RESULTS

(I) Analysis of results of some measurements and the routine laboratory investigations:

The means of ages (in months) in groups (A), (B), (C), (D) and the control group were 36.3 ± 7.85; 45.6 ± 5.42; 35 ± 5.19; 46.4 ± 5.64 and 48.5 ± 8.61 (months), respectively. The means of ages in group (A) and (C) were significantly lower than that of the control ($P < 0.05$) [table 6].

The means of percentage ratio of standard weights/age in groups (A), (B), (C), (D) and the control group were 95.7 ± 3.17; 88.8 ± 3.21; 83.8 ± 3.21; 83.8 ± 5.11; 81.32 ± 4.71; and 97.65 ± 2.2, respectively. The means of groups (B), (C) and (D) were significantly lower than that of the control group and group (A) ($P < 0.05$). Also, the means of groups (C) and (D) were significantly lower than that of group (B) ($P < 0.05$) [table 6].

The means of percentage ratio of heights/age in groups (A), (B), (C), (D) and the control group were 97.7 ± 3.24; 96.8 ± 2.68; 97.6 ± 2.62; 96.98 ± 2.18, and 98.22 ± 2.59, respectively. No statistical difference was found between the different groups and the control group

The means of total proteins (g/dl) in groups (A), (B), (C), (D) and the control group were 6.32 ± 0.46; 5.7 ± 0.55; 5.38 ± 0.34; 4.98 ± 0.32 and 6.16 ± 0.53, respectively. The results of groups (B), (C) and (D) were significantly lower than that of the control group ($P < 0.05$) and of group (A). Also, the mean of total proteins of group (D) was significantly lower than that of group (B) and (C) [table 6].

The means of haemoglobin concentration (g/dl) in groups (A), (B), (C), (D) and the control group were 12.46 ± 0.53; 10.73 ± 0.53; 10.5 ± 0.67; 9.23 ± 0.45 and 12.91 ± 0.71, respectively. The results of groups (B), (C), (D) were significantly lower than that of the control and of group (A) ($P < 0.05$), while those of group (D) was significantly lower than that of groups (B) and (C) [table 6].

The means of leucocytic counts (thousand cell/mm^3) of the groups (A), (B), (C) (D) and the control group were 12.14 ± 1.53; 12.82 ± 1.38; 9.98 ± 1.44; 10.05 ± 2.01; and 8.62 ± 1.68, respectively. In groups (A), (B) and (C) these figures were significantly higher than those of the control group ($P < 0.05$), while in group (D) they did not differ significantly from the control group. Also, the means of groups (C) and (D) were significantly lower than those in groups (A) and (B) ($P < 0.05$) [table 6].

As regards the stool exam, the results revealed that 50% of patients, in groups (A) and (B), had few haematophagous amoebae, while the rest of patients had vegetative and cystic forms of E. histolytica in addition to few R.b.c's and mucus. 30% of cases of group (B) had passed moderate amount of mucus; 80% of group (C) had giardia lamblia trophozoites and the rest had G. lambila cysts, in addition to 70% of cases passing moderate amount of mucus; and lastly 80% of cases of group (D). The group of mixed infection had vegetative forms of both E. histolytica and G. lamblia; 10% (one child) had vegetative G. lamblia plus E. histolytica cysts; and the last 10% had vegetative G. lamblia plus haemotophagous E. histolytica trophozoites (few). 90% of that group had moderate amount of mucus in their stools (table 5).

(II) Analysis of the results of serum zinc, copper, magnesium and calcium in all the study groups:

(A) Serum zinc: (table 8).

1- Group (A): It ranged between 78-95 ug/dl with a mean of 85.7 ± 6.27 ug/dl. This was significantly lower than that of the control group but significantly higher than that of groups (B), (C) and (D) ($P < 0.05$).

2- Group (B): It ranged between 60-95 ug/dl with a mean of 77.3 ± 12.5 ug/dl. This was significantly lower than that of the control group but significantly higher than that of group (D) ($P < 0.05$).

3- Group (C): It ranged between 53-85 ug/dl with a mean of 71.6 ± 10.03 ug/dl which was significantly lower than that of the control group and group (A) ($P < 0.05$).

