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The State Of Birth Weight In The North Of Iran

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ABSTRACT

Introduction and object: This study was designed for determining the birth weight and some other factors affecting rural newborn children in the north of Iran (south east of Caspian sea).

Material and Method: A sample size of 695 cases was chosen by cluster and random sampling from 20 villages. The birth weight of the newborn and the mother's socio-economic status were recorded by a questionnaire. The data was analyzed by SPSS windows software.

Results: The prevalence of LBW, NBW and HBW was observed to be 11.1%, 84.1% and 4.8%, respectively. The birth weight among children whose mothers had iron supplements was lower than that of children whose mothers did not take iron supplement (3173gr vs 3246gr) and statistical differences between the two groups were not significant. Birth weight have a positive correlation and significant statistical differences with both maternal age (r=0.2 , p=0.01) and maternal BMI(r=0.24 , p=0.01).The birth weight in the 5th birth order was more than that in the1st birth order and statistical differences were significant (P=0.01). Birth weight had a positive correlation with familial income (P<0.05).

Discussion: Our study showed that maternal BMI, birth order and socioeconomic factors were associated with intrauterine weight gain, but iron supplements didn't have a positive outcome.

Key Words: Birth weight, BMI, Social-Economic, Iron supplementation, Iran

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Introduction

Birth weight is strongly associated with the health and survival of infants in the developing world, where 90% of the 250 million low birth weight babies (<2500 g) are born each year [1]. Studies of food supplementation have typically reported increases in birth weight of 25-84 g per 10 000 kcal of maternal energy intake during pregnancy [2], although mean increases of about 135 g may be observed with higher energy intakes [3]. A recent study indicates that anaemia in pregnancy is a risk factor for preterm delivery and is associated with low birth weight (LBW)[4],[5].

Despite the potential benefits of such interventions on pregnancy outcomes, the effects of maternal micronutrient supplementation on birth weight and intrauterine growth have not been well studied. Individual micronutrients such as folic acid, iron, zinc and vitamin A have received awareness. An overview of five controlled trials showed a 40% reduction in the prevalence of intrauterine growth retardation with folic acid supplementation although these trials were small and were not well considered. [6]Trials in Bangladesh[7] and Peru [8] did not verify the improvemence in birth weight with antenatal zinc supplementation, which was reported in previous studies A randomized placebo controlled trial in Niger showed no perfection in birth weight after maternal iron

supplementation during pregnancy, although length at birth was found to be improved[9]. The effectiveness of iron supplementation in improving pregnancy outcome is currently debated. Although there is evidence for lower birth weight among mothers with anaemia, there are no data to set up a causal association [10]. Other studies have reported that maternal vitamin A or β carotene supplementation failed to influence either infant mortality[11] or neonatal weight [12], but was associated with a 44% decline in pregnancy related maternal mortality[13] .

Gorgan is the capital city of the Golestan Province in the north of Iran and according to the report of the Iranian Statistical Center [14], it has a population of more than 300,000 and is one of the agricultural regions of the country. Based on the above report, the village population in this town is 56.1% as a whole, which is mainly engaged in the agricultural occupation. There are different ethnic groups living in this region. The main ethnic groups are: Fars (native), Turkman and Sistanee. Sistanee and Turkman ethnic groups are mainly the residents of the villages. Due to the restriction in executing epidemiological projects, there were no studies on the iron supplement intake in the villages of this area, up till now; therefore, it was necessary to design a research project to determine the iron intake and effect on birth weight. The Iranian Health System recommended that all rural pregnant women should intake iron supplements from the 4^{th} month for prevention of anaemia.

Material and Methods

This is a retrospective and cross-sectional descriptive study, and 690 cases from 20 villages were chosen by cluster and simple sampling by 20 trained interviewers using a questionnaire. We recorded the birth weight of newborn children, the iron supplementation status during pregnancy and the family's socio-economic status. The data was analyzed by the SPSS.win version 14 software. The logistic regression model was applied to evaluate variables that were associated with the likelihood of being LBW.

The economic status was categorized, based on the possession of 10 consumer items which were considered necessary for modern-day life, such as telephone, running water, gas pipeline, personal house, colour television, computer, video, private car and cooler. According to this list, the economic status of the sample population in this study was as follows: low ≥3, moderate = 4-6, and good = 7-10. In this study, ethnicity was defined as follows; 1) the Fars ethnic group (native). These people resided in this region since a long time and they were considered to be the native residents of this region. 2) the Sistanee ethnic group: people who immigrated to this region from the Sistan and Bluchestan provinces during the past decades. 3) the Turkman ethnic group: this group does not have family relation ships with other ethnic groups and therefore can be considered as an independent race. They reside in a particular rural area. BMI was calculated as weight (kg) and /height ($m^{2)}$. Birth weight was defined as Low Birth Weight (<2500 gr), Normal Birth Weight (2500 to 4000 gr) and High Birth Weight (<4000 gr). There were 3 educational categories : 1:Illeterate, 2: 1-12 years schooling and 3: Beyond high school(academic education). Taking iron supplement during pregnancy has been defined as:1- None: Lack of iron supplement intake 3-Sometimes: Iron supplement intake time to time. 2- Routinely: Iron supplement intake regularly.

