RESULTS

Data were collected from 40 patients from the Tropical Clinic at Cairo University Pediatric Hospital, complaining of chronic diarrhea, as well as from twenty ages and sex matched healthy children serving as control group.

Chronic diarrhea cases with IgA deficiency named group A, while chronic diarrhea cases without IgA deficiency named group B and control group named group C.

Six cases with IgA deficiency were found (group A). The data of the 6 patients and their comparisons with cases without IgA deficiency (group B) are presented in the following tables and figures:

Table (1): Demographic data of group A (n=6).

Age (Years) Mean ± SD Range	 6.7 ± 4.5 (4 – 14 y)
Gender (Frequency, %) No of male No of female	 4 (66.7) 2 (33.3)
Weight (Kg) Mean ± SD Range	 16 ± 4.7 11 - 24
Weight Centile (Frequency, %) <3rd 3rd-25th ≥25th	 2 (33.3) 3 (50) 1 (16.7)
Height (Cm) Mean ± SD Range	 95.2 ± 14.3 (84 - 123)
Height Centile (Frequency, %) <3rd 3rd-25th ≥25th	 3 (50) 2 (33.4) 1 (16.7)

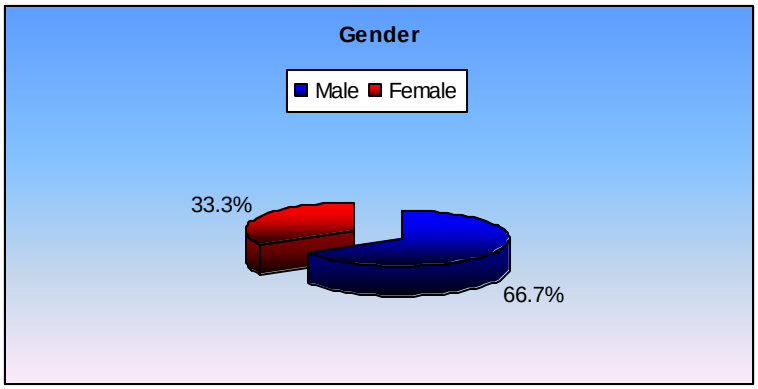

Figure (1): Gender distribution in group A

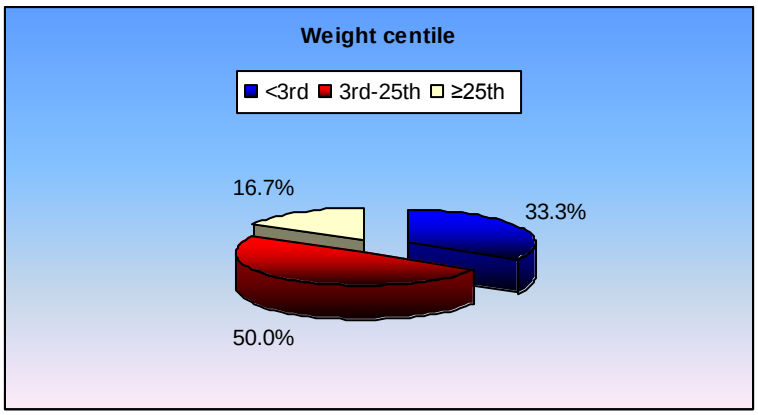

Figure (2): Weight centile distribution in group A

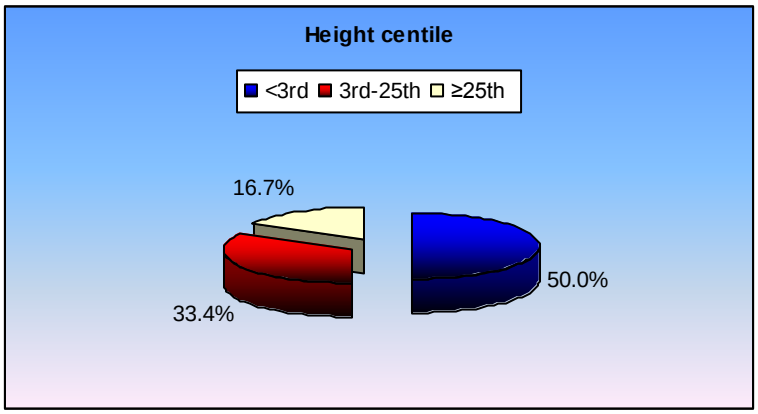

Figure (3): Height centile distribution in group A

Among our IgA deficient group there were 4 males (66.7%) and 2 female (33.3%). There ages ranged between (4 - 14 y) with a mean of (6.7 ± 4.5 y). Two patients (33.3%) had their weight below 3rd percentile for age and three patients (50%) had their height below 3rd percentile for age.

