



Prevalence of Papillary and Follicular Thyroid Carcinoma in Patient Who Visited University of Nigeria Teaching Hospital (UNTH) (2014 – 2018)
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Abstract

This prevalence of papillary thyroid carcinomas and follicular thyroid carcinomas amongst patient attending UNTH Ituku-Ozalla, Enugu State was investigated. The clinical records of 30 patients with information on clinical diagnosis of either papillary thyroid carcinomas or follicular thyroid carcinomas were taken. Duplicate sections were cut into 5 microns and stained using Haematoxylin and Eosin staining technique in order to demonstrate their general tissue structure. The frequency distribution of papillary and follicular thyroid carcinoma showed age group less than 29, 30- 34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64 to be, 2(6.67%), 2(6.67%) 1(3.33%), 7(23.33%), 6(20%), 5(16.67%), 4(13.33%), and 3(10%) respectively. However, the results also showed that out of the 30 samples collected, 6 were follicular thyroid carcinoma, and 24 were papillary thyroid carcinoma. The 6 follicular thyroid carcinoma patients had 2 male patients and 4 female patients while the 24 samples of papillary thyroid carcinoma patients had 6 male patients and 18 female patients, Furthermore, 1 patient out of the 6 follicular thyroid carcinoma samples was below 40 years and 5 patients were equal to or above 40 years, also the 24 papillary thyroid carcinoma samples had 6 patients below 40 years and 18 patients equal to or above 40 years. It can be deduced that the higher incidence of papillary thyroid carcinoma in contrast to follicular thyroid carcinoma could be due to the nutritional diet of the patients and difference in sex hormones. Age and life style is also a risk factor for papillary and follicular carcinoma of the thyroid gland.

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Introduction

Carcinoma is a type of growth that develops in a tissue that lines the inner or outer surfaces of the body which generally arises from cells originating in the endodermal or ectodermal germ layer during embryogenesis. It occurs when the DNA of a cell is damaged or altered and the cell begins to grow uncontrollably and becomes malignant. The thyroid gland is a butterfly-shaped gland that is about 12-15mm long. It lies deep to the sternohyoid and sternothyroid muscles located anteriorly in the neck at the level of C5-T1 vertebrae (Moore and Arthur, 2001). It consists primarily of right and left lobes located anteriorly laterally to the larynx and trachea and a relatively thin isthmus unites the lobes over the

tracheal rings (Moore *et al.*, 2001). The thyroid gland develops from two distinct embryonic lineages

histologically; follicular cells (which produce thyroxine) and parafollicular cells (c-cells) (which produce calcitonin), it is composed of many spherical hollow sacs called thyroid follicles, the principal cells that surrounds these follicles are simple cuboidal epithelium.

Thyroid cancer is a type of growth originating from follicular or parafollicular thyroid cells. Carcinoma of the system accounting for about 5% of the thyroid nodules (Pacini *et al.*, 2006), like many endocrine cancers, various types of thyroid cancers have extremely variable time courses and biological patterns and various separate pathological forms

which have made it difficult in defining common themes in the disease. There are four main types of thyroid cancer, papillary Thyroid Carcinoma, Follicular Thyroid Carcinoma, Mesullary Thyroid Carcinoma and Anaplastic Thyroid Carcinoma.

There are two histological types of thyroid carcinoma arising from follicular cells, which are papillary carcinoma (PTC) and follicular carcinoma (FTC). These two histological types are also called differentiated thyroid carcinoma (DTC) and are analyzed as a single group for clinical studies, investigating prognostic factors and prognosis of patients. However, biological behaviors of these two carcinomas significantly differ. PTC frequently metastasizes to distant organs such as the lungs, bone and brain than PTC (Yasuhiro and Akira, 2011). Papillary Thyroid cancer is the most common types of thyroid cancer, it accounts for 80% of all thyroid cancers, and it generally grows very slowly but can often spread to lymph nodes in the follicular variant, other variants include; columnar, diffuse, scierosing and tall cell. Follicular thyroid accounts for about 10 – 15% of all thyroid cancers. A hurther cell thyroid cancer is a variant of follicular thyroid cancer. FTC usually does not spread to the lymph nodes, but in some cases can spread to other parts of the body such as lungs or bones.

