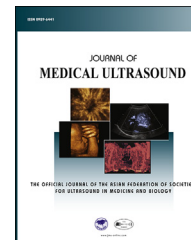


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ORIGINAL ARTICLE

Thyroid Gland Standard for Bangladeshi Population and Prevalence of Unknown Pathologies in the Normal Population

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Abstract Objective: The thyroid gland is an important endocrine gland. A nomogram of thyroid gland size in a Bangladeshi population is prepared in this study.

Methods: In the present prospective, cross-sectional study, a nomogram of thyroid gland size was constructed using a linear parameter. Measurements were made of the anteroposterior diameter of the two lobes and the isthmus of the thyroid gland, and the results compared with results from Western studies. Thyroid size was also determined in pregnant women and similar comparisons were made. High-resolution ultrasonography was used for scanning purposes.

Results: Mean, standard deviations, and 95% confidence intervals of the measurements were derived from the data of 711 individuals. The mean size of the right lobe of the male participants was 12.73 ± 2.21 mm and of the left lobe 12.36 ± 2.53 mm. The mean size of the right lobe of the female participants was 12.31 ± 2.03 mm and of the left lobe 10.88 ± 2.04 mm. The mean size of the isthmus of the studied men was 3.17 ± 0.69 mm and was 3.09 ± 0.73 mm for the women studied. The mean values of pregnant women were also derived. Statistically significant differences were determined between the right and left lobes within the groups and between two groups. A table of the unknown thyroid pathologies detected during the study, found in 71 individuals or 9.08% of all participants, was also prepared.

Conclusion: These nomograms will aid in differentiating normal from abnormal measurements of thyroid glands in the Bangladeshi population. This study also presents the prevalence of unknown thyroid diseases in normal Bangladeshi population.

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Conflicts of interest: The author declares no conflicts of interest.

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Introduction

With recent advances in diagnostic imaging, thyroid gland size can now be assessed with accuracy using high frequency probes. The thyroid gland is an endocrine gland. It secretes three important hormones, namely thyroxine (T4), triiodothyronine (T3), and calcitonin, which affect the body's metabolism, growth, and development [1].

The thyroid is composed of right and left lobes connected across the midline by the isthmus. It is located in the anteroinferior part of the neck below the larynx and anterior to the trachea. The isthmus unites the lower third of the lobes. The thyroid gland is generally shaped like a U or a low-slung H. In the latter, the cross bar represents the isthmus and the vertical bars represent two conical lateral lobes, rounded below and tapered above. In the transverse plane the thyroid gland has a horseshoe appearance [1].

The normal thyroid gland is uniformly echogenic, with medium- to high-level echoes similar to the liver and testes. It is more echogenic than the contiguous muscular structures and vasculatures [1].

High frequency transducers (7.5–15 MHz) currently provide both deep ultrasound penetration—up to 5 cm—and high-definition images, with a resolution of 0.7–1 mm. No other imaging method can achieve this degree of spatial resolution. Linear-array transducers are preferred because of the wider near field of view and the capability to combine high-frequency gray scale and color Doppler images [2].

This prospective study was undertaken to prepare a nomogram of thyroid gland size in a Bangladeshi population.

Participants and methods

Healthy individuals were evaluated in this cross-sectional, prospective study. The female participants were divided into two groups: (1) not pregnant; and (2) pregnant. All study participants were Bangladeshi. The criterion for inclusion in the study was healthy normal individuals with no history of thyroid or parathyroid gland disease. Criteria for exclusion from the study were when a goiter or any abnormality or lesion was detected in the thyroid gland during the measurement scan, or any history of thyroid-related

disease. Well informed consent of the patients was obtained. This study was conducted from September 2012 to December 2014.

All patients underwent a clinical examination followed by a complete ultrasonographic examination of the thyroid gland including measurements of the two lobes in the anteroposterior (AP) diameter and of the isthmus of the gland also in AP diameter (Figures 1 and 2). The patients were examined in the supine position, with the neck extended. A small pillow was placed under the shoulders to provide better exposure of the neck. Firstly, the thyroid gland was scanned transversely to see if it was normal and homogenous to exclude any nodules, cysts, or any other lesions. A suitable transverse section including the two lobes and the isthmus of the gland was obtained. AP diameter of the isthmus was measured in this plane by placing the cursors in the anterior and posterior margins of isthmus. The right lobe was then scanned in the longitudinal plane. A long section of the right lobe was obtained and the image was then frozen. The widest AP diameter of the lobe was measured by placing the cursors in the anterior and posterior margins of the lobe. The left lobe was measured in a similar manner. All measurements were taken in millimeters (mm). A 7.5-MHz linear transducer (Aloka, SSD500, Japan) was used for all scans. SPSS (SPSS Inc., Chicago, IL, USA) was used for data entry and statistical analysis. Mean, standard deviation (SD), and 95% confidence intervals (CI) of all three measurements were derived. Statistical significance was analyzed between the two groups and within each group.

Results

A total of 711 thyroid gland measurements were obtained. The demographic characteristics of the study population were as follows: the mean age of the male participants was 38.86 ± 15.30 years (1 SD) with a range of 14–78 years; the mean age of the female participants was 32.73 ± 10.51 years (1 SD) with a range of 13–85 years; the mean age of the pregnant female participants was 28.49 ± 4.92 years (1 SD) with a range of 18–40 years.

The majority of participants were from urban areas. Table 1 gives the number of male, female, and pregnant female participants observed in the course of the study, and the means and SD of the thyroid measurements. It also

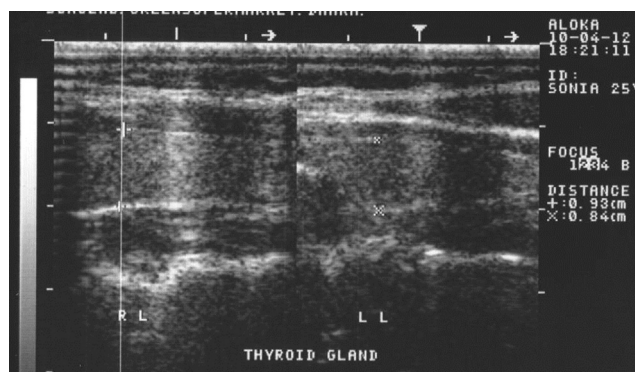


Figure 1 Longitudinal sections of thyroid lobes for anteroposterior measurements.

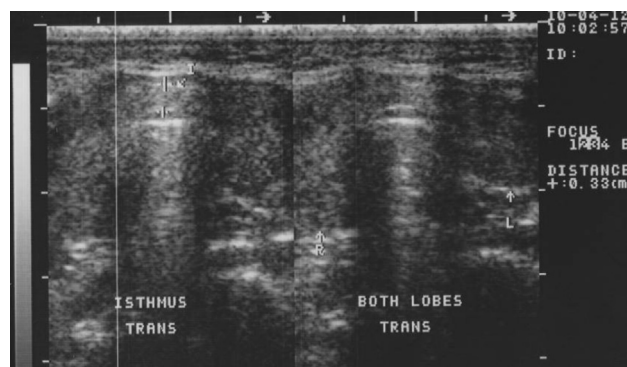


Figure 2 Transverse section of thyroid gland at the level of the isthmus for anteroposterior measurement.

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