HOUSEHOLD SALT IODISATION LEVEL AND URINARY IODINE CONCENTRATION OF CHILDREN ATTENDING PUBLIC PRIMARY SCHOOLS IN ZARIA, NORTHWEST NIGERIA

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INTRODUCTION

- Iodine is an essential nutrient required in very little amounts in human and its an important component of thyroid hormones (Delange and Dunn, 2005).

- These hormones maintain the body's metabolic state and support normal growth and development in children (Zimmermann, 2009)

- Iodine deficiency resulting from inadequate dietary iodine intake is related to a spectrum of diseases collectively referred to as iodine deficiency disorders, IDDs (Hetzel, 1996)

- These include preventable conditions such as impaired mental function, goitre, hypothyroidism, cretinism, and retarded physical development; iodine deficiency also causes increased child mortality (Delange, 1996).

INTRODUCTION/2

- Iodization of salt is widely regarded as the most effective and sustainable longterm public health measure for the prevention and control of IDDs (Mannar, 2009).

- Earlier studies indicated that northern Nigeria is an area of endemic goiter (Isichei *et al.*, 1995)

- Latest study suggest that despite the advances in salt iodization program and improvement in salt production and marketing technology, the quality of available salts at the household in Nigeria is still poor (Arinola, 2014)

- Moreover, over 90% of ingested iodine finally appears in the urine, Urinary Iodine Concentration (UIC) is a good indicator of recent iodine intake (Balaji *et al*., 2010)

INTRODUCTION/3

- There is inadequate documentation of the iodine status of school age children in Nigeria and specifically children from northern Nigeria with the highest level of undernutrition as recorded in the Nigeria Demographic and Health Survey report (NDHS, 2013)

- Against this background this work was conceived to assess the progress been made regarding consumption of iodised salt in households in Kaduna state.

MATERIALS AND METHODS

Study Area

- The study was conducted in the ancient city of Zaria (11°04'N 7°42'E), comprising two local government Areas of the 23 in the state

Sample Size

- The sample size was obtained using the formula outlined by FAO, 1990

$$n = \frac{Z^2pq}{d^2}$$

q= 1 – p p = anticipated prevalence

d = desired precision = 0.05

z = value for std normal deviate = 1.96

Sampling

- The list of all the public primary schools in Zaria was obtained from the Ministry of Education Zonal office, they were stratified into wards, four wards were randomly selected and fours schools were also randomly selected from the list of schools in the wards.

- 400 children aged 6 – 12 years were then randomly selected from the list of registered students in the schools

Sample collection

- Fieldwork consisted of completing a structured questionnaire and the collection of approximately 15 g salt (three teaspoons) from each of the 400 students.

- Casual urine samples was obtained from a sub sample of the students (n -100) using sterile containers in the morning hours as described by the method of Navnit, (2011).

- The Salts and the urine samples were then transported to the Food and Nutrition Laboratory, Dept. of Biochemistry, ABU Zaria in an iodine-free container, which was tightly sealed by means of a plastic zip and placed in a thick paper envelope for laboratory analysis.

Laboratory Methods

- Salts samples were analyzed by Iodometric titration procedure of Mannar and Dunn, 1995

- Urinary Iodine Concentration was determined using the Sandell – Kolthoff Ammonium persulfate digestion procedure of Dunn, 1993

