

Original article

Papillary Thyroid Cancer: Prevalence, Diagnosis Methods, Symptoms and Management Options in Tripoli, Libya

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Abstract

Papillary thyroid cancer is the most common type of thyroid cancer, affecting the thyroid gland in the neck. It can cause the thyroid gland to swell and lead to symptoms such as difficulty swallowing and shortness of breath. Treatment for papillary thyroid cancer usually involves surgically removing the affected gland and undergoing radiation or chemotherapy if necessary. It is important to detect this type of cancer in its early stages to increase the chances of recovery. Papillary thyroid cancer is a public health concern due to its recent increase in prevalence in the world. This study aimed to evaluate the prevalence of papillary thyroid cancer among the population in the Tripoli area, Libya, and to evaluate some of the contributing factors, including gender, age, and iodine deficiency in the body. A study was conducted on 200 people, women and men, covering most age groups from two hospitals (Tripoli University Hospital & Al-Zawiya Street Central Hospital) in the Tripoli region, western Libya. The extent of the disease was determined using a questionnaire filled out from patient files. In general, the prevalence of papillary thyroid cancer was (27.5%). Of which (75.9%) are females and (24.1%) are males. In addition, the highest prevalence rate was in the age group of 36-55 years. The most common cause of infection is a lack of iodine in the body, and the most prominent symptom that explains the disease is the emergence of lymph nodes in the neck.

Keywords. Thyroid Cancer, Treatments, Diagnosis, Prevalence.

Introduction

The thyroid gland is a vital endocrine gland located at the base of the throat, in front of the windpipe, in the shape of a butterfly. It plays an important role in regulating many body functions [1]. The thyroid gland secretes the hormones thyroxine (T4) and triiodothyronine (T3), which contribute to regulating metabolic rate, growth, functions of the nervous system, heart, digestive system, body temperature, weight, and other vital functions [2]. This gland uses iodine to manufacture hormones and produces many hormones that are necessary for the function of every cell in the body. It helps regulate growth and metabolic processes (catabolic and anabolic processes in the body) and affects the human sleep rhythm. Disturbances in thyroid function can also lead to health problems such as overactive thyroid (hyperthyroidism) or underactive thyroid (hypothyroidism) [3]. Cancer is a group of diseases characterized by abnormal growth of cells in the body. These abnormal cells cause the formation of malignant tumors that spread to other parts of the body. Cancer can occur in any part of the body and may have various causes such as genetics, environmental pollution, smoking, and others. Papillary carcinoma is a type of benign tumor that occurs in the lymphatic system, including the lymph nodes and spleen. Although they are benign, some papillomas can cause health problems if they grow large and begin to press on nearby organs.

Papillary thyroid cancer is the most common type of thyroid cancer. It can be inactive for a long time and may not show any obvious symptoms in the early stages. However, some symptoms can appear, such as swelling in the neck, difficulty swallowing, or voice changes, and it accounts for 80 to 90% of all thyroid cancers [4]. This cancer affects women three times more than men! Papillary carcinoma is most common in the 30-60 age group, but it grows and spreads more quickly in older patients [5]. People who have received radiation therapy to the neck (often for a noncancerous condition in childhood or for other cancerous conditions in adulthood) are at increased risk of developing papillary carcinoma [5]. Diagnosis of papillary thyroid cancer includes clinical examination and diagnostic tests such as blood tests, radiography, and ultrasonography. Treatment for papillary Thyroid cancer usually includes surgical removal of the tumour and may include radiation therapy or chemotherapy. Most cases of papillary thyroid cancer have high treatment success rates if detected early. However, early diagnosis and appropriate treatment play an important role in increasing the chances of recovery.

Early detection of thyroid cancer can increase the chances of successful treatment, so it is important to perform periodic examinations to check the health of the thyroid gland. Treatment methods depend on the type and stage of the tumour, if thyroid cancer is diagnosed, surgical treatment can be the primary option to remove the tumour. After surgical treatment, hormones may be prescribed to help regulate the level of thyroid hormones. A variety of chemotherapy drugs can be used to treat thyroid cancer, such as doxorubicin and cabocitabine, Chemotherapy for papillary thyroid cancer is done by using chemical drugs that aim to kill cancer cells or prevent their growth. The type and dose of chemotherapy is determined based on the type and stage of thyroid cancer and treatment is given intravenously or orally. Psychosocial support can be important in helping patients cope with the diagnosis and treatment of thyroid cancer. Due to the prevalence

of papillary thyroid cancer at a rate of 80% to 90%, in addition to the lack of studies or statistics in our country compared to its wide spread. This study aimed to evaluate the prevalence of papillary thyroid cancer among the population in the Tripoli area, Libya, and to evaluate some of the contributing factors, including gender, age, and iodine deficiency in the body

