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Website: Kjar.spu.edu.iq | Email: kjar@spu.edu.iq

Thyroid disorders among patients with type II Diabetes Mellitus

Mariwan Abdulla Hama Salih
Medical Laboratory
Technical College of Health
Sulaimani Polytechnic University
Sulaimani Iraq
Mariwan.abdulla@spu.edu.iq

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Abstract

Recently hospitals are full of patient suffering from several chronic diseases. Two of these diseases are Diabetes Mellitus (DM) and Thyroid diseases. DM is a chronic disease characterized by irregular abnormal elevation of blood glucose level. It is classified in to several types depending on the situation; the major types are type I and type II. Thyroid disease is an endocrine disease which characterized by over production or decrease in production of thyroid hormones by thyroid glands. The main function of thyroid hormones is the regulation of body metabolism. Both of diseases are endocrine disease. These diseases currently the major hurdle among patient and become the great challenge in front of government capability to fight the problem. These data were collected between the last months of 2017 to the 15th of April 2018 from overall 300 patients. All the information has been collected from Diabetic and Endocrine Center, Shorsh Hospital and Medical DAIK Group in Sulaiman city. In total of 300 patients, Twenty five percent 25% of patients have both diabetes and thyroid disease. Fifty nine percent 59% of patients only have diabetes without any sign of thyroid problem, and finally only Sixteen percent 16% were have thyroid problem again without any evidence of having diabetes signs. This study showed that from the collection of (300) patients, seventy five (75) patients have both diabetes mellitus and thyroid diorders, these are more predominance in overage 40 years of mostly females, illiterate and housewife that mostly were insulaimani city.

Keywords: Diabetes Mellitus, Thyroid Disorders, DM and Thyroid Diseases.

1. INTRODUCTION

Diabetes mellitus is a chronic disease that described by disorder in metabolism of sugar or carbohydrate in general. It is also identified as hyperglycemia, diabetes mellitus produces by either lack of insulin secretion or decreased uptake of insulin by the tissues or cells, the chronic hyperglycemia of diabetes patient is associated with long term damage, dysfunction, and failure of different organs especially eye, kidney, nerve, and blood vessels.[1] There are two main types of diabetes mellitus which are type I and type II, also there are some other types of diabetes which are less familiar, such as genetically disorder, endocrine disorder, infections, and drug or chemical toxins, these cases considered as a secondary diabetes mellitus.[2] The other type of diabetes mellitus is called gestational diabetes which may be relieved after delivery. It is first recognized during pregnancy.[3] Insulin dependent diabetes mellitus (IDDM) is considered as a Type I diabetes and caused by lack of insulin releasing by Islets of Langerhans of beta cell of pancreases, usually develop type I diabetes in early ages to adult age, and about ten percent 10% of diabetes cases are type I.[1, 4] The non-insulin dependent diabetes mellitus (NIDDM) is the name used to describe Type II diabetes that caused by decreased sensitivity of target insulin resistance.[1] Type II diabetes mellitus can be improved by losing weight, following a healthy diet,[5] experiencing exercise,[6] and monitoring blood glucose level. Overweight and obese people have a much higher risk of developing type II diabetes compared to those with a healthy body weight. The risk of developing type II diabetes is also greater as we get older. Researchers suggested that with age the tendency to put on weight are more likely and become less physically active.[4] In both types (type I & II) of diabetes mellitus metabolism of all main foodstuffs is altered,[5] the basic effect of insulin lack or insulin resistance on glucose metabolism is to prevent the efficient uptake and utilization of glucose by most cells of the body except those of brain. As a result, blood glucose concentration increases, cell utilization of glucose falls increasingly lower, and utilization of fats and proteins increased. A research stated that there thyroid disorders are discovered in patients with Diabets.[7] Diabetes mellitus and thyroid disease are the two most common endocrine diseases. Thyroid dysfunction includes hypothyroidism (Hashi-motos thyroditis), hyperthyroidism (Grave's disease) and defuse nodular goiter, the first two endocrinopathies induced by an autoimmune process.[8]