A study done by schlumberger in 2002 showed that papillary and follicular thyroid carcinoma accounts for 90% of all thyroid cancers. Another study carried out by the National cancer institute indicates that in both FTC and PTC, females are affected three times more often than male and are often diagnosed between the ages of 40 and 60. Papillary cancer of the thyroid gland is usually not aggressive in contrast to follicular thyroid cancer which can be more aggressive in older patients. However, this research is yet to come across a study done in Enugu state of Nigeria to investigate the prevalence of follicular and papillary thyroid carcinoma and the influence of gender and age on the occurrence.

This study determines the prevalence of follicular and papillary carcinoma in patients who visited university of Nigeria teaching hospital Ituku Ozalla and the influence of gender and age on the occurrence. This will help alert the development and level of papillary

and follicular thyroid carcinoma in Enugu state of Nigeria and could help in making health policies.

Materials and Methods

The study ethical approval was granted by College of Medicine Ethical Committee (COMREC), University of Nigeria.

All patient samples with papillary and follicular thyroid carcinoma collected in University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu state Between 2014-2018.

Thirty patient's samples comprising of 8 males and 22 females who met with the inclusion criteria were chosen using purposive sampling technique. All the analysis was carried out at the Histopathology Laboratory Department of University.

Data Collection

Patient's bio data which includes their age, gender, year of diagnosis and type of thyroid cancer. The embedded tissue blocks of follicular and papillary thyroid carcinoma mounted on a wooden block were collected from university of Nigeria teaching hospital. The tissue blocks were cut into 5um thick sections using a rotary microtome. Cut sections were placed on 20% alcohol to prevent folding of tissue, and were later placed in a water bath at 48 degree Celsius to allow section to spread out.

Slides were used to pick up sections at an angle of 45 degrees. The slides were placed on a hot plate for drying of water and sticking of tissue on the slide.

Cut sections were stained with Erlich's haematoxylin and eosin.

Staining Procedure

Haematoxylin and eosin staining technique is performed to demonstrate the general structure of tissue (Omorodion *et al.*, 2019). After staining the tissue, the tissue was viewed under the microscope using x 10 objective, and photo-micrography taken

Results and Discussion

The tissue after staining shows that the nuclei retain the blue colour while cytoplasm was stained pale pink The demographic characteristics of patients are represented in the tables and figures below:

Table 1: Demographic Characteristics of the Patients

Age Range	2014	2015	2016	2017	2018	Total
29>	-	-	1	1	-	2(6.67%)
30 -34	-	1	-	-	1	2(6.67%)
35 – 39	-	-	-	-	1	1(3.33%)
40 – 44	2	2	-	2	1	7(23.33%)

45 – 49	-	1	3	1	1	6 (20%)
50 – 54	1	2	-	2	-	5 (16.67%)
55 – 59	-	1	1	1	1	4(13.33%)
60 – 64	1	1	1	-	-	3(10%)
Total	4(13.33%)	8(26.67%)	6(20%)	7(23.33%)	5(16.6%)	30 (100%)

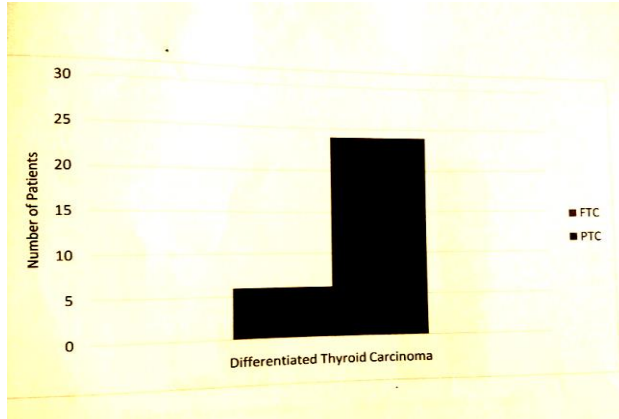


Fig 1: Distribution of Different thyroid carcinoma in patients who attended UNTH Between 2014-2018

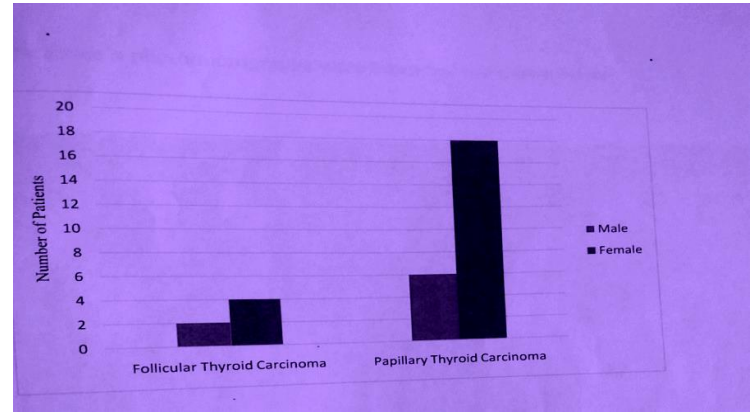


Fig. 3: Showing the Distribution of Papillary Thyroid Carcinoma and follicular Thyroid Carcinoma according to gender.