4- Group (D); group of mixed infection: It ranged between 50-73 ug/dl with a mean of 67 ± 6.91 ug/dl which was significantly lower than that of the control group and groups (A) and (B) ($P < 0.05$).

5- Control group: Serum zinc in the control group ranged between 80-135 ug/dl with a mean of 103.7 ± 16.26 ug/dl, which was significantly lower than that reported abroad by Pekarek et al,(1972), ($P < 0.05$).

(B) Serum copper: (table 9).

1- Group (A): The results ranged between 110-160 ug/dl with a mean level of 130.4 ± 14.1 ug/dl which was significantly higher than the control group and groups (B), (C) and (D) ($P < 0.05$).

2- Group (B): It ranged between 90-143 ug/dl with a mean of 117.1 ± 14.6 ug/dl. This did not differ significantly from that of the control group, but it was significantly higher than that of groups (C) and (D ($P < 0.05$).

3- Group (C): It ranged between 89-130 ug/dl with a mean of 104.3 ± 14.2 ug/dl. There was no significant difference when compared with the control group.

4- Group (D); (mixed infection group): It ranged between 70-105 ug/dl with a mean of 90.9 ± 11.7 ug/dl which was significantly lower than the control group and groups (A), (B) and (C).

5- Control group: It ranged between 85-150 ug/dl with a mean of 115 ± 23.8 ug/dl.

(C) Serum Magnesium: (table 10).

1- Group (A): Serum magnesium in group (A) ranged between 1.8-2.41 mg/dl with a mean of 2.07 ± 0.22 mg/dl. This did not differ significantly from that of the control but was significantly higher than that of groups (C) and (D) ($P < 0.05$).

2- Group (B): It ranged between 1.7-2.25 mg/dl with a mean of 1.98 ± 0.17 mg/dl. This was significantly lower than that of the control ($P < 0.05$) but did not differ significantly from that of the group (A).

3- Group (C): It ranged between 1.7-2.0 mg/dl with a mean of 1.85 ± 0.03. This was significantly lower than that of groups (A) and (B) ($P < 0.05$), but it was still near the lower limit of the normal range.

4- Group (D);(group of mixed infection): Serum magnesium levels ranged between 1.71-1.9 mg/dl with a mean of 1.79 ± 0.02 mg/dl. This was significantly less than that of the control group and group (B) but did not differ significantly from that of group (C) ($P < 0.05$).

5- Control group: It ranged between 1.9-2.48 mg/dl with a mean of 2.16 ± 0.06 mg/dl.

(D) Serum Calcium: (table 11).

1- Group (A): It ranged between 9.1-10.9 mg/dl with a mean of 9.86 ± 0.2 mg/dl with no significant difference from the control group.

2- Group (B): It ranged between 9.2-10.5 mg/dl with a mean of 9.67 ±0.13 mg/dl and no significant difference was found when compared with the control group and group (A) ($P > 0.05$).

3- Group (C): It ranged between 9-9.8 mg/dl with a mean of 9.25 ± 0.07 mg/dl. This ~~did not~~ show ~~any~~ significant difference when compared with the control group and groups (A) and (B), but it was still near the lower limit of the normal range.

4- Group (D); group of mixed infection: The serum calcium in this group ranged between 8.2-9.4 mg/dl with a mean of 8.77 $\pm$ 0.12 mg/dl. This was significantly lower than that of the control group and groups (A), (B) and (C), ($P < 0.05$).

5- Control group: It ranged between 9.3-10.8 mg/dl with a mean of 9.91 $\pm$ 0.17 mg/dl.

Table (5). Results of stool examination
(Expressed in percentage ratio of the group)

Item	% of Gr. (A)	% of Gr. (B)	% of Gr. (C)	% of Gr. (D)
.Offensive loose	60	40	30	60
.Offensive watery	40	60	70	40
.Trophozoites	20 (HEH) 40 (VEH) 30 (both)	20 (HEH) 20 (VEH) 30 (both)	50 (GL)	80 (VEH + GL) 10 (HEH+GL)
.Cysts	--	--	20 (G.L.C)	--
.Both	10 (VEH+EHC)	30 (VEH+EHC)	30 (GL+GLC)	10 (GL+EHC)
.Mucus: few moderate	70 --	-- 30	30 70	20 80
.Mucus + Rbs's (few).	30	70	--	--

VEH: Vegetative entamoeba histolytica

HEH: Haematophagous entamoeba histolytica

EHC: Entamoeba histolytica cysts

GL : Giardia lamblia

GLC: Giardia lamblia cysts.