The role of autoimmunity has been well recognized in the link between autoimmune thyroid diseases and type I diabetes mellitus. On the other side, interrelationships between type II diabetes mellitus and thyroid dysfunction have also been suggested but not easily clarified due to several complications.[9] However thyroid disorders were found to be more common in subjects with type I diabetes compared to those with type II diabetes.[10]

The relation between DM and thyroid disorder are linked with several pathological states and also autoimmune diseases, and additionally with other physiological and physical parameters.[11] Controlling diabetes will be difficult when start pathological complication state of thyroid disorders and is commonly found in most forms of DM which is associated with specified ages in type II diabetes and autoimmune diseases in type I diabetes.[7]

Since the last years, there was little data available about thyroid diseases in patients with type II diabetes. Therefore, this study performed to find the additional reasons and information which may be not reported yet. The collected data will help in diagnosing these cases and can be the key for solution for many chronic diseases.

Thyroid glands are the main sources of releasing triiodothyronine T3 and tetraiodothyronine T4 and also calcitonin production. These hormones are tolerating human body metabolisms.[12] Both types of thyroid disorders are producing from abnormal production of thyroid hormones, the sign and symptoms can be noted very slowly, it starts with fatigue and weight gain due to reducing in rate of metabolism and then the situation will be out of control. The thyroid disease is more likely produce in female more than males.[3]

Research in this area especially in thyroid dysfunction stated that the sign and symptoms of depression and memory problem in patient with thyroid disorders will increased severely.[12] Hyperthyroidism can produce from increasing in production of thyroid hormones, which

causing in elevation in human body's metabolisms. The most common symptoms are weight loss, weakness, irregular heartbeat, and difficulty sleeping. Researchers suggested that autoimmune diseases could produce thyroid disorders. [13] Both thyroid glands and pancreas are regarded in endocrine system. People that have autoimmune disorders are likely at risk of getting another endocrine disorder.[13] patient with type II diabetes problem are also at a risk of thyroid dysfunction.[14, 15] although the risk is not as great as that for a Type I diabetic.[11] This is due to Type I diabetes being an autoimmune disease. Thyroid disease does not cause diabetes any more than diabetes causes thyroid disease.

Thyroid function has an effect on diabetes due to its role in regulating the body's metabolism. [16] Therefore, controlling diabetes Mellitus may be difficult when the thyroid gland is out of balance. Additionally, thyroid disorder causes in producing diabetes at an increased risk of diabetes complications,[17] and can worsen many diabetic conditions, such as neuropathy.[18, 19]

The level of glucose in the blood is affected by high or low thyroid level, i.e the high level of thyroid in blood causes the elevation of glucose level in the blood. That is due to use of insulin quicker in the case of hypothyroidism. Thyroid glands and hormones have intriguing characters in the regulation of blood glucose and insulin functions.[20]

Research about relation between DM and thyroid disorder are ongoing and researchs that already performed were suggested the necessity of controlling DM and thyroid disorders due to the probability of increasing their complication are too high.[19]

Recently, an increase in the thyroid disorder phenomena, especially in those patients with type II diabetes in diabetes and endocrine care center attract researcher attention to expand the area of their research to find the reason behind this problem, and to build up a barrier in front of the expansion of the diabetes complications. The aim of this study is to understand the relationship between types II diabetes mellitus and thyroid diseases, because these diseases are chronic and more common in recent years, and to clarifying the main causes and providing scientific answers to the condition. The aim of this work is to encourage care centers to spend effort on monitoring patients who suffering from these diseases and any complications.

2. METHODS AND MATERIALS

2.1 Sample Collection and Data Analysis

The data showed here were claimed from Diabetic and Endocrine Center, Shorsh Hospital and Medical DAIK Group in Sulaimani city in between November 2017 to April 2018. Clinical data, including Age, Sex, Smoking, Nationality, Marital status, Blood group, Residency and Occupation, previous history of hypertension and duration of diabetes, were collected by preparation of the well-organized questionnaires from face to face interview with the patients or the third parties accompanies them. The data analysis were performed by using Microsoft Excel software, the recorded data were added to the software and analysed. Ethical consideration, were followed according to Technical College of Health/ Sulaimani Polytechnic University regulations and patients confidentiality and their safety have been considered according to the scientific research ethical regulations.

2.2 Study design

This study is an observational and cross sectional study from the population of diabetes patients in different health care centers were data collected from face to face interview with recording data from pre-organized questionnaires.