Table (2): Comparison between gender, weight centiles and height centile in group A and group B.

Cases / Variables	Group B (n = 34) Frequency, (%)	Group A (n = 6) Frequency, (%)	*P*-value
Gender			
Male	25 (73.5)	4 (66.7)	0.729
Female	9 (26.5)	2 (33.3)	
Weight Centile			
<3rd	15 (44.1)	2 (33.3)	0.199
3rd - 25th	8 (23.5)	3 (50)	
≥25th	11(32.4)	1 (16.7)	
Height Centile			
<3rd	11 (32.4)	3 (50)	0.654
3rd - 5th	10 (29.4)	2 (33.3)	
≥25th	13 (38.2)	1 (16.7)	

There was no statistically significant difference between gender distribution, weight centiles and height centiles in group A and group B.

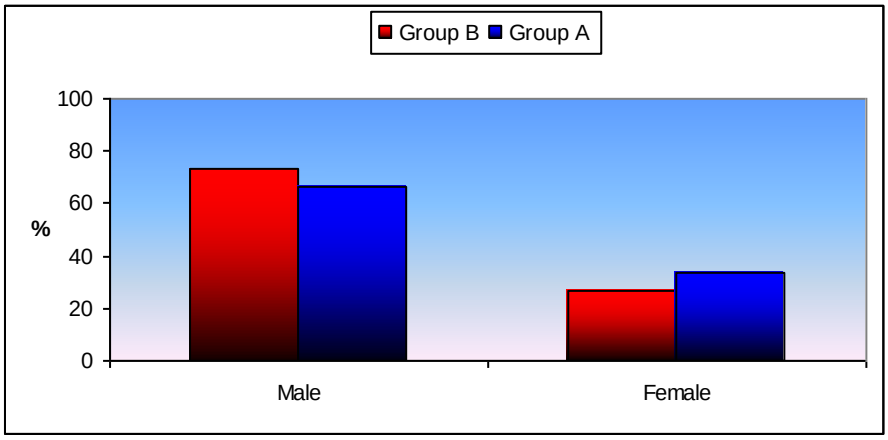

Figure (4): Comparison between gender distributions in group A and group B

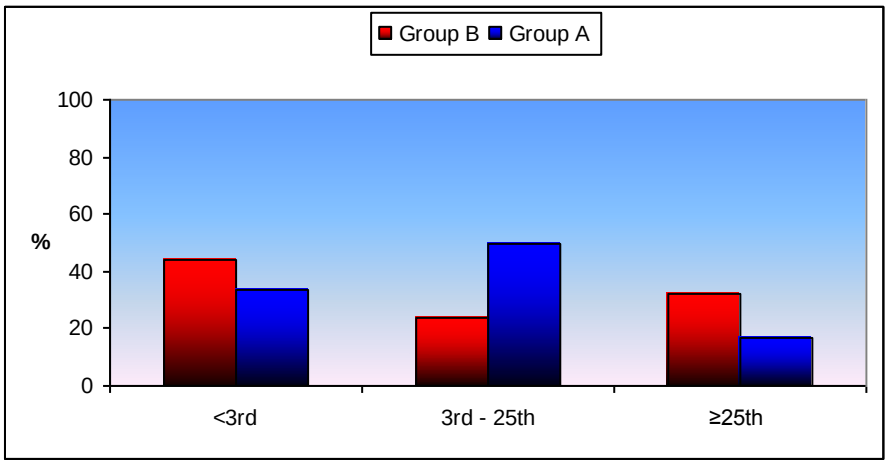

Figure (5): Comparison between weights centile distributions in group A and group B

