Original Article

Prevalence of hypothyroidism in different occupational groups of Bangladeshi population

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Abstract

***Background and aims**:* Hypothyroidism is a common global endocrine disorder. The magnitude of hypothyroidism at community level in Bangladesh is unknown except some clinic-based studies. The present study was undertaken to determine the prevalence of hypothyroidism in different occupational groups of Bangladeshi population and to assess the risks related to it.

***Study design**:* Three occupational groups (house-wives, college students, rickshaw-pullers) of native Bangladeshi population were purposively selected. Investigations included socio-demography, anthropometry, blood pressure and biochemistry [fasting blood glucose, lipids, thyroid stimulating hormone (TSH) and free thyroxin (FT4)]. Laboratory tests were done only on a randomized sample of participants.

***Results**:* Overall, 626 (M/F=123 / 503) participants with a mean age of 35.9 (34.75 – 37.02) years volunteered. The mean values of all participant for TSH and FT4 were 2.08 (95%CI: 1.72 – 2.45) µiu/ml and 13.04 (95CI:12.86 – 13.22) pmol/L respectively. The third percentile of TSH ranged from 0.42 to 0.46 µiu/ml and 97th percentile ranged from 5.16 to 5.24 µiu/ml. For FT4, the 3rd and the 97th percentile were 10.3 and 16.41 pmol/L, respectively. The prevalence of hypothyroidism in both sexes was 7.0% (M/F=4.1/8.3%). Occupational groups, sex and increasing age, obesity, blood pressure, and lipids showed no association with hypothyroidism. Hyperglycemia was proved to be a significant risk for hypothyroidism (prevalence in diabetic vs. non-diabetic was12.9% vs. 5.5%, p = 0.04; FBG was correlated with TSH, r = 0.138, p <0.001).

Conclusions: It is concluded that the prevalence of hypothyroidism was almost equal to other studies. Hypothyroidism was not related to increasing age, obesity, blood pressure and lipids. It was found to affect all sexes, all social classes and all occupational groups. Hyperglycemia was evidently found as significant risk for hypothyroidism.

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Introduction

Hypothyroidism is a common endocrine problem that is encountered everywhere in the world, be it in developed or developing countries [1-3]. This endocrine disorder affects health from utero to childhood and even extends to adulthood [4,5]. Hypothyroidism in pregnancy may lead to premature delivery or even its loss [6]. Additionally, hypothyroxemia in pregnancy may be associated with gestational diabetes [7] and hypertension [8]. It has long been known that normal growth and development was affected by hypothyroidism if not diagnosed and intervened in early life [9]. An interesting observation reported from Bangladesh was that dyslipidemia, hyperuricemia and impaired renal function were related to hypothyroidism [10]. Congenital hypothyroidism has been reported to be 1.5 per thousand population in southern region of

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Bangladesh [11]. If these cases are not detected at an early stage, then they become physically and mentally handicapped [12]. Again, hypothyroidism has been reported to be associated with coronary artery disease [13]. Although there are many studies on hypothyroidism, there are few population based reports on the prevalence of hypothyroidism. This study aimed to determine the prevalence of hypothyroidism in different occupational groups of native Bangladeshi population and to assess the risks related to it.

Study design

Participants

Three occupational (housewives, students, rickshaw-pullers) groups of native Bangladeshi people were selected purposively. The housewives of a suburb community were approached through local female health workers. This population represented the females of a Bangladeshi community maintaining traditional lifestyle. The second group, medical college students, represented young urban affluent community. The third group, rickshaw-pullers, represented non-affluent, hard-working young men of rural origin temporarily living in urban slum.

In different geographical site, enlistment of each participant was confirmed after discussion in detail. The objectives of the study and procedural steps were explained. If the participant agreed to volunteer then a token noting identification number was given and they were advised to attend an adjacent investigation site after an overnight fast. Gonoshasthya Kendra (GSK), a local community hospital was selected for the suburb housewives. The Department of Community Medicine of Ibrahim Medical College was appointed for the medical college students. A garage (local office of Rickshaw Sromik Union) at Nandigram, Dhaka was selected for the rickshaw-pullers with the help of their union leaders.

