

# Thyroid autoimmunity in children and adolescents with Type 1 Diabetes Mellitus

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**INTRODUCTION** : Type 1 diabetes mellitus (T1DM) is caused by immune mediated destruction of islet cells of the pancreas. It is commonly associated with other organ – specific autoimmune disorders particularly autoimmune thyroid disease (AITD). AITD is characterized by T and B-lymphocyte infiltration of the thyroid gland and the presence of autoantibodies specific to the thyroid gland. Thyroid antibodies can be detected at diagnosis or years after diagnosis. Therefore, we sought to clarify thyroid autoimmunity in a cohort of Malaysian patients with T1DM and to evaluate risk factors for these clinical entities.

**METHODOLOGY** : A total of 77 patients (39 girls) with T1DM were followed up over time at the Department of Paediatric Endocrinology, Hospital Putrajaya, Malaysia from the period of 2001 to 2019. At diagnosis, all the patients were evaluated for beta cell autoimmunity - autoantibodies to glutamic acid decarboxylase (GADA), insulinoma-associated protein-2 (IA2) and islet cell (ICA). Thyroid function tests and autoantibodies to thyroid peroxidase (TPO) and thyroglobulin (TG) were evaluated periodically

## RESULTS

**Table 1 : Clinical and biochemical characteristics of patients with T1DM with or without thyroid autoantibodies**

Variable	All patients (77)	Thyroid Ab Positive (25)	Thyroid Ab Negative (52)	P value
Current age (yr)	13.19 +/- 4.3	14.9 +/- 3.4	14.35 +/- 3.9	0.68
Sex (F) %	39 (50.7)	17 (69.2)	22 (37)	<b>0.048</b>
Age at Diagnosis (yr)	7.59 +/- 3.74	9.16 +/- 3.4	7.07 +/- 3.9	<b>0.045</b>
HbA1c (%)	9.75 +/- 2.54	9.6 +/- 2.17	9.7 +/- 2.33	0.86
DKA at diagnosis (%)	61 (79.5)	21 (84.6)	40 (81.5)	0.81
TSH Level at diagnosis (IU/L)	2.42 +/- 1.72	3.17 +/- 2.9	1.83 +/- 0.83	<b>0.048</b>
Positive antibodies (%)	63 (82.3)			
GAD (%)	46 (60.3)	18 (71.5)	29 (55.5)	<b>0.04</b>
IA2 (%)	24 (31.5)	6 (23.1)	19 (37)	0.48
ICA (%)	39 (50.7)	11 (46.2)	23 (44.4)	0.92
Duration of Diabetes (yr)	6.72 +/- 3.78	9.75 +/- 4.46	7.61 +/- 4.0	0.425

