

RESULTS

CHAPTER IV

RESULTS

Result of basic data are shown in tables 1,2,6

Results of laboratory investigations are shown in tables 3,4,5.

1) Results of plasma magnesium levels determination:

a- In group I (acute asthmatic children), level of plasma magnesium in the total group ranged from 1.27 to 2.31 mg/dl with a mean value of 1.72 ± 0.30 mg/dl (Table 7, Fig. 1), for males mean value is 1.81 ± 0.24 mg/dl and for females mean value was 1.67 ± 0.32 mg/dl (Table 8) with no significant difference between both sexes ($P > 0.05$), (Table 8).

b- In group II (Non-acute asthma children), level of plasma magnesium level ranged from 1.59 to 2.47 mg/dl with a mean value of 1.93 ± 0.25 mg/dl (Table 7, Fig. 1) Mean value of plasma magnesium for males was 1.95 ± 0.35 mg/dl and for females was 1.89 ± 0.31 mg/dl (Table 8), with no significant difference between both sexes ($P > 0.05$), (Table 8).

c- In group III (Control group), level of plasma magnesium in the total group ranged from 1.62 to 2.44 mg/dl with a mean value of 1.93 ± 0.26 mg/dl (Table 7), for males 1.94 ± 0.25 mg/dl and for females 1.89 ± 0.23 mg/dl (Table 8) with no significant difference between both sexes ($P > 0.05$) (Table 8).

- Comparing plasma magnesium level in group I versus group III (Control group), significant difference was observed ($P < 0.05$) being less in group I (acute asthma group) (Table 9).

- On comparing plasma magnesium level in group II versus control group (Group III), no significant difference was found ($P > 0.05$) (Table 9).

- On comparing plasma magnesium level in group I (Acute asthma group) versus group II (Non acute asthma group) significant difference was found ($P < 0.05$) being less in group I (Acute asthma group), (Table 9, Fig. 1).

- On considering plasma magnesium level below 1.6 mg/dl as hypomagnesemic level, (Landon and Young, 1993), (Wacker, 1980).

- In group I (Acute asthma group) 8 patients out of 25 patients in percentage of 32% had hypomagnesemia (Table 10).

- In group II (Non acute asthma group) only one patient out of 25 patient in percentage of 4% had hypomagnesemia (Table 10).

- In group III (Control group), non of them had hypomagnesemia (Table 10).

- Using Z test for comparison of percentage of children with hypomagnesemia in the three studied groups, significant difference was present between group I and group III ($Z = 3.0861$) (Table 10), and between group I and group II $Z = 2.5767$ (Table 10) and no significant difference between group II and group III $Z = 1.010$ (Table 10).

N.B.: Z value ≥ 1.960 mean significant.

- Correlation between plasma magnesium levels and number of attacks of asthma in previous year (Fig. 3,4).

- There was no significant correlation between plasma magnesium level and number of attacks of asthma in previous year in asthmatic children with ($r = 0.1341$, $P > 0.05$) in group I and ($r = 0.2199$, $P > 0.05$) in group II (Fig. 3,4).

2) Results of erythrocyte magnesium levels determination (Table 7,12, Fig. 2).

a- Erythrocyte magnesium level ranged from 4.51 to 5.26 mg/dl in group I (Acute asthma group) and ranged from 4.51 to 5.30 mg/dl in group II (Non acute asthma group) and from (4.51 to 5.23 mg/dl in the control group (Table 7).

- b- Mean value was 4.88 ± 0.22 mg/dl in group I (Acute asthma group), and 4.82 ± 0.24 mg/dl in group II (Non acute asthma group) and 4.80 ± 0.29 mg/dl in control group.
- No significant difference between the 3 studied groups ($P > 0.05$) (Table 12, Fig. 2).
 - No effect of sex on levels of erythrocyte magnesium level in the three studied groups ($P > 0.05$). (Table 11).

3) Results of total plasma protein levels determination:

Mean values of plasma protein were 6.95 ± 0.34 g/dl in group I and 6.97 ± 0.37 g/dl in group II and 6.98 ± 0.34 g/dl in group III respectively (Table 13).

- No significant difference was found between levels of plasma protein in the three studied groups ($P > 0.05$) (Table 13).

4) Results of plasma albumin levels determination:

- a- Mean values of plasma albumin were 4.07 ± 0.35 g/dl in group I and 4.05 ± 0.31 g/dl in group II and 4.11 ± 0.40 g/dl in group III respectively (Table 14).
- No significant difference were found between levels of plasma albumin in the three studied groups ($P > 0.05$) (Table 14).
 - b- Significant positive correlation were found between plasma magnesium levels and plasma albumin levels in the three

studied groups with ($r = 0.4707$, $P < 0.05$) in group I and ($r = 0.5254$, $P < 0.05$) in group II and ($r = 0.6156$, $P < 0.05$) in group III respectively (Table 14, Fig. 5,6,7).

Table (1): Basic data of group I (Acute asthma group).

Serial no.	Sex	Age (Y)	Duration of asthma (Y)	Age of onset (Yr)	No. of att./year	No. of hosp. admission in previous yr	Family history	Other manifestations of allergy
1	M	5.5	3.5	2	4	1	+ve	Allergic rhini
2	M	9	5	4	3	3	+ve	Allergic rhini
3	M	7.5	7	0.5	3	2	+ve	Atopic dermati
4	M	7	2	5	4	1	-ve	-ve
5	M	12	6	6	3	2	-ve	-ve
6	M	12	4	8	5	2	-ve	Allergic rhini
7	M	7	2	5	3	1	+ve	Allergic rhini
8	M	9	7	2	4	1	+ve	Atopic dermati
9	M	8.5	6	2.5	3	2	-ve	-ve
10	M	6	4	2	4	4	+ve	Allergic rhini
11	M	9.5	6	3.5	3	3	-ve	Allergic rhini
12	M	8	4	4	3	2	+ve	Atopic dermati
13	M	7	5	2	4	2	+ve	-ve
14	M	9	4	5	4	4	-ve	-ve
15	F	11	9	2	3	2	-ve	Eczema
16	F	6	4	2	4	1	+ve	-ve
17	F	12	6	6	4	1	+ve	Allergic rhini
18	F	8	6	2	3	3	+ve	Allergic rhini
19	F	8.5	5	3.5	4	2	-ve	-ve
20	F	11.5	2.5	9	3	1	-ve	Urticaria
21	F	6	4	2	3	2	-ve	-ve
22	F	5	1	4	4	2	+ve	-ve
23	F	10	4	6	4	3	+ve	Papular urtic
24	F	8	3	5	5	2	+ve	-ve
25	F	10.5	8.5	2	4	2	-ve	Prurigo of H

Hosp. : hospital att. : attack

Table (2) : Basic data of group II (Non-Acute asthma group).

