RESULTS AND ANALYSIS OF DATA

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RESULTS

The study included 50 patients suffering from bronchial asthma induced and/or exacerbated by milk or egg ingestion. Thirty two of these patients were male and eighteen were females. Their age ranged from 6 months to 12 years.

Thirty five patients had milk ($\pm$ egg) induced asthma, and forty one had egg ($\pm$ milk) induced asthma. Of these patients, 9 had milk (without egg) allergy, and 15 had egg (without milk) allergy. These patients will be referred to as monoallergenic. The remaining 26 patients, who had both milk and egg allergy, will be referred to as diallergenic.

The following tables and figures summarize the results obtained in our study:

Table 5 : shows the details of the results of the 50 cases under study namely percentile growth curves, skin tests, BDT, total serum IgE, and specific IgE. The table is subdivided according to the severity of the asthma into (a) mild (b) moderate and (c) severe asthmatic attacks.

Table 6 :   shows   the   results of BDT, total serum IgE, and milk
            specific IgE in patients with positive history of milk
            allergy and (a) positive skin test or (b) negative
            skin test to cow's milk albumin.

Table 7 :   shows the results of BDT, total serum IgE, and egg
            specific IgE in patients with positive history of egg
            allergy and (a) positive skin test or (b) negative
            skin test to ovalbumin.

Table 8 :   shows the results of BDT, total serum IgE, and
            specific IgE in patients with (a) positive milk
            allergy,negative egg allergy history, (b) positive egg
            allergy, negative milk allergy history.

Table 9 :   shows the results of BDT, total serum IgE, and
            specific IgE in patients with positive history of both
            milk and egg allergy.

Table 10:   shows the results of different parameters studied in
            (a)   milk allergic patients, and (b) egg allergic
            patients.

Table 11 & Fig.14: show the relation between the results of skin

tests and parameters studied in patients with positive history of (a) milk allergy, and (b) egg allergy.

Table 12 & Fig.15: show the comparison between the different parameters studied in patients with positive history of both milk and egg allergy and those studied in patients with (a) positive milk allergy, negative egg allergy history, and (b) positive egg allergy, negative milk allergy history.

Table 13 & Fig.16: show the relation between the severity of asthma and total serum IgE.

Table 14 & Fig.17: show the relation between the severity of asthma and specific IgE.

Table 15 & Fig.18: show the relation between the severity of asthma and BDT.

Table 16 & Fig.19: show the relation between the severity of asthma and growth percentiles.

Fig.   20: shows   the   correlation   between   total serum   IgE and

weight percentile.

Fig.   21: shows   the correlation between BDT and total serum IgE

in patients with positive history of (a) milk allergy,

and (b) egg allergy.

Fig.   22: shows   the   correlation   between   total serum   IgE and

specific IgE in patients   with positive history of (a)

milk allergy, and (b) egg allergy.

Fig.   23: shows   the correlation between BDT and specific IgE in

patients   with positive   history of   (a) milk allergy,

and (b) egg allergy.

a)Patients with MILD asthmatic attacks

P#	AGE	PERCENTILE GROWTH CURVE			SKIN TESTING							BDT (%)		TOTAL SERUM IgE (KU/L)	SPECIFIC IgE SCORE	
		W.	L.	H.C.	CMA	EA	PT	PG	HD	HaD	M	aLA	OA		Mi	E
1	6m	50	55	50	+	-	-	-	-	-	-	49	20	50	3	-
2	6m	50	60	50	-	-	-	-	-	-	-	28	31	25	-	-
3	1y6m	70	75	70	-	+	-	-	+	-	-	18	37	60	-	-
4	2y4m	75	75	75	-	+	-	-	+	-	-	19	29	100	-	-
5	2y4m	70	70	55	+	+	-	-	-	-	-	25	19	75	-	-
6	2y6m	78	77	50	+	+	-	-	-	-	-	40	28	350	2	-
7	2y6m	75	75	50	+	+	-	-	-	-	-	38	20	500	-	-
8	3y	85	48	50	-	-	-	-	-	+	-	28	32	200	-	-
9	6y	62	30	--	+	-	-	-	+	-	+	25	20	25	-	-
10	6y6m	60	22	--	-	+	-	-	-	-	+	15	38	10	-	-
11	7y	92	94	--	+	-	-	-	+	+	+	45	23	35	2	1
12	8y	70	70	--	-	+	-	-	+	-	+	10	43	12	-	-
13	10y	75	75	--	+	-	-	-	+	-	+	51	20	90	2	-

P# =Patient number
W. =Weight
L.=Lenght   H.C.=Head Circumference
CMA=Cow's Milk Albumin   EA=Egg Albumin   PT =Pollens Trees
PG =Pollens Grasses   HD=House Dust   HaD =Hay Dust
M   =Molds
aLB=alpha-Lactalbumin   OA=Ovalbumin
Mi =Milk   E=Egg

TABLE 5 (cont.):

b)Patients with MODERATE asthmatic attacks

P#	AGE	PERCENTILE GROWTH CURVE			SKIN TESTING							BDT (%)		TOTAL SERUM IgE (KU/L)	SPECIFIC IgE SCORE	
		W.	L.	H.C.	CMA	EA	PT	PG	HD	HaD	M	aLA	OA		Mi	E
14	9m	40	65	50	-	+	-	-	-	-	-	17	33	190	-	-
15	1y7m	45	42	50	-	-	-	-	-	-	-	32	40	39	4	-
16	1y7m	50	48	48	-	-	-	-	-	-	-	16	40	40	-	2
17	1y8m	60	70	30	-	-	-	-	-	-	-	23	40	40	-	2
18	1y9m	40	60	30	-	-	-	-	-	-	-	28	31	35	2	2
19	2y	50	50	25	-	-	-	-	-	-	-	23	25	70	0	-
20	2y	47	40	50	-	-	-	-	-	-	-	25	15	10	3	0
21	2y6m	47	49	25	-	-	-	-	-	-	-	27	18	60	-	-
22	2y9m	60	49	25	-	-	-	+	-	-	-	20	23	50	-	3
23	3y	75	49	50	+	-	+	-	-	-	-	19	31	190	0	2
24	3y	60	49	23	-	-	-	+	-	-	-	31	20	50	0	-
25	3y4m	50	65	<5	+	+	-	-	-	-	+	60	48	100	2	3
26	3y6m	70	50	25	+	+	+	-	-	-	-	41	30	45	2	2
27	3y6m	58	70	<5	+	+	-	-	+	-	-	63	54	150	0	2
28	8y	68	80	--	-	-	-	-	-	-	-	13	28	340	0	1
29	11y	37	82	--	-	-	-	-	+	-	+	26	30	500	-	-
30	11y	65	<5	--	+	-	-	-	-	-	-	18	23	39	3	3
31	12y	67	<5	--	+	-	-	-	-	-	-	40	51	40	4	2

