



JIMMA UNIVERSITY

COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES

DEPARTMENT OF EPIDEMIOLOGY

PREVALENCE OF GOITER AND ITS DETERMINANTS AMONG CHILDREN AGES  
OF 6 TO 12 YEARS IN ASSOSA TOWN, BENISHANGUL-GUMUZ REGIONAL  
STATE, NORTH WEST ETHIOPIA.

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## I. Summary

**Background:** Iodine-deficiency disorders (IDDs) are major public health problems in Ethiopia. Since the distribution of the problem varies from one region to another, in order to undertake control programs baseline information needs to be established regionally.

**Objective:** To assess prevalence of goiter and its determinants among children of ages 6 to 12 years in Assosa town, Benishangul-Gumuz Regional State, Ethiopia.

**Method:** A cross sectional community-based study was conducted in the town from May 18-28 /2012 GC. In order to determine prevalence of goiter, iodine content of salt and knowledge, attitude and practice of mothers on iodine deficiency disorders (goiter), a sample size of 395 children aged from 6 to 12 years and the respective households from which the eligible children selected were used. For this study proportional allocation of the sample size to each individual kebele was used. Data was collected with a total of 8 trained data collectors (4 experienced nurses & 4 grade 12<sup>th</sup> or 10<sup>th</sup> completed individuals) and accordingly goiter grade was determined (classified) by one public health officer. Goiter was classified based on the WHO /UNICEF/International Council for the Control of IDD, while, iodine content of salt determined by RIT. Standard Questionnaires were used & Data was cleaned, coded, entered to computer using SPSS version-16 software, summary statistics, Univariate analysis followed by multivariate analysis..

**Result:** For this study the prevalence of goiter was (104) 26.3% (male = 55 (26.7%), female = 49 (25.9%)). Of the total prevalence; 62 (15.7%) had palpable, while 42 (10.6%) visible. 322 (81.5%) of HHs in the town utilized salt that were below the set standard for salt iodine level (<15ppm). 302 (76.5%) of mothers (food caterers) replied to have some information (heard) about iodized salt, iodine or IDD (goitre); 239 (60.5%) of mothers had favourable attitude towards iodized salt; 14(3.6%) of mothers had improper practice on exposure of salt to the sun light and 86 (21.9%) had improper practice on salt adding time. Factors significantly associated with children's goiter were; iodized salt use OR 2.103, 95%CI [1.013-4.367], family income OR 1.929, 95%CI [1.017-3.658], age of children OR 0.454, 95%CI [0.271-0.761] and residence (kebele) OR 3.116, 95%CI [1.480-6.560].

**Conclusions and recommendation:** prevalence of children's goiter is high, iodized salt utilization status of households is very low together with limited knowledge, attitude and practices of mothers on iodized salt in Assosa town. Thus, reinforcing the laws that ban the marketing of non iodized salts (universal iodization of salt), awareness raising programs might increase the demand for iodized salt of the local community.

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## **VI. List of abbreviations**

BGRS – Benishangul-Gumuz Regional State  
CSA –Central Statistical Authority  
EDHS – Ethiopian Demographic and Health Survey  
EOS - Enhanced Outreach Strategy  
HEW– Health Extension Workers  
HH– Household  
ICCIDD- International Conference for Children in Iodine Deficiency Disorders (Diseases)  
IDD- Iodine Deficiency Disorders  
IEC/ BCC - Information, Education and Communication/Behavioral Cultural Communication  
ISU-Iodized Salt Utilization  
JHU –John Hopkins University  
JU - Jimma University  
KAP – Knowledge, Attitude and Practice  
MOH- Ministry of Health  
Oxfam-GB- Oxfam-Great Britain  
PPM- Parts Per Million  
PPS- probability proportionate to size  
RIT- Rapid Iodine Test kit  
SAC-School age children  
SDC- Socio-demographic characteristics  
SNNPS – South Nations and Nationalities Peoples State  
TGP – Total Goiter Prevalence  
TGR- Total Goitre Rate, i.e. the sum of grades 1 and 2 of the study population.  
TSH – Thyroid Stimulating Hormone  
TVET- Technical and Vocational Education Training College  
UIE- Urinary Iodine Examination  
UNICEF- United Nations Children Emergency Fund  
USI- Universal Salt Iodization  
WHO- World health organization  
WHO/UNICEF - World Health Organization/United Nations Children Emergency Fund

# CHAPTER ONE: INTRODUCTION

## 1.1 Background information of the region

The Benishangul-Gumuz is one of the nine regional states of Ethiopia situated in the North West part of the country. The region shares its boundary with the Amhara, Oromia and Gambella regions and the Republic of Sudan in the North, in the East, in the South and in the West respectively. The region is sub-divided in to three zones and one special woreda namely; Assosa, Metekel and Kamashi zones and Mao-Komo special woreda. Based on the 2007 E.C. census conducted by the CSA, the Benishangul-Gumuz Region has a total population of 670,847, (M=340,378; F=330,469; urban inhabitants numbered 97,965 (14.6% of the population). It has an estimated area of 50,248 km<sup>2</sup> (19,400.9 sq mi) and estimated density of 10.4/ people per km<sup>2</sup> (27/sq mi) (1)

Assosa woreda which is one of the 21 woredas of the BGR found under Asosa Zone. Based on figures from the CSA in 2005, the woreda has an estimated total population of 102,732, ((M=53,340; F=49,392); 20,226 (19.69% of the population)) are urban dwellers. it has an estimated area of 1,991.41 Square Kms, the woreda has a population density of 51.6 people/ Square Km.

Assosa town is found in North Western part of Ethiopia and found in Assosa woreda. Assosa town commonly shares to be a capital city for the BGR, Assosa Zone and Assosa woreda administrations. The town has a latitude and longitude of 10°04'N 34°31'E 10.067°N 34.517°E, with an elevation of 1,570 meters (3). The town is located 687 km away from Addis Ababa towards the North West and has an area of 9.82km<sup>2</sup>. (3).

The estimated population of Assosa town is 30,146. The population by ethnicity are; the Oromo (41.19%), the Amhara (29.93%), the Berta (17.39%), the Tigray (5.43%), the Sebat Bet Gurage (1.35%), the Silt'e (1.29%); and all the rest comprised 3.42% of the population. The majority of the inhabitants professed Ethiopian Orthodox Christianity; with 54.92% of the population having reported they practiced that belief, while 29.75% and 14.89% of the population said that they were Muslim and Protestant respectively. (3).

The town comprises of 4 (four) Kebeles having 6,697 residential houses with an average HH size of 4.5 persons per a HH. The town has an average altitude of 1,570 m (5,151 ft) above sea level and with

annual rainfall ranges between 800mm to 1000mm. The climatic condition is “wainadega” and has an average annual temperature of 32<sup>0</sup>c (4).

Health facilities providing services to the town’s population are; one government owned regional hospital and health center and others owned by like NGOs, OGOs & private for profit health facilities include about ten clinics, three rural drug venders, two pharmacies, two drug stores, and five diagnostic laboratories.

Iodine deficiency is the single most preventable cause of brain damage among newborn children and is responsible for several other adverse health outcomes, including stillbirths among pregnant women, delayed development among children, and goiter among adolescents and adults. Defined broadly as Iodine Deficiency Disorders (IDD), these health effects can diminish the learning capacity and productivity of entire communities (5 and 6, 7).

WHO estimates that approximately 2 billion people worldwide are exposed to the risks of IDD. In May 2002, the Special Session on Children at the United Nations set a goal for the elimination of IDD by the year 2005. Officials worldwide agreed that Universal Salt Iodization (USI) is the long-term solution to attain this goal. However, 35 countries around the world have yet to implement an IDD-control program. (7 & 8)

Even if communicable diseases, such as malaria, diarrhea, tuberculosis, and acute respiratory tract infections are the major public health problems of Assosa town, nutritional problems like iodine deficiency disorders which are in majority of cases thought to be over looked as trivial by parents, have also been assumed to play a very important role by interfering in the health status of the residents, children in particular.

## **1.2 Statement of the problem**

The nationally conducted cross-sectional study on IDD in Ethiopia in randomly selected five regional states, namely; Amhara, Oromiya, Tigray, SNNP and BGR states by the year 2007 showed that in BGR goitre rate of school age children is 46.6%, while that of the national accounted only 37.1%. The study has also showed that in many parts of the study areas awareness about IDD was very limited. (10).

In the 2005 EDHS, cooking salt in HHs was tested for the presence of iodine using salt testing kits supplied by UNICEF. According to that national survey HHs in Dire Dawa are the most likely to consume adequately iodized (62%) salt, while HHs in BGR were the least likely (14%). As clearly

being observed in the locality, while recently there is an initiation of USI at the national level, the provision and utilization pattern of non iodized salt in the region still seem to be incessant.

### **1.3 Rationale**

Despite the above stated goitre and iodized salt utilization problems, there is no recent & updated information that could awaken the local government, NGOs and the likes as required as possible. Additionally, recently KAP of mothers on iodized salt and IDD is not well known,

### **1.4 Significance of the study**

This study is significant to close the information gaps related to goiter in SAC, iodized salt utilization status of HHs along with KAP of mothers them in the town via determining risk factors in the study area. Thus, the results of this study at community level will be used as baseline or update information to institute proper planning and intervention program to prevent or reduce the occurrence and worsening of IDDs. In addition to these, it could demonstrate the actual extent of goitre that does not reach health facility, which may be over looked as trivial by parents.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1. Facts about iodine and IDD (goiter)**

#### **2.1.1 Importance of iodine**

Iodine is a chemical element required for the structure (formation) of the thyroid hormone (is a chemical compound that is produced by the thyroid gland) a hormone. Iodine is one of essential nutrients required for normal growth and development (24). It is released into the bloodstream by the thyroid gland, which is butterfly-shaped and located at the base of the neck (22). People who lack iodine in their system are unable to make enough of the thyroid hormone thus leading the pituitary gland to produce more thyroid-stimulating hormone (TSH). This over-stimulation of the thyroid also leads to a series of poor health outcomes known as IDD (30).

#### **2.1.2 Iodine deficiency**

Causes of Endemic iodine deficiency are found in mountainous areas where the soil, subject to heavy rainfall, glaciations, or flooding, is depleted (washed-out) of essential nutrients, nutrients that the body does not have in sufficient amount, but acquires it from the external environment in the form of food, etc) (22). The poor quality of the soil is further exacerbated by human practices of land clearing for agriculture, overgrazing of livestock, and tree cutting for fuel and charcoal (23). To compound the problem, the consumption of certain principal plant foods commonly found in developing countries (e.g. cassava) releases cyanide, which is converted to thiocyanate in the body and can block the absorption of iodine (30).

#### **2.1.3 What are iodine deficiency disorders?**

Iodine deficiency disorders represent the multitude of adverse health consequences related to iodine deficiency. The most visible sign of iodine deficiency is the presence of goiter, a maladaptation to iodine deficiency that results in a swelling at the neck (23). In essence, the goiter is an overworked thyroid gland that has become enlarged in an attempt to compensate for the lack of iodine in the system (23).

Studies have shown that during the first two trimesters of an iodine deficient mother's pregnancy, the fetal brain can be damaged to the extent that the baby is born a short height and retarded development (30). This mainly occurs in areas where the iodine intake is below 25 µg per day (30).

## 2.2. Occurrence of IDD (goiter)

Iodine Deficiency Disorders (IDD), the world's greatest single cause of preventable brain damage and mental retardation, are estimated to affect 30% of the world's population among which 17.8 % (150,000) people are affected in Africa alone (25).

WHO considers that if goiter rate is found to be above 5% of a population it is a public health problem. (13) A number of previous studies have prevailed goitre to occur in an endemic scale in many parts of Ethiopia. A stratified goitre survey conducted in Ethiopia (with the exception of Tigray) on 36,635 school children and 19,128 household members revealed that the prevalence was 30.6% and 18.7% respectively. It was also found that the prevalence is higher in high altitudes for both school children and household members (26).

A baseline survey of goiter prevalence conducted among five endemic regions (Shoa-Majetie; GamuGofa-Sawla; Shoa-Gohatsion; Bale-Adaba; Gojam-Bure) and four non-endemic regions (Harergie-Alemaya; Shoa-Mojo; Sidamo-Yabello; Arsi-Hurruta) from 1988 to 1991E.C. revealed that both the endemic and non-endemic regions were found to have a higher goiter prevalence rate than previously reported. A mean goiter prevalence rate was found to be  $21.80 \pm 5.4$  (27).

Another study carried out in three villages of GamuGofa, Southern Ethiopia, reported that the total goiter rate (TGR) in the study sites was 62% while visible goiter rate was 25 %. (28)

In an intervention study conducted in Awassa, South Ethiopia Visible goiter rate reported were 28.1% and 28.3% for the same dose groups respectively (29).

A recent study conducted in ten villages from four administrative regions (Shoa, Jimma, Arsi and GamuGofa) indicated that the gross prevalence rate among school children was 53.3%. This prevalence rate was regarded as severe according to the classification of WHO/UNICEF/ICCIDD (33). The prevalence rate was higher among female population (56.1% of female population had goitre), while that of males were only 50.1% (32).

Similarly, another study conducted in Kobo village and 8 schools in central Ethiopia revealed a goiter prevalence of 63.3% in the village and 93.4%, 81.1% and 29.3 % in the schools in Kobo, Kambatana - Hadya province and Gubre, respectively (31). A similar study conducted on elementary school children in the district neighboring to the present study area also reported 64.1% prevalence of goiter (34).

A cross-sectional community based study conducted from February to May 2005 G.C. in 10,998 women in child bearing age of 15 to 49 years demonstrated iodine deficiency in Ethiopia is a severe health problem with the range of ill effect of IDD is remained beyond goiter in Ethiopia. According to that study findings the total goiter prevalence (weighted) was 35.8 % (95% CI 34.5-37.1), 24.3% palpable and 11.5% visible goiter. This demonstrates that more than 6 million women affected by goiter prevalence in four regional states namely Sothern Nation Nationalities and People (SNNP), Oromia, Benishangul-Gumuz and Tigray were greater than 30%, an indication of severe iodine deficiency. In the rest of region except Gambela, the IDD situation was mild to moderate. According to the WHO/UNICEF/ICCIDD this is a lucid indication that IDD is a major public health problem in Ethiopia. More than 90% of child bearing age women didn't know the cause of iodine deficiency and importance of iodated salt. As a conclusion the study was recommend Ethiopia at risk of IDDs (35).

### **2.3. Aggravating factors of IDD**

Generally, besides low iodine intake, several factors seem to play role in exacerbating and worsening IDD situation in Ethiopia (36). Iodine deficiency disorders (IDD) affect millions people in developing countries mainly due to iodine deficiency and aggravating factors that affect the bioavailability (availability in to the blood stream) of iodine in the body (37). Goitrogenic factors from food sources can aggravate iodine deficiency (38).

For instance one study conducted at national level showed that in SNNP and Benishangul-Gumuz regional states, those who had consumed three times or more in a week (children & mothers) cassava are significantly ( $p < 0.01$ ) affected by goitre than those who did not or rarely consumed.

However, in Oromiya, the goitre rate was not significantly associated with cassava consumption perhaps cassava was not consumed widely and frequently as SNNP and Benishangul-Gumuz regional states. Besides, cassava was introduced to Oromiya region recently. (36)

In Amhara region, goitre rate was significantly ( $p < 0.05$ ) higher in high altitudes than in low both for children and mothers.

### **2.4. Sources of iodine and utilization status of iodized salt**

A study conducted in goiter endemic districts in Northern India to assess the iodine content of salt at household and retail levels found out that 80% of salt samples from both of the levels contain less than the minimum recommended level by the government (15 mg/kg) despite an official ban on the entry of un-iodized salt since October 1986 (41). It was also reported that there was no significant difference



(the same) in the iodine content of samples from households and shops. Iodine content of packed salt was higher than loose bags collected from shops. This study implicated an urgent need for proper monitoring of iodine content at production, distribution, storage, wholesale and retail level in order to ensure the minimum recommended level at the households (18).

There was an increase in the proportion of households that used iodized salt and an increase in iodine concentration of common (edible) salt, i.e. both the number of iodized salt consumers and the iodine concentration level per salt sample are found to be increasing. Even if the iodine content of retail samples increased to a mean of 25µg/g at follow up one year later it is somewhat below the revised legal requirement, 40-60µg/g (7). But, still the salt iodine content was below the legal requirement indicating that only mandatory salt iodization is not a guarantee for consumption of acceptable level of iodine by the households.

In 1987 analysis of 50 specimens of salt from across the country in Guatemala found that 86% had a concentration below 60PPM, the legal criterion at that time (33). Studies in Tanzania indicated that after iodization machinery was installed in 1992 and legislation for iodization of salt was enacted in 1996, the proportion of households consuming iodated salt in the highly endemic areas steadily rose from zero before the programme to over 90% in some areas (8).