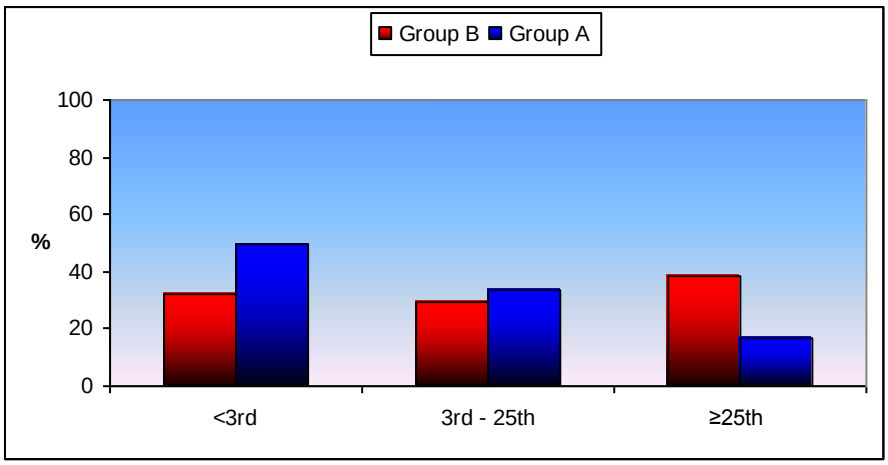

Figure (6): Comparison between height centile distributions in group A nd group B

Table (3): Clinical data of group A (n=6) and group B (n=34).

Standard group	Group A (n = 6)	Group B (n = 34)	P-value
Diarrhea duration (Years) Mean ± SD Range	 4.7 ± 3.7 2 - 12 y	 2.9 ± 2.1 1 - 9 y	 0.095
Motions (Number/day) (Frequency, %) 4-8 >8	 5 (83.3) 1 (16.7)	 28 (82) 6 (18)	 0.967
Motion quality (Frequency, %) Loose Watery Semi-solid	 3 (50) 2 (33.3) 1 (16.7)	 15 (44) 9 (26.4) 10 (29.6)	 0.056
Bloody stool (Frequency, %) Negative Positive	 5 (83.3) 1 (16.7)	 26 (76.4) 8 (23.6)	 0.659
Vomiting (Frequency, %) No Yes	 4 (66.6) 2 (33.4)	 24 (70.5) 10 (29.5)	 0.345
Hospital admission (Frequency, %) Never < 5 times >5 times	 3 (50) 2 (33.3) 1 (16.7	 20 (58.8) 12 (35.2) 2 (6)	 0.437
Consanguinity (Frequency, %) Yes No	 4 (66.7) 2 (33.3)	 12 (35.3) 22 (64.7)	 0.148
Recurrent pneumonia (Frequency, %) Yes No	 3 (50) 3 (50)	 10 (29.5) 24 (70.5)	 0.321
Autoimmune diseases (Frequency, %) Yes No	 1 (16.6) 5 (83.4)	 0 34 (100)	 0.016*