RESULTS

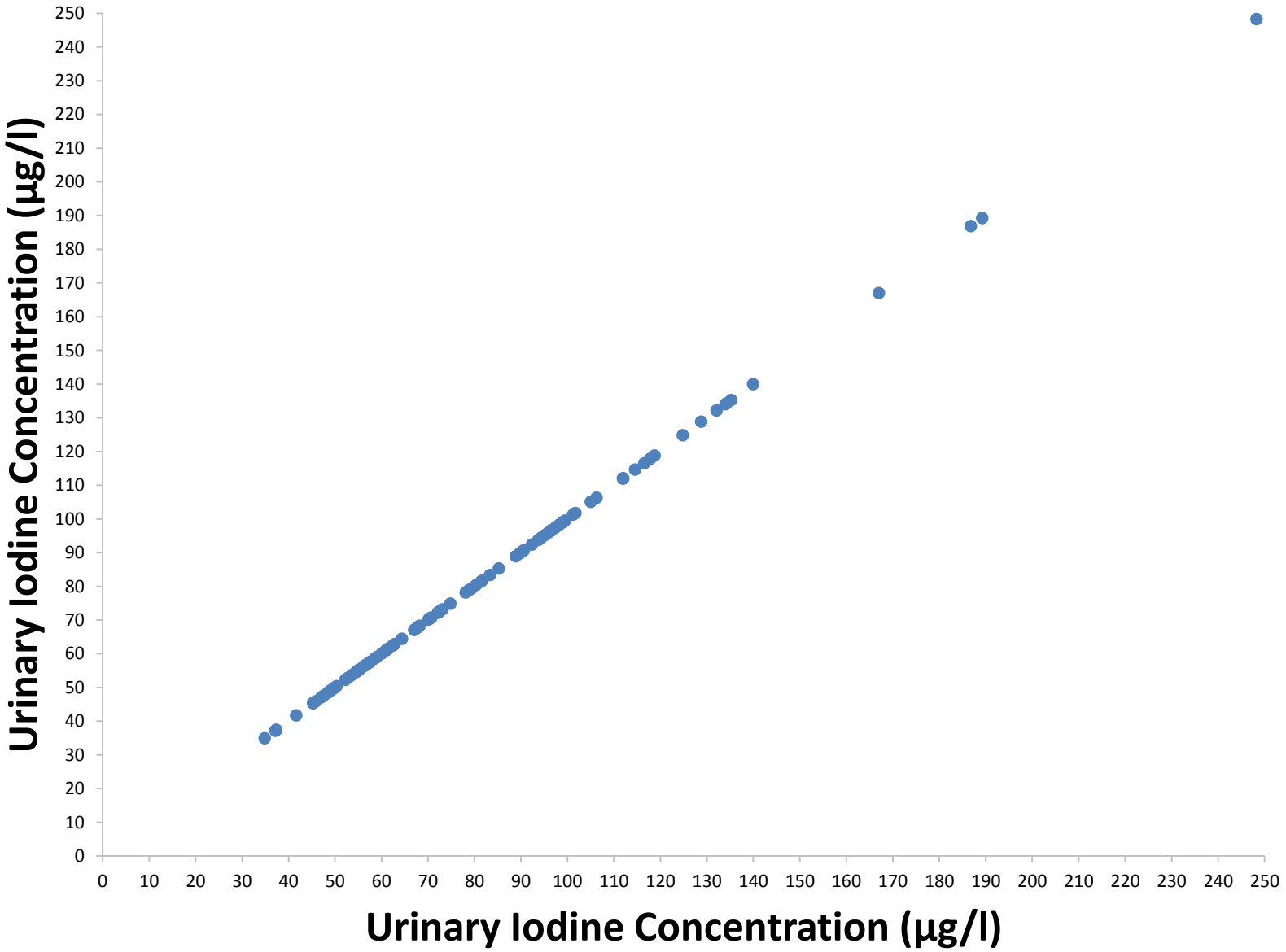