Serial no.	Sex	Age (Y)	Duration of asthma (Y)	Age of onset (Yr)	No. of att. /year	No. of hosp. admission in previous yr	Family history	Other manifestations of allergy
1	M	10	6	4	5	1	-ve	Eczema
2	M	8.5	6	2.5	3	2	+ve	-ve
3	M	11.5	5	6.5	3	1	-ve	Atopic dermatitis
4	M	11	6	5	3	2	-ve	-ve
5	M	7.5	2.5	5	4	3	+ve	Urticaria
6	M	12	6	6	5	2	-ve	Allergic rhinitis
7	M	9	3	4.5	6	1	+ve	-ve
8	M	9.5	5	4.5	3	1	-ve	-ve
9	M	7.5	3	6.5	5	2	+ve	Eczema
10	M	7.5	1	6	6	1	-ve	Allergic rhinitis
11	M	9	3	1	6	2	-ve	-ve
12	M	6	5	2.5	6	1	+ve	Allergic rhinitis
13	M	3	0.5	3.5	3	1	+ve	Allergic rhinitis
14	M	4	0.5	4.5	4	1	-ve	-ve
15	M	5.5	1	9	10	3	+ve	Atopic dermatitis
16	M	10	1	2	3	2	+ve	Eczema
17	M	5	3	10	4	1	-ve	-ve
18	F	12	2	3.5	3	2	+ve	Allergic rhinitis
19	F	6.5	3	3.5	4	1	-ve	-ve
20	F	5.5	2	3.5	4	2	+ve	-ve
21	F	7	5	2	3	1	-ve	-ve
22	F	9.5	4	5.5	4	1	+ve	Papular urticaria
23	F	10	2	8	3	2	+ve	Allergic rhinitis
24	F	4	2	2	4	1	-ve	-ve
25	F	6	2	4	4	1	-ve	-ve

Hosp. : hospital

att. : attack

Table (3): Result of laboratory investigations for group I (Acute asthma group).

no.	Sex	Age (y)	Plasma Mg level (mg/dl)	Erythrocyte Mg level (mg/dl)	Total plasma protein (g/dl)	Plasma Alb. (g/dl)
1	M	5.5	1.71	4.52	6.260	3.480
2	M	9	2.31	4.92	7.220	4.490
3	M	7.5	1.93	5.24	6.980	4.390
4	M	7	1.46	4.88	6.870	3.975
5	M	12	2.01	5.11	7.250	4.220
6	M	12	1.94	4.73	7.100	4.210
7	M	7	1.61	4.89	6.950	3.910
8	M	9	1.64	4.67	7.115	4.110
9	M	8.5	1.72	5.26	6.300	3.500
10	M	6	1.39	4.72	7.011	4.115
11	M	9.5	1.37	4.87	7.210	3.960
12	M	8	1.51	4.78	7.160	4.165
13	M	7	1.79	5.02	6.580	3.640
14	M	9	1.62	4.64	7.270	3.970
15	F	11	2.11	5.07	7.260	3.950
16	F	6	1.41	4.78	6.770	3.960
17	F	12	2.05	4.99	7.240	4.380
18	F	8	1.34	4.67	6.690	3.920
19	F	8.5	1.98	5.04	7.110	4.380
20	F	11.5	1.32	4.62	6.890	3.930
21	F	6	1.69	4.51	6.180	3.440
22	F	5	1.63	5.07	7.250	4.470
23	F	10	1.27	4.22	6.590	3.790
24	F	8	2.04	5.26	7.190	4.420
25	F	10.5	2.22	4.87	7.215	4.390

Table (4): Results of laboratory investigations for group II (Non-Acute Asthma children).

no.	Sex	Age (y)	Plasma Mg level (mg/dl)	Erythrocyte Mg level (mg/dl)	Total plasma protein (g/dl)	Plasma Alb. (g/dl)
1	M	10	2.41	4.91	7.210	4.490
2	M	8.5	1.91	4.88	6.950	4.210
3	M	11.5	2.02	5.30	7.200	4.210
4	M	11	2.42	4.52	7.320	4.800
5	M	7.5	1.85	4.53	6.850	4.370
6	M	12	1.97	5.11	7.160	3.950
7	M	9	1.73	4.52	6.34	3.520
8	M	9.5	1.89	4.73	6.980	3.940
9	M	7.5	1.78	4.58	6.540	3.620
10	M	7.5	1.65	4.61	6.020	3.360
11	M	9	1.97	5.03	7.220	3.790
12	M	12	2.47	4.90	7.360	4.370
13	M	6.5	1.63	5.29	6.980	4.840
14	M	5.5	1.67	4.58	7.260	3.980
15	M	7	1.88	4.60	7.350	4.500
16	M	9.5	2.21	4.51	7.250	4.320
17	M	10	1.96	4.91	7.120	4.100
18	F	6	2.11	5.08	7.210	4.460
19	F	3	1.74	4.84	6.380	3.540
20	F	4	1.84	4.62	7.250	4.300
21	F	4	1.64	4.97	6.950	3.980
22	F	5.5	1.97	5.21	6.980	4.390
23	F	10	2.21	4.83	7.110	4.230
24	F	5	1.71	4.51	6.260	3.480
25	F	6	1.59	4.93	7.120	4.110