**: Significant at P ≤ 0.05*

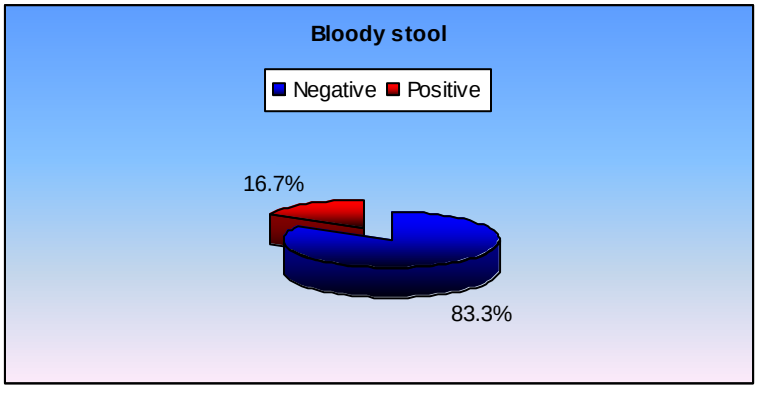

Figure (7): Prevalence of bloody stool in group A

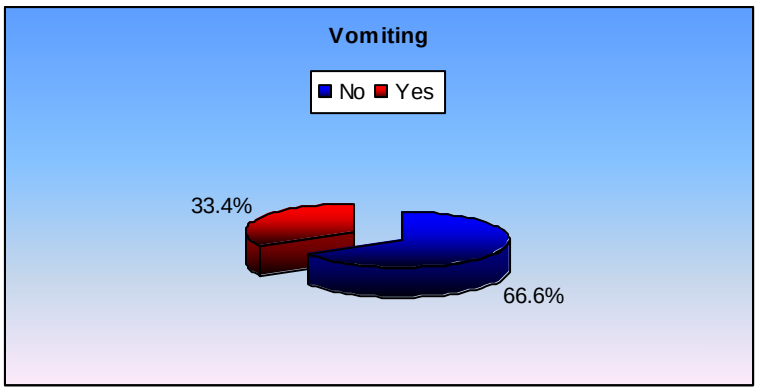

Figure (8): Prevalence of vomiting in group A

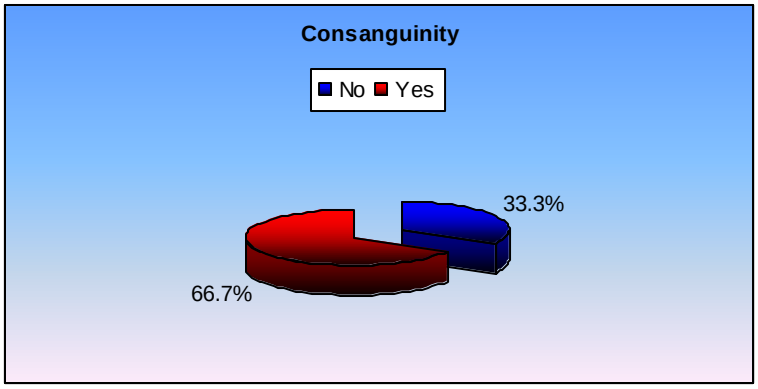

Figure (9): Prevalence of consanguinity in group

There was statistically significant difference between group A and group B as regard to autoimmune diseases prevalence, but there was no significant difference between both groups (A, B) as regard to other clinical data.

IgA deficient patients had chronic diarrhea with a mean duration of (4.7 ± 3.7 y). Diarrhea was associated with vomiting in 2 patients (33.4%) and bloody stool in one patient (16.7%) and parents were consanguineous in 4 patients (66.7%). Three patients (50%) had recurrent pneumonia and 1 patient (16.7%) had autoimmune diseases in the form of insulin dependent diabetes mellitus (IDDM) and hyperparathyroidism. For chronic diarrhea cases without IgA deficiency, diarrhea was associated with vomiting in 10 (29.5%) patients and bloody stool in 8 (23.6%) patients and parents were consanguineous in 12 (35.3%) patients. Ten patients (29.5%) had recurrent pneumonia and no patients had autoimmune diseases.

Table (4): Immunoglobulins data of group A and group B.

Standard group	Group A (n = 6)	Group B (n = 34)	P-value
IgA (mg/dl) Mean ± SD Range	 23.3 ± 8.6 21.4 - 27	 168.6 ± 102.7 91 - 443	 <0.001*
IgG (mg/dl) Mean ± SD Range	 1146.1 ± 1072.3 40 – 3187	 1235.3 ± 510.5 251 - 2484	 0.256
Serum IgG (Frequency, %) Normal < Normal > Normal	 4 (66.6) 1 (16.7) 1 (16.7)	 23 (67.6) 2 (6) 9 (26.4)	 0.610
IgM (mg/dl) Mean ± SD Range	 126.6 ± 65.4 23 – 190	 152.6 ± 69.2 41 - 365	 0.636
Serum IgM (Frequency, %) Normal < Normal > Normal	 5 (83.3) 1 (16.7) 0	 28 (82.3) 2 (6) 4 (11.7)	 0.473