Results

The prevalence of LBW, NBW and HBW were 11.1%, 84.1% and 4.8%, respectively. Birth weight had an inverse relationship with iron supplementary intake in the gestational period and in infants whose mothers took more iron supplement than others, but this difference wasn't statistically significant[Table/Fig 1].

(Table/Fig 1) Characteristics of subject rural area in north of Iran.

Taking Iron Supplement	N=696	Percent
None	23	3.3
Sometimes	548	78.7
Routinely	125	18
Type of Birth Weight	N=704	Percent
LBW	78	11.1
NBW	592	84.1
HBW	34	4.8

LBW=Low Birth Weight
NBW = Normal Birth Weight
HBW = High Birth Weight

Birth weight has a direct and significant relationship with the mother's age and the mean of the birth weight of children in mothers who are <18 years old, is also less than that seen in children whose mothers are >36 years old. The mother's BMI is another factor that has a positive relationship with birth weight (P=001). Family number is related to birth weight and there are

statistically significant differences between families with 5-8 numbers and over, or those families with numbers under it (p=0.001).This study shows that three economical characteristics (good, moderate and poor) have statistical significance with each other, based on the birth weight (p=0.001). Birth weight in the 3rd-5th birth order is higher than that in other birth orders and there are statistically significant differences between them (p=0.001). There are statistically significant differences between the three ethnic groups based on birth weight. Fars (native) and Sistanee groups have the most and the least mean of birth weight, respectively (p=0.001)[Table 2].

(Table/Fig 2) Some factors association with Birth Weight in north of Iran.

Variables		N	Birth Weight(gr) Mean(SD)	T.test PV
Maternal age(year)	≥18*	44	(653.5) 2982.9	0.001
	19-35	613	(523.1) 3151.2	
	36≥	43	(546.8) 3459.3	
Maternal BMI	>18.5*	43	(510.3) 2954.9	0.001
	18.5-24.9	355	(497.2) 3113.5	
	25-29.9	199	(554.7) 3183.2	
	30≥	94	(622.9) 3337.8	
Family Number **	5<	381	(533.0) 3086.8	0.001
	5-8	264	(516.8) 3273.0	
	8>	56	(600.6) 3102.9	
Economic Status	Good	32	(476.2)3285.9	0.001
	Moderate	365	(519.6)3233.1	
	Poor*	295	(552.1)3066.7	
Birth Order ***	1-2	493	(545.6)3106.7	0.001
	3-5	177	(456.6)3312.3	
	6-9	28	(690.3)3171.4	
Ethnic Group****	Fars (native)	128	(501.7) 3190.9	0.001
	Turkman	268	(574.4) 3307.7	
	Sistanee	297	(485.9) 3008.3	

*** Mean of birth weight is lower than other interval groups and statistical differences is significant.**
**** Mean of birth weight among 5-8 family number is over than other groups and statistical differences is significant.**
***** Mean of birth weight among newborn children at 3-5 birth order is over than other groups and statistical differences is significant.**
******Turkman's neonatal birth weight is the higher than other ethnic groups and statistical difference is significant.**

The unadjusted odds ratios show that maternal age>18 years (P=0.004, 95% CI ,OR=2.902) ,Family number<5 (P=0.038, 95% CI ,OR=1.683) , Low economic status (P=0.002, 95% CI ,OR=2.193),Birth order <3(P=0.003, 95% CI ,OR=2.7), and Sistaneesh ethnic group (P=0.032, 95% CI ,OR=1.675) are significantly related to LBW [Table 3].

(Table/Fig 3) Crude Odds Ratios of LBW among neonatal children.

Variables	B	P.V	Exp(B)	CI for Exp (B) 95%	
				Lower	Upper
Maternal age (<18 year)*	1.065	0.004	2.902	1.404	5.997
Maternal BMI(<18.5) **	0.773	0.050	2.165	0.999	4.694
Family Number <5	0.521	0.038	1.683	1.029	2.754
Economic Status (Low)	0.785	0.002	2.193	1.345	3.577
Birth Order <3	0.993	0.003	2.7	1.394	5.228
Ethnic Group(Sistanee)	0.516	0.032	1.675	1.044	2.688

CI=Confidential Interval
***Odds Ratio is higher than other factors.**
****There is no statistical signification**

The adjusted odds ratios show that maternal age>18 years (P=0.031, 95% CI,OR=2.381) , Low economic status (P=0.011, 95% CI ,OR=2.002) and Birth order <3(P=0.017, 95% CI ,OR=2.767) are significantly related to LBW[Table/Fig 4].