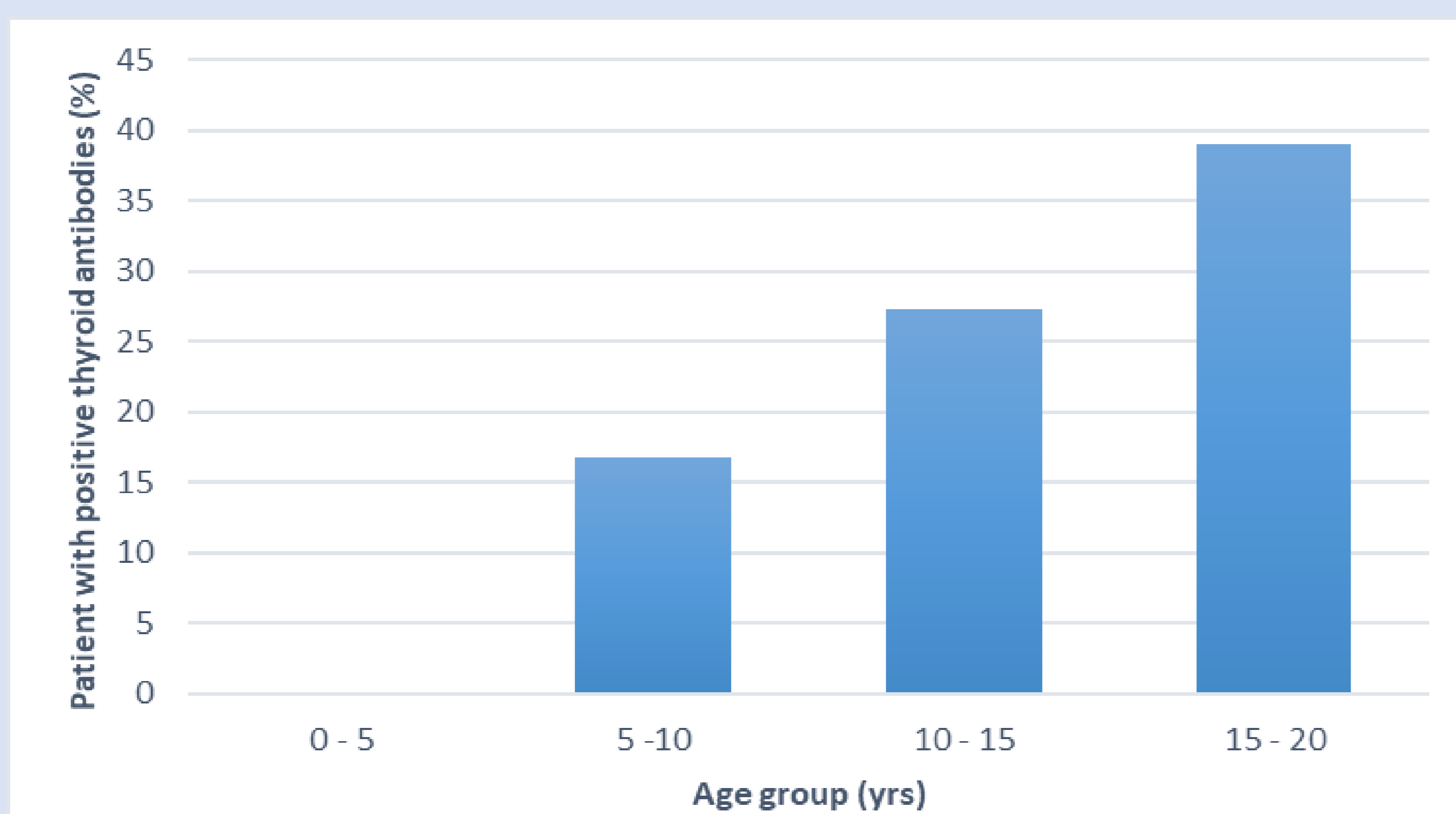
\*Values are presented as mean±standard deviation or number (%)  
\*Significance value, P < 0.05

**Table 2 : Binary logistic regression analysis of factors associated with thyroid autoantibody positivity in patients with T1DM**