Table (5): Result of laboratory investigations for group III (Control group).

no.	Sex	Age (y)	Plasma Mg level (mg/dl)	Erythrocyte Mg level (mg/dl)	Total plasma protein (g/dl)	Plasma Alb. (g/dl)
1	M	11.5	2.46	5.23	7.320	4.830
2	M	6.5	1.81	4.59	6.660	3.680
3	M	4	1.65	4.52	6.020	3.460
4	M	10	2.31	5.11	7.360	4.350
5	M	11	2.44	5.03	7.210	4.350
6	M	10.5	1.93	4.93	7.250	4.460
7	M	7.5	1.88	4.53	7.220	4.200
8	M	7.5	1.64	4.59	6.980	3.970
9	M	6.5	2.10	4.62	7.240	4.480
10	M	9	1.94	4.73	7.210	4.310
11	M	8	1.81	5.08	6.665	3.970
12	M	8	1.99	4.79	6.990	3.685
13	M	6.5	1.72	4.81	6.300	4.380
14	M	11.5	1.67	5.13	7.215	3.500
15	F	8.5	1.88	4.48	7.350	4.110
16	F	9	2.19	4.82	7.200	4.450
17	F	6.5	1.78	4.59	6.540	4.320
18	F	8	1.94	4.59	6.970	3.620
19	F	6.5	1.64	4.51	6.850	4.210
20	F	10	2.04	4.91	7.210	3.920
21	F	9.5	1.81	4.58	6.670	4.120
22	F	9	2.41	4.71	7.120	3.680
23	F	12	1.71	5.19	6.995	4.190
24	F	11	1.98	5.09	7.115	4.120
25	F	9	1.62	4.55	6.860	3.950

Table (6): Summary of clinical data in the 3 groups.

Variables		Group I (Acute asthma) gp n = 25	Group II (Non-acute asthma) gp n = 25	Group III (Control) gp n = 25
Age (Yr)	Range	5 - 12	3 - 12	4 - 12
	Mean $\pm$ SD	8.54 $\pm$ 2.13	7.88 $\pm$ 2.26	8.76 $\pm$ 1.83
Sex M/F ratio		14 / 11	17 / 8	14 / 11
Duration of asthma (yr)	Range	1 - 9	0.5 - 6	-
	Mean $\pm$ SD	4.74 $\pm$ 1.97	3.18 $\pm$ 1.85	-
Age of onset in years	Range	0.5 - 9	1 - 10	-
	Mean $\pm$ SD	3.80 $\pm$ 2.11	4.70 $\pm$ 2.24	-
No of attack / year	Range	3 - 5	3 - 10	-
	Mean $\pm$ SD	3.60 $\pm$ 0.65	4.44 $\pm$ 1.96	-
no. of hospital admission in previous year	Range	1 - 4	1 - 3	-
	Mean $\pm$ SD	2.04 $\pm$ 0.89	1.56 $\pm$ 0.65	-
Family history of atopy	No.	14	12	-
	Percentage	56%	48%	-
Personal history of atopy	No	15	13	-
	Percentage	60%	52%	-

- The three groups were comparable as regard age and sex.
- No significant differences were present between group I and group II in all items of clinical data.

Table (7): Summary of laboratory data in the 3 groups.

Variables		Group I (Acute asthma) gp	Group II (Non-acute asthma) gp	Group III (Control) gp
Plasma Mg (mg/dl)	Range	1.27 - 2.31	1.59 - 2.47	1.62 - 2.44
	mean $\pm$ SD	1.72 $\pm$ 0.30	1.93 $\pm$ 0.25	1.93 $\pm$ 0.26
Erythrocyte Mg (mg/dl)	Range	4.51 - 5.26	4.51 - 5.30	4.51 - 5.23
	Mean $\pm$ SD	4.88 $\pm$ 0.22	4.82 $\pm$ 0.24	4.80 $\pm$ 0.29
Total plasma ptn (g/dl)	Range	6.18 - 7.27	6.02 - 7.36	6.02 - 7.36
	Mean $\pm$ SD	6.95 $\pm$ 0.34	6.97 $\pm$ 0.37	6.98 $\pm$ 0.34
Plasma Alb. (g/dl)	Range	3.44 - 4.49	3.36 - 4.84	3.46 - 4.84
	Mean $\pm$ SD	4.05 $\pm$ 0.31	4.11 $\pm$ 0.40	4.08 $\pm$ 0.35

Table (8): Comparison between plasma magnesium levels (mg/dl) in males and females in the three studied groups.

Group		Male	Female	t-value	P
Group I	No.	14	11		
	Range	1.37 - 2.31	1.27 - 2.22		
	Mean $\pm$ SD	1.81 $\pm$ 0.24	1.67 $\pm$ 0.32	0.4601	>0.05
Group II	No.	17	8		
	Range	1.63 - 2.47	1.59 - 2.21		
	Mean $\pm$ SD	1.95 $\pm$ 0.35	1.89 $\pm$ 0.31	0.5721	>0.05
Group III	No.	14	11		
	Range	1.64 - 2.44	1.62 - 2.41		
	Mean $\pm$ SD	1.94 $\pm$ 0.25	1.89 $\pm$ 0.23	0.4958	>0.05

Group I : Acute-asthma group.

Group II: Non acute-asthma group.

Group III: Control group.

P > 0.05 = Not significant.

Table (9): Comparison between mean values of plasma magnesium levels (mg/dl) in the three studied groups.

Groups	No.	Plasma Magnesium level (mg/dl) (Mean $\pm$ SD)	t-value	P
Group I	25	1.72 $\pm$ 0.30	2.6440	<0.05
Group III	25	1.93 $\pm$ 0.26		
Group II	25	1.93 $\pm$ 0.25	1.5260	>0.05
Group III	25	1.93 $\pm$ 0.26		
Group I	25	1.72 $\pm$ 0.30	2.6880	<0.05
Group II	25	1.93 $\pm$ 0.25		

Group I: Acute asthma group.

