ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH

THE EFFECT OF IODINE DEFICIENCY ON ACADEMIC PERFORMANCE OF SCHOOL CHILDREN IN SODO TOWN, SOUTHERN ETHIOPIA

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Table of Contents

ABBREVIATIONS

AOR- Adjusted Odds Ratio

CDC- Centers for Disease Control and Prevention

CI- Confidence Interval

COR- Crude Odds Ratio

EDHS- Ethiopian Demographic and Health Survey

ICCIDD- International Council for Control of Iodine Deficiency Disorders

IQ- Intelligence Quotient

MOH- Ministry of Health

OR- Odds Ratio

PI- Principal Investigator

SNNPR- Southern Nations Nationalities and Peoples Region

SPSS- Statistical Package for Social Sciences

Tg- Thyroglobulin

TSH- Thyroid stimulating hormone

UI- Urinary iodine

UN - United Nations

UNICEF- United Nations Children's Fund

WHO -World Health Organization

LISTS OF TABLES

ABSTRACT

Background: There are many reasons for children to underperform at school because of poor nutritional status, below average intelligence, socio-cultural environment and other environmental factors. Iodine deficiency disorder is a public health problem worldwide including Ethiopia and it is the major cause of preventable brain damage in children. Although there are studies on iodine deficiency in the country, its effect on academic performance is not well documented.

Objective: This study intended to assess effect of Iodine Deficiency on academic performance of school children in Wolaita Sodo town, Southern Ethiopia.

Methods: School based comparative cross sectional study on a sample population of 270 children with goiter and 264 without goiter was conducted in a purposively selected primary school in Sodo town, Southern Ethiopia from Dec. 2010 to Feb 2011. Total students in each class were examined for the presence of goiter and classified based on WHO recommendation. For every child with goiter, next child without goiter was selected from the same class. Pre-tested structured questionnaire was used to collect data on socio-demographic factors and information on students' academic performance was obtained from the school record. Multivariate logistic regression analysis was employed to see the effect of independent variables on the outcome variable. Ethical clearance was obtained from Research Ethics Committee of School of Public Health, College of Health Sciences, Addis Ababa University.

Result: Among children with goiter higher proportion (54.8%) were females and proportion increase with age. Consuming foods (cabbage and cassava) was significantly associated with goiter (AOR=1.9; 95%CI=1.2, 2.9). The odds of scoring low school performance was higher among, children whose fathers were illiterate (AOR=1.9; 95%CI=1.1, 3.5) and absenteeism of more than four days (AOR=1.5; 95%CI=1.1, 2.21). Goiter was significantly associated with low academic performance (AOR=1.8; 95%CI=1.2, 2.5).

Conclusion and recommendation: Goiter rate is significantly associated with consumption of goiterogens. Presence of goiter has negative effect on academic performance. Awareness on endemic goiter and its impact on school performance and emphasis on prevention and control by concerned bodies is recommended to alleviate the problem.

1. INTODUCTION

1.1 Background

Poor academic achievement has been a major area of concern for educators, parents, and students for at least the past more than three decades (1). There are several reasons for children to underscore at school. These include medical problems, below average intelligence, specific learning disability, attention deficit hyperactivity disorder, emotional problems, a poor socio-cultural home environment, psychiatric disorders, or environmental factors(2).

Nutritional status is major environmental factor that can affect academic performance of school children. The scientific evidence shows that malnutrition in infants and children is a risk factor in the formal educational system. It is important to include nutrition as a determinant of school performance and achievement. Nutritional status among school children has significant adverse effects on school progress. There is direct relationship between prevalence of malnutrition in a country and the contribution by malnourished children to educational wastage. Children who are undernourished and whose learning is slow have difficulties in mastering school material and are among those with high chances of repeating grades and dropping out early from school (3).

Iodine deficiency is a major public health problem for populations worldwide, particularly for pregnant women and young children. They are a threat to the social and economic development of countries. The most devastating outcomes of iodine deficiency are increased perinatal mortality and mental retardation. Iodine deficiency is the greatest cause of preventable brain damage in childhood (4). People living in areas affected by severe iodine deficiency may have an intelligence quotient (IQ) of up to 13.5 points below that of those from comparable communities in areas where there is no iodine deficiency. This mental deficiency has an immediate effect on child learning capacity (5). According to report of the WHO to the 60th World Health assembly (WHA) (May 2007), about 31% (1900.9 million) of the world's population still have insufficient iodine intakes As a result, twenty-two million children globally each year are at risk of impaired intellectual function and lower school performance (6).

The prevalence of iodine deficiency disorder among school children in Ethiopia was 53.3%. The prevalence was higher in females (56.1%) than in males (50.8%) (7). In addition goiter prevalence in four regional states of Ethiopia namely Southern Nation Nationalities and People

(SNNP) which is study area, Oromia, Benshangul-Gumuz and Tigray was greater than 30%, and this indicate severe iodine deficiency. In the rest of the regions except Gambella, the IDD situation was mild to moderate. According to WHO/UNICEF/ICCIDD, this shows iodine deficiency disorder is a major public health problem in Ethiopia (8).

Goiter is the most visible manifestation of IDD. Endemic goiter results from increased thyroid stimulation by thyroid stimulating hormone (TSH) to maximize the utilization of available iodine and thus represents mal adaption to iodine deficiency. Goiter rate is useful to assess long term impact of iodine deficiency disorder (9).

The aim of this study is to assess iodine deficiency disorder based on goiter prevalence and its effect on academic performance of school children in Sodo town southern Ethiopia. Therefore this study will contribute knowledge and understanding of iodine deficiency disorder and its effect on school achievement of children in the area.

1.2 Rationale of The Study

Study population of 6-12 years of age is preferred because of their high vulnerability to goiter, easy accessibility and they are representative of their age group in the community. Identifying the effect of iodine deficiency on academic performance helps policy makers and programmers to design feasible prevention and control measures in the school environment. It will contribute towards understanding of the intellectual cost of iodine deficiency. In addition the study will give relevant ideas that policy makers may use to alleviate educational interferences arising from iodine deficiency.

2. LITERATURE REVIEW

2.1 Nutritional Status and Education

Factors like education of parents, the income of the family, the child's caretaking arrangement, his health and dietary intake, determine in part the child ' s schooling and performance. In developing countries protein energy malnutrition and micronutrient deficiencies are high. Accordingly, in these countries malnutrition, as a risk factor for the educational future of children, should be a major concern for health, nutrition and educational policies (3, 10). Nutritional problems are among major factors that affect learning and school performance. Several studies have explored the relationship between nutritional anthropometric indicators and such school indicators as grade level, age at enrollment, absenteeism, achievement test scores, IQ, and performance on selected cognitive tasks including concentration in the classroom. Many studies revealed significant findings between the nutritional status indicators and cognitive test scores or school performance indicators (10).

Micronutrients that commonly affect school population are iodine deficiency disorder, iron deficiency and vitamin A deficiency. The consequences of IDD are significant in terms of school achievement. Conditions associated with IDD include reduced intelligence, psychomotor retardation, mental and neurologic damage, and cretinism (10).

A study conducted in South Africa showed that there is a positive relationship between nutritional status and educational achievement of English and Mathematical performance in rural children of South Africa grades 4–8. Furthermore, these relationships were neither influenced by age nor by gender (11).

2.2 Iodine Deficiency Disorder

Iodine deficiency disorder is a term used to describe different negative effects of iodine deficiency on people and animals. Iodine is essential micronutrient used to synthesize thyroid hormones. In adequate iodine intake or absorption leads to insufficient production of these hormones, which in turn negatively affects various organs function particularly the heart, liver, kidneys and most devastatingly, the developing brain. In Children it can cause, hypothyroidism, impaired coordination, impaired mental function, lower IQ points, Retarded mental and physical development, and Diminished school performance (12).

Different studies indicated the effect of iodine in intelligence of children. Meta-analysis of studies conducted in China revealed that intelligence damage of children exposed to sever iodine deficiency is about 12.45IQ points loss (13). A study done in Benin showed that children with increased urinary iodine concentrations had a significantly greater increase in performance on the combination of mental tests (14), in Mexico moderate iodine deficiency in school children was associated with 4.26 times higher risk of low IQ (15), in Malaysia mental performance of school children following iodized oil supplementation showed significant increase in proportion (16).

A study done in Tanzania to assess iodine deficiency and schooling attainment suggested, reducing fetal IDD has significant benefits for child cognition: Protection from IDD in utero is associated with 0.36 years of additional schooling. Furthermore, the effect appears to be substantially larger for girls. There is no indication that iodized oil capsules improved rates of illness or school absence due to illness, suggesting that iodized oil capsule improves schooling through its effect on cognition rather than its effect on health. It also indicated a strong negative influence of total goiter rate and strong positive influence of salt iodization on female school participation (17).