Interview and investigations

The interview included socio-demographic information (on contact address, age, sex, family income, education, and occupation) as well as clinical history (of present and past illness, medication, family history of hypertension, diabetes, stroke, thyroid diseases, and physical activity). Anthropometric measures included height, weight, waist and hip circumference. Body mass index (BMI: weight in kg / height in meter sq.), waist-to-hip ration (WHR: waist / hip) and waist-to-height ration (WHtR: waist / height) were calculated. Systolic blood pressure (SBP) and diastolic blood pressure (DBP) was taken using a mercury sphygmomanometer after ten min physical rest and mental relaxation.

Taking an aseptic measure five ml venous blood was taken after an overnight fast and centrifuged. Serum was separated and immediately transported to biochemistry laboratory for estimation of fasting blood glucose (FBG), total cholesterol (T-Chol), triglycerides (TG), high-density lipoproteins (HDL) and low-density lipoproteins (LDL). Separated aliquots were sent to Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine and Metabolic Disorders (BIRDEM) for assaying thyroid stimulating hormone (TSH) and Free Thyroxin (FT4) using chemiluminescent microparticle immunoassay technology.

Operational definition

Hypothyroidism was diagnosed when the TSH value exceeded 4.0 µIU /L and the FT4 value was normal [14, 15].

Statistical analysis

The quantitative values were expressed in mean with standard deviation (SD) or mean with 95% confidence interval (CI). The prevalence rates were given in percentages. Unpaired t-tests were used to determine the differences between groups. Chi-sq estimated the associations between two or more variables including trends. One-way ANOVA used for multiple comparisons among the three occupational groups. We used SPSS version 20. The level significance was <0.05.

Results

A total of 625 participants took part in the study. The characteristics of all participants are shown in Table-1. The mean values with 95% confidence interval (CI) of age, BMI, SBP and FBG were 35.9 (34.75 – 37.02) years, 23.3 (23.0 – 23.7) kg/m^2, 119.5 (118.3 – 120.6) mmHg and 6.06 (5.84 – 6.28)

Table-1: *The characteristics of all participants*

Variables	N	Mean	95%CI
Age (y)	625	35.9	34.75 – 37.02
BMI (kg/m^2)	624	23.3	23.0 –23.7
WHR	624	0.88	0.88 – 0.89
WHtR	623	0.542	0.536 – 0.549
SBP (mmHg)	621	119.5	118.3 – 120.6
DBP (mmHg)	621	75.7	74.9 – 76.5
FBG (mmol/l)	575	6.06	5.84 – 6.28
TG (mg/dl)	382	169.3	160.2 – 178.5
Chol (mg/dl)	381	129.0	123.8 –134.1
HDL (mg/dl)	382	40.8	37.3 – 44.4
LDL (mg/dl)	382	56.9	51.9 – 61.9
TSH (µIU/ml)	374	2.08	1.72 – 2.45
FT4 (pmol/L)	361	13.04	12.86 – 13.22
TSH (µIU/ml): 3rd percentile			0.42 – 0.46
TSH (µIU/ml): 97th percentile			5.16 – 5.24
FT4 (pmol/L): 3rd percentile			10.13
FT4 (pmol/L): 97th percentile			16.41

BMI – body mass index (wt in kg /ht in met sq.); WHR – waist-to-hip ratio; WHtR – waist-to-ht ratio; SBP, DBP – systolic , diastolic blood pressure; FBG – fasting blood glucose; TG – Triglycerides; Chol – total cholesterol; HDL – high-density lipoproteins; LDL – low-density lipoproteins; TSH – thyroid stimulating hormone (thyrotrophin); FT4 – free tetra-iodothyronin. Laboratory tests (FBG, TG, Chol, HDL, LDL, TSH, FT4) were done in randomized samples.