Group II: Non acute asthma group

Group III: Control group.

P < 0.05 = Significant

P > 0.05 = Not significant

Table (10): Distribution of children according to the level of plasma magnesium (mg/dl).

Groups	No.	Plasma Magnesium level < 1.6 mg/dl		Plasma Magnesium level ≥ 1.6 mg/dl	
		No.	%	No.	%
Group I	25	8	32%	17	68%
Group II	25	1	4%	24	96%
Group III	25	-	0%	25	100%
Group I versus group III		Z = 3.0861		Significant	
Group I versus group II		Z = 2.5767		Significant	
Group II versus group III		Z = 1.010		Non significant	

Group I : Acute asthma group

Group II: Non-acute asthma group.

Group III: Healthy control.

N.B.: Z test for comparison of percentage.

Table (11): Comparison between erythrocyte magnesium levels (mg/dl) in males and females in the three studied groups.

Group		Male	Female	t-value	P
Group I	No.	14	11		
	Range	4.52 - 5.26	4.51 - 5.23		
	Mean $\pm$ SD	4.89 $\pm$ 0.23	4.89 $\pm$ 0.24	0.5723	>0.05
Group II	No.	17	8		
	Range	4.53 - 5.30	4.51 - 5.21		
	Mean $\pm$ SD	4.81 $\pm$ 0.26	4.79 $\pm$ 0.23	0.7883	>0.05
Group III	No	14	11		
	Range	4.52 - 5.23	4.51 - 5.19		
	Mean $\pm$ SD	4.81 $\pm$ 0.27	4.78 $\pm$ 0.25	0.8782	>0.05

Group I : Acute asthma group

Group II : Non - acute asthma group

Group III: Healthy control.

P > 0.05 = Not significant.

Table (12): Comparison between mean values of erythrocyte magnesium levels (mg/dl) in the three studied groups.

Groups	No.	Erythrocyte Magnesium level (mg/dl) (Mean $\pm$ SD)	t-value	P
Group I	25	4.88 $\pm$ 0.22	0.9674	>0.05
Group III	25	4.80 $\pm$ 0.29		
Group II	25	4.82 $\pm$ 0.24	0.7573	>0.05
Group III	25	4.80 $\pm$ 0.29		
Group I	25	4.88 $\pm$ 0.22	1.0651	>0.05
Group II	25	4.82 $\pm$ 0.24		

Group I : Acute asthma group

Group II: Non-acute asthma group

Group III: Healthy control.

P > 0.05 = Not significant

Table (13): Comparison between mean values of total plasma protein levels (g/dl) in the three studied groups.

Groups	No.	Total plasma protein level (g/dl) (Mean $\pm$ SD)	t-value	P
Group I	25	6.95 $\pm$ 0.34	0.7325	>0.05
Group III	25	6.98 $\pm$ 0.34		
Group II	25	6.97 $\pm$ 0.37	0.9351	>0.05
Group III	25	6.98 $\pm$ 0.34		
Group I	25	6.95 $\pm$ 0.34	0.7622	>0.05
Group II	25	6.97 $\pm$ 0.37		

Group I: Acute asthma group.

Group II: Non acute asthma group

Group III: Control group.

P > 0.05 = Not significant

Table (14): Comparison between mean values of plasma albumin levels (g/dl) in the three studied groups.

Groups	No.	Plasma albumin level (g/dl) (Mean $\pm$ SD)	t-value	P
Group I	25	4.07 $\pm$ 0.35	0.9431	>0.05
Group III	25	4.11 $\pm$ 0.40		
Group II	25	4.05 $\pm$ 0.31	0.8532	>0.05
Group III	25	4.11 $\pm$ 0.40		
Group I	25	4.07 $\pm$ 0.35	0.6425	>0.05
Group II	25	4.05 $\pm$ 0.31		

Group I: Acute asthma group.

Group II: Non acute asthma group

Group III: Control group.