A study conducted in India showed higher prevalence of goiter among females (55.1%) when compared with males (47.2%) and increase in prevalence with increase in age (18). Another study in different settings of India showed higher prevalence among females and highest during adolescent (19).

2.3 Indicators of Iodine Deficiency Disorder

Common indicators of iodine deficiency disorder are: urinary iodine, thyroid size and blood constituents (20).

Urinary Iodine- urinary iodine excretion is a good marker of very recent dietary iodine intake. It is the most useful indicator because it is reflective of the current intake of iodine in the diet. Studies have convincingly demonstrated that a profile of iodine concentrations in morning or other casual urine specimens (child or adult) provides an adequate assessment of a population's iodine nutrition, provided a sufficient number of specimens are collected. Round the clock urine samples are difficult to obtain and are not necessary.

Table 1 Epidemiological criteria for assessing iodine nutrition based on median urinary iodine concentrations of school-age children (≥6 years)

Median urinary iodine (µg/l)	Iodine intake	Iodine status
<20	Insufficient	Sever iodine deficiency
20-49	Insufficient	Moderate iodine deficiency
50-99	Insufficient	Mild iodine deficiency
100-199	Adequate	Adequate iodine nutrition
200-299	Above requirement	More than adequate intake
>=300	Excessive	Risk of adverse health effects

Thyroid size- This is determined by inspection and palpation of thyroid gland. Ultrasonography provides more precise information. Although it lacks sensitivity to acute changes of iodine intake thyroid size is more useful in assessment of severity and long term impact of iodine deficiency disorder. Simple classification of goiter by palpation indicated as

Grade 0- No palpable or visible goiter

Grade 1- A goiter that is palpable but not visible when the neck is in the normal position.

Grade 2- A swelling in the neck that is clearly visible when the neck is in a normal position.

It is recommended that total goiter rate of 5% or more in school children from 6-12 years of age shows public health problem in the population

Table 2 Epidemiological criteria for assessing the severity of IDD based on the prevalence of goiter in school-age children.

Total goiter rate	Degree of IDD
0.0-4.9%	None
5.0-19.9	Mild
20-29.9	Moderate
>=30	Sever

Blood constituents- Thyroid stimulating hormone (TSH) and Thyroglobulin (Tg) can serve as surveillance indicators.

2.4 Ethiopian Situation of Iodine Deficiency Disorder

According to a situational analysis carried out by the Ministry of Health (MOH) and the /United Nations Children's Fund (UNICEF) in 1993, 42 million people (78%) of the total population of Ethiopia are exposed to iodine deficiency, 35 million (62%) are iodine deficient, 14 million (26%) have goiter and at least one in 1000 people is cretin; with about 50,000 prenatal deaths (21).

Studies conducted in different parts of Ethiopia indicated iodine deficiency is public health problem of the country. Study on prevalence of goiter in school children revealed 39.9% of total goiter rate and only 4.2% of the households had iodized salt (22). Another study in Gamo Gofa, Ethiopia showed goiter rate of 51.7% , significant association between familiar tendency of goiter between parents and their children and consumption of halleko (moringa stenopetela) leafy vegetable more than twice a day is significantly associated with goiter (23). In Ethiopia according to EDHS 2005, only 20% of the households had salts that are adequately iodized and in southern Ethiopia only about 18.5% (24).

Study conducted on endemic goiter in Ethiopian Jews revealed that food goiterogens were major factor for goiter and prevalence was higher among females (25). Another study in immigrant Ethiopian children in Israel showed 56.7% and 72.2% prevalence of goiter among males and females respectively and progressive increase with age until puberty, in addition goiterogenic food and iodine deficiency were associated with goiter (26).

2.5 Assessment of Cognitive Performance in Children

The accurate assessment of cognitive performance in children is critical for detecting the effects of micronutrient deficiency or supplementation on the developing brain and its functions. Selection of culturally appropriate measures that are sensitive enough to detect cognitive changes is needed. Methods like assessment of attention, speed of information processing, learning and memory, executive functions, intelligence (e.g. Intelligence Quotient), academic achievement can be used to evaluate cognitive performance in children. Academic achievement can be assessed using school grades and teacher rating of school performance. In addition, there are a number of instruments that assess specific learning outcomes such as reading, spelling, arithmetic, and general knowledge. Selection of tests needs to be undertaken with care to ensure that they tap learning outcomes appropriate to the child’s country and school system (27).

Study conducted among Chinese children showed sex of the child, number of siblings, educational level of both mother and father affect academic performance (28).

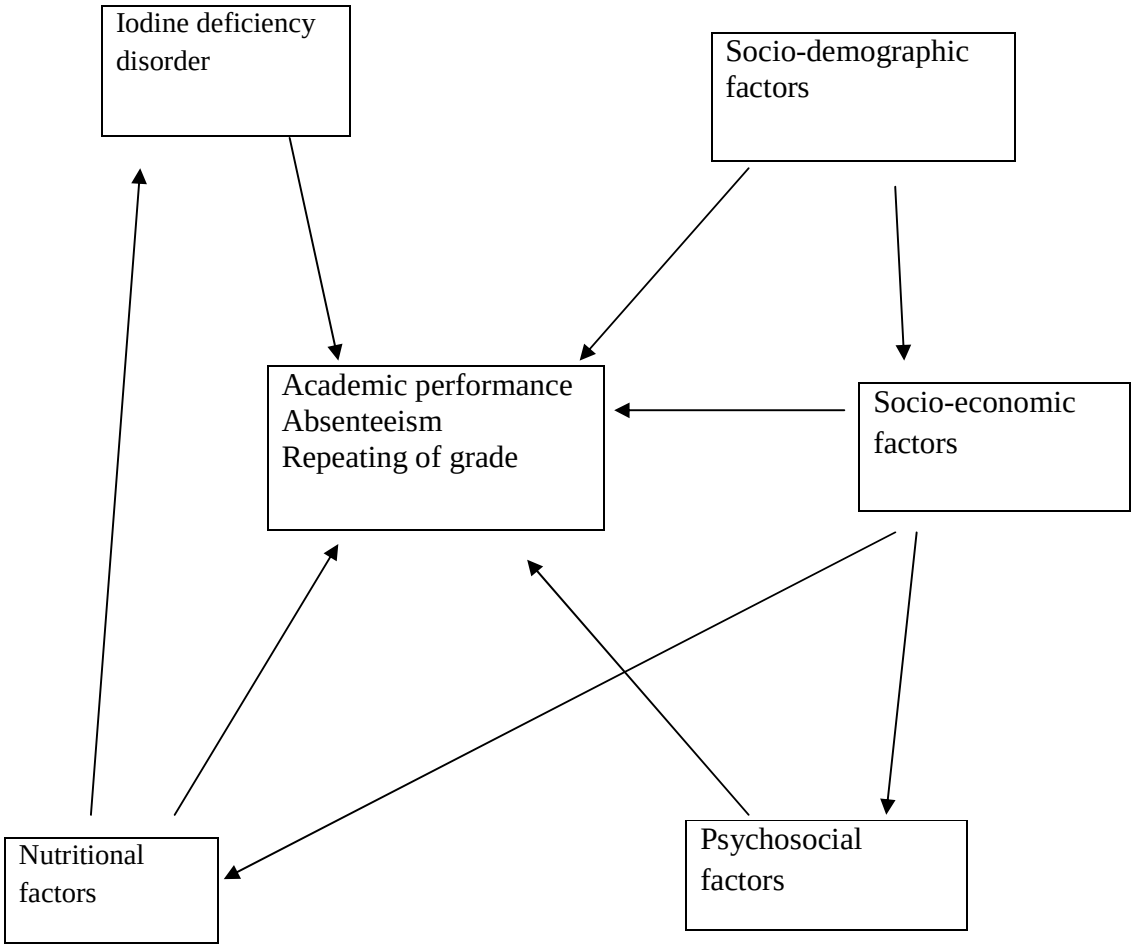

Fig 1. Conceptual frame work

3. OBJECTIVES

3.1 General Objective

To assess the effect of Iodine Deficiency on academic performance of school children.

3.2 Specific Objectives

-To assess the effect of iodine deficiency on academic performance of school children

-To assess factors affecting iodine deficiency disorder in Wolaita Sodo

4. METHODS

4.1 Study Area and Period

The study was conducted in Wolaita Sodo town which is the capital of Wolaita zone from December, 2010 up to February, 2011.

Wolaita Zone is one of the 13 zones in Southern Nations Nationalities and Peoples Region. It is centrally located in the region, bordered by Kambata and Tembaro and Hadiya Zone in the north, Gamogofa Zone in the south, Dawro zone in the west, Sidama zone and Oromiya region in the east (29).