TABLE 5 (cont.):

c)Patients with SEVERE asthmatic attacks

P#	AGE	PERCENTILE GROWTH CURVE			SKIN TESTING							BDT (%)		TOTAL SERUM IgE	SPECIFIC IgE SCORE	
		W.	L.	H.C.	CM A	E A	P T	P G	H D	Ha D	M	a LA	O A	(KU/L)	Mi	E
32	1y6m	30	40	25	-	+	-	-	-	-	-	18	37	100	-	-
33	3y	25	40	20	-	-	-	-	-	-	-	31	42	280	1	3
34	3y	23	49	5	+	-	-	-	-	-	-	24	56	550	-	-
35	3y	20	40	10	-	-	-	-	-	-	-	26	32	70	-	0
36	3y	10	45	5	-	-	-	-	-	-	-	23	23	230	0	0
37	5y	10	25	5	-	-	+	-	-	-	-	58	21	100	0	2
38	5y	10	48	12	+	+	-	+	+	-	-	23	31	280	-	-
39	5y	70	50	20	+	-	-	-	-	-	-	17	41	135	0	0
40	8y	<5	22	--	-	-	-	-	-	-	-	23	13	100	-	-
41	8y	31	55	--	-	-	-	-	-	-	-	17	49	125	-	3
42	8y	<5	22	--	-	-	-	-	+	-	-	27	15	220	0	2
43	8y	<5	20	--	-	-	-	-	+	-	-	40	48	520	2	1
44	8y6m	<5	22	--	-	-	-	-	+	-	-	31	39	150	-	3
45	11y6m	<5	<5	--	-	-	-	-	+	-	+	23	28	340	2	2
46	12y	<5	<5	--	+	+	+	-	+	-	+	35	38	300	2	2
47	12y	<5	<5	--	-	-	+	-	-	-	-	43	30	230	2	2
48	12y	<5	<5	--	-	-	+	-	-	-	-	45	35	240	1	0
49	12y	21	<5	--	-	-	-	-	-	-	-	50	43	79	2	2
50	12y	<5	<5	--	-	+	+	+	+	-	-	20	39	90	3	0

TABLE 6: RESULTS OF BDT, TOTAL SERUM IgE. AND MILK SPECIFIC IgE IN PATIENTS WITH POSITIVE HISTORY OF MILK ALLERGY AND

a) With positive skin test

PATIENT No	BDT (%)	TOTAL SERUM IgE (KU/L)	SPECIFIC IgE SCORE
1	49	50	3
5	25	75	–
6	40	350	2
7	38	500	–
9	25	25	–
11	45	35	2
13	51	90	2
25	60	100	2
27	63	150	2
30	18	39	3
31	40	40	4
34	24	550	–
39	58	135	0
46	35	300	2

b) With negative skin test

PATIENT No	BDT (%)	TOTAL SERUM IgE (KU/L)	SPECIFIC IgE SCORE
15	32	39	4
18	28	35	2
19	23	70	0
20	25	10	3
21	27	60	–
24	31	50	0
26	41	45	2
29	26	500	–
33	31	280	1
35	26	70	0
36	23	230	0
37	28	100	0
40	23	100	–
42	27	220	0
43	40	520	2
44	31	150	–
45	23	340	2
47	43	230	2
48	45	240	1
49	50	79	2
50	20	90	3

TABLE 7: RESULTS OF BDT, TOTAL SERUM IgE, AND EGG SPECIFIC IgE IN PATIENTS WITH POSITIVE EGG ALLERGY HISTORY AND

a) With positive skin test

PATIENT No	BDT (%)	TOTAL SERUM IgE(KU/L)	SPECIFIC IgE SCORE
3	37	60	−
4	29	100	−
10	38	10	−
12	43	12	−
14	33	190	−
25	48	100	3
27	54	150	2
32	37	100	−
34	56	550	−
38	31	280	−
39	41	135	0
46	38	300	2
50	39	90	0

b) With negative skin test

PATIENT No	BDT (%)	TOTAL SERUM IgE(KU/L)	SPECIFIC IgE SCORE
2	31	25	−
8	32	200	−
11	23	35	1
16	48	40	2
17	51	75	2
18	31	35	2
19	25	70	−
20	15	10	0
22	23	50	3
23	31	190	2
26	30	45	2
28	23	340	1
29	30	500	−
30	23	39	3
31	51	40	2
33	42	280	3
35	32	70	0
36	23	230	0
37	21	00	2
40	13	100	−
41	49	125	3
42	15	220	2
43	48	520	1
44	39	150	3
45	28	340	2
47	30	230	2
48	35	240	0
49	43	79	2

TABLE 8: RESULTS OF BDT, TOTAL SERUM IgE, AND SPECIFIC IgE IN PATIENTS WITH

a) (+) Milk Allergy, (-) Egg Allergy History

PATIENT No	BDT (%)	TOTAL SERUM IgE(KU/L)	SPECIFIC IgE SCORE
1	49	50	3
5	25	75	-
6	40	350	2
7	38	500	-
9	25	25	-
13	51	90	2
15	32	39	4
21	27	60	-
24	31	50	0

b) (+) Egg Allergy, (-) Milk Allergy History

PATIENT No	BDT (%)	TOTAL SERUM IgE(KU/L)	SPECIFIC IgE SCORE
2	31	25	-
3	37	60	-
4	29	100	-
8	32	200	-
10	38	10	-
12	43	12	-
14	33	190	-
16	48	40	2
17	51	75	2
22	23	50	3
23	31	190	2
28	23	340	1
32	37	100	-
38	31	280	-
41	49	125	3

TABLE 9:RESULTS OF BDT,TOTAL SERUM IgE,AND SPECIFIC IgE IN PATIENTS WITH POSITIVE HISTORY OF BOTH MILK AND EGG ALLERGY

PATIENT No	BDT (%)		TOTAL SERUM IgE (KU/L)	SPECIFIC IgE SCORE	
	a-lact albumin	oval-bumin		milk	egg
11	45	23	35	2	1
18	28	31	35	2	2
19	23	25	70	0	-
20	25	15	10	3	0
25	60	48	100	2	3
26	41	30	45	2	2
27	63	54	150	0	2
29	26	30	500	-	-
30	18	23	39	3	3
33	40	51	40	4	2
33	31	42	280	1	3
34	24	56	550	-	-
35	26	32	70	-	0
36	23	23	230	0	0
37	28	21	100	0	2
39	58	41	135	0	0
40	23	13	100	-	-
42	27	15	220	0	2
43	40	48	520	2	1
44	31	39	150	-	3
45	23	28	340	2	2
46	35	38	300	2	2
47	43	30	230	2	2
48	45	35	240	1	0
49	50	43	79	2	2
50	20	39	90	3	0

TABLE 10: RESULTS OF DIFFERENT PARAMETERS STUDIED IN

a) Milk allergic patients (n = 35)

TEST PERFORMED	No of (+) CASES	%
Skin Test	14	40
BDT	19	54.3
Total Serum IgE	24	68.6
Specific IgE (n = 27)	19	70.3

b) Egg allergic patients (n = 41)

TEST PERFORMED	No OF (+) CASES	%
Skin Test	13	31.7
BDT	29	70.7
Total Serum IgE	29	70.7
Specific IgE (n = 28)	22	78.6

TABLE 11: RELATION BETWEEN RESULTS OF SKIN TEST AND PARAMETERS STUDIED IN PATIENTS WITH POSITIVE HISTORY OF (mean ± S.D.)