Table (6). Ages, weights and heights of all the study groups

Item	Gr. (A)	Gr. (B)	Gr. (C)	Gr. (D)	Control
.Age (months)					
Range	27-48	36-50	24-40	38-54	36-60
$\bar{X} \pm$ SD	36.3± 7.85	45.6±5.42	35±5.19	46.4±5.64	48.5±8.61
SE	2.48	1.7	1.64	1.76	2.72
P	< 0.05	> 0.05	<0.05	> 0.05	
.%of Wt/age					
Range	87-98.1	81.2-92.4	70-86.7	71-89.2	99-99.6
$\bar{X} \pm$ SD	95.7±3.17	88.8±3.21	83.8±8.11	81.32±4.71	97.65±2.2
SE	1	0.98	1.62	1.49	0.7
P	> 0.05	< 0.05	> 0.05	< 0.05	
.% of Ht/age					
Range	88.6-99.7	90-98.9	90.5-99.6	92-99.2	90.2-100
$\bar{X} \pm$ SD	97.7±3.24	96.8±2.68	97.6±2.62	96.98±2.18	98.22±2.6
SE	1.03	0.85	0.83	0.69	0.82
P	> 0.05	> 0.05	> 0.05	> 0.05	

Wt : weight

Ht : height

Table (7). Some routine laboratory investigations of all the study groups

Item	Gr. (A)	Gr. (B)	Gr. (C)	Gr. (D)	Control
.Tot. Prot. (g/dl).					
Range	5.5-7	5-6.5	4.9-6	4.5-5.5	5.2-6.8
$\bar{X} \pm$ SD	6.32±0.46	5.7±0.55	5.38±0.34	4.98±0.32	6.16±0.53
SE	0.15	0.17	0.11	0.1	0.17
P	> 0.05	< 0.05	< 0.05	< 0.05	
.Hemoglobin (g/dl)					
Range	11.5-13	10.1-11.5	9.9-12	8.7-10	11.9-13.8
$\bar{X} \pm$ SD	12.46±0.53	10.73±0.53	10.5±0.67	9.23±0.45	12.91±0.71
SE	0.17	0.17	0.21	0.14	0.22
P	> 0.05	< 0.05	< 0.05	< 0.05	
.Leucocytes (x 1000/mm^3)					
Range	9.9-14	10-14	7.9-12	7-13.1	5.6-10.9
$\bar{X} \pm$ SD	12.14±1.53	12.82±1.38	9.98±1.44	10.05±2.01	8.62±1.66
SE	0.48	0.43	0.45	0.64	0.53
P	< 0.05	< 0.05	< 0.05	< 0.05	

Tot. Prot. : Total proteins

Table (8). Serum zinc levels
in all the study groups
(in µg/dl)

Item	Gr. (A)	Gr. (B)	Gr. (C)	Gr. (D)	Control
Range	78-95	60-95	53-85	50-73	80-135
$\bar{X}$	85.7	77.3	71.6	67	103.7
SD	6.27	12.5	10.03	6.91	16.26
SE	1.98	3.95	3.17	2.18	5.14
t	3.26	4.07	5.31	8.36	
P	< 0.0025	<0.0005	< 0.0005	< 0.0005	
t*		1.9	1.13	1.22	
P*		<0.05	>0.05	>0.05	

t : (t) value of comparison of a case and control

P : (P) value of comparison of a case and control

t* : (t) value of comparison of two neighbouring cases

P* : (P) value of comparison of two neighbouring cases.

