the other hand, the birth weight of newborn babies constituting the dependent variable of the study.

### Maternal age and weight of the newborn

From Table 1, the proportion of newborns with low birth weight is higher in maternal age between 20 and 34 years (71.84%) 3.79% against and 24.37% respectively for age groups under 20 years and ≥ 35 years. This difference is statistically significant ( $p < 0.001$ ).

### Parity of mother and newborn weight

Table 1 shows that the proportion of infants with low birth weight is higher among primiparous women (81.41%) against 14.98% and 3.61% respectively in paucipares and in multiparous this difference was statistically significant ( $p < 0.0001$ ). Comparison of primiparous and multiparous mothers pauciparous (Table 1) shows that the proportion of newborns with low birth weight is also high among primiparous (81.41%) against 18.59% in pauciparous and multiparous. This difference is statistically significant ( $p < 0.0001$ ).

### Weight and gestational age of the newborn

Table 1 shows that the proportion of infants with low birth weight is higher (50.90%) in mothers with gestational age less than 37 weeks of gestation (WG), against 49.10% in mothers with gestational age greater than or equal to 37 weeks, there is a positive association between gestational age less than 37 weeks and low birth weight, and this association was statistically significant ( $p < 0.0001$ ). In addition, the 554 newborns with low birth weight, 50.9% (282 infants) are premature.

### Mode of delivery and weight of the newborn

We note that the rate of newborns with low birth weight is substantially higher when they were born by natural voice (bass) with 69.13%, against 1.80% of births by caesarean section, although this difference is not statistically significant ( $p = 0.272$ ).

### Pathology of the mother and newborn weight

It is reported that the proportion of infants with low birth weight is only 91/554 cases, or 8.12% among mothers who presented with hypertension that is prevalent on other diseases. We note that there's a strong correlation between maternal diseases (hypertension, anemia, and gestational diabetes) and low birth weight. This relationship is highly significant ( $p < 0.0001$ ).

### General Characteristics of the Newborn

#### Sex of newborn

About 10,008 live newborns who have been the subject of our study, 50.84% ( $n = 5088$ ) were male and 49.16% ( $n = 4920$ ) were female. The predominance of newborn male gender is observed that difference is statistically significant with a sex ratio of 1.034.

#### Distribution of infants according to birth, weight and sex

According to birth weight, 5.53% (554 infants) are low birth weight and 94.47% (9454 newborns) are of normal weight. The proportion of newborns with low birth weight is higher among newborns of women (2.83%) compared to that found in newborn males (2.70%) without this difference was statistically significant (Table 2).

#### Characteristics of birth weight

Birth weight varies between 900 g and 5700 g. The overall mean birth weight was  $3378.55 \text{ g} \pm 520.47 \text{ g}$  and the median weight was estimated at 3400 g.

90.79% of newborns have a weight ranging from 1500 to 2499 g, and 8.84% have a weight that is between 1000 to 1499 g, while the percentage of low birth weight less than 1000 g is 36% (Figure 1).

Sex of newborns, the mean birth weight was  $3409.02 \pm 528.25$  grams in newborn male and  $3347.06 \pm 50,44$  grams among those females, this difference was statistically significant ( $p < 0.0001$ ).

In newborns normal birth weight, the mean birth weight was  $3456.006 \pm 357.49$  grams and in newborns with low birth weight, they are respectively  $2056.733 \pm 357.39$  grams, the difference between the birth weight was statistically significant ( $p < 0.0001$ ).

#### Distribution of infants according to the APGAR score

The proportion of newborns with APGAR score greater than 7 in the fifth minute of 9814 (98.06%), while it is estimated that 194 (1.94%) among newborns with APGAR score below 7. We found no significant relationship between poor APGAR score and the proportion of newborns.

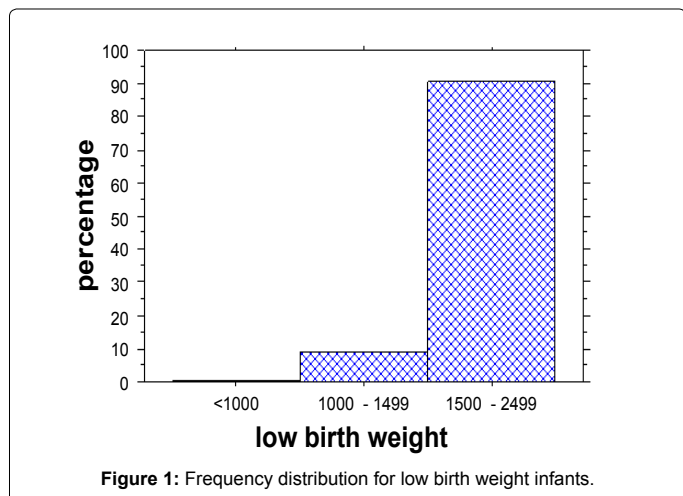
#### Weight distribution of infants according to the APGAR score

In newborns normal birth weight, APGAR score in the fifth minute average is ( $8.65 \pm 0.68$ ) is to say greater than 7, while in LBW infants, they are ( $6.94 \pm 1.29$ ) The difference between mean birth weight and APGAR score less than 7 was statistically significant ( $p < 0.0001$ ).

