

Glycemic Control in Egyptian Adolescent Girls with Type 1 DM

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Background

Adolescents with Type 1 Diabetes (T1D) have worse metabolic control than preadolescent children due to poor adherence with medications and insulin resistance related to puberty hormones. Adolescent girls are at a particular risk for poor control as insulin sensitivity decreases in the luteal phase of the menstrual cycle. Progesterone, secreted in the second half of the cycle, may cause an increase in appetite and caloric intake.

Objectives

This study was conducted to assess the effect of puberty on the glycemic control of adolescent type 1 diabetic females following up in the Diabetes, Endocrine and Metabolism Pediatric Unit (DEMPU) of the Children's Hospital of Cairo University and to study the effect of menstruation on insulin demand and blood glucose control in these girls.

Patients and Methods

A cross-sectional study of thirty pubertal adolescent girls (Group 3), thirty prepubertal girls (Group 1) and thirty boys in variable stages of puberty (Group 2- Tanner stages 2-5) all with ages ranging from 10-15 years and similar mean T1D duration (5.12-5.42 years). We compared mean blood glucose levels, mean insulin doses and mean HbA1Cs (average of the last 4). In addition, Group 3 patients were asked to keep tight records of their blood glucose one week before and during the week of menstruation and to increase their insulin doses to correct for any high blood sugars as needed. We also compared the degree of participation in sports in the three groups.

Results

Mean blood glucose levels were higher in pubertal girls than in both other groups reflected also in their mean HbA1Cs and insulin requirements ($p < 0.05$) (Fig. 1).

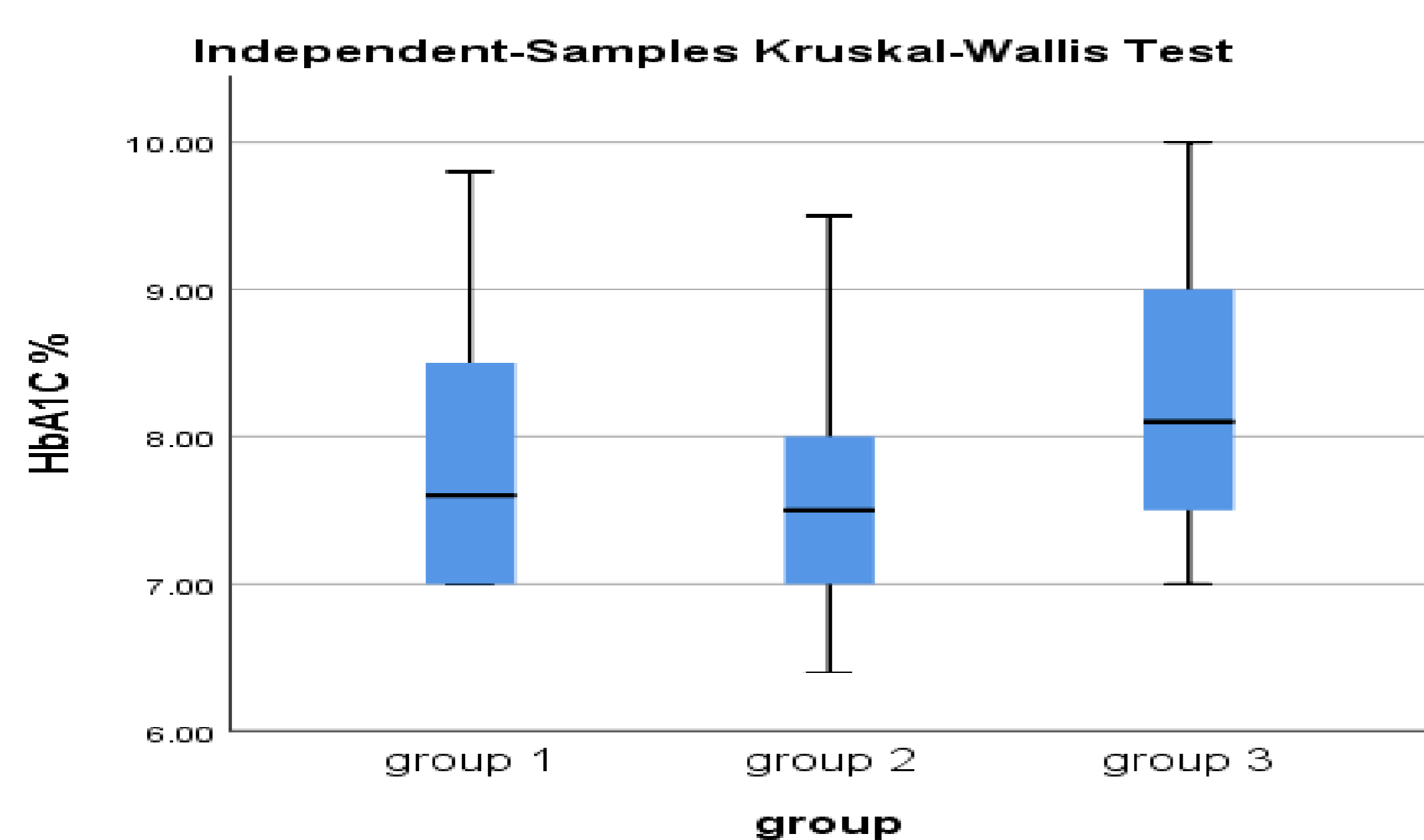


Figure 1: Mean HbA1C levels in group 1 (prepubertal girls) $n=30$, group 2 (pubertal boys T2-T5) $n=30$ and group 3 (pubertal girls) $n=30$ ($p < 0.05$).

Table 1: Diabetes control during the week of menstruation and the week before it in adolescent girls (Group 3)

	Group 3 (number=30)					
	Mean	SD	Median	Minimum	Maximum	P value
Onset of menarche (yrs)	12.38	1.01	12.5	10	14.5	-
Mean bl. glucose week before menses (mg/dL)	274.27	50.94	275.00	192.00	380.00	<0.001
Mean bl. glucose week of menses (mg/dL)	296.30	54.79	290.00	195.00	420.00	
Mean insulin dose the week before menses (Units/kg/day)	1.22	.38	1.20	.60	2.00	<0.001
Mean insulin dose week of menses (Units/kg)	1.44	.45	1.50	.60	2.30	

Girls of group 3 had significantly higher mean blood glucose and mean insulin dose during the week of menstruation than the week before ($p < 0.001$) (Table 1).

A third of pubertal girls did not participate in any form of walking or sports compared to 13.3% of pubertal boys and 20% of prepubertal girls. The difference was highly significant ($p < 0.001$).

Conclusion

Puberty and menstruation in T1D girls have an adverse effect on diabetes control. Closer monitoring is needed during the menstrual period and higher doses of basal insulin may be necessary during that time. Higher HbA1C levels may also be related to lower participation in sports in this group which is common in Arab countries. Sports should be encouraged in this group.

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