P > 0.05 = Not significant

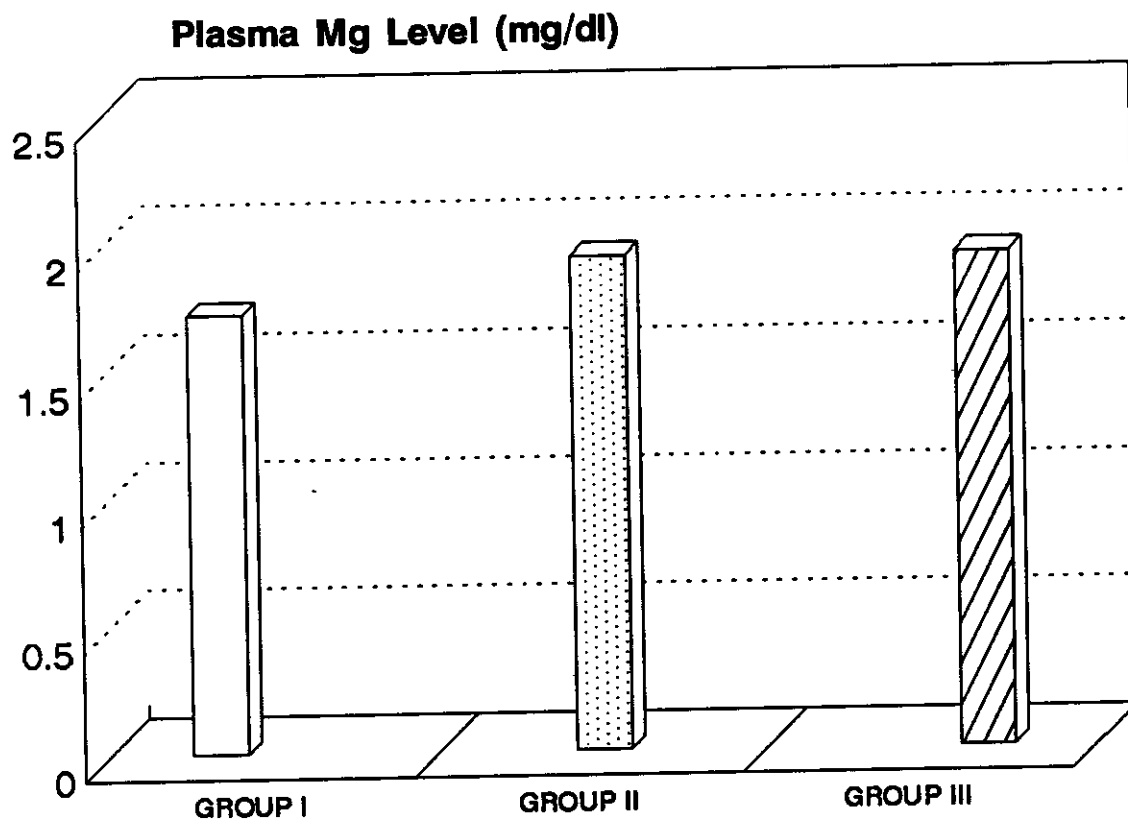
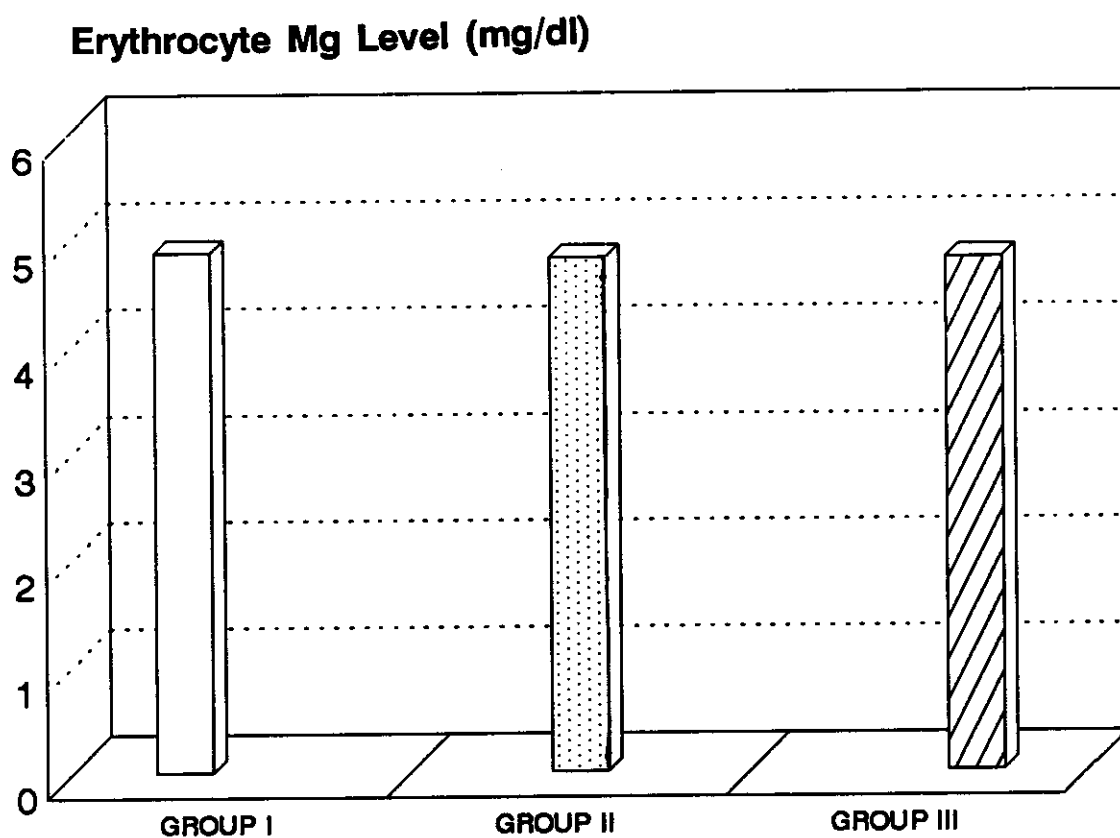


Fig. (1): MEAN PLASMA MAGNESIUM LEVELS OF THE THREE STUDIED GROUPS (mg/dl).

Group I: Acute asthma group.

Group II: Non acute asthma group.

Group III: Healthy control.



**Fig. (2): MEAN ERYTHROCYTE
MAGNESIUM LEVELS OF THE THREE
STUDIED GROUPS (mg/dl)**

Group I: Acute asthma group.

Group II: Non acute asthma group.

Group III: Healthy control.

