



**Daffodil**  
*International*  
**University**

**An Internship Report**

On

**Thyroid related disorders and relation with vitamin D level**

At Institute of Nuclear Medicine and Allied Sciences (INMAS), Dhaka Medical  
College, Hospital Campus Bangladesh Atomic Energy Commission

**Supervisor by**

Dr. Nizam Uddin

Assistant Professor

Department of Nutrition & Food Engineering

Daffodil International University

**Submitted by**

S M Kudrat Ali

ID: 172-34-670

Department of Nutrition and Food Engineering

Daffodil International University

**Date of submission: 24/11/2022**

## LETTER OF TRANSMITTAL

Date: 24 November, 2022

To  
Dr. Nizam Uddin  
Assistant Professor and Lecturer,  
Department of Nutritional and Food Engineering  
Faculty of Allied Health Sciences  
Daffodil International University

### **SUBJECT: SUBMISSION OF INTERNSHIP REPORT**

Dear Sir,

It is a great pleasure and honor for me to have the opportunity to submit Internship report as a part of the Nutritional and Food Engineering (NFE) program curriculum. I have prepared this report based on the acquired taste the knowledge during my internship period in Institute of Nuclear Medicine and Allied Sciences (INMAS). This report is based on, "Thyroid related disorders and relation with vitamin D level" I have got opportunity to work in Institute of Nuclear Medicine and Allied Sciences, especially Department of Thyroid Under supervision Head of department of Thyroid Dr. Fatima Sultana Haque (MBBS,DNM. M.Phil CMO & Professor), Dr. Rubina Begum (MBBS, M.phil CMO & Professor) and Dr.Tania Sultana (MBBS, M.phil SMO & Assistant Professor).

I therefore, would like to place this report to your judgment and suggestion. Your kind advice will encourage me to perform better panning in the future.

Sincerely Yours

S M Kudrat Ali

S M Kudrat Ali  
ID: 172-34-670  
Department of Nutrition & Food Engineering  
Faculty of Allied Health Sciences (FAHS)  
Daffodil International University

## LATTER OF AUTHORIZATION

24 November, 2022

To

Dr. Nizam Uddin

Assistant Professor and Lecturer,

Department of Nutritional and Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

### **SUBJECT: DECLARATION REGARDING THE VALIDITY OF THE INTERNSHIP REPORT**

Dear Sir,

The internship report knowledge and extent the practices of thyroid related disorders and relation with vitamin D level at Institute of Nuclear Medicine and Allied Sciences. Was submitted to the Department of Nutrition and Food Engineering, Faculty of Allied Health Sciences, Daffodil International University.

This study was fully concerned with department and faculty members.



Supervisor's Signature

Date: ...11/12/2021.....

Dr. Nizam Uddin

Assistant Professor, Lecturer

Dept. of Nutrition and Food Engineering

Faculty of Allied Health Sciences (FAHS)

Daffodil International University

## **CERTIFICATION APPROVAL**

I'm to certify that the internship report on "Thyroid related problems with nutrient D level" at Institute of Nuclear Medicine and Allied Sciences, directed by S M Kudrat Ali, ID: 172-34-670 of branch of Nutrition and Food Engineering has been endorsed for show and defense/viva-voice.

I'm satisfied to thusly guarantee that the information and finding introduced in the report are the legitimate work of Amal Abdihakim Hassan, I emphatically suggested the report introduced by Amal Abdihakim Hassan for additional scholarly suggestions and safeguard/viva-voice. Amal Abdihakim Hassan bears solid moral person and extremely lovely character. It has to be sure an extraordinary delight working with him. I wish him accomplishment throughout everyday life.

Sincerely yours

Date: .....

Sheikh Mahatabuddin, Ph. D.  
Associate Professor and Head  
Dept. of Nutrition and Food Engineering  
Faculty of Allied Health Sciences (FAHS)  
Daffodil International University

## **CERTIFICATION OF INTERNSHIP**

This is to certify that S M Kudrat Ali worked as an interne in Thyroid division & RIA lab that she Completed two month of internship program on Institute of Nuclear Medicine and Allied Sciences, Dhaka medical college & Hospital campus, Dhaka. She worked in the Institute in association with the doctors of relevant sections. She was found to be sincere in her daily activities during her training period. She is well behaved and maintain good manner with her colleagues, department staff and the patient as well. It is my pleasure to certify Amal Abdihakim Hassan and wish her best in her future.

We wish her success in life.

For, Institute of Nuclear Medicine and Allied Science, Dhaka, Dhaka Medical College, Hospital Campus Bangladesh Atomic Energy Commission.

**Professor Dr. Jasmine Ara Haque**

Director

Institute of Nuclear Medicine and Allied Science, Dhaka,

Dhaka Medical College, Hospital Campus

Bangladesh Atomic Energy Commission

## ACKNOWLEDGEMENT

In the preparation of this report I would like to acknowledge the encouragement and assistance given to my number one people. At first I'd like to thank my creator the Almighty Allah (SWT) the most merciful, kind and gracious guidance for enabling me the strength and opportunity to complete the report in time successfully.

I'd like to take this opportunity to express my gratitude to everyone who has been a part of my life at some point.

My deep gratitude and earnest much appreciated to the honorable Associated Dean, faculty of Allied Health Science, Prof. Dr. Md Bellal Hossain for his kind cooperation and to acknowledge this Degree. My deep and earnest much appreciated to the honorable Head of Department of Nutrition and Food Engineering, Daffodil International University, Sheikh Mahatabuddin, Ph. D. for this kind cooperation and accept this Degree. I am encouragement taking this privilege to deliver my gratefulness to each and every people who are involved with me in every phase of my life.

I would also like to express my great respect & warmest thanks to my supervisor Dr. Nizam Uddin, Assistant Professor, lecturer of Department of Nutrition and Food Engineering, Daffodil International University for his whole-hearted supervision during my project work and organizational attachment period. More particularly I would like to thank him for incalculable motivation and encouragement and also to thank for giving his time and wisdom.

My gratitude goes to entire Nutrition and Food Engineering Department, Daffodil International University for arranging Internship Program that Facilitates integration of theoretical knowledge with their real life situation.

I am exceptionally to thankful to the Director & CMO of Institute of Nuclear Medicine and Allied Sciences (INMAS), DHAKA, BANGLADESH. Dr. Jasmine Ara Huque and I thanks to Dr. Fatima Sultana Haque (MBBS, DNM. M.Phil CMO & Professor), Head Department of thyroid for giving me the opportunity to complete my internship. And also to thanks to Dr. Rubina Begum (MBBS, M.phil CMO & Professor)

And Dr. Tania Sultana (MBBS, M.phil SMO & Assistant Professor) for their encouragement and under supervision of department of thyroid at Institute of Nuclear Medicine and Allied Sciences, Dhaka, Bangladesh.

