Determination of Urinary Iodine Excretion (UIE) to Assess Iodine Deficiency Disorder (IDD) among Pregnant Women in District Hospital of Sindhupalchowk, Nepal

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PHIDReC Team
March, 2014
Kathmandu

Summary

Pregnant women and infants are risk populations of iodine deficiency disorders (IDD). Our previous studies also revealed that pregnant women are at risk of non-visible IDD. Therefore, this study has been designed to explore the status of Iodine Deficiency Disorders (IDD) among pregnant women through analysis of urinary iodine excretion (UIE). A total of 100 pregnant women from Chautara Hospital Sindhupalchowk was included to analyze UIE. Although the general clinical status of women was satisfactory, the urinary iodine excretion revealed that still 27 percent of pregnant women in Sindhupalchowk had insufficient iodine intake. This indicates that pregnant women are still at risk of iodine deficiency disorder and they should be in priority population for the IDD prevention program.

1. Introduction

Iodine Deficiency Disorder (IDD) is the world's single most significant cause of preventable brain damage and mental retardation. Twenty nine percent of the population (1570 million people) is at risk of iodine deficiency today in the world. The immense danger to health due to IDD arises from the fact that these disorders can began even before the child is born. Although iodine is needed in small amount on an average of 150 mcg (100 to 300) per person per day, [1, 2] lack of iodine is associated with wide range of clinical and sub-clinical conditions. The most obvious sign of IDD is goiter, which is a gross enlargement of the thyroid gland in the neck, with a global prevalence of 12%. In addition to goiter, IDD leads to infant mortality, stillbirths, birth complications, mental retardation and depressed psychomotor functions. Moderate IDD in early childhood has been estimated to lower the intelligence quotient by about 10-15 points, while in adults it causes lethargy. [3]

IDD is an important major micronutrient deficiency problem in Nepal. In some isolated mountainous area of Nepal, most of the adult woman had goiter and up to 10% of population were cretins, the severest form of IDD. [4]

In areas with severe iodine deficiency (<50 mcg intake/day), goitrogenesis as well as hypothyroidism were frequently observed in mother and newborn as a result of the inability of the thyroid gland to adjust to changes in thyroid economy associated with pregnancy. Hence, the pregnant woman and the newborn have been considered primary targets for iodine supplementation in such areas.[5] Ministry of Health and Population has prioritized Iodine Deficiency Disorders as a high level activity in its Nutrition Policy and Strategy 2004. By the year 2017 iodine deficiency disorders will be eliminated virtually from Nepal. [7]

We implemented iodine supplementation among pregnant mothers in Antenatal Care (ANC) Clinic of Chautara Hospital Sindhupalchowk. We found significant positive outcome in mothers and children born from iodine supplemented mothers.

All these findings associated with pregnant women justify the burning issue for the research on iodine deficiency disorders among pregnant mother and newborn. With these motivations, this study was designed to screen among pregnant women and newborn in Beni Hospital Myagdi in 2012 and 2013 analyzing urinary iodine. This

study also provided health education to the women of rural community regarding the use of two children logo containing iodized salt.

2. Objectives

To determine the status of Iodine Deficiency Disorders (IDD) in pregnant women in Chautara Hospital Sindhupalchowk.

Specific objectives

1. To assess the physical health including blood pressure measurement of women.
2. To determine the status of IDD among pregnant women analyzing urinary iodine excretion.
3. To provide health education to pregnant mothers and mother's group in the rural community regarding iodized salt and IDD.

3. Methodology

3.1 Research design

This cross-sectional study was conducted to determine the status of IDD among pregnant mothers in Chautara Hospital Sindhupalchowk during September, 2013 to February 2014. In addition, health education on iodized salt and iodine deficiency disorder were provided to women. This was a follow up study with adding some variables for assessing IDD among pregnant women.

3.2 Study site

The site of this study was Chautara Hospital Sindhupalchowk. Sindupalchowk district is situated in hilly ecological region of Central Region of Nepal.