a) Milk Allergy

SKIN TEST	BDT (%)	TOTAL IgE (KU/L)	SPECIFIC IgE SCORE
Positive (n = 14)	40.8 ± 14.1	174.2 ± 178	2.0 ± 1.3 (n = 10)
Negative (n = 21)	32.1 ± 9	164.5 ± 147.5	1.4 ± 1.3 (n = 17)
Total (n= 35)	35.6 ± 11.4	168.4 ± 160.2	1.6 ± 1.3 (n = 27)

b) Egg Allergy

SKIN TEST	BDT (%)	TOTAL IgE (KU/L)	SPECIFIC IgE SCORE
Positive (n = 13)	40.3 ± 8.2	159.8 ± 146.6	1.4 ± 1.3 (n = 23)
Negative (n = 28)	31.6 ± 11.1	156.4 ± 139.5	1.7 ± 1.0 (n = 28)
Total (n = 41)	34.4 ± 10.3	157.5 ± 141.7	1.6 ± 1.3 (n = 28)

TABLE 12: COMPARISON BETWEEN THE DIFFERENT PARAMETERS STUDIED IN
PATIENTS WITH POSITIVE HISTORY OF BOTH MILK AND EGG
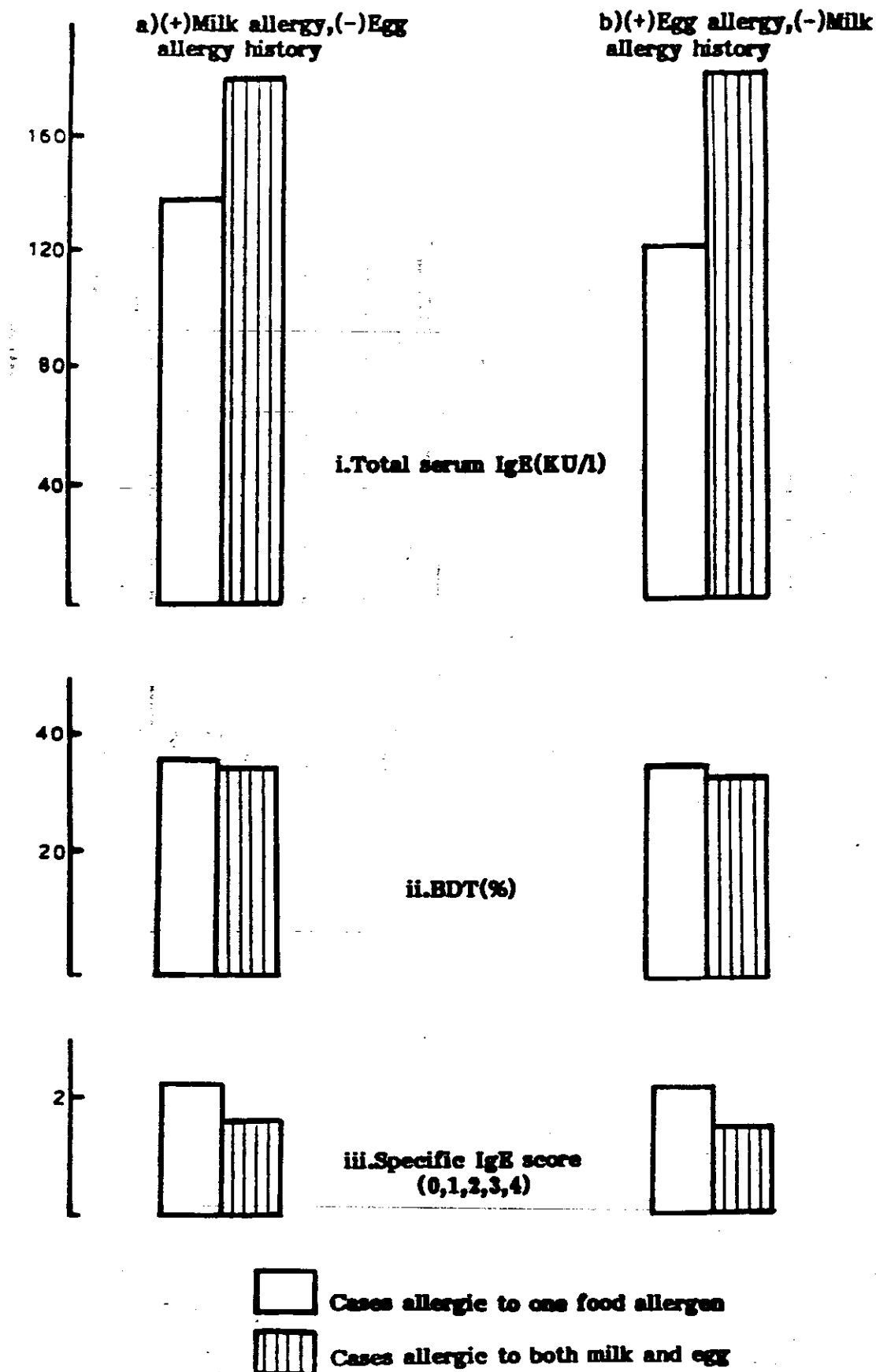ALLERGY AND THOSE STUDIED IN PATIENTS WITH

(a) (+) Milk Allergy, (-) Egg Allergy History

PATIENT ALLERGIC TO	BDT (%)	TOTAL IgE (KU/L)	SPECIFIC IgE SCORE
Milk	35.9 ± 9.8	137.7 ± 168.2	2.2 ± 1.5 (n = 15)
Milk & Egg	34.4 ± 12.9	179.1 ± 156.1	1.6 ± 1.2 (n = 21)

b) (+) Egg Allergy, (-) Milk Allergy History

PATIENT ALLERGIC TO	BDT (%)	TOTAL IgE (KU/L)	SPECIFIC IgE SCORE
Egg	35.7 ± 8.8	119.8 ± 100.3	2.2 ± 0.7 (n = 6)
Milk & Egg	33.8 ± 12.2	179.1 ± 156.1	1.5 ± 1.1 (n = 22)

TABLE 13: RELATION BETWEEN SEVERITY OF ASTHMA AND TOTAL SERUM IgE

SEVERITY	TOTAL SERUM IgE (KU/L)
Mild (n = 13)	117.9 ± 148.5
Moderate (n = 18)	112.4 ± 126.4
Severe (n = 19)	217.8 ± 139.7

TABLE 14: RELATION BETWEEN SEVERITY OF ASTHMA AND SPECIFIC IgE

a) Milk Specific IgE

MILK SPECIFIC IgE SCORE	MILD & MODERATE CASES		SEVERE CASES	
	No	%	No	%
0	5	31.2	4	33.5
1	0	0.0	2	16.7
2	6	37.5	5	41.7
3	3	18.8	1	8.3
4	2	12.5	0	0.0
TOTAL	16	100%	12	100%

b) Egg Specific IgE

EGG SPECIFIC IgE SCORE	MILD & MODERATE CASES		SEVERE CASES	
	No	%	No	%
0	1	7.7	5	33.3
1	2	15.4	1	6.7
2	7	53.8	6	40.0
3	3	23.1	3	20.0
4	0	0.0	0	0.0
TOTAL	13	100%	15	100%