Methods

A question form was designed to collect data from patient files at Tripoli University Hospital and Central Hospital—Al-Zawia Street in July and August 2023. Files that were obtained are represent the patients for the last three years (2021/2022/2023). The question form was used to collect data such as treatment methods, the most affected age group, the gender most at risk of contracting the disease, symptoms, and detection methods. Initially, 200 records, 100 from each hospital (Tripoli University Hospital and The Central Hospital—Zawia Street), were collected in July and August 2023. All data were collected from patients' files received at two hospitals during the past three years (2021-2023).

Results

Statistics on the spread of the disease at the level of Greater Tripoli were studied, we found that the number of patients attending the two hospitals was unanimously 6,119 cases they are as follows: Tripoli University Hospital (3374), Tripoli Medical Centre (2745), 200 records were taken, 100 from each hospital.

Table 1 Demographic information

Variables	Percentage
Gender of patient	
Male	24.10%
Female	75.90%
Health status of patient	
I don't have any chronic diseases	68.40%
Diabetes	16.30%
Hypertension	6.30%
Heart disease	5.80%
Gland disorders high	2.60%
Gland disorders low	0.50%
Patient age	
Month-10y	1%
11y-18y	0.50%
19y-25y	5.10%
26y-35y	9.70%
36y-55y	50.80%
56y-60y	31.10%
More than 60y	1.50%

The most obvious symptoms of PTC

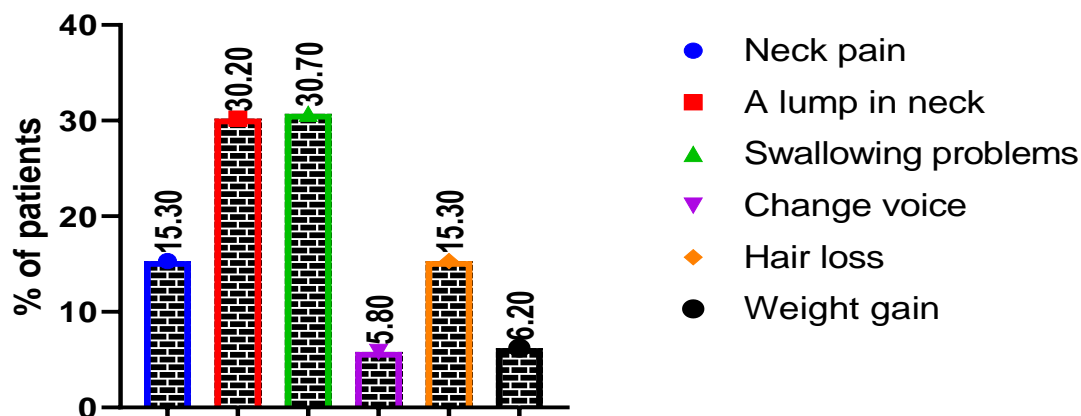


Figure 1. The most obvious symptoms are the appearance of lymph nodes in the neck and difficulty swallowing, in addition to pain in the neck.