**: Significant at P ≤ 0.05*

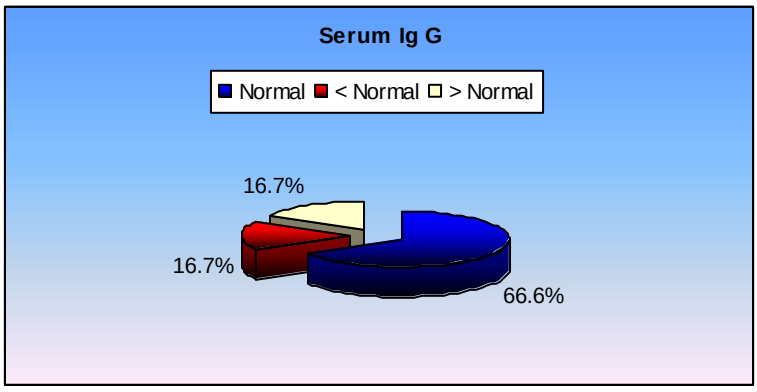

Figure (10): Serum IgG levels in group A

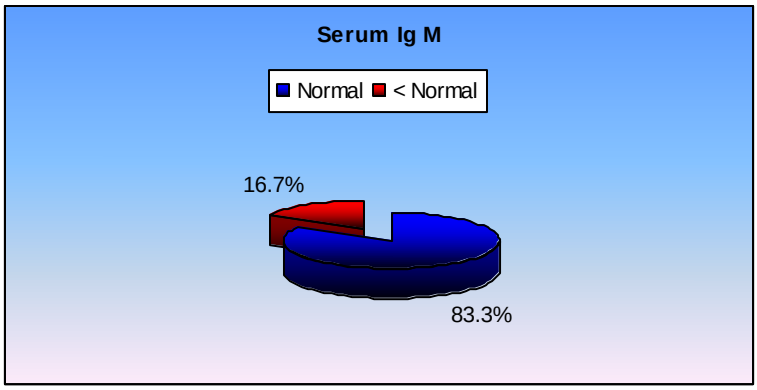

Figure (11): Serum IgM levels in group A

The previous table showed that:

IgA deficiency was found in 6 (15%) out of 40 patients. The profiles of the 6 patients with decreased IgA levels were as follows:

- Four patients had IgG and IgM levels within normal ranges for age.
- One patient had IgG level more than normal ranges for age and IgM within normal rang for age.
- The last patient had IgG and IgM levels below normal ranges for age, and this patient was suffering from chronic diarrhea, recurrent pneumonia, multiple bone fractures and autoimmune disorders in the form of insulin dependent diabetes mellitus (IDDM), hyperparathyroidism and possible celiac disease. These associations are common features of CVID.

For chronic diarrhea cases without IgA deficiency (group B):

- Serum IgG level was within normal range for age in 23 patients (67.6%), below normal range for age in 2 patients (6%) and above normal range for age in 9 patients (26.4%).
- Serum IgM level was within normal range for age in 28 patients (82.3%), below normal range for age in 2 patients (6%) and above normal range for age in 4 patients (11.7%).

Table (5): Findings of stool analysis and colonic biopsy of group A and group B.

Standard group	Group A (n = 6)	Group B (n = 34)	P-value
Stool analysis (Frequency, %) E.hystolytica Giardia	 2 (33.3) 4 (66.7)	 16 (47) 10 (29.4)	 0.161
Stool culture (Frequency, %) NEPI*	 6 (100)	 34 (100)	 Not computed because the variable is constant
Colonic biopsy results (Frequency, %) IBD	 4 (66.7)	 18 (52.9)	 0.533

*No enteric pathogens isolated.

The previous table showed that:

- Among our IgA deficient group: *Giardia* had been detected in 4 (66.7%) patients by stool analysis and four patients (66.7%) had been diagnosed IBD by colonic biopsy.
- For chronic diarrhea cases without IgA deficiency: *Giardia* had been detected in 10 (29.4%) patients by stool analysis and eighteen patients (52.9%) had been diagnosed IBD by colonic biopsy.