The study area, Wolaita Sodo town, is 330 kms South of Addis Ababa and 160 kms west of the regional capital, Hawassa. The total population of the town is estimated to be 76,780, of which 40,495 are males and 36,285 and the average family size is 4.2. Altitude of study area is 1501-3000m above sea level with annual rain fall 1695mm.Common staple foods in the area are cereals, roots, tuber crops and vegetables.

The town has 3 high schools ,10 primary and 19 Kindergarten (KG) schools (30, 31).

4.2 Study Design

School based comparative Cross sectional study

4.3 Study Population

4.3.1 Source population

Source population were school children.

4.3.2 Sample population

Sample population were school children in primary school. As per recommendations of WHO/UNICEF/ICCIDD, the school children in the age group 6-12 yrs from both sexes were selected, because of their high vulnerability to goiter, easy accessibility and because they are representative of their age group in the community (32).

Inclusion criteria- children who are in the age range 6-12 years were included in the study.

Children who have stayed in the town for at least six months.

4.3.3 Sample size calculation

The sample size was calculated using the following two sample proportion formula: (33).

$$\mathbf{n_1} = \frac{\left[Z\alpha/2\sqrt{\left(1+\frac{1}{r}\right)P(1-P)} + Z\beta\sqrt{P1(1-P1)+\frac{P2(1-P2)}{r}}\right]^2}{(P1-P2)^2} \quad , \quad \mathbf{n_2 = n_1 r}$$

Where

$\mathbf{n_1}$= sample size of children with goiter, $\mathbf{n_2}$=sample size of children without goiter.

$\mathbf{p_1}$= proportion of below average academic performance among school children with goiter, $\mathbf{p_2}$=proportion of below average academic performance among those children without goiter

P= average proportion

$\boldsymbol{\alpha}$=level of significance=0.05

$\mathbf{1-\beta}$=desired power=80%

r=ratio of with goiter to without goiter = n_1/n_2= 1:1

$\mathbf{Z\beta}$= coefficient at level of power=0.84

$\boldsymbol{Z\alpha/2}$ =coefficient at level of significance=1.96

Taking proportions 0.19 and 0.30 respectively of below average score in Primary School Leaving Examination Test (PSLET) among those without IDD and with IDD from study in Tanzania (17), the sample size was calculated as 257 for those with goiter and 257 for those without goiter. Considering a non response rate of 5% the sample size became 270 for n1 and 270 for n2.

4.3.4 Sampling procedure

One primary school was selected out of 10 primary schools from the town by purposive sampling technique. Number and list of students were obtained from school. Total students in each class were examined for presence of goiter and classified based on WHO recommendation. Children who have goiter were given identification number. For every child with goiter, next nearest child without goiter was selected from the same class.

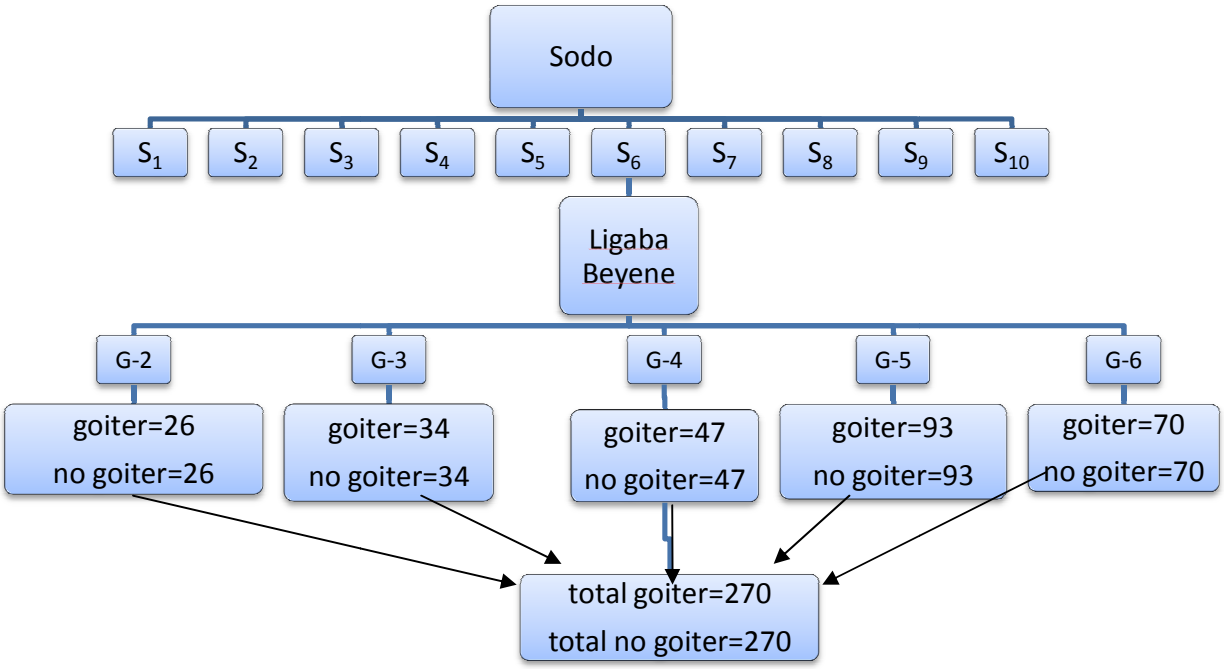

Fig 2. Sampling procedure

4.4 Data Collection Tools and Techniques

4.4.1 Interview on socio-demographic variables

The data was collected using a pre-tested structured questionnaire prepared by reviewing prior study and other materials on the topic. The questionnaire was translated into Amharic and back to English to ensure its consistency. The interview was conducted by five nurses who were trained for two days. The principal investigator gave training for data collectors. Data collectors approached children by introducing themselves, and then they collected information after explaining the purpose of their visit by reading the information sheet.

4.4.1 Reviewing documents or records

Standardized check list was used to gather information from the school about the students' grade report, grade averages, and days of absenteeism from the school. Reviewing documents or records was done by the principal investigator.

4.4.2 Goiter survey method

All the students of the recommended age group who present on the days of survey were clinically examined for the enlargement of thyroid (goiter) by three trained health officers to minimize inter-individual variability using palpation method as per recommendations. Goiter grading was done as per recommendation of WHO/UNICEF/ICCIDD [Grade 0: no goiter; Grade1: thyroid palpable but not visible; Grade 2: thyroid visible with neck in normal position].

4.4.3 Data quality management

Data quality assurance was in place during questionnaire designing, data collection, data entry. Questionnaire was objective based, logically sequenced, free of scientific terms, non-leading and pretested. The data collectors and supervisors were provided with intensive training on the objectives of the study and on areas like thyroid examination to minimize inter-individual variability. The collected data were checked by the Principal investigator on daily basis for any incompleteness and/or consistency and possible correction was made. During data entry attention was given to avoid double entry and data cleaning was considered.

4.5 Data Processing and Analysis

Data were entered using Epi-Info version 3.5.1 and exported to SPSS for analysis. Univariate and bivariate analysis were used to describe the data according to some important characteristics of study subjects. Multivariate logistic regression analysis was done to see the effect of independent variables on the outcome variables. The data were summarized in percentages and tables.

The evaluation of student's academic performance was made by addition of grades of a semester and then divided by the number of subjects taken to calculate average score.

4.6 Variables

Dependent variable- Academic performance

Independent variables- Age, Sex, Socio-economic status of parents, common staple foods, Psychosocial variables, goiter presence

4.7 Operational Definitions

Goiter-Thyroid gland which has lateral lobes with a volume greater than the terminal phalanges

Endemic goiter- goiter prevalence greater than 5% among population.

Academic performance – It is a school level summary measure based on the average score of student on the standard of school achievement test.

High score – a score above mean of the students' grade.

Low score – a score below mean of the students' grade.

Absenteeism – Students' non-attendance during school hour from school.

Repeating – students' failed to pass the last academic year achievement test (failed to pass the last calendar year examination).

4.8 Ethical Considerations

Ethical clearance was obtained from the research ethics committee of School of Public Health and Institutional Review Board of College of Health Science, Addis Ababa University. Permission was obtained from Sodo town Health and Education offices. Because of difficulty of meeting the student's family, the investigator discussed the ethical issues with the school officials. The study will have no harm to the students, their families and school environment. Therefore, involvement of parents was not considered as prerequisite in this study. Informed consent was obtained from study participants. The freedom of children to participate or not participate in the study was explained and respected. Any child with goiter during data collection was advised to visit the nearby health facility to obtain possible advice and management.

4.9 Dissemination Plan

The output of this study will be disseminated to the College of Health Sciences, School of Public Health as partial fulfillment of Master's degree in public health. It will also be disseminated to Sodo town Health Office, Sodo town Education Office and other concerned governmental and non-governmental organizations. Attempts will be made to publish the article in a peer reviewed journal and to make presentations in scientific conferences.