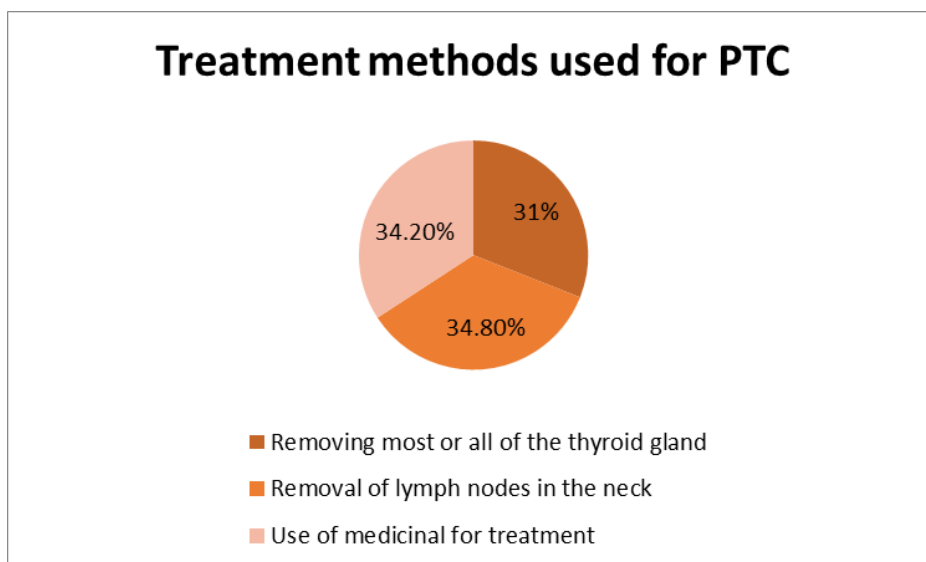


Figure 2. The most commonly used methods of treatment are removal and eradication of lymph nodes and the use of medical medications, followed by removal of part or all of the thyroid gland.

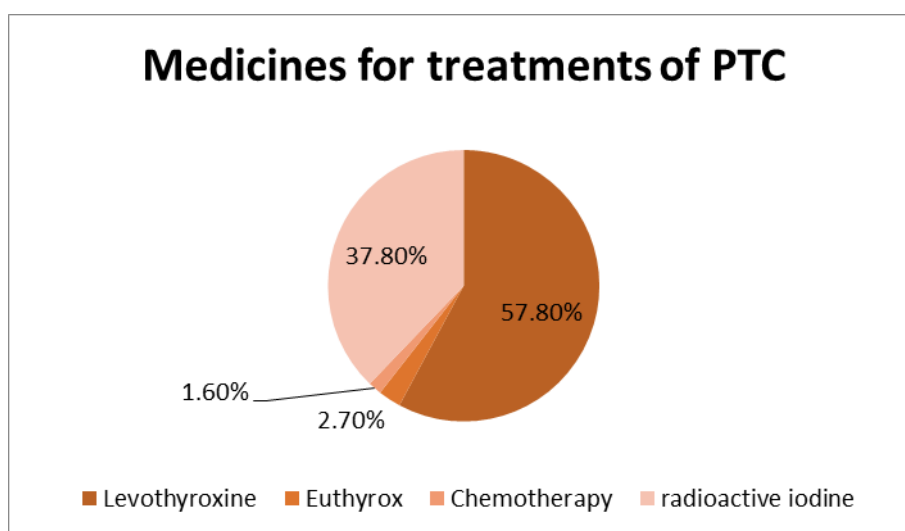


Figure 3. The most commonly used treatment is Levothyroxine, then treatment with radioactive iodine.

Discussion

In this study, a questionnaire was used to collect data from patients' records. The aim was to estimate the prevalence of papillary thyroid carcinoma (PTC) in Tripoli_Libya. Moreover, to study the symptoms, detection methods and treatments options used in management of this disease. Data were collected from two major hospitals in Greater Tripoli (University Hospital Tripoli and The Central Hospital, Al-Zawia Street) and the study spanned two consecutive months (July- August, 2023). A total of 200 patient records were taken (100 records from each hospital); the records contained recent data from the past three years (2021- 2023). Papillary thyroid carcinoma (PTC) is the most common form of thyroid cancer. Nearly 20,000 new cases are diagnosed annually in the United States, according to the American Cancer Society; this accounts for 80% to 85% of thyroid tumors [6]. This is due to the multiple and varied causes of the disease in humans' daily lives without awareness of the reasons.

The data of current study showed that the number of PTC cases attending to Greater Tripoli (University Hospital Tripoli and The Central Hospital, Al-Zawia Street) were 6119 case for the last three years (2021/2022/2023), around 2000 case per year. The prevalence of PTC among women was concluded as (75.9%), while among men was (24.1%), that, indicate the women are affected three times more than men, which is consistent with studies mentioned that, in women, the age-standardized incidence rate of papillary thyroid cancer during 2008–12 ranged from 4.3–5.3 cases per 100 000 person-years in the Netherlands, the UK, and Denmark, to 143.3 cases per 100 000 women in South Korea [7]. The higher incidence of PTC in women compared to men is attributed to the functional dysfunction of the thyroid gland in some cases due to increased estrogen levels in the body. Many women in their thirties experience certain symptoms, which are attributed to disorders such as; thyroid gland issues caused by excessive estrogen. A thyroid

disorder arises due to elevated levels of estrogen in the body, which increases the thyroxine-binding globulin, a binding protein of the thyroid gland. As a result, the thyroid hormones T3 and T4 become significantly reduced as they bind to the thyroxine-binding globulin, preventing them from effectively reaching or entering the cells to perform their functions. This can lead to symptoms of hyperthyroidism. On other hand, it has been observed that the age group most affected by this disease is between (36-55) years, accounting for (50.8%), this data is agreed with this data are agreed with Hughes et al,2010 [8] which mentioned that the most affected age group was 40-50 years. The impact of patient age on thyroid cancer disease has remained poorly defined, with incompatible findings [9]. Our results confirm an increased prevalence of PTC with advancing age.