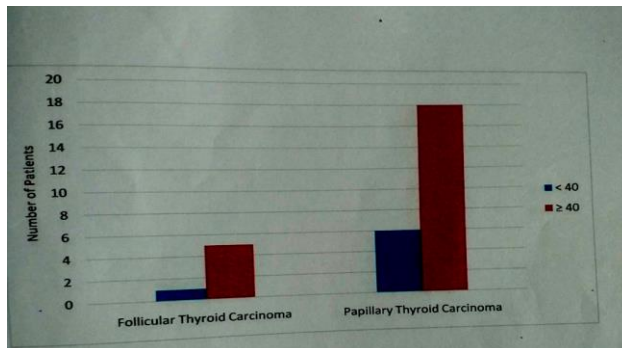


Fig 2.: Showing the Distribution of Different Thyroid Carcinoma according to age

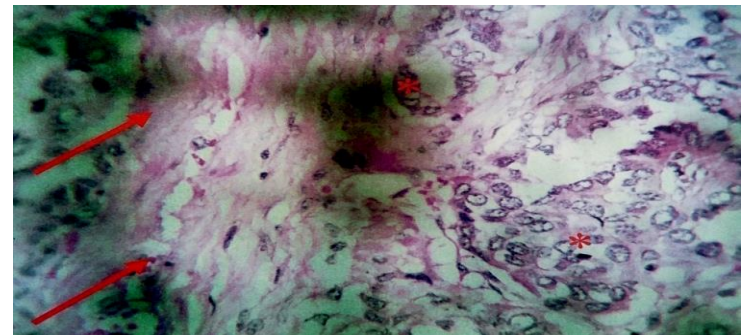


Fig 4: Section of papillary thyroid carcinoma showing a fibrous core(arrow) and a cluster of malignant cells with oval nuclei with ground glass appearance(*). Stain H&E. MAG.X400

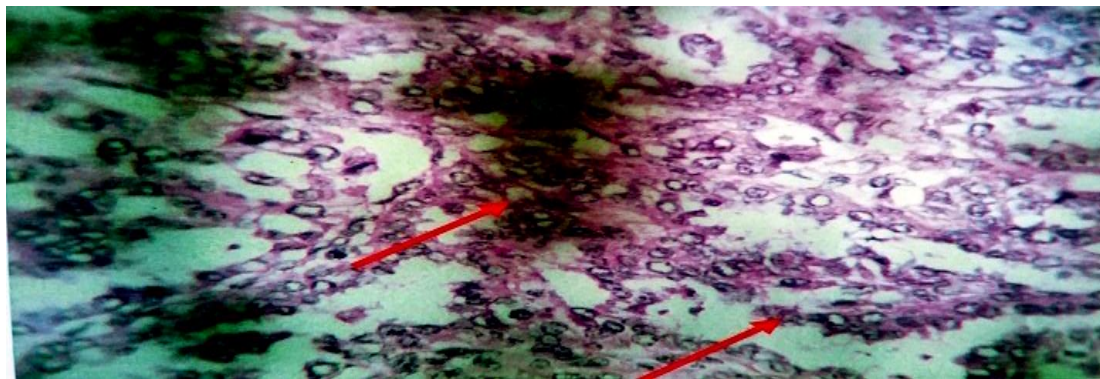


Fig 5: Section of papillary thyroid carcinoma showing a cluster of malignant cells with oval nuclei with oval

nuclei with ground glass appearance(→). Stain H&E. MAG.X400

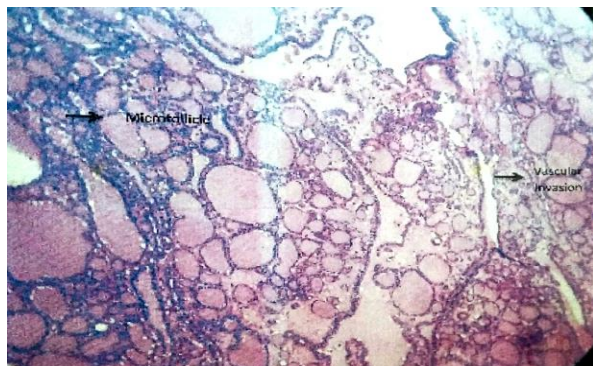


Fig 6: photomicrograph of minimally invasive follicular thyroid carcinoma . Stain H&E. MAG.X400