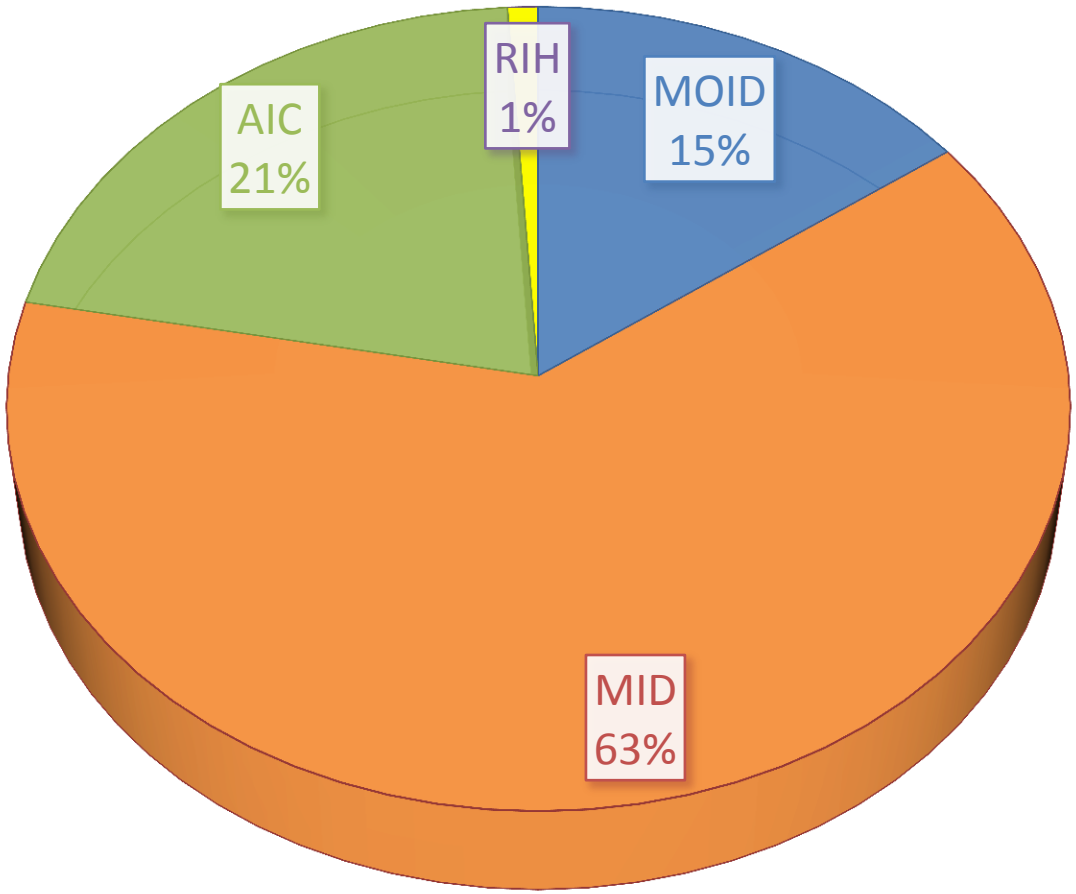