3. RESULTS AND DISCUSSION

The collected data were analyzed based on those parameter that were obtained from the well-organized form for data collection, Diabetes patient with thyroid disease were analyzed. All

data were collected from November 2017 to April 2018. The information from totals of 300 patients have been collected from Diabetic and Endocrine Center, Shorsh Hospital and Medical DAIK Group in Sulaimani. In total of 300 patients, only twenty five percent 25% of patients have both diabetes thyroid disorders. Patients with only diabetes were fifty nine percent (59%) and patients with only thyroid disorders were sixteen percent (16%).
Figure 1 showed gender distribution of Diabetes and thyroid disorder patients, the figure indicated that the higher percentage 85% were found in female developed with both DM and thyroid disorder. In contrast male patients only 15% have the complication of thyroid with type II DM, this result also consistent with the research result performed by Smithson 2014.[21]

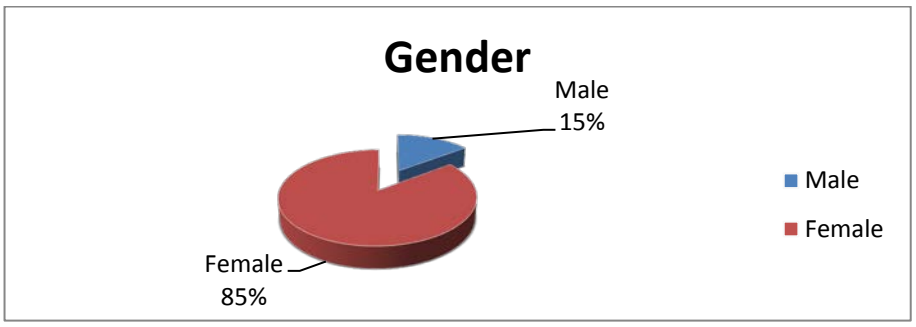

Figure 1: Gender distribution of diabetic mellitus and Thyroid Disorders

Patient ages were previously reported to show considerable effects on developing thyroid disorder on patient with DM.[11] Figure 2 shows the factor of age that participated in developing thyroid disorder in patient with DM. The most prevalent age were recorded to be 40-60 years by 57% more likely to get developed thyroid disorder compared to the rest of the age groups.

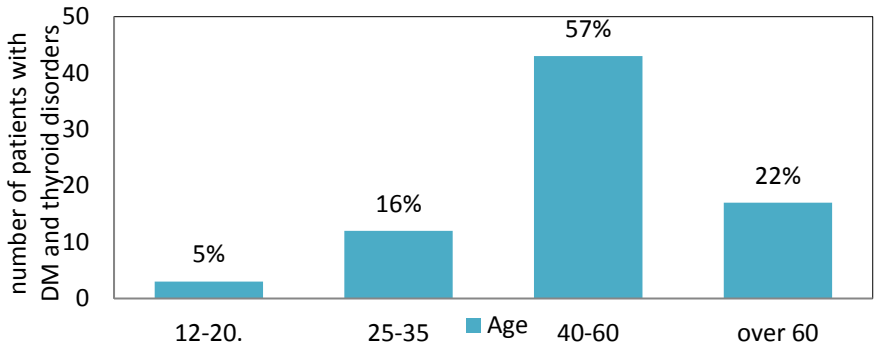

Figure 2: Age distribution between diabetic mellitus and thyroid disorder

Different occupations in Figure 3 indicates that seventy six percent %76 of patients were house wife, which have the highest prevalence, only eight percent 8% were students and five percent 5% were teachers , employers are only four percent 4% and retired patients are (%2.7). This result revealing that, low physical activities and the burden of house holder were in concern to develop thyroid disorder in DM patients. However, it is worth to mention that some patients might not visit the control center for regular monitoring of their health.