Table-2: *Characteristics compared between men and women*

Variables	Men			Women			
	N	Mean	SD	N	Mean	SD	*p*
Age (y)	122	32.4	12.9	503	36.7	14.6	*.003*
BMI (kg/m^2)	121	21.5	5.29	503	23.7	4.2	*.000*
WHR	121	0.90	0.085	503	0.88	0.084	*.041*
WHtR	120	0.50	0.070	503	0.55	0.080	*.000*
SBP (mmHg)	120	114.7	13.59	501	120.6	14.7	*.000*
DBP (mmHg)	120	70.6	8.64	501	76.9	10.3	*.000*
FBG (mmol/l)	123	5.8	1.93	452	6.1	2.84	*.434*
TG (mg/dl)	123	180.5	94.9	259	164.0	88.7	*.098*
Chol (mg/dl)	122	132.0	36.5	259	127.5	56.5	*.431*
HDL (mg/dl)	123	49.3	57.4	259	36.8	14.8	*.001*
LDL (mg/dl)	123	52.8	35.0	259	58.9	55.8	*.268*
TSH (µIU/ml)	122	1.62	1.09	252	2.30	4.27	*.085*
FT4 (pmol/L)	122	12.9	1.44	239	13.06	1.86	*.729*

BMI – body mass index (wt in kg /ht in met sq.); WHR – waist-to-hip ratio; WHtR – waist-to-ht ratio; SBP, DBP – systolic , diastolic blood pressure; FBG – fasting blood glucose; TG – Triglycerides; Chol – total cholesterol; HDL – high-density lipoproteins; LDL – low-density lipoproteins; TSH – thyroid stimulating hormone (thyrotrophin); FT4 – free tetra-iodothyronin. Laboratory tests (FBG, TG, Chol, HDL, LDL, TSH, FT4) were done in randomized samples.

mmol/L, respectively. The mean values for TSH and FT4 were 2.08 (95% CI: 1.72 – 2.45) µiu/ml and 13.04 (95%CI: 12.86 – 13.22) pmol/L respectively. The 3rd percentile of TSH ranged from 0.42 to 0.46 µiu/ml and 97th percentile ranged from 5.16 to 5.24 µiu/ml. For FT4, the 3rd and 97th percentile reached 10.3 and 16.41 pmol/L respectively.

Table-3: *The prevalence (%) of hypothyroidism according to sex, social class, obesity, hypertension, diabetes and occupation*

Variables	N	%	p*
Sex (both)	374	7.0	-
Men	122	4.1	
women	252	8.3	0.09
Social class			
Non-affluent	292	7.5	
Affluent	82	4.9	0.50
Obesity (expressed in tertile)			
BMI (low)	135	5.2	
BMI (middle)	120	10.8	
BMI (high)	117	5.1	0.13
WHR (low)	138	4.3	
WHR (middle)	117	11.1	
WHR (high)	117	6.0	0.09
WHtR (low)	143	6.3	
WHtR (middle)	125	7.2	
WHtR (high)	103	7.8	0.90
Systolic Hypertension			
No	327	6.4	
Yes	42	11.9	0.16
Diastolic Hypertension			
No	328	6.4	
Yes	41	12.2	0.14
Diabetes			
No	292	5.5	
Yes	62	12.9	0.04
Occupation			
Housewives	193	9.8	
Medical students	99	3.0	
Rickshaw pullers	82	4.9	0.056

*p – after chi-sq test

The comparisons between men and women are shown in Table-2. The differences of anthropometric measures (BMI, WHR, WHtR) and blood pressure (both systolic and diastolic) were significant. The women had significantly higher BMI (p<0.001), WHtR (p<0.001), SBP and DBP (p<0.001); whereas, men had higher WHR (p<0.05) and HDL (p<0.01). Men and women did not differ with respect to TSH and FT4.

Table-3 shows the prevalence of hypothyroidism according to sex, social class, obesity, hypertension, diabetes and occupation. The overall prevalence was 7.0% in the total study population. The prevalence of hypothyroidism was significantly higher in diabetic than non-diabetic participants (12.9% vs. 5.5%, p = 0.04). The difference of prevalence of hypothyroidism was not significant among the different sex, grades of obesity or occupational group; neither there were any differences between participants with and without systolic and diastolic hypertension.

Table-4 shows the comparison of participants having hypothyroidism (TSH > 4.0 µiu /L) with that of without hypothyroidism (TSH ≤ 4.0 µiu /L). Obesity, blood glucose and lipids did not differ significantly; whereas, diastolic blood pressure was significantly lower in the hypothyroid group (74.4 ± 9.8 vs 79.4 ± 11.6 mmHg, p = 0.016).