The edible salt tests made by the EDHS in the year 2005 for the determination of the presence of iodine in salt using salt testing kits in households showed that salt which contains at least 15 parts per million (PPM) of iodine is considered to be adequately iodized. Of the 99 percent of households in which an iodine test was carried out, only 20 percent had salt that was adequately iodized. Wealth and place of residence make little difference in iodine fortification. The study result as mentioned earlier showed that households in Dire Dawa were most likely to consume salt that was adequately iodized (62%) while households in Benishangul-Gumuz least likely (14 %).

Inadequate amounts of iodine in the diet are related to serious health risks for young children. The EDHS results show that 19 percent of children 6-59 months live in households using adequately iodized salt. Children under age one, rural children and children living in Dire Dawa are more likely than their counterparts to live in households using adequately iodized salt. There is no clear pattern by mother's age at birth or wealth quintile in the percentage of children living in households using adequately iodized salt. (40)

The Quality and Standards Authority of Ethiopia, has set the iodine level to be 60-80 PPM as potassium iodate, after making allowance for losses of iodine during storage and distribution. In Ethiopia, the average consumption of salt per capita per day is 10grams and salt with iodine content of 60 mg/kg would therefore satisfy the recommended daily requirement of 150µg of iodine per person to prevent IDD(1). But, there was no data that indicates the iodine level of salt both at the retail and consumption levels. Even most studies done outside the country did not try to see the knowledge, attitude and practice (KAP) of shopkeepers and household food caterers about iodized salt.

According to results of a cross-sectional study conducted in Ethiopia nationally, among 10,965 children of ages 6 to 12 years from February to May 2005GC, the national total goiter weighted prevalence rate was 39.9% (95% confidence interval, 38.6% to 41.2%), representing more than 4 million children. The median UIE was 2.45microg/dL; 45.8% of children had UIE values of 2microg/dL or less, and 22.8% had UIE values of 2.01 to 5.0pg/dl. Only 4.2% of the households had iodated salt. According to the WHO/UNICEF/ICCIDD classification, both goiter prevalence and UIE levels indicate that the whole country appears to be severely affected by iodine deficiency. Furthermore the virtual absence of iodated salt in the households shows that currently there is no salt iodization program in the country Dietary sources of iodine in Ethiopia are not dependable, and hence a sustainable universal salt iodization program needs to be implemented without delay.

Study that was conducted in Shebe town, south west Ethiopia, under the title of “Iodine concentration in salt at household and retail shop levels” demonstrated that high proportions of residents in Shebe town were consuming inadequately iodized salt. There were marked losses of iodine from salt by the time it reaches to consumption level in that some households were found to use salt with zero iodine content, whereas, all salt samples collected from the shops had at least some iodine. Poor awareness about iodized salt among food caterers and even in shopkeepers was also disclosed in that study. Socio-demographic factors such as ethnicity, religion, sex, lower educational level of food caterers might have an influence on poor, household practices like exposure of salt to sunlight. Information, education and communication on the importance consuming iodized salt and its proper handling in the house and regular monitoring of the salt iodine level at consumer level is essential for elimination of IDD. In addition to these the study had also showed that improper practices of food caterers related to iodized salt were found to be associated with female sex ( $P < 0.01$ ), Amhara ethnicity ( $P < 0.001$ ), Orthodox

religion ( $P = 0.008$ ), literacy status ( $p = 0.04$ ) and occupation ( $P = 0.01$ ). Good knowledge, about iodized salt was significantly associated with favorable attitude among food caterers ( $P < 0.001$ ). (41) According to a situational analysis carried out by 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. This report claims that many health problems in the country are attributable to iodine deficiency (40).

According to the study conducted in Shebe town in Seka Chekorsa district of Jimma zonal administration, Oromiya regional state on October 2003 larger proportions of households were using iodized salt 255(92.7%) and the rest 20(7.3%) used non-iodized salt among household samples, iodine concentration varied from 0-75 PPM with a mean of 28.9 and standard deviation of 20.4( $X \pm S.D$ ) PPM. The most frequent value 116(42%) was found to be in the range of 0.1 -25PPM. At least 20 (7.3%) had no iodine content at all. More than 224 (8.1%) had a concentration below 60PPM, the minimum Standard value set by the Quality and standards Authority of Ethiopia (13). Only 19% mean (62.55PPM) value as 50.1-75PPM was found in the standard level (60-80ppm). Iodine concentration in the retail shop salt samples ranged from 0.11-75 PPM with a mean value of 34.52 and standard deviation of 17.40 PPM, which was larger than household samples. The least proportion 10(30.5%) and largest proportion 17 (51.5%) were found in the range of 0. 1-25PPM and 21.11-50 PPM, respectively. Nearly similar proportions; six (18.2%) of retail shop samples were found in the highest range of 50.1-75ppm. The variation of salt iodine level between household and retail samples gets wider when it comes to the lower ranges of iodine level in that the household sample had lower values as compared to the retail. Almost half of the food caterers 148 (49.5%) had proper practice related to iodized salt, they usually add salt late at the end of cooking while nearly equal proportion 151 (50.5%) add salt in the early beginning and in the middle of cooking which is improper practice.(92) Most (73.9%) of the food caterers exposed their salt to sunlight while the remaining 78(26.1%) did not. The majority (93%) of salt containers in the households had cover but the remaining 21(7%) did not. Almost all (99.3%) stored their salt in dry places while two (0.7%) food caterers stored in moist area

Even though inadequate intake of iodine is the principal cause of IDD, other goitrogens like cassava, millet, soya bean, bamboo shoot, turnip, kale which interfere (hinder) with the metabolism of iodine and the formation of the hormone are also implicated (1, 7-9). Contamination of drinking water by

different microbes, and other associated nutritional deficiencies as Vitamin A, protein energy malnutrition (PEM) and iron deficiency anemia (IDA) are among the environmental and nutritional factors which contribute to the occurrence of IDD (42).

### **2.5 How is iodine deficiency measured and evaluated?**

Several methods have been developed to measure the degree of iodine deficiency in a population (25). Goiter is described as “a thyroid gland whose lobes have size (dimensions) 3 greater than the tip of the thumb of the person examined.” (19).

### **2.6 Prevention and control methods of IDDS (goiter)**

IDD can be eliminated in a cost effective way as it has been in most industrialized countries by adding iodine to universally consumed product, common salt. That means salt iodization to a level of 30 - 100 PPM with any iodine compound, usually in the form of potassium iodide (KI) or potassium iodate (KIO<sub>3</sub>) (43,44).

The cost effective way of controlling the iodine deficiency is achieved through a long term strategy of iodizing salt. There are however, other short term methods like iodized oil capsules (Lipid oils), iodized water, Lugols iodine etc. depending on the urgency of correction of the deficiency and accessibility of severely affected areas. Ethiopia as a member of WHO has accepted iodating all the salt produced in the country for human consumption (12).

Study carried out in South Africa to evaluate the effectiveness (successfulness) of mandatory iodization of salt after one year indicated that favorable changes were observed on the process indicator between baseline and follow-up.

In an intervention study conducted in Awassa, South Ethiopia to determine the response of the thyroid on introduction of varying doses of oral iodized oil 42% goiter reduction was observed after 13 months. Before the intervention TGR was 64.9% and 69.8% in 200mg and 400mg dose groups, respectively. (28)

In order to prevent IDD, universal salt iodization (USI) programme was launched in Ethiopia earlier (1988) and interrupted after few period of operation. Termination of the salt iodization (stoppage of adding of iodine nutrient in to the salt) program in goitre endemic areas is reported to accelerate thyroid dysfunction (12, 36).

Consistent monitoring of iodine in salt at production, storage, sale and consumption level; and prevention of sale of non-iodated salt is vital components of salt iodization programme that should be

adjusted to meet local conditions and requirements. The information generated by monitoring mechanism should directly be linked to decision-making, and there should be a feedback system allowing necessary changes to be made (19). Therefore, monitoring salt iodization is a useful first step in tracking process towards meeting the goal of IDD elimination.

Various studies findings, ended up in the prevalence of IDD in studied populations usually emphasis in recommending of sustainable iodine intervention program. One of such studies was the one that was targeted the reproductive age women in Ethiopia from February to May 2005 G.C. one of its recommendations forwarded by that study stated sustainable intervention of iodine intervention program to be very crucial to control the problem. In addition to this it had also noted the implementation of nutrition education, universal salt iodization program and iodized oil capsule distribution in some peripheries where iodine deficiency is severe is urgently required (45)

As previously discussed, although the nationally conducted studies had been supporting goitre prevalence and low status of utilization of iodized salt of HH as one of public health problem of the Benishangul-Gumuz Region; it seemed to be lacked to point out whether or not there was association existing between them and it is not recent findings as well. So it is essential to test for the presence of their association including updating of the existed information to take appropriate measures.

Thus, the main objective of the study was to assess and identify the distribution of goitre in children of ages 6 to 12 years; iodized salt utilization status of HHs and their association with respect to sociodemographic & the like factors of the population in Assosa town, Benishangul-Gumuz Regional State, Ethiopia, and thereby based on the study findings to ensure the participation and involvement of the concerned bodies including those who are affected by and at risk of acquiring the problem to undertake necessary measures to solve the problem.

## **CHAPTER THREE: OBJECTIVES**

### **3.1 General Objectives**

To assess prevalence of goiter and its determinants among children of ages 6 to 12 years, in Assosa town, Benishangul-Gumuz Regional State, Ethiopia.

### **3.2 Specific Objectives**

- 3.2.1 To determine the prevalence of goiter among children aged 6 to 12 years
- 3.2.2 To determine the socio-demographic factors associated with goitre among children aged 6 to 12 years
- 3.2.3 To determine nutritional factors associated with goitre among children aged 6 to 12 years.

## CHAPTER FOUR: METHODOLOGY

### 4.1 Study area & period

The study was conducted in Assosa town, Benishangul-Gumuz Regional State among children aged 6-12 years residing in the four kebeles of the town from May 18-28/2012G.C

### 4.2 Source population

All children of ages 6-12 years residing in the four kebeles of Assosa town. The study was conducted at home level with the total children ages of 6-12 years population is taken to be 18.6 % of the total population (30,146) of the town, i.e. 5,607. (48)

### 4.3 Sampled population

All children ages of 6-12 years who fulfilled the predefined set criteria.

All households within which those children surveyed for goiter study purpose were also selected to collect the required data about iodized salt use and KAP of the mothers.

### 4.4 Study population

All selected 395 CHILDREN OF AGES 6 TO 12 years on whom the actual data was collected (to determine goiter)

All selected 395 households in which the actual data of eligible children was collected (to determine iodized salt utilization of households and KAP of mothers (food caterers)

### 4.5 Study design

A community-based cross-sectional study was conducted in Assosa town among selected families.

### 4.6 Sample size

#### A. Children of ages 6-12 years

In order to determine prevalence of goiter in children of ages 6-12 years, sample size was calculated using single proportion formula that is also supported by ICCIDD recommendations to calculate the sample size of children to be examined in a prevalence survey. Thus, according to ICCIDD recommendations, the sample size of children to be examined in a prevalence survey was calculated using the following formula.

$$n = \frac{(z\alpha/2)^2 p(1-p)}{d^2}$$

Therefore, taking an estimated prevalence of goitre 46.6% (51), and allowing an error of 5% of detecting the estimated prevalence by chance alone with 95% confidence interval, the sample size required was;

$$n = \frac{(z\alpha/2)^2 p(1-p)}{d^2}$$

$$= \frac{(1.96)^2 (0.466)(0.534)}{(0.05)^2}$$

$$n = 383$$

Using a population correction measure;

i.e. 
$$nf = \frac{n}{1 + \frac{n}{N}}$$

$$\frac{n}{1 + \frac{n}{N}} = \frac{383}{1 + \frac{383}{5,607}} = 358.6 \approx 359$$

But, allowing 10% contingency for possible non response the final sample size required was;

$$359 * 10\% = 35.9 \approx 36$$

$$359 + 36 = 395$$

395 is the final sample size of the children.

Where,

n = sample size calculated

N = population size (Total CHILDREN OF AGES 6 TO 12 yrs)

z = confidence interval (at 95%) i.e. = 1.96

p = prevalence = (0.466)

q = (1-P) = (0.534)

d= the margin of error taken = 0.05

= To make the sample proportional to the total number of children in each kebeles the final sample size was stratified using the formula.

Proportion of children of ages 6 to 12 yrs sample size;

Kebele proportions of children sample size;

Sample size of children per kebele = n x (child population of each Kebele)

N



## B. Households

All 395 households that had been surveyed for the study of goiter were used to collect the required data for the determination of iodized salt utilization status of households, KAP of mothers, and their association with children's goiter.

### 4.7 Sampling frame

Table1; Total & school age childhood population distribution by age, sex, kebele and household. Assosa town, May 2012

Assosa town							
Variables		Total population			Children ages of 6 to 12 yrs (18.6 %)*	Household (4.5per/HH)	Sample
		Male	Female	Total			
Kebele identification	Kebele 1	4241	3862	8103	1507	1801	106
	Kebele 2	3079	2896	5975	1111	1328	78
	Kebele 3	4291	4172	8463	1574	1881	111
	Kebele 4	3701	3904	7605	1415	1690	100
Total		15,312	14,834	30,146	5,607	6,700	395

Source; 2004 E.C. annual plan document; Assosa town environmental hygiene prevention & control office.

\* **Obtained by calculating the 1994 CSA results** (reports) for the Benishangul-Gumuz Region towns' CHILDREN OF AGES 6 TO 12 yrs proportion from that of the total.

### 4.8 Sampling technique

The probability sampling technique, specifically the systematic sampling technique was employed to access the required subjects. Additionally to acquire the required number of subjects from each of the four kebeles of Assosa town the proportional sampling probability to size (PPS) was also used.

### 4.9 Sampling procedure

The total number of children of ages 6 to 12 years in the each kebele was divided by sample size allocated for that kebele. This gave the sampling interval K for that kebele. A number between one & the sampling interval was selected randomly. At each kebele every K<sup>th</sup> household was included in the study. If there was no child 6-12 in the house hold, the next household was included. The procedure continued until the sample allocated for that specific kebele was achieved.

At each kebele, the data collector assumed a central point, rolled pencil on paper to get random starting point (HH) to start data collection and visited every household in which there were children of ages 6 to 12 years in a clock wise direction until the sample allocated for the kebele was obtained. Every household in which there is at least one child between ages of 6 to 12 years was surveyed. Any

households that were found to have more than one child with in the family were supposed to recruit only one child in the study and the rest are excluded from the study. In such type of households, samplings by lottery methods were employed to include only one child in to the study. Thus, based on these the selections of the required children were recruited until the required sample size was obtained. Likewise, all the households surveyed for the children were also included in the study to collect the required data in the study of utilization status of iodized salt of household.

#### **4.10 Data collection instrument & tools**

Procedure of a “rapid iodine test” to verify the presence of adequate iodine contents in salt sample.

##### **Method:**

##### **Rapid iodine test**

This method is used to qualitatively determine the presence of iodine in salt.

##### **Necessary Materials**

- ✓ Rapid iodine test kit
- ✓ Salt collecting material (saucer or plate)

##### **Principle:**

- ✓ Iodate in the salt oxidizes iodine added to the salt in the presence of free H<sup>+</sup> and gives free iodine.
- ✓ The free iodine turns starch into light blue to dark colour.

##### **Procedure:**

- ✓ Collect approximately 20 grams of salt sample (fill up the rapid iodine test cup with the salt sample)
- ✓ Put the salt sample on a clean paper
- ✓ Instill one drop of the rapid iodine test on the sample salt
- ✓ Observe for the color change within 1-2minutes
- ✓ Record the result of the observed color change at the spot point i.e. for the presence or absence of the required iodine content within the sample salt

##### **Summary of normal value of iodine content in the salt:**

- ✓ Salt has required amount of iodine if it contains > 15ppm
- ✓ The rapid iodine test used to determine the presence of iodine within the salt i.e. it shows only for the presence or absence of the required amount of iodine mineral within the salt sample.
- ✓ How to determine the test result: As described on the kit, small amount of salt was placed on saucer and moistened with two drops of test reagent. The presence of iodine in the salt will be recorded by

observing the immediate or after one minute turn of its colour light blue to dark blue/purple coloration and the persistence of this colour for several minutes.

### **Study variables**

#### **Dependent variables**

- Goiter status (of children of ages 6 to 12 years)

#### **Independent variables**

- Age of children and mother
- sex of children and respondent
- Ethnicity
- Religion
- Educational level (of the mother and father)
- Occupational status (of the mother and father)
- Marital status
- Family size
- knowledge (of the mother)
- Attitude (of the mother)
- Practice (of the mother)
- Iodized salt utilization status of household
- Cassava consumption status of household

Goiter was measured by physical examination of the child's thyroid gland which is located at the base of the anterior neck via inspection, palpation and synthesis of data from these techniques

Goiter grading and nutritional (salt) assessment made to determine prevalence of goitre among children of ages 6 and 12 years and iodine level of salt. Additionally, mothers or food caterers' behavior towards iodized salt utilization and their associations with goiter done.

The thyroid size was graded according to the joint criteria of WHO, UNICEF and ICCIDD; (10)

Grade 0: No palpable or visible goitre (Normal);

Grade 1: A goitre that is palpable but not visible goiter (i.e. the thyroid is not visibly enlarged);

Grade 2: palpable and visible goitre and consistent with an enlarged thyroid when the neck is palpated.

