

## Prevalence of malnutrition during pregnancy and associated factors in women of Ardal County in 2012-2013

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### ABSTRACT

**Background and aims:** Normal pregnancy and its successful outcome require intake of sufficient food. Undesirable nutrition is directly associated with pregnancy outcome, therefore, its prevention is the best strategy to maintain maternal and fetal health. The present study was conducted to investigate the prevalence of malnutrition during pregnancy and associated factors in women of Ardal County.

**Methods:** The present study was a descriptive, analytical, cross-sectional study conducted in 2012-2013 and investigated 435 pregnant women referring to healthcare center of Ardal, who were enrolled by census method. The instrument of data gathering was a form which was filled out with reference to the registered data in household medical file. The data were analyzed by SPSS 16 using Chi square and Fisher's exact test.

**Results:** Of the total of 435 women, 31.7% had diploma education and 98.2% were housewives. Chi square test indicated no significant association between the women's and their spouses' education level and occupation, and weight gain throughout the whole pregnancy ( $P>0.05$ ). The highest prevalence of malnutrition (51.3%) was derived in the first trimester.

**Conclusion:** In view of the prevalence of underweight pregnant women, the training of healthcare centers' personnel is important. Consider the proper implementation of healthcare schedule during pregnancy, particularly monitoring of mothers' weight gain and training of appropriate nutrition.

**Keywords:** Malnutrition, Pregnancy, Associated factors.

Original article

### INTRODUCTION

Pregnancy is one of the most significant and riskiest periods of life for mothers and infants, which is highly important to individual, family, and community health.

The health and/or disease of pregnant mothers affect only their quality of life but also fetal life and health. Several factors are involved in maternal and fetal health,

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including proper nutrition in pregnancy. Pregnant mothers are highly susceptible to malnutrition due to enormous pressures caused by hormonal, metabolic, and physical variations. In fact, fetal growth and development is highly associated with maternal nutrition and provision of mothers' needs is dependent on intake of nutrients.<sup>1</sup> Fetal growth is dependent on satisfactory access to nutrients and if the nutritional needs of the mothers are not sufficiently met, fetus intakes its required nutrients from limited reservoir of mother's body. Inappropriate and insufficient diet in pregnancy affects maternal health and birth weight negatively. Therefore, proper diet supplies energy for mothers and there is a linear, positive correlation between mothers' and fetuses' weight.<sup>2</sup> Bansil et al. study indicated that nutrition-related disorders are associated with an approximately nine-fold increase in fetal growth restriction.<sup>3</sup> Weight gain is more associated with fetal growth during the second trimester than the first and third trimesters.<sup>4,5</sup>

Inappropriate nutrition may lead to some complications such as intrauterine growth restriction (IUGR), abortion, preterm delivery, and particularly low birth weight. Therefore, the quantity and quality of nutrition are particularly important. Attention to the quality of pregnant women's nutrition began when low birth weight was reported 8-10% and the mortality in the infants with low birth weight at the early days and/or weeks of life was much more likely than the infants with normal birth weight. In addition to sufficient nutrition, the balance between protein and energy in late pregnancy has significant effects on birth weight and the acquisition of diseases by infants.<sup>6</sup>

Overall, a normal pregnancy and its successful outcomes require intake of sufficient nutrients. The effects of malnutrition on maternal and fetal health

have been recently known and prevention of malnutrition is the best strategy to maintain the health.<sup>7</sup> The fetus meets all its needs from mother during the growth and development and lack of food leads to depletion of reserves in mother's body and therefore her weight loss.<sup>8</sup> Mother's hunger causes physical, hormonal, and metabolic changes in her own and fetus's body due to ketone and competition for nutrients.<sup>9</sup> Malnutrition in pregnancy leads to increased prevalence of abortion, congenital anomalies, low birth weight, and growth disorders.<sup>10,11</sup>

Researchers are seeking to determine the indicators to represent the status of nutrition in pregnant women so that the risks could be decreased in the pregnancies at risk, assisting in successful termination of pregnancy.<sup>12</sup> By World Health Organization (WHO) figures, approximately 13% of born infants have a birth weight of 2500 g, of which 80% live in developing countries.<sup>13</sup> WHO reported the prevalence of low weight in Iran 8% in 1994 and 10% in 1999. Therefore, birth weight is associated with not only mother's nutrition quality, health, prenatal care, and social environment, but also normal fetal growth and development (1). A study conducted in 2010 indicated that lack of appropriate weight gain in pregnancy was highly correlated with IUGR and low birth weight.<sup>14</sup>

Moreover, Yucheng et al study in Taiwan in 2010 demonstrated a significant association between the weight in pregnancy and infant's birth weight.<sup>15</sup> Although mother's weight gain in pregnancy is a very important healthcare index in pregnancy, no similar study has been yet conducted to investigate the prevalence of malnutrition in pregnant women, and the present study is in line with research priorities of Health Center in Chaharmahal and Bakhtiari province. Then, this study was conducted to determine the prevalence of malnutrition and its associated factors in pregnant women.

