

Biochemical Assessments of Thyroid profile and its association with Cognitive level among children with autism in a tertiary care center of Bangladesh

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BACKGROUND

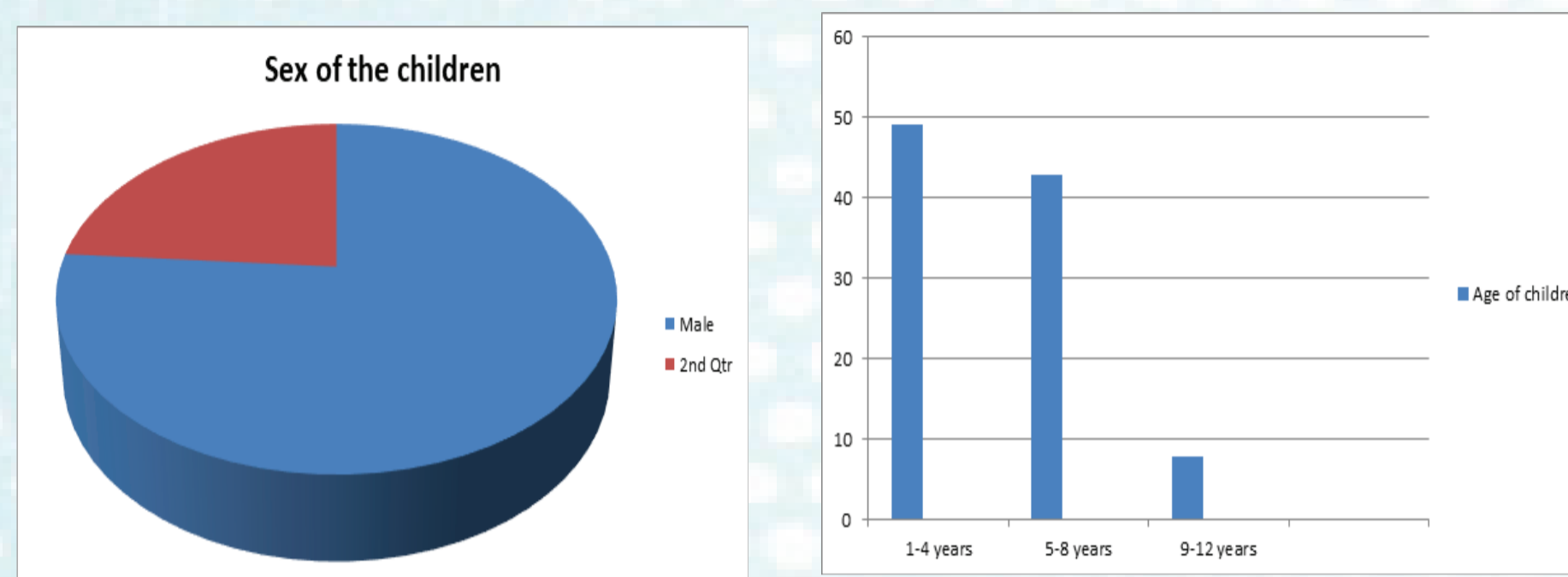
The causation of autism is still unknown. Thyroid hormones are important for brain development of a child, which also have immunomodulatory actions. It has a vital role on cognitive function also. So dysregulation of Thyroid hormones may have a potential role in children with Autism Spectrum Disorder (ASD). 1 in 160 children has an autism spectrum disorder (ASD) (World Health Organization: WHO, 2017). Not only that There is a report concluded that the prevalence of autism had risen to 1 in every 59 births in the United States – twice as great as the 2004 rate of 1 in 125 and almost 1 in 54 boys. (CDC, 2018). In Bangladesh, autism has already been identified as burden of diseases and it has been assumed that the magnitude is high and majority cases, is undetermined. In a study it was found that autism and thyroid disease were closely related. In another study it was found that diagnosed with Autism Spectrum Disorder (ASD) had low thyroid function. With proper treatment of thyroid function, it was often see significant gains in cognitive level. For some children there was a considerable amount of improvement. So it would be necessary to screen out thyroid hormone level for proper medicinal treatment. But in some other cases there were high level of thyroid hormone also found in some cases may be due to maternal thyroid diseases or different drug treatment of ASD children. (Frye et al. 2017) For any kind of thyroid abnormalities need timely screening.