Correlations of TSH and FT4 with other variables (BMI, WHR, WHtR, blood pressure, and blood glucose) are shown in Table-5. TSH showed, as expected, significant negative correlation with FT4 (r = -0.304, p <0.001) and significant positive correlation with FBG (r = 0.138, p <0.001). Systolic blood pressure showed significant positive correlation with obesity related variables (BMI, WHR, WHtR; for all p<0.001) and also with FBG (p<0.001). Neither TSH nor FT4 showed significant association with obesity variables and blood pressure.

One-way ANOVA analyzed the multiple comparisons (BMI, WHR, WHtR, SBP, DBP, FBG, TSH, FT4) taking occupational group as factor (Table 6a and 6b). These tables clearly depict that the rickshaw pullers had lowest BMI and WHtR, which were significant (for both, p<0.001). The house wives had significantly higher BMI, WHtR, SBP and DBP than the other two occupational groups. In contrast, TSH and FT4 did not differ among the three occupational groups.

Table-4: *Comparison of characteristics between participants with and without (26 vs. 347) hypothyroidism*

	With hypothyroidism n= 26		**Without hypothyroidism n = 347**		
	Mean	**SD**	**Mean**	**SD**	***p**
Age (y)	34.5	14.1	38.6	14.8	0.156
BMI (kg/m^2)	23.12	4.7	22.2	4.04	0.363
WHR	0.882	0.085	0.886	0.051	0.819
WHtR	0.530	0.082	0.530	0.066	0.977
SBP (mmHg)	117.8	14.0	123.2	17.3	0.064
DBP (mmHg)	74.4	9.8	79.4	11.6	0.016¶
FBG (mmol/l)	5.8	2.2	6.3	1.8	0.316
TG (mg/dl)	168.8	88.3	140.2	87.2	0.165
Chol (mg/dl)	130.7	34.2	137.5	125.4	0.536
HDL (mg/dl)	44.2	41.7	32.9	14.0	0.228
LDL (mg/dl)	56.1	30.8	75.6	28.5	0.066

*p value after unpaired t-test; there was significant difference between the two groups except diastolic blood pressure. ¶ - only significant difference; Laboratory tests (FBG, TG, Chol, HDL, LDL, TSH, FT4) were done in randomized samples.

Table-5: *Pearson Correlations (r) of TSH and FT4 with other investigated variables*

		AGE	**TSH**	**FT4**	**BMI**	**WHR**	**WHTR**	**FBG**	**SBP**
AGE	*r*	1	.075	.081	-.119**	.257**	.170**	.326**	.307**
	p		.147	.127	.003	.000	.000	.000	.000
	N		373	360	623	623	622	574	620
TSH	*r*		1	-.304**	-.048	.009	-.019	.138**	.098
	p			.000	.352	.869	.714	.009	.061
	N			359	372	372	371	354	369
FT4	*r*			1	-.020	-.016	.032	.068	-.066
	p				.707	.761	.547	.208	.217
	N				359	359	358	341	356
BMI	*r*				1	.285**	.740**	-.002	.162**
	p					.000	.000	.954	.000
	N					623	623	573	619
WHR	*r*					1	.594**	.210**	.203**
	p						.000	.000	.000
	N						623	573	619
WHTR	*r*						1	.150**	.274**
	p							.000	.000
	N							572	618
FBG	*r*							1	.221**
	p								.000
	N								570
SBP	*r*								1
	p								
	N								

** Correlation is significant at the 0.01 level (2-tailed).

Table-6a: *One-way ANOVA analyzed the multiple comparisons (BMI, WHR, WHtr, SBP, DBP, FBG, TSH, FT4) taking occupational group as factors*

