URINARY IODIDE AND CHLORIDE EXCRETION IN PREGNANT NIGERIAN WOMEN IN JOS

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ABSTRACT

Aim And Objective- The aim of this study is to determine the status of iodide- a potential indicator of thyoid function in pregnant Nigerian women in Jos Plateau state Central Nigeria.

Materials and Methods- Urinary iodide and chloride levels were measured by standard spectrophotometric methods (Bourdoux et al, 1985, Schales and Schales 1941) respectively in 75 pregnant women during the three stage of their pregnancy and these were compared with those of 20 non pregnant women match for age and used as controls.

Result- The result obtained showed urinary iodide excretion (U.I.E)µg/dl was not significant during the first trimester ($P>0.05$) but significantly higher in the second and third trimesters ($P<0.05$ and $P<0.00l$) respectively compared to control and maximal during the third trimester.

Urinary Chloride level show no significant difference ($P> 0.05$) throughout the three trimester between the test and control subjects.

Conclusion- The result indicate that Jos metropolis which is the area under study may be said to be iodide sufficient and that there is no excess chloride to compete with iodide In circulation.

Key words- Urinary iodide, chloride, pregnancy, Nigerians.

INTRODUCTION

Iodine exist as iodine in nature and is sparsely distributed on the earth surface. It is an halogen which is fairly reactive and form different iodine on combination with metals. Iodine is a very important component of thyroid hormone needed for normal physiological functions in the body. Deficiency of iodine in the body causes what is called iodine deficiency disorders (IDD) manifesting with various clinical and biochemical manifestation affecting all age group of human subjects. IDD can cause abortion and stillbirth during pregnancy and cretinism in neonates and infants, increased perinatal and infant mortality and retarded bone weight.

In pre-adolescent and adolescent deficiency can cause reduction of physical growth and intelligent quotes (IQ) due to decreased production of thyroid hormones and consequently goiter.

Pregnant women and women of child bearing age are one of the most important target group in an iodine deficiency zone. Others include neonates and infants, then pre-adolescent and adolescent, finally adult and men of older age above 45 years.

Constant supply of thyroid hormones are very crucial in the development of human brain in the embryo. Thyroxine (T_4) crosses the physiological blood/ brain barrier and reaches the brain tissue where it is converted to tri-iodothyronie (T_3) by deiodinase enzyme for normal human brain development and maturation processes. It is established (though in animal models) that thyroid hormones can not cross placental barrier adequately in either direction[2,3] hence the foetal thyroid hormone requirement are probably met by maternal iodine pool which can cross placenta freely into the foetal circulation rather than the maternal thyroid hormones. This demonstrate the clear significant and critical value of iodine

availability in pregnant women that require compliance by all mean to enable a healthy society.

Previous studies conducted in plateau state suggest that most part of the state are goiter endemic due to environmental iodine deficiency[45]. The focus of this study is to examine and establish the status of iodine in pregnant women living in Jos and it's environs. Chlorine, which is an important halogen[6] like iodine bears some useful relationship with iodine in their urinary excretion pattern in reaction to iodine deficiency.

MATERIAL AND METHODS

A total 95 subject (women) aged 18-36 years were included in the study, comprising 75 pregnant women (age range 18-36) matched for age and used as controls.

The subject were recruited from the ante-natal clinic of Jos University Teaching Hospital (JUTH) Jos who are normally housewives and civil servants visiting the clinic after an inform consent. The control subjects (non-pregnant women) were selected similarly among students and relatives of hospital. The subject comprises of people from different tribes who are resident in and around Jos.

The sample collected were early morning urine of about 5-10ml avoided into a sterile container, analysis of urinary iodine was done by standard spectrophotometric method7 (Sandel-Kolthoff reaction described by Bourdoux et al 1987). The urinary chloride was assayed by the method of schales and schales 1941.[8]

RESULT

The result are as presented in table 1 and table 2 below. Table I shows urinary iodine excretion in μg/dl among pregnant and non pregnant control subjects. Comparing mean of UIE for women control subjects with the three trimester ($P<0.05$). The mean of the second and third trimester group were found to be significantly higher ($P<0.05$) and ($P>0.001$) respectively.