Table (9). Serum copper levels
in all the study groups
(Expressed in µg/dl)

Item	Gr. (A)	Gr. (B)	Gr. (C)	Gr. (D)	Control
Range	110-160	90-143	89-130	70-105	85-150
$\bar{X}$	130.4	117.1	104.3	90.9	115
SD	14.1	14.6	14.2	11.7	23.8
SE	4.45	4.62	4.49	3.69	7.53
t	1.76	0.24	1.22	2.87	
P	< 0.05	> 0.05	> 0.05	< 0.01	
t*		2.8	2.01	2.3	
P*		<0.05	<0.05	<0.05	

t : (t) value of comparison of a case and control
P : (P) value of comparison of a case and control
t* : (t) value of comparison of two neighbouring cases
P* : (P) value of comparison of two neighbouring cases.

Table (10). Serum magnesium levels
in all the study groups
(Expressed in mg/dl)

Item	Gr. (A)	Gr. (B)	Gr. (C)	Gr. (D)	Control
Range	1.8-2.41	1.7-2.25	1.7-2.0	1.71-1.9	1.9-2.48
$\bar{X}$	2.07	1.98	1.85	1.79	2.16
SD	0.22	0.17	0.1	0.07	0.19
SE	0.07	0.05	0.03	0.02	0.06
t	0.98	2.3	4.62	5.85	
p	>0.05	<0.05	<0.0005	<0.0005	
t*	1.05	2.23	1.66		
P*	>0.05	<0.05	>0.05		

t : (t) value of comparison between a case and control

P : (P) value of comparison between a case and control

t* : (t) value of comparison between a case and a neighbouring case

P* : (P) value of comparison between a case and a neighbouring case.

Table (11). Serum calcium levels
in all the study groups
(expressed in mg/dl)

Item	Gr. (A)	Gr. (B)	Gr. (C)	Gr. (D)	Control
Range	9.1-10.9	9.2-10.5	9-9.8	8.2-9.4	9.3-10.8
$\bar{X}$	9.86	9.67	9.25	8.77	9.91
SD	0.62	0.41	0.24	0.39	0.53
SE	0.2	0.13	0.07	0.12	0.17
t	0.19	1.12	3.9	5.48	
p	> 0.05	> 0.05	< 0.0025	< 0.0005	
t*	1.44	2.84	3.54		
P*	>0.05	<0.05	<0.05		

t : (t) value of comparison between a case and control

P : (P) value of comparison between a case and control

t* : (t) value of comparison between a case and a neighbouring case

P* : (P) value of comparison between a case and a neighbouring case.

Table (12). Serum zinc, copper magnesium & calcium in all the study groups (expressed in mean ± SD)

Item	Gr. (A)	Gr. (B)	Gr. (C)	Gr. (D)	Control
Zn (ug/dl)					
X ± SD	85.7±6.27	77.3±12.5	71.6±10.03	67±6.91	103.7±16.26
t	3.26	4.07	5.31	8.36	
t*		1.9 (S)	1.13 (NS)	1.22 (NS)	
Cu (ug/dl)					
X ± SD	13.4±14.1	117.1±14.6	104.3±14.2	90.9±11.7	115±23.8
t	1.76	0.24	1.22	2.87	
t*		2.8 (S)	2.01 (S)	2.3 (S)	
Mg (mg/dl)					
X ± SD	2.07±0.22	1.98±0.17	1.85±0.1	1.79±0.07	2.16±0.19
t	0.98	2.3	4.62	5.85	
t*		1.05 (NS)	2.23 (S)	1.66 (NS)	
Ca (mg/dl)					
X ± SD	9.86±0.62	9.67±0.41	9.25±0.24	8.77±0.39	9.91±0.53
t	0.19	1.12	3.9	5.48	
t*		1.44 (NS)	2.84 (S)	3.54 (S)	

t : (t) value of case vs. control
t* : (t) value of case vs. case
NS : (P) not significant
(S) : (P) significant.