3.3 Sample size and sampling

We enrolled 100 pregnant mothers seeking ANC in Chautara Hospital. Urine samples from those women were collected for determination of urinary iodine excretion. We also provided health education for those women. In addition, 4 mothers group in adjoining

VDCs of Chautara were provided health education. Mothers group is a group of women formed by female community health volunteers (FCHVs).

3.4 Physical examination of pregnant women

Women visiting Chautara District Hospital for antenatal check up were examined for blood pressure. The attending nurse/ANM measured the blood pressure of examined mothers.

3.5 Collection of urine samples

Urine samples were collected from 100 pregnant women in the hospital for the analysis of Urinary Iodine Excretion (UIE) to screen IDD status. The urine samples were collected in clean leak proof container. The collected urine samples were kept in refrigerator at -20^0C until analysis. The UIE analysis was conducted at BP Koirala Institute of Health Sciences (BPKIHS), Dharan.

3.6 Health education on iodine to pregnant mothers, women and Female Community Health Volunteers

Pregnant women were counseled and health education was provided regarding importance of iodine during pregnancy. We also assessed mother's knowledge on IDD. Health education was provided to pregnant mothers in the hospital. In addition, health education was given to mother groups in their mother group meeting along with Female Community Health Volunteers (FCHVs) in the rural community of Sindhupalchowk. The health education was provided to 4 mothers groups in the district. The mothers group of the dalit, janajati and disadvantaged community were selected for health education package. In the meeting in the community, iodized salt packet with two children logo was distributed to motivate them to use iodized salt.

Pregnant women with high blood pressure were counseled in the hospital during her follow up ANC visit not to take too much salt.

3.7 Data collection

Knowledge on iodine and IDD, perceptions of mothers on iodized salt were collected

using questionnaire from mothers. The UIE test data were collected after sample analysis. The descriptive qualitative information regarding the mother's perceptions on iodized salt were collected through interview and focus group discussion. Focus group discussion was conducted with mothers in their mother group meeting.

3.8 Data management and analysis

Collected data were entered in SPSS version 13 and analyzed. Descriptive analyses as well as qualitative data were presented. The following classification of urinary iodine excretion (UIE) for pregnant women was used.

Table 1: WHO classification of iodine deficiency disorders (IDD) on the basis of urinary iodine excretion for pregnant women

Median Urinary Iodine (µg/L)	Iodine intake	Iodine status
<150 µg/L	Insufficient	Severe iodine deficiency
150-249µg/L	Adequate	Adequate iodine nutrition
250–499 µg/L	Above requirements	Risk of iodine induced hyperthyroidism
≥500 µg/L	Excessive	Risk of adverse health consequences

4. Findings

Characteristics of women involved in the study

The age range of women included for UIE was 16-40 years. The mean age of the women was 22.8 years (SD-4.1 years). Majority of women (63.4 percent) were of age 21-35 years.

Table 2: Characteristics of the women

Characteristics	Number (n=101)	Percent
Age distribution (in years)		
< or equal to 20	36	35.6
21-35	64	63.4
More than 35	1	1.0
Mean age (S.D.)	22.8±4.1 (Min.-16; Max.-40)	
Mean weight (Kg)	52.0±6.6 (Min.-35; Max.-68)	

About 11 percent of mothers had hypotension whereas one mother had hypertension.

Table 3: Blood pressure category of women

Blood pressure	Number	Percent
Normal	89	88.1
Hypotension	11	10.9
Hypertension	1	1.0

Ninety percent of women had normal clinical status whereas two percent had abnormal clinical status.

Table 4: General clinical status of women

Clinical status	Number	Percent
Normal	99	98.0
Abnormal	2	2.0

Urinary iodine level among pregnant women

Urinary iodine excretion (UIE) level indicates that 27 percent of women had insufficient iodine intake. Similarly, 31 percent of women had excessive UIE greater than 500 µg/l.