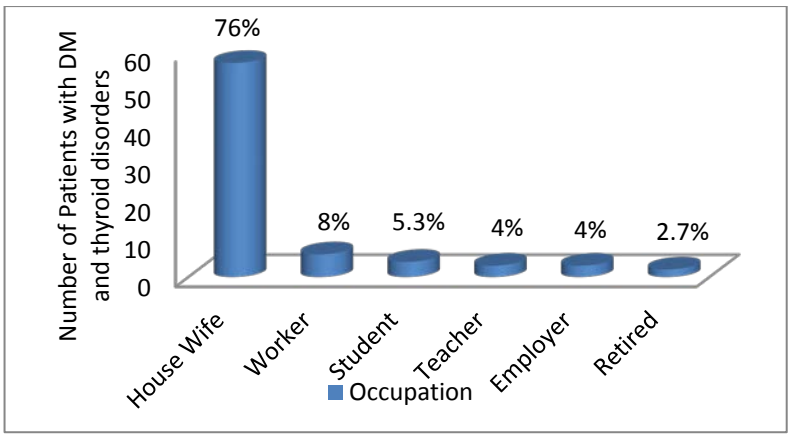

Figure 3: prevalence of occupational distribution between DM and Thyroid diseases

Particular diseases associated with the most mentioned syndrome are listed in figure 4, in which patients with both DM and thyroid disorder were associated with hypertension by sixty percent 60% while two percent 2% with Asthma and twenty one percent 21% with heart diseases. The complication of hypertension also stated from the cross-sectional study by Talwalkar et al. [22] for the patient with hypothyroidism and type II DM.

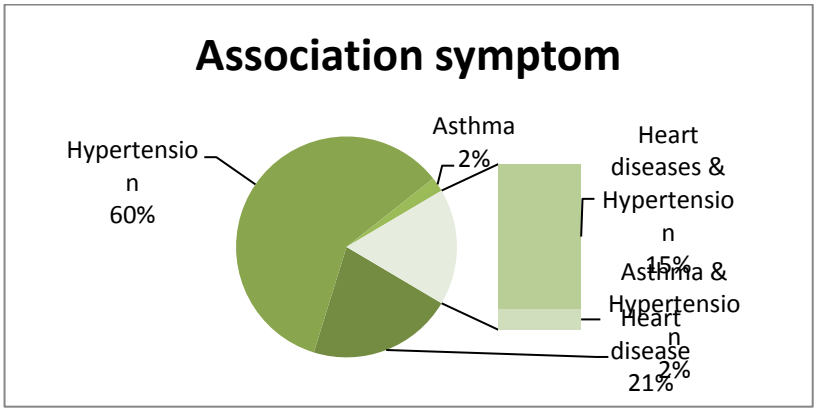

Figure 4: disease associated with DM and Thyroid disorder patients

Different blood groups have been taken into consideration in respect of both thyroid and diabetes patients. Surprisingly the blood group O+ was found twenty four percent 24% were more likely to have the sign of thyroid disorder as shown in figure 5. Herein indicates the patients with blood group A+ only nine percent (9%) gets thyroid disorders. But those with blood group B+ only four percent (%4) with thyroid dysfunction. Significantly when the Rh of all blood group type are negative, the ratio were lower, this means patients with Rh negative are less likely to get thyroid disorder compared with Rh positive. It is important to mention that may be there are undiagnosed patients with other disease not mentioned here, but research about complications of both thyroid disorder and type II DM are suggested to be considered.[10, 21]

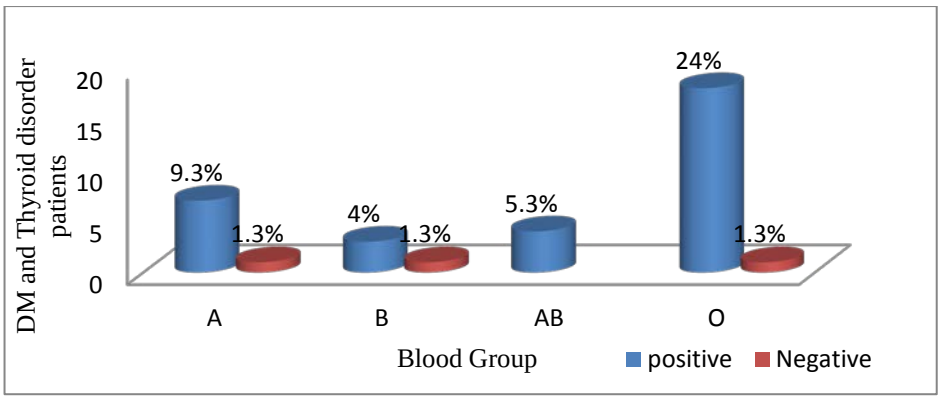

Figure 5: Different blood groups associated with DM and Thyroid disorder

Types of thyroid disorder accompanies with Diabetes Mellitus are illustrated in figure 6, which showed that hypothyroidism were more common in patients with DM by about 56% against 44% of hyperthyroidism. This case could be explained by the overproduction of thyroid hormones induced by the metabolism of sugar in human body.[15]