Table (13). Serum zinc, copper, magnesium and calcium in group (B) & group (D) (expressed in mean ± SE)

Item	Group (B)	Group (D)
Zinc (ug/dl)		
$\bar{X}$ + SE	77.3 ± 3.95	67 ± 2.18
(t)	2.28	
(P)	<0.05	
Copper (ug/dl)		
$\bar{X}$ ± SE	117.1 ± 4.62	90.4 ± 3.69
(t)	4.58	
(P)	<0.05	
Mg (mg/dl)		
$\bar{X}$ ± SE	1.98 ± 0.05	1.79 ± 0.02
(t)	3.53	
(P)	<0.05	
Ca (mg/dl): $\bar{X}$ ± SE	9.67 ± 0.13	8.77 ± 0.12
(t)	5.1	
(P)	<0.05	

Figure (1). Showing Heights and Weights of all the study groups.

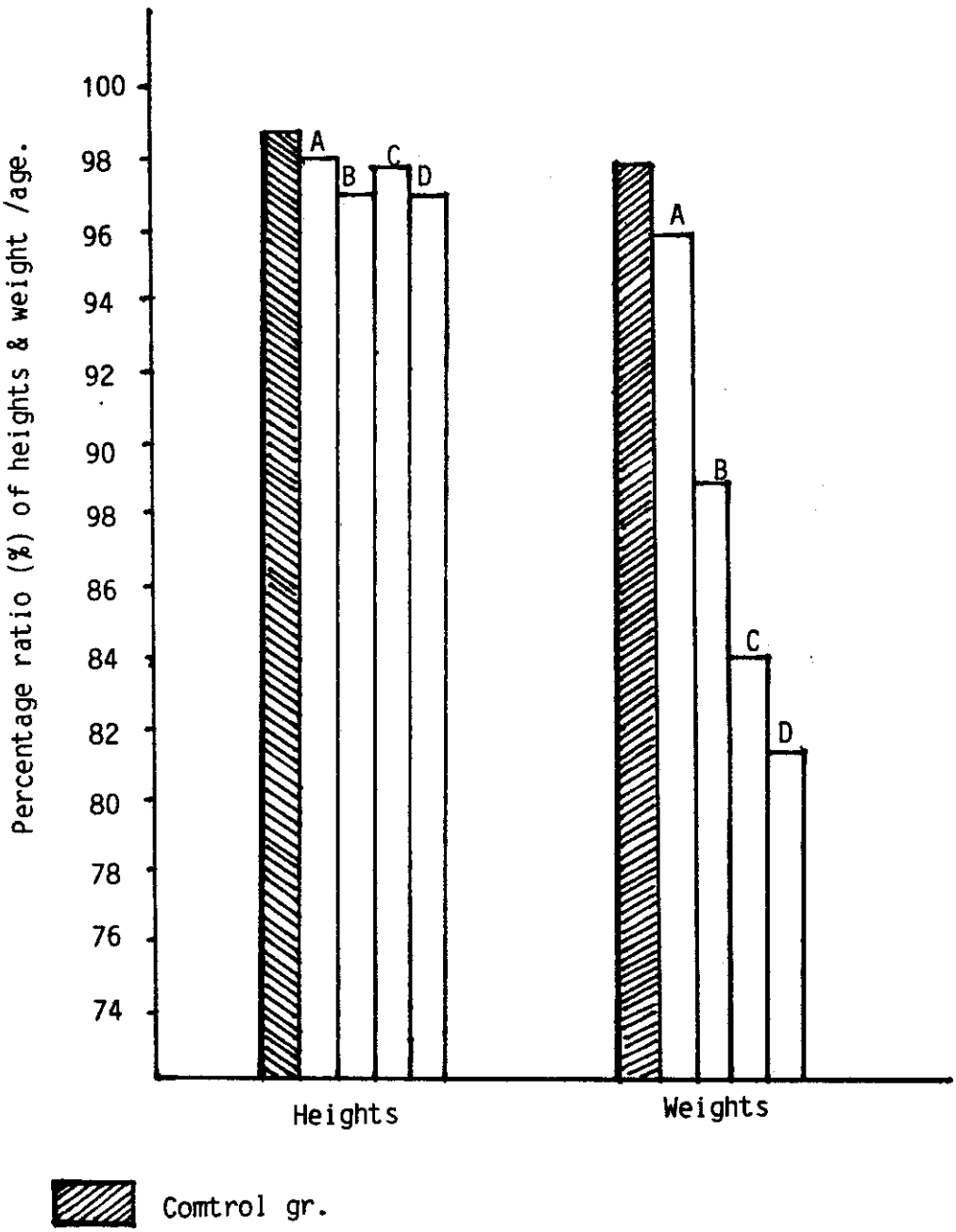
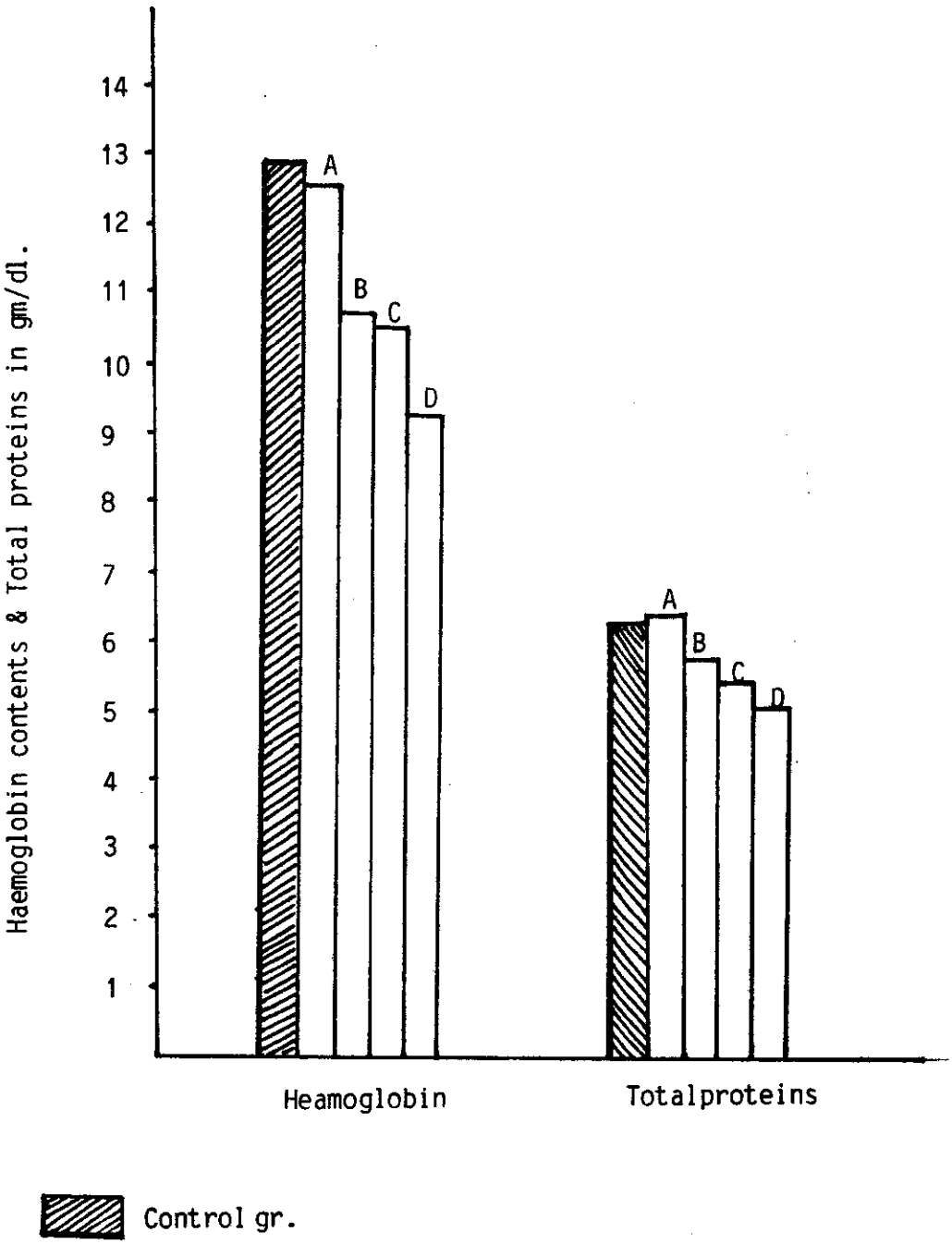


Figure (2). Showing Haemoglobin Contents and Total proteins.of all the study groups.