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TABLE 15:   RELATION BETWEEN SEVERITY OF ASTHMA AND BDT

a) Using a-lactalbumin

SEVERITY	BDT (%)
Mild (n = 13)	30.1 ± 13.4
Moderate (n = 13)	29.0 ± 14.1
Severe (n = 19)	30.8 ± 11.5

b) Using ovalbumin

SEVERITY	BDT (%)
Mild (n = 13)	27.7 ± 8.1
Moderate (n = 18)	32.6 ± 12.2
Severe (n = 19)	34.7 ± 11.4

TABLE 16: RELATION BETWEEN SEVERITY OF ASTHMA AND WEIGHT, HEIGHT, AND SKULL CIRCUMFERENCE

SEVERITY	WEIGHT PERCENTILE	HEIGHT PERCENTILE	SKULL CIRC. PERCENTILE
Mild (n = 13)	70.1 ± 12.3	63.5 ± 20.2	56.2 ± 10.3 (n = 8)
Moderate (n = 18)	54.9 ± 11.4	54.9 ± 11.4	31.3 ± 17.1 (n = 14)
Severe (n = 19)	15.5 ± 16.1	26.7 ± 18.4	12.7 ± 8.0 (n = 8)

a)Milk allergy

b)Egg allergy

i.Total serum Ig (KU/l)

ii.BDT(%)

iii.Specific IgE score
(0,1,2,3,4)

(+)Skin test cases

(−)Skin test cases
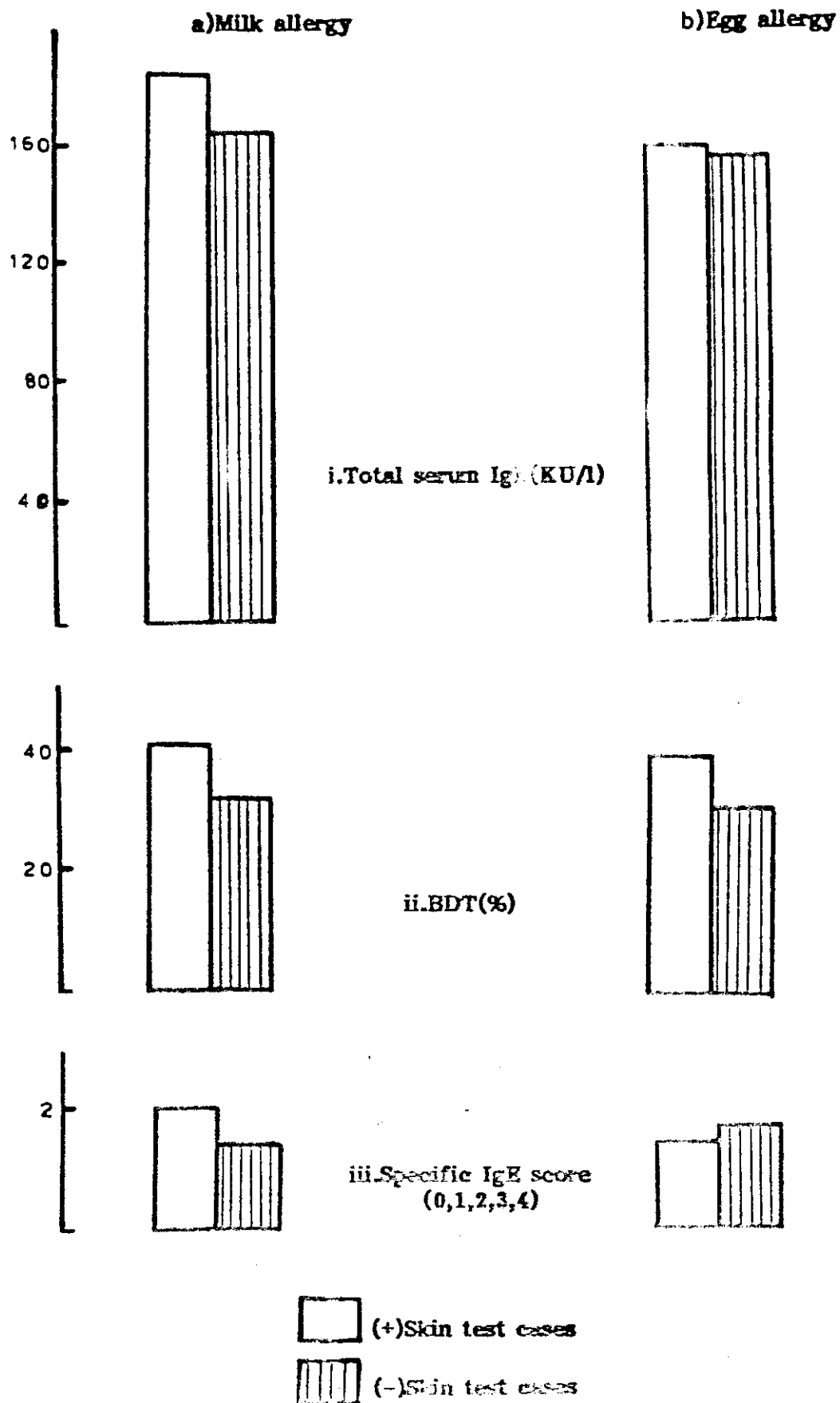
FIGURE 15:COMPARISON BETWEEN THE DIFFERENT PARAMETERS STUDIED IN PATIENTS WITH POSITIVE HISTORY OF BOTH MILK AND EGG ALLERGY AND THOSE STUDIED IN PATIENTS WITH

a)(+)Milk allergy,(-)Egg allergy history

b)(+)Egg allergy,(-)Milk allergy history

i.Total serum IgE(KU/l)

ii.BDT(%)

iii.Specific IgE score (0,1,2,3,4)