Table 2 shows urinary chloride levels in μg/dl for control and the three test groups. Comparing with each of the three test group there were no significant difference between them in each case ($P>0.05$).

TABLE I

URINARY IODIDE EXCRETION (UIE)..IN **NON PREGNANT AND PREGNANT WOMEN** (µg/dl)

	Non pregnant	Pregnant women		
	. Women	1st Trimester	2nd Trimester	3rd Trimester
N	20	25	25	25
Age range (years)	- 20-35	22-35	18-35	22- 36
Mean Age (years)	26.0	26.4	29.2	28.6
Mean UIE (µg/dl)	15.20:t134	15.91:t1.28	16.00:t1.00	18.821:2.30
P		>0.05	<0.05	<0.001

TABLE 2

URINARY CHLORIDE EXC RETION IN PREGNANT AND NON PREGNANT WOMEN (µg/dl)

of men	Non pregnant	Pregnant women		
	Women .	.1st Trimester	2nd Trimester	3rd Trimester
	20 -	25	25	25
Age range (years)	20-35	22- 35	18- 35	22- 36
Mean Age (years)	26.0	26.4	29.2	28.6
Mean Urinary chloride (µg/dl)	0.4.07	0.49:tO.12	0.51:tO.06	0.57:\:0.05
p		>0.05	>0.05	>0.05

DISCUSSION

Iodine deficiency disorder affects over 500 million people worldwide as a major nutritional problem though developing countries are worst hit compared to the industrialized world.[9] Brain development in the foetus and childhood is crucial in any society for attainment of good quality of life and development[10,11,12,13]. Not much work has been done on pregnant women on iodine deficiency disorder in our environment hence the need for this study. It has been established that urinary iodine excretion (UIE) greater than 10 μg/dl indicate iodine sufficiency.[14,15,16]. The vulnerable group for iodine deficiency includes pregnant women, children and particularly infants. In response to these challenges the World Health Organization (WHO) technical consultation has produced a new guideline on iodine requirements and monitoring in these vulnerable groups. The consultation made several specific and far reaching recommendations concerning requirements and indicators to control iodine deficiency disorders in pregnant women, lactating mothers and in children less than 2 years old. Some of the recommendations include endorsing universal salt iodization (USI) which remains the key strategy to eliminate iodine deficiency disorders (IDD). The recommendations also include monitoring of both iodized salt quality and iodine nutrition is important to ensure that an optimal state of iodine nutrition are reached and sustained. Where salt has been adequately iodized and consumed by more than 90% of the population for the last two years, it can be reasonably expected that the iodine needs of pregnant women, of child bearing age and lactating mothers are covered by their diet" and that the iodine stored in their thyroid gland is sufficient to ensure adequate hormone synthesis and secretion. However iodized salt may not provide sufficient iodine for the child's need during complementary feeding especially if the mother is only marginally iodine sufficient hence it may be necessary for fortification of the complementary babies food to make sure that requirement are met until such a time the child can eat the normal family food[16]. From the present study therefore it can be said that non pregnant women student were iodine sufficient (UIE of 15.20 ± 1.34 μg/. It was also observed from the study that urinary iodide excretion was significantly higher in the second and third trimesters among the pregnant women; which is primarily due to increased GFR (glomerular filtration rate), observed during advance progressive pregnancy. It was also observed in the present study that the urinary chloride excretion does not bear any direct relationship with that of UIE in the pregnant subjects.

CONCLUSION

The result indicates that Jos metropolis which is the area under study may be said to be iodide sufficient and that there is no excess chlorine to compete with iodide in circulation.

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