Parameters	Group	N	Mean	95% CI
BMI (kg/m^2)	Housewives	444	23.5	23.1 – 23.9
	Medical students	99	25.8	25.0 –26.6
	Rickshaw-pullers	81	19.3	18.4 –20.3
	Total	624	23.3	23.0 –23.7
WHR	Housewives	444	0.892	0.884 –0.900
	Medical students	100	0.863	0.847 –0.878
	Rickshaw-pullers	80	0.898	0.878 –0.919
	Total	624	0.888	0.882 –0.895
WHTR	Housewives	444	0.554	0.547 –0.562
	Medical students	99	0.534	0.520 –0.548
	Rickshaw-pullers	80	0.486	0.470 –0.501
	Total	623	0.542	0.536 –0.549
SBP (mmHg)	Housewives	444	121.4	120.1 –122.8
	Medical students	95	114.0	111.6 –116.3
	Rickshaw-pullers	82	115.1	111.8 –118.5
	Total	621	119.5	118.3 –120.6
DBP (mmHg)	Housewives	444	77.3	76.3 –78.3
	Medical students	95	74.0	72.2 –75.8
	Rickshaw-pullers	82	69.0	67.1 –70.8
	Total	621	75.7	74.9 –76.5
FBG (mmol/L)	Housewives	393	6.2	5.9 –6.5
	Medical students	100	4.9	4.7 –5.0
	Rickshaw-pullers	82	6.4	5.9 –6.8
	Total	575	6.0	5.8 –6.2
TSH (µIU/ml)	Housewives	193	2.46	1.78 –3.1
	Medical students	99	1.65	1.42 –1.87
	Rickshaw-pullers	82	1.71	1.45 –1.97
	Total	374	2.08	1.72 –2.45
FT4 (pmol/L)	Housewives	181	13.2	12.9 –13.4
	Medical students	98	12.7	12.4 –13.0
	Rickshaw-pullers	82	13.0	12.7 –13.3
	Total	361	13.0	12.8 –13.2

The post-hoc (Bonferroni) tests showed the differences of anthropometric measures (BMI, WHR, WHtR, SBP, DBP and FBG) between the three groups significant, whereas, TSH and FT4 showed no significant difference. These are evident from the column 95% CI. Table of multiple comparisons by post-hoc were shown in Table-6b

Table-6b: *Multiple Comparisons by post-hoc (Bonferroni) taking occupational group as factor*

Dependent Variable	(1) Occupational group	(J) Occupational group	Mean Difference (I-J)	Std. Error	Sig.
BMI (kg/m^2)	1	2	-2.31667*	.46989	.000
		3	4.15486*	.51080	.000
	2	1	2.31667*	.46989	.000
		3	6.47153*	.63341	.000
	3	1	-4.15486*	.51080	.000
		2	-6.47153*	.63341	.000
WHR	1	2	.02936*	.00930	.005
		3	-.00639	.01021	1.000
	2	1	-.02936*	.00930	.005
		3	-.03575*	.01260	.014
	3	1	.00639	.01021	1.000
		2	.03575*	.01260	.014
WHTR	1	2	.02036	.00863	.056
		3	.06825*	.00943	.000
	2	1	-.02036	.00863	.056
		3	.04789*	.01167	.000
	3	1	-.06825*	.00943	.000
		2	-.04789*	.01167	.000
SBP (mmHg)	1	2	7.49099*	1.62940	.000
		3	6.30806*	1.73253	.001
	2	1	-7.49099*	1.62940	.000
		3	-1.18293	2.17273	1.000
	3	1	-6.30806*	1.73253	.001
		2	1.18293	2.17273	1.000
DBP (mmHg)	1	2	3.29196*	1.12758	.011
		3	8.32020*	1.19894	.000
	2	1	-3.29196*	1.12758	.011
		3	5.02824*	1.50357	.003
	3	1	-8.32020*	1.19894	.000
		2	-5.02824*	1.50357	.003
FBG (mmol/L)	1	2	1.34193*	.29477	.000
		3	-.12441	.31953	1.000
	2	1	-1.34193*	.29477	.000
		3	-1.46634*	.39209	.001
	3	1	.12441	.31953	1.000
		2	1.46634*	.39209	.001
TSH (µIU/ml)	1	2	.81758	.44030	.192
		3	.75268	.46950	.329
	2	1	-.81758	.44030	.192
		3	-.06490	.53183	1.000
	3	1	-.75268	.46950	.329
		2	.06490	.53183	1.000
FT4 (pmol/L)	1	2	.48897	.21608	.073
		3	.16742	.22934	1.000
	2	1	-.48897	.21608	.073
		3	-.32155	.25785	.640
	3	1	-.16742	.22934	1.000
		2	.32155	.25785	.640

* The mean difference is significant at the 0.05 level.