Cases allergic to one food allergen

Cases allergic to both milk and egg

FIGURE 16:TOTAL SERUM IgE VALUES IN PATIENTS WITH MILD, MODERATE, & SEVERE ASTHMA
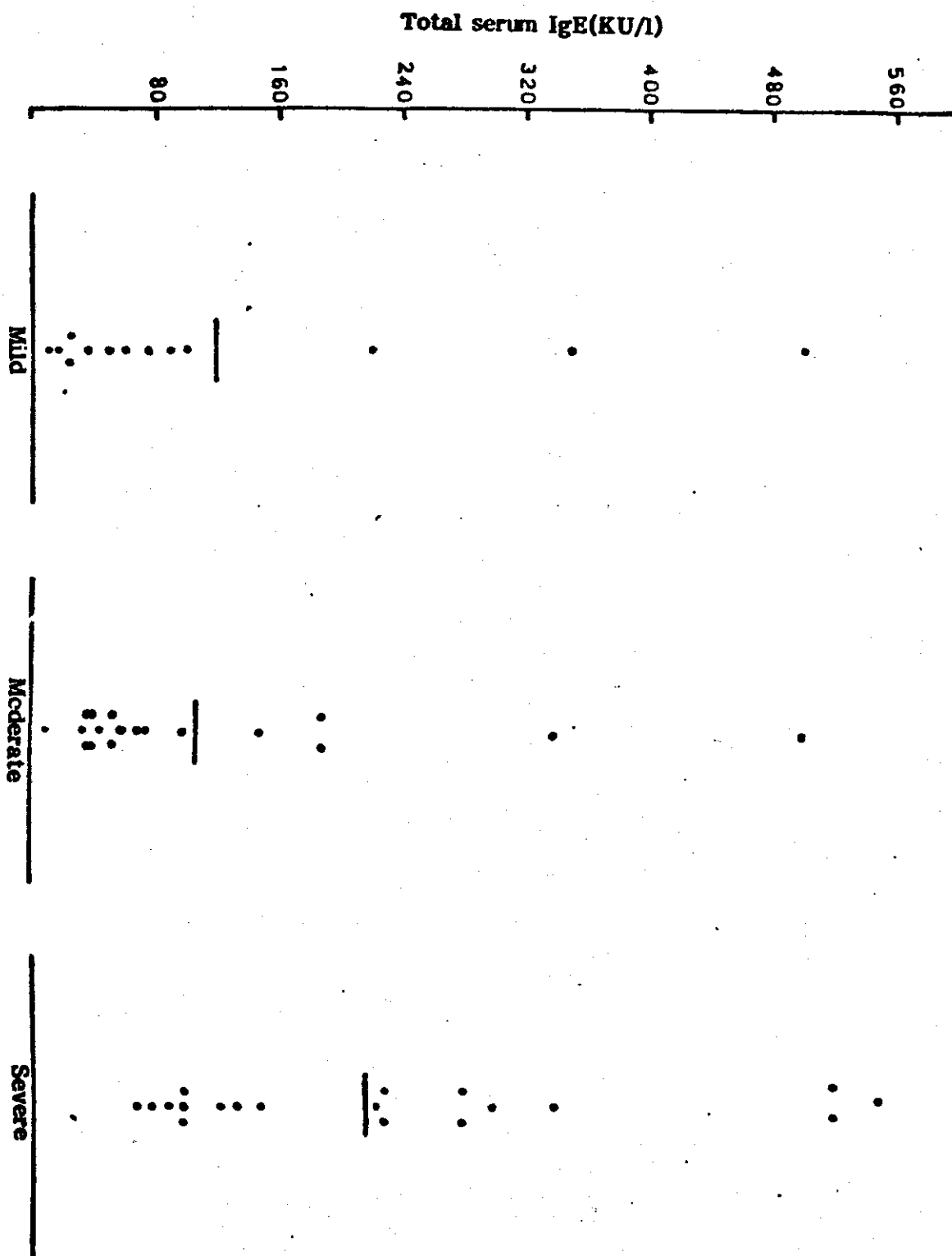
FIGURE 18: BDT IN PATIENTS WITH MILD, MODERATE, & SEVERE ASTHMA

a) Using a-lactalbumin

b) Using ovalbumin
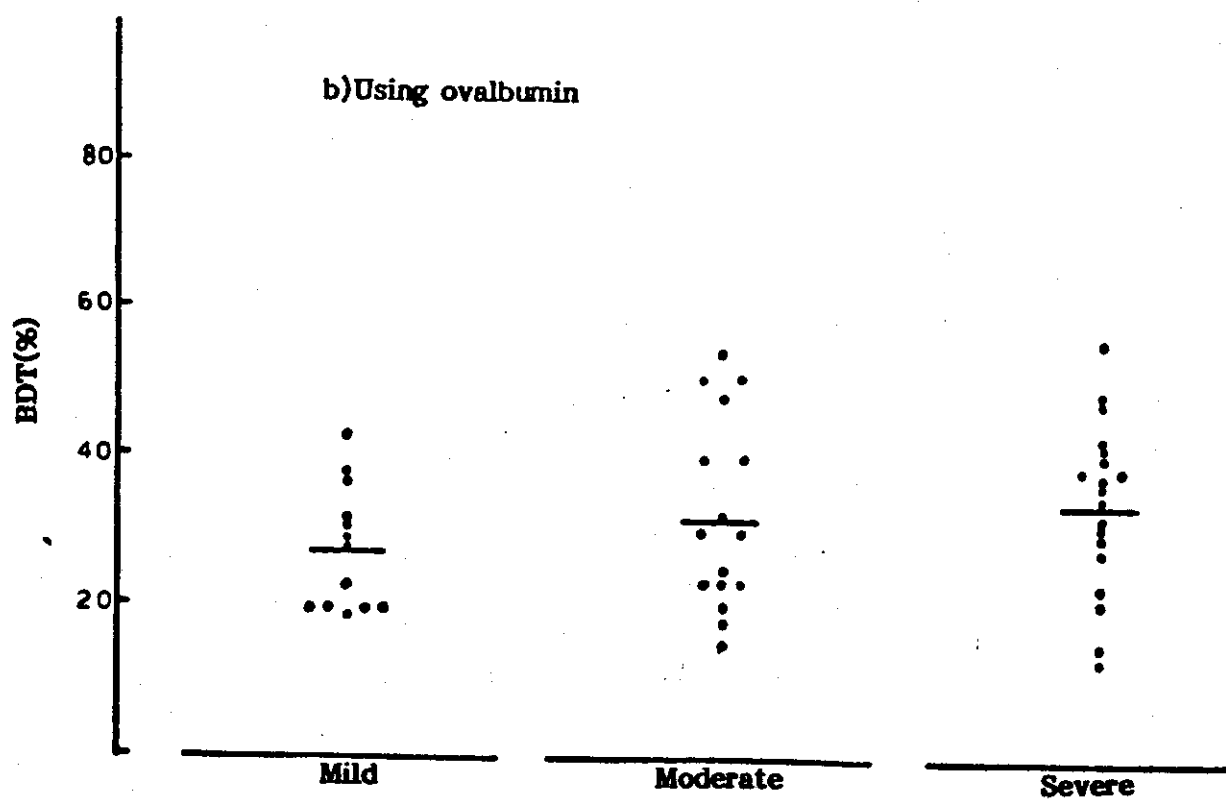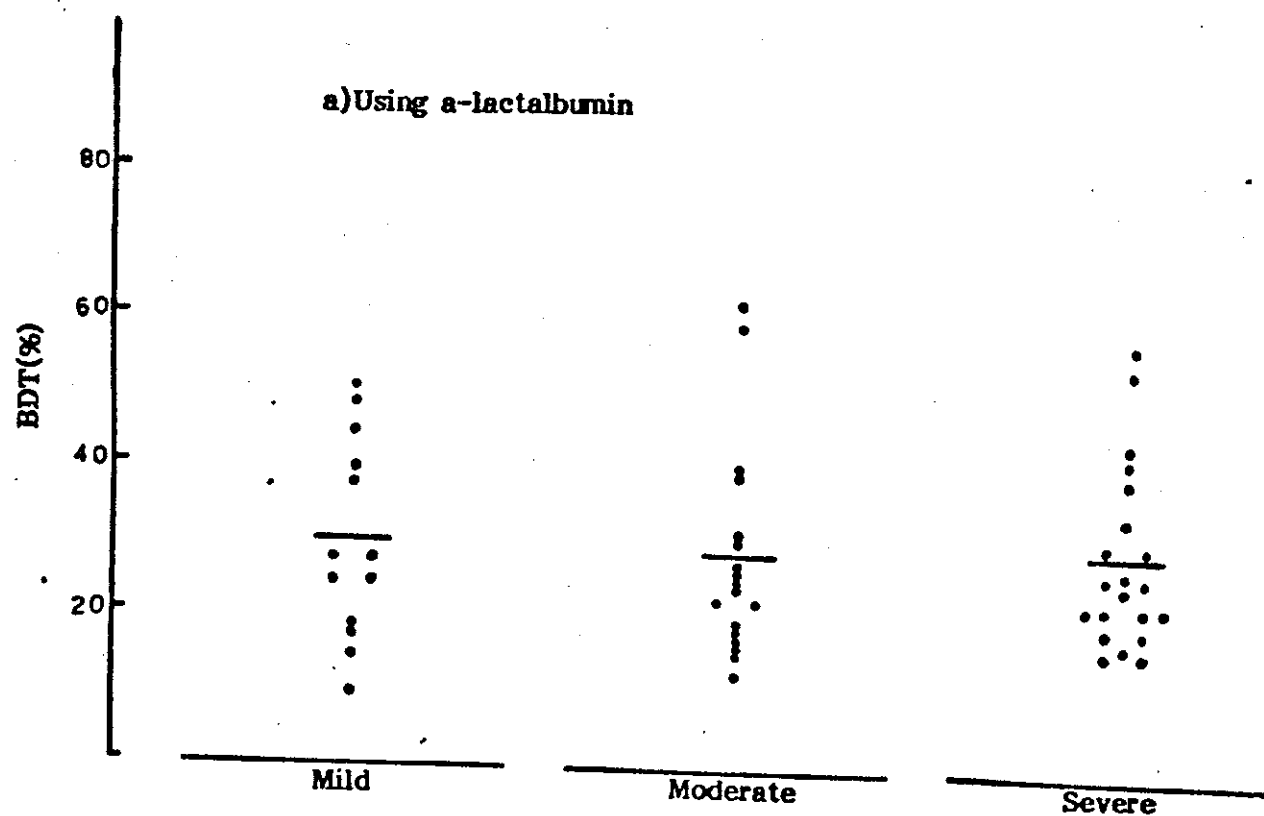
FIGURE 19: ANTHROPOMETRIC MEASURES IN MILD, MODERATE, & SEVERE ASTHMATIC CASES