Lastly, I would like to extend my sincere thanks of this dissertation to my father Abdihakim Hassan Alikar and to my mother Zahra Abdikarem Mohammed for unlimited love and support. Their encouragement during the bad times and I would not be able to accomplish my ambitions and inspirations especially without the support of my parents, their enthusiasm during the good times gave me constant inspiration in future life.

## EXECUTIVE SUMMARY

Thyroid hormone imbalance has been seen in Bangladesh in huge numbers for the last three to four decades. According to statistics, in Bangladesh, at least one thyroid patient's emergency occurs in every family regularly. According to sources, approximately 10% of Bangladeshi citizens have clinically thyroid issues. The thyroid condition has a significant impact on society's daily lives. Thyroid diseases affect people of all ages, ranging from one-day-old infants (often Hypothyroidism) to hundred-year-olds, and they can worsen as we age. Thyroid hormone imbalance, often known as thyroid disorder, is difficult to identify early since the signs and symptoms of this disease overlap with those of other diseases. Because the cause of thyroid diseases has yet to be determined, most members of society must exercise caution and organize public awareness campaigns concerning thyroid patients to live in peace.

Thyroid hormones are very important and have a variety of functions. They monitor virtually every cell in the body for changes in gene transcription: under- or overproduction of these hormones has a significant impact. Thyroid hormone secretion problems are very frequent, affecting 5% of women and 0.5 percent of men. The first half of the paper offers information on the Institute of Nuclear Medicine and Allied Health, while the second part of the study contains information about thyroid associated illnesses and their relationship with vitamin D levels. The second section covers several aspects of thyroid hormone and how it functions. The third section includes various reports from thyroid cancer patients. The fourth section contains the final section. The findings of this study are quite significant.

# **Table of Content**

<b>LETTER OF TRANSMITTAL</b>	<b>ii</b>
<b>LATTER OF AUTHORIZATION</b>	<b>iii</b>
<b>CERTIFICATION APPROVAL</b>	<b>iv</b>
<b>CERTIFICATION OF INTERNSHIP</b>	<b>v</b>
<b>ACKNOWLEDGEMENT</b>	<b>vi</b>
<b>EXECUTIVE SUMMARY</b>	<b>vii</b>
<b>CHAPTER-ONE</b>	<b>1</b>
<b>INTRODUCTION</b>	<b>1</b>
<b>1.1 How thyroid gland works</b>	<b>3</b>
<b>1.2 Aim of internship</b>	<b>6</b>
<b>1.3 Origin of report</b>	<b>7</b>
<b>1.4 Objective of the program</b>	<b>8</b>



<b>1.5 Scope of the study</b>	<b>9</b>
<b>1.6 Methodology</b>	<b>9</b>
<b>1.7. Limitation of the report</b>	<b>10</b>
<b>CHAPTER-TWO</b>	
<b>OVERVIEW OF THE HOSPITAL</b>	
<b>2.1 Background Overview of Institute of Nuclear Medicine and Allied Health (INMAS), Dhaka, Bangladesh Atomic Energy Commission</b>	<b>12</b>
<b>2.2 Thyroid division</b>	<b>13</b>
<b>2.3 Services and Facilities</b>	<b>13</b>
<b>2.4 Different Types of thyroid disease that covers INMAS</b>	<b>13</b>
<b>CHAPTER</b>	
<b>THREE DESIGN OF THE STUDY</b>	
<b>3.1 Study Area</b>	<b>15</b>
<b>3.2 Physical examination</b>	<b>16</b>
<b>3.3 Testing your thyroid level</b>	<b>17</b>
<b>3.4 Quantitative estimation of T4 in human serum or plasma estimation range 20-320ng/ml</b>	<b>18</b>
<b>3.5 Determination of Vitamin D</b>	<b>21</b>

**CHAPTER-FOUR**  
**DIFFERENT TYPES OF THYROID DISEASE & THEIR**  
**TREATMENT INFORMATION**

<b>4.1 Thyroid cancer</b>	<b>25</b>
<b>4. 2 Diagnosis</b>	<b>26</b>
<b>4.3 Dietary supplementation of thyroid cancer</b>	<b>27</b>
<b>4.4. Papillary thyroid cancer</b>	<b>29</b>
<b>4.5 HERE IS REPORT OF PAPILLARY CARCINOMA PATIENT THAT I WAS COLLECTED FROM THE INSTITUTE OF MEDICINE AND ALLIED SCIENCES (INMAS), DHAKA, BANGLADESH</b>	<b>30</b>
<b>4.6 Hypothyroidism</b>	<b>31</b>
<b>4.7 Treatment of Hypothyroidism</b>	<b>32</b>

**CHAPTER-FIVE**  
**RECOMMENDATION & CONCLUSION**

<b>5.1 Recommendation</b>	<b>34</b>
<b>5.2 Conclusion</b>	<b>35</b>
<b>5.3 Reference</b>	<b>36</b>

**DEDICATED TO MY BELOVED PARENTS**

# CHAPTER-ONE

## INTRODUCTION

# CHAPTER-ONE

## INTRODUCTION

The thyroid is a butterfly shape due to the gland consisting of two lobes that are connected by a piece of tissue called isthmus. And each lobe is filled that contain hormones the body needs to function. The thyroid gland secretes hormone that help regulates the body's metabolism (the way it uses energy). They are two hormones produced and released by the thyroid gland, called Tri-iodothyronine (T3) and Thyroxine (T4).

Tri-iodothyronine (T3) has three iodine atoms whereas Thyroxine (T4) has four iodine atoms. T4 is a more active hormone that has an impact on growth and development, metabolism, body temperature and heart rate. The body converts T4 into T3 as needed. While the removal of one iodine atom from T4 leads to creation of 80% of T3, it generated by the removal of one iodine atom from T4 a process called deiodination.

They are latent until they are isolated from the protein, the thyroid gland utilizes protein and iodine from to deliver these hormones. The amount of thyroid hormone produced and given is generally by the pituitary gland. The small organ, located near the base cerebrum, controls a few organs in the body in addition to the thyroid. The pituitary gland is limited by hormones released by the hypothalamus, which place constraints on it (part of the base of the brain extremely close to the pituitary organ).