(Table/Fig 4) Adjusted Odds Ratios of LBW for exposure to some factors.

Variables	B	P.V	Exp (B)	95% CI for Exp(B)	
				Lower	Upper
Maternal age(<18 year)*	0.867	0.031	2.381	1.082	5.240
Maternal BMI(<18.5)	0.675	0.105	1.930	0.871	4.276
Family Number <5	0.246	0.360	1.279	0.755	2.164
Economic Status (Low)*	0.694	0.011	2.002	1.174	3.415
Birth Order<3*	1.018	0.017	2.767	1.202	6.369
Ethnic Group(Sistanee)	0.137	0.602	1.147	0.685	1.922

CI=Confidential Interval
***There is statistical signification.**

Discusion

Birth weight is influenced by some factors such as as social-economic status, anaemia, lack of pregnancy care, metabolic diseases, low maternal weight and height, maternal age, number of deliveries and the mother's education [2],[4],[5],[7].

In present study, the prevalence of LBW is 11.1%. The Iranian ministry of health reported that the prevalence of LBW was about 10% in the year 2000 [2]. The prevalence of LBW was reported in the year 2000 as follows: USA -7.6% , British -2.8% , Sweden -3.53% and Hispanic - 5.7% [4],[7],[11],[15].

The prevalence of LBW in developing countries is more than that in developed countries. For example, this criteria in India's poor residential areas is 39.1%, among residents on the outskirts of the capital city in Bangladesh is 36.8% and in rural areas in some of the Asian countries is 20.9% [6],[16]. The prevalence of LBW was reported in Babul (a city in north of Iran)- 7.7% and in a hospital in the west of Iran- 19.1% [17],[18]. Based on similar studies, the LBW in this area is found to be less than that in developing countries, but it is more than that in developed countries.
Age of mother is a factor which affects birth weight. In this study, birth weight was found to have a direct relationship with the mother's age. Cogswell [3] and Zaltnik [19] reported that the LBW incidence is low among older women and other studies [6],[16],[20],[21] reported that there are statistically significant differences between birth weight and maternal age. Maternal BMI has a direct effect on birth weight [22],[23],[24] and we found similar results in our study.

Neggers [25] showed that maternal BMI is the best predictive in birth weight assessment and other studies [26],[27] and there is a positive relationship between maternal BMI and birth weight.

In this study, the mean of birth weight among neonatals at the 3rd -5th birth order was more than in the upper or lower birth order. Zahed Pasha [17] in Iran showed that the prevalence of LBW in the first delivery was 8.8% and in secondary and tertiary deliveries was 15.2% . Maruaka [28], in Japan, reported that there was a negative correlation between birth weight and birth ranking. The study by Eghbalian [18] in a hospital in Iran did not show a correlation between birth weight and birth order.

There is a direct relationship between birth weight and economic status. Another factor affecting birth weight was economy. The birth weight was lower in poor families. Valero [10], Wood [29] and Starfield [30] confirmed the above results in their studies.

Ethnicity is another factor that can change the mean of birth weight, and socio-economic differences in ethnic groups cause changes in it. Wood's study [29] showed that the incidence of LBW in black-skinned people was less than that in white-skinned people in the US .Fang [31] reported that the prevalence of LBW in white-skinned people was less than that in dark-skinned and Hispanic immigrants to America. Similar studies [32],[33],[34],[35],[36],[37] proved that there is birth weight differentiation among ethnic groups and immigrant people. They have made it clear that level of income, culture, education and health care is different among different ethnic groups. In the present study, there were found to be statistical differences between the three ethnic groups such as Fars(native), Turkman and Sistanee, at the point of mean of birth weight . Turkman's neonatals had the highest birth weight.

Iron supplementation affects birth weight during pregnancy, but in this study, there wasn't any statistically significant correlation between iron supplementation and birth weight. Probably there are other factors that can change birth weight and it is necessary to study them. Studies by Totunchi [38] in a hospital in Tehran showed that iron supplementation in pregnant women cause an increase in birth weight. Gogswell [3] reported that the prevalence of LBW among neonatals whose mothers had iron supplements was 4%, but in neonatals whose mothers didn't have iron supplements it was 17%.

We did not have any information about medical supervision status and dosing of iron supplements and we did not determine all factors related to birth weight . These are the limitations of this study.

Briefly, our study showed that maternal age, family numbers, economic status, birth order and ethnicity are risk factors for LBW.

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