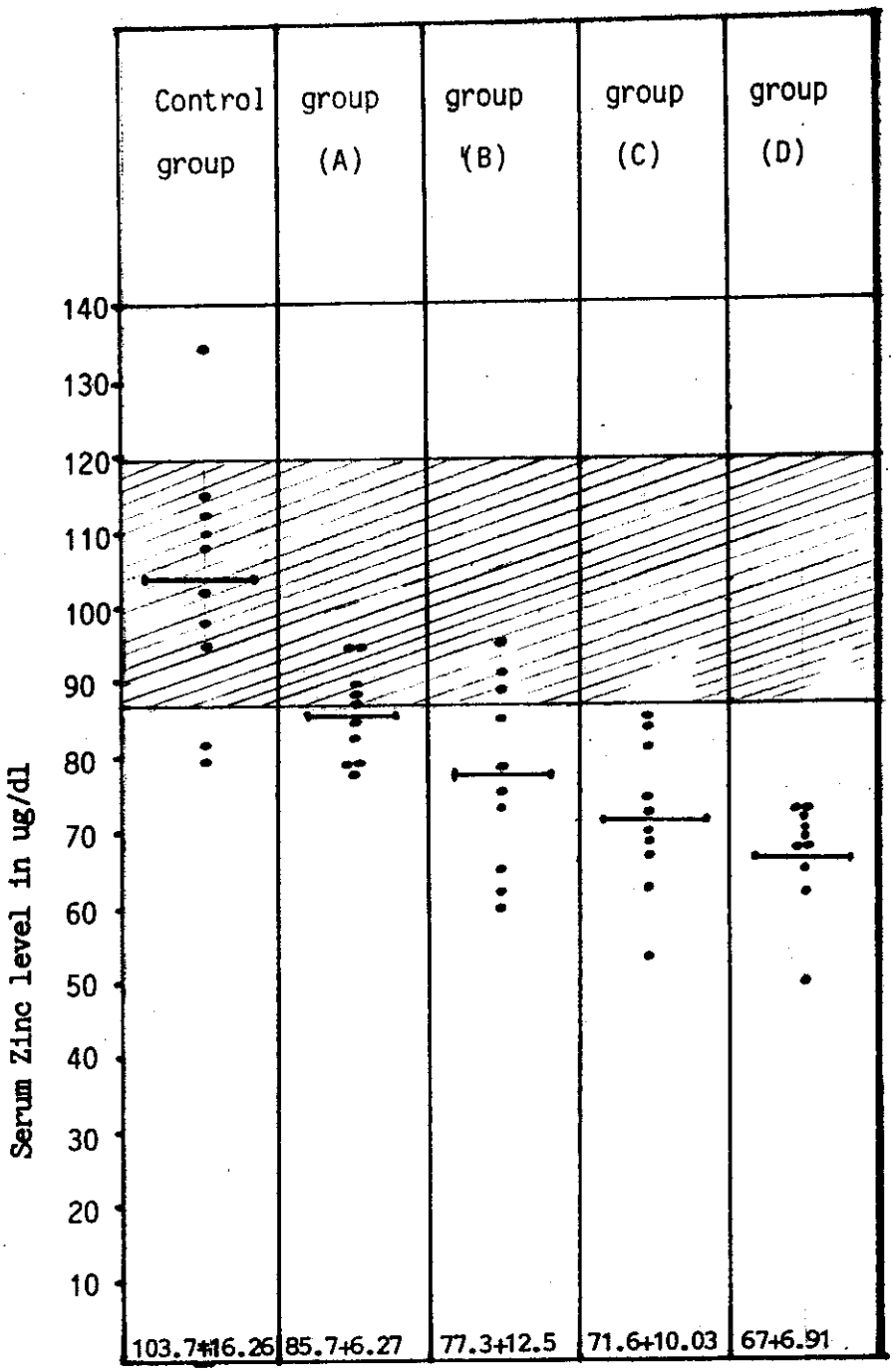


Figure (3). Scattagram of Serum Zinc concentration in all the study groups.