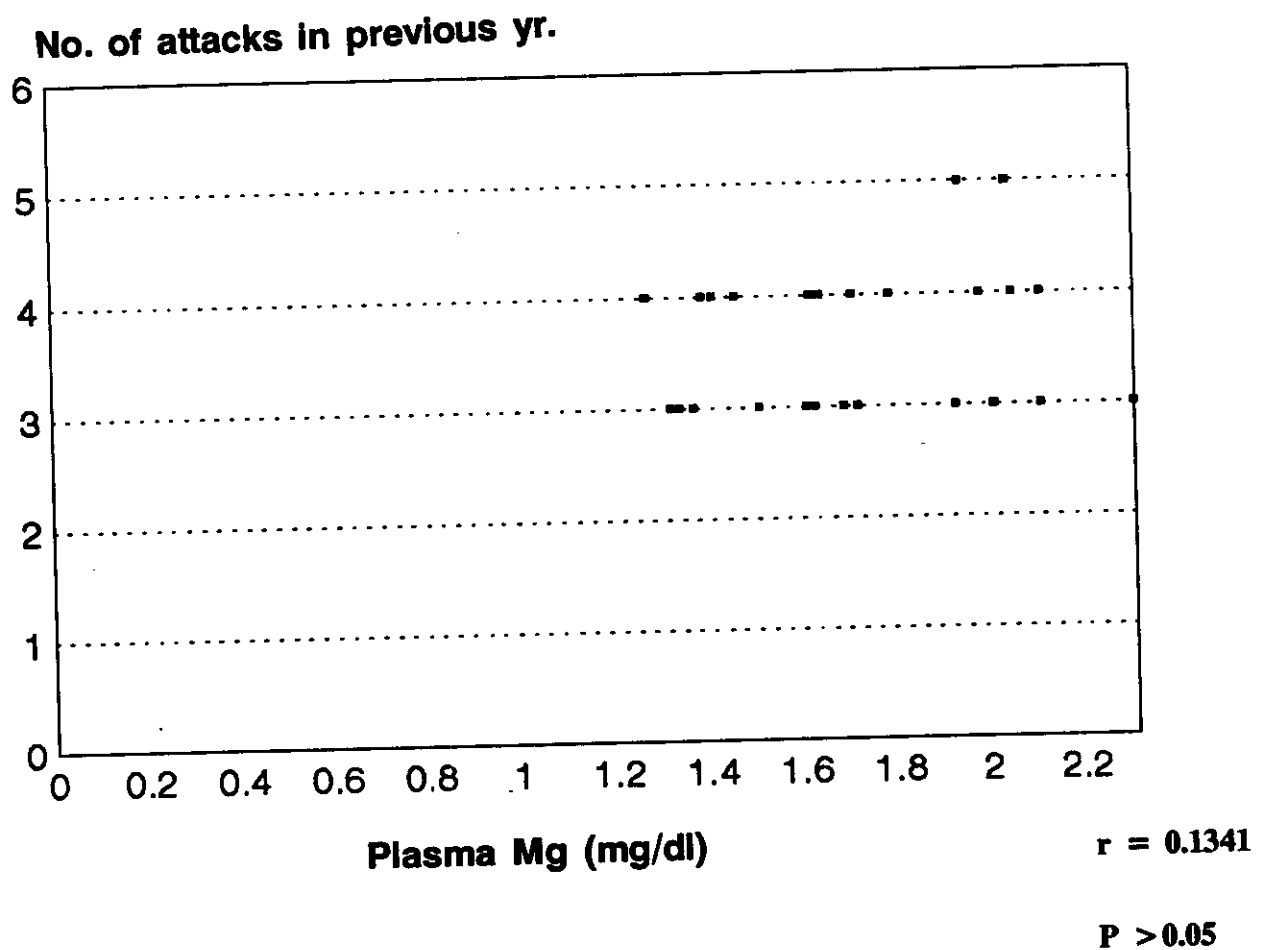
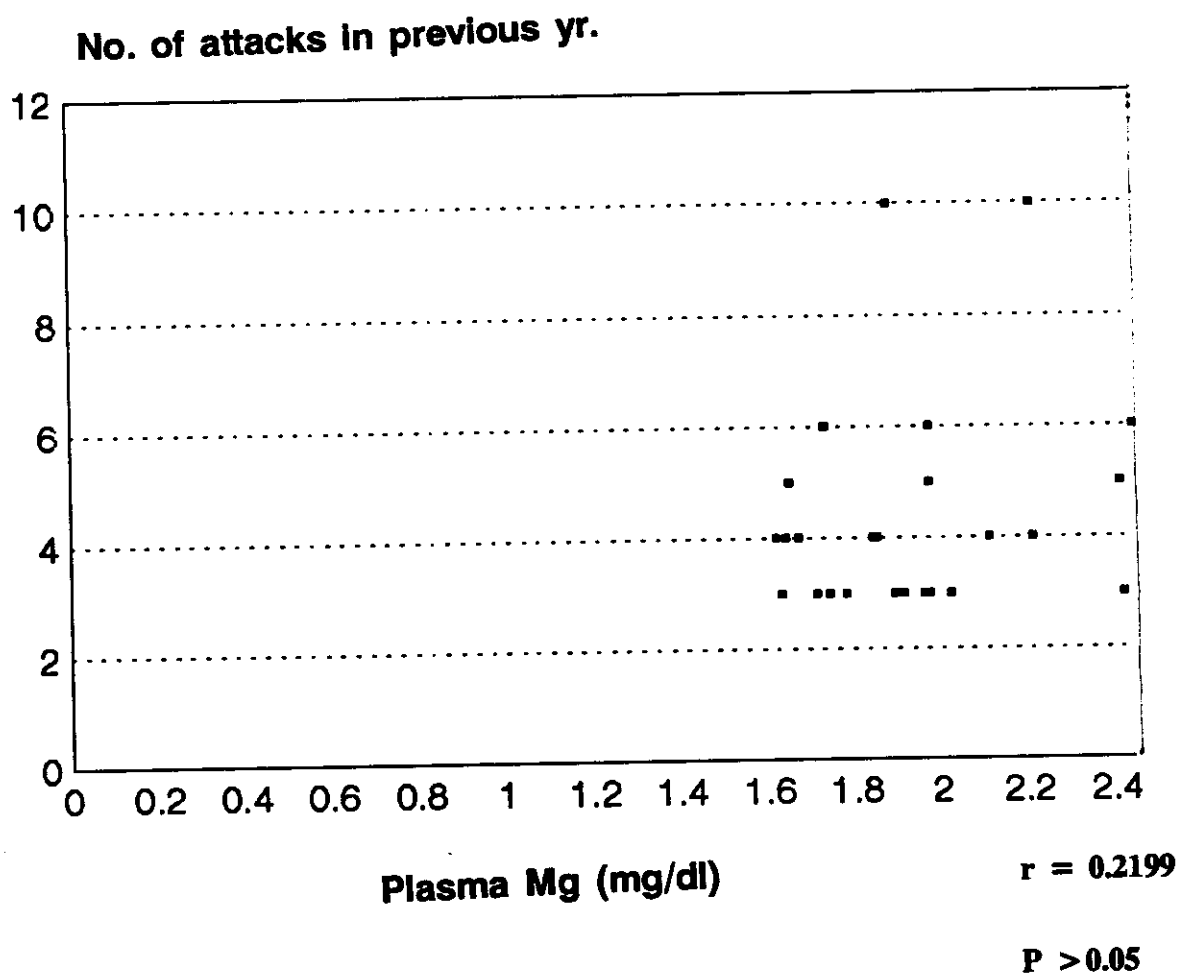


Fig. (3): CORRELATION BETWEEN PLASMA MAGNESIUM AND NUMBER OF ATTACKS IN PREVIOUS YEAR IN GROUP I (ACUTE ASTHMA GROUP).