The hypothalamus releases hormones that inhibit the pituitary gland's ability to function (part of the base of the brain extremely close to the pituitary organ). When the brain recognizes a deficiency in thyroid hormones, it releases TRH (thyrotropin-releasing hormone), which encourages the pituitary gland to release TSH (thyroid-stimulating hormone), which causes the thyroid gland to manufacture and distribute thyroid hormone. Thyroid hyperthyroidism is a condition in which the thyroid hormone overreacts and produces too much thyroid hormone (over-active).

Hypothyroidism is a disorder in which the thyroid gland is underactive and generates too much thyroid hormone.

## 1.1 How thyroid gland works

Although the thyroid gland is small, it plays a critical role in metabolic rate enhancement and helping activities such as heart rate, menstrual cycle, neurological system, and many others. Our thyroid produces two vital hormones: tri-iodothyronine and thyroxine, which absorb iodine from the food we eat (T3 and T4). T4 hormone it contains four iodine atoms, the T4 hormone is easily recognized. Because it has four iodine and attaches to protein and travels through the bloodstream after being chosen from the thyroid glands. T4 sheds an iodine atom and transforms into the considerably more active T3 when it reaches target cells and tissues. It enters a nuclear cell and gets to work after being transformed.

Everyday about one third of the T4 your body produces is converted T3, depending on the body's minute to minute's needs. And it helps the thyroid directly produces some T3 but a much smaller amount with a normally functioning the thyroid your body has about 1,000 micrograms of T4 circulating and your thyroid produces about 80 to 100 micrograms daily to keep those levels steady it may be small but a lot responsibility.

*Normal T3 level is about 100-200 ng/dL*

*Normal T4 level is about 5.0-12.0 µg/dL*

Doctors don't usually under the T3 test if they suspect hypothyroidism. T3 test help to identify the thyroid cancer. T3 is diagnostically not that much important like T4 because T3 is formed from T4. Doctors may under the T4 test if the symptoms suggest any kind of thyroid disorders. Such as- Over reactive thyroid hormone hyperthyroidism. High free T3 levels may mean you have hyperthyroidism.

Low T3 levels may refer hypothyroidism.

High TSH suggest over-reactive (hyperthyroid) and producing excess thyroid hormone. The most majority of T3 and T4 are bound to proteins in the blood stream.

### **TSH:**

TSH, or thyroid stimulating hormone, created by the foremost pituitary organ and is the thyroid organ's primary energizer for thyroid chemical creation. It advances thyroid hypertrophy by making the follicular cells in the thyroid multiply. The nerve center pituitary pivot controls TSH levels. TSH is emitted by TRH, or thyrotropin of the foremost pituitary,  
© Daffodil International University

which is created for the most part by neurons in the nerve center. Thus, TSH makes thyroid follicular cells discharge thyroid hormones as T3 and T4.

**Uses of TSH test:**

A person may need a TSH test if he/she has symptoms of too much thyroid hormone in blood (Hypothyroidism). If too little thyroid hormone in blood (Hypothyroidism).

<b>TSH</b>	<b>Normal Range</b>
Children birth to 4 days	1.0 to 39.0 $\mu$ IU/mL
Children 2 to 20 weeks	1.7 to 9.1 $\mu$ IU/mL
Children 21 weeks to 20 years	0.7 to 6.4 $\mu$ IU/mL

**Caused of increased TSH in blood**

- ❖ Hypothyroidism
- ❖ Hashimoto thyroiditis
- ❖ Pituitary gland tumor
- ❖ Insufficient dose of thyroid hormone

**Caused of decreased TSH in blood**

- ❖ Excess dose of thyroid hormone
- ❖ Pituitary gland disorders
- ❖ Goiter
- ❖ Grave's disease

**T3:**

The active form of thyroid hormone is tri-iodothyronine (T3). Despite the fact that it just represent for 20% of the hormone delivered, most of T3 is created through fringe T4 to T3 transformation.

Bound T3 is (99.95) bounds in plasma & storage form, T3 is attached like globulin,

Albumin, and lipoprotein.

FT3 (0.02%) active form available for use your body and tissue. And that's free from Albumin and activity is higher.

Is active form of tri-iodothyronine (T3) and diagnostically very important this play role in all function of the body than bound T3. Because FT3 is helping body and different organs (heart, muscle, brain and liver) in proper function because it the active form of (T3).



#### **T4:**

Thyroxine, or T4, comprises for over 80% of the chemical delivered. At the point when it is released into the course, it goes through de-iodination, which brings about the arrangement of T3. Bound T4 is (99.95%) and bounds to plasma & storage form, T4 is attached like globulin, Albumin, and lipoprotein. FT4 (0.02%) active form available for use your body and tissue. And that's free from Albumin and activity is higher.

Is active form of thyroxine (T4) and diagnostically very Important this play role in all function of the body than bound T4. Because FT4 is helping body and different organs



(heart, muscle, brain and liver) in proper function because it the active form of (T4)

**Causes of thyroid problems:**

- A. Iodine deficiency
- B. Autoimmune disease – which immune system leading attacks the thyroid, leading to hypothyroidism or hyperthyroidism.
- C. Inflammation – caused by bacteria or virus
- D. Cancerous tumors
- E. Certain medical treatment or genetic.

**1.2 Aim of internship**

Every level of position gives as an opportunity to understudies to interface hypothesis with training and further fill an improvement for those official that have resolved to take part in the temporary job program in each of the division. The division studies its strategic preparing understudies for critical approach for advancement in precision Nuclear Medicine for treatment and clinical pathologies circumstance, week after week important topics should determine different related disorders of thyroid disorders and physiological caused and clinical treatment are discussed.

**The Internship:**

- i. An internship provides an understudy with practical true engagement with society, whether it's public, private or charitable.
- ii. It's understand to develop sustainable open organization, a skill that cannot be taught in a classroom setting.
- iii. These counteracts between complaining usual assignments for the interning office and learning about the human inspiration process in a mind- boggling association.

- iv. Allows to understand to apply advanced skills gained in the study hall to the real-world open private, or philanthropic management problems.
- v. An internship enables a student to apply theoretical concepts taught in the classroom to real-world situations in the work place, such as – open organizational experiences.
- vi. Provides understudy of real-world experience working with a public, private and charitable organizations or working with public or private hospital prior to joining the activity showcase. Such as – exposure broadens understudies activity options while also training them is exposure of professionals.