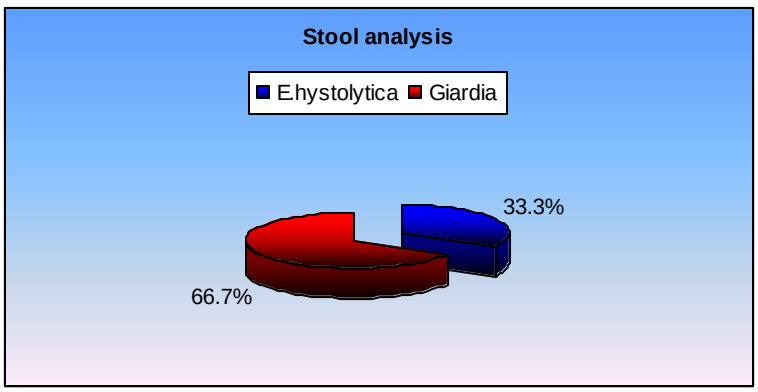

Figure (12): Stool analysis in group A

Table (6): Immunoglobulin A levels in group C.

Case No	Age/year	IgA levels (mg/dl)
1	4	97
2	4.5	112.5
3	4.8	122
4	5	145
5	5.6	151
6	5	142
7	5.4	132.8
8	5.5	139
9	6	144.3
10	6.3	190.7
11	7	154
12	7.4	167.5
13	9	187
14	9.6	205
15	10	193.4
16	11	215
17	12	223.5
18	13	245,3
19	13,5	295,6
20	14	304

Table (7): Comparison between IgA levels in group C and group A.

Standard Group	Group C (n = 20)	Group A (n = 6)	*P*-value
IgA levels	Mean ± SD	Mean ± SD	
	176.2 ± 58.4	32.3 ± 8.6	<0.001*

** Significant at P ≤ 0.05*

Control group showed statistically significantly higher mean IgA levels than IgA deficiency patients.

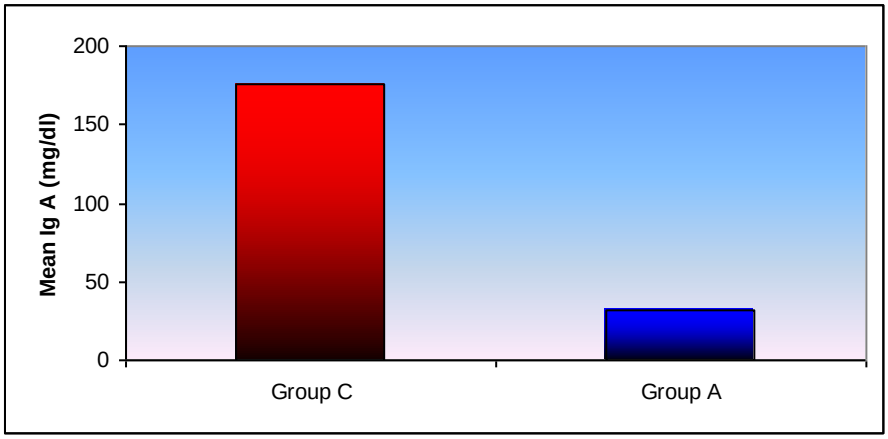

Figure (13): Mean Ig A levels in group C and group A.

Table (8): Comparison between consanguinity in group A and group B.

Cases / Consanguinity	Group B (n = 34)	Group A (n = 6)	*P*-value
	Frequency, (%)	Frequency (%)	
Yes	12 (35.3)	4 (66.7)	0.148
No	22 (64.7)	2 (33.3)	

There was no statistically significant difference between consanguinity in group A and group B.