Figure 1: Urinary Iodine Content of Student Attending Public Secondary schools in Zaria



MID= Mild Iodine Deficiency,
MOID=Moderate Iodine Deficiency
AIC= Adequate Iodine Content
RIH= Risk of Iodine-induced Hyperthyroidism

Figure 2: Distribution of Respondent by Iodine Status

Table 1. Mean and Median Urinary Iodine Concentration of Pupils Attending Public Primary Schools in Zaria

Parameter	Value (µg/l)
Mean±SD Urinary Iodine Concentration	82.08±35.71
Median Urinary Iodine Concentration	72.31

Values are mean ± standard deviation

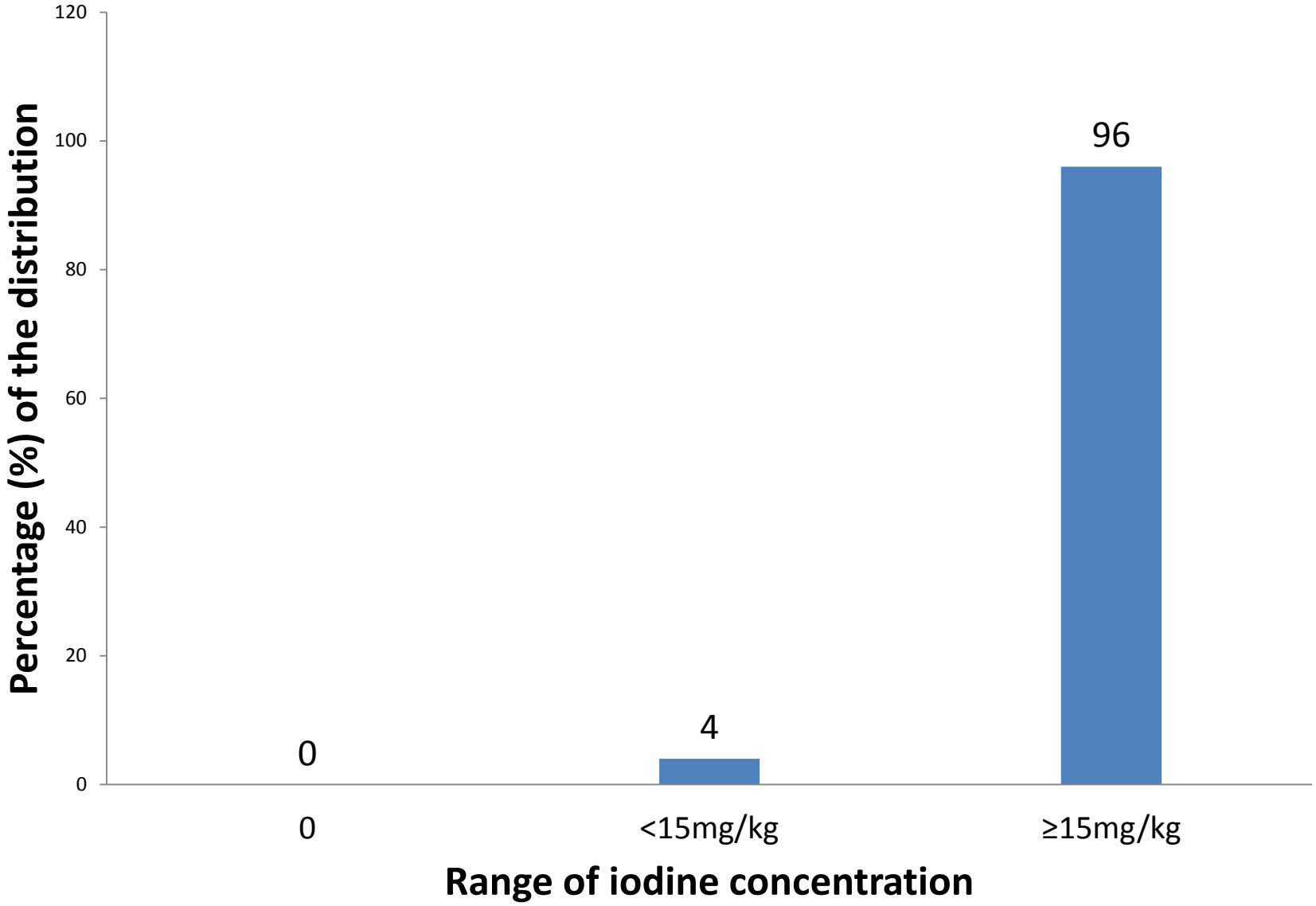


Figure 3: Variation in Iodization of Salts Used in Households of Students attending Public Primary Schools in Zaria