5. RESULT

5.1 Socio-demographic Characteristics of Study Participants

In this study total of 534 participants (270 children with goiter and 264 without goiter) were included, making the response rate 98.9%. All the participants were from Ligaba Beyene Elementary school. The distribution of study subjects by selected socio-demographic characteristics presented in table 1.

It is worth noting that students with goiter and without goiter are comparable in basic socio-demographic variables except paternal occupation which was statistically significantly different.

Among total participants, 122 (45.5%) of children with goiter and 123 (46.6%) of without goiter were male children. The mean (± SD) age of respondents with goiter and without goiter was 11.0(±1.1) and 10.9(±1.2) years respectively.

The participants were from grade 2nd to 6th and relatively larger number, 93 (34.4%) of children with goiter and 81 (31.4%) without goiter were from grade 5th. Regarding place of birth, the majority, 243(90.1%) of children with goiter and 232 (87.9%) of without goiter were born in Wolaita, while 13 (4.8%) of with goiter and 11 (4.2%) of without goiter were born in Gamo-Gofa.

Concerning ethnic background, 220 (81.5%) of those with goiter and 223 (84.5%) of without goiter were from Wolaita, 30 (11.1%) of with goiter and 18 (6.8%) of without goiter from Amhara, and 15 (5.6%) of with goiter and 17(6.4%) of without goiter from Guraghe ethnic group. Religiously, 140 (51.9%) of children with goiter and 138 (52.3%) of without goiter were from protestant, 99 (36.7%) of with goiter and 94 (35.6%) of without goiter from Orthodox, 14 (5.2%) of with goiter and 16 (6.1%) of without goiter from Muslim.

Table1 Socio-demographic profile of students in Ligaba Beyene Elementary School, Sodo Town, Southern Ethiopia, March, 2011

Variables	With Goiter n, (%)	Without Goiter n, (%)	Total n, (%)	p-value
Sex				0.74
Male	122 (45.2)	123 (46.6)	245 (45.8)	
Female	148 (54.8)	141 (53.4)	289 (54.2)	
Age				
6-9	27 (9.9)	29 (11)	56 (10.5)	0.71
10-12	243 (90.1)	235 (91)	478 (89.5)	
Grade				
2	26 (9.6)	28 (10.6)	54 (10.1)	0.94
3	34 (12.6)	37 (14.0)	71 (13.3)	
4	47 (17.4)	45 (17.0)	92 (17.2)	
5	93 (34.4)	83 (31.4)	176 (33.0)	
6	70 (25.9)	71 (26.9)	141 (26.4)	
Pace of birth				
Wolaita	243 (90)	232 (87.9)	475 (89.0)	0.41
Gamo-Gofa	13 (4.8)	11 (4.2)	24 (4.5)	
Others	14 (5.2)	21 (8.0)	35 (6.5)	
Ethnicity				
Wolaita	220 (81.5)	223 (84.5)	443 (83.0)	0.36
Amhara	30 (11.1)	18 (6.8)	48 (9.0)	
Guraghe	15 (5.6)	17 (6.4)	32 (6.0)	
Others	5 (1.9)	6 (2.3)	11 (2.0)	
Religion				
Protestant	140 (51.9)	138 (52.3)	278 (52.0)	0.98
Apostolic	12 (4.4)	12 (4.5)	24 (4.5)	
Orthodox	99 (36.7)	94 (35.6)	193 (36.1)	
Muslim	14 (5.2)	16 (6.1)	30 (5.6)	
Catholic	5 (1.9)	4 (1.5)	9 (1.7)	
Total	270 (50.6)	264 (49.4)	534 (100.0)	

*statistical significance at $p<0.05$ ** significance at $p<0.01$

Regarding educational status of fathers 32(11.9%) of children with goiter and 25(9.5%) of children without goiter had illiterate father. Fifty three (19.6%) of children with goiter and 39(14.8%) without goiter had illiterate mothers. Concerning occupation of fathers of the respondents, 26(9.6%) of children with goiter and 14(5.3%) without goiter were teachers. Mothers of one hundred thirty four (49.6%) of children with goiter and 128 (48.5%) of children without goiter were house wives.

Table 2. Socio-demographic profile of parents of children in Ligaba Beyene Elementary School, Sodo Town, Southern Ethiopia, March, 2011

Variables	With goiter (n,%)	Without goiter (n,%)	Total (n,%)	p-value
Father's education				
Illiterate	32 (11.9)	25 (9.5)	57 (10.7)	0.23
Write/Read	5 (1.9)	5 (1.9)	10 (1.9)	
Primary	54 (20.0)	65 (24.6)	119 (22.3)	
Secondary	87 (32.2)	99(37.5)	186 (34.8)	
College/Univ	92 (34.1)	70 (26.5)	162 (30.3)	
Mother's education				
Illiterate	53 (19.6)	39 (14.8)	92 (17.2)	0.83
Write/Read	9 (3.3)	14 (5.3)	23 (4.3)	
Primary	104 (38.5)	105 (39.8)	209 (39.1)	
Secondary	77 (27.5)	72 (27.3)	149 (27.9)	
College/Univ	27 (10.0)	34 (12.9)	61 (11.4)	
Father's occupation				
Teacher	26 (9.6)	14 (5.3)	40 (7.5)	0.01*
Farmer	15 (5.6)	17 (6.4)	32 (6.0)	
Merchant	76 (28.1)	81 (30.7)	157 (29.4)	
Other Govt employee	94 (34.8)	83 (31.4)	177 (33.1)	
Private/NGO	45 (16.7)	60 (22.7)	105 (19.7)	
Others	14 (5.2)	9 (3.4)	23 (4.3)	
Mother's occupation				
House wife	134 (49.6)	128 (48.5)	262 (49.0)	0.62
Merchant	72 (26.7)	64 (24.2)	136 (25.4)	
Other Govt. employee	28 (10.4)	30 (11.4)	58 (10.8)	
Private/NGO	18 (6.7)	24 (9.1)	42 (7.8)	
Daily laborer	8 (3.0)	12 (4.6)	20 (3.7)	
Others	10 (3.7)	6 (2.3)	16 (3.0)	
Total	270(50.6)	264(49.4)	534(100)	

*statistical significance at $p<0.05$ ** significance at $p<0.01$

Two hundred eighteen (80.7%) of children with goiter and 215 (81.4%) of children without goiter had access to radio and 188 (69.6%) with goiter and 184 (69.7%) without goiter had access to television set. One hundred eighty one (67.0%) of with goiter and 189 (71.6%) of without goiter lived in their own house while the rest in rent house. Regarding family size 137 (50.7%) of children with goiter and 121 (45.8%) of without goiter lived with family size larger than five.

Concerning water source 223(82.6%) of those with goiter and 236(89.4%) of without goiter had access to tap water. Two hundred twenty seven (84.1%) of children with goiter and 196 (74.2%) children without goiter reported goitrogenic foods like cabbage, cassava as their common meals. Majority of the study participants, 166(61.5%) of children with goiter and 167(63.3%) of without goiter preferred to study at home.

Table 3 Socio-economic status of parents/guardians of students in Ligaba Beyene Elementary School, Sodo Town, Southern Ethiopia, March, 2011

Variables	With Goiter n, (%)	Without Goiter n, (%)	Total n, (%)	p-value
Availability of Radio	218(80.7)	215(81.4)	433 (81.1)	0.83
Yes	52(19.3)	49(18.6)	101 (18.9)	
No				
Availability of TV				
Yes	188(69.6)	184(69.7)	372 (69.7)	0.98
No	82(30.4)	80(30.3)	162 (30.3)	
House owner ship				
Our own	181(67.0)	189(71.6)	370 (69.3)	0.25
Rent	89(33.0)	75(28.4)	164 (30.7)	
Family size				
<=five	133(49.3)	143(54.2)	276 (51.7)	0.25
>five	137(50.7)	121(45.8)	258 (48.3)	
Water source				
Tap	223(82.6)	236(89.4)	459 (86.0)	0.03*
Bono	11(4.1)	5(1.9)	16 (3.0)	
River	6(2.2)	9(3.4)	15 (2.8)	
Well	30(11.1)	14(5.3)	44 8.2)	
Common food				
Goiterogenic	227(84.1)	196(74.2)	423 (79.2)	<0.01**
(cabbage, cassava)	43(15.9)	68(25.8)	111 (20.8)	
Non-goiterogenic				
Home comfortable to study				
Yes	247(91.5)	253(95.8)	500 (93.6)	o.02*
No	23(8.5)	11(4.2)	34 (6.4)	
Preferred place of study				
Home	166(61.5)	167(63.3)	333 (62.4)	0.52
School	92(34.1)	90(34.1)	182 (34.1)	
Open field	12(4.4)	7(2.7)	19 (3.5)	
Total	270 (50.6)	264 (49.4)	534 (100.0)	

5.2 Psychosocial Conditions of Study Participants

Majority of the respondents, 249(92.2%) of with goiter and 246(93.2%) of without goiter reported to have good relationships with their peers and 263(97.4%) of with goiter and 260(98.5%) of without goiter had good relationships with their families. One hundred seventy (63%) of respondents with goiter and 159 (60.2%) of respondents without goiter had ever been bullied by one of their families and 128(47.4%) of with goiter and 140 (53%) of without goiter had ever been punished at school. Shortage of educational material was reported by 112 (41.5%) of students with goiter and 77 (29.2%) of students without goiter. Forty four (16.7%) of respondents with goiter and 51 (19.3%) of respondents without goiter reported that their family had ever quarreled with each other while they were studying at home. Twenty four(8.9%) of children with goiter and 29 (11%) were disturbed by families quarrel.