### **1.3 Origin of report**

The internship program is a necessity for understudies in the Department of Nutrition and Food Engineering to complete their scholastic professions and graduate. Internship in hospital or industry-based preparing are fundamental for getting a handle on subjects educated in conventional school, as per Daffodil International University's Department of NFE. The significant object is to give true insight and preparing to understudies. Besides, there is as yet a colossal hole between scholarly learning and potential data application in genuine current wellbeing and sustenance. Temporary positions can assist with decreasing the hole by carrying understudies nearer to work searchers. Understudies in this program have the chance to apply their homeroom learning in a true setting and to find out with regards to current wellbeing patterns. The report is started from curricular prerequisites of B.Sc. in Nutrition and Food Engineering. The subject of my report is “Thyroid related disease and with their relation of vitamin D” for this reason I have observed their guidelines counseling method and operational activities closely. I accommodate my internship program with Institute of Nuclear Medicine and Allied Sciences, INMAS, Dhaka, Bangladesh. and as per discussion with my academic supervisor Dr. Nizam Uddin, Assistant Professor, lecturer, department of Nutrition and Food Engineering, faculty of Allied Health Sciences, Daffodil International University.

**To study and internship program have the following purpose:**

1. To fulfill the requirements of B.Sc. in Nutrition and Food Engineering program to complete graduation.
2. To gain knowledge about practical work besides theoretical knowledge.
3. To assisting student in expressing dependability, initiative, professionalism, work completion
4. To establish a more direct line of communication with potential employers.
5. To provide opportunity to gain practical knowledge and use it in job place.
6. To know about Institute of Nuclear Medicine and Allied Health Sciences (INMAS).

## **1.4 Objective of the program**

There are two objectives of this internship program they are:

- General objective
- Specific objective

### **General objective**

1. To fulfill the Bachelor of Nutrition and Food Engineering Degree requirement of faculty of Allied health sciences, Daffodil International University.
2. The essential objective of preparing this report is to fulfill the necessity of B.Sc. in Nutrition and Food Engineering Program. A brief knowledge of the modern health field can only be attained through the pragmatic implementation thoughts, which we learnt from our academic activities. With these objectives, I have made all possible efforts and essential analysis to submit this paper in an enlightened form

in a really brief time. I have attempted my level best to eliminate of mistakes from the paper. As I had to complete my internship within a short period of time so the study admits its limitations.

### **Specific objective**

All the more explicitly this review contains following aspects:

- A. To learn thyroid related disorders and relation with vitamin D level
- B. To give an overview of this Institute of Nuclear Medicine and Allied Health Sciences (INMAS), DHAKA, BANGLADESH.
- C. To learn RIA lab Investigation and treatment of thyroid disease.
- D. To have an idea about activities of this Institute (INMAS), DHAKA, BANGLADESH

## **1.5 Scope of the study**

This report was written after a lengthy discussion on thyroid problems and its relationship to vitamin D levels in the body. And consider how crucial the thyroid is for growth and the excretion of a few key hormones that control how rapidly the body burns energy, manufactures proteins, and how sensitive the body should be to other hormones. As a result, one of the thyroid's primary responsibilities is to activate and maintain metabolic activities in the body. This study goes into greater detail and provides additional information about thyroid secretory hormones, as well as thyroid-related disorders and relation with vitamin D level.

## **1.6 Methodology**

Methodology begins with the selection of a topic, data source, and systematic interpretation of results, as well as the identification of essential points. The following is the methodology's overall process.

### **Selection of the topic:**

Selection for a topic for a research project is really crucial. It is contingent on the acquired knowledge and on- the-job experience of those assigned to the hospital.

### **Source of data:**

There are two sources of data:

#### **Primary Source of data:**

- Visiting to the Hospital.
- Histopathology report
- & RIA lab report

#### **Prospectus Secondary Source of data:**

- Official website of INMAS.
- Journal and article
- Manual and files of the Hospital
- Prospectus

### **Tools Used:**

Some pictures of different report patient files and picture of equipment that used for the laboratory investigation such as – vitamin D, blood collects for T3, T4, FT3, FT4 and TSH. Ultra-sonogram and scan are used in this report for showcase I was collected to the hospital and to classify different types of data.

## **1.7. Limitation of the report**

Though I have tried my level best to make the report successfully but every one understand that no report can provide coverage of a given topic in an absolute sense. I had also some limitations to collect proper data.

- A. Because of the hospital policy, rules and regulations they were unable to provide some information.
- B. Because of unavailability of time some of them were unable to supply certain details

## **CHAPTER-TWO**

### **OVERVIEW OF THE HOSPITAL**

## CHAPTER-TWO

### OVERVIEW OF THE HOSPITAL

#### **2.1 Background Overview of Institute of Nuclear Medicine and Allied Health (INMAS), Dhaka, Bangladesh Atomic Energy Commission.**

The institute of Nuclear Medicine and Allied Sciences (INMAS), Dhaka, Bangladesh. Is situated on the Dhaka medical college campus and was established in 1962 as Bangladesh's first Nuclear Medicine Center. It is one of the country's fifteen INMAS offices. INMAS, Dhaka, offer particular clinical types of assistance in the space of scintigraphy, ultrasound, and CD, PET-thyroid atomic cardiology, atomic nephrology, and in vitro therapeutic, among others. The institute is run under by the Bangladesh Atomic Energy Commission (BAEC), which is essential for the Government of the People's Republic of Bangladesh's Ministry of Science and Technology.

#### **Vision of INMAS:**

1. INMAS' vision has been portrayed just like a focal point of greatness in biomedical and clinical exploration, with an uncommon reference on ionizing radiation.

#### **Mission of INMAS:**

2. INMAS' aim is to do clinical exploration in Nuclear Medicine and non-obtrusive imaging modalities, with a specific spotlight on organic radio defenders and thyroid issues.



## **2.2 Thyroid division:**

One of the main branches of the Institute of Nuclear Medicine and Allied Sciences (INMAS) in DHAKA, Bangladesh, is the thyroid division. Thyroid-prepared trained professionals and specialists in this space analyze and treat an assortment of thyroid diseases, including goiter, thyrotoxicosis, papillary thyroid carcinoma, follicular carcinoma, hypothyroidism, hyperthyroidism, and different sorts of thyroid contamination. This thyroid division, then again, is the country's most significant thyroid community. The significant administrations that INMAS give are various offices and administrations and different sorts of patients visit consistently to profit from the symptomatic and helpful administrations. As well as seeing patients, a few types of examination are directed. The clinical facility, like dialysis organizations, might be making supplier associations for thyroid patients, like thyroid disclosure and the board. Patients and staff have a nearby association since they should manage the early reaction to different diseases and insightful treatment.