Average weight percentile

Average height percentile

Average skull circumferance percentile

Mild

Moderate

Severe
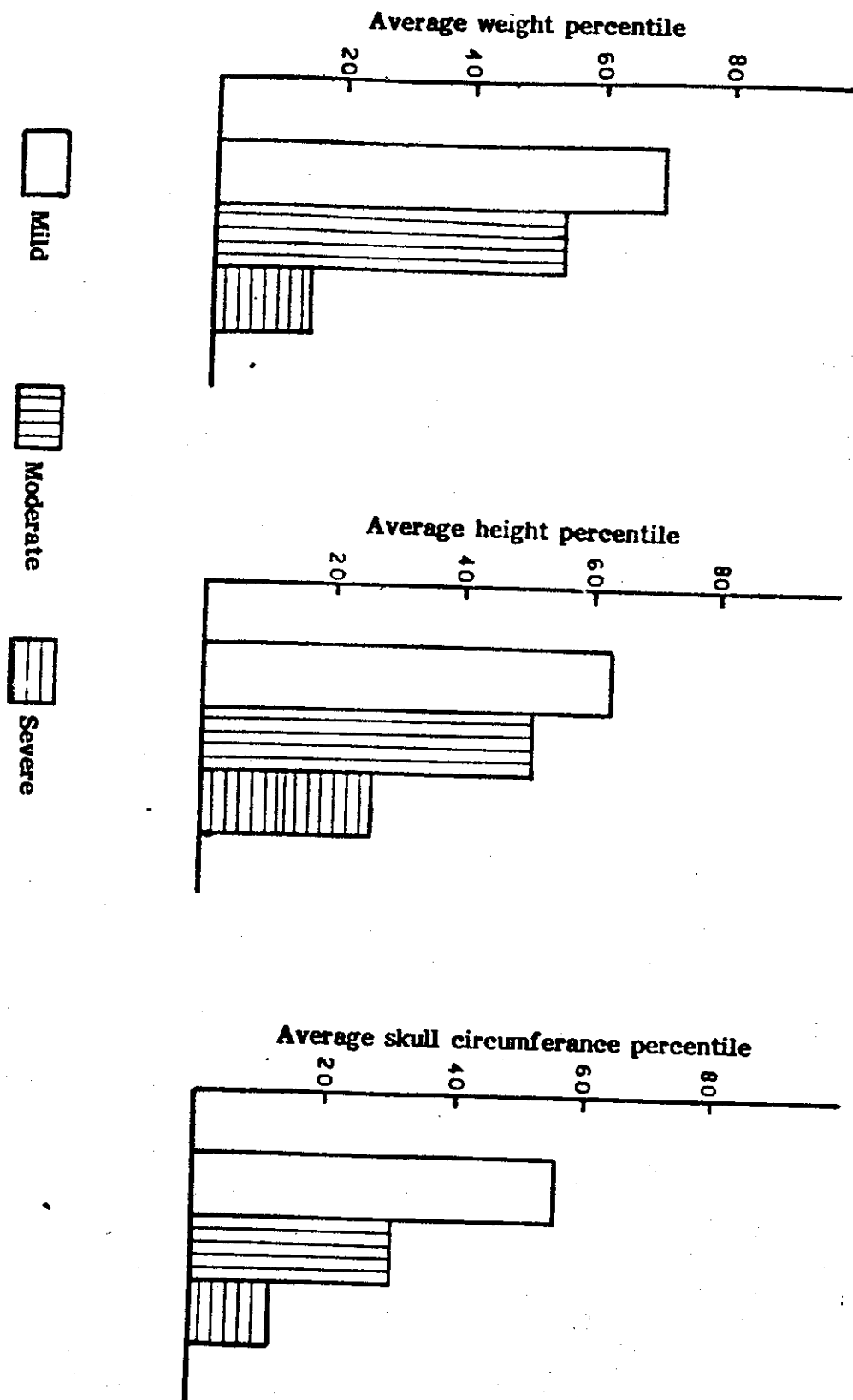
FIGURE 20: CORRELATION BETWEEN TOTAL SERUM IgE AND WEIGHT PERCENTILE
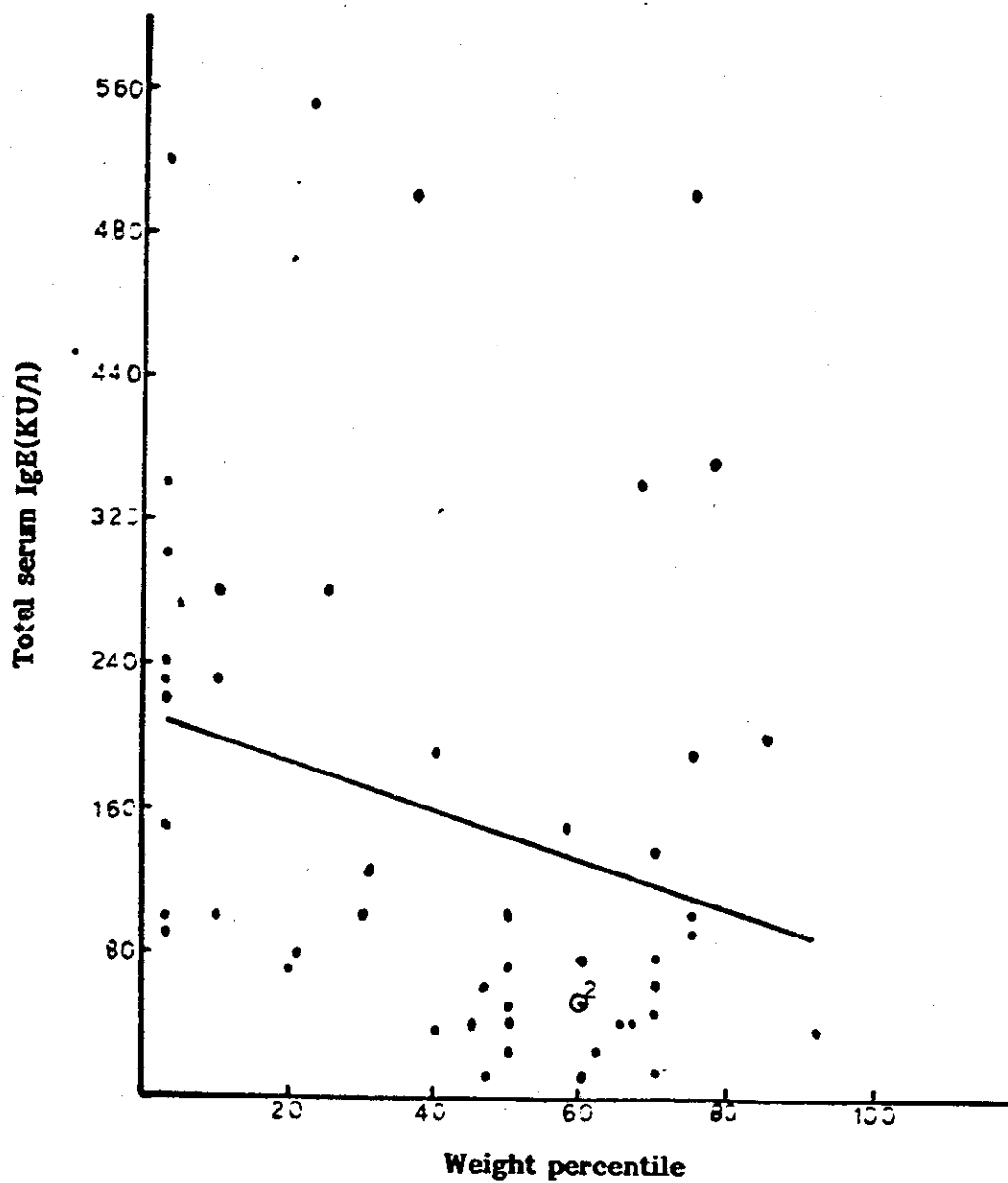
FIGURE 21: CORRELATION BETWEEN BDT & TOTAL SERUM IgE IN PATIENTS WITH POSITIVE HISTORY OF