Table 4 Psycho-social and behavioral characteristics of students in Ligaba Beyene Elementary School, Sodo Town, Southern Ethiopia, March, 2011

Variables	With Goiter n, (%)	Without Goiter n, (%)	Total n, (%)	p-value
Good relation with peers	249(92.2)	246(93.2)	495 (92.7)	0.67
Yes	21(7.8)	18(6.8)	39 (7.3)	
No				
Good relation with families	263(97.4)	260(98.5)	523 (97.9)	0.38
Yes	7(2.6)	4(1.5)	11 (2.1)	
No				
Ever been bulled by families				
Yes	170(63.0)	159(60.2)	329 (61.6)	0.51
No	100(37.0)	105(39.8)	205 (38.4)	
Punished at school				
Yes	128(47.4)	140(53.0)	268 (50.2)	0.19
No	142(52.6)	124(47.0)	266 (49. 8)	
Study night				
Yes	258(95.6)	258(97.7)	516 (96.9)	0.16
No	12(4.4)	6(2.3)	18 (3.1)	
Work load at home				
Yes	57(21.1)	40(15.2)	97 (18.2)	0.05
No	213(78.9)	224(84.8)	437 (81.8)	
Families encourage				

families encourage				
Education of children	248(91.9)	247(93.6)	495 (92.7)	0.44
Yes	22(8.1)	17(6.4)	39 (7.3)	
No				
Shortage of Educa.				
Material				
Yes	112(41.5)	77(29.2)	189 (35.4)	<0.01**
No	158(58.8)	187(70.8)	345 (64.6)	
Family quarrel				
Yes	45(16.7)	51(19.3)	96 (18.0)	0.42
No	225(83.3)	213(80.7)	438 (82.0)	

5.3 Academic Performance of Study Subjects

Average score of students for both groups was 70 percent. Significantly more students with goiter had academic score that is below the average when compared to those without goiter (57% versus 41.3%, p-value<0.01). Absenteeism from class was relatively higher among students with goiter than without goiter (34.1% and 27.3% respectively).

5.4 Factors Associated With Goiter

Children with goiter and without goiter were compared with some key variables.

Results of bivariate logistic regression analysis showed that using drinking water from river is positively and significantly associated with presence of goiter (COR=2.2; 95%CI=1.1, 4.3) as compared to using tap water. Children who were consuming common goitrogens like cabbage and cassava had higher odds of developing goiter (COR=1.8; 95%CI=1.1, 2.8) than children who did not use common goitrogens as their usual diet (table 6).

Other variables age, sex, place of birth, educational status of father and mother were found to have no significant association with goiter in the bivariate analysis.

Variables which were identified to have significant association (at significance level of 0.05) with goiter in the bivariate regression model were entered in to stepwise forward multivariate regression. In multivariate logistic regression model, common goitrogenic food (AOR=1.9; 95%CI=1.2, 2.9) and drinking water from river (AOR=2.5; 95%CI=1.2, 4.9) had independent association with goiter (see Table 5)

Table 5. Association of socio-demographic variables with goiter among school children in Wolaita Sodo, 2011

Variables	Goiter status of children		Crude OR (95%CI)	Adjusted OR (95%CI)
	With Goiter n,(%)	Without Goiter n,(%)		
Age				
6-9	27(9.9)	29(11.0)	1.0	1.0
10-12	243(90.1)	235(91.0)	1.1 (0.6, 1.9)	1.2(0.7, 2.2)
Sex				
Male	122(45.2)	123(46.6)	1.0	1.0
Female	148(54.8)	141(53.4)	1.0 (0.7, 1.4)	1.0(0.7, 1.4)
Place of birth				
Wolaita	243(90)	232(87.9)	1.5 (0.7, 3.1)	1.4(0.6, 2.9)
Gamo-Gofa	13(4.80	11(4.2)	1.7(0.6, 5.0)	1.5(0.5, 4.4)
Other	14(5.2)	21(8.0)	1.0	1.0
Water source				
Tap	223(82.6)	236(89.4)	1.0	1.0
Bono	11(4.1)	5(1.9)	2.3 (0.7, 6.8)	2.4(0.8, 7.3)
River	6(2.2)	9(3.4)	2.2 (1.1, 4.3)*	2.5(1.2, 4.9)*
Well	30(11.1)	14(5.3)	0.7 (0.2, 2.0)	0.7(0.2, 2.2)
Food				
Common goiterogens	227(84.1)	196(74.2)	1.8 (1.1, 2.8)*	1.9(1.2, 2.9)*
Not goiterogens	43(15.9)	68(25.8)	1.0	1.0
Fathers education				
Illiterate	37(13.7)	30(11.4)	1.2 (0.7, 2.0)	1.1(0.6, 1.9)
Literate	233(86.3)	234(88.6)	1.0	1.0
Mothers education				
Illiterate	62(22.9)	53(20.1)	1.1 (0.7, 1.7)	1.1(0.7, 1.8)
Literate	208(87.1)	211(79.9)	1.0	1.0

*statistical significance at $p<0.05$

5.5 Factors Associated with Academic Performance

The effects of different variables were tested for their association with academic performance in binary logistic analysis (table 6).

Children whose fathers did not follow formal education (COR=2.5; 95%CI=1.4, 4.3), mothers did not follow formal education (COR=1.8; 95%CI=1.1, 2.7), home did not comfortable to study (COR=2.4; 95%CI=1.1, 5.3), absenteeism from class five or more times (COR=1.5; 95%CI=1.0, 2.2) and presence of goiter (COR=1.8; 95%CI=1.3, 2.6) were associated with low school performance.

Other demographic and psychosocial variables included in the study were not associated significantly with academic performance.

All variables that have association (at significance level of 0.05) with outcome variable in the bivariate analysis were included in the multivariate regression model.

Fathers education (AOR=1.9; 95%CI=1.1, 3.5), absenteeism (AOR=1.5; 95%CI=1.1, 2.2) presence of goiter (AOR=1.8; 95%CI=1.2, 2.5) had independent association with academic performance.

Children whose fathers did not attend formal education were 1.9 times more likely to have less academic performance than those whose fathers attended formal school. Students who had $\geq$5 days of absenteeism from the school were 1.5 times more likely to be lower in their academic performance than those with <5 days of absenteeism.

Children who had goiter were 1.8 times more likely to have low academic performance than those who did not have goiter.

Table 6. Predictors of academic performance among school children in Wolaita Sodo, 2011

Variables	Academic performance		Crude OR (95%CI)	Adjusted OR (95%CI)
	Below average n,(%)	Above average n,(%)		
Age				
6-9	28(10.6)	28(10.3)	1.0	1.0
10-12	235(89.4)	243(89.7)	0.9(0.5, 1.6)	1.0(0.6, 1.9)
Sex				
Male	113(43.0)	132(48.7)	1.0	1.0
Female	150(57.0)	139(51.3)	1.2(0.8, 1.7)	1.1(0.8, 1.6)
Fathers education				
Illiterate	46(17.5)	21(7.7)	2.5(1.4, 4.3)*	1.9(1.1, 3.5)*
Literate	217(82.5)	250(92.3)	1.0	1.0
Mothers education				
Illiterate	70(26.6)	45(16.6)	1.8(1.1, 2.7)*	1.5(0.9, 2.4)
Literate	193(73.4)	226(83.4)	1.0	1.0
Availability of radio				
Yes	210(79.8)	223(82.3)	1.0	1.0
No	53(20.2)	48(17.7)	1.1(0.7, 1.8)	0.9(0.5, 1.4)
Availability of TV				
Yes	173(65.8)	199(73.4)	1.0	1.0
No	90 (34.2)	72(26.6)	1.4(0.9, 2.0)	1.1(0.7, 1.7)
Family size				
<=5	149(56.7)	127(46.9)	1.0	1.0
>5	114 (43.3)	144(53.1)	1.4(1.1, 2.0)*	1.4(0.9, 2.0)
Home comfortable to study				
Yes	240(91.3)	260(95.9)	1.0	1.0
No	23(8.7)	11(4.1)	2.4(1.1, 5.3)*	2.0(0.9, 4.5)
Preferred site of study Home	165(62.7)	168(62.0)	1.0	1.0
School	89(33.8)	93(34.3)	0.9(0.6, 1.3)	0.91(0.6, 1.3)
Open field	9 (3.4)	10(3.7)	0.9(0.3, 2.3)	0.77(0.2, 2.0)
Good relation with				