**Fig. (4): CORRELATION BETWEEN
PLASMA MAGNESIUM AND NUMBER
OF ATTACKS IN PREVIOUS YEAR
IN GROUP II
(NON ACUTE ASTHMA GROUP).**

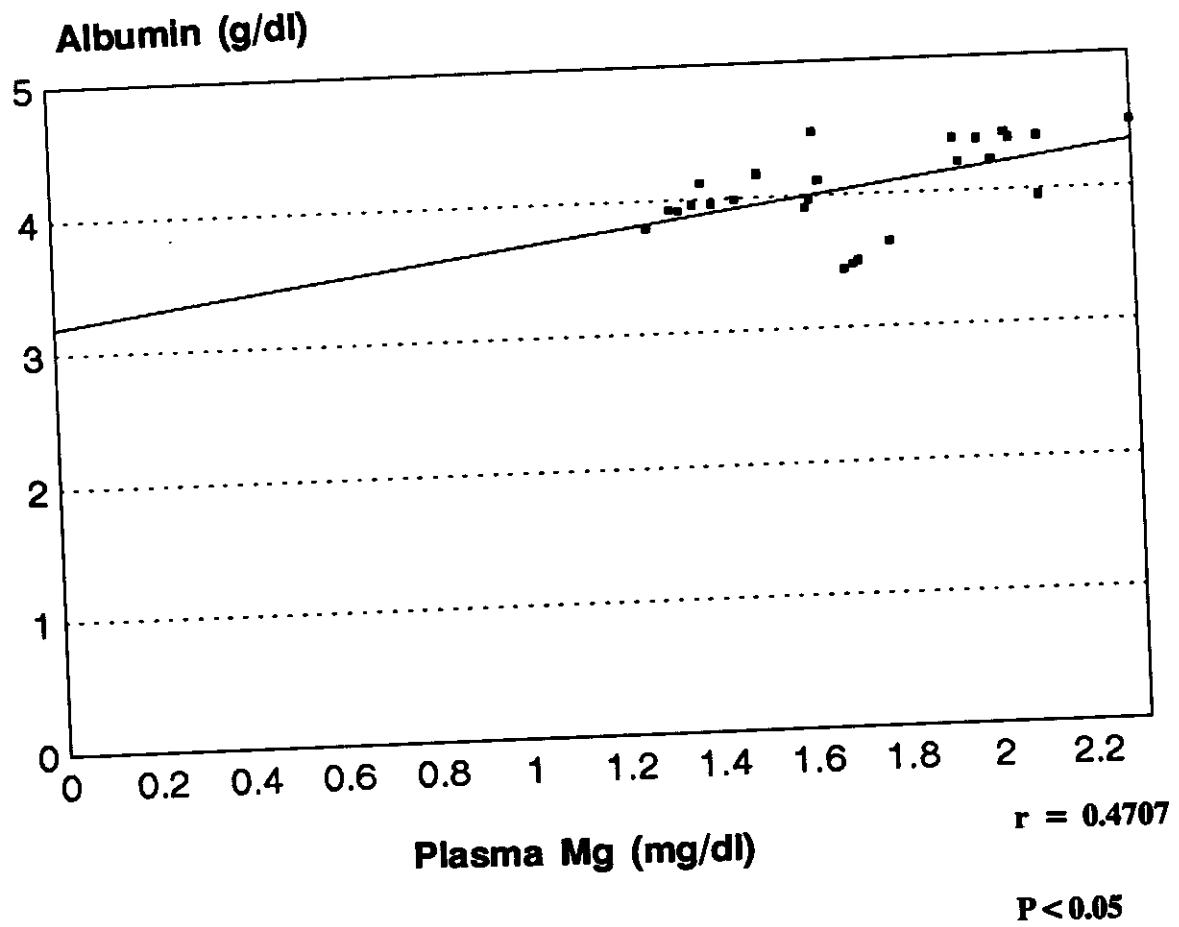


Fig. (5): CORRELATION BETWEEN PLASMA MAGNESIUM AND ALBUMIN IN GROUP I (ACUTE ASTHMA GROUP).