## **2.3 Services and Facilities**

The major services that INMAS provide are:

- a. To provide modern and latest technical services to the patient
- b. Expansion of diagnostic & therapeutic capability
- c. Increase of academic & Research activities and
- d. Development of the human resource

## **2.4 Different Types of thyroid disease that covers INMAS:**

- a) Hypothyroidism
- b) Hyperthyroidism
- c) Different types of thyroid cancers



## **CHAPTER-THREE**

### **DESIGN OF THE STUDY**

**CHAPTER**  
**THREE DESIGN OF THE STUDY**

**3.1 Study Area**

The study divided into two areas. Such as:

- a) Study on the Doctor's chamber
- b) Study on & RIA lab

**History Taking**

The history taking is most important briefly explain what history taking will involve and they ask patient if they have pain before proceeding with the clinical examination.

**History Taking includes:**

1. Particularly of the patient data
2. Disease history
3. Family history
4. Menstrual history taking
5. Symptoms
6. Drug history
7. Current problem
8. Medical and surgery history
9. History of past
10. If she's pregnancy women
11. If she's lactating mother

## **RIA lab**

The thyroid patient send to different facilities such as -

1. Blood test
2. TSH
3. FT3
4. FT4
5. Thyroid tissue/nodule
6. Tg (thyroglobulin)
7. Anti-thyroid Antibody
8. PTH (Parathyroid Hormone)
9. Calcium
10. Albumin
11. Vitamin D
12. PET scan
13. MRI
14. CT scan
15. HRUS of the Neck

## **3.2 Physical examination**

Thyroid assessments comprise of observation and palpation of the thyroid organ to build up standard readings that will direct treatment.

- a) Observation: First we need absorb for any enlargement of thyroid gland for this we need to tilt the patient head to their right/left and look out any enlargement for enlarged masses in this region of the neck.
- b) Palpation: so now we are moving on to palpitation of the thyroid gland, for this we need to locate where the thyroid is situated before that lets learn about the simple

anatomy.

### 3.3 Testing your thyroid level

The best way to check your thyroid hormone level is with to check TSH, T3, T4, FT3, and FT4 the test determines the amount of thyroid hormones producing in your blood test

According to the INMAS RIA lab are into two method one is depends on the age category and another one is fix method.

- ✓ Chemilumnescence immunoassay system (CIS).
- ✓ Radio immune assay (RIA) and immune Radio Metric Assay (IRMA)

#### 1. Chemilumnescence immunoassay system (CIS)

Investigation	Reference Range
Free tri-iodothyronine (ft3)	3.5-6.5 P mol/L ( Adults) 5.1-8.0 p mol/L ( Infants 1-23 months) 4.7-7.2 p mol/L (Adolescents 13-20 yr.)
Free thyroxine ( FT4)	11.55-22.7 P mol/L ( Adults) 12.1-18.6p mol/L (Infants 1-23 months) 11-18.6 p mol/L (children 2-12 yr.) 10.7-18.4 p mol/L (Adolescents 13-20 yr.)
Thyroid stimulating hormone (TSH)	0.35-5.5 $\mu$ IU/mL (Adults) 0.87-6.15 $\mu$ IU/mL (Infants 1-23 months) 0.87-4.16 $\mu$ IU/mL (Children. 2-12yr.) 0.48-4.17 $\mu$ IU/mL (Adolescents 13-20 yr.)

Estimated are carried out by Siemens ADVIA Centaur XPI Chemilumnescence Immunoassay System (CIS)

## 2. Radio Immunoassay (RIA) and Immune Radio Metric Assay (IRMA).

SI NO.	Investigation	Normal Range
1	Total Tri-iodothyronine (T3)	.23-3.54n mol/L
2	Total thyroxine (T4)	54-173 n mol/L
3	Free Tri-iodothyronine ( FT3)	3.50-8.56n mol/L

Assay was performed in Radio Immune Assay (RIA) and Immune Radio Metric Assay (IRMA) Method used Radio-isotope I-125 tracer.

### 3.4 Quantitative estimation of T4 in human serum or plasma estimation range 20-320ng/ml

#### Principle method

The radioimmunoassay technique depends on rivalry between <sup>125</sup>I-marked T4 and T4 in principles or examples to be tried for a set number of T4 counter acting agent restricting locales. The measure of T4 in the example after it has been brooded.

The centralization of present in obscure example can be approximated by estimating the small amount of <sup>125</sup>I marked T4 bound within the sight of reference principles containing differed known amounts of T4.

#### Contents of kit (400 test pack)

- 4 vials (148 kBq) I125-T4 solution (4x21ml, red)
- 2 vial T4 antibody ( 2x2ml, blue)
- T4 standard (2x6 vials) pipette 1ml of distilled water into zero standard. Pipette 0.5ml distilled water into each of the other vial of T4 standards for reconstitution and stand for 5 minute. The concentration are 20, 40, 80, 160, 320 ng/ml.
- 4 vial PR B, before used the reagent should be thoroughly mixed by gentle shaking

and swirling to ensure a homogeneous suspension.

**Storage instructions:**

1. Store it at 2-8C
2. Do not freeze
3. Allow all reagent to come to room temperature prior to use in the assay.

**Equipment and material required but not provided:**

- a) Disposable polystyrene tubes
- b) Micropipettes with disposable tips (50, 200 and 500  $\mu$ L)
- c) Vortex type mixer
- d) Tube track
- e) Water bath at 37C
- f) Gamma counter

**Assay procedure;**

The order of the steps should be followed exactly.

- I. Label and arrange assay tubes in the assay rack
- II. Pipette 50 $\mu$ L aliquots of standards or samples into the prelabelled tubes ( see Table1)
- III. Dispense 200 $\mu$ L 125I –T4 solution (red) into each tube.
- IV. Dispense 100 $\mu$ L T4 antibody to each tube (except ‘T’)
- V. Vortex the tubes thoroughly, incubated at 37C for 45 minutes
- VI. Dispense 500 $\mu$ L precipitant into each tube except “T”
- VII. Incubate at room temperature for 15 minutes. Centrifuge the tubes for 20 minutes At 1500g (except “T”)
- VIII. Discard the supernatant by decantation or secretion (except ‘T’)
- IX. Count all the tubes in a suitable gamma counter.

**Table2: Total T4 Kit assay protocol unit  $\mu\text{L}$**

	T	STANDARD	SAMPLE
T2 standard Samples	200	50	50
125I-T4		200	200
T4 antibody		100	100

Vortex. Incubator at 37C for 15 minutes

PR B      500      500

Incubate at room temperature for 15 minutes. Centrifuge the tubes for 20 minutes at 1500 X g. Discard the supernatant and count.