Papillary thyroid carcinoma represents 70% of all thyroid malignancies and it is the most common of all thyroid cancer, and is among the most curable cancers, however some patients are at high risk of recurrence or even death (Lin and Bhattacharyya, 2010). Study has shown it is more common in women and presents in the 20-55 year of age group. It is also the predominant cancer type in children with thyroid cancer, and with patients with thyroid cancer who has had previous radiation to the head and neck (Din, *et al.*, 2012). Papillary thyroid cancer gets its name from the papillae among its cells, visible on microscopy.

Follicular thyroid carcinoma accounts for 15% of thyroid carcinoma and occurs more commonly in women over 50 years of age. Thyroglobulin can be used as a tumour marker for well differentiated follicular thyroid cancer. It is a well differentiated tumour that resembles the normal microscopic pattern of the thyroid. However, both follicular and papillary thyroid carcinoma are considered to be well differentiated thyroid cancers together they make up to 95% of the thyroid cancers. They both arise from the follicular cells showing a broad range of overlapping clinical and cytological features. While papillary thyroid cancer is considered a variant of papillary thyroid carcinoma, hurthle cell cancer is considered a variant of follicular thyroid carcinoma. Thyroid cancers are found more often in patients with a history of low dose or high dose external radiation to the thyroid area with papillary thyroid carcinoma being the most common to develop after exposure to radiation.

It was observed that the prevalence amongst patient greater than 40 years was higher than in patients lesser than 40 years, this significant difference of age on the

prevalence of papillary thyroid carcinoma and follicular thyroid carcinoma could be attributed to the fact that as one grows old, the ability of the body to perform the normal apoptosis is reduced, thus leading to hyperplasia of the cells without control.

From the result obtained in the study, there was a higher incidence of papillary and follicular thyroid carcinoma in patient above 40 years than in those below 40 years, the significant influence of age on the prevalence of papillary and follicular thyroid carcinoma could be attributed to the fact that as one grows older, the ability of the body to perform the normal apoptosis is reduced, thus leading to hyperplasia of the cells without control.

Furthermore the result from this study showed a higher incidence of both follicular thyroid carcinoma and papillary thyroid carcinoma in female than in male, although the gender disparity in incidence and aggressiveness of papillary thyroid carcinoma and follicular thyroid carcinoma is well established, but the cause of this disparity is poorly understood (Negri *et al.*, 2006) stated that the difference between men and women is in their sex hormones and its influence on the various systems in the body. The fluctuation of sex hormones during a woman's menstrual cycle and pregnancy he hypothesized as the reason for the gender disparity in papillary thyroid cancer, and his hypothesis was later backed by Kilfroy *et al.* (2009) when he stated that the peak incidence of papillary thyroid carcinoma has been observed in women aged 40-49 years, this being the age group at which most women approach or enter menopause. In addition, our understanding of the environment and genetic susceptibility for thyroid cancer will improve and can serve to help identify factors influencing thyroid cancer gender disparity.

Finally, the result showed that there were more patient samples with papillary thyroid carcinoma than follicular thyroid carcinoma, dietary and nutritional factors have been implicated as risk factors for differentiated thyroid cancer of follicular cell origin. Iodine deficiency is a well-established risk factor for developing follicular thyroid cancer (Delange and Lecomte, 2000). By contrast, iodine excess has been associated with an increased risk of papillary thyroid cancer (Horn and Morris, 2001). The increased prevalence of papillary thyroid carcinoma than follicular thyroid carcinoma as opposed to Yoon, *et al.* (2008) and Asari *et al.* (2009) in this work could be as a result of excess ingestion of iodine rich diet by patients in this location.

Conclusion

In conclusion, papillary thyroid carcinoma had a higher prevalence than follicular carcinoma with females of the middle age bracket and above being higher than male of the same age bracket.

Recommendation

Further studies should be done to investigate the prevalence of medullary thyroid carcinoma and its

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various form in this environment. Further studies should be done to investigate and check for the reasons for gender disparity in thyroid carcinomas. People should be educated on the risk factors of thyroid cancers especially the females.

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