good relation with peers	Yes	242(92.0)	253(93.4)	1.0	1.0
	No	21(8.0)	18(6.6)	1.2(0.6, 2.3)	1.2(0.6, 2.4)
Good relation with families					
	Yes	257(97.7)	266(98.2)	1.0	1.0
	No	6 (2.3)	5(1.8)	1.2(0.3, 4.1)	1.0(0.2, 3.6)
Do you study night					
	Yes	252(95.8)	264(97.4)	1.0	1.0
	No	11(4.2)	7(2.6)	1.6(0.6, 4.3)	1.3(0.5, 3.6)
Have you had work load					
	Yes	54(20.5)	42(15.5)	1.4(0.8, 2.1)	1.3(0.8, 2.2)
	No	209(79.5)	229(84.5)	1.0	1.0
Families encourage edu.					
	Yes	244(92.8)	251(92.6)	1.0	1.0
	No	19(7.2)	20(7.4)	0.9(0.5, 1.8)	0.9(0.4, 1.8)
Shortage of educational material					
	Yes	97(36.9)	92(33.9)	1.1(0.7, 1.6)	0.9(0.6, 1.4)
	No	166(63.1)	179(66.1)	1.0	1.0
Goiter status					
	No	109(41.4)	155(57.2)	1.0	1.0
	Yes	154 (58.6)	116(42.8)	1.8(1.3, 2.6)*	1.8(1.2, 2.5)*
Absenteeism					
	<5	170(64.6)	200(73.8)	1.0	1.0
	≥5	93(35.4)	71(26.2)	1.5(1.1, 2.2)*	1.5(1.1, 2.3)*
Total		263(100.0)	271(100.0)		

*****significant at $p<0.05$

6. DISCUSSION

The current study presents findings from school based comparative cross sectional study that aimed at determining the effect of iodine deficiency disorder on academic performance of school children. In this study children from 6-12 years of age were included, since they are highly susceptible to iodine deficiency disorders, it is easy to access them and these children can represent the same age groups in their communities.

In this study, among children with goiter, relatively higher proportions were females and the proportion of children with goiter increased with age. This was consistent with studies done in India (18, 19), Israel (26), and Ethiopia (7) on the prevalence of goiter.

Presence of goiter is significantly associated with using drinking water from river compared to those using tap water. The odds of developing goiter among those who used river was 2.5 times higher as compared to those who used piped water. This might be because of variation in iodine concentration of the area.

Consumption of common goitrogenic foods like cabbage and cassava at least once daily was independently associated with palpable or visible goiter. The odds of developing goiter was 1.9 times higher among those who consumed foods like cabbage and cassava daily when compared to those who had not used. Similar results were obtained in other studies in Gamo-Gofa, Ethiopia (23), and Israel (25, 26).

Age and sex of children were not significantly associated with academic performance of children; which is in agreement with findings from a study conducted in South Africa (11).

Educational status of mother is associated with school performance of children in study conducted among Chinese children (28). In this study educational status of mother was significantly associated with school performance of children in bivariate analysis; but the association disappeared when the effect of other variables was controlled in multivariate analysis.

Fathers' educational status was independently associated with school performance of children. In the present study, children whose father did not follow formal education had higher odds of scoring below average grade when compared with those whose fathers attended formal education, which is consistent with a result from study in China (28).

In this study, family size had no significant association with academic performance of children, which is inconsistent with the result from study in China to determine the academic outcomes with siblings and without siblings (28). This difference might be due to socio-cultural variations among study subjects.

In the bivariate analysis children reported that their home was not comfortable to study were 2.4 times more likely to have below average score when compared to those whose home was comfortable. However the association disappeared in multivariate analysis.
Number of days of absenteeism from school was independently associated with school performance. Students who had more than four days of absenteeism were 1.5 times more likely to score below average grade when compared to those who had less than four days absenteeism. This might be because of missing of lessons in the class by those who had poor attendance.

In the present study, presence of goiter in school children was independently associated with school performance. Children who had goiter had higher odds of getting below average score in school grade when compared to those who did not have goiter. Other studies conducted in China (13), Mexico (15), Malaysia (16) and Tanzania (17) revealed similar negative effect of iodine deficiency disorder on mental performance of school children.

Generally, the findings of the present study are important in pointing out the negative influence of iodine deficiency disorders on intellectual potential of children. It could provide helpful insights for policy makers and program implementers to design feasible prevention and control measures in school environment. It is worthy to note that there are some limitations which warrant careful interpretation of the findings of this study which are elaborated in the limitation section.

Strength and limitation of the study

Strength of the study:

- The study tried to assess largely unexplored area of the research in Ethiopia, namely, assessed the effect of Iodine Deficiency Disorders on academic performance.
- Use of comparison group enabled in depth analysis of factors which could affect academic performance among school children.

Limitation of the study:

- It is possible that variables such as genetic variations which were not measured in this study can be potential confounders.
- Lack of standard IQ testing system which is designed in our country context, culturally appropriate and sensitive enough to detect cognitive changes.

7. CONCLUSION AND RECOMMENDATION

7.1 Conclusion

- The likely hood of having lower school performance was significantly higher among students with goiter.
- In this study, there was no significant difference in academic performance between different age groups, sex, family size and other variables considered.
- Educational status of fathers and absenteeism from class were possible factors associated with poor school performance
- The relative proportion of goiter was higher among female students and the proportion increase with age
- Goiter rate in the study area was significantly associated with consumption of goiterogens like cabbage and cassava.

7.2 Recommendations

Based on the findings the following recommendations are forwarded.

Government / community

- Additional emphasis on prevention and control of iodine deficiency disorders like sustainable universal salt iodization program should be implemented.
- Promoting distribution and utilization of iodized salt in the community
- Health education and awareness creation of community on iodine deficiency disorders
- Basic education programs for adults who cannot attend formal education

School officials

- Awareness should be created on the negative impacts of goiter (IDD) on academic performance
- School officials should work with health sector and families in order to improve educational status of children

Further research

- Further school based studies are needed to see the effect of Iodine Deficiency Disorder on school performance by longitudinal design.

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ANNEX I_ QUESTIONNAIRE

1. Information sheet: This sheet is to be read for the participants of the study.

Good morning/afternoon, my name is --------- and I am one of the data collectors for the study being conducted by Addis Ababa University, College of Health Sciences, School of Public Health on effect of iodine deficiency disorder on academic performance of school children Wolaita Sodo town. You are selected scientifically to be participant of this study if you give me consent after you have understood the following information sheet:

Title of the study: A comparative cross sectional study on effect of iodine deficiency disorder on academic performance of school children in Wolaita Sodo town.

Back ground of the study: Iodine deficiency is a major public health problem for populations worldwide including Ethiopia, particularly for pregnant women and young children. The most devastating outcomes of iodine deficiency are increased perinatal mortality and mental retardation. This mental deficiency has an immediate effect on child learning capacity and school performance.

Objective of the study: To assess effect of iodine deficiency disorder on academic performance of school children.

Benefit of the study: -the participant will not get any direct benefit for being participant

-The result can be used as a baseline for further studies that can be done in this town.

- The result will be used to design prevention and control measures of the problem.

-The result will be disseminated to the Sodo town Education Office and Health Office.

Harm of the study: the study has no any harm except that participant will spend up to 30 minutes in the interview.

Rights of the participant: -participation has full right

-Not participate

- The participant can stop participating in the study at any time

-The participant can skip question which she does not want to respond

-During the interview, the participant can ask questions which are not clear

Confidentiality: - the secrecy of any information forwarded will be maintained

2. Consent form

I --------have well understood the study information sheet read above.

And now I am in a position -------- to participate in the study by giving information.