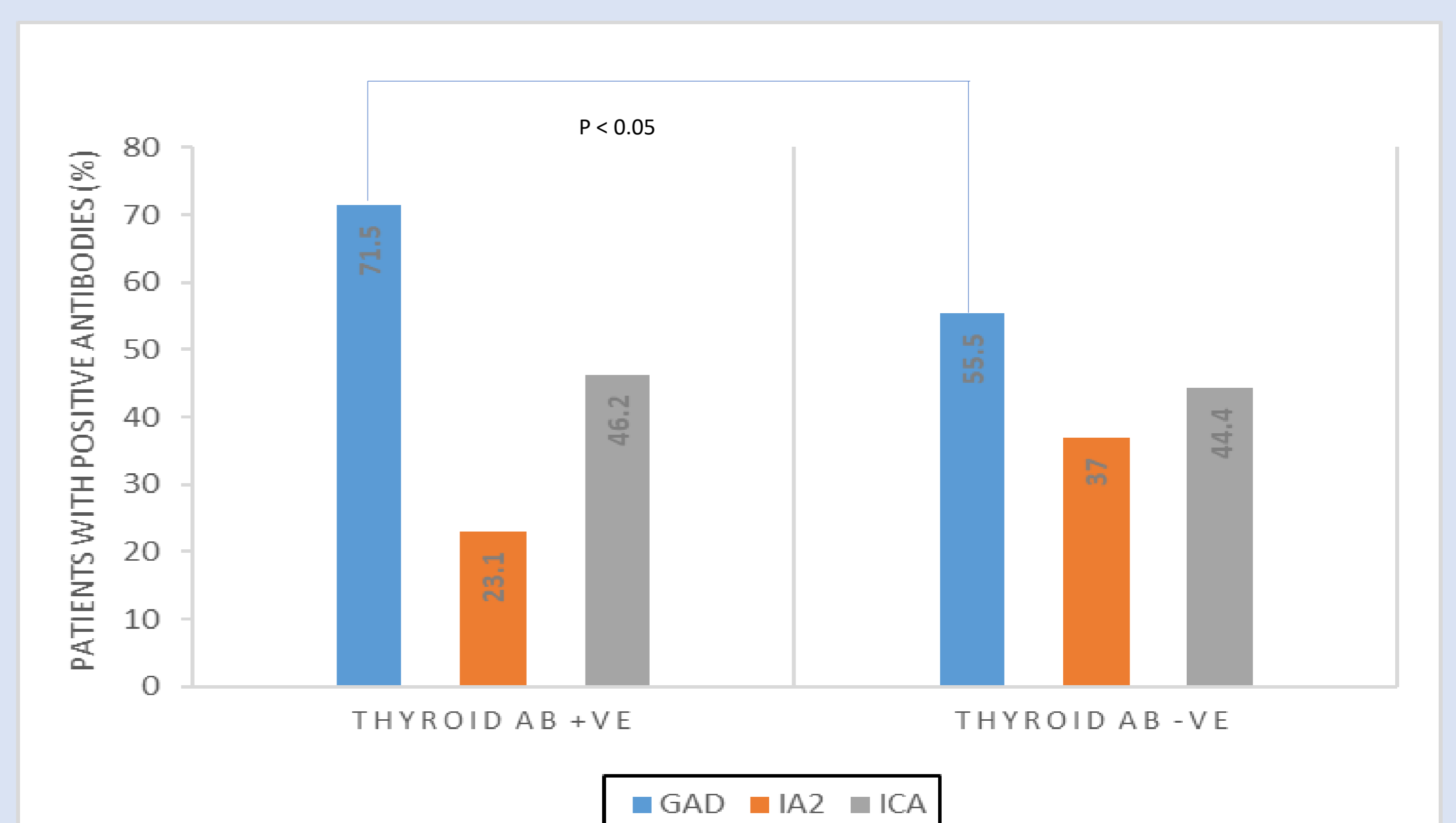
Variable	B	Standard Error	P value	Odds ratio	95% CI
GAD	0.247	0.69	<b>0.047</b>	1.28	(0.33 - 4.94)
TSH level at diagnosis	0.43	0.26	0.09	1.54	(0.93 - 2.55)
Sex	1.34	0.72	0.053	3.83	(0.93 - 15.71)
Duration of diabetes	1.00	0.083	0.92	1.008	(0.86 - 1.89)
Age	0.038	0.09	0.67	1.04	(0.87 - 1.24)

Variable	
Patients with thyroid autoimmunity (%)	25 (32.5)
Patient with ATG + (%)	14 (20)
Patient with ATPO + (%)	26.4 (30)
Patient with ATPO+ and ATG+ (%)	7 (8.9)
Patients with hypothyroidism (%)	8(10.4)
Mean age of thyroid autoimmunity (yr)	12.29 +/- 3.65

**Figure 1 : Percentage of positive thyroid antibodies with increasing age of patient.**



**Figure 2 : Percentage of patient with positive beta cell antibodies with thyroid autoimmunity**



**DISCUSSION:** In this study, the prevalence of thyroid autoimmunity observed in patients with T1DM was 32.5%, There was a significantly higher prevalence of GADA, older age of onset of T1DM, higher levels of TSH at diagnosis and a female preponderance in patients with thyroid autoimmunity. The prevalence of significant thyroid antibody titers increased with increasing age of patients and reached its maximum in the 15- to 20-year age group

**CONCLUSION** : Clinicians must take into account age at diagnosis, TSH levels and GADA levels when evaluating the risk of development of autoimmune hypothyroidism in patients with T1DM

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