The most common symptoms among patients, based on their records, include neck swelling problems (30.7%), followed by the appearance of lymph node nodules in the neck (30.2%), Hair loss (15.3%) and weight gain (6.2%), which is agreed with D.M 2023[10], that said the most common symptoms are neck pain and swelling problems. Furthermore, the methods used to detect papillary thyroid carcinoma (PTC) were explained, along with the treatment options involving medication, radiation or surgical procedures for its removal. It was concluded that the most successful method for detecting this disease is ultrasound imaging (40.9%), followed by blood sampling (20.7%), take a sample of the gland (9.8%), Ultrasound is an best imaging modality for detection and assessment of a thyroid tumours. It is easy to achieve, broadly accessible and does not involve ionizing radiation [11]. Our data are confirming the studies that mentioned the more common detections methods are blood test & ultrasound imaging. Although the most reliable way to detect PTC is to take a sample from the gland, the most widely used detection method is ultrasound imaging. Radioactive iodine therapy is used as a type of radiation therapy to kill thyroid gland cells and any remaining thyroid cancer cells after surgery.

The success rate of treatment with radioactive iodine is approximately (37.3%). During the removal of the thyroid gland, lymph node removal in the neck may also be performed and the excised nodes are examined for the presence of cancer cells. In certain cases, when the thyroid cancer is very small, doctors may recommend removing only one side (lobe) of the thyroid gland, with a success rate estimated at (34.8%). Its results are equal 65%. Thyroidectomy is the most common treatment for thyroid cancer, where most patients undergo surgery to remove all or a majority of the thyroid gland. This was estimated to be (16%) in the current research. Its results are equal 21%. Thyroidectomy carries the risk of bleeding and infection. During surgery, damage to the parathyroid gland may also occur; leading to low calcium levels in the body, Therefore, calcium supplements are administered along with drug treatment to compensate for calcium loss in most PTC cases. After surgical removal of the thyroid gland, treatment with thyroid hormones is necessary, taking levothyroxine (Levoxyl, Synthroid and others) for the rest of your life is necessary.

The success rate of medication treatment is approximately (34.2%). The mentioned medication treatment provides the missing hormone that is usually produced by the thyroid gland and suppresses the production of thyroid-stimulating hormone (TSH) from the pituitary gland. Elevated levels of thyroid-stimulating hormone (TSH) may stimulate the growth of any remaining cancer cells, the estimated success rate of treatment with levothyroxine medication is (57.8%), consistent with the Hema Chandran 2020 [12] that show results are equal 63% levothyroxine. This study provides flashes and hints on the field of PTC, which will be highly valuable when focusing on research directions in the coming years.

Conclusion

Papillary thyroid cancer is the most common type of thyroid cancer and it can be treated effectively, especially if detected early. Treatment options may include surgery to remove the cancerous thyroid tissue, radioactive iodine therapy, and hormone replacement therapy. The prevalence of papillary thyroid cancer may vary, and it is important for individuals to have regular check-ups with healthcare professionals to detect any abnormalities. In the thyroid gland. It is also important for individuals to be aware of any risk factors such as family history of thyroid cancer, exposure to radiation, or certain genetic conditions. It is recommended for individuals in to seek medical advice from healthcare professionals if they notice any symptoms such as a lump in the neck, difficulty swallowing, hoarseness, or unexplained weight loss. Early detection and treatment can significantly improve the prognosis for papillary thyroid cancer.

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Conflict of interest. Nil

References

1. Hunt JL, Barnes EL. Non-tumor-associated psammoma bodies in the thyroid. *Am J Clin Pathol.* 2003 Jan;119(1):90-4. doi: 10.1309/8V9N-1KQ2-5D0L-2F6X.