a)Milk allergy

b)Egg allergy

Total serum IgE(iu/ml)

BDT(%)

a)Milk allergy

b)Egg allergy
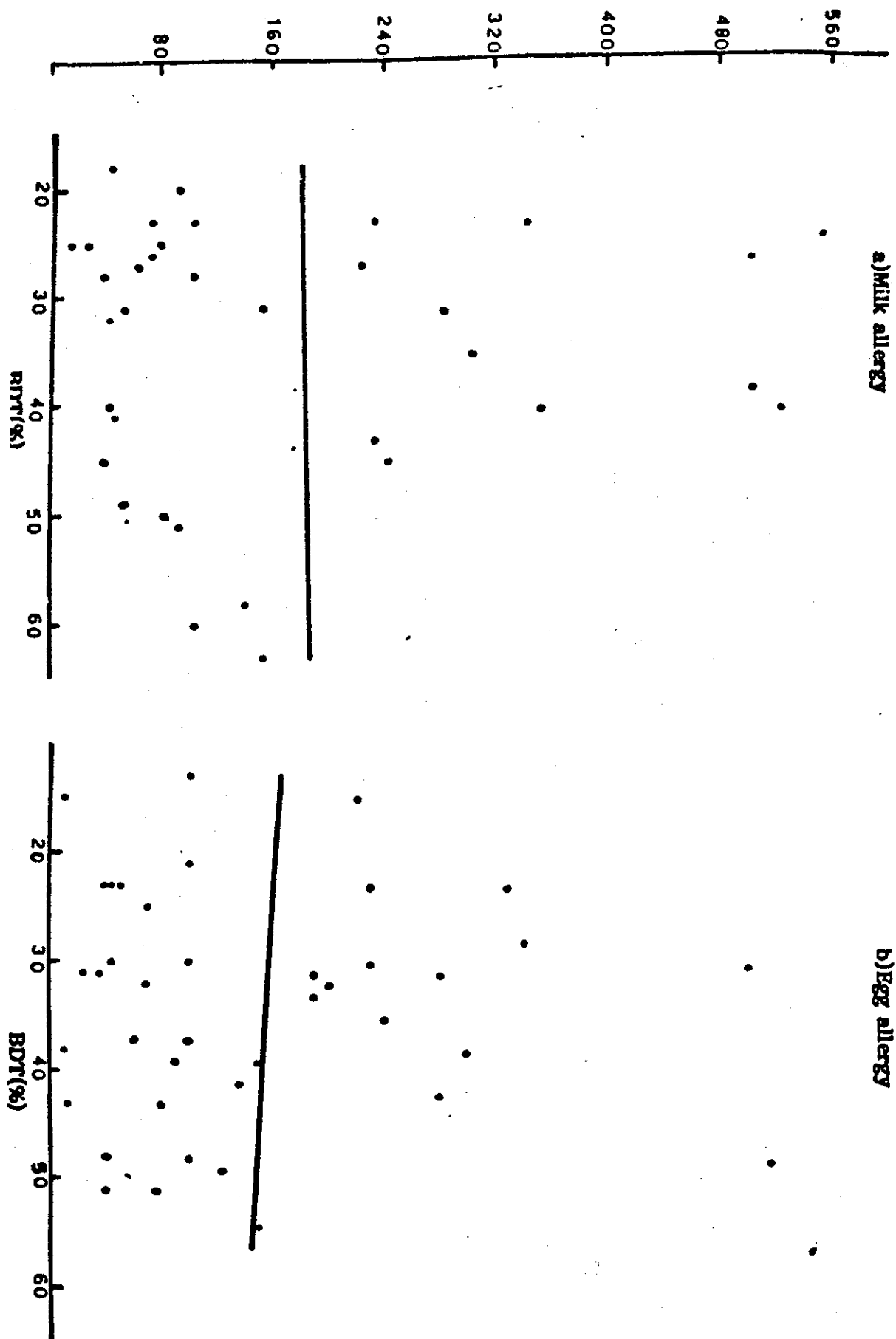
FIGURE 23: CORRELATION BETWEEN BDT & SPECIFIC IgE IN PATIENTS WITH POSITIVE HISTORY OF