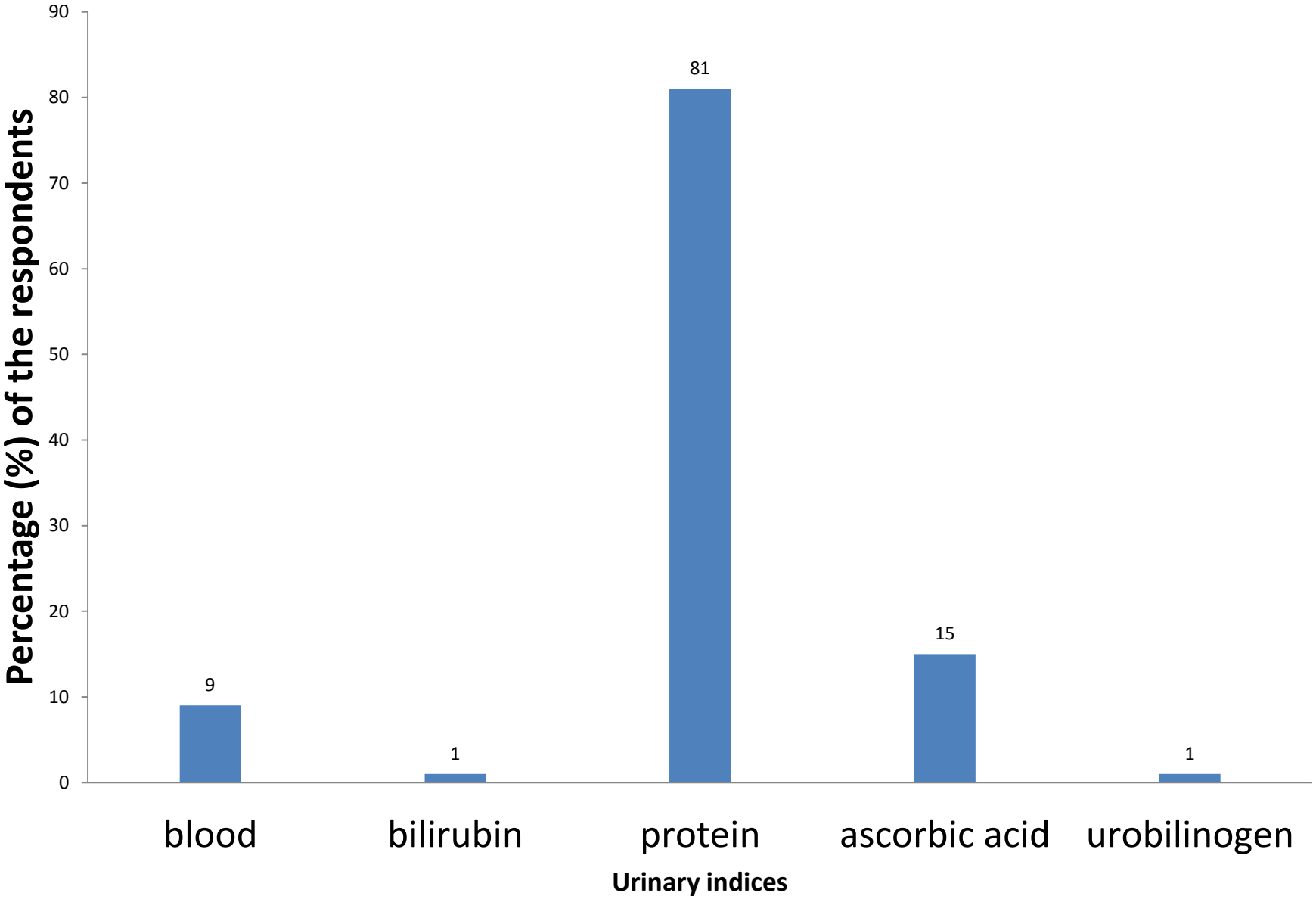


Figure 4: Variation of Some Urinary Indices in the Respondents

CONCLUSION

- The finding show that, moderate, and mild iodine deficiency and risk of iodine induced hyperthyroidism were found in 15%, 63% and 1% respectively.
- Proteins were present in urine of 81% of respodent.
- All the household salts in the study area are iodised but only 96% are iodised at levels ≥ 15mg/Kg
- Proteins, ascorbic acid, blood, bilirubin and urobilinogen were detected in urine of 81%, 15%, 9% and 1% of the pupils respectively.

RECOMMENDATION

- Need to check assess common foods in the study areas for the presence of goitrogens
- Encourage the inclusion of iodised salts in wide range of food consumed by the subjects
- Dietary diversification to foods naturally rich in iodine should be promoted through aggressive social marketing in the study area
- Finally, there is a need to establish a national control programme, targeting the population at large for the prevention and treatment of malnutrition in general and IDD specifically

Thanks for Listening