## METHODS

Study population of this descriptive-analytical study consisted of all pregnant women with a household file in the Health Center of Ardal County and 43 affiliated health houses. After the researcher obtained the letter of introduction from the Research and Technology Deputy and Health Center of Shahrekord University of Medical Sciences, she collected the data from the files of all mothers (formed since 2012) by census method using a self-developed questionnaire containing the items on mother's age, mother's education and occupation, number of family members, number of children, gestational age at first pregnancy, parity, interval between births, gestational age (week), maternal BMI, and maternal weight gain in the first, second and third trimesters. The validity of the questionnaire was examined and confirmed by some teachers of the Department of Health. The inclusion criterion was existence of the household file at health houses and exclusion criteria were multiple pregnancy and history of abortions, stillbirths, smoking and alcohol drinking, and underlying disease such as diabetes, hypertension, and thyroid and mental disorders.

Necessary approval was obtained from the research and technology deputy of the

university, the province's and county's health centers and urban health centers, and the personal data were kept as confidential for observance of ethical considerations. The data were analyzed by SPSS using descriptive (frequency, percentage, mean, and standard deviation [SD]) and analytical (chi square and Fisher's exact test) statistics.

## RESULTS

Of 435 studied participants, 82.3% lived in rural areas and 29 individuals had the education level higher than diploma. Ninety eight point two percent of the participants were housewives. The age range was 17-44 (mean:  $26.5 \pm 5.41$ ) years. The number of family members was minimally 2 and maximally 14 with mean of  $4.07 \pm 2.03$ .

By the findings, 73 (16.8%) of participants had appropriate weight gain, 223 (51.3%) of participants had lower than appropriate weight gain, and 139 (32.0%) had higher than appropriate weight gain during the whole pregnancy (Table 1), so that the lowest (73.6%) weight gain was derived in the first trimester followed by the second and third trimesters (27.4%).

**Table 1:** Descriptive indices of maternal malnutrition during whole pregnancy

Title	Frequency	Percentage
Appropriate weight gain	73	16.8
Lower than appropriate weight gain	223	51.3
Higher than appropriate weight gain	139	32.0
Total	435	100

In addition, chi square test indicated that there is no statistically significant association between mothers' and spouses' education level and weight gain during the

whole pregnancy ( $P > 0.05$ ). Fisher's exact test indicated no statistically significant association between mothers' and their spouses' occupation and weight gain

during the whole pregnancy, so that most employed and unemployed women had lower than appropriate weight gain ( $P>0.05$ ).

Analysis of variance indicated no significant association between weight gain and the variables, except for gestational age (Table 2).

**Table 2:** Analysis of variance of demographic characteristics in according to whole weight gain during studied women's pregnancy period

Variable	Total weight gain	Number of women	Mean	Standard Deviation	P
Mothers' age	Appropriate	73	26.36	5.37	0.79
	Less than appropriate	223	26.49	5.60	
	More than appropriate	139	26.83	5.11	
Family size	Appropriate	73	4.36	2.49	0.16
	Less than appropriate	223	4.13	2.00	
	More than appropriate	139	3.83	1.77	
Number of children	Appropriate	73	0.88	0.99	0.59
	Less than appropriate	223	0.86	0.94	
	More than appropriate	139	0.96	1.03	
Age at first pregnancy	Appropriate	73	22.71	4.59	0.37
	Less than appropriate	223	22.85	3.46	
	More than appropriate	139	22.26	1.01	
Parity	Appropriate	73	1.96	1.12	0.40
	Less than appropriate	223	1.98	1.14	
	More than appropriate	139	2.12	1.18	
Interval between pregnancies	Appropriate	73	3.76	2.10	0.38
	Less than appropriate	223	3.91	2.02	
	More than appropriate	139	4.24	6.56	
Gestational age	Appropriate	73	28.62	9.07	0.00
	Less than appropriate	223	18.01	9.07	
	More than appropriate	139	21.88	7.67	