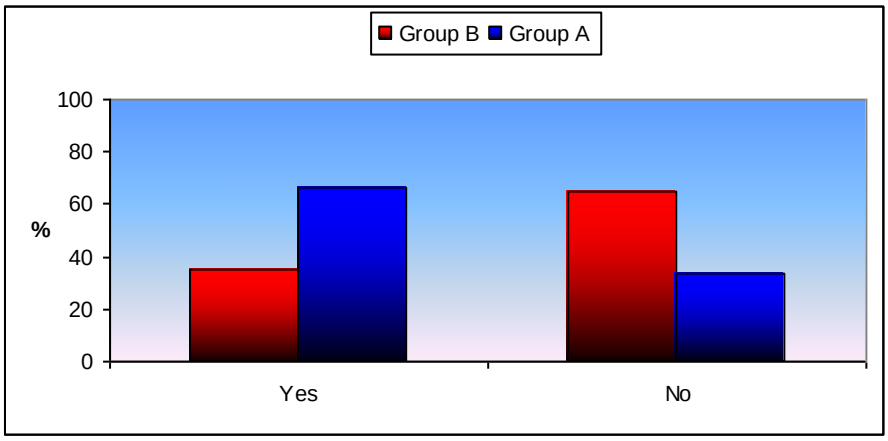

Figure (14): Comparison between consanguinity in group A and group B

Table (9): Comparison between celiac profiles in group A and group B.

Cases / Celiac profile	Group B (n = 34)	Group A (n = 6)	*P*-value
	Frequency, (%)	Frequency, (%)	
Positive	4 (11.8)	1 (16.7)	0.195
Negative	11 (32.4)	4 (66.6)	
Not determined	19 (55.8)	1 (16.7)	

There was no statistically significant difference between celiac profiles in group A and group B.

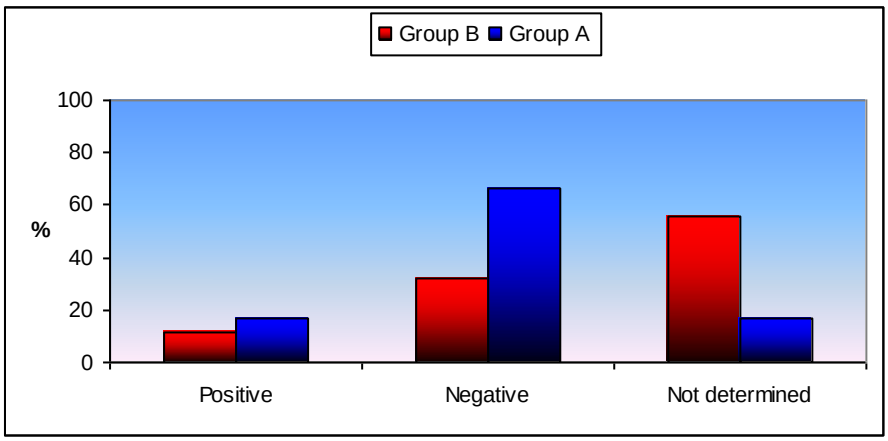

Figure (15): Comparison between celiac profiles in group A and group B

Table (10): Comparison between prevalence of IBD in group A and group B.

Cases / IBD	Group B (n = 34)	Group A (n = 6)	*P*-value
	Frequency, (%)	Frequency, (%)	
Yes	18 (52.9)	4 (66.7)	0.533
No	16 (47.1)	2 (33.3)	

There was no statistically significant difference between prevalence of IBD in group A and group B.

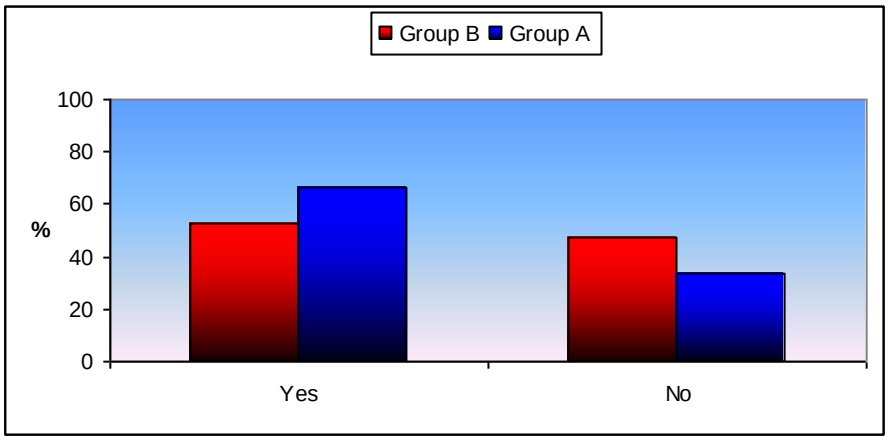

Figure (16): Comparison between prevalence of IBD in group A and group B