Additionally, to verify the presence or absence of iodine within table salts, sample salt for consumption of the family weighing approximately 20gm each (full of saucer or plate) was drawn from each of the households'. Then was examined and the findings was recorded immediately at the spot point. Consequently, questionnaire was also used to gather the required data via requesting the mother, heads of the households or relevant family members.

#### **4.12 Data collectors**

A total of 8 data collectors, i.e. four 10/12 grade complete data collectors for conducting interview and four nurses who had previous experience in testing salt for iodine content and goiter physical examination were involved.

In order to verify the presence or absence of iodine within table salt samples, salt was examined and the findings were recorded immediately at the spot point by the trained data collectors, who were at least 10th grade completed individuals. Additionally, questionnaires that were used to gather the required data were administered by the same trained data collectors.

#### **4.13 Data quality control**

To control the quality of the study instrument was checked, training of data collectors & pre-testing was conducted; at the end of each day data clearing, editing and cross-checking were done. Supervision of data collectors and the collection techniques were closely followed up together with commenting of incidents of problems.

The pre-testing was made on 5% of the sample size five days prior to the beginning of the actual data collection day out of the actual data collection area. The intra and inter observer variation in evaluation of sample salt test and goitre examination results were controlled by providing of repeated trainings of data collectors and assigning of well experienced and competent health professionals.

#### **4.14 Data analysis**

Statistical software such as SPSS version-16 and scientific data calculators were employed to analyze the data. Data was cleaned, coded, entered to computer using the SPSS software, summary statistics, and Univariate analysis followed by multivariate analysis done. Subsequently data was represented by tables and graphs.

#### **4.15 Ethical issues**

Formal permission letter was given from Jimma University students Research project office. Then the letter was presented to the Benishangul Gumuz regional health bureau so that additional official letter was written specifically to the respective four administrative kebele offices including that of letters written to all the concerned bodies and surveyed households of Assosa town in general to allow and cooperate in the process of data collection by the recruited data collectors. Based on that, discussion was made with the mentioned and other concerned administrative bodies and with that of individual households about the objective and purpose of the study and as confidentiality as were secured. Likewise, prior to data collection, other issues, like respondents as could deny to give information, in case if children were found to have goiter during the examination due to resource constraint, except medical advices as they could not be managed clinically were told to respondents. Consequently after consent had been signed by the representative of eligible individual households (preferably mothers) the procedures were carried out as per agreement until it ended up.

#### **4.16 Dissemination Plan**

The study findings will be communicated to those who need the study results for various purposes. Governmental and non-governmental organizations, institutions and individuals that have interest on the subject matter will be users of the findings. Among these, institutions listed below are assumed to be the most important customers for the result findings of this study so that it will be disseminated to;

- ✓ The Jimma University, public health and medical faculty, the department of epidemiology.
- ✓ The Benishangul-Gumuz regional state health bureau, Assosa zonal health department, Assosa woreda health office and Assosa woreda environmental hygiene prevention and control office.
- ✓ Other relevant international & national organizations.

Consequently, trial will also be made to publish the result findings via scientific journals.

#### **Operational definitions**

**Goitre prevalence:** - refers to number of CHILDREN OF AGES 6 TO 12 years, having goitre of grade -1 and above among groups of similar age.

**Goitrogenic factors:** - Factors which can cause goitre and/or iodine deficiency.

**A household:** - A group of people living under the authority of the same family head and regularly sharing the same meals.

**Iodized salt:** - Salt that has been proved by iodine test kit test to have sufficient iodine content within

**Iodized salt utilization coverage:** - Percentage of HHs that are confirmed to have the required level of iodine in the salt via testing with rapid test kit for consumption of the family at the time of the study.

**Non-iodized salt:** - A salt sample that has been proved by iodine test kit not to have sufficient iodine content in it.

**Rapid iodine test kit** – a reagent used to verify the presence of the required amount of iodine in the salt sample.

**School age children** - refers to ages of children 6 to 12 years.

**Knowledge:**-awareness or familiarity of the respondent about the issue in which the mothers (care takers) should answer at least 75% of knowledge question correctly.

**Good knowledge:** Label of knowledge scores answered greater than 50% of the question correctly.

**Poor knowledge:** Label of knowledge scores answered 50% or less of the question correctly.

**Attitude:** - The way of thinking about something or behaving toward something.

**Strongly agree:** - Firmly hold the same opinion towards factors situation

**Agree:** - hold same: - Opinion towards factor situation

**Uncertain:** - in the middle of the two (Neutral)

**Not agree:** - having different opinion toward factor situation

**Strongly disagree:**- having completely opposite opinion to factor situation

**Favourable:** - Label of attitude for positive statements, responses including strongly agree and agree **or** label of attitude for negative statements, responses including strongly disagree and disagree

**Unfavourable:**- Label of attitude for positive statements, responses including strongly disagree, disagree and uncertain **or** label of attitude for negative statements, responses including strongly agree and agree and uncertain

**Practice:** - To do something regularly as part of one's normal behavior.

**Proper practice:** - Label for subjects without any practice that might result in the reduction of salt iodine content

**Improper practice:** - Label for subjects with any single practice that might result in the reduction of salt iodine content

## CHAPTER FIVE: RESULTS

### 5.1 Socio-demographic description of respondents

Among 395 respondents, 369 (93.4%) were mothers (care takers) of the children while the rest 26 (6.6%) that of adult family members. The mean age of the respondents was 31.38 years (SD of 7.54 and range of 13 – 70 years). Of the total respondents, 377 (95.4%) were females with 15 (3.8%) of them household heads.

373 (94.4%) respondents were married and 274 (70.1%) of them were house wives with no other work. 316 (80.5%) of mothers can at least read and write. The predominant religion of the respondents (mothers) were Orthodox and Muslim by religion which accounted to be about 189 (47.8 %) Orthodox and 146 (37.0 %) Muslim. Similarly 50 (12.7%) were Protestant, 9(2.3%) were Catholic and 1 (0.3%) were others. With regards to ethnicities about 178 (45.1%) were Amhara, 94 (23.8%) were Oromo, 82 (20.8%) were Berta, 17 (4.3%) Tigre and all the rests accounted about 6 % were Shinasha, Gurage, Gumuz and others. Out of 391(100) mothers, 274 (70.1%) were house wives with 84 (21.5%) private organization workers and 13(3.3%) traders, the rest others accounted to be 20 (5.2%) (Table 2)

The average family size per household was 5.28 (SD of 1.9, Range of 2-13). About 145 (36.7%) of households had a size of greater than five, whereas the rest 250 (63.3%) had one to five. The average estimated monthly income of the respondents was 401.7 birr and with the median of 303.4 birr. Seven point eight percent of the respondents had income less than 400 birr and 33.4 % earn less than 1600 birr. (Table 2)

**Table 2:** Socio-Demographic Characterstistic of mothers (caregivers) and fathers in Assosa town, Benishangul-Gumuz Regional State May 2012

Variable	Number (%)
<b>Mother's age group</b>	
• ≤ 20	20 (5.1)
• 21-25	73 (18.7)
• 26-30	119 (30.4)
• 31-35	90 (23.0)
• 36-40	59 (15.1)
• 41-45	13 (3.3)
• 46-50	9 (2.3)
• 51-55	3 (0.8)
• ≥ 56	5 (1.3)
• Total	391(99)

<b>Marital status of the mother</b> <ul style="list-style-type: none"> <li>• Married</li> <li>• Unmarried</li> <li>• Divorced</li> <li>• Widowed</li> <li>• Total</li> </ul>	373 (94.4) 2 (0.5) 5 (1.3) 15 (3.8) 395 (100)
<b>Ethnicity</b> <ul style="list-style-type: none"> <li>• Amhara</li> <li>• Oromo</li> <li>• Berta*</li> <li>• Tigre</li> <li>• Others</li> <li>• Total</li> </ul>	178 (45.1) 94 (23.8) 82 (20.8) 17 (4.3) 23 (5.8) 395 (99)
<b>Religion</b> <ul style="list-style-type: none"> <li>• Orthodox</li> <li>• Muslim</li> <li>• Protestant</li> <li>• Catholic</li> <li>• Others</li> <li>• Total</li> </ul>	189 (47.8) 146(37.0) 50 (12.7) 9 (2.3) 1 (0.3) 395 (100)
<b>Household size</b> <ul style="list-style-type: none"> <li>• 5 or below 5</li> <li>• More than 5</li> <li>• Total</li> </ul>	250 (63.3) 145 (36.7) 395 (100)
<b>Monthly Family income in birr</b> <ul style="list-style-type: none"> <li>• <math>\leq 400.00</math></li> <li>• 401.00-800.00</li> <li>• 801.00- 1600.00</li> <li>• 1601.00-3000.00</li> <li>• <math>\geq 3001.00</math></li> <li>• Total</li> </ul>	31 (7.8) 101 (25.6) 142 (35.9) 56 (14.2) 65 (16.5) 395 (100)
<b>Mother's Occupation</b> <ul style="list-style-type: none"> <li>• House wife</li> <li>• Private organization worker</li> <li>• Trader</li> <li>• Others</li> <li>• Total</li> </ul>	274 (70.1) 84 (21.5) 13(3.3) 20(5.2) 391(99)



<b>Father's Occupation</b> <ul style="list-style-type: none"> <li>• Government employee</li> <li>• Daily laborer, minor works, etc</li> <li>• Merchant or other business (medium to higher)</li> <li>• Farmer</li> <li>• Minor business, trade (commodities, etc ...)</li> <li>• Others</li> <li>• Total</li> </ul>	190 (50.0) 51 (13.4) 43 (11.3) 22 (5.8) 21 (5.5) 64 (16.3) 391(99)
<b>Mother's Education</b> <ul style="list-style-type: none"> <li>• Illiterate</li> <li>• &lt; 6<sup>th</sup> Grad</li> <li>• ≥ 6<sup>th</sup> Grad and above</li> <li>• Total</li> </ul>	77 (19.5) 68 (17.2) 250 (63.3) 395 (100)
<b>Father's Education</b> <ul style="list-style-type: none"> <li>• Illiterate</li> <li>• &lt; 6<sup>th</sup> Grad</li> <li>• ≥ 6<sup>th</sup> Grad and above</li> <li>• Total</li> </ul>	32 (8.1) 54 (13.7) 309 (78.2) 395 (100)

## 5.2. Socio-demographic description of children

A total of 395 children were included in the study from all the four kebeles of Assosa town. The mean number of children between ages of 6 to 12 years in household was 1.29 with SD of 0.66. The mean age for the children was 8.86 years with SD of 2.01. 167 (42.3%) children were aged 10 to 12 years and that of 228 (57.7%) were ages of six and 6-9 years of age. About 206 (52.2%) were males and 189 (47.8%) were females. The median age for males and females were **22.0 and 24.0 months** respectively. For this study, about 111 (28.1%) and 106 (26.8%) children were selected from kebele 03 and kebele 01 respectively. The rest 100 (25.3%) and 78 (19.7%) were introduced from that of kebele 03 and kebele 01 respectively. This is shown in table 3 below. (Table 3)

**Table 3;** Socio-Demographic Characterstistic of children aged 6-12years in Assosa town, Benishangul-Gumuz regional State May 2012

Variable	Number (%)
<b>Age group</b>	
• 6-9	228 (57.7)
• 10-12	167 (42.3)
• Total	395(100.0)
<b>Sex</b>	
• Male	206 (52.2)
• Female	189 (47.8)
• Total	395(100.0)
<b>Number of children in a household</b>	
• Only one	300 (75.9)
• More than one	95 (24.1)
• Total	395 (100)

### 5.3 Prevalence of goiter

Total goiter prevalence in children ages of 6-12 years in Assosa town was 104 (26.3%), out of which within kebele 01 and kebele 02 the prevalence were 36 (34%) and 19 (24.4%) respectively, while within that of kebele 03 and kebele 04 were 37 (33.3%) and 12 (12%) respectively.(Table4)

With respect to the distribution of goiter within sex; 55 (26.7%) of goiter prevalence in children were observed in males, while the rest 49 (25.9%) among that of females. (Table4) Similarly, goiter prevalence within CHILDREN OF AGES 6 TO 12 were counted to be; 6 (9%), 9 (15.8%), 14 (25.9%), 11 (22.0%), 25 (35.2%), 17 (38.6%) and 22(42.3%) respectively

With respect to the distribution of goiter grade, out of the total goiter prevalence, 62 (15.7%) of which were palpable (Grade-1) goiter, while the rest 42 (10.6%) were that of visible (grade-2). The palpable goitre that were observed within age groups of 6–9 and 10–12 were 28 (12.2%) and 34 (20.4%) respectively, while that of visible within age groups of 6–9 and 10–12 were counted about 12 (5.3%) and 30 (18.0%) respectively. Similarly, from the total 104 (26.3%) goiter prevalence, palpable goiter within males and females were 35 (17%) and 27 (14.3%) respectively and that of visible goiter found in similar order of age groups were counted to be 20 (9.7%) and 22 (11.6%) respectively. The palpable goitre within households that had only one child and that of more than one were 41 (13.7%) and 21 (22.1%) respectively, while that of visible within the same doses of the groups counted to be 26 (8.7%) and 16 (16.8%) respectively. (Table 4)

**Table 4:** Prevalence of goiter in children aged 6 to 12 years by geographic and socio demographic variables in Assosa town, Benishangul-Gumuz Region. May 2012.

Variable	Normal (%)	Grade-I (%)	Grade-II(%)	Total (%)
<b>Age group</b>				
• 6-9	188 (82.5)	28 (12.2)	12 (5.3)	40 (17.5)
• 10-12	103 (61.7)	34 (20.3)	30 (18.0)	64 (38.3)
• Total	291(73.7)	62 (15.7)	42 (10.6)	104 (26.3)
<b>Sex</b>				
• Male	151 (73.3)	35 (17.0)	20 (9.7)	55 (26.7)
• Female	140 (74.1)	27 (14.3)	22 (11.6)	49 (25.9)
• Total	291 (73.7)	62 (15.7)	42 (10.6)	104 (26.3)
<b>Kebele</b>				
• 01	70 (66)	18 (17)	18 (17)	36 (34)
• 02	59 (75.6)	12 (15.4)	7 (9)	19 (24.4)
• 03	74 (66.7)	25 (22.5)	12 (10.8)	37 (33.3)
• 04	88 (88)	7 (7)	5 (5)	12 (12)
• Total	291 (73.7)	62 (15.7)	42 (10.6)	104 (26.3)
<b>Children size per HH</b>				
• Only one	233 (77.7)	41 (13.7)	26 (8.7)	67 (22.4)
• More than one	58 (61.1)	21 (22.1)	16 (16.8)	37 (38.9)
• Total	291 (73.7)	62 (15.7)	42 (10.6)	104 (26.3)

#### 5.4 Prevalence of iodized salt utilization of households

According to the rapid iodine test results that had been made from 393 total number of study household samples; 106 (27%) sampled salts were found to have no any iodine content (0 PPM), while 208 (52.9%) had that of less than 15PPM and the rest 79 (20.1%) were with proper amount of iodine contents as was set by the national regulatory Authority. Thus, summarizing these in to two groups of based on the criteria fulfillment; 314 (79.9%) households had been utilizing salts that had below the standard minimum criteria set by the Quality and Standard Authority of Ethiopia, while the rest 79 (20.1%) were utilizing that of fulfilled. (Table 5)

**Table 5:** Distribution of iodine content of sampled salts with respect to unit ppm and the nationally set criteria, Assosa town, Benishangul-Gumuz Regional State, May 2012.

Salt iodine level measurement	Level of iodine	Number (%)
Per unit ppm	Nil (0)	106 (27)
	Less than 15 ppm	208 (52.9)
	Equal to or greater than 15ppm	79 (20.1)
	<i>Total</i>	393 (100)
Per standard	Below the standard	314 (79.9)
	Fulfilled the standard	79 (20.1)
	<i>Total</i>	393 (100%)

### 5.5 Prevalence of cassava use

Out of 395 total respondents of the households in Assosa town, 63 (15.9%) of them gave their response as used cassava for consumption, while the rest 332 (84.1%) gave that of never used. Among these users 19 (4.8%) and 41 (10.5%) of them were replied as to use it in frequency of once or more than once per week and less than once per week respectively. Similarly, out of 58 valid response given by households as had been used cassava for the family consumption, 9 (2.3%) of them were used it for the duration of five or greater than five years, whereas the rest 49 (12.5%) for that of less than five years. as illustrated in table 6 below.