2. Xing M. Molecular pathogenesis and mechanisms of thyroid cancer. *Nat Rev Cancer*. 2013 Mar;13(3):184-99. doi: 10.1038/nrc3431.
3. Schlumberger M, Brose M, Elisei R, Leboulleux S, Luster M, Pitoia F, Pacini F. Definition and management of radioactive iodine-refractory differentiated thyroid cancer. *Lancet Diabetes Endocrinol*. 2014 May;2(5):356-8. doi: 10.1016/S2213-8587(13)70215-8.
4. Salem Ali A. (TSAB) from phage displayed peptide library. *J Microbiol Biotechnol*. 2013;49(1):55-61.
5. Moon S, Song YS, Jung KY, Lee EK, Park YJ. Lower thyroid cancer mortality in patients detected by screening: a meta-analysis. *Endocrinol Metab (Seoul)*. 2023 Feb;38(1):93-103. doi: 10.3803/EnM.2023.1678.
6. Pacini F, DeGroot LJ. Thyroid cancer. In: De Groot LJ, Chrousos G, Dungan K, et al., editors. *Endotext* [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2013. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK285555/>.
7. Miranda-Filho A, Lortet-Tieulent J, Bray F, Cao B, Franceschi S, Vaccarella S, Dal Maso L. Thyroid cancer incidence trends by histology in 25 countries: a population-based study. *Lancet Diabetes Endocrinol*. 2021 Apr;9(4):225-34. doi: 10.1016/S2213-8587(21)00027-9.
8. Hughes DT, Haymart MR, Miller BS, Gauger PG, Doherty GM. The most commonly occurring papillary thyroid cancer in the United States is now a microcarcinoma in a patient older than 45 years. *Thyroid*. 2011 Mar;21(3):231-6. doi: 10.1089/thy.2010.0137.
9. Kwong N, Medici M, Angell TE, Liu X, Marqusee E, et al. The influence of patient age on thyroid nodule formation, multinodularity, and thyroid cancer risk. *J Clin Endocrinol Metab*. 2015 Dec;100(12):4434-40. doi: 10.1210/jc.2015-3100.
10. Pollock DM. Thyroid cancer: symptoms, causes, and treatment. Medically reviewed by Aaronson NL. Healthline. 2023 Feb 28. Available from: <https://www.healthline.com/health/thyroid-cancer>.
11. Wong KT, Ahuja AT. Ultrasound of thyroid cancer. *Cancer Imaging*. 2005 Dec 9;5(1):157-66. doi: 10.1102/1470-7330.2005.0110.

المستخلص

سرطان الغدة الدرقية الحليمي هو النوع الأكثر شيوعاً من سرطان الغدة الدرقية، ويؤثر على الغدة الدرقية في الرقبة. ويمكن أن يسبب تضخم الغدة الدرقية ويؤدي إلى أعراض مثل صعوبة البلع وضيق التنفس. وعادة ما يتضمن علاج سرطان الغدة الدرقية الحليمي إزالة الغدة المصابة جراحياً والخضوع للعلاج الإشعاعي أو الكيميائي إذا لزم الأمر. ومن المهم اكتشاف هذا النوع من السرطان في مراحله المبكرة لزيادة فرص الشفاء. ويعتبر سرطان الغدة الدرقية الحليمي مصدر قلق للصحة العامة بسبب الزيادة الأخيرة في انتشاره في العالم. وهدفت هذه الدراسة إلى تقييم انتشار سرطان الغدة الدرقية الحليمي بين السكان في منطقة طرابلس، ليبيا، وتقييم بعض العوامل المساهمة، بما في ذلك الجنس والعمر ونقص اليود في الجسم. أجريت الدراسة على 200 شخص، من النساء والرجال، غطت معظم الفئات العمرية من مستشفين (مستشفى طرابلس الجامعي ومستشفى شارع الزاوية المركزي) في منطقة طرابلس، غرب ليبيا. وتم تحديد مدى انتشار المرض باستخدام استبيان تم تعبئته في ملفات المرضى. وبشكل عام بلغ معدل انتشار سرطان الغدة الدرقية الحليمي (27.5%)، منها (75.9%) إناث و(24.1%) ذكور، كما أن أعلى معدل انتشار كان في الفئة العمرية (36-55) سنة، والسبب الأكثر شيوعاً للإصابة هو نقص اليود في الجسم، وأبرز الأعراض التي تفسر المرض هو ظهور الغدد الليمفاوية في الرقبة.