To be voluntary ⟶sign below and conduct interview

Not to be voluntary-⟶ go to the next child

Signature of the interviewer ----------

(Signature of the interviewer certifies that informed consent has been given verbally by the respondent)

Questionnaire identification number _____

Name of the Interviewer _____Signature_____date _____

Name of the supervisor _____Signature _____date _____

Address of the investigator:

Mob. =0911-96-77-48

email =eskwolka@yahoo.com

For further question/ information use the address of the IRB medical faculty:

Addis Ababa University, Faculty of medicine

Phone number= 011-5-53-87-34

email= aaumfirb@yahoo.com

3. Questionnaire

Identification

001. Id number of Questionnaire_____ 002. Sub city_____ 003. Kebele _____

I Questionnaire for child socio-demography

Ser.No	Question	Response	Skip to
101	Grade and section	__ __	
102	Age	___years	
103	Place of birth	_____	
104	Sex	1. Male 2. Female	
105	Religion	1. Protestant 2. Apostolic 3. Orthodox 4. Muslim 5. other(specify_____)	
106	Ethnicity	1. Wolaita 2. Amhara 3. Gurage 4. other(specify_____)	

II- Socio-economic and educational status of parents (guardians of child)

Ser.No	Question	Response	Skip to
201	Residence	1. Town 2. Rural	
202	Do you have radio?	1. Yes 2. No	
203	Do you have TV set?	1. Yes 2. No	
204	Whose property is the house in which you live?	1. Our own 2. Rent 3. Don't know	
205	How many rooms does your house have?	_____	
206	How many persons live in your house?	_____	
207	Is your home comfortable for studying?	1. Yes---------- 2. No	209
208	If no, for the above question, what is the reason?	1. Crowdedness of room 2. Have no separate room 3. Problem of insect infestation 4. Others (specify)_____	
209	Where do you prefer to study?	1. At home 2. At school 3. At open field 4. other (specify)_____	

210	From where do you use water?	1. Tap in the compound 2. Bono 3. River 4. Well 5. Others(specify)_____	
211	What are common foods consumed at home?	_____	
212	What is your father's educational level?	1. Unable to write, read 2. Write, read 3. Primary 4. Secondary 5. College	
213	What is your mother's educational level?	1. Unable to write, read 2. Write, read 3. Primary 4. Secondary 5. College	
214	What is your father's occupation?	1. Teacher 2. Farmer 3. Merchant 4. Other gov't employee 5. Private employee/NGO 6. Daily laborer 7. Unemployed 8. Other (specify)_____	
215	What is your mother's occupation?	1. House wife's 2. Teacher 3. Farmer 4. Merchant 5. Other gov't employee 6. Private employee/NGO 7. Daily laborer	

		8. Unemployed 9. Other (specify)_____	

III- Psycho-social and behavioral characteristics of the children.

Ser.No	Question	Response	Skip to
301	Do you think you have good relationship with your peers?	1. Yes 2. No	
302	Do you think you have good relationship with your families?	1. Yes 2. No	
303	Have you ever been bulled by one of your families?	1. Yes 2. No	
304	Have you ever been punished at school?	1. Yes 2. No----------	Q 306
305	If yes, to for above question what was the reason?	1. Disagreement with teachers 2. Disagreement with students 3. Violating the rules of the school 4. Others (specify)_____	
306	Do you study at night?	1. Yes---------- 2. No	Q 308
307	If no, for above question what might be the reason behind?	1. Lack of light sources 2. Uncomfortable environment 3. Family discouragements 4. Work load from family 5. other(specify)_____	

308	Have you had much workload at home/out of home?	1. Yes 2. No	
309	Do your families' encourage your education?	1. Yes 2. No	
310	Do you have a shortage of educational materials?	1. Yes 2. No	
311	Do your family quarrel each other, while you are at home?	1. Yes 2. No----------	Q 401
312	If yes, how frequent they did?	1. Once a week 2. More than once a week 3. Once a month 4. Other (specify)_____	
313	Could their quarrel have disturbed you?	1. Yes 2. No	

IV- Physical examination of the student

Ser.No	Examination	Result	
401	Goiter palpation	1. Grade 0 2. Grade 1 3. Grade 2	

V- School score of students, repeating and absenteeism

Ser.No	School status	Response	Skip to
501	Grade score of last academic year	1. Below mean 2. Above mean	
502	Class repeated last year	1. Yes 2. No ----------	Q 504
503	If yes, what was the reason?	1. Academic 2. Family 3. Disease 4. Other (specify)- _____	
504	Absenteeism from the school in last Academic year	1. ≥ 5 days 2. 5 days 3. 4 days 4. 3 days 5. 2 days 6. 1 day 7. No absenteeism	

Thank you

Name of the interviewer _____signature _____date_____

Name of the supervisor _____signature _____date_____

ANNEX II _AMHARIC VERSIONS OF QUESTIONNAIRE

1. ***<u>የጥናቱ መግለጫ</u>***

(መረጃ በመስጠት ለሚሳተፉ ልጆች የሚነበብ)

ጤና ይስጥልኝ እንደምን አደርክ/ዋልክ/ሽ? ስሜ _____ይባላል የመጣሁት ከዚሁ ከወላይታ ሶዶ ስሆን ከ 6-12 ዓመት ዕድሜ ክልል ባሉት ልጆች በአዲስ አበባ ዩኒቨርሲቲ በጤና ሳይንስ ኮሌጅ ለሚካሄደው ጥናት መረጃ በመሰብሰብ ላይ ከሚገኙ መረጃ ሰብሳቢዎች መካከል አንዱ ነኝ አንተ/አንቺ ከዚህ በታች የሚነበበውን የጥናቱን መግለጫ ተገንዝበው ፍቃደኛ ከሆኑ መረጃ ለመስጠት የዚህ ጥናት ተሳታፊ እነዲሆኑ ሳይንሳዊ በሆነ መንገድ ተመርጠዋል፡፡

የጥናቱ ርዕስ፡- በወላይታ ሶዶ ከተማ ከ 6-12 ዓመት ባላቸው ልጆች የአዮዲን አጥረት በሽታ በትምህርትታቸው ላይ የሚያመጣውን ተፅኖ፡፡

መግቢያ፡- የአዮዲን እጥረት በሽታ ኢትዮጲያን ጨምሮ የአለም አቀፍ ዋና የህብረተሰብ ጤና ችግር ነው፡፡ የበሽታው አደገኝቱ ነፍሰጡር እናቶች እና ልጆች ላይ ይብሳል፡፡ በሽታው የህፃናትን ሞት ከመጨመር አልፎ መከላከል የምንችለውን የአዕምሮ ዘገምተኝነት በልጆች ላይ የሚያመጣው ጉዳት ተማሪዎች በመማር ብቃታቸውን ውጤታቸው ላይ ተፅኖ ሊኖረው ይችላል፡፡

የጥናቱ ዓላማ፡- የአዮዲን እጥርት በሽታ በልጆች ትምህርት ላይ የሚያመጣውን ተፅኖ ማወቅ፡፡

የጥናቱ ጥቅም፡ - ተሳተፈው ተሳተፈ በመሆኑ የሚያገኘው ምንም ጥቅም የለም››

- ከዚህ ጥናት የሚገኘው ውጤት በከተማው ለወደፊት ለሚጠኑ ተመሳሳይ ጥናቶች ፅንሰ መነሻ ግብአት ያገለግላል፡፡
- የጥናቱ ውጤት በሽታውን ለመከላከልና ለመቆጣጠር ትኩረት አቅጣጫ መሆኑን ይጠቁማል፡፡
- የጥናቱ ውጤት ለሶዶ ከተማ ጤና ጽ/ቤትና ትምህርት ጽ/ቤት ይገለፃል፡፡

የጥናቱ ጉዳት፡- የጥናቱ ተሳታፊ እስከ 30 ደቂቃ የሚደርስ ጊዜ ከማባከን ውጪ በጥናቱ ተሳታፊ በመሆናቸው የሚደርስባቸው ጉዳት ምንም የለም፡፡

የጥናቱ ተሳታፊ መብቶች፡- በዚህ ጥናት መሳተፍም ሆነ አለመሳተፍ ሙሉ መብት ነው፤ በመሳተፍ ላይ ያሉ በማንኛውም ሰዓት ማቋረጥ ይቻላል፣ ከጥያቄዎች ውስጥ ለመመለስ የማይፈልጉትን ጥያቄ አለመመለስ ይቻላል፡፡

የጥናቱ ሚስጥራዊነት፡- የተሳተፈው ማንነት በሚስጥር ይያዛል፡፡

ጥያቄ አልዎት?