**Table 6:** Cassava consumption status of households in Assosa town, Benishangul-Gumuz region May 2012'

Variables		Number (%)
Use cassava as food for the family?	Yes	63 (15.9%)
	No	332 (84.1%)
	<i>Total</i>	395 (100)
Frequency of use	once per week	19 (4.8%)
	< once per week	44 (11.13%)
	never used	332 (84.7%)
	<i>Total</i>	395 (100)
Duration of use	< 5 years	49 (12.4%)
	=>5 years	9 (2.3%)
	Could not remember	5 (1.3%)
	<i>Total</i>	395 (100)

## **5.6 Mother's Knowledge, Attitude and practices on iodized salt**

Based on five iodized salt knowledge related questions offered to mothers (respondents), out of the total 392 respondents, 308 (78.6 %) of them were replied as heard regarding to iodized salt. Likewise, 101 (27.8 %) and 146 (40.2%) of the total respondents were able to list, write or mention at least one of the sources of iodine and the prevention methods of IDD's or daily consumption of iodized salt as could prevent iodine deficiency disorders respectively. Similarly, 177 (48.8%) and 154 (42.4) of them were able to identify the advantages of the iodized salt and effects of IDD's respectively. (Table 8)

Likewise, based on six types of iodized salt related attitude inquiries presented to 395 mothers (respondents), about 239 (60.5%) of them provided proper attitude responses towards it, while the rest 156 (39.5%) gave that of improper. Thus, from the total 395 respondents, 54 (13.7%) of them gave their response as not to believe that food prepared with iodized salt tastes less delicious than non-iodized salt does, while that of 264 (66.8%) and 264 (66.8%) believed that iodized salt did not incur more cost than its benefits and that did not believe in giving of iodized salt to small children as inadvisable respectively. Similarly, about 285(72.2%) and 282 (71.4%) of the mention total respondents believed that iodized salt should as to be handled in the store, household etc with great care than non-iodized salt and that of believing in advising their family members to use iodized salt. 282(71.4%) of the respondents were also gave their response as to believe in using (preferring) iodized salt than non-iodized salt. (Table 8)

Among the assessed mothers' practices, improper salt adding practice of the mothers (food handlers) found to be 86 (21.9%). Out of those improper salt adding practice; 24 (6.1%) were usually add salt during food cooking, while the rest 62 (15.8%) were that of at early and the middle of cooking. But, the rest 307 (78.1%) of mothers were usually add at the end of cooking (Table 8)

Likewise, out of the total 394 valid respondents 14 (3.6%) of them were usually expose salt to the sun light, which is improper practice, whereas that of the remaining 378 (96.4%) did not. Similarly, 380 (96.7%) of salt containers in households had cover, while the rest 13 (3.3%) didn't. Almost 392 (99.7%) food caterers were usually store salt in dry places, while one (0.3%) stored in moist area. (Table 7)

**Table. 7** Mother’s Knowledge, Attitude and practices on iodized salt and IDD (goiter) Assosa town, Benishangul-Gumuz regional state May2012.

Variable	Status	Number (%)
<b>Knowledge</b>	Yes	177 (48)
	No	192 (52)
	Total	369 (100)
<b>Attitude</b>	Proper	239 (60.5)
	Improper	156 (39.5)
	<i>Total</i>	<i>395 (100)</i>
<b>Practices:</b>		
	• Salt adding	
	*Added during food cooking	24 (6.1)
	* Early and at the middle cooking	62 (15.8)
	Late at the end of cooking	307 (78.1)
	<i>Total</i>	<i>393 (100)</i>
• Sunlight exposure of salt	*Yes	14 (3.6)
	No	378 (96.4)
	<i>Total</i>	<i>392 (100)</i>
• Salt container	With cover	380 (96.7)
	*Without cover	13 (3.3)
	<i>Total</i>	<i>363(100)</i>
• Salt storage place	Dry area	392 (99.7)
	*Moist are	1 (0.3)
	<i>Total</i>	<i>393 (100)</i>
Average total for improper Practices		385 (7.4)

\* Improper practice

## 5.7 Maternal factors associated with goiter

In order to determine what factors associated with goiter in children, several socio demographic and related factors were entered in multivariate logistic regression as can be viewed on table 9 below. Hence, the crude measure of children that were living within monthly family income of less than or equals to 800.00 birr were 1.788 (1.127-2.839) times more vulnerable to contract goiter than within that of families that had a monthly income of greater than 800.00 ETB. The significance was persisted with OR (95% CI) of 1.929 (1.017-3.658) after adjustment had been made to control the confounders (P=0.044)

With respect to nutritional status of households, even though there was no significant association between children’s goiter and iodized salt utilization of the respective children’s households during crude measure, after made adjustments those children who were living within households of not

utilizing iodized salt at the time of the study had a 2.103 (1.013-4.364) times more likely risk of acquiring goiter than those being lived within utilizing households (P=0.046). But in contrast to this no association could be obtained between that of cassava use of households.

Both the crude and adjusted measures of children's goiter with respect to age group had significant association. Thus, children whose age group lied between 6 to 9 years had 0.342 (0.216-0.544) times less chances of acquiring goiter than that of 10 to 12 years. the significance was also holds true after controlling the confounding variables with a OR (95% CI) of 0.320 (0.190-0.538) (P=0.000)

Those children who were living in household's size of 5 or below had a significant association with a crude and OR measure of 0.616(0.390-0.972), but, it could not persist after adjustments were made. (Table 8)

**Table8** Maternal factors associated with goiter in children ages of 6- 12 years in Assosa town, Benishangul-Gumuz region. May 2012

Variable	Goiter status Number (%)		Crude OR (95%CI)	Adjusted OR (95%CI)
	Present	Absent		
<b>Mother's age</b>			1.00	
• < 30yrs	50 (23.7)	161 (76.3)		0.849 (0.501-1.441)
• > 30yrs	54 (30)	126 (70)	0.725(0.462-1.136)	
<b>Religion</b>			1.00	
• Muslim	(28.1)	(71.9)		0.854 (0.430-1.684)
• Other Christian	(25.4)	(74.6)	1.147 (0.724-1.817)	
<b>Ethnicity</b>			1.00	
• Indigenous	(30.4)	(69.6)		1.353(0.616-2.972)
• Non-indigenous	(25.1)	(74.9)	1.307 (0.781-2.186)	
<b>Mother's education</b>			1.00	
• Illiterate	(27.3)	(72.7)		0.595 (0.291-1.216)
• Others	(26.1)	(73.9)	1.062 (0.606-1.860)	
<b>Father's education</b>			1.00	
• Illiterate	(40.6)	(59.4)		1.668 (0.685-4.060)
• Others	(25.1)	(74.9)	2.045 (0.969-4.314)	
<b>Mother's occupation</b>			1.00	
• No work/Hose wife	(27.4)	(72.6)		1.487 (0.746-2.963)
• Others	(26.0)	(74)	1.071 (0.622-1.842)	

**Table 8** Maternal factors associated with goiter in children ages of 6- 12 years in Assosa town, Benishangul-Gumuz region. May 2012

Variable	Goiter status Number (%)		Crude OR (95%CI)	Adjusted OR (95%CI)	
	Present	Absent			
<b>Father's occupation</b>	• Gov't employee	(24.2)	(75.8)	1.00	1.039 (0.558-1.936)
	• Others	(28.3)	(71.7)	0.810 (0.516-1.270)	
<b>Marriage</b>	• Married	97 (26.0)	276(74)	1.00	0.284 (0.021-3.765)
	• Single	7 (31.8)	15 (68.2)	0.753(0.298-1.902)	
<b>Family income</b>	• =<800ETHB	45 (34.1)	87 (65.9)	1.00	1.929 (1.017-3.658)
	• >800ETHB	59 (22.4)	204 (77.6)	1.788(1.127-2.839)	
<b>Household size</b>	• 5 or below	57 (22.8)	193 (77.2)	1.00	0.939 (0.543-1.626)
	• More than 5	47 (32.4)	98 (67.6)	0.616 (0.390-0.972)	
<b>Iodized salt use</b>	• No	89 (28.3)	225 (71.7)	1.00	2.103 (1.013-4.367)
	• Yes	14 (17.7)	65 (82.3)	1.837 (0.981-3.440)	
<b>Sunlight exposure of salt</b>	• Improper	4 (28.6)	10 (71.4)	1.00	0.503(0.107-2.371)
	• Proper	99 (26.1)	281 (73.9)	1.136 (0.348-3.702)	
<b>Salt adding time</b>	• Improper	31 (32.6)	64 (67.4)	1.00	0.983 (0.524-1.845)
	• Proper	73 (24.3)	227 (75.7)	1.506 (0.910-2.492)	
<b>Child sex</b>	• Female	49 (25.9)	140 (74.1)	1.00	0.891 (0.536-1.480)
	• Male	55 (26.7)	151 (73.3)	0.961 (0.614-1.505)	
<b>Child age</b>	• 6-9yrs	40 (17.5)	188 (82.5)	1.00	0.320 (0.190-0.538)
	• 10-12yrs	64 (38.3)	103 (61.7)	0.342 (0.216-0.544)	
<b>Cassava use</b>	• Yes	20 (31.7)	43 (68.3)	1.00	1.013 (0.452-2.267)
	• No	84 (25.3)	248 (74.7)	1.373 (0.765-2.466)	



## 5.8 Child factors associated with goiter

Though the adjusted measure for the distribution of goitre based on the size of children ages of 6-12 yrs groups in households of the town was not significant, the crude measure showed as there was significant associated between them (P= 0.000). Thus, those children found within households that had more than one number of children were at about 0.451 (0.275-0.739) times at less risk of acquiring goiter than within that of only one child. Whereas, both the crude and adjusted measures of distribution of goitre in children based on their age group in the town were significantly associated (P= 0.000). Hence, those children found within age group of 6-9 years were 0.342 (0.216-0.544) and 0.454 (0.271-0.761) times at less risk of acquiring goiter than within that of 6-9 years during crude and adjusted measures respectively (P =0.000 ). Otherwise there were no difference in goitre rate between sexes of children (P= 0.931) both with and without made adjustments. As compared to kebele 04, kebele 01 was 3.771(1.827-7.786) and 3.116 (1.480-6.560) times at high risk of acquiring goiter during the crude and adjusted measures respectively. These were significant at P value of 0.001 and 0.002 respectively (Table 9)

**Table9.** Child factors associated with goiter in Assosa town, Benishangul-Gumuz region. May2012.

Variable	Goitre status		Crude OR (95 % CI)	Adjusted OR (95% CI)
	Present Number (%)	Absent Number (%)		
<b>Children size (age6-12 yrs)</b> • only one • more than one	67(22.3)	233 (77.7)	1.00	0.694 (0.389-1.241)
	37 (38.9)	58 (61.1)	0.451(0.275-0.739)	
<b>Child age group</b> • 6-9 years • 10-12	40 (17.5)	188 (82.5)	1.00	0.454 (0.271-0.761)
	64 (38.3)	103 (61.7)	0.342 (0.216-0.544)	
<b>Sex of children</b> • Female • Male	49 (25.9)	151 (73.3)	1.00	1.021 (0. 637-1636)
	55 (26.7)	140 (74.1)	0.961 (0. 614-1.505)	
<b>Kebele</b> • Kebele 1 • Kebele 2 • Kebele 3 • Kebele 4	36 (34.0)	70 (66)	1.00	3.116 (1.480-6.560)
	19 (24.4)	59 (75.5)	1.597 (0.830-3.074)	
	37 (33.3)	74 (66.7)	1.029 (0.586-1.807)	
	12 (12.0)	88 (88.0)	3.771(1.827-7.786)	

## CHAPTER 6; DISCUSSION

This study showed that total goiter prevalence among children ages of 6-12 years in Assosa town to be 104 (26.3%). This is in line with the following three study findings conducted in Ethiopia. According to the first national level study finding conducted on 36,635 school age children goitre prevalence was 30.6% (29). The second study, an interventional study conducted in Awassa, South Ethiopia showed that total goiter prevalence among school age children were 56.4% (32). The third, a baseline survey for goiter prevalence conducted among five endemic regions and four non-endemic regions from 1988 to 1991E.C. revealed that both endemic and non-endemic regions had higher goiter prevalence than previously reported. The goiter prevalence was 21.80 (30). Disparity to the current study finding was that the prevalence was higher in the first two of the mentioned studies. Among possible explanations for the observed discrepancies is differences in topography of land in which the previous study areas, as compared to that of the present, are situated in high lands, which in favors the land to be eroded so easily so that iodine content of the land will be depleted, consequently more goitrous children occurrence will be more likely. The second elucidation is relative to Assosa town, food caterers and most of the population in those comparative study areas had in general lower educational backgrounds and poor knowledge, attitude, and practice with respect to iodine or iodized salt use so that accordingly it could lead to the existence of such more number of goiter cases. Others determinants such as difference in the growth of the towns and that of societal economic, demographic and cultural factors, and the like might directly or indirectly influence the goiter prevalence could also be cited as reasons for the existence of difference in the findings.

The current study showed that there is significant difference in the distribution of children's goiter among the kebeles of the town. There were relatively higher goiter prevalence in kebele 01 thirty six (34.0%) and kebele 03 thirty seven (33.3%), while lower prevalence recorded in kebele 02 nineteen (24.4%) and kebele 04 twelve (12.0%). Possible explanation for the variation is the more or less homogeneity distribution of food caterers in more of the kebeles that might cause variation in sociodemographic factors such as ethnicity, religion and educational statuses which directly or indirectly influences goiter prevalence because of disparities in utilizing statuses households of such nutrition as iodized salt and goitrogenic (cassava, etc) utilization among the kebeles.

Even if goiter was not significantly different within children's sex ((Male = 55 (26.7%) & Female= 49 (25.9%)) in this study, obviously there were differences in goiter prevalence based on distribution of

children's ages. Thus, generally there were increasing tendency of goiter prevalence with increment on ages (age groups) of children. For instance children with ages of 6 and 7 years had goiter prevalence of 9.0% and 15.8% within their respective age distribution, respectively. Whereas, the last two eligible children ages of 11 and age 12 years, had 38.6% and 42.3% goiter prevalence respectively. Similarly out of the observed total goiter prevalence, goitre that were observed within age group of 6 to 9 and that of 10 to 12 were 40 (17.5%) and 64 (38.3%), respectively. The result could be expected, since as ages of children raising the probability of acquiring goiter could also increase. Likewise, other study findings had showed comparable result of increments in prevalence with increase in ages of children. For example the study on prevalence of iodine deficiency disorder in a highland district in Tigray showed that goiter prevalence increased with age. (21) Therefore this finding is generally acceptable. Another study showed that though the goiter prevalence was higher than the current study the distribution of cases among sexes were almost the same as this study, i.e. a little bit higher prevalence in boys than in girls, thus goiter prevalence among girls was 32.4% while 33.7% of boys were goitrous (P=0.518) (52).

Another study conducted in ten villages from four administrative zones of Oromia region, namely; Shoa, Jimma, Arsi and that of South Nations and Nationalities Peoples State; GamuGofa, declared total goiter prevalence of school children was 53.3% with higher prevalence among female population (56.1% of female population had goitre) and that of males only 50.1% (28). As compared to this study, there was slightly more than two fold total goiter rate and within each sex. Though slightly higher goiter prevalence was observed among female population to the contrary of this study, such slight difference between sexes might be the expected phenomena.

The current study finding demonstrated that amongst 104 (26.3%) total goiter prevalence, 62 (15.7%) were palpable (grade-1) goiter, while the rest 42 (10.6%) were that of visible (grade-2). Here occurrences of goiter by goiter grade had shown some correspondence in that relatively there were lower distributions of goiter grade-2 within each of the following three studies. Among those studies, the one that were conducted in Isfahan; 16 years after the initiation of salt iodization in Iran showed that among the overall 32.9% of 2,331 students who had goiter, 4.6% of them were classified as goitrous grade 2 (visible goiter). Similarly, the second another study conducted in three villages of GamuGofa, Southern Ethiopia, reported that total goiter rate (TGR) in the study sites was 62% while visible goiter rate was 25 %. (38). The third one, an interventional study conducted in Awassa, South Ethiopia showed that visible goiter rate were 28.1% and 28.3% for the same dose groups respectively (25). Thus, contrasting the previous three studies with that of the current, even if there were much

variation among the values of goiter grades within each respective study, all had similarity in the occurrences of prevalence that had lower observation of visible (grad-2) goiter than that of palpable (grad-1) goiter. So the findings were tolerable and the discrepancy in frequency distribution of the study areas is also acknowledgeable, since it could vary from area to another due to many determinant factors. Thus, as compared the current study finding the magnitude of goiter prevalence in all of the previous study findings was much higher. Possible explanation for these discrepancy is the previous study areas were either very much prone to iodine deficiency due to such variations as geographical, social, economical, and cultural determinant factors or other favourable conditions to the occurrence of goiter like knowledge, attitude or practices of the local population towards utilization of iodized salt is less in extent, etc. can be stated. Another likely clarification might be that the findings of this study by itself might not dig out all the existed cases of goiter that could be observed if the study were supported by such techniques or methods as laboratory UIC tests and the likes.

Taking the Quality and Standard Authority of Ethiopia's minimum standard requirement for salt iodine content i.e. equals or greater than 15PPM as a reference, among the total 393 sampled salts gathered from each study HHs of Assosa town, HHs that had been found utilizing of salt below the set minimum standard (<15PPM) in the town was 314 (79.9%) . This implies that the utilization coverage of the HHs in of town was very much limited. Among the total 393 sampled salts of households; 106 (27%) had nil (0 PPM) iodine content, 208 (52.9%) had iodine content of less than 15PPM and the rest 79 (20.1%) had the proper amount of iodine contents as was set by the national regulatory Authority. Though it needs further investigation, here the presence of some iodine content (<15PPM) within the tested salt samples might indicate that either there were a loss of iodine from salt by the time it reaches to consumption level in households or salts were being sold from the iodized selling shops that did not satisfied the set standards. To sum up 314 (79.9%) households had been utilizing salts that had nil or beneath the standard minimum requirement of iodine content, while the rest 79 (20.1%) were utilized with the set standard. The findings of this study is more or less comparable with those other study findings such as the 2005 EDHS result of the national survey of households at regional level, according to the result, iodized salt utilization households in Dire Dawa were found to be the most likely to consume salt that was adequately iodized (62 percent) while in that of Benishangul-Gumuz is the least likely (14 %). It is also compatible with study result that was conducted in Shebe town in Seka Chekorsa district of Jimma zonal administration, Oromiya regional state. The study finding at the stated area, Shebe town, showed that 81% of household salt samples had iodine levels below the nationally set minimum standard. (59)

It is also in line with the finding that was reported in an endemic district of North India where 80% of salt samples contain less than the minimum recommended level by the government of 15mg/kg, despite an official ban on the entry of non-iodized salt since October 1982 (55). Another study that had similar study findings with this study was that conducted within an extended Guatemalan community which showed 50 salt samples (86%) had a concentration below 60PPM, the legal criteria at that time (54).

Except iodized salt utilization households of Dire Dawa, the rest of all the above findings, had very low iodized salt utilization coverage which could implied that population found within the areas, children and pregnant mothers in particular, are at high risk of developing or had already developed IDD. Thus, the finding of this study should alert one to undertake the necessary measures as urgently as possible in order to tackle the worsening of the problem.

Cassava utilization status of households in Assosa town was very much limited. Of the total of 395 respondents of the households in the town, 63 (15.9%) of them gave their response as used cassava for consumption, while the rest 332 (84.1%) gave as never used. Among these users 19 (4.8%) and 41 (10.4%) of them were replied as to use it in frequency of once or more than once per week and less than once per week respectively. Similarly, out of 58 valid response given by households as had been used cassava for the family consumption, 9 (2.3%) of them were used it for the duration of five or greater than five years, whereas the rest 49 (12.4%) for that of less than five years. Another study that was conducted under a title of “The Role of Changing Diet and Altitude on Goitre Prevalence in Five Regional States in Ethiopia” showed that out of 729 study households in the Benishangul Gumuz region, 257 (35.2%) of them used cassava for the family consumption. That is more than double consumption coverage of the current study. The possible explanation for the observed differences was because of the scope (representativeness) of the study subjects between the two was different, i.e. the current study inferences only Assosa town’s population, which relatively had proper knowledge, attitude and practices as compared to the regional study. Thus, the result is tolerable to be accepted.

Here below is comparison made between this study finding and that of study carried out in Shebe town, South West Ethiopia among food caterers knowledge related to iodine deficiency. (59) Based on this, according to this study finding 78.6% of respondents (food caterers) of Assosa town were replied that they had ever heard about iodine, iodized salt, IDD or goitre, while on the other side of the study only 28.4% of food caterers gave similar response about iodized salt.

As compared to food caterers' knowledge of Shebe town, there was considerably more information about iodine, iodized salt, IDD or goitre, which might help one to make an intervention iodized salt use program. The possible explanation to this discrepancy is that as compared to town Shebe, which is a capital to one of the woredas (district) of Jimma zone, Assosa town is the regional capital (Benishangul-Gumuz Region), thus the population of Assosa town could have a comparative advantages to acquired not only information but also that of access to utilize iodized salt in ease way. Additionally Assosa city's population would be believed to be more literate than that of Shebe. Thus, one could not be puzzled to get such differences. Of course other conditions, such as information bias could be considered here.

Only 27.8 % and 40.2% of the total eligible respondents were able to list, write or mention at least one of the sources of iodine and the prevention methods (consumption of iodized salt as could prevent iodine deficiency disorders) respectively, whereas on the other study there was only 23.4% of food caterers knew that daily consumption of iodized salt could prevent iodine deficiency disorders; Possible explanation to this is as compared to the previous ever heard inquiry presented to respondents; here one might expect respondents to answer more specifically (give more detail information). Thus a decline in providing of the correct answer is expected. Thus, based on the findings, there were more food caterers' with appropriate knowledge in Assosa town than in that of Shebe town. Other than the given possible explanation, the previously mentioned factors could also be considered here.

Similarly, 48.8% and 57.6 0% of them were able to identify the advantages of the iodized salt and effects of IDDs respectively, while ninety 32.1% of food caterers were able to identify at least one effect of iodine deficiency and 10% gave two or more effects of IDD.

Here there was also a better knowledge status was showed by food caterers of Assosa town. The above mentioned possible conditions could also hold true here. To sum up the result, although as compared to Shebe town there was better iodine deficiency knowledge of food caterers in Assosa town, knowledge about iodine deficiency was low among mothers (food caterers) in both study areas.

According to the current study findings, out of 395 respondents (food caterers) interviewed, 304 (77.0 %) of them were responded that they had heard of iodine, iodized salt, IDD or goitre. Among the total 395 respondents about 235 (60.4%) of them had favourable attitude towards iodized salt. Another similar study conducted in Shebe town, south west Ethiopia about food caterers knowledge on iodine deficiency showed that out of 299 food caterers interviewed, 85 (22.4%) of them responded that they had heard of iodized salt and were asked about their attitude towards it, as a result of that in general,

239 (60.5) household food caterers had favourable attitude towards iodized salt. The possible explanation to this could be, since there was a big discrepancy between food caterers' knowledge of this study finding (comparatively, more number of food caterers with appropriate knowledge found in Assosa town) and that of study conducted in Shebe town, therefore more number of food caterers' with proper attitude would be expected in Assosa town. For that reason, we can conclude that although there was no sufficient observation of favourable attitude towards iodized salt, as compared to the previous study area Assosa town had better attitude towards iodized salt.

Most, 307 (78.1%) of the food caterers had proper practice related to iodized salt, they usually add salt late at the end of cooking, while the rest 86 (21.9%) add salt in the early beginning and in the middle of cooking which is an improper practice. Similarly the same study that was conducted in Shebe town showed that almost half of the food caterers 148 (49.5%) had proper practice related to iodized salt, they usually add salt late at the end of cooking, while nearly equal proportion 151 (50.5%) add salt in the early beginning and in the middle of cooking which is improper practice. (57).

Comparing the above two study findings, we could suggest that there were more food caterers with appropriate knowledge and attitude in Assosa town than that of Shebe town and the presence of this appropriate knowledge and attitude of food caterers consequently could direct to food caterers' proper practices of iodized salt handling like proper salt adding practice. Based on these proportionally the existence of more food caterer's who had proper salt adding practice in Assosa could be reasonable.

Very limited number of food caterers exposed their salt to sunlight. Out of the 394 valid respondents only 14 (3.5%) of them had improper practice of salt exposure to the sunlight, while the remaining 378 (96.4%) did not. The majority 380 (96.7%) of salt containers in the households had cover. Almost all 392 (99.7%) food caterers were stored their salt in dry places, while only one (0.3%) stored in moist area. (59) Likewise study that was conducted in Shebe town reported that most (73.9%) of the food caterers exposed their salt to sunlight while the remaining 78(26.1%) did not. The majority (93%) of salt containers in the households had cover but the remaining 21(7%) did not. Almost all (99.3%) stored their salt in dry places while two (0.7%) food caterers stored in moist area. With the exception of big discrepancy showed in food caterers' salt adding practices, both study findings showed almost similar results that had high good practices coverage in the other two food caterers practices, i.e. good practices of salt containers cover and salt storing place, which were little bit higher good practices of food caterers coverage in Assosa town. The likely explanation for the likelihood occurrence of such

discrepancy in the sunlight exposure of salt were due to the majority of food caterers (78.3%) had poor knowledge. As clearly indicated in the previous research study this may be because almost half of food caterers were illiterate, and with less exposure to media in Shebe town, while in this study only 77 (19.6%) of food caterers were illiterate and relatively with more exposure to media. Other possible reasons for observing the discrepancy here might be difference in food caterers' attitude towards iodized salt could be mentioned.

Exposure of salt to sunlight was very much limited and was not significant in Assosa town. Thus, among 394 total valid respondents only 14 (3.6%) were exposing salt to sunlight. Unlikely to Assosa town, other study findings conducted in Shebe town showed that among 299 total valid respondents most, 221(73.9%) of them had improper practice of exposure of salt to sunlight in the town which was significantly associated with female sex ( $P < 0.01$ ), ethnicity ( $P = 0.02$ ), occupation ( $P = 0.01$ ). (57)

Possible clarification to the obtained difference is because of sociodemographic & economic discrepancy that was existed between the two areas. As stated earlier among those differences, educational, cultural, religious, entity could be mentioned here. For instance the educational level of food caterers in Assosa town as compared to that of Shebe were much better and better education may influence good practice, through better awareness about iodized salt, even though education was not significantly associated in both of the cases. According to possible reason given by the previous study, the area had such cultural practices including preparation of spices like pepper ("Berberre") evidenced in those who are orthodox Christians who probably might be Amhara. But if one considered the religious factor according to the current real situation in Assosa town, because of the respondents better educational back grounds and that of environmental situation (city with better information, access and the like) it could not be true. Thus, because of these and others reasons the differences perhaps occurred. The current study did not include sex as one of factors because all respondents were expected to be mothers of children as in after conducted the study almost all were females. Generally as the above findings demonstrated, as compared to the total 394 valid sample size, the number (coverage) of sunlight exposure of salt within each group was very much limited (small), thus generally, it may be so difficult to give final conclusion.

Based on sociodemographic characteristics of mothers of the respective family member it was found that households' iodized salt utilization coverage with respect to age group of mother's (caretakers) of children had no considerable differences. Thus, 19.0% mothers within the age group of less than 30



years were found to preserve iodized salt at the time of data collection, while 21.9% of mothers within that of beyond 30 years. Thus, this might indicate without basing the maternal age status, one should have to be urged to intervene such programs as awareness rising program, universal iodized salt supply, and the like so as there could be a better need in iodized salt need and use.

As compared to Muslim mothers, those other Christian mothers had better iodized salt utilization coverage at the time of data collection using the RIT kit. Thus, among 146 total Muslim mothers (food caterers) of children, only 17 (11.6%) of them were serving their respective families with salt iodine content that fulfilled the nationally set minimum standard, whereas out of 246 total Christian mothers (care takers) 62 (25.2%) of them were found to utilize iodized salt in accordance with the set standard. With respect to ethnicity, as compared to the five indigenous ethnic groups of the region, the non-indigenous populations were found to have a better iodized salt utilization coverage 69 (22.9%), while the indigenous ethnic groups had iodized salt utilization coverage of 10 (10.9%) in the town.

Children's age and their location (Kebele) were among factors that determined goiter in children. Children whose age group were between 6-9 years were about 0.454 times at less risk of acquiring goiter than within that of 6-9 years ( $P=0.000$ ). The possible explanation to the rise in goiter prevalence with respect to the rise in ages (age groups) of children is that as the ages of children increases the probability of acquiring goiter also increases and this was also supported by elucidating significant associations among children's age group ( $P < 0.001$ ). (19). With respect to sex of children, there was no difference in prevalence of goitre between them. ( $P= 0.931$ ). Another factors associated with children's goiter were geographical location of children. Thus, as compared to children who were residing in kebele 04, those who were residing in kebele 01 was at about 3.116 (1.480-6.560) times at high risk of acquiring goiter. ( $P=0.002$ ). This could be explained by variability of the kebeles in the distribution of socio demographic factors of populations, which might have linkage with goiter in the town. These could be; religion, ethnicity, knowledge and educational status, etc. As clearly observed in Assosa town, those populations with similar characteristics are usually inclined to reside together.

Family income was one of the important sociodemographic predictors of children's goiter in Assosa town. Thus, at about children that were living within monthly family income of less than or equals to 800.00 birr were 1.929 (1.017-3.658) times more vulnerable to contract goiter than within that of families that had a monthly income of greater than 800.00 birr. ( $P=0.044$ ) this is clear, since those families, with better income status could afford in buying of iodized salt which is comparatively more

expensive to non iodized salt. other factors, such as mother's or father's educational level, which is most of the time proportional to family income could also boost to play important roles to obtain and utilize iodized salt.

With respect to nutritional status of households, even if cassava use of households of children's were not found to be determinant factor for children's goiter, that of by iodized salt utilization of households was found to be significant after adjustments had been made to control for founders. Therefore children who were living within households of not utilizing iodized salt were at about two fold times higher likelihood of acquiring goiter than within that of utilizing households ( $P=0.046$ ). even though as compared to prevalence of goiter within non cassava consuming families 84(25.3%), there were increased number of goitrous children within that of consuming (31.7%), no significant associations were observed based on use of cassava within the respective households, even after disaggregating use of cassava both by frequency and duration of use. But, other study conducted at regional level in the region could elucidate cassava as determinant factor for goiter in children ( $P=0.008$ ).

Possible explanation for this is that as compared to this study finding, number of cassava consuming households 257 (34.9%) and goitrous children 133 (51.8%) in the previous study were much more than that of the current (25.3%). Thus, the non-significance association could be obtained; because of the fact that distribution cassava consumed families and that of goiter cases were not sufficient to elucidate the significance (60)

In addition to entered as one of the factors to determine children's goiter by sociodemographic and geographic location of children, age group of children were entered as one of the maternal, sociodemographic and economic variables to determine goiter. As a result it was also found to be as one of the factors associated with children's goiter. Thus children whose age group lied between 6 to 9 years had about 0.34(0.22-0.5) times less chances of acquiring goiter than that of 10 to 12 years. This implies that as ages of children increases the probability of acquiring of goiter was increasing too.

There was a temporal relation based on family size which might have an effect in children's goiter.

Based on the iodized salt knowledge of mothers (respondents), of the total 369 valid mothers, almost half 177 (48%) had improper knowledge on iodized salt, iodine deficiency disorder or goiter. Likewise, with respect to mothers attitude, on average out of 395 respondents, about 156 (39.5%) of mothers had improper attitude towards iodized salt.

Though the above figures observed figure seem to be controversial, i.e. as compared to knowledge of mothers more number (coverage) of observation figured out in proper mothers' attitude, it could be tolerable as mothers' that could be inclined (show attitude) towards something without having the knowledge to what they inclined to.

With respect to salt handling practices of mothers, amongst the four assessed mothers salt handling practice of Assosa town, the salt adding practice of mothers was found the top most count of improper practices 86 (21.9%), while all the rests were that of below 3.3% coverage. Similarly, other study showed that socio-demographic factors such as ethnicity, religion, sex, lower educational level of food caterers might have an influence on poor, household practices like improper salt adding practices, exposure of salt to sunlight and the like. (59).

## **CHAPTER 7; LIMITATIONS OF THE STUDY**

### **7.1. Study limitations**

Because of resource constraints the scope of this research had limitations to carry out other more sensitive assessment methods such as urinary iodine excretion, blood TSH level, ultrasonography, and the like. However, it is obvious that the paper can provide the required information about goiter (IDD) and what measures need to be undertaken by decision makers in the locality and its surroundings.

Current practice of iodization may not show previous practice and other possible causes of goiter remain to be explained

However repeated training were given to data collectors, a possibility might still existed for misclassification of goiter grade I.

### **7.2. Strengths of the study**

The non-response rate was very much limited.

The study was carried out just after the implementation of the national law (January, 2010) for the universal salt iodization of Ethiopia (“Iodized salt control directive number 5/2004EC, FMHACA).

This is a community based study which is very approximate to the reality and it employs quantitative methods which minimizes subjectivity

The study of household goitre survey for CHILDREN OF AGES 6 TO 12 years for Assosa town is believed to be first time.

## CHAPTER 8; CONCLUSION AND RECOMMENDATIONS

### 8.1 Conclusion

Assosa town, with 26.3% goiter prevalence of children is endemic to iodine deficiency and the prevalence of goiter in the children of Assosa town is high.

When there is less than 90% of HHs in a community used iodized salt effectively, WHO considers IDD a public health problem of the area. Thus, the 20.1% iodized salt utilization coverage of Assosa town, demonstrated IDD to be a public health problem of the local community.

There was significant association of goiter with age or age group of children ( $P=0.000$ ), which was increasing with increase in age and age group. However, there was no differences in goiter by children's sex observed ( $P=0.862$ )

At the time of this study, very low percentage of families 79 (20.1%) found to consume salts that had iodine content of below the nationally stipulated level in the town.

Maternal factors such as iodized salt use and family income and child factors child age and their residence (kebele) area found to be important sociodemographic predictors of children's goiter in Assosa town.

Cassava use of families, which was very much limited in the town (15.9%) were found to have no difference in children's goiter in this study; suppose that were due to the consumption status of the community was not widely, frequently and/or for reasonable time duration.

Though, relative to educational level, knowledge, attitude and practices of mothers (food caterers) of Shebe town, there were better coverage in Assosa town, practically their knowledge, attitude and practice on several aspects of iodized salt (IDD), including link between cassava consumption and goiter were found to be very poor in the town.

## **8.2 Recommendations**

Treatments for goitre should be instituted by the health sector with close collaboration of relevant stake holders.

Since, there is less than 90% of HHs in Assosa town used iodized salt effectively, based on the WHO set criteria program has to be established to eliminate IDD as a public health problem of the local community.

There should be shared responsibilities by such sectors as QSA, the MOH and stake holders & others in order to implement continuous monitoring of iodized salt including the law that bans marketing of non-iodized salt.

In order to increase the demand for iodized salt and to undertake appropriate preventive measures of IDD/goiter by the local community, IECs, which raise community awareness about the effects consuming iodized salt and goitrogenic substances such as cassava, should be conducted in the town.

Iodized salt should be made available at an affordable cost to the community and there should be a sign that enables the community to distinguish it from non-iodized salt.

In order to dig out majority victims and susceptible IDD cases as much possible, further studies that are supported by other modernized data collecting tools such as laboratorial assisted measurements of UIC need to be conducted.

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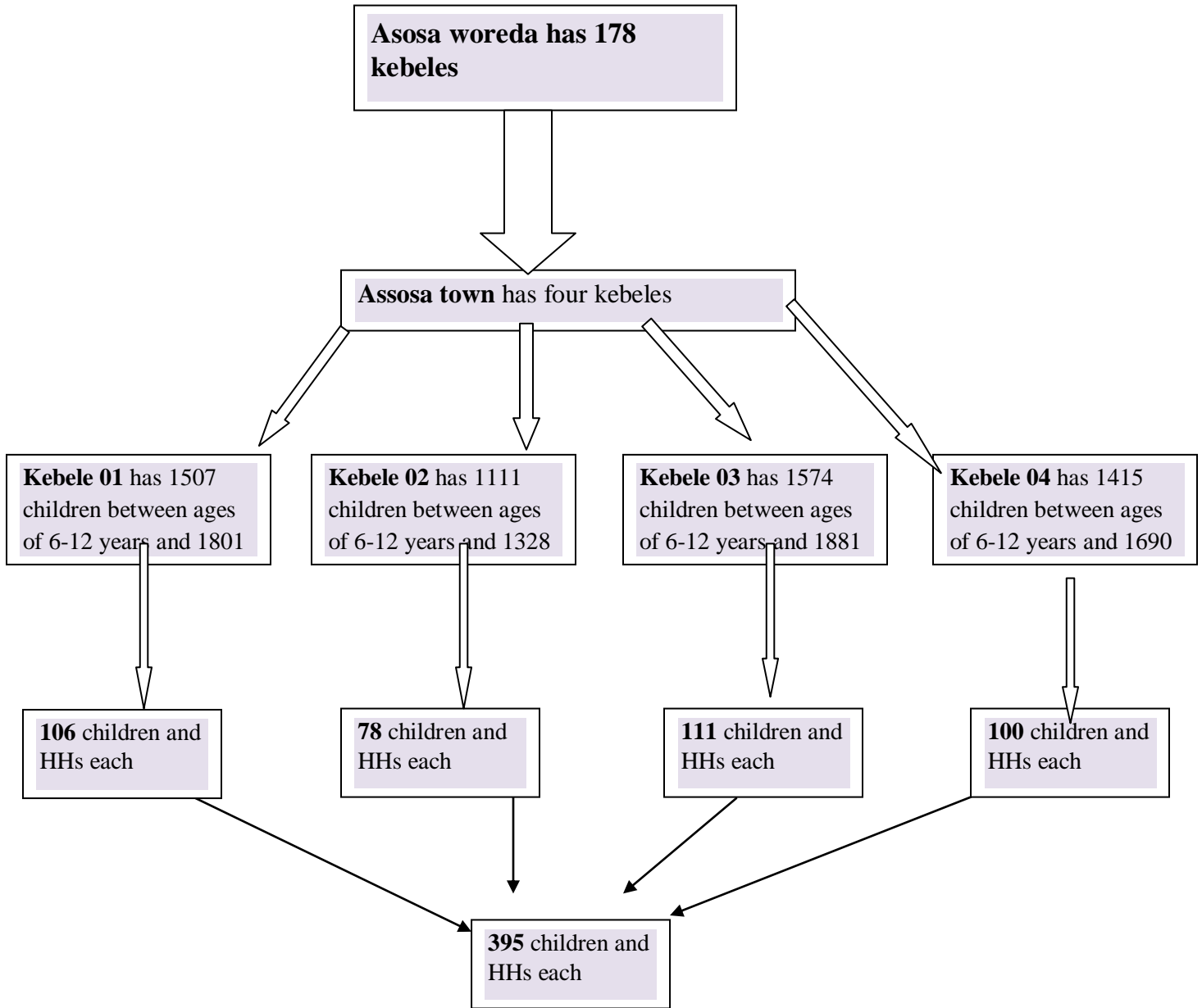


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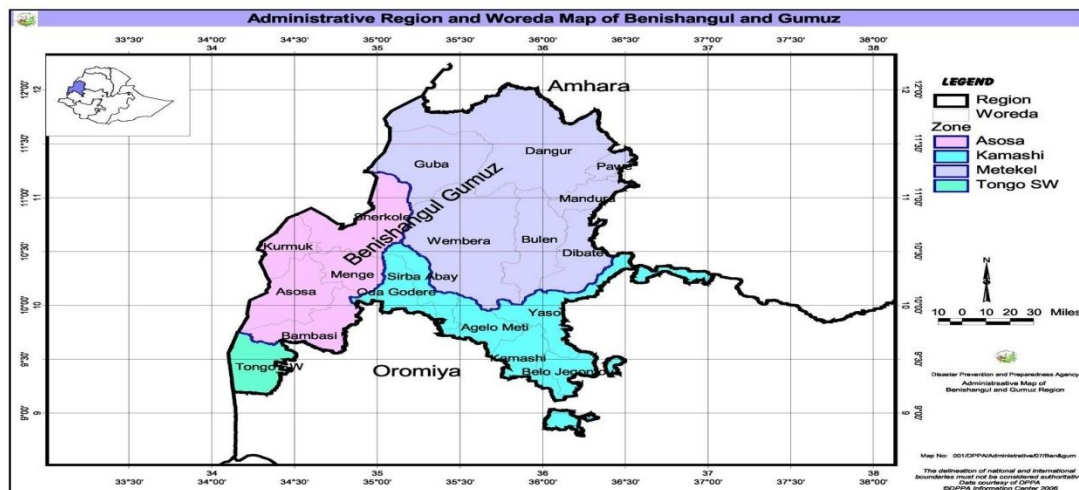
**ANNEXES;**

**Annex- 1 Diagrammatic presentation of the sampling procedure in Assosa town**



## Annex- 2 Administrative map and Distribution of children

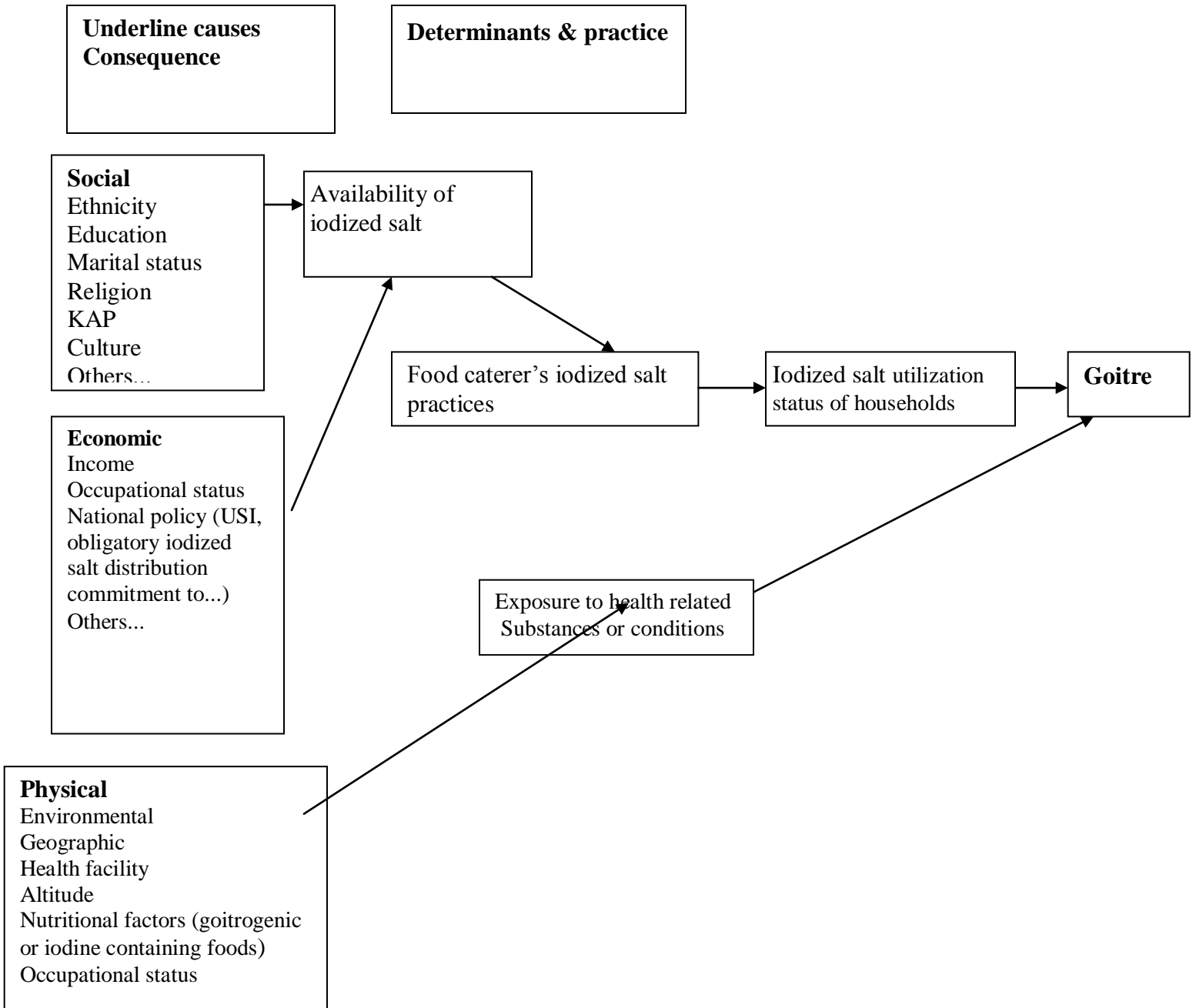
### Annex 2.1 Administrative region and woreda map of Benishangul-Gumuz Regional State (5).



### Annex 2.2 Distribution of children between ages of 6-12 by kebele and HH in Assosa town, Benishangul-Gumuz. May 2012 (50)

Kebele	Number of Population	Number of HHs region			Number of Children Between ages of 6-12 years		
		Total	Sample selected (based on PPS)	Actual Sample Collected	Total	Sample selected (based on PPS)	Actual Sample Collected
01	8103	1801	106	106	1507	106	106
02	5975	1328	78	78	1111	78	78
03	8463	1881	111	111	1574	111	111
04	7605	1690	100	100	1415	100	100
Total	30,146	6,700	395	395	5,607	395	395

Annex-3; Conceptual framework for determinants of children’s goiter and iodized salt utilization and handling practices;



## **Annex- 4 Bottles of 10-50 ml, containing a stabilized starch-based solution (Rapid test kits)**

Rapid test kits



Figure 2: Bottles of 10-50 ml, containing a stabilized starch-based solution (Rapid test kits)  
Rapid test kits

These are small bottles of 10-50 ml, containing a stabilized starch-based solution. One to two drops of the solution placed on salt containing iodine (in the form of potassium iodate) produces a blue/purple *coloration*. These kits should therefore be regarded as qualitative rather than quantitative. Coloration (blush) indicates that iodate is present, but the concentration cannot be reliably determined. In cases where there is suspicion of alkalinity in the salt sample, a drop of the ‘recheck solution’ may be used and the test may be dropped over the drop of recheck solution to indicate the presence of iodine

### **Advantage of rapid test kits**

An advantage of rapid test kits is that they can be used in the field to give an immediate result. They are therefore useful to health inspectors and others who are involved in carrying out spot checks on food quality or household surveys

They may also play a valuable educational role, in that they provide a visible indication that salt actually is iodized. Accordingly, they can be used for demonstration purposes in schools and other institutions. However, because rapid test kits do not give a reliable estimate of iodine content results must be backed up by titration.

There are a large number of test kits available on the market; moreover, many countries are currently producing their own. UNICEF also supplies countries with test kits

## Annex-5: Questionnaire

Questionnaire for a research on assessment of prevalence of goiter among CHILDREN OF AGES 6 TO 12 years and utilization of iodized salt of household and their determinants in Assosa town, Benishangul-Gumuz Region, North West Ethiopia, 2012..

Hello, my name is \_\_\_\_\_, I am one of the data collectors in this study. The study is intended to assess prevalence of goiter in children between ages of 6 to 12 years and behavior of the community on utilization of iodized salt. To attain this purpose, your honest and genuine participation by responding to the questions prepared is very important and highly appreciated.

Confidentiality and consent

We would like you to answer some personal questions. Your answers are completely confidential.. No one will be told what you said in connection to your name. You don't have to answer any question if you do not want to and you can stop the interview at any time.

However your honest answer to these questions will help us to better understand the situation and will contribute to the measures taken to solve the study problem. We would greatly appreciate your help in participating in this study, would you be willing to participate.

If yes, proceed.

If no, thank and stop here.

\_\_\_\_\_  
(Signature of the interviewer certifying that respondent has given informed consent verbally)

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**Jimma University Post Graduate Public Health program**

**Questionnaire for a research on assessment of prevalence of goiter among CHILDREN OF AGES 6 TO 12 years and utilization of iodized salt of household and their determinants in Assosa town, Benishangul-Gumuz Region, North West Ethiopia, 2012.**

Interviewer's Name \_\_\_\_\_

Supervisor's Name \_\_\_\_\_

Date of interview \_\_\_\_\_

Questionnaire No \_\_\_\_\_

**Instructions**

1. Please read each and every question carefully and circle the number which belongs to correct response of the interview and do not forget for completeness of the format before leaving the household.
2. Carefully observe & palpate the presence of goitre in each and every child of ages 6 to 12 years who are member of the selected households' (For physicians /health officers).
3. Strictly follow the standard procedure to collect the required amount (12gm) of salt sample and to test and approve (disprove), and immediately to record it at the spot point or before living each households.
4. Don't forget that the age range of the child should lie between 6 to 12 years.
5. If the child's age is 6 to 12 yrs ask his name, age sex, birth date and year, place of birth and house number.
6. In case, if the child place of birth is different from his current location, specify where he has born and when did he started to live in his current location.
7. Don't forget that in the majority of cases, this questionnaire is designed to obtain data about the children (between 6 to 12 years) and the mother or care taker of the HH. Therefore when collecting data particularly related to knowledge or information status of the family, please record directly about the status of the mother or care taker, unless specified.

**Part-one**

**1. Introduction**

1.1 Name of head of household \_\_\_\_\_

1.2 Total size of household (Total number of members of the household) \_\_\_\_\_

1.3 Occupation of father \_\_\_\_\_

1.4 Number of children ages 6-12 years in the household \_\_\_\_\_

1.5 Name of mothers/food handler of the household (family) \_\_\_\_\_

1.6 Address: \_\_\_\_\_

1.7 Town \_\_\_\_\_ Kebele \_\_\_\_\_ House number \_\_\_\_\_



**2. The physical examination and rapid iodine test results of the HHs;**

**2.1 Physical examination result for the presence of goitre in children ages of 6-12 years in the HH as confirmed by a physician or a health officer**

S.N	Names of children	Age	Sex	Goitre status		
				Absent (Normal)	Present	
					Grade-1	Grade-2
<b>Total</b>						

**2.2 Result of the rapid iodine test for the presence of iodine in the salt sample of the HH:**

S.N	Head of the HH	Sex	Age	Does the salt sample contain the required amount of iodine content?	
				Yes	No

**3. Background information of a mother (care taker).**

3.1 Age: \_\_ sex: \_\_\_\_ M \_\_\_\_ F \_\_\_\_

3.2 Marital status:

A. Married B. Single C. Divorced D. Widowed E. Others (specify) \_\_\_\_\_

3.3 What is your religion?

B. Muslim B. Orthodox C. Protestant D. Catholic E. Others (specify)

3.4 What is your ethnicity?

A. Berta B. Gumuz C. Shinasha D. Mao E. Komo F. Oromo G. Amhara H.Tigre

I. Other (specific) \_\_\_\_\_.

3.5 What is your occupation?

- A. Merchant B. Farmer C. Government employee D. Non Governmental Organization (NGO) employee E. Daily Laborer F. House wife G. Minor trader (Local beer ...) H. Other (Specify)

3.6 How much is the average monthly income of your family in Eth Birr?

- A. ≤ 400 B. 401-800 C. 801- 1600 D. ≥1600

3.7 What is the educational status of the mother/caretaker of the HH

- A. Illiterate B. Able to read and write C. Grade 1-5 C. Grade 6-8 D. Grade 8-12 E. Grade. 12 and above.

**Part-two**

**4. Information on iodine**

4.1 Have you (the mother or caregiver) **heard** about iodine, iodized salt, IDD or goitre?

- A. Yes B. No

If your answer to question number 4.1 is **yes**, please, answer to the following questions numbered from 3.2 to 3.6?

4.2 From which sources of information have you heard about iodine, iodized salt, IDD or goitre? Circle your answer(s).

- A. Radio B. TV C. Health institution D. Posters F. Friends or people G. Others (specify) \_\_\_\_\_

4.3 What are the **advantages** of iodine (list)?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4.4 What are the **effects** or signs and symptoms of IDD's (list)?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4.5 Mention or list **sources** of iodine you have come across?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4.6 What **prevention** methods of IDD's do you know (list)??

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**5. Information on goitre status of children ages of 6-12 years**

4.1 Where did the child born?

- A. Here in Assosa town B. Other place (Specify) \_\_\_\_\_

4.2 If your answer to question number 4.1 is other place, when did the child start to live here in Assosa?

A. Before three two B. After three years C. I don't remember

4.3 If your answer to question number 4.5 is yes, where does the mass started to develop?

A. Here in Assosa town B. Other place (Specify) \_\_\_\_\_

6. From question 5.1 to 5.6 presented below, please select one of the choices you preferred the most;

**6.1** Do you believe (agree) that food prepared with iodized salt tastes less delicious than non-iodized salt does?

A. Strongly agree B. Agree C. Uncertain D. Disagree E. Strongly disagree

**6.2** Do you believe (agree) that iodized salt incurs more cost than its benefits?

A. Strongly agree B. Agree C. Uncertain D. Disagree E. Strongly disagree

**6.3** Do you believe (agree) in giving iodized salt to small children is advisable?

A. Strongly agree B. Agree C. Uncertain D. Disagree E. Strongly disagree

**6.4** Do you believe (agree) that iodized salt should be handled in the store, household etc with great care than non-iodized salt?

A. Strongly agree B. Agree C. Uncertain D. Disagree E. Strongly disagree

**6.5** Do you believe (agree) in advising my family members to use iodized salt?

A. Strongly agree B. Agree C. Uncertain D. Disagree E. Strongly disagree

**6.6** Do you believe (agree) in preferring to use iodized salt than non-iodized salt?

A. Strongly agree B. Agree C. Uncertain D. Disagree E. Strongly disagree

**6.7** If you believe (agree or strongly agree) in using iodized salt to question number 5.6, why do you agree to use it? Because \_\_\_\_\_.

A. iodized salt is cheap B. iodized salt is not available C. iodized salt has more advantage than non iodized salt  
D. other (Specify) \_\_\_\_\_

**6.8** If you are using iodized salt, how often do you use iodized salt?

A. Always B. Mostly (for the most part) C. rarely (infrequently) C. Other (Specify)

**6.9** If you are using iodized salt, for how long have you been using iodized salt continuously?

A. Less than three years B. Between three to five years C. For five or more than five years

D. Don't remember

**7.** From question 6.1 to 6.4 shown below, make a circle to a letter provided in front of your statement of choice in your handling of iodized salt at household level.

**7.1** At what time do you add salt

A. During food cooking

B. Early and at the middle of cooking

C. Late at the end of cooking

D. Total

**7.2** Do you expose salt to sunlight

A. Yes

B. No

C. Total

7.3 Which type of salt container do you use?

A. With cover

B. Without cover

C. Total

7.4 At which storage place do you use to store salt?

A. Dry area

B. Moist area

C. Total

8. From question 6.1 to 6.4 shown below, make a circle to a letter provided in front of your statement of choice in your handling of iodized salt at household level.

8.1 Do you know cassava?

A. Yes      B. No

8.2 Do you use cassava as food for the family?

B. Yes      B. No

8.3            If your answer to question number 8.2 is yes, how frequently you are using cassava?

A. Always   B. Mostly (for the most part)   C. rarely (infrequently)   C. Other (Specify)

8.4            If your answer to question number 8.2 is yes, for how long have you been using iodized salt continuously?

B. Less than three years   B. Between three to five years   C. For five or more than five years

D. Don't remember

8.5 Do you know cassava is a goitrogenic food?

A. Yes      B. No

**Thank you for the information you gave us!!!**

a) Modified Amharic version

መጠይቅ

ከ6 - 12 ዓመት ዕድሜ ክልል ውስጥ ባሉ ህጻናት የሚገኘውን የእንቅርት በሽታ ስርጭት፣ በቤተሰብ ደረጃ የሚታየውን የአዮዲን ጨው የአመጋገብ ስርዓት እና መንስዕዎቻቸውን አስመልክቶ ጥናት ለማድረግ የተዘጋጀ

መጠይቅ ።

አሰሳ ከተማ፣ ቤኒሻንጉል ጉሙዝ ክልል፣ ሰሜን ምዕራብ ኢትዮጵያ፣

ሚያዝያ / 2012 ዓ.ም

እኔ የመጠሪያ ስሜ \_\_\_\_\_ የተባልኩኝ በዚህ ጥናት ውስጥ ካሉት መረጃ ሰብሳቢዎች መካከል አንዱ ስሆን ሰላምታዬን በቅድሚያ አቀርባለሁ። የዚህ ጥናት ዓላማ ከ9 - 12 ዓመት መካከል ባሉ ህጻናት የሚገኘውን የእንቅርት በሽታ ስርጭት፣ በቤተሰብ ደረጃ የሚታየውን የአዮዲን ጨው የአመጋገብ ስርዓት እና መንስዕዎቻቸውን አስመልክቶ ጥናት ማድረግ ሲሆን ጥናቱን ከታለመለት ዓላማ ለማድረስም በርስዎ በኩል በታማኝነትና በሀቀኝነት ለቀረቡት ጥያቄዎች ምላሽ በመስጠት የሚደረገው ተሳትፎ እጅግ አስፈላጊ እና ትልቅ ቦታ ይሰጠዋል።

ሚስጥርን ስለመጠበቅና ማረጋገጫ ስለመስጠት ፣

በጥናቱ ውስጥ ለተወሰኑ ግለሰባዊ የሆኑ ጥያቄዎች ምላሾችን ይሰጡ ዘንድ እንጠብቃለን። በርስዎ የሚሰጡት ምላሾች ሙሉ በሙሉ በሚስጥር የሚያዙ ሲሆን ማንም ሰውም ለሰጡት ምላሽ በስምዎ አንጻር እንዲያውቀው አይደረግም። ምላሽ ለመስጠት ፈቃደኛ ላልሆኑባቸው ጥያቄዎች ሁሉ መልስ መስጠት የሌለብዎት ሲሆን በማንኛውም ሰዓት መጠይቁን ሊያቋርጡ ይችላሉ።

ነገር ግን ለቀረቡልዎት ጥያቄዎች የእርስዎ በታማኝነት ምላሽ መስጠት ስለሚጠናው ነገር (ሁኔታ) የተሻለ ግንዛቤ እንዲኖረን ሲያደርግ በቀጣይነትም ለታዩት ችግሮች ለሚወሰዱ የመፍትሔ ዕርምጃዎች አስተዋጽኦ አለው። እርስዎ በዚህ ጥናት ላይ የሚያደርጉትን ተሳትፎ በእጅግ እናደንቃለን። በጥናቱ ለመሳተፍ ፈቃደኛ ነዎትን ?

መልስዎ አዎን! ከሆነ ይቀጥሉ፣

መልስዎ አይደለም! ከሆነ ምስጋናችንን እያቀረብን እዚህ ላይ ያቁሙ ።

(መጠይቅ አድራጊው ለመረጃ ሰጪው የቃል መረጃ ስለመስጠቱ ማረጋገጫ (መተማመኛ) ፊርማ)

በጂማ ዩኒቨርሲቲ የህብረተሰብ ጤና ድህረ-ምረቃ ፕሮግራም

ከ6 - 12 ዓመት ዕድሜ ክልል ውስጥ ባሉ ህጻናት የሚገኘውን የእንቅርት በሽታ ስርጭት፣ በቤተሰብ ደረጃ የሚታየውን የአየዲን ጨው የአመጋገብ ስርዓት እና መንስዓዎቻቸውን አስመልክቶ ጥናት ለማድረግ የተዘጋጀ መጠይቅ ።

አሰሳ ከተማ፣ ቤኒሻንጉል ጉሙዝ ክልል፣ ሰሜን ምዕራብ ኢትዮጵያ፣  
ግንቦት / 2012 ዓ.ም

ቃለ መጠይቁን ያደረገው ስም \_\_\_\_\_  
የሱፐርቫይዘር ስም \_\_\_\_\_  
ቃለ መጠይቅ የተደረገበት ቀን \_\_\_\_\_  
የመጠይቁ ቁጥር \_\_\_\_\_

መመሪያ ፣

8. እባክዎን እያንዳንዱንና ማናቸውንም ጥያቄዎች በጥንቃቄ በማንበብ ለየጥያቄዎቹ ትክክለኛውን ምላሽ እንደ ጥያቄው ባህሪ መልስ መስጠቱን ያረጋግጡ (በምርጫ ደረጃ ለቀረቡ ጥያቄዎች ከቀረቡት አማራጮች መካከል አንድ ፊደል ብቻ መስጠቱን፣ በጽሁፍ ደረጃ ለቀረቡት ጥያቄዎች ደግሞ ተገቢውን ምላሽ በተሰጠው ክፍት ቦታ መጻፉን) ። በተጨማሪም የእያንዳንዱ መጠይቅ ክፍለ ጊዜ ከመጠናቀቁ በፊትም ለተገቢው ጥያቄዎች ሁሉ ተገቢውን ምላሽ በተሟላ መልኩ ስለመስጠቱ ሳያረጋግጡ መጠይቅ ከተደረገበት ቦታ አይንቀሳቀሱ ።

9. ለቀረቡት መጠይቆች መልስ የሚሰጠው ሰው በተቻለ መጠን የየቤተሰቡ አባል የሆነች እናት (ጥግዚት(የህጻን አሳዳጊ)) ብትሆን ይመረጣል። ይህ ካልሆነ (ካልተቻለ) ግን የቤተሰቡን ምግብ የምታዘጋጅ (የሚያዘገጅ) ሰው ወይም ከቤተሰቡ ምግብ ዝግጅት ጋር ቀረቤታ ያለው የቤተሰቡን አባል መልስ እንዲሰጥ ያድርጉ።

10. በዚህ ጥናት የሚካተቱ የህጻናት ዕድሜ ከ9 - 12 ዓመት ዕድሜ ክልል ውስጥ የሚገኝ መሆኑን ያስታውሱ።

11. በዚህ ጥናት የሚካተቱ አባወራዎች (ቤተሰቦች) ቢያንስ አንድ ከ9 - 12 ዓመት ዕድሜ ክልል የሚገኝ ህጻን ያለበት መሆን እንዳለበት አይዘንጉ። ማለትም ከላይ በተጠቀሰው የዕድሜ ክልል ውስጥ በቤተሰቡ ውስጥ ከሌለ በጥናቱ እንዳይካተት ተደርጎ በምትኩ በተከታታይ ከሚገኙት ቤቶች መካከል ቢያንስ አንድ በተፈለገው የዕድሜ ክልል ውስጥ የሚገኝበት ህጻን ያለበት አባወራ (ቤተሰብ) ተመርጦ በጥናቱ ይካተታል።

12. በእያንዳንዱና በማናቸውም ለጥናት በተመረጠ ቤተሰብ ውስጥ ከ9 - 12 ዓመት ዕድሜ ክልል ከአንድ በላይ ህጻን ከተገኘ ከመካከላቸው በዕድሜ አንጋፋ (ትልቁ) ህጻን ብቻ በእንቅርት በሽታ ስለመያዙ ምርመራ የሚደረግለት ይሆናል።

13. የዕንቅርት ምርመራው ያላካተታቸው ቀሪዎቹን ህጻናትን በተመለከተ ከላይ በተራ ቁጥር የተገለጸው እንደተጠበቀ ሆኖ ህጻናቱን አስመልክቶ የቀረቡት ሌሎች መጠይቆች መረጃዎቹ መሰብሰብ ይኖርበታል።

14. የእንቅርት በሽታን ለመለየት በሚደረገው የህጻኑ ምርመራ ወቅት በአንገት ላይ እብጠት (እንቅርት) ስለመኖሩ ጥንቃቄ የተሞላበት የምልክታ (observation) እና የዳሰሳ (palpation) ምርመራ መደረግ አለበት።

15. እያንዳንዱ ቤተሰብ የአዮዲን ጨውን እየተጠቀመ እንደሚገኝ ለማረጋገጥ በሚደረገው ጥናት ላይ በአዮዲን መመርመሪያ ኪት (Iodine test kit) ውስጥ ያለቸውን አነስተኛ ብልቃጥ መሰረት በማድረግ ከእያንዳንዱ ቤተሰብ የተወሰደውን የጨው ናሙና በመሙላት እዚያው ናሙናው በተሰበሰበበት ስፍራ ምርመራውን (test) በማድረግ የተገኘውን ውጤት (መረጃ) ወዲያውኑ መዝግበው ይያዙ።

ክፍል አንድ

2. መግቢያ

የቤቱ አባወራ ስም \_\_\_\_\_ ያታ \_\_\_\_\_ ዕድሜ \_\_\_\_\_

የቤተሰቡ አባላት ብዛት \_\_\_\_\_

ከ9 - 12 ዓመት ዕድሜ ክልል ውስጥ የሚገኙ ህጻናት ቁጠር \_\_\_\_\_

የህጻን እናት (ሞግዚት) ስም \_\_\_\_\_

አድራሻ: \_\_\_\_\_

ከተማ \_\_\_\_\_ ቀበሌ \_\_\_\_\_ የቤት ቁጥር \_\_\_\_\_

መረጃውን የሚሰጠው ሰው:-

ስም \_\_\_\_\_ ጾታ \_\_\_\_\_ እድሜ \_\_\_\_\_

በቤተሰቡ ውስጥ ያለው ድርሻ (እናት፣ አባት፣ እህት፣ ወንድም፣ የቤት ሰራተኛ፣ ወዘተ...) \_\_\_\_\_

የት/ት ደረጃ \_\_\_\_\_

ስራ \_\_\_\_\_

8.6 የህጻኑ አሳዳጊ (ሞግዚት) ለህጻኑ ያላት ዝምድና (ቀረቤታ):-

ሀ. እናት      ለ. አባት      ሐ. እንጀራ እናት      መ. የሴት አያት      ሰ. የወንድ አያት      ረ. ሌላ  
(ይጠቀስ) \_\_\_\_\_





10.2 የጋብቻ ሁኔታ:

ሀ. ያገባች ለ. ያላገባች ሐ. የፈታች መ. ባል የሞተባት ሰ. ሌላ (ይጠቀስ)

10.3 የሚከተሉት ሀይማኖት ዓይነት?

ሀ. እስልምና ለ. ኦርቶዶክስ ሐ. ፕሮቴስታንት መ. ካቶሊክ ሠ. ሌላ (ይጠቀስ)

10.4 የብሄር (ብሄረሰብ) ዓይነት?

ሀ. በርታ ለ. ጉሙዝ ሐ. ሺናሻ መ. ማኦ ሠ. ኮሞ ረ. ኦሮሞ ሰ. አማራ ሸ. ትግራይ ቀ. ሌላ (ይጠቀስ) \_\_\_\_\_

10.5 የስራ ዓይነት?

ሀ. በመለስተኛ፣ መካከለኛ፣ በከፍተኛ ንግድ (ሆቴል፣ መደብርና በመሳሰሉት) ለ. ግብርና ሐ. የመንግስት ሰራተኛ

መ. የግል ድርጅት ተቀጣሪ ሠ. በመንግስታዊ ባልሆነ ድርጅት ተቀጣሪ ረ. የቀን ሰራተኛ ሰ. የቤት እመቤት

ሸ. በአነስተኛ ንግድ ስራ (በአረቁ፣ ጠላና በመሳሰሉት ንግድ ስራዎች) ቀ. ሌላ (ይጠቀስ)

10.6 የህጻኑ አባት (አሳዳጊ) ስራ?

ሀ. በመለስተኛ፣ መካከለኛ፣ በከፍተኛ ንግድ (ሆቴል፣ መደብርና በመሳሰሉት) ለ. ግብርና ሐ. የመንግስት ሰራተኛ መ. የግል ድርጅት ተቀጣሪ ሠ. በመንግስታዊ ባልሆነ ድርጅት ተቀጣሪ ረ. የቀን ሰራተኛ ሰ. በአነስተኛ ንግድ ስራ (በአነስተኛ ሸቀጥና በመሳሰሉት ንግድ ስራዎች) ሸ. ሌላ (ይጠቀስ) \_\_\_\_\_

የህጻኑ አባት (አሳዳጊ) ዕድሜ \_\_\_\_\_

10.7 የቤተሰቡ ጠቅላላ አማካይ ወርሀዊ ገቢ (የእናትና የአባት) ስንት ነው (በኢትዮጵያ ብር)?

ሀ.  $\leq 400$  ለ. 401-800 ሐ. 801- 1600 መ. 1601-3000 ሠ.  $\geq 3001$

10.8 በቤተሰቡ የህጻኑ እናት (ሞግዚት) የትምህርት ደረጃ (ሁኔታ) ምን ያህል ነው?

ሀ. ምንም ያልተማሩ ለ. ማንበብና መጻፍ የሚችሉ ሐ. ከ1ኛ እስከ 5ኛ ክፍል መ. ከ6ኛ እስከ 8ኛ ክፍል

ሠ. ከ8ኛ እስከ 10 ረ. ከ11-12ኛ ክፍል(ቅድመ-ዝግጅት) ሰ. 12ኛ (10+2) ክፍል ያጠናቀቁና ከዚያ በላይ

10.9 በቤተሰቡ የህጻኑ አባት (ሞግዚት) የትምህርት ደረጃ ስንት ነው?

ሀ. ምንም ያልተማሩ ለ. ማንበብና መጻፍ የሚችሉ ሐ. ከ1ኛ እስከ 5ኛ ክፍል መ. ከ6ኛ እስከ 8ኛ ክፍል

ሠ. ከ8ኛ እስከ 10 ረ. ከ11-12ኛ ክፍል (ቅድመ-ዝግጅት) ሰ. 12ኛ (10+2) ክፍል ያጠናቀቁና ከዚያ በላይ

ክፍል ሁለት

11. በጥናቱ ዙሪያ ያተኮሩ ልዩ መረጃዎች

11.1 የአዮዲን ንጥረ-ነገር፤

11.1.1 የአዮዲን ንጥረ-ነገርን፣ የአዮዲን ጨውን፣ የአዮዲን እጥረት በሽታን (IDD) ወይም እንቅርትን(goiter) በተመለከተ የህጻኑ እናት (ሞግዚት) ሰምተው ወይም መረጃ አግኝተው ያውቃሉን ?

ሀ. አዎን            ለ. የለም

ከላይ በተራ ቁጥር 4.1 ለቀረበው ጥያቄ መልስዎ አዎን ከሆነ ከዚህ ቀጥሎ ከተራ ቁጥር 4.1.2 እስከ 4.1.6 ለቀረቡት ጥያቄዎች መልስዎን ይስጡ?

11.1.2 ስለ አዮዲን ንጥረ-ነገር፣ የአዮዲን ጨው፣ የአዮዲን እጥረት በሽታ (IDD) ወይም እንቅርት (goiter) መረጃ ያገኙት ከምን ዓይነት የመረጃ ምንጭ ነው? (ከተሰጡት አማራጮች መካከል መርጠው መልስዎን ከአማራጮቹ ፊት ለፊት የተሰጡትን ፊደል (ፊደላት) በመክበብ ያስፍሩ). (

ማሳሰቢያ :- የመረጃ ምንጭዎ ከአንድ በላይ ከሆነ መልስዎን ከአንድ አማራጭ በላይ በመምረጥ ፊደላቱን ሊያክቡ ይችላሉ ::

ሀ. ራዲዮ            ለ. ቴሌቪዥን            ሐ. ከጤና ተቋም            መ. ፖስተር            ሠ. ከጓደኛ ወይም ከሌላ ሰው  
ረ. ከትምህርት ቤት            ሰ. ሌላ (ይጥቀሱ)\_\_\_\_\_

11.1.3 መረጃ አግኝተው ከአወቁ ቀጥሎ ከተዘረዘሩት አማራጮች መካከል መረጃ ያገኙበትን መርጠው ከፊት ለፊት የሚገኙትን ፊደላት በመክበብ ያመለክቱ (መረጃ ያገኙት ከአንድ በላይ ከሆነ መልስዎን ከአንድ አማራጭ በላይ በመምረጥ ፊደላቱን ሊያክቡ ይችላሉ) ?

ሀ. አዮዲን            ለ. የአዮዲን እጥረት በሽታን (IDD)            ሐ. እንቅርትን (goiter)            መ. አዮዲን ጨው  
ሠ. ስለተጠቀሱት ሁሉ ሰምቼ አላውቅም            ረ. ምንም መረጃ የለም

ቀጥሎ ከተራ ቁጥር 4.1.3 እስከ 4.1.6 ለቀረቡት ጥያቄዎች መልስዎን በተሰጡት ክፍት ቦታዎች ላይ ዘርዝረው ይጻፉ;

11.1.4 የአዮዲን ንጥረ-ነገር የሚሰጣቸው ጥቅሞችን ይዘርዝሩ?

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11.1.5 የአዮዲን እጥረት በሽታ (IDD) ሲከሰት ሊታዩ የሚችሉ የበሽታውን ምልክቶች ይዘርዝሩ?

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11.1.6 የአዮዲን ንጥረ-ነገር ሊገኝ የሚችልባቸውን ምንጮች ይዘርዝሩ?

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11.1.7 የአዮዲን እጥረት በሽታን (IDD) ለመከላከል መወሰድ የሚገባውን የመከላከያ ዘዴዎች ምን ምን ናቸው?

እባክዎ! ከዚህ በመቀጠል ከተራ ቁጥር 4.2 እስከ 4.4 ስር ለተዘረዘሩት ጥያቄዎች መልስዎን ከተሰጡት አማራጮች መካከል በመምረጥ መልስዎን ከፊት ለፊታቸው የቀረቡትን አማራጭ ፊደላት በመክበብ ይመልሱ። በተጨማሪም አልፎ አልፎ ለቀረቡት ጥያቄዎችም እንደጥያቄዎቹ ባህሪያት መጥቀስ (መዘርዘር) ያሉባቸውን በመለየት ዘርዘረው ይጻፉ።

11.2 የእንቅርት በሽታ (Goiter) (ከ9 - 12 ዓመት ዕድሜ ክልል በሚገኙ ህጻናት) ፣

11.2.1 የህጻኑ የትውልድ ቦታ የት ነው?

ሀ. አሶሳ ከተማ      ለ. ከአሶሳ ከተማ ውጪ (ስፍራውን ይጥቀሱ)

11.2.2 ከላይ በተራ ቁጥር 4.2.1 ለቀረበው ጥያቄ መልስዎ ከአሶሳ ከተማ ውጪ ከሆነ ህጻኑ እዚህ አሶሳ ከተማ ውስጥ መኖር የጀመረው ከመቼ ጊዜ አንስቶ ነው?

ቀን \_\_\_\_\_ ወር \_\_\_\_\_ ዓ.ም \_\_\_\_\_

11.2.3 ከላይ በተራ ቁጥር 4.2.1 ለቀረበው ጥያቄ ትክክለኛ ጊዜውን ሊያስታውሱ ካልቻሉ አሶሳ ከተማ ውስጥ መኖር ከጀመረ ስንት ዓመት ይሆነዋል?

ሀ. አንድ ዓመት    ለ. ሁለት ዓመት    ሐ. ሶስት ዓመት    መ. አራት ዓመት    ሠ. አምስት እና ከአምስት ዓመት በላይ  
ረ/ በፍጹም አላስታውስም

11.2.4 በህጻኑ አንገት ላይ እብጠት (እንቅርት) መታየት የጀመረው ህጻኑ የት አገር እያለ ነበር ?

(የእንቅርት በሽታ እንዳለባቸው በጥናቱ ለተረጋገጡ ትውልዳቸው ከአሶሳ ውጪ ለሆኑና ህጻናት ብቻ መረጃ ለመሰብሰብ የሚያገለግል)

ሀ. አሶሳ ከተማ      ለ. ከአሶሳ ከተማ ውጪ (ስፍራውን ይጥቀሱ)

11.2.5 በአዮዲን ጨው የተዘጋጀ ምግብ አዮዲን ከሌለው ጨው ያነሰ ጣዕም (መጻዛ) አለው ብለው ያምናሉን (ይስማማሉን)?

ሀ. በእጅግ እስማማለሁ ለ. እስማማለሁ ሐ. እርግጠኛ አይደለሁም መ. አልስማማም ሠ. በእጅግ አልስማማም

11.2.6 በአዮዲን ጨው የተዘጋጀ ምግብ ከሚሰጠው ጥቅም ይልቅ ዋጋው ያመዝናል ብለው ያምናሉን (ይስማማሉን)?

ሀ. በእጅግ እስማማለሁ ለ. እስማማለሁ ሐ. እርግጠኛ አይደለሁም መ. አልስማማም ሠ. በእጅግ አልስማማም

11.2.7 በአዮዲን ጨው የተዘጋጀ ምግብን ለህጻናት መመገብ አስፈላጊ ነው ብለው ያምናሉ?

ሀ. በእጅግ እስማማለሁ ለ. እስማማለሁ ሐ. እርግጠኛ አይደለሁም መ. አልስማማም ሠ. በእጅግ አልስማማም

11.2.8 የአዮዲን ጨው አዮዲን ከሌለው ጨው በበለጠ ሁኔታ በሚከማችበት ስፍራም ሆነ በቤት ውስጥ በሚቀመጥበት ቦታና በመሳሰሉት ስፍራዎች ከፍተኛ ጥንቃቄ መደረግ ያሻዋል ብለው ያምናሉን (ይስማማሉን)?

ሀ. በእጅግ እስማማለሁ ለ. እስማማለሁ ሐ. እርግጠኛ አይደለሁም መ. አልስማማም ሠ. በእጅግ አልስማማለሁ

11.2.9 የቤተሰብዎ አባላት የአዮዲን ጨውን እንዲጠቀሙ ምክርን የመሰጠን አስፈላጊነት ያምኑብታልን ይስማሙብታልን?

ሀ. በእጅግ እስማማለሁ ለ. እስማማለሁ ሐ. እርግጠኛ አይደለሁም መ. አልስማማም ሠ. በእጅግ አልስማማለሁ

11.2.10 የአዮዲን ጨውን አዮዲን ከሌለው ጨው ይበልጥ ለመጠቀም ይመርጣሉን (ይስማማሉን)?

ሀ. በእጅግ እስማማለሁ ለ. እስማማለሁ ሐ. እርግጠኛ አይደለሁም መ. አልስማማም ሠ. በእጅግ አልስማማም

11.2.11 በተራ ቁጥር 4.2.10 ለቀረበው ጥያቄ የአዮዲን ጨውን አዮዲን ከሌለው ጨው ይበልጥ ለመጠቀም (እስማማለሁን ወይም በእጅግ እስማማለሁን) ከመረጡ የአዮዲን ጨውን ለመጠቀም የመረጡበት ምክንያት ምንድር ነው?

ሀ. የአዮዲን ጨው ጥቅም ከወጪው ያመዘነ ስለሆነ) ለ. የአዮዲን ጨው አቀራረብ ስለሚስማማኝ (በእሽግ መልክ ስለሚቀርብ) ሐ. የአዮዲን ጨው አዮዲን ከሌለው ጨው አንጻር የተሻለ ጥቅም ስላለው ረ. ሌላ (ይጥቀሱ) \_\_\_\_\_

በተራ ቁጥር 4.2.10 ለቀረበው ጥያቄ የአዮዲን ጨውን አዮዲን ከሌለው ጨው ይበልጥ ለመጠቀም አልስማማም በእጅግ አልስማማምን ከመረጡ የአዮዲን አልባ ጨውን ለመጠቀም የፈቀዱበት ምክንያት ምንድር ነው?

ሀ. የአዮዲን አልባ ጨው ዋጋ ስለሚረክስ ለ. የአዮዲን ጨው በቀላሉ ስለማይገኝ

ሐ. የአዮዲን ጨውን የተለየ ጥቅም ስለማላውቅ መ. የአዮዲን ጨው ጣዕም ስለማይመቸኝ ሰ. ሌላ (ይጥቀሱ) \_\_\_\_\_

11.2.12 የአዮዲን ጨውን ተጠቅመው ከአወቁ በምን ያህል የጊዜ ልዩነት ተጠቅመዋል ?

ሀ. ዘወትር (ሁልጊዜ) ለ. አብዛኛውን ጊዜ (አዮዲን ከሌለው ጨው ከምጠቀምበት ጊዜ በበለጠ)

ሐ. አልፎ አልፎ (አንዳንድ ጊዜ) መ. ሌላ (ይጥቀሱ) \_\_\_\_\_

11.2.13 የአዮዲን ጨውን ለምን ያህል ጊዜ ተጠቅመዋል?

ሀ. ከአንድ ዓመት በታች ለ. አንድና ከአንድ እስከ ሶስት ዓመታት ሐ. ሶስትና ከሶስት እስከ አምስት ዓመታት መ. አምስትና ከአምስት ከአምስት ዓመታት በላይ ሠ. አላስታውስም

11.3 የአዮዲን ጨው አይያዝ እና አጠቃቀም (በቤተሰብ ደረጃ)

11.3.1 ምግብን በሚያዘጋጁበት (በሚጋግሩበት፣ በሚያፈሉበት፣ ወዘተ ) ጊዜ ጨውን በየትኛው ምን ጊዜ በሚዘጋጀው ምግብ ውስጥ ይጨምራሉ?

ሀ. ምግብን እየበሰለ በሚገኝበት ሰዓት  
ለ. ምግቡ ከመብሰሉ በፊት እና በመብሰሉ መካከል ሳለ  
ሐ. ምግቡ ከበሰለ በኋላ መጨረሻ ላይ

11.3.2 ጨውን የፀሐይ ብርሀን ላይ ያወጣሉን?

ሀ. አዎን ለ. የለም

11.3.3 ምን ዓይነት የጨው መያዣ ይጠቀማሉ ?

ሀ. ክዳን ያለው ለ. ክዳን የሌለው

11.3.4 ጨውን ለማስቀመጥ ምን ዓይነት ስፍራ (ቦታ) ይጠቀማሉ?

ሀ. ደረቅ ቦታ ለ. እርጥበት አዘል ቦታ

11.4 ካሳቫ ተክል (cassava)

➤ (አልባፍራ/ባፍራ = በአረብኛ) ፣

➤ (ቆጭኖ = በኦሮምኛ)

11.4.1 ስለ ካሳቫ ተክል ስምተው ያውቃሉን ?

ሀ. አዎን ለ. የለም

11.4.2 በተራ ቁጥር 4.4.1 ለቀረበው ጥያቄ መልስዎ አዎን ከሆነ የካሳቫ ተክልን ለቤተሰብዎ በምግብነት ተጠቅመው ያውቃሉን?

ሀ. አዎን ለ. የለም

11.4.3 በተራ ቁጥር 4.4.2 ለቀረበው ጥያቄ መልስዎ አዎን ከሆነ ካሳሻን በየስንት ጊዜው ለምግብነት ይጠቀማሉ ?

ሀ. ዘወትር (ሁልጊዜ) ለ. አብዛኛውን ጊዜ (በሳምንት ከአንድ ጊዜ በላይ) ሐ. አልፎ አልፎ (ቢባዛ በስምንት ቀናት ከአንድ ጊዜ ባልበለጠ) መ. ሌላ (ይጥቀሱ) \_\_\_\_\_

11.4.4 በተራ ቁጥር 4.4.2 ለቀረበው ጥያቄ መልስዎ አዎን ከሆነ ካሳሻን ለምን ያህል ጊዜ በተከታታይ ሳያቋርጡ ለምግብነት እየተጠቀሙ ይገኛል?

ሀ. ከአንድ ዓመት በታች ለ. አንድና ከአንድ እስከ ሶስት ዓመታት ሐ. ሶስትና ከሶስት እስከ አምስት ዓመታት መ. አምስትና ከአምስት ዓመታት በላይ ሠ. አላስታውስም

11.4.5 በተራ ቁጥር 4.4.1 ለቀረበው ጥያቄ መልስዎ አዎን ከሆነ የእንቅርት ወይንም የአዮዲን እጥረት በሽታ ካሳሻን በመመገብ ሳቢያ ሊከሰት እንደሚችል ያውቃሉን ?

ሀ. አዎን ለ. የለም

11.4.6 በተራ ቁጥር 4.4.2 ለቀረበው ጥያቄ መልስዎ አዎን ከሆነ ካሳሻን ከሚያስከትለው የእንቅርት፣ የአዮዲን እጥረት እና መሰል በሽታዎች ለመከላከል የወሰዱት የመከላከል እርምጃ አለን?

ሀ. አዎን ለ. የለም

11.4.7 በተራ ቁጥር 4.4.6 ለቀረበው ጥያቄ መልስዎ አዎን ከሆነ ካሳሻ ከሚያስከትለው የእንቅርት፣ የአዮዲን እጥረት እና መሰል በሽታዎች ለመከላከል የወሰዱት እርምጃዎች ምንምን እንደሆነ ይጥቀሱ?

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11.4.8 በተራ ቁጥር 4.4.1 ለቀረበው ጥያቄ መልስዎ አዎን ከሆነ ካሳሻን ከሚያስከትለው የእንቅርት፣ የአዮዲን እጥረት እና መሰል በሽታዎች ለመከላከል መወሰድ አለበት ብለው የሚያምኑትን የመከላከል እርምጃ ይጥቀሱ

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**መረጃዎቹን በመስጠት ስለተባበሩን እናመሰግናለን !!!**