Original Article

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Nutrition Section

Deficiencies of the Microelements, Folate and Vitamin B12 in Women of the Child Bearing Ages in Gorgan, Northern Iran

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ABSTRACT

Background: The deficiencies of folic acid, vitamin B12, and microelements during pregnancy may affect the health of newborns.

Objectives: To assess the serum levels of folate, vitamin B12, iron, zinc and copper in healthy women of the childbearing ages in Gorgan, northern Iran.

Methodology: This descriptive, cross-sectional study was carried out on 100 women of childbearing ages in northern Iran during November 2007-March 2008. The serum levels of folate, vitamin B12, iron, copper and zinc were evaluated by laboratory tests.

Results: Iron, copper , folate, vitamin B12 deficiencies and folate with vitamin B12 deficiency were detected in 13%, 32% , 13% , 32% and 11% women of the childbearing ages, respectively .

According to the ethnicity, vitamin B12, folate and iron deficiencies in the Sistani group were observed in 38.3%, 12.9% and 12.9% of the women, respectively. In the native Fars group, the above mentioned deficiencies were found in 31.1%, 13.4% and 7.5% of the subjects.

Folate and vitamin B12 deficiencies were observed in the urban habitant in 32.7% and 11.5 % of the subjects as compared to those in the rural habitant (in 30.4% and 15.2%of the subjects respectively). The folate deficiencies in the under and above 18 years old subjects were 22.2% and 9.9%, respectively.

Conclusions: This study showed that the deficiency of the micronutrients was considerable in women of the childbearing ages in Gorgan, northern Iran.

Key Words: Woman, Microelements, Folate, Vitamin B12, Iron, Childbearing age, Iran

INTRODUCTION

The pregnancy outcome is adversely affected by folate, vitamin B12, iron and zinc deficiencies [1]. Maternal anaemia creates an adverse impact in the form of preterm deliveries, prenatal mortalities and low birth weight and it may also contribute to childhood mental disability [2].

Epidemiological studies recommend that up to 75% of the neural tube defects could be prevented by folate intake through dietary supplements or food fortification [3,4].

Also, low maternal vitamin B 12 levels are considered to be an affecting factor for the neural tube defects in newborns [5]. This study was done to determine the serum levels of folate, vitamin B12, iron, zinc and copper in women of the childbearing ages in Gorgan, northern Iran.

METHODOLOGY

This descriptive, cross-sectional study was done on one hundred, 18-35 years old women of the childbearing ages in Gorgan, Iran the capital city of the Golestan province in northern Iran, during December 2007-August 2008. The consent agreement form was completed by all the participants. The ethical approval for this study was obtained from the ethics committee of the Golestan University of Medical Sciences.

The subjects were selected by using a simple randomized sampling method from among the women who were referred to the Gorgan Health Care Centre. All the residents in the rural and urban areas of Gorgan city are referred to this centre for marriage consultations and laboratory exams before their marriages are planned. The demographic characteristics of the women, which included their ages, residencies and ethnicities, were recorded in questionnaires by holding direct interviewa.

Native Fars and Sistani are the main ethnic groups in Gorgan. Native Fars is the dominant population and they are the original residents in this area; while the Sistani ethnic group emigrated from southeastern Iran half a century ago.

Biochemical Analysis

Peripheral blood samples (4 milliliters) were collected from each subject. The folate (folic acid) and vitamin B12 concentrations were measured by a RIA (radioimmunoassay) method by using the Genesis system (DRGP–-Germany). The serum levels of iron (Fe) and copper (Cu) were measured by a chemical method. The zinc concentration was determined by atomic absorption.

The cut-off values for serum folate, vitamin B12, iron, copper and zinc, which had to be considered as deficiency thresholds, were taken as 1.5 ng/ml, 160 pg/ml, 37 µg/dL, 70 µg/dL and 70 µg/dL, respectively.

RESULTS

Iron and copper deficiencies were found in 9% and 45% of the subjects, respectively. Serum folate and vitamin B12 deficiencies were observed in 13% and 32% of the subjects, respectively. A serum folate along with vitamin B12 deficiency was observed in 11% percent of the subjects. The serum zinc concentration was normal in all the subjects.

Vitamin B12, folate, iron and copper deficiencies were observed in 37 %, 22.2%, 11.1% and 33.3% of the subjects who were less than 18 years old respectively.

Vitamin B12, folate, iron and copper deficiencies were observed in 29.6%, 9.9%, 8.2% and 49.3% of the women who were above 18 years of age respectively.

According to the ethnicity, vitamin B12, folate, iron and copper deficiencies in the Sistani ethnic group were observed in 38.3%, 12.9%, 12.9% and 54.8% of the cases, respectively.

In the native Fars group, vitamin B12, folate, iron and copper deficiencies were observed 31.1%, 13.4%, 7.5% and 41.8% of the women respectively.

Folate and vitamin B12 deficiencies in the urban habitant were found in 32.7% and 11.5% women as compared to those in the rural habitant, which were found in 30.4% and 15.2% women respectively. The deficiencies of iron and copper in rural residents were seen in 13.5 % and 50% of the subjects in contrast to those in urban residents, which were seen in 4.2% and 40.4% women.

DISCUSSION

In this study, folate deficiency was detected in 13% of the women of the childbearing ages. Our results were comparable with those of Abdolahi et al's study, which reported a folate deficiency in 14.3% of the women of the childbearing ages in Gorgan before a folic acid fortification was implemented [6]. Our study was done six months after a flour fortification with folic acid and iron was given. The reduction of the folate deficiency may be due to the effect of the fortification mandatory program. Also, the folate deficiency in women of the childbearing ages was reported to be 25.1% in Lebanon [7] and 39% in Bangladesh [8].

In our study, a vitamin B12 deficiency was detected in 32% of the subjects, which was reported to be 22.7% in the northern Iran before the flour fortification with folic acid implemented [6]. A vitamin B12 deficiency was reported in 39.4% women of the childbearing ages in Lebanon [7], in 21.4% women in Korea [9] and in 13 % women in Bangladesh [8]. These differences can be due to the different food habits in these countries, because food habits are culturally specific.

An iron deficiency was observed in 13% of the subjects in our study. An iron deficiency was reported in 48% women of the childbearing ages in Lebanon [7], in 34.7% women in Yazd (central part of Iran) [10] and in 14.5% women in Tabriz (northwest of Iran) [11].

In the developing countries, a majority of the women get pregnant while they suffer from anaemia or inadequate stores of iron.

In Safavi et al's study, the iron deficiency among the women residents in rural areas was found to be higher than that among the women in the urban areas in 11 continents of Iran [12] which was consistent with our results.

In our study, the iron deficiency was more in younger subjects. The iron deficiency was found to be 17.6% among the adolescent schoolgirls in Sudan [13] and to be 30.2% in Chinese girls [14].

In our study, a copper deficiency was detected in 32% of the subjects but the rate was 42.8% among high school girls in southeastern Iran [15]. The deficiency of copper could be due to unsuitable food habits, fast foods and wrapped foods.

LIMITATION OF STUDY

Determination of the folic acid concentration in the bread which is a main food in this area, was not possible in our study.

CONCLUSION

This study showed that the deficiency of micronutritients was considerable in women of the childbearing ages in Gorgan, northern Iran. Therefore, health and nutrition programs are necessary for promoting the status of the micronutritients in women of the childbearing ages.

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