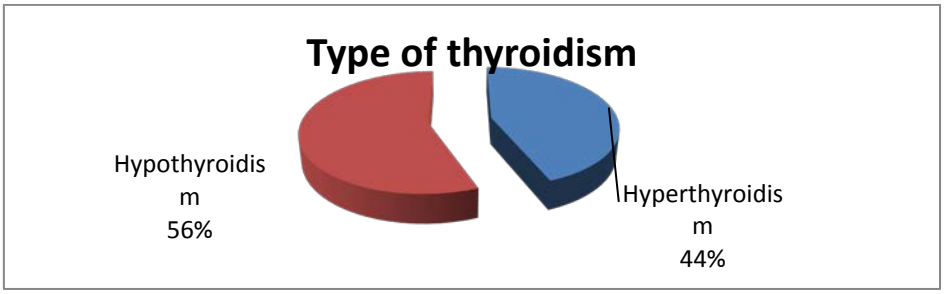

Figure 6: types of thyroid disorders in DM patients

Smoking in patients were taken in to consideration Figure 7 showed that only four percent 4% of active smoker were developed with type II DM and thyroid disorders, surprisingly most patients were found not smoker and neither passive smoker, the effect of smoking have been explained by high level of thyroxine-binding globulin in smoker patients.[23]

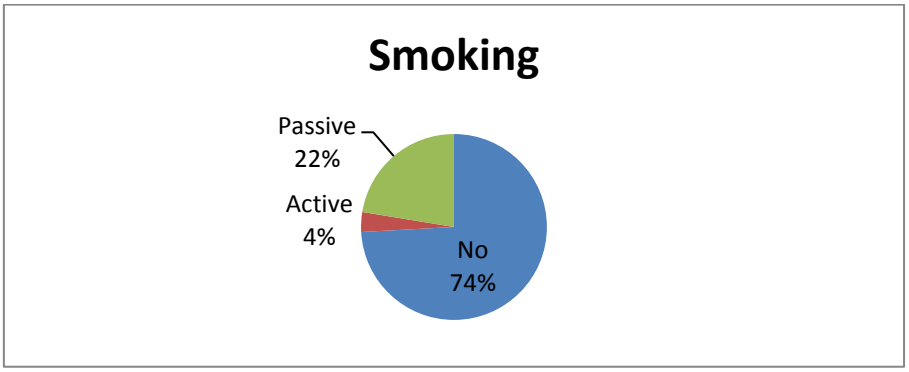

Figure 7: prevalence of smoking on DM and thyroid disorder

Figure 8 showed that patients start first with type II diabetes mellitus are more likely to develop with thyroid disorders, this proved by eighty five percent 85% of patients first developed with DM followed by thyroid disorder, however study also confirmed that patient with thyroid disorders have a high risk of getting DM type II.[24] The data also restated that

after 10-15 years of the first developed DM they start to develop sign of thyroid disorders. This result also confirmed by researcher (Chaker et al.) in 2016.[9]

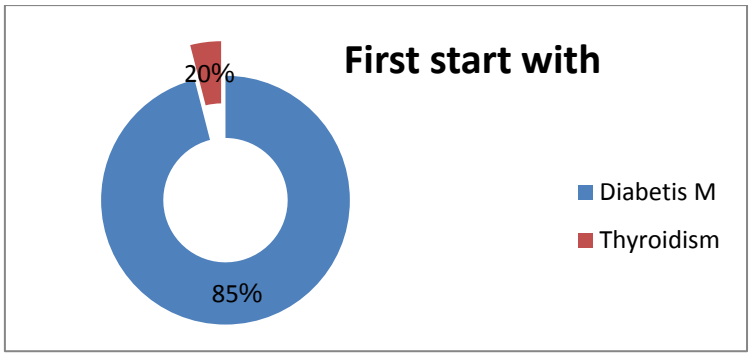

Figure 8: Prevalence of first start with the diseases.