## DISCUSSION

Maintaining maternal health and giving birth to healthy infants are ultimate purposes of prenatal care. One of the most important issues during pregnancy is mother's nutrition, because intrauterine growth and development of infants is associated with maternal nutrition, and the only way to meet

energy needs and fetal structures is maternal cerebral blood through placenta.<sup>6</sup>

In addition, the findings indicated that there was no statistically significant association between mothers' and their spouses' education level and weight gain during pregnancy. In Goshtasbi study,

mothers were mostly highly educated.<sup>16</sup> In Taheri et al. study; the prevalence of infants with low birth weight was not significantly associated with smoking during pregnancy, mother's education level, abortion history, and parity. In another study, parity and mother's education level and occupation were not significantly associated with low birth weight.<sup>17</sup> Also, the study findings indicated that all the variables, except for gestational age, were not significantly associated with mothers' weight gain.

Mother's age increases the likelihood of IUGR due to certain factors such as nutrition, prenatal care, and nutritional and social supports with unpleasant effects. On the other hand, young gestational age is associated with the risk of acquiring fetal prenatal complications. Young women, apart from insufficient development of the reproductive system and the needs of their growing body, are often remarkably surrounded by unfavorable nutritional, social, and psychological conditions.<sup>18</sup> Zahedi et al study indicated that mother's occupation and low birth in pregnancy were not significantly associated with each other.<sup>19</sup> Delaram found that weight gain will be increased in pregnant women as the education level is increased.<sup>20</sup>

A high proportion (73.6%) of the participants in the first trimester, 41.6% in the second and third trimester, and 51.3% during the whole pregnancy had lower than appropriate weight gain in the present study. Mothers' weight gain during pregnancy and its effects on placental growth and hence infants' weight is highly important. Inappropriate sectional weight gain in pregnancy could affect neonatal weight gain. By the previous studies, overall weight gain in pregnancy should not be used as the only nutritional index during pregnancy and weight gain during each independent trimester is particularly important.<sup>16</sup>

Therefore, strength of the present study was investigation of weight gain during all trimesters. The lowest weight gain was derived in the first trimester. The mothers with lower than normal weight gain are likely to be predisposed to acquiring chronic infections due to lack of nutrients such as iron and zinc, which are needed for efficiency of safety system. The infection and inflammation increase the likelihood of preterm delivery. The results of Sal Hu et al showed that less than normal weight gain was associated with preterm delivery.<sup>20</sup>

The findings of conducted studies have indicated a strong association between fetal birth weight and maternal weight. In Pakniat et al. study, birth weight increased with increase in BMI at early pregnancy, and low birth weight increased in the women with lower than normal weight and decreased in the women with overweight, so that the heaviest neonatal weight was 4 kg in overweight and obese group, which is mainly attributed to mothers' old age and parity.<sup>21</sup> A retrospective study by Yucheng et al in Taiwan in 2010 indicated that the mothers with BMI of 21-27 and weight gain of 13-18 were more likely to give birth to infants with normal age range (2112-4390 g), and the infants' weight was significantly higher in the mothers with BMI of 24-27 than the mother with BMI above 27 and under 18. That study also demonstrated that weight gain in pregnancy was significantly associated with birth weight.<sup>15</sup>

Incidence of maternal and fetal complications is an unpleasant outcome in risky pregnancies and deliveries. Therefore, considering the approaches for decreasing these unpleasant complications and outcome is a significant purpose of prenatal care, and weight suitability and adjustment should be addressed in prenatal advising and care as an important and appropriate solution to decrease pregnancy complications.<sup>12</sup>

A high proportion of the studied women had a lower than appropriate weight gain during pregnancy particularly the first trimester. So, it is necessary for healthcare team, particularly nurses, to seek to train appropriate nutrition to and constantly follow these pregnant women until delivery, because failure to train them appropriately could cause several problems for both infants and mothers. The infants with low birth weight and their acquisition of diseases due to mothers' malnutrition during pregnancy could lead to stupendous costs for health system and family. Finally, maternal nutrition-caused diseases and nutritional disorders in infants could be prevented through focusing on advising and training roles of nursing. Lack of easy access to medical files of pregnant women in rural areas was a limitation of the present study.

## CONCLUSION

The results of the present study demonstrated that training of healthcare centers' professionals is conducive to further considering appropriate implementation of prenatal care particularly monitoring of mothers' weight gain and nutrition during pregnancy even at early pregnancy. In this regard, implementing educational programs and increasing mother's awareness at every care session is very important. It is also suggested to do prospective studies to investigate the effect of maternal nutrition, how to do prenatal care during first, second, and third trimesters, and the contribution of each trimester to pregnancy outcomes.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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