### Calculation of results

#### Result can be calculated using logit-log plotting

##### Logit-log plotting

- Calculate the mean count rate for the zero standard (B0)
- Divide the counts for each standard (B) by the mean counts for the zero standard (B0) and multiply by 100.
- Plot B/B0 esteems for every norm against the T4 fixation on logit-log chart paper.
- Read off the T4 concentration from the logit-log plot.

Calibration values quoted in this leaflet are in units of ng/mL. Using the molecular weight of 777, conservation to units of nmol/L may be made using the following expression:  $\text{ng/mL} = 0.777 \times \text{nmol/L}$

#### Expected values:

Normal range: 42-135ng/mL (54-173nmol/L)

Because tiny variances may occur from laboratory to laboratory and from area to region, it is suggested that every research facility decide its own typical reach for its specific population.

**Note:**

- ❖ This assay Kit must only be used for in-vitro diagnosis.
- ❖ This assay Kit contains radioactive material, during handling and disposal of radioactive materials, the existing legal regulations must be observed.
- ❖ Compositions of this Kit contain sodium azide as a preservative, avoid contamination of skin.
- ❖ The Kit must not be used after the expiry of date.



Figure 01: Different types of RIA lab of INMAS



### 3.5 Determination of Vitamin D

The main role of vitamin D is controlling bone digestion and calcium, low degree of nutrient D has likewise been related with immune system thyroid infection (AITD, for example, – Hashemite's thyroid thyroiditis (HT) and grave's disease (GD).

#### The vitamin D determination variable step:

Step-1

Assay procedure (Automatically)

Dispenses 25  $\mu$ l (ds)

Incubates (5 min at 37C)

Dispenses (100  $\mu$ l (LR)

Incubates (3 min at 37C)

Dispenses 200  $\mu$ l (sp)

Incubates (7 min at 37C)

Separates

Aspirates

Washes the curve (ADVIA Centaur wash)

Dispenses (300  $\mu$ l) (each of ADVIA – CAR & CBR)

Reports result



#### Vitamin D helps in body:

1. Deposited calcium within the bone
2. Increase CA absorption in small intestine
3. Decrease calcium
4. Excretion in kidney

**There two forms of vitamin D they give patient who has calcium density or low calcium:**

Vitamin D active form like: calcitonin

Vitamin D inactive form like: D-rise and D-choral

Vitamin D after intake the body it turn to liver the convert and get to the liver and finally from liver it's shift to blood and sprayed all the body cells.

Generally the vitamin D having it inactive form at body and by the sunlight it's turn of active.

Active form of vitamin D is known as cholecalciferol.



Figure 02: RIA lab of INMAS

## **CHAPTER-FOUR**

# **DIFFERENT TYPES OF THYROID DISEASE & THEIR TREATMENT INFORMATION**

**CHAPTER-FOUR**  
**DIFFERENT TYPES OF THYROID DISEASE & THEIR TREATMENT**  
**INFORMATION**

**4.1 Thyroid cancer**

Thyroid disease is a condition wherein malignant (cancer) cells create in the thyroid organ's tissues. Thyroid knobs are somewhat normal. However, they aren't generally the reason for sickness.

The thyroid tissue load in the body is demonstrated by the serum level of Tg, whether or not the situation is protected or hazardous. Since blood levels are identified with thyroid tissue volume, blood levels can be utilized to decide "disease trouble" in Tg and Ultrasonic beds.

**Types of thyroid cancer:**

1. Papillary thyroid carcinoma is the most successive kind of thyroid malignant growth, around for around 80% of all cases.
2. Follicular thyroid malignant growth is the most widely recognized sort of thyroid disease, around for 10- 15% of all thyroid malignant growth cases.
3. Medullary thyroid malignant growth is the most widely recognized sort of thyroid disease, around 4% of all cases.
4. Anaplastic thyroid malignant growth is a remarkable sort of thyroid disease that can be the most risky in its beginning phases.

**Causes of thyroid cancer:**

- a) Inherited genetic syndrome
- b) Iodine deficiency
- c) Radiation openness

### **Symptoms of thyroid cancer:**

- ✓ Neck and throat pain
- ✓ Lump in your neck
- ✓ Trouble gulping
- ✓ Vocal changes, harshness
- ✓ Cough

### **4. 2 Diagnosis:**

- A. Physical test
- B. Blood test
- C. Scan
- D. Ultra-sonogram neck
- E. Removing sample of thyroid tissue
- F. Genetic testing

### **Treatment of thyroid cancer:**

The type of thyroid cancer, the size of the cancer, and the procedure that can be utilized to treat thyroid cancer are as follows:

- a) Removing the whole thyroid organ or most of the thyroid organ
- b) Removing a piece of the thyroid organ
- c) Lymph nodes in the neck are taken out

### **In this institute, they use operation notes:**

- i. Dated and time of operation
- ii. Name of the operation
- iii. Indication
- iv. Name of the surgeon
- v. Name of Assistant
- vi. Name of Anesthesia

vii. Name of the Anesthetist

After the surgery, the patient is referred to the INMAS institute, where they advise the patient to take some blood tests, an ultra-sonogram of the neck, and a scan of his/her report to date for applying "Radioiodine therapy," which is frequently used after medical surgery to eliminate the excess thyroid tissues that remain healthy. Radioiodine comes in capsules or liquids that you swallow. INMAS had documented/recorded room lifelong follow-up books of persons who had been treated with radioiodine therapy. The institute make files and follow-up books for the patient.

**The patient was advised to follow instructions bellowed after receiving Radioiodine therapy:**

1. Patients isolation at least like 5 days in a different hospital cabin with its own bathroom
2. A lot of water must be consumed, and micturition must be done frequently.
3. Intake immense measure of Water since water can helps the body's radiation weight to be decreased.
4. To forestall salivary organ decay, bite sharp pickles and lemon desserts frequently following 24 hours of radioiodine treatment for 5 days.
5. Spit, regurgitation, pee, and excrement should be generally placed into the latrine container and flushed twice or washed completely.
6. The patient is restricted to their room and isn't allowed to leave it. In an assortment of circumstances, you'll need to utilize a telephone.
7. Personal effects of the patient are not allowed to be taken outside of the lodge. All that will be used can be kept in the cooler for a couple of days prior to washing.
8. Visitors ought to be precluded from seeing the patient in case she is pregnant or has youngsters. Just a grown-up can go through over 5 minutes with the patient, and nobody can see that person multiple occasions in a 24-hour time span

After isolation patient was discharged to the hospital and sent to the thyroid chamber in this institute (INMAS), the patient has still a source of Radioiodine. And is given him a separate room to rest only scan done with the Radioiodine protection shielding material.