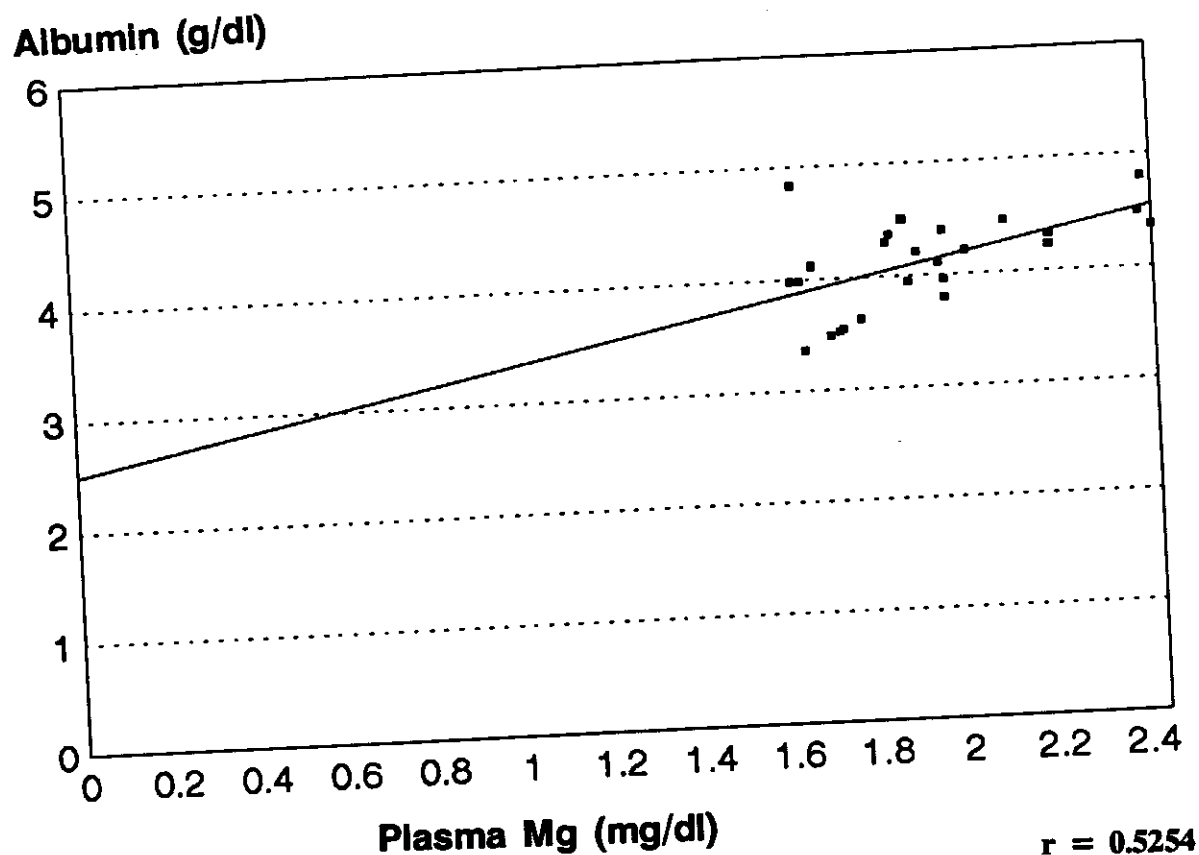
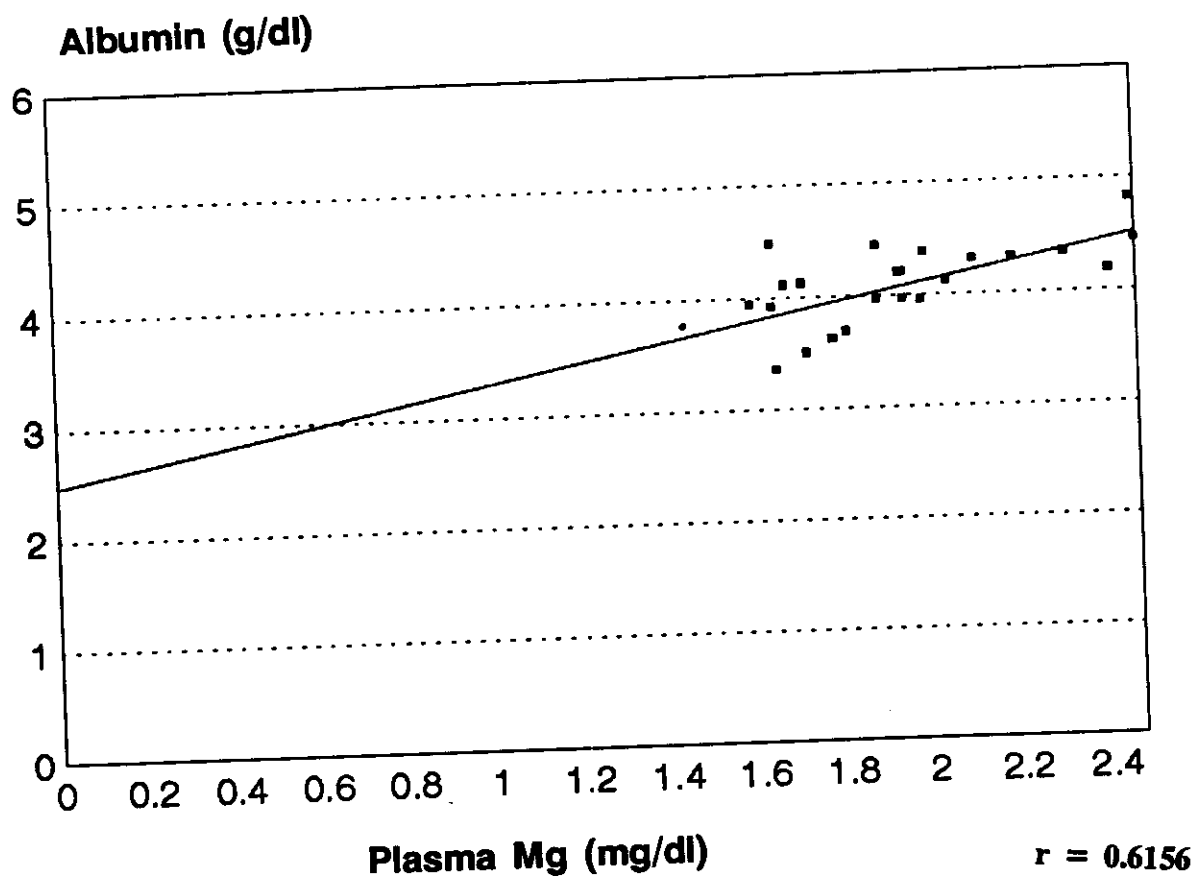
 $r = 0.5254$ $P < 0.05$

Fig. (6): CORRELATION BETWEEN PLASMA MAGNESIUM AND ALBUMIN IN GROUP II (NON ACUTE ASTHMA GROUP).



**Fig. (7): CORRELATION BETWEEN
PLASMA MAGNESIUM AND ALBUMIN
IN GROUP III (HEALTHY CONTROL
GROUP).**