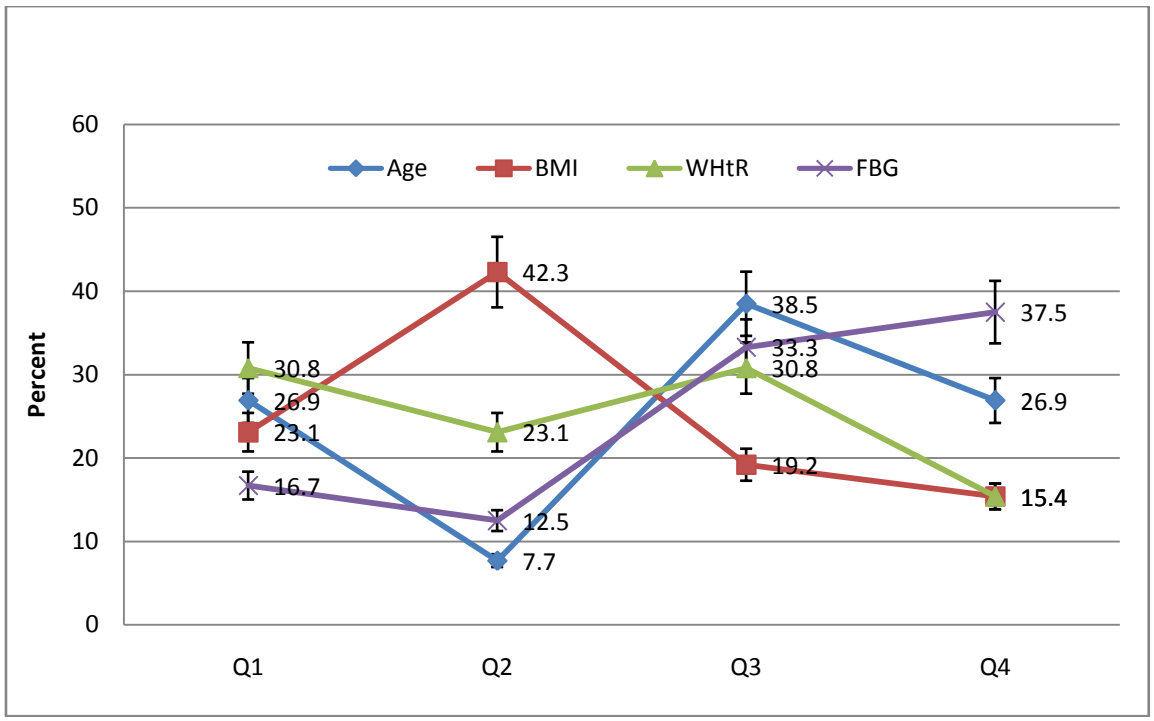

Fig-1: Trend of hypothyroidism prevalence according to quartiles of age, BMI, WHR, WHtR, FBG. The trends of prevalence (%) for age-quartile, BMI-quartile were not significant, whereas, FBG-quartile was found significant (p=.04). The quartiles of central obesity measures (WHR) were not significant (not shown in the figure).

Table-7: *Statistics measures of central tendencies and variability of thyroid stimulating hormone (TSH) and free thyroxin (FT4)*

		TSH	**FT4**
N		374	361
	Central tendencies		
Mean		2.0868	13.04
Median		1.5350	13.04
Mode		1.02	14.74
	Dispersion / spread		
Percentiles	10	0.62	10.95
	20	0.87	11.53
	30	1.06	12.07
	40	1.28	12.51
	50	1.53	13.04
	60	1.71	13.47
	70	2.08	13.86
	80	2.76	14.39
	90	3.48	14.94
	3^{rd} percentile	0.42 – 0.46	10.3
	97^{th} percentile	5.16 – 5.24	16.41

TSH: 3^{rd} percentile 0.42 – 0.45; 97^{th} percentile 5.16 – 5.24; FT4: 3^{rd} percentile 10.13; 97^{th} percentile 16.41

We investigated the trend of prevalence of hypothyroidism according to quartiles (Q 01 through Q04) of age, BMI, WHtR, FBG in Figure-1. The measures of central tendencies and variability of thyroid stimulating hormone (TSH) and free thyroxin (FT4) are shown in Table-7. The prevalence did not increase significantly with increasing age, BMI, WHtR; whereas, the trend was significant for increasing level of FBG (p=0.04).