After completing the patient his/her post-therapy scan the patient come to the doctor's room for the Serum TSH, USG of the neck, thyroid scan, Anti Tg AB, vitamin D, serum calcium, and albumin and corrected calcium file then discuss if it's good or bad and give him some prevention foods and supplementation.

#### **4.3 Dietary supplementation of thyroid cancer**

You'll need to take medication to restore the thyroid gland's function in your body's metabolism if your thyroid gland was removed as part of your thyroid cancer treatment.

Check with your doctor before taking any supplements to see if they will interact with this. A low-iodine diet, which is mainly advised to people with thyroid problems, is also a type of nutritional supplements (differentiated papillary thyroid cancer and follicular thyroid cancer). If you're on a low-iodine diet before having thyroid cancer surgery, these nutrients can assist you with keeping away from the eating regimen's aftereffects.

**Thyroid cancer is usually treated by surgically removing the thyroid gland. Thyroid cancer prevention diets after diagnosis:**

- i.** Eating start broccoli sprouts.
- ii.** Add smell of apricot kernels to your diet
- iii.** Drinking some dacha green tea
- iv.** Eat wild caught fish
- v.** Vitamin C rich foods
- vi.** Keep your selenium level and iodine level balanced
- vii.** Replenish your B vitamins such as – B1, B3, B6, B7, B12 and B9
- viii.** Avoid inflammatory foods such as – sugar, refined oils, refined carbohydrates,

#### **4.4. Papillary thyroid cancer**

The most common kind of thyroid cancer is papillary carcinoma, which accounts for 80% of all thyroid cancer cases. Papillary thyroid cancer can affect anyone at any age, from childhood to old age, but it is most frequent in people between “30 to 50” Women are more likely than men to have papillary thyroid disease, which is usually innocuous in young women. If you have papillary carcinoma, a physical exam, blood test, scan, ultra-sonogram neck, and biopsy will be required to identify whether or not a nodule is malignant.

#### **Causes of papillary thyroid cancer:**

- A. Certain genetic condition
- B. Family history
- C. Radiation therapy
- D. Gender

#### **Symptoms of papillary thyroid cancer:**

Nodules are growing that may be solid or filled with fluid

- ❖ Lymph in your neck
- ❖ Hard time swallowing
- ❖ Sore throat
- ❖ Swallowing lymph nodes in your neck
- ❖ Trouble breathing

#### **Treatment:**

In most cases, surgery involves removing the entire thyroid gland as well as lymph nodes. After that, you'll need to undergo radioiodine ablation, which will remove any remaining healthy thyroid tissue.



**4.5 HERE IS REPORT OF PAPILLARY CARCINOMA PATIENT THAT I WAS COLLECTED FROM THE INSTITUTE OF MEDICINE AND ALLIED SCIENCES (INMAS), DHAKA, BANGLADESH.**

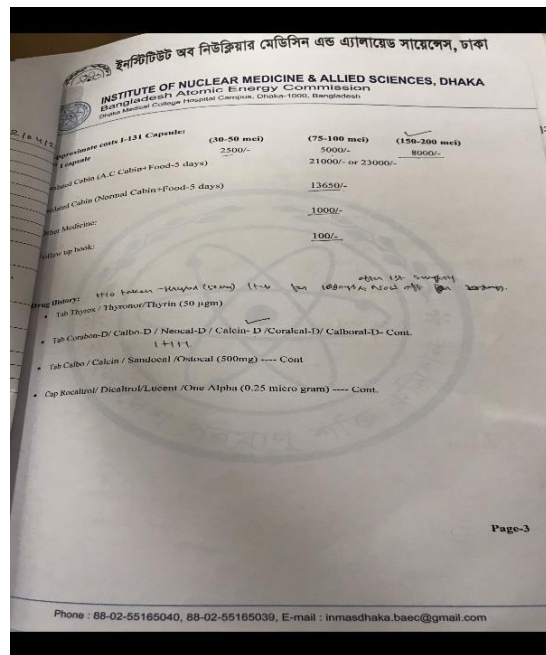
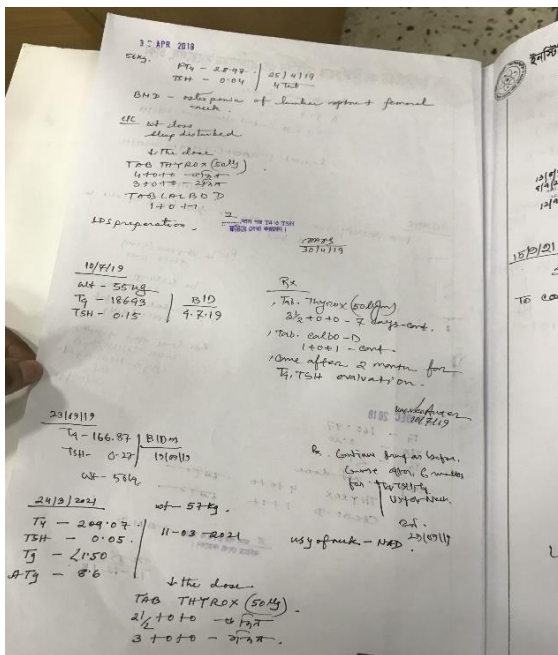
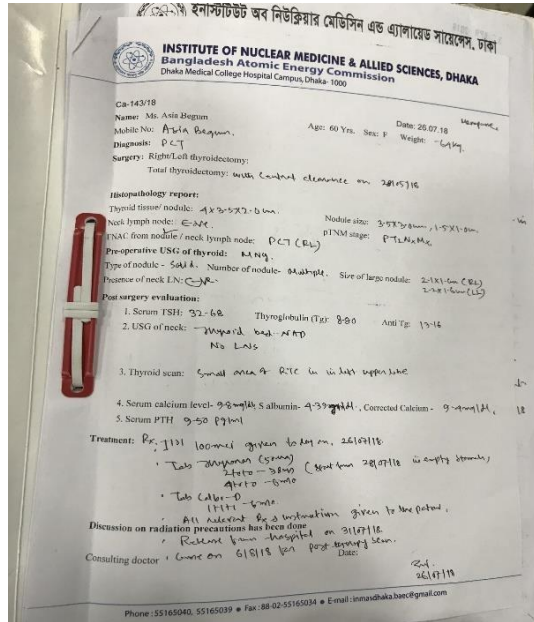
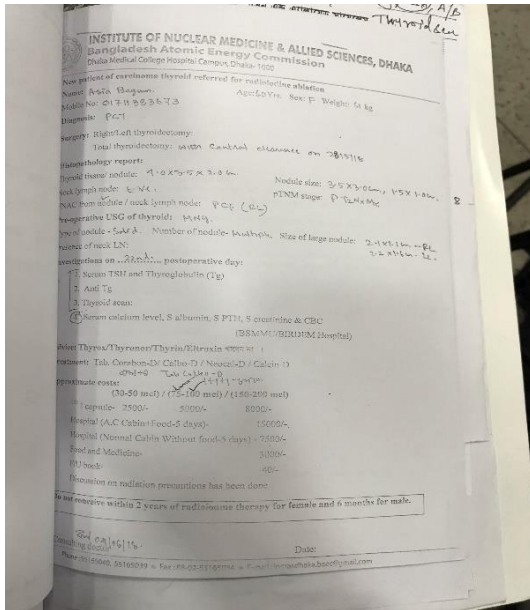