OBJECTIVES

The objectives of this study will assess the thyroid profile and cognitive level among children with Autism and to find out the correlations between them.

MATERIALS AND METHODS

This will be a Cross-Sectional case-control study, 100 children will be taken in each group and age range were 2 to 12 years. Random sampling method will used. ASD children will be selected from out-patient department of Institute of Paediatric Neurodisorder and Autism (IPNA) Bangabandhu Sheikh Mujib Medical University (BSMMU), where the patients will be regularly visited for diagnosis, assessment and management. Autism Spectrum Disorder will be diagnosed by DSM-5 criterias. On the other hand same number of controlled children will be selected with same age group from randomly selected regular schools in Dhaka city. After selecting cases and controls, sample of blood will be collected and examine for Biochemical assays of thyroid function in the form of free triiodothyronine (FT3), free tetraiodothyronine (FT4), thyroid-stimulating hormone (TSH) will be done by using commercially available enzyme-linked immunosorbent assay (ELISA) kits. Cognitive level of ASD children will be measured by trained psychologist with The Bayley Scales of Infant and Toddler Developme (BSID-III), The Wechsler Intelligence Scale for Children – Revised 4th Edition (WISC-R IV) and The Wechsler Preschool and Primary Scale of Intelligence Fourth Edition(WPPSI-IV).



Co-relation between FT3, FT4, TSH with cognitive level in ASD children (n=63)

Thyroid hormone	Ref. Value	Cognitive level			p-value
		Boarder line	Mild	Moderate	
FT3	1.40-4.20 pg/mL	17	22	14	0.86
	>4.20 pg/mL	4	4	2	2.15±0.37
FT4	0.8-1.80 ng/dL	17	22	15	0.53
	>1.80 ng/dL	4	4	1	2.14±0.35
TSH	0.70-5.70 microIU/mL	20	25	16	0.69
	<0.70 microIU/mL	1	1	0	1.96±0.18

Comparison between different level of components in ASD children (n=63)

Cognitive level	n	FT ₃ (pg/mL)	FT ₄ (ng/dL)	TSH (mIU/L)
Borderline	21	2.19±0.40	2.19±0.40	1.95±0.22
Mild	26	2.15±0.37	2.15±0.37	1.96±0.20
Moderate	16	2.12±0.34	2.06±0.25	2.00±0.00

Data were expressed as Mean±SD. 'Compare mean' test was performed to compare between groups. The test of significance was calculated and (p values <0.05) there was no level of significance.

DISCUSSION

The present study was undertaken to observe some aspects of thyroid function status in children with autism spectrum disorders by estimating serum FT3, FT4 and TSH levels. All the parameters were also estimated in apparently healthy age to find out the baseline data and also for comparison. This study showed that, the mean serum FT3, FT4, TSH levels were within normal range. This finding was in agreement with other researchers of different countries. Abnormalities in level of this hormone can have significant deleterious behavioral and cognitive effect (Frye et al. 2017). In summary, our findings leads to the suggestion that impairment of cognitive development found in autistic children may result from the abnormalities of thyroid hormone level present in these special children.

CONCLUSION

For measurement of cognition BSAID III was used among 98.4 % children. 41.3% children had mildly delayed cognition level. It was found that FT3, FT4 levels were almost normal with slightly increased and incase of TSH slightly decreased. No association was present between Thyroid hormone level and cognition level of ASD children. From the result of this study, it may be concluded that there were presence of Thyroid hormone level abnormalities among autism spectrum disorders children with mild impairment of Cognition level. But there was no significant association detected. Therefore, routine thyroid test of pregnant mother and new born may be useful for early detection of thyroid hormone abnormality and also detect the level of impairment of cognition.

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CONFLICT OF INTEREST

The Authors declare that they do not have any conflict of interests.

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