Discussions

Hypothyroidism is based only on the circulating blood level of TSH despite normal FT4 level, and the clinical manifestations are usually not evident. This study is unique in the sense that it addressed the prevalence of subclinical hypothyroidism at community level. Additionally, it investigated whether the risk factors, so far known, are associated with hypothyroidism in our population. Simultaneously, this study included different occupational groups for comparison of prevalence rates and the associated risk factors acting upon the occupational groups. The study could propose the values of TSH and FT4 at 3^{rd} and 97^{th} percentile (Table-1). This finding may help to compare or to determine future reference range of TSH and FT4.

The prevalence of hypothyroidism observed in this study is somehow lower than that of India [3]. In India, overall prevalence was 9.4% (men /women = 6.2% /11.4%); whereas, the prevalence of this study was 7% (men / women = 4.1% / 8.3%). Jeannine et al. reported that the prevalence of hypothyroidism varied 3% to 11% depending on the diagnostic cut-off of TSH, geographical site and ethnicity [15]. A clinic based study in Assam reported the prevalence as 13.1% [16]. Most of the studies opined that the prevalence among women is higher than that of men [2,3,16,17]. We also found higher prevalence in women than men (8.2% vs. 4.1%, p = 0.09), but the difference was not significant.

Regarding diabetes, the prevalence of hypothyroidism was significantly higher among the diabetic than among the non-diabetic group (Table-3). Correlation was also found significant between FBG and TSH (Table-5). Additionally, we found that the trend of hypothyroidism increased significantly with increasing fasting blood glucose (Figure-1). The associations between hypothyroidism and diabetes have been reported in other studies and in other forms of diabetes [6, 7, 18-22]. A study found a higher TSH level in patients with metabolic syndrome suggesting that hypothyroidism may be a risk factor for it [23]. In subclinical hypothyroidism, insulin resistance may result from diminished rate of insulin stimulated glucose transport caused by perturbed expression of glucose transporter type 2 genes (GLUT 2). There is also impaired insulin stimulated glucose utilization in peripheral tissues [24].

In Table-4, hypothyroid group had significantly lower diastolic blood pressure than their normal thyroid counterpart. It is not clear why hypothyroid group had significantly lower diastolic blood pressure. Possibly, the hypothyroid group has also diabetes as mentioned above, leading to autonomic neuropathy resulting in diastolic dysfunction and lower diastolic blood pressure. On the contrary, some investigators found association of hypothyroidism with hypertension [25]. There is a plausible explanation that hypothyroidism reduces dopaminergic activity in central nervous system, which in turn increases norepinephrine leading to hypertension. Several statistical analyses were undertaken based on this theory, but we found no significant association between hypothyroidism and hypertension (Table-3, 4, 5).

As regards to age, it has been observed that TSH increased with age [5, 26] though with much genetic variation. We found that age had no significant correlations with TSH and FT4 (Table-5, Figure 1). Neither, we found any significant difference of age between participants with and without hypothyroidism (Table-4).

The study has some limitations. Had we clinically examine those who had high TSH level we could have identified the common signs or symptoms related to hypothyroidism which could help physician to look into clinical features cautiously. Secondly, we could have assayed free tri-iodothyronine (FT3), thyroid peroxidase antibody (anti-TPO) and reverse thyroxine (rt3) for more reliable thyroid dysfunction.

Conclusions

The study concluded that the prevalence of hypothyroidism, which remains unnoticed (hidden or subclinical), was not negligible in Bangladeshi population. The risks of hypothyroidism related to increasing age, obesity (general or central), hypertension and hyperlipidemia were found not significant. Hypothyroidism was prevalent equally irrespective of sex, occupational groups or social class. Hyperglycemia was unequivocally proved as significant risk for hypothyroidism.

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