Figure 03: Different types of papillary carcinoma patient file

#### **4.6 Hypothyroidism**

Hypothyroidism (underactive thyroid) is a condition where your thyroid organ doesn't produce enough of specific chemicals. At the point when hypothyroidism is in its beginning phases.

#### **Hypothyroidism signs and symptoms may include:**

- i.** Sensitivity to the cold has increased.
- ii.** Fatigue
- iii.** Skin become dry
- iv.** Gaining weight
- v.** Muscle weakness
- vi.** Pain, stiffness or swelling in your joints
- vii.** Thinning hair
- viii.** Impaired memory
- ix.** Enlarged thyroid gland (goiter)
- x.** Elevated blood cholesterol level
- xi.** Depression
- xii.** Heavier than normal or irregular menstrual periods

#### **Causes of hypothyroidism:**

- A.** Autoimmune disease
- B.** Radiation therapy
- C.** Thyroid surgery
- D.** Over-response to hypothyroidism treatment
- E.** Iodine deficiency
- F.** Pituitary disorder

**Risk factors:**

- i. Are older than 60
- ii. Having a family history of thyroid disease
- iii. Have an autoimmune disease such as – type 1 diabetic or celiac disease
- iv. Receiving radiation to your neck or upper chest
- v. Have had thyroid surgery (partial thyroidectomy)

**4.7 Treatment of Hypothyroidism**

Hypothyroidism is frequently treated using the synthetic thyroid hormone levothyroxine (Levo-T, Synthroid, others). This drug helps to restore normal hormone levels in the body.

**Table: Hypothyroidism limited and avoid foods:**

Disease Name	Limited food	Avoid food
Hypothyroidism	Red rice	Fatty foods
	Red flour	Cabbage
	Fruit	Cauliflower
	Fried foods	Broccoli
	Vegetables	Couch
	Fish in the sea	Peach fruit
	Frequently small meals	Pear,
	10 to 12 glasses of water	And strawberries.
	Vitamin (limited):	
	Iodine,	
Selenium,		
Zinc.		

## **CHAPTER-FIVE**

### **RECOMMENDATION & CONCLUSION**

## CHAPTER-FIVE

### RECOMMENDATION & CONCLUSION

#### 5.1 Recommendation

Eating well is important for the patient who has thyroid disorders, and this can help their feel better. A new diet is essential of their treatment process. Not only it will help patient feels better, it can also help patient avoid complications of their disease. Now a day's people suffer from various thyroid diseases such as thyroid cancer, hyperthyroidism, hypothyroidism, Hashimoto's disease, Grave's disease, thyroid nodule and thyroiditis. In this period, their diet should be modified than other normal diet according to their diseases. Different patient need different diet according to their right proportion. The aim of this study is investigate different types of thyroid disease and their relation of vitamin D level and also to suggested patient healthy diet. These factors depend on a stage of a patient disease, type of treatment, laboratory result, and presence of other medical conditions. Protein, calcium, magnesium, and iodine help your thyroid work. Make sure you are getting plenty of all the B vitamins, vitamin A and Vitamin C.

- a) Eat at least 5 portions of a variety of fruit and vegetables every day
- b) Base meals on higher fiber starchy foods like potatoes, bread, rice or pasta
- c) Have some dairy or dairy alternatives
- d) Eat some beans, pulses, fish, eggs, meat and other protein
- e) Choose unsaturated oils and spreads, and eat them in small amounts
- f) Drink plenty of fluids (at least 6 to 8 glasses a day)

#### **Avoid these products**

- A.** Pseudoephedrine (found in over-the-counter cold remedies) can cause nervousness, insomnia, headache, and high blood pressure.
- B.** Alkaloids, including caffeine, morphine, and quinine, can rise your blood pressure and heart rate.

## 5.2 Conclusion

I'm truly blessed by getting such opportunity from our Honorable Head of division of Nutrition and Food Engineering, sheik Mahatabuddin, Ph. D. what's more, to my supervisor Dr. Nizam Uddin, Assistant Professor, speaker division of Nutrition and Food Engineering and furthermore the Director and CMO of Institute of Nuclear Medicine and Allied Sciences (INMAS), Dhaka, Bangladesh. Dr. Jasmine Ara Huque and Dr. Fatima Sultana Haque (MBBS, DNM. M.Phil CMO and Professor), Head Department of thyroid for offering me the chance to finish my temporary job and welcome me energetically and was useful to me, the emergency clinic was exceptionally enormous and I took in numerous things from the division of thyroid at Institute of Nuclear Medicine and Allied Sciences (INMAS). From this temporary position program I have acquired heaps of viable encounters on thyroid related problems and connection of nutrient D level. I felt that I have acquired new information, abilities and accomplished a few of my learning objectives.

At the end line again I want to give thanks to the authority of the institute of Nuclear Medicine and Allied Sciences (INMAS), Dhaka, Dhaka Medical College, Hospital Campus Bangladesh, Atomic Energy Commission

### 5.3 Reference

1. <https://www.inmas-dhaka.org>
2. use power foods to protect your health after thyroid cancer | beyond thyroid cancer
3. Oppenheimer, J.H Role of plasma protein in the binding, distribution and metabolic of thyroid hormones, New England journal of medicine, 1964, 278 1153-1162
4. Mardell, RA strategy for in vitro test of thyroid function, Amsterdam. The radiochemical center, 1978, 21
5. Ellis, S. M. AND EKINS, R.P. the radioimmunoassay of free (diffusible) T3 and T4 concentrations in serum. Journal of endocrinology, 1973, 59 Xliii.
6. Dusault J.H. AND LABERCRE, C. Dosages de la thyroxine (T4) PER METHOD Radioimmunologiaue dansle luat de sang seche: novella method de depistage de I' hypothyroid neonatal L, 'unionmedicaleduCanada, 1973, 102, 2062-2064.