Table 4: Urinary iodine excretion level and iodine intake status

UIE level (µg/l)	**Number (n=100)**	**Percent**
Insufficient (<150)	27	27.0
Adequate (150-249)	17	17.0
Above requirements (250-499)	25	25.0
Excessive (≥500)	31	31.0

5. Conclusion

Although the general clinical status of women was satisfactory, the urinary iodine excretion revealed that still 27 percent of pregnant women in Sindhupalchowk had insufficient iodine intake. This indicates that pregnant women are still at risk of iodine deficiency disorder and they should be in priority population for the IDD prevention program.

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Annexes

Performa for collection of urine samples from pregnant women

Date:

Name of the mother:

Name of the husband:

Address: District: VDC: Village:

Ward No.:

Name of the Hospital:

1. Age of the mother:
2. Caste:
3. Religion:
4. Blood pressure (mmHg):
5. Weight:
6. General clinical status
    a. Normal
    b. Not normal
7. Urine sample collected in filter paper
    a. Yes
    b. No

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Information Sheet for Pregnant Women and Parents of Children

Name of Principle Investigator:
Name of Organization: Public Health and Infectious Disease Research Center (PHIDReC)
Name of Sponsor: Society for Eliminating Nepalese Iodine Deficiency Disorder (SENID) Japan

Information sheet for individuals participating in the research
"Screening of Iodine Deficiency Disorder (IDD) and Supplementation of Iodine among Pregnant Women in Beni Hospital, Myagdi, Nepal"

(I am ..... and I work at the PHIDReC Kathmandu. We are doing some research on the Iodine Deficiency Disorder to determine its burden in risk population such as pregnant women and children.)

Purpose of the research

Iodine Deficiency Disorder (IDD) is an important major micronutrient deficiency problem in Nepal. In areas with severe iodine deficiency (<50 mcg intake/day), goitrogenesis as well as hypothyroidism were frequently observed in mother and newborn as a result of the inability of the thyroid gland to adjust to changes in thyroid economy associated with pregnancy. Hence, the pregnant woman and the newborn have been considered primary targets for iodine supplementation in such areas.

All these findings associated with pregnant women justify the burning issue for the research on iodine deficiency disorders among pregnant mother and newborn. With these motivations, this pilot study has been designed to screen IDD in children born from iodine supplemented mothers during pregnancy and pregnant mothers testing TSH in order to implement iodine supplementation in pregnant women.

Procedures

The site of this study is Beni Hospital Myagdi. We will collect urine samples from 400 pregnant mothers when they seek ANC. We also assess knowledge and perceptions of mothers on IDD and iodine. The mothers will also be assessed clinically. Similarly, urine samples will also be collected from newborns from the same hospitals during the study period. Urine samples will be analyzed for urinary iodine excretion using standard procedure.

Risks and Discomforts

There will be no any risks during collection of urine sample. The urine sample will be collected using sterile leak proof container in the hospital when you seek ANC.

Benefits

Your participation is likely to help us to find out more about what is the burden of Iodine Deficiency

Disorder (IDD) in high risk population in Nepal and this information will be useful to implement iodine deficiency control programme.

Incentives

You will not be provided any incentive to take part in the research.

Confidentiality

The information that we collect from this research will be kept confidential. Information about you that will be collected from the study will be stored in a file which will not have your name on it, but a number assigned to it. Which number belongs to which name will be kept under lock and key, and will not be divulged to anyone except the researchers, and research sponsors.

Right to refuse or withdraw

You do not have to take part in this research if you do not wish to do so, and this will not affect the future treatment of your family at the health facility at the District Hospital in any way. You will still have all the benefits that you would otherwise have.

You may stop participating in the research at any time that you wish to, without losing any of your rights as a patient or otherwise.

Who to contact

If you have any questions you may ask those now or later. If you wish to ask questions later, you may contact: (Prof. Chitra Kumar Gurung, PHIDReC, Kathmandu, Phone: +977-1-4494254).

Consent Form from Pregnant Women for Blood Sample Collection for IDD Screening

I have read/has been read to me the foregoing information. I have had the opportunity to ask questions about it and any questions I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this study and understand that I have the right to withdraw from the study at any time without in any way affecting me and my family as a health care seeker.

Participant's Name:
Signature:
Place:
Date:

Witness (Name):
Place:
Signature:
Date: