

**DETERMINATION OF HOUSEHOLD USE
OF IODATED SALT IN THE HOHOE
DISTRICT IN THE VOLTA REGION,**

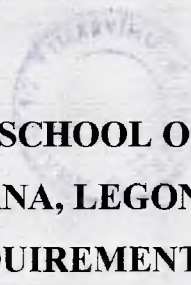
GHANA

BY

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FOR THE AWARD OF
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DECLARATION

I, Luiz Octaviano Amoussou-Gohoungo, hereby declare that this submission is my own work And that to the best of my knowledge, it contains neither material previously published or written by another person nor material which, to a substantial extent, has been accepted for award of any degree or diploma of a university or other institution of learning except where acknowledgement is made in the text.



Signature



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CERTIFICATION

The undermentioned persons supervised the conduct of this study from proposal development stage, collection and analysis of the data and the write up and its submission.

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DEDICATION

This study is dedicated to my family and to the Lord almighty who made all this possible.



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LIST OF ABBREVIATIONS

ACC	United Nation Administrative Committee on Coordination
DHA	District health administration
DHMT	District health management team
EPI	Expanded Programme on Immunization
I.S.	Iodated Salt
ICCIDD	International Council for the Control of Iodine Deficiency Disorders
IDD	Iodine Deficiency Disorders
IQ	Intellectual Quotient
KI	Potassium iodide
KIO ₃	Potassium iodate
MI	The Micronutrient Initiative
MOE	Ministry of education
MOFA	Ministry of food and agriculture
MOH	Ministry of Health
NSIC	National Salt Iodisation Committee
NUT	Department of Nutrition for Health And Human Development.
PAMM	Program against Micronutrient Malnutrition
PNDCL	Provisional National Defense Council Law
PPM	Parts per million
SCN	Sub-committee on Nutrition
T3	Tri-iodothyroxine
T4	Thyroxin
TG	Thyroglobin



TRH	Thyrotrophin-releasing hormone
TSH	Thyroid-Stimulating hormone
U.I.S.	Un-Iodated Salt
UNICEF	United Nation Children's Fund
USAID	United State Agency for International Development
USI	Universal Salt Iodisation
WFP	World Food Programme
WHO	World Health Organization
WHO	World Health Organization



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ABSTRACT

In recent years, iodine deficiency disorders (IDD) have emerged as an important public health problem in Ghana. In the Hohoe district the prevalence of goitre was 26% (Asibey-Berko, et al 1994). Ghana has adopted the continuous use of iodated salt as a solution to IDD. This was supported by Act 523, which requires that, any salt meant for human and animal consumption in Ghana should be iodized.

After the launching of a national campaign against IDD at Hohoe in 1997, awareness on the importance of the use of iodated salt was created in the district. However, the results of the 1998 Ghana Demographic and Health Survey (GDHS, 1998) showed that the Volta region had the lowest percentage of households using iodated salt (10%). The DHMT of the Hohoe district health administration is worried over the low utilization of iodated salt in the Volta region and more so because Hohoe is an endemic goitre area in the region.

The study therefore was a cross-sectional survey that aimed at establishing the proportion of people using iodated salt, and factors affecting the use of iodated salt in the district. It took place in thirty communities. Three hundred women in charge of household cooking and 50 salt sellers were interviewed using structured questionnaire. The study examined their awareness of the importance of iodated salt, its availability, affordability, and utilization in the district. The salt used for household cooking was tested for iodine.

The study revealed that the level of awareness of the importance of iodated salt was very low in salt sellers, as 70% of them had low level of awareness. Though

243 (81%) women in charge of household cooking said they had heard of iodated salt, only 201(67%) said they know the benefits associated with the use of iodated salt. However, it is really surprising to note that, out of the 201 who claimed they know its benefit, 8, 66, and 127 of the women had high, moderate and low level of awareness about iodated salt, respectively.

With regard to availability of iodated salt only 8% of salt sellers were selling iodated salt. About 57% of women in charge of household cooking said iodated salt was always available when they wanted to buy it.

With the question of affordability, it was found that 36.8% of the women in charge of household cooking said it was not affordable. The iodine test on the salt consumed in the households indicated however that only 16% of households used iodated salt. Availability, cost and awareness were the main factors determining the usage of iodated salt in the district.

CHAPTER ONE

1. 0 INTRODUCTION

Iodine is an essential micronutrient required to make the hormone thyroxin, which is produced by the thyroid gland in the neck. Thyroxin, along with other hormones, helps to control the rate of metabolism in the body (Anita, 1987). Iodine is normally found in good supply in seafood, milk and green vegetables especially spinach (Harrison, 1984). In some areas such as mountainous areas, iodine is leached away or washed out of the soil by the rain and other phenomena such as erosion and deforestation. Such areas lack iodine and the people in the areas are exposed to Iodine Deficiency Disorders (IDD). In addition, people living in areas naturally poor from iodine and not getting iodine supplementation are also at risk of suffering from IDD.



The most common effect of iodine deficiency is goitre, a swelling of the thyroid gland. But Iodine Deficiency Disorders (IDD) go beyond this. There are more serious effects of iodine deficiency, which may not be easily recognized especially in children, pregnant women and adults. In pregnancy, iodine deficiency can lead to spontaneous abortion, stillbirth and cretinism (severe mental retardation). In childhood, it can lead to impaired learning and poor school performance, mental retardation, growth failure, stunting, speech and hearing defects. In adults, it can lead to poor intelligence (low IQ) and goitre (Zamrazil, 1998; Asibey-Berko et al., 1999).

Results from various studies showed that 3% of all babies born to iodine deficient-mothers will be cretins; 10% severely mentally retarded and the remaining 87% will suffer a mild-to-moderate intellectual disability. Also there are more mentally retarded children in iodine deficient areas than in other areas. Moreover, the impairment to children's intelligence

development caused by iodine deficiency during their foetal and infant periods was irreversible (Fu et al., 1994).

Iodine deficiency disorder is known to be a significant public health problem in 118 countries in the world (ICCIDD/UNICEF/WHO, 1993). At least 1572 million people in the world are estimated to be at risk of iodine deficiency disorders (I.D.D). In Africa, 181 millions (32% of the population), are at risk of IDD; 86 million are affected with goitre and 1.1 million are affected with cretinism (WHO/NUT, 1994).

In recent years, iodine deficiency has emerged as an important public health problem in Ghana. In fact for the past five decades endemic goitre and cretinism have been recognized as occurring mainly in the Northern and Upper regions of the country but with pockets of high prevalence in the centrally located and even Southern region of Ghana. A study done in three districts in Volta region (Hohoe, Nkwanta and Akatsi) showed a mean prevalence of 22% of goitre (Asibey-Berko et al., 1994).

Since intellectual capital is a crucial resource for national and international development (UNICEF, 1995), there was the need to find a solution to IDD. Fortunately, it has been well established that an adequate iodine intake prevents iodine deficiency disorders (Aghini-Lombard et al., 1997).

Over the past 60 years, several ways of supplementing iodine in the diet have been proposed. A variety of vehicles such as salt, bread, sweets, milk, sugar and water have been tried. The iodisation of salt is widely accepted because salt is consumed by all sections of any population. The addition of iodine does not change the colour, appearance, or taste of the salt (Mahshid et al., 1996). Through UNICEF assistance and the co-ordinating role of the National Salt Iodisation Committee (NSIC), production of iodated salt commenced in 1995 in

Ghana. By July 1997, as many as 17 large and medium scale salt producers and salt processors had been supported to produce iodated salt. In support of this, the Food and Drugs Amendment Act 1996, Act 523 passed in December 1996 and which became effective in July 1997 requires that, any salt meant for human and animal consumption should be iodised (P.N.D.C.L. 305 B, 1992).



To get people to use iodated salt, a country must go through the following steps.

1. There must be factories producing ordinary salt (un-iodated salt) for various purposes. Salt is used in textile and soap production, ORS production, animal and household consumption.
2. Some of the factories must either use part of the salt produced, for iodated salt or there should be manufacturers who will buy the salt and iodised it. The un-iodated salt is washed, to get rid of the dirt and other impurities, dried, milled with potassium iodide, anti-caking agent is added, and the iodated salt obtained is then packaged in small polypropylene bags and labelled.
3. Mechanisms should be in place at the national level to ensure the production and distribution of iodated salt of good quality.
4. The wholesalers must buy the iodated salt and distribute it to the retailers in the communities. Possible sources of iodated salt in the district are market places, mobile van, stores, hospital and clinics.
5. There should be creation and promotion awareness through health education in the communities to enhance the knowledge of salt sellers and household regarding the importance of iodated salt.
6. A law requiring sellers to sell only iodated salt and users to use only iodated salt must be in place.

7. The law on the use of iodated salt must be enforced at district level and the local government must play an important role in the enforcement of the law.

In the Hohoe district, there is evidence of Iodine deficiency disorders. The district is in a mountainous area and the prevalence of goitre is 26% (Asibey-Berko et al., 1994). In February 1997, a national campaign against iodine deficiency was launched in the Hohoe district and all those selling salt in the district, especially the market women and stores owners attended the function. Thereafter some level of awareness was created in the district on the importance of the use of iodated salt. There was promotion of the awareness created in the district through efforts of the Ministry of Health (MOH), Ministry of Food and Agriculture (MOFA) and Ministry of Education (MOE). However, the results of the 1998 Ghana Demographic and Health Survey (GDHS, 1998) showed that the Volta region had the lowest percentage of households using iodated salt (10%).

The implications of this low utilisation on the health of the population as regards IDD cannot be over emphasized. The DHMT of the Hohoe district health administration is worried over the low utilisation of iodated salt in the Volta region and more so because Hohoe is an endemic goitre area in the region. Meanwhile, very little was done in the district on the utilisation of iodated salt. The DHMT therefore wished to assess the level of iodated salt utilisation and the factors hindering its use in the district so as to design plan for the necessary intervention.

The main objective of the present study therefore, was to establish the proportion of people using iodated salt in the district and also to determine the socio-economic, behavioural and other independent variables that affect the use of iodated salt in the Hohoe district.

The specific objectives were to:

1. Assess the level of awareness of households and salt sellers on the importance of iodine in the diet.
2. Verify whether iodated salt is always available and if people in the district consider the price affordable.
3. Determine the level of utilisation of iodated salt at household level.
4. Identify the socio-cultural factors that hinder households from buying or using iodated salt.



CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Definitions

2.1.1 Iodated salt

Iodated salt is obtained by adding small quantity of iodine (30mg-100mg of iodine per kg of salt, or parts per million) to the ordinary kitchen salt (sodium chloride), usually in the form of potassium iodide (KI) or potassium iodate (KIO_3).

2.1.2 Household

A household is a group of people living together in the house and sharing the meals cooked from the same pot.

2.1.3 Importance of iodine

Iodine is an essential micronutrient required to make the hormone thyroxine, which is produced by the thyroid gland in the neck. Thyroxine, along with other hormones, helps to control the rate of metabolism in the body (Anita, 1987). Iodine is involved in regulating metabolic activities of all cells throughout the life cycle. In addition, it plays a key role in cell replication. This is particularly relevant for the brain since neural cells multiply mainly *in utero* and during the first two years of life (ACC / SCN, 2000). The diet supplies iodine for the body. The human adult body contains 15-20 mg of iodine and this can be maintained by an intake of 100-150 mg of iodine per day.

2.1.4 The thyroid gland

The thyroid gland consists of two lobes, one on each side of the trachea and overlapping the thyroid cartilage, joined by a narrow portion, the isthmus, which lies in front of the second and third cartilaginous rings of the trachea. Behind it are the left and right recurrent laryngeal

nerves supplying the larynx, four parathyroid glands and the fifth cervical to the first thoracic vertebrae. The thyroid takes up iodine from the blood to make the hormones thyroxine (T_4) and tri-iodothyronine (T_3), which are stored as thyroglobulin (TG). The thyroid gland secretes thyroxine and T_3 into the blood under the control of thyroid-stimulating hormone (TSH) from the anterior pituitary. Fall in the thyroxine level of the blood stimulates the hypothalamus to release TRH and the pituitary to secrete TSH. The TSH stimulates the thyroid to secrete thyroxine and return the level in the blood to normal. Similarly a high blood level of thyroxine inhibits hypothalamic TRH and pituitary TSH secretion, thus decreasing the output and blood level of thyroxine (Harrison, 1984).



2.2 Sources of iodine

In coastal area, iodine is present in seafood and in traces in most food (Harrison, 1984).

In other areas, iodine is widely distributed in foods, but is found in good supply in milk, green vegetables and especially spinach (Anita, 1987). Some geological factors and some substances called goitrogens can interfere with availability of iodine. In hilly or mountainous areas, iodine is leached away or washed out of the soil by the rain and other phenomena such as erosion and deforestation. A study done in Poland, in 1993, revealed that the majority of children with goitre were inhabitants of mountainous villages. (Wasikowa et al., 1993)

2.3 Iodine Deficiency Disorders (IDD)

Lack of iodine leads to IDD, which constitute a major public health problem in the world (Tiwari, 1995; van der Haar, 1997; Zahidi, 1999). IDD affect the foetus, the neonate, the child and the adolescent, and the adult. It results, not only in goitre (thyromegaly), which is just a cosmetic or external manifestation, but also in brain damage and other neurological abnormalities (Zamrazil, 1998; Asibey-Berko et al., 1999).

Iodine deficiency is the leading cause of preventable intellectual impairment and is associated with a spectrum of neurological and developmental pathology (Maberly, 1994). The World Health Organization estimates that 20 million people in the world have various degrees of preventable brain damage due to the effects of Iodine Deficiency on the foetal brain development. The retarded body growth is referred to as cretinism (Wardlaw et al., 1996). Iodine deficiency, by affecting the brain, is an important cause of mental handicap and poor educability of children (Pandav et al., 1997).

2.3.1 IDD in the foetus

Iodine deficiency in the foetus is the result of iodine deficiency in the mother. Maternal iodine deficiency is responsible for high rates of abortions, stillbirth and neonatal mortality in the order of 0.5-1 percent of pregnancies in endemic areas (Asibey-Berko et al., 1999). This high incidence of stillbirths, abortions and neonatal mortality can be reduced by iodisation (McMichael et al., 1980).

Another major effect of foetal iodine deficiency is endemic cretinism. This condition is still widely prevalent, affecting for example up to 10% of the populations living in severely iodine-deficient areas in India (Pandav and Kochupillai, 1982), Indonesia (Djokomoeljanto et al., 1983) and China (Ma et al., 1982).

2.3.2 IDD in the Neonate

Iodine deficiency in pregnancy increases perinatal mortality, and low birth weight in those who survive. Adequate thyroxin is necessary for the development of the brain. A greater part of the brain development occurs after birth and is completed in the second year of life. In the neonate iodine deficiency causes neonatal hypothyroidism characterized by brain damage with serious implications such as: mental retardation and severe growth retardation. Neonatal goitre may also be present.

2.3.3 *IDD in childhood*

In children iodine deficiency manifest itself by the presence of goitre, which becomes very prominent in adolescence. Thus goitre in children increases with age, reaching a maximum after the first decade of life. Recent studies of children in China indicate a higher general prevalence of lowered intellectual performance in iodine deficient areas compared with areas without iodine deficiency (Wang Dong, et al., 1985). Iodine Deficiency also impairs hearing. According to a survey in Guizhou province of China, the average hearing level of otherwise normal school children in an IDD endemic area was significantly poorer than in a non-endemic control area (Wang et al., 1985).

There is increasingly evidence of impaired mental function in apparently normal children living in iodine-deficient areas. Recent observations indicate lower scores in measured mental and perceptual development in children in severely iodine-deficient area in Spain, compared with a control group carefully matched by socio-economic status and educational level (Bleichrodt et al., 1987). Similar data are available from Chile (Muzzo et al., 1986).

2.3.4 *IDD in adult*

The common result of iodine deficiency in adults is endemic goitre. However, it is accompanied with is a high degree of apathy due to reduced mental function.

Goitre

When the diet does not supply enough iodine the synthesis of thyroxin is lowered and the thyroid gland attempts to produce thyroxin. This leads to hyperplasia and hypertrophy of the cells of the gland. The gland enlarges and protrudes in the neck region as goitre, which becomes visible.

Goitre has been described in people as far back as 3000 BC, usually in women. Simple goitre is a painless condition, but if uncorrected it can lead to pressure on the trachea, which causes difficulty in breathing. According to the size, goitre is classified by WHO/ICCIDD as Grade 0, Grade 1A, Grade 1B, Grade 2, and Grade 3 (Asibey-Berko and Orraca-Tetteh, 1994).



- Grade 0: No goitre.
- Grade 1A: Each lateral lobe is larger than the ends of the thumbs.
- Grade 1B: Thyroid is enlarged and visible when the neck is extended.
- Grade 2: Thyroid is enlarged and visible with the neck in the normal position.
- Grade 3: Thyroid is greatly enlarged and is recognised from a distance of 10 metres.

Treatment with iodine can result in a slow reduction in the size of the thyroid gland, although surgical removal of part of the gland may be required in severe cases. (Wardlaw et al, 1996).

Goitre is also associated with the consumption of goitrogens.

Large amount of these substances are found in raw turnips, cabbage, Brussels sprouts, cauliflower, cassava as well as other plants.

2.4 Solution to Iodine Deficiency Disorders

IDD must be corrected. And it is well known that iodine deficiency correction prevents endemic goitre and other IDD (Vitti et al, 1998). A teaspoon of iodine is all a person requires in a lifetime. Since iodine cannot be stored for long periods by the body, tiny amounts are needed regularly. In areas of endemic iodine deficiency, food fortification and supplementation have proven highly successful and sustainable interventions. Studies had revealed that, IDD could be totally eliminated by prophylaxis using iodine administered in salt, oil or some other vehicle (Lamberg, 1991; Yazipo et al., 1995). The fortification of salt or oil is the most common tool to prevent IDD (USAID, 1999). However the iodisation of salt is widely and uniformly accepted because salt is consumed by all sections of any population. The addition of iodine does not change the colour, appearance, or taste of the salt. Following a special recommendation of the United Nations Joint Committee on Health Policy, universal salt iodisation (USI) is now being applied in almost all countries with an IDD problem recognized as being of public health significance (van der Haar, 1997). Studies have shown

that prophylaxis using iodated salt is an effective way to eliminate IDD (Wang, 1985; Ali et al., 1992; Ngogang, J., J. Meli et al., 1993; Hetzel, 1998; Zhao et al., 1999).

Through UNICEF assistance and the co-ordinating role of the National Salt Iodisation Committee (NSIC), production of iodated salt commenced in 1995, in Ghana. However, the making of iodated salt requires special training and equipment in order to get the correct mixture of salt and potassium iodide (Unicef, 1997). To ensure good quality iodated salt, its production must be monitored. The quality of iodated salt should be periodically assessed (Pandav et al., 1994; Kumar, 1995). To create increased demand for consumption of iodated salt in the community, intensive educational campaigns on IDD needs to be launched and nutrition education needs to be strengthened, to convince the population to use iodated salt in household food production (Lutynski, 1996).



2.5 Legislation in Ghana on iodated salt.

According to the Food and Drug Law, 1992 (P.N.D.C.L. 305 B) on “Mandatory fortification of salt”, “No person shall mine salt for human or animal consumption; or import, manufacture, package, label, advertise, store, deliver, distribute, trade, sell or export any salt that is not fortified with potassium iodide (KI), or potassium iodate (KIO₃) in accordance with this Act.”

The Food and Drugs Amendment Act (1996), 523 passed in December 1996, became effective in July 1997. The Act requires that, any salt meant for human and animal consumption should be iodated.

However the law is not being enforced. Many people don't know about the Law. Compared to un-iodated salt, iodated salt is not affordable. With regard to Law enforcement, more stringent measures should be adopted to ensure that manufacturers and importers of iodated salt conform to the required specifications. (Kumarasiri et al, 1998).

Iodated salt is also not evenly distributed in the population, making it not always available. Moreover at the distribution points, the un-iodated salt sells faster than the iodated salt (UNICEF and MOH, 1999).

2.6 Perception of iodated salt by the population.

People have different beliefs about iodated salt. This divergence in beliefs affects the utilisation of iodated salt.

The first impression is that iodated salt is for sick people. Therefore if you are not sick it is not necessary to use it. The second belief is that goitre or IDD is hereditary. Belief in the hereditary causation of IDD tends to be high in societies where familial goitre is common and endogamy is high. (Lellep Fernandez, 1998).

The third belief is that iodated salt is for rich people.



2.7 Utilisation of iodated salt.

Prophylaxis programmes based on the distribution of iodated salt have been unsuccessful in developing countries, for socio-economic reasons (Yazipo et al., 1995). Considering the fact that the production of iodated salt started, in 1995, in Ghana, backed by the Food and Drugs Amendment Act 1996, Act 523 passed in December 1996 which became effective in July 1997, we can say that the utilisation of iodated salt is still low in the country. In Ghana, 28% of households use a type of salt that has adequate level of iodine to prevent IDD. The Brong Ahafo and Ashanti regions have the highest rates of household with iodated salt (52% and 62%, respectively). The Central and Volta regions have the lowest percentages of household using iodated salt (10%), (GDHS 1998). A study done to determine household use of iodated salt in the NZEMA EAST district shows a household consumption of iodated salt of 16.7 % (Ahedor, 1999). Also a study done to determine the national coverage of iodated salt in Ghana shows a household consumption of iodated salt of 22.1 % (Agble, Armah, 1999).

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Variables

The dependent variable studied was the use of iodated salt. Background variables studied were age, educational level, religion, occupation, and market place. Independent variables studied were knowledge on the importance of iodated salt, type of salt sold, availability of iodated salt, affordability of iodated salt, source of information on iodated salt, sources of iodated salt, to purchase and reasons for not using iodated salt.

3.2 Study design

The study was a cross-sectional survey.



3.3 Study area

The study area was the Hohoe district. It is one of the twelve (12) districts in the Volta Region. It consists of 106 communities and has a surface area of 1.172 square kilometres with a population of 147,293 (2000 census). It is bounded on the North by Jasikan district, on the South by Ho district on the East by the Republic of Togo and on the West by Kpando district.

The area has physical features including mountain Afadjato, the highest mountain in Ghana, and two (2) water falls that attract tourists into the district. The main occupations of the people in the area are farming which depends on the two (2) main seasons and trading.

The district has been divided into six sub-districts, Leklebi, Alavanyo, Gbledi, Akpafu, Likpe and Have. The district has twenty-seven (27) health facilities distributed in the six (6) sub-

districts under the District Health Administration. There is a district hospital, MCH offices, a number of private clinics and many stores, where iodated salt can be procured. The study was conducted in thirty communities in the district.

3.4 Study population

The study population included all women in-charge of household cooking in the district and salt sellers in the markets and the stores in the district.

3.5 Sample size

To assess the availability and affordability of iodated salt in the district, the awareness of women in charge of household cooking about the importance of iodated salt and the utilisation of iodated salt at the household level, the formula used for calculating sample size in cluster surveys taking into account the cluster design was used. Considering the level of utilisation of iodated salt in Volta region to be 10% (GDHS, 1998), a level of absolute precision of 5%, a desired level of certainty of 95% and a design effect of 2, a sample size of 276 was calculated. However the minimum recommended sample size based on thirty clusters (that is, ten household in each community) was used. This resulted in a total of 300 women in-charge of household cooking, to interview.

To assess the awareness of salt distributors on the importance of iodated salt in the district, a different sample size was used. Considering that 15% of market women sell salt in the district, a level of absolute precision of 10% and a desired level of certainty of 95%, a sample size of 48 was calculated. However, 50 salt sellers were interviewed.

3.6 Sampling procedure

a. To select 300 women in charge of household cooking, the EPI 30 –cluster survey method was used (Kevin M. et al., 1995). Multistage sampling procedure was used to select the households where the survey was conducted.

Step 1. Selection of communities

A technique called “ population proportionate sampling “ was used to select 30 communities out of 106.

Step 2. Selection of households

The Hohoe District Health Administration has the list of all households in the district. This list was used to select ten households per community using systematic sampling.

b. Selection of salt sellers

There were about 200 registered salt sellers in the district, 50 were selected using simple random sampling (lottery method). A list of the 200 salt sellers was made. The salt sellers were numbered from 1 to 200. The numbers were written on 200 small sheets of paper and folded. Fifty sheets were randomly selected out of the 200.

3.7 Data collection techniques

a. Interview using questionnaire

Structured questionnaire was administered to fifty salt sellers and 300 women in charge of household cooking (annexes 1 & 2).

b. Testing of iodine content of salt

The iodine content of salt collected from the household was determined using a field test kit (Armah J.G.A, Amankwah M., 1997). A drop of the reagent was added to a spatula full of

salt to be tested on a white paper plate (4cms * 4cms). The change of colour was noted and compared with the colour code printed on the container of the Test Kit. The salt was judged adequate if the colour code was 50ppm and more and declared iodated salt.

3.8 Selection and training of interviewers.

For 2 days eight interviewers were selected and taken through the WHO recommended procedures for conducting EPI coverage survey using cluster-sampling techniques (Kevin M. et al., 1995). The questionnaire was translated into Ewe and used for the training session.

3.9 Clearance from local authorities

Before the research started, consent was sought from the district assembly. The chiefs and the elders of the communities were informed about the study and their assistance was also sought through the TBAs. At the household level, consent was obtained from the household head and from the selected women, before the research was carried out. In every market, consent was sought from every salt seller, and in stores, consent was sought from the store's owner. Everyone selected was free to respond or not; no action was taken against her or him.



3.10 Pre-testing of the methodology

Pre-testing was done during the training workshop at the Hohoe market, and in two households from a community that was not selected for the study. Reactions of the respondents to the research procedures were observed, taking into consideration respondents daily work schedule and their willingness to answer questions and to collaborate with the investigator. The questionnaires were also tested for their accuracy and reliability and whether there was the need to revise them. The sampling procedures and the interviewers activities were also checked.

3.11 — Data quality

To assure quality of the data, interviewers were to check if the questionnaires were filled in completely after each interview. During the data collection period, the principal investigator was also checking the data at the end of each day. He was checking whether the questionnaires were filled in completely, and whether the recorded information made sense.

3.12 Data handling

Questionnaires were numbered at the end of the interviews; and the data collected were kept in designated files open for various category of information by the principal investigator.

3.13 Data processing and analysis

The data collected were entered into COMPAQ computer using Microsoft Word Software Package. Epi Info version 6 was used for data processing and analysis. The statistics used were: Frequency, range, percentage, p value and chi square.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic characteristics

4.1.1 Salt sellers

TABLE 1.

DISTRIBUTION OF SALT SELLERS BY AGE

Age	Frequency	Percentage of Total
< 20	1	2
20-29	3	6
30-39	13	26
40-49	16	32
50-59	11	22
60-69	6	12
TOTAL	50	100

Fifty salt sellers were interviewed; their age ranged from 18- 68.

26% of salt sellers were within the age group of 30 and 39 years while 32% of salt sellers were within the age group of 40 and 49 years.

TABLE 2.

DISTRIBUTION OF SALT SELLERS BY MARKET

Name of Market	Frequency	Percentage of Total
Boller	8	16
Hohoe	15	30
Koloenu	12	24
Kpeme	3	6
Likpe Bala	8	16
Stores	4	8
Total	50	100

More than 50% of the salt sellers included in the study were from Hohoe and Koloenu markets, while only 8% of the salt sellers were store owners.

Most of the salt sellers were women. The only man selling salt was a store's owner.

TABLE 3.
DISTRIBUTION OF SALT SELLERS BY EDUCATIONAL BACKGROUND

Educational Background	Frequency	Percentage of Total
No formal education	16	32
Basic education	32	64
Secondary education	2	4
Tertiary education	0	0
Total	50	100

Thirty two percent of salt sellers had no formal education and 64 % of them had basic education. Only 4% of the salt sellers in the study had secondary school education and none of the sellers had tertiary education.

4. 1. 2. Women in charge of household cooking

Three hundred women in charge of household cooking were interviewed; their age ranged from 16 years to 89 years.

TABLE 4.

DISTRIBUTION OF WOMEN IN CHARGE OF HOUSEHOLD COOKING BY AGE

Age	Frequency	Percentage of Total
< 20	2	0.7
20-29	71	23.7
30-39	66	22
40-49	64	21.3
50-59	37	12.3
60-69	27	9
70-79	24	8
80-89	9	3
TOTAL	300	100

Twenty three percent of women in charge of household cooking were within the age group of 20 to 29 years, 22 % of the women were within the age group of 30 to 39 years while 21.3% of the women were within the age of 40 to 49.

Ninety-five percent women in charge of household cooking were Christians, 3.7% were Moslem and 1.3% belonged to the traditional religion.

TABLE 5.

DISTRIBUTION OF WOMEN IN CHARGE OF HOUSEHOLD COOKING BY OCCUPATION

Occupation	Frequency	Percentage of Total
Farmer	116	38.7
Trader	95	31.7
House wife	20	6.7
Self-employed	38	12.7
Salaried worker	21	7
Un-employed	10	3.3
Total	300	100

Seventy percent of the respondents were farmers and traders while 3.3% of the respondents were un-employed.

TABLE 6.

DISTRIBUTION OF WOMEN IN CHARGE OF HOUSEHOLD COOKING BY EDUCATIONAL BACKGROUND

Educational Background	Frequency	Percentage of Total
Basic Education	203	67.7
Secondary	27	9
Tertiary	7	2.3
No Formal	63	21
Total	300	100

Twenty one percent of the women in charge of household cooking had no formal education; 67.7 % of them had basic education; 9% had secondary education and 2.3% had tertiary education.

**4.2. Level of awareness of salt sellers and households on iodated salt**

Some variables were re-categorised.

The answers to Q11 were re-categorised into: High level of awareness, moderate level of awareness and low level of awareness.

- If the answer to Q11 was: Prevents goitre or prevents diseases or increases child intelligence then it was categorised low level of awareness.
- If the answer to Q11 was: Prevents goitre and prevents diseases or prevents diseases and increases child intelligence or Prevents goitre and increases child intelligence then it was categorised moderate level of awareness.
- If the answer to Q11 was: Prevents goitre and prevents diseases and increases child intelligence then it was categorised as high level of awareness.

4.2.1. Salt sellers**TABLE 7.
DISTRIBUTION OF SALT SELLERS BY KNOWLEDGE ABOUT IODATED SALT**

Level of awareness about iodated salt	Frequency	Percentage of Total
High level	7	14
Moderate level	8	16
Low level	35	70
Total	50	100

Seventy percent of salt sellers had low level of awareness about iodated salt, 16% of the salt sellers had moderate level of awareness and only 14% of the salt sellers had high level of awareness about it. Therefore we can say that the level of awareness in the group of salt sellers was low.

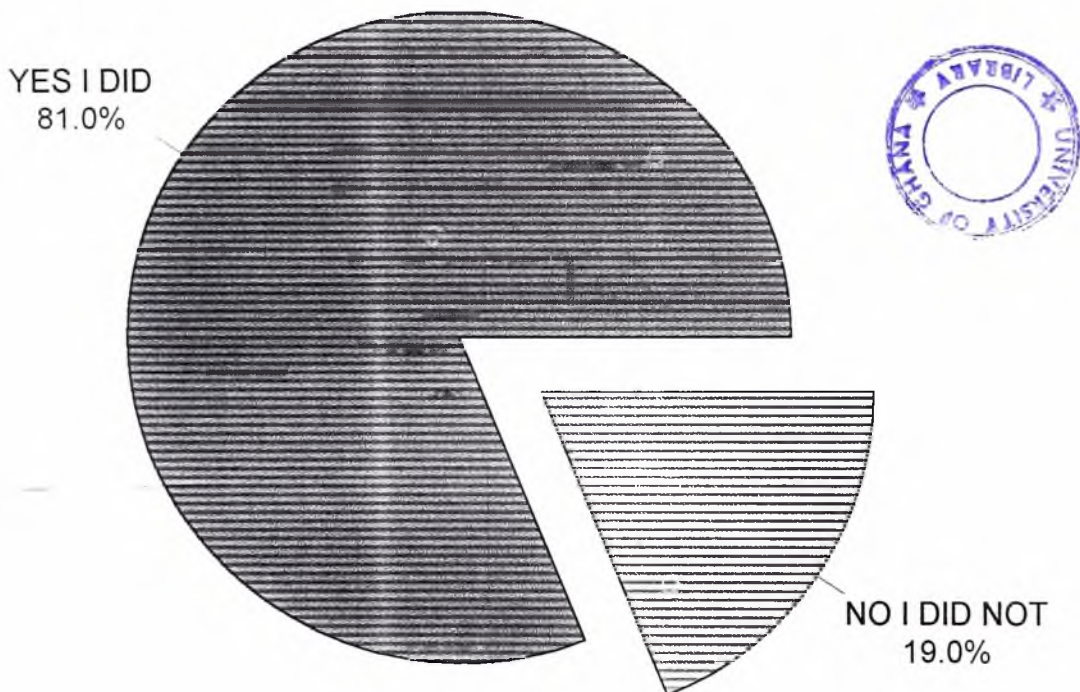
TABLE 8. DISTRIBUTION OF SALT SELLERS BY LEVEL OF AWARENESS AND BY THE TYPE OF SALT SOLD

Level of awareness about Iodated Salt	Iodated salt	Un-iodated salt	Both	Total
High level	3	-	4	7
Moderate level	1	3	4	8
Low level	-	35	-	35
Total	4	38	8	50

Forty two percent of salt sellers with high level of awareness on iodated salt sold only iodated salt whilst the rest sold both. The salt sellers with low level of awareness on iodated salt sold only un-iodated salt. This difference is statistically significant (chi-square: 38.34) meaning that salt sellers who knew about iodated salt were more likely to sell this type of salt than those who lacked this awareness.

4.2.2. Women in charge of household cooking

FIGURE 1. DISTRIBUTION OF WOMEN BY ANSWER GIVEN TO “ HAVE YOU HEARD OF IT?”



As shown in Figure 1, 243 (81%) of women in charge of household cooking said they had heard of iodated salt. However, 201 said they knew its benefits and 42 said they did not.

TABLE 9.
DISTRIBUTION OF WOMEN BY LEVEL OF AWARENESS AND BY
EDUCATIONAL BACKGROUND

Educational background	High level	Moderate level	Low level	Total
Basic education	4	45	90	139
Secondary	0	11	14	25
Tertiary	3	2	2	7
No formal education	1	8	21	30
Total	8	66	127	201

As shown in Table 9, it is surprising to note that, of 25 women with secondary level education none had a high level of awareness about iodated salt. Also out of 7 women with tertiary level education, 2 had a low level of awareness about iodated salt. However there was a woman with no formal education who had a high level of awareness about the use of iodated salt.

TABLE 10.
DISTRIBUTION OF RESPONDENTS BY SOURCES OF INFORMATION

Sources	Frequency	Percentage
Radio	9	3.7
Health Personnel	75	30.9
Relatives/Spouse	11	4.5
Friends/Colleagues	7	2.9
Mobile Van Seller	55	22.6
Television & Radio	6	2.5
Radio & Health Personnel	18	7.4
Radio & Mobile Van Seller	9	3.7
Health Personnel & Mobile Van Seller	42	17.3
Television, Radio & Health Personnel	11	4.5
Total	243	100

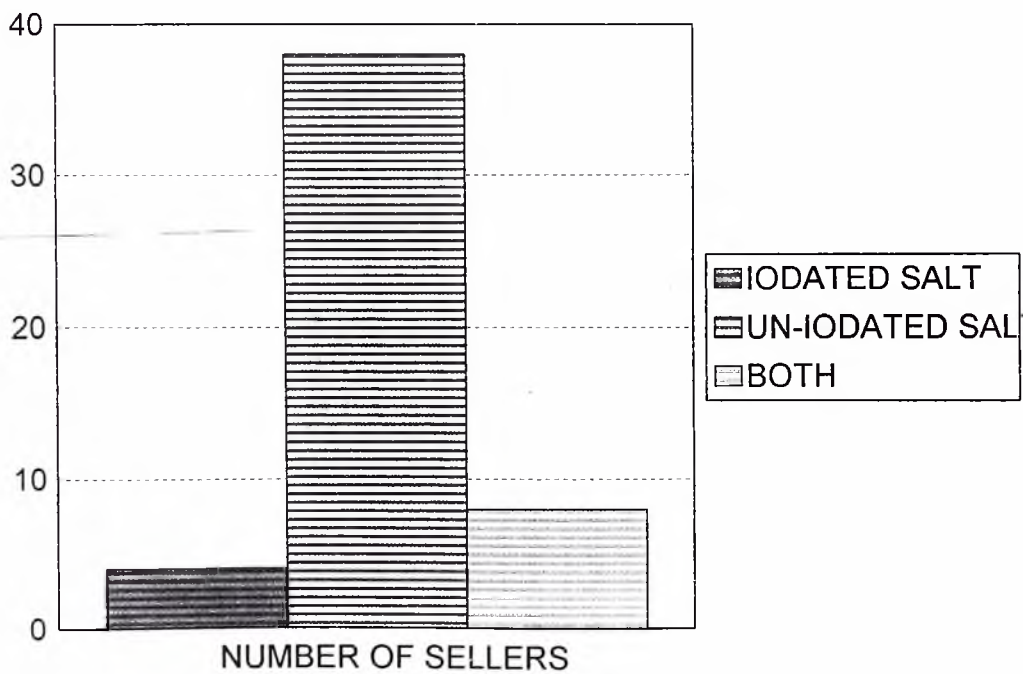
Health personnel were the source of information to 30.9% of the respondents, followed by 22.6% of respondents having mobile van seller as their source of information. In the lower part of the table, combination of health personnel and mobile van seller represented the source of information for 17.3% of the respondents.



4.3. AVAILABILITY OF IODATED SALT

4.3.1. Salt sellers

FIGURE 2. DISTRIBUTION OF SALT SELLERS BY TYPE OF SALT SOLD



As shown in Figure 2 only 4 salt sellers (8%) were selling only iodated salt. Eight salt sellers (16%) were selling both but 38 (76%) were selling only un-iodated salt.

4.3.2. Women in charge of household cooking

Out of 182 women who said they used iodated salt, 105 (57.7) said iodated salt was always available when they wanted it and 77 (42.3%) said it was not.

TABLE 11.
DISTRIBUTION OF RESPONDENTS BY SOURCE OF PURCHASE OF IODATED SALT

Sources of purchases of iodated salt	Frequency	Percentage
Local Markets	30	16.5
Sellers in Vehicle	41	22.5
Health Facilities	50	27.5
Stores	15	8.2
Local markets and Sellers in vehicle	10	5.5
Local markets and /Health facilities	12	6.6
Sellers in vehicle and /Health facilities	12	6.6
Others	12	6.6
Total	182	100



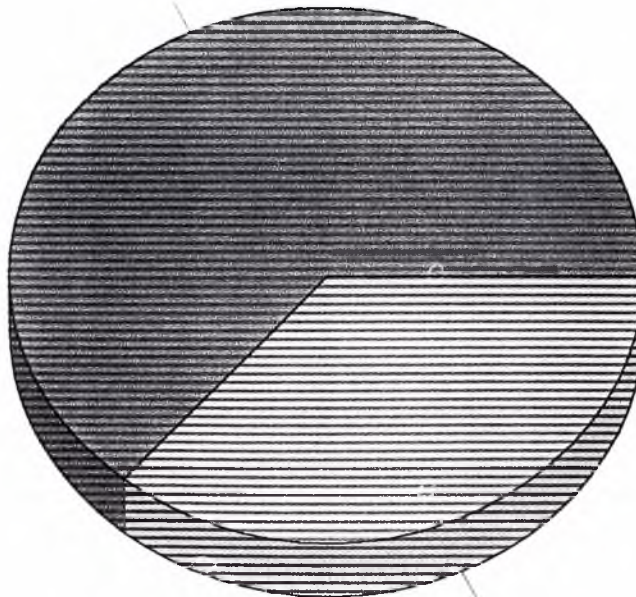
Out of 182 women who were using iodated salt, 50 (27.5%) said they bought it from health facilities and 41 (22.5%) from the sellers in a vehicle. The local markets accounted for only 16.5% of the sales. This meant that iodated salt was not easily available, in the district.

4.4. Affordability of iodated salt

4.4.1. Women in charge of household cooking

FIGURE 3. AFFORDABILITY OF THE IODATED SALT

IT IS AFFORDABLE
63.2%



IT IS NOT AFFORDABLE
36.8%

Out of 182 women who used iodated salt, 115 (63.2%) said that iodated salt was affordable, and the remaining 67 (36.8%) said it was not affordable as indicated in Figure 3.

4.5. Utilisation of iodated salt

4.5.1. Women in charge of household cooking

One hundred and eighty two respondents out of 243 said they used iodated salt while 61 said they did not use it.

TABLE 12.
DISTRIBUTION OF WOMEN BY PATTERN OF THE USE OF IODATED SALT

How often do you use it?	Frequency	Percentage
Every day	43	23.6%
Once in a while	88	48.4%
When I have money to buy some	9	4.9%
When I remember	2	1.1%
When it is available at home	40	22%
Total	182	100%

As shown in Table 12, about 48.4% of the women who said they used iodated salt, used it once in a while. Only 23.6% used it everyday. However, 22% used it when it was available at home. Interestingly 1.1% used it when they remembered. This means that the use of iodated salt was not even regular among those who used it.

The test revealed that, only 16% representing 48 out of the 300 households used salt containing adequate level of iodine as shown in Figure 4.

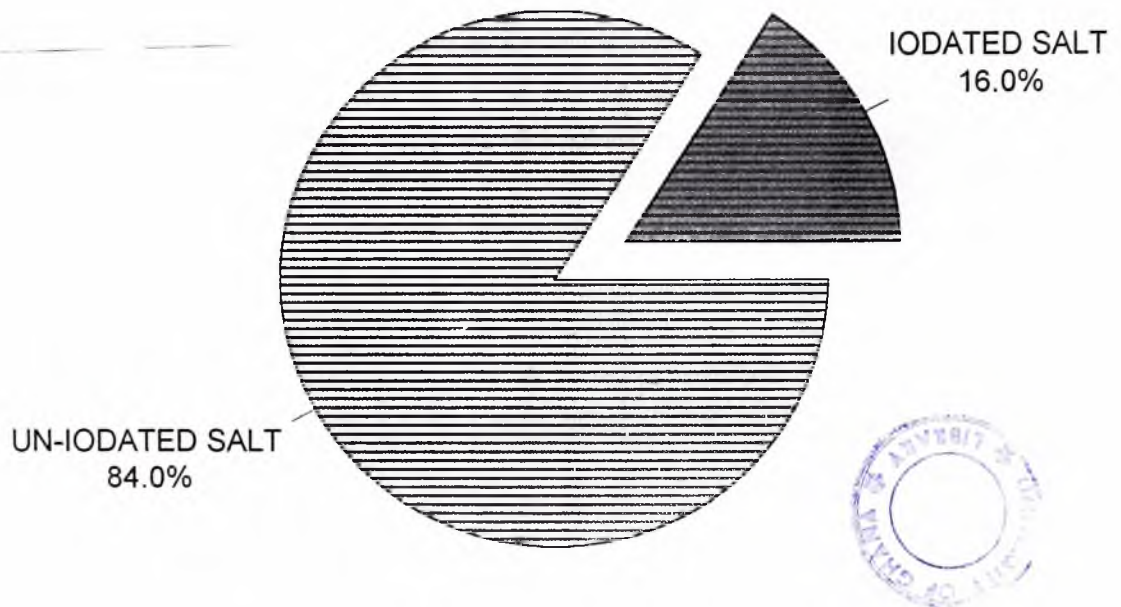
FIGURE 4. SALT TEST RESULT

TABLE 13.
DISTRIBUTION OF RESPONDENTS BY THEIR VIEW ON THE AFFORDABILITY
OF THE IODATED SALT AND THE SALT TEST RESULT

Test Result	It is affordable	It is not affordable	Total
Iodated Salt	37	9	46
Un- Iodated Salt	78	58	136
Total	115	67	182

In Table 13, only 37 respondents out of 115 who said iodated salt was affordable were using iodated salt and 9 out 67 respondents who said iodated salt was not affordable were also using it. Considering the P-value ($P\text{-value} = 0.01$), the difference was statistically significant.

TABLE 14.
DISTRIBUTION OF WOMEN WHO SAID THEY USED IODATED SALT BY THE
ANSWER TO DO YOU ALWAYS GET IT TO BUY? AND BY THE SALT TEST
RESULT

Do you always get it to buy?	Test showing iodated salt	Test showing un-iodated salt	Total
Yes	45	60	105
No	1	76	77
Total	46	136	182

Forty two percent of women who said iodated salt was always available were using it. However only 1.3% of women who said iodated salt was not always available were using it. Considering the Chi-squares ($\text{Chi-squares} = 40.62$), the difference was statistically significant. However only about 43% of women who said iodated salt was always available were actually using it.

TABLE 15.
DISTRIBUTION OF WOMEN BY SALT TEST RESULT AND BY LEVEL OF
AWARENESS OF THE USE OF IODATED SALT

Level of awareness about iodated salt	Test result = iodated salt	Test result = Un-iodated salt	Total
High Level	0	8	8
Moderate Level	24	42	66
Low Level	17	110	127
Total	41	160	201

Table 15. shows that all the 8 women with high level of awareness on the use of iodated salt were not using iodated salt. That meant awareness was not the only factor influencing the use of iodated salt.



4.6. REASONS FOR NON-UTILISATION OF IODATED SALT**TABLE 16.
SALT SELLERS REASONS WHY PEOPLE DON'T BUY IODATED SALT**

Reasons	Number of salt sellers	Percentage of total
It is costly	7	14
People don't know about it	32	64
It is not always available	6	12
It is costly and it is not always available	2	4
It is costly and people don't know about it	2	4
People don't know about it and it is not always available	1	2
Total	50	100

As shown in the Table 16, sixty four percent of the sellers said that they did not sell iodated salt because people did not know about it. Fourteen percent of the sellers said that they did not sell because it was costly, whilst 12% said that they did not sell because it was not always available.

TABLE 17.
DISTRIBUTION OF WOMEN BY REASONS FOR NOT USING IODATED SALT

Reasons	Frequency	Percentage of Total
It is costly	17	27.4
It is not always available	9	14.5
It is not my preference	7	11.3
I heard of it recently	8	12.9
I'm not sure of what they say about it	10	16.1
It is costly and it is not always available	4	6.5
It is costly, it is not always available and it is not my preference	2	3.2
It is costly, it is not my preference and I'm not sure of what they say about it	5	8.1
Total	62	100



Table 18 shows reasons for the low or non-utilisation of iodated salt. Twenty seven percent of the women said it was due to its cost. Meanwhile 16.1% said they were not sure of the information about iodated salt, and 14.5% cited non-availability as a reason. Twelve percent of women heard of it recently and for 11.3% it was not their preference.

CHAPTER FIVE

5.0 DISCUSSION

The importance of iodine in regulating metabolic activities and its particular relevance for brain cell cannot be over-emphasized. The deficiency of this essential micronutrient leading to IDD is a major public health problem. It results not only in goitre (thyromegaly) but other associated problems such as brain damage and stillbirth in pregnant women.

Efforts are made, therefore, by most countries to introduce iodine into the diet and hence the use of iodated salt in Ghana. This study was aimed at assessing the use of iodated salt in Hohoe district.

The study has revealed that the majority (60%) of the salt sellers are within the age group of 30 and 49, which is the most economically active group. In addition to this, the majority of them also do not have formal education. This scenario has implications for the design and implementation of IDD control programmes, since education is a necessary factor to change behaviour of people. Therefore in designing training manuals on the importance of the use of iodated salt, it must specifically be tailored to meet the peculiar needs of this majority uneducated group. Training manuals could be incorporated into the non-formal education programmes currently being implemented in Ghana. Education can also take the form of role-plays, short dramas and posters designed in local languages. Since the majority of respondents

were also Christians, messages concerning the use of iodated salt can be channeled through churches.

Over two thirds (70.4%) of the women are farmers and traders. This information is useful, as it must be taken into consideration when planning the time schedules for awareness promotion/creating programmes.

The level of awareness of the need to use iodated salt has been found to be very low in salt sellers (70% of them have low level of awareness). Two hundred and forty three women in charge of household cooking (81%) said they have heard of iodated salt. This figure is higher compared to the findings of a study by Agble and Armah (1999), in which 71.8% said they have heard about iodated salt. However, out of 243 women who said they have heard of iodated salt, only 201 said they know its benefits.



The level of awareness on the importance of iodated salt was operationally defined as the knowledge of its benefits; knowledge that the use of iodated salt prevents goitre and other diseases and increase child intelligence. This awareness was found to be low in the salt sellers. However it was found that even though the majority of the women in charge of household cooking claim they know the benefits associated with the use of iodated salt, only very few of them actually know what deficiencies it causes if not used. Even in women with secondary education, only very few were aware of the diseases iodine deficiency could lead to.

This low level of awareness could be due to the fact that the educational messages of the promotion programme are not very adequate. This is more serious when most

respondents claimed their main source of information on the use of iodated salt is from health personnel.

About 31% of women in charge of household cooking have heard about iodated salt from health personnel, twenty two percent of women got the information from mobile vans and 17.3% claim they have heard of iodated salt from both health personnel and mobile vans. In a similar study Agble and Armah (1999) health workers were sources of information for 25.5% whilst radio/friends and relatives informed 24 and 22.9% respectively. It is interesting to note however that in these two studies, health workers form the majority from whom information on the use of iodated salt is passed on in most communities. It appears however, that the information is not concise and not packaged appropriately, since the knowledge of respondents contains distortions and the benefit of iodated salt is not properly understood.

Attempts were also made to investigate the availability of iodated salt from those who sell salt in general. It was found that only 8% of those sampled were engaged in selling of only iodated salt. The majority of retailers (76%) were selling un-iodated salt. This has a consequence on availability, and indicates that only a small proportion of those using iodated salt in cooking bought it from the open market or in the stores. This finding is in consonance with the response, which was received from those who use iodated salt for household cooking. 27.6%, 22.6% and 16.6% obtained it from the health facilities, mobile vans and the local markets, respectively. This is not surprising since respondents had indicated earlier that health personnel were their main source of information.

This finding underscores the fact that the Ministry of Health is doing the bulk of work in the promotion of the use of iodated salt by creating awareness and involvement in its distribution countrywide. Fifty seven percent of respondents said iodated salt was always available when they needed to buy it. Despite its availability, a random test conducted revealed that only about 43% of women who said iodated salt was always available were actually using it. This brings to the forefront the fact that availability cannot presume usage. One is forced to conclude that even though it is available, its usage is not as high as expected. Could non-use therefore be a question of affordability? In attempting to answer this, it was found however that of the 63.2% of the respondents who said they could afford iodated salt, only 37% were actually found to be using it.

These results seem very interesting as one wonders what actually is preventing the respondents from using the salt. If iodated salt were available and also affordable, then one would expect that its usage would be high among the respondents.

About 75% of the respondents said they were using the salt in cooking. A test to confirm this indicated, however, that only 16% of households use iodated salt. This figure is lower than a nation-wide finding by Agble & Armah (1999), which indicated about 22.1% of households use iodated salt. It is also interesting to find that 8 of the women who had a high level of awareness on the use of iodated salts and its benefits were not actually using the salt for domestic purposes.

Most of those who sell salt but do not use the iodated salt gave reasons such as lack of awareness regarding its non-use and some also complained about the cost, while

others said it was also not available to them for use. For the consumers, the major factors affecting usage were the cost, lack of awareness and availability. These findings have indicated that in all situations, lack of usage could not really be attributed to its availability. Rather, it is either the awareness of the need to use it or its cost, which may determine whether households would use, iodated salt or not. Agble and Armah (1999) however found in their survey that the use of iodated salt is low because it is not always available for people to buy. It can therefore be concluded that three main factors: availability, cost and awareness are the three main factors that determine the usage of iodated salt, in the country. The extent to which these factors influence/affect usage depends on: the interplay with other factors, such as willingness and preference, among others. To enhance the use of iodated salt in the country, there would be the need for enforcement of the legislation on its use.

CHAPTER SIX**6.0 CONCLUSIONS AND RECOMMENDATIONS****6.1. Conclusions**

The level of awareness about the importance of iodated salt is low in the district. Only 14% of the salt sellers had high level of awareness about the importance iodated salt. Though 81% of women in charge of household cooking have heard of iodated salt, only 201 out of the 243 women who have heard of iodated salt know its benefits. Of 201 women who said they know the benefits of iodated salt, only 8 of them had high level of awareness. It is however interesting to note that health personnel represent the major source of information for the households about the importance of iodated salt.

Un-iodated salt is being sold more than iodated salt at the local markets. Seventy six percent of the salt sellers interviewed were selling only un-iodated salt, 16% were selling both salt and only 8% of them were selling only iodated salt.

Regarding availability and affordability of iodated salt, 42.3% of respondents said iodated salt was not always available when they wanted it and 36.8% of the respondents said that iodated salt was not affordable.

The level of utilisation of iodated salt at the household level is very low. Only 16% of the households were using salt with adequate iodine content.

Regarding factors that hinder households from using iodated salt, lack of awareness, cost and availability represented the main reasons, in the district. However there is the need to

consider other factors such as: willingness to use iodated salt, cultural beliefs and the lack of enforcement of the legislation.

6.2. Recommendations

Based on the findings, our recommendations are the followings:

1. The DHA should redesign its awareness creation and promotion package on the importance of iodated salt so that all the people in the district would really perceive the message about the use of iodated salt. There is the need to launch intensive educational campaigns on IDD and strengthen nutrition educations to convince the population to use iodated salt in household food cooking.
2. The DHA should investigate factors affecting availability of iodated salt in the district in order to improve upon it.
3. With regard to affordability, the DHA should organise periodic meetings with salt sellers in the district and encourage them to sell iodated salt in smaller packages of 250 and 100 grams. This will make the salt more affordable to the people.
4. The Hohoe DHA should disseminate the findings of this study at an assembly meeting, to enable local government and assembly men appreciate the situation on the ground with regard to the use of iodated salt, and also confirm that the use of iodated salt is a concern of the local government not only MOH. The forum should also be used by the DHA to educate the local government on the role of other sectors such as

MOFA, MOE and the environmental unit of the local government, in the creation and promotion of awareness about the use of iodated salt, in the district.

5. The local government should establish a committee for the “promotion of the use of iodated salt” in the district. In addition it should also create a fund for public sensitisation, education and monitoring of exclusive use of iodated salt, in the district.

This committee should also see to it that the law is made known to people and its implementation enforced.



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ANNEX 1. Questionnaire on the use of iodated salt to be answered by women in-charge of household cooking.

Study Number _____

Date of interview: _____

1. Name of the community _____

2. Name of the Head of the household _____

Identity of the respondent (woman in-charge of household cooking)

3. Name _____

4. Age _____

5. Religious Background []

- a. Christian []
- b. Moslem []
- c. Traditional []
- d. Others [] (specify)

6. Occupation []

- a. Farmer []
- b. Trader []
- c. House wife []
- d. Self-employed []
- e. Salaried Worker []
- f. Unemployed []

7. Educational background: []

- a. Primary []
- b. Middle/JSS []
- c. Secondary []
- d. Tertiary []
- e. None []

8. Have you ever heard of iodated salt? Yes or No []

- a. Yes []
- b. No []

9. If yes, what are your sources of information? (Multiple answers required) []

- a. Television []
- b. Radio []
- c. Health personnel []
- d. Seminar/ Durbar/Drama []
- e. School/Books/Journals []
- f. Relatives/Spouse []
- g. Friends/Colleagues []
- h. Mobile Van sellers []
- i. Salt Seller []
- j. Others [] (specify)

10. Do you know the benefits of iodated salt? Yes or No []

- a. Yes []
- b. No []

11. If yes, what are its benefits? (Multiple answers required) []
- a. Prevents goitre []
 - b. Prevents diseases []
 - c. Increases child intelligence []
 - d. Others [] (specify)
12. Do you use it? Yes or No []
- a. Yes []
 - b. No []
13. If yes, how often do you use it? []
- a. Every day []
 - b. Once in a while []
 - c. When I have money to buy some []
 - d. When I remembered []
 - e. When available []
14. Do you always get it to buy? []
- a. Yes []
 - b. No []
15. Where do you buy it? (Multiple answers required) []
- a. Market Place []
 - b. Stores []
 - c. Chemical shops/Health facilities []
 - d. Road side []
 - e. Sellers in vehicle []
 - f. Others [] (specify)

16. Is it affordable? Yes or No []

a. Yes []

b. No []

17. If yes, why don't you use it? (Multiple answers required) []

a. It is costly []

b. It is not available []

c. My religion []

d. It is not my preference []

e. I never heard of it []

f. I heard of it recently []

g. I am not suffering from goitre []

h. I am not sure of what they say about it []

i. Other [] (specify)

Other observations.



1. Testing of iodated salt

a. Adequate []

b. Not adequate []

ANNEX 2. Questionnaire on the sales of iodated salt to be answered by salt sellers

Name of the market _____ Name of salt seller _____

1. Salt sellers age []
2. Salt sellers sex []
 - a. Male []
 - b. Female []
3. Salt sellers level of education : []
 - a. Primary []
 - b. Middle/JSS []
 - c. Secondary []
 - d. Tertiary []
 - e. None []
4. What type of salt are you selling []
 - a. Iodated salt []
 - b. Non iodated salt []
 - c. Both []
5. What do you know about iodated salt? (Multiple answers required) []
 - a. Prevents goitre []
 - b. Prevents diseases []
 - c. Increases child intelligence []

6. Why are people not buying iodated salt?

(Multiple answers required) []

a. It is costly []

b. Their religion []

c. They are not suffering from goitre []

d. They don't know about it []

e. It is not available []

f. They prefer un-iodated salt []

g. other (specify) []



ANNEX 3

Testing of iodine content of salt

The Field Test Kit was used to assess the iodine content of the salt consumed by the households. The test necessitated

Materials

- * MBI KITS Field Test Kit for testing iodated salt.
- * MBI KITS Recheck Solution for testing alkaline salt.
- * Spatula
- * White paper plates 4cms * 4cms

Procedure of testing

- * One spatula full of salt was placed on a white paper plate
- * One drop of the test solution was put on the salt sample
- * The immediate change of colour was noted.
- * The colour developed was matched with the colour code printed on the container of the test kit.

Interpretation of testing

- * The salt was judged adequate if the colour code is 50ppm and more.
- * The salt was judged inadequate if the colour code is 25ppm
- * The salt was judged un-iodated if the colour code is 0

ANNEX 4.

FIGURE 5. ANALYSIS DIAGRAM FOR CONCEPTUAL FRAMEWORK