Finally both types of thyroid disorders are developed with ages after 40-60 years as showed in figure 9 and Figure 10, this result entirely supported by the research from past which stated that increase in age will increase the concern of getting thyroid disorder.[11] This result can be explained based on the ability of aged patients to have regular life style of performing physical exercise and eating healthy food, additionally the long term of such chronic disease could effect on the normal function of Kidneys, Liver and thyroid glands as well.

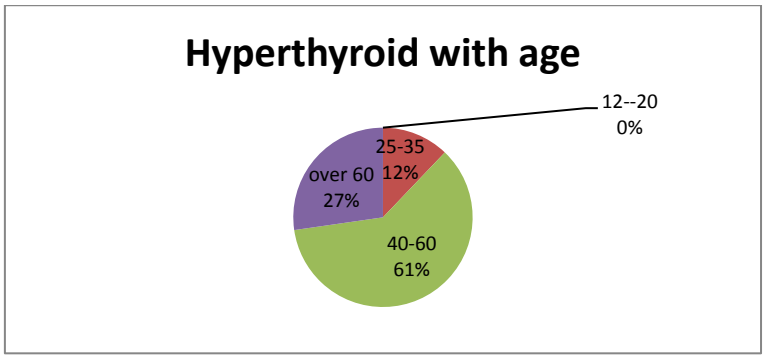

Figure 9: Association of Hyperthyroidism with ages

Figure 10 showed the development of hypothyroidism with age, it can be noted that patients with type II diabetes between ages 40-60 years were more likely to get hyperthyroidism by fifty five percent 55%, the reason also could be decreasing physical activity in over ages. A study by Korean researchers reported that uncontrolled or poorly controlled type II DM associated with subclinical hypothyroidism in elder females.[25]

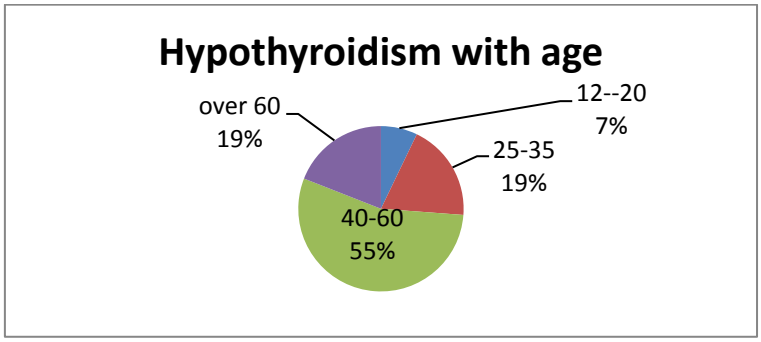

Figure 10: Association of Hypothyroidism with ages

4. CONCLUSION

In conclusion, this study confirmed the fact of relation between DM and thyroid disorder and provided more evidenced data. The diabetes patients with thyroid disease that took parts in this study were between ages 40-60 years, which means that the older type II diabetes patient are more prone to thyroid disease than adult patients. This study also showed that thyroid disease among female diabetes patients are more obvious than male patients, this may be due to difference in skeletal muscular strength and higher activity of male in comparison to female. In addition seventy percent 70% of female ages above 40 years were found more likely with both type II MD and thyroid disorders, furthermore, they were house holders with no enough activity, and they were found in city residence stress with hormonal changes during pregnancy are some other causes.[1] It is also concluded that mostly patients with diabetes first were more likely to get thyroid disease, but those patients with thyroid first are also reported to be likely to have diabetes.[24] Generally, patients with Blood Group (O+) were found to be more likely to have both diabetes and thyroid disorder than patients with other blood groups. The recommendation to avoid diabetes patients from getting other complications like thyroid disorder are informing patient about thyroid diseases, eating regular diet, controlling diabetes, regular physician meeting and finally regular exercises. Thyroid disorders and DM care center should also consider complications and comorbidity in those patients within ages 40-60 years old.

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