2. ***<u>የፍቃደኝነት መጠየቂያ ቅጽ</u>***

እኔ _____የጥናቱ መግለጫ ተነቦልኝ/አንብቤና ተገንዝቤ የጥናቱ ተሳታፊ ለመሆን ፍቃደኛ ሆኛለው ፊርመህ/ሽ መጠይቁን ሙላ

ፍቃደኛ አልሆንኩም⟶ ወደ ሚቀጥለው ተማሪ እለፍ

(የመረጃ ሰብሳቢ ፊርማ መኖር ግለሰቡ የጥናት ተሳተፊ ለመሆን ፍቃደኛ መሆኑን ያመለክታል)

የመጠይቁ መለያ ቁጥር _____

የመረጃ ሰብሳቢ ስም _____ ፊርማ _____ቀን _____

የተቆጣጣሪው ስም _____ ፊርማ _____ቀን _____

የተመራማሪው አድራሻ

ሞባይል፡- <u>0911967748</u>

ኢሜል ፡- <u>eskwolka@yahoo.com</u>

ለበለጠ መረጃ የሚከተለውን የተቋሙን ገምጋሚ ቦርድ አድራሻ ይጠቀሙ

አዲስ አበባ ዩኒቨርሲቲ ጤና ሳይንስ ኮሌጅ

ስልክ፡ <u>011-5-53-87-34</u>

ኢ-ሜል፡ <u>aaumfirb@yahoo.com</u>

3.መ ጠ ይ ቅ

በአዲስ አበባ ዩንቨርስቲ በጤና ሳይንስ ኮሌጅ የህብረተሰብ ጤና ትምህርት ቤት በወላይታ ሶዶ ከተማ ከ 6 — 12 ዕድሜ ክልል ባሉት ልጆች ላይ የአዮዲን እጥረት በሽታ በትምህርታቸው ላይ የሚያመጣውን ተፅኖ ለማወቅ ለሚደረገው ጥናት መረጃ መሰብሰቢያ የተዘጋጀ መጠይቅ

መ ለ ያ

001 - የመጠይቅ መለያ ቁጥር ----------

002 - ክፍለ ከተማ ----------

003 - ቀበሌ ----------

ክፍል አንድ፡ የልጆች ማህበራዊ ሁኔታዎች

ተ.ቁ	ጥያቄ	ምላሽ	ይለፉ
101	ስንተኛ ክፍል ነህ/ሽ?	----	
102	ዕድሜ	-------	
103	የተወለደበት /ችበት ቦታ	-------	
104	ፆታ	1. ወንድ 2.ሴት	
105	ሐይማኖት ምንድ ነው?	1. ፕሮቴስታንስ 2. ሓዋርያት 3. ኦርቶዶክስ 4. መስሊም 5. ካቶሊክ 6. ሌላ/ይገለፅ/ -----	
106	ብሔርህ ምንድን ነው?	1. ወላይታ 2. አማራ 3. ጉራጌ 4. ሌላ (ይገለፅ)------	

ክፍል ሁለት፡- የልጁ ወላጅ /አሳዳጊ ማህበርዊ ሰነ ህዝባዊና

ኢኮኖሚያዊ ገጻዮች

ተ.ቁ	ጥያቄ	ምላሽ	ይለፉ
201	የሚኖሩበት ቦታ	1. ከተማ 2. ገጠር	
202	ቤተሰብ ሬድዮ አለው?	1. አዎ 2. የለውም	
203	ቤተሰብ ቴሌቭዥን አለው?	1. አዎ 2. የለውም	
204	የመኖሪያ ቤት የባለቤትነት ሁኔታ	1.የግል 2. የኪራይ 3. አላውቅም	
205	ቤቱ ስንት ክፍሎች ሰሉት?	----	
206	ቤቱ ውስጥ ስንት ሰዎች አሉት?	--------	
207	ቤታችሁ ውስጥ ለማንበብ/ለማጥናት ይመቻል?	1. አዎ-------- 2. አይመችም	209

208	ለማንበብ የማይመች ከሆነ ምንኒያቱ ምንድን ነው?	1. ቤቱ ይጠባል 2. የጥናት ክፍል የለም 3. ጥቃቅን ነፍሳት ያስቸግራሉ? 4. ሌላ (ይገለጽ)-------	
209	የት ለማጥናት ትመርጣለህ?	1. ቤት 2. ት/ቤት 3. ሜዳ 4. ሌላ (ይገለጽ)------	
210	ውሃ ከየት ታገኛላችሁ?	1. ከቧንቧ 2. ከቦኖ 3. ከጉድጓድ 4. ወንዝ 5. ሌላ (ይገለጽ)------	
211	በብዛት የምትመገቡት የምግብ ዓይነት	----------	

212	የአባት /ያሳዳጊ የትምህርት ሁኔታ	1. ያልተማረ 2. ማንበብና መፃፍ የሚችል 3. አንደኛ ደረጃ ያጠናቀቀ 4. ሁለተኛ ደረጃ ያጠናቀቀ 5. ኮሌጅ ያጠናቀቀ	
213	የእናት /ያሳዳጊ የትምህርት ሁኔታ	1. ያልተማረች 2. ማንበብና መፃፍ የምትችል 3. አንደኛ ደረጃ ያጠናቀቀች 4. ሁለተኛ ደረጃ ያጠናቀቀች 5. ኮሌጅ ያጠናቀቀች	
214	የአባት /ያሳዳጊ ሥራ	1. መምህር 2. ገበሬ 3. ነጋዴ 4. ሌላ የመንግስት ሠራተኛ 5. የግል ተቀጣሪ 6. ያልተቀጠረ 7. ሌላ (የገለጸ)---------	
215	የእናት /ያሳዳጊ ሥራ	1. የቤት እመቤት 2. መምህር 3. ገበሬ 4. ነጋዴ 5. ሌላ የመንግሥት ሠራተኛ 6. የግል ተቀጣሪ 7. የቀን ሠራተኛ 8. የልተቀጠረች 9. ሌላ (ይገለጽ)	

ክፍል ሦስት፡- የህፃኑ ሥነ -ልቦናዊ ሁኔታ

ተ.ቁ	ጥያቄ	ምላሽ	ይለፍ
301	ከጋደኞችህ /ሽ ጋር ጥሩ ግንኙነት አለኝ ብለህ /ሽ ታስባለህ /ሽ?	1. አዎ 2. የለኝም	
302	ከቤተሰብህ /ሽ ጋር ጥሩ ግንኙነት አለ ኝ ብለህ /ሽ ታስባለህ /ሽ?	1. አዎ 2. የለኝም	
303	ቤት ውስጥ ተገርፈህ ታውቃለህ /ሽ?	1. አዎ 2. አልተገረፍኩም	
304	ትምህርት ቤት ተገርፈህ /ሽ ታውቃለህ /ሽ ተቀጥተህ /ሽ?	1. አዎ 2. አልተገረፍኩም----------	306
305	የተቀጣህ /ሽ ከሆነ ምክኒያቱ ምንድን ነበር?	1. ከመምህሩ ጋር አለመስማማት 2. ከተማሪ ጋር አለመስማማት 3. የተ/ቤቱን ሥርዓት ባለማክበር 4. ሌላ /ይገለፅ ----------	
306	ማታ ታነባለህ /ሽ ወይም ታጠናለህ /ሽ?	1. አዎ---------- 2. አላነብም	308
307	የማታነብ ከሆነ ምክኒያቱ ምንድን ነው?	1. መብራት ስለሌለ 2. ቤት ውስጥ ስለማይመች 3. ቤተሰቦቼ ለማንበብ አያበረታቱኝም 4. ሥራ ይበዛብኛል 5. ሌላ/ ይገለፅ----------	
308	ቤት ወስጥ ሥራ ይበዛብሀል?	1. አዎ 2. አይበዛብኝም	
309	ቤተሰቦችህ እንድትማር ያበረታታሉ?	1. አዎ 2. አያበረታቱም	
310	የትምህርት መሣሪያዎች (መጽሐፍ ፣እስክሪብርቶ የመሣሰሉ) እጥረት አለ?	1. አዎ 2. እጥረት የለም	
311	አባትህና እናትህ ተጣልተው ያውቃሉ?	1. አዎ 2. ተጣልተው አያውቁም----------	401
312	ከተጣሉ ምን ያህል ጊዜ?	1. በሳምንት አንድ ጊዜ 2. በሳምንት ከአንድ ጊዜ በላይ 3. በወር አንዴ 4. ሌላ (ይገለፅ)----------	

313	በነሱ ጥል ምክንያት ተረብረብሸሃል/ሻል ?	1. አዎ 2. አልረበሸኝም	

ክፍል አራት፡- የእንቅርት ምርመራ

ተ.ቁ	ምርመራ	ውጤት	ይለፉ
401	የእንቀርት ምርመራ	1. ደረጃ 0 2. ደረጃ 1 3. ደረጃ 2	

ክፍል አምስት፡- የተማሪዎች የት/ቤት ውጤት እና ክትትል ሁኔታ

ተ.ቁ	የትምህርት ሁኔታ	ምላሽ	ይለፉ
501	ባለፈው ዓመት የክፍል ውጤት	1. ከአማካይ በታች 2. ከአማካይ በላይ	
502	ባለፈው ዓመት በክፍል ደገም/ች?	1. አዎ 2. አልደገመም	
503	የደገመ /ች ከሆነ ምክኒያቱ ምንድን ነው?	1. አነስተኛ ውጤት 2. በቤተሰብ ችግር 3. በበሽታ 4. ሌላ (የገለፅ)	
504	ባለፈው ዓመት ከትምህርት በት የቀረበት ቀን	1. ከአምስት ቀን በላይ 2. አምስት ቀን 3. አራት ቀን 4. ሦስት ቀን 5. ሁለት ቀን 6. አንድ ቀን 7. ቀርቶም አይውቅም	