Sex of infants	LBW newborns		Newborns normal birth weight		P value
	n	(%)	n	(%)	
Females	284	2,83	4636	46,33	NS*
Males	270	2,70	4818	48,14	
TOTAL	554	5,53	9454	94,47	

NS\*: not significant

**Table 2:** Distribution of birth weight newborns by sex.



## Discussion

The survival of a newborn are closely associated with his birth weight. Mortality is higher and physical health problems are more common in infants of low birth weight (<2500 g) than those whose weight at birth is normal [12,13].

The aim of this study was to examine different factors which may contribute to LBW in a recent sample of western Algeria birth. 10200 women who were admitted to the obstetrics and gynecology unit of maternity hospital in Sidi Bel Abbes city constituted the sample group for this study. 9454 delivered full term normal weight infants, while the other 554 delivered LBW infants. The incidence of LBW in our area is 5.53% (554 infants), which is relatively high compared to the national average amounted to 3.7% in 2005 [11].

Several factors explain this increase. On the one hand, the number of premature birth and low birth weight has steadily increased, in part due to greater use of treatment against sterility. On the other hand, the decline in childbearing and increased use of delivery techniques such as provocation delivery and cesarean section are other explanatory factors. In fact we found that the percentage of cesarean section was 1,80% for the LBW, and it was even more higher for the NBW with 26.71%, and according to the World Health Organization cesarean section rates higher than the median observed globally (15%) is not acceptable.

The proportion of newborns with low birth weight is almost similar to the rate found by El Mhamdi et al. (5.1%) [14]. This value approximates this rather values reported in studies of many developed countries [13] On the other hand, this rate is minimal compared to that of the maternity health center Vélingara Senegal (23.78%) and those observed in most hospitals in Tanzania (12-18%) [15,16].

A significant correlation was observed between maternal age and birth weight. More mothers are younger; birth weight is low, the more it runs the risk of giving birth to low weight. Similar results have been reported [17-19] and a study in Pakistan [3], that the age is not sufficiently elucidated [20,21].

According to the literature, primiparity is a protective factor against adverse fetal outcomes and especially the FPN and increased parity is a risk factor for adverse outcomes of pregnancy in the mother and the fetus [22-24]. In our series, the parity is relatively low compared to other developing countries [24]. Several authors have found similar

results especially concerning primiparity [25-27] unlike SENG A [19].

Regarding gestational age, it was found that gestational age less than 37 weeks is one of the factors most strongly associated with low birth weight ( $p<0.0001$ ), this finding is consistent with those reported by other authors [7,27].

Prematurity is an important public health problem. It is the greatest cause of morbidity and mortality in obstetrics [28]. However, circumstances leading to preterm birth are still unclear, but its etiology is believed to be multi-factorial [29]. The results suggested that the prevalence is high in our study population; 6.57% (658) for preterm birth. Our findings differ from data on premature births compiled by Letaief et al. from Monastir (2%) [30]. In addition, it was observed during the study of gestational age that 50.9% (282 infants) only newborns are low birth weight premature infants, which are low, compared to what happens in developed countries, where about 70% of newborns with low birth weight premature infants [24].

Hypertensive disorder of pregnancy is considered to be a major worldwide problem and presents an increased risk of both maternal and perinatal mortality and morbidity [31,32]. Preeclampsia, a multisystem disorder partly of unknown aetiology specific to pregnancy [33], has been implicated as one of the main predisposing factors for intrauterine foetal growth restriction and prematurity [34]. Consistent with findings from studies conducted else-where [35,36]. Additionally, in their study, Yücesoy et al. [37] demonstrated that gestational age and neonatal birth weight were lowest in severely preeclamptic mothers. This may be as a result of the utero-placental insufficiency that happens in this category of disorders which can result to foetal growth retardation [35].

In our study, it was observed that the proportion of infants with low birth weight is higher (8.12%) among mothers with hypertension, against 1.62% among mothers with gestational diabetes and anemia. Earlier researches reported a relationship between gestational diabetes and LBW [38-40].

And about the sex of the new born, it has been observed in our study, that the proportion of LBW newborns is higher among newborns of female gender (2.83%) although this difference is not statistically significant, this observation is similar to that reported by Lamine in Senegal between 1985 and 1989, and SENG A [15,19]. By cons, Letaief and al, in a study conducted in the region of Monastir in Tunisia between 1995 and 1997 found that female gender was significantly associated with the occurrence of low birth weight [30].

The average weight at birth of our cohort is  $3378.55 \pm 520.47$  g, which is higher than that Razafitsalama et al. found which was successively 2901 g, 2962 g and 2939 g [41], by cons, it is lower than that of developed countries ranging from 3460 to 3486 gr [42].

Support an emergency neonatal evaluation will be guided by the APGAR score. It is reported that the poor APGAR score (<7) in the fifth minute, is highly correlated with birth weight ( $p<0.0001$ ). Some authors have noted a higher rate than that found in our study ranging from 2.6% to 51.2% [41,43].

We conclude that maternal age between 20 and 34 years, primiparity, gestational age less than 37 weeks, gestational diabetes and hypertension, and APGAR score <7 are significant factors resulting in LBW babies.

## Conclusion

This study confirms the association of maternal age between 20 and

34 years, gestational age less than 37 weeks, and the APGAR score <7 with low birth weight of new borns in the west Algerian population, but also the role of other factors such as maternal diseases, including hypertension and gestational diabetes.

This work could help stakeholders in the health field at all levels of the system to better understand the problems of low birth weight and do more to benefit the health of the mother and child.

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