a)Milk allergy

b)Egg allergy
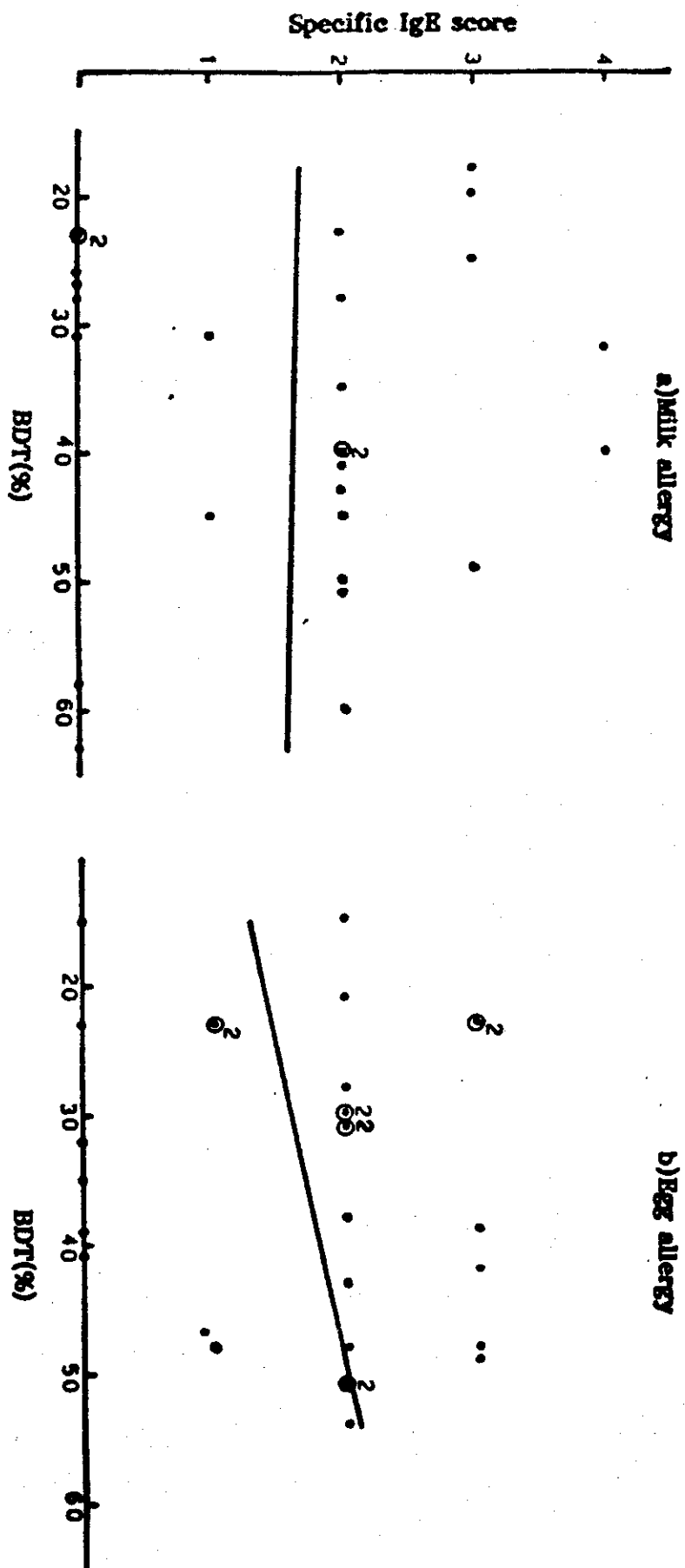
ANALYSIS OF DATA

1.Comparison between positive and negative skin test cases:

a) Milk allergy patients (Table 11a, Fig. 14a)

The BDT values were significantly lower in negative skin test cases than in positive skin test cases. The t value was 2.205 and the p value was equal to 0.05 which is statistically significant.

The total serum IgE and specific IgE values tend to be lower in negative skin test cases, but the difference is not statistically significant. The t value for the total IgE was 1.413, and for the specific IgE was 1.225. The p value for both was higher than 0.05 which is statistically insignificant.

b) Egg allergy patients (Table 11b, Fig 14b)

The BDT values were also significantly lower in negative skin test cases. The t value was 2.518 and the p value was equal to 0.05.

The total serum IgE (t = 0.028) and specific IgE (t = 0.577) values showed no difference between positive and negative skin test cases. The p value for both total and specific IgE was higher than 0.05

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2.Comparison between mono and diallergenic cases:

a) Patients with positive milk allergy, negative egg allergy history (Table 12a, Fig. 15a)

The results of the different investigations did not differ between mono and diallergenic cases.

The BDT values (t = 0.583) were the same in the two groups (p > 0.05).

The total serum IgE values (t = 1.363) tend to be higher in diallergenic cases, while the specific IgE values (t = 1.649) tend to be higher in monoallergenic cases; however, the difference is not statistically significant (p > 0.05).

b) Patients with positive egg allergy, negative milk allergy history (Table 12b, Fig. 15b)

The statistical findings in this group were the same as in the above (No 2a). The p value for the 3 tests was higher than 0.05.

The BDT values (t = 0.190) showed no difference. The total serum IgE values (t = 0.879) tend to be higher in diallergenic cases, while the specific IgE values tend to be higher in monoallergenic cases, but the difference was not statistically significant.

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3.Relation between severity of asthma and different parameters:

a) Total serum IgE (Table 13, Fig. 16)

Mild and moderate asthmatics had values which did not differ from each other (t = 0.394, p > 0.05).

Severe cases had a higher level relative to mild and moderate cases, which was statistically significant (t = 4.292, p < 0.001).

b) Specific IgE (Table 14, Fig. 17)

i. milk allergy patients: There was no evidence for a significant relation between severity of asthma and the milk specific IgE (Z = 0.86, p > 0.05).

ii. egg allergy patients: No statistical difference was shown between the values in the different groups (Z = 1.97, p > 0.05).

c) BDT (Table 15, Fig. 18)

There is no statistical difference between the different groups classified by severity.

d) Growth parameters (Table 16, Fig. 19)

i. Weight:severe asthmatic cases had lower weight relative to mild (t = 8.531, p < 0.001) cases.

Mild and moderate cases also differed significantly (t= 3.467, p < 0.001). There was a significant decrease in weight expressed in percentiles of normal growth curves in the moderate cases.

The same conclusion applies for length or height and head circumference.

ii. Length or height: Severe cases had lower values relative to moderate cases (t = 3.314, p < 0.05), and moderate cases showed decreased values relative to mild cases (t = 2.077, p = 0.05).

iii. Head circumference: Severe and moderate cases differed significantly (t = 2.224, p = 0.05) where the severe cases had lower values. Moderate cases had lower head circumference than mild cases (t = 2.449, p = 0.05).

From all these data, we found that the severity of asthma affects the total serum IgE and the growth percentile parameters.