Horizontal pars : mean S.zinc of the group.

Striated area : mean ±SD of the control gr.

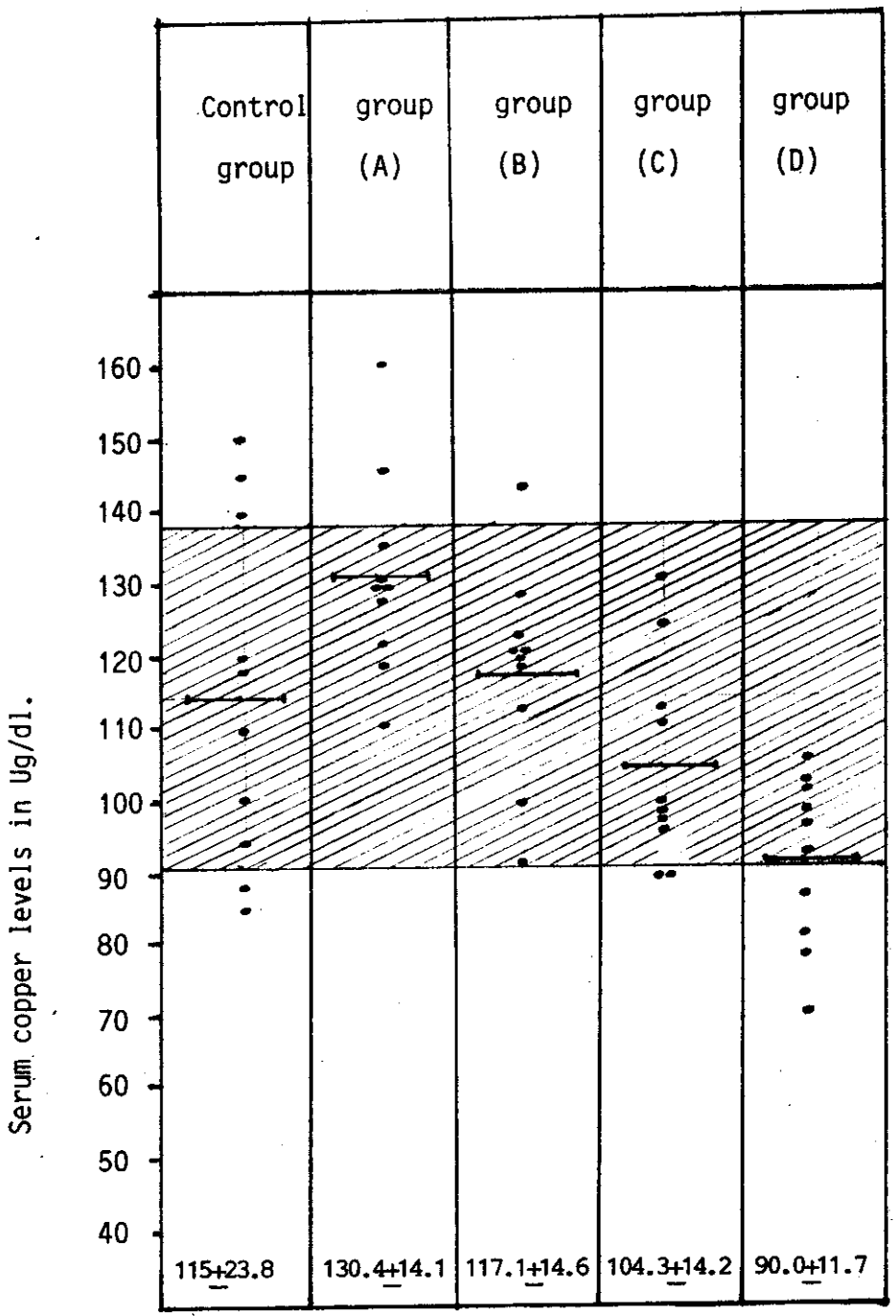


Figure (4). Scattagram of Serum copper in all the study groups.

Horizontal pars : mean S. copper of the group

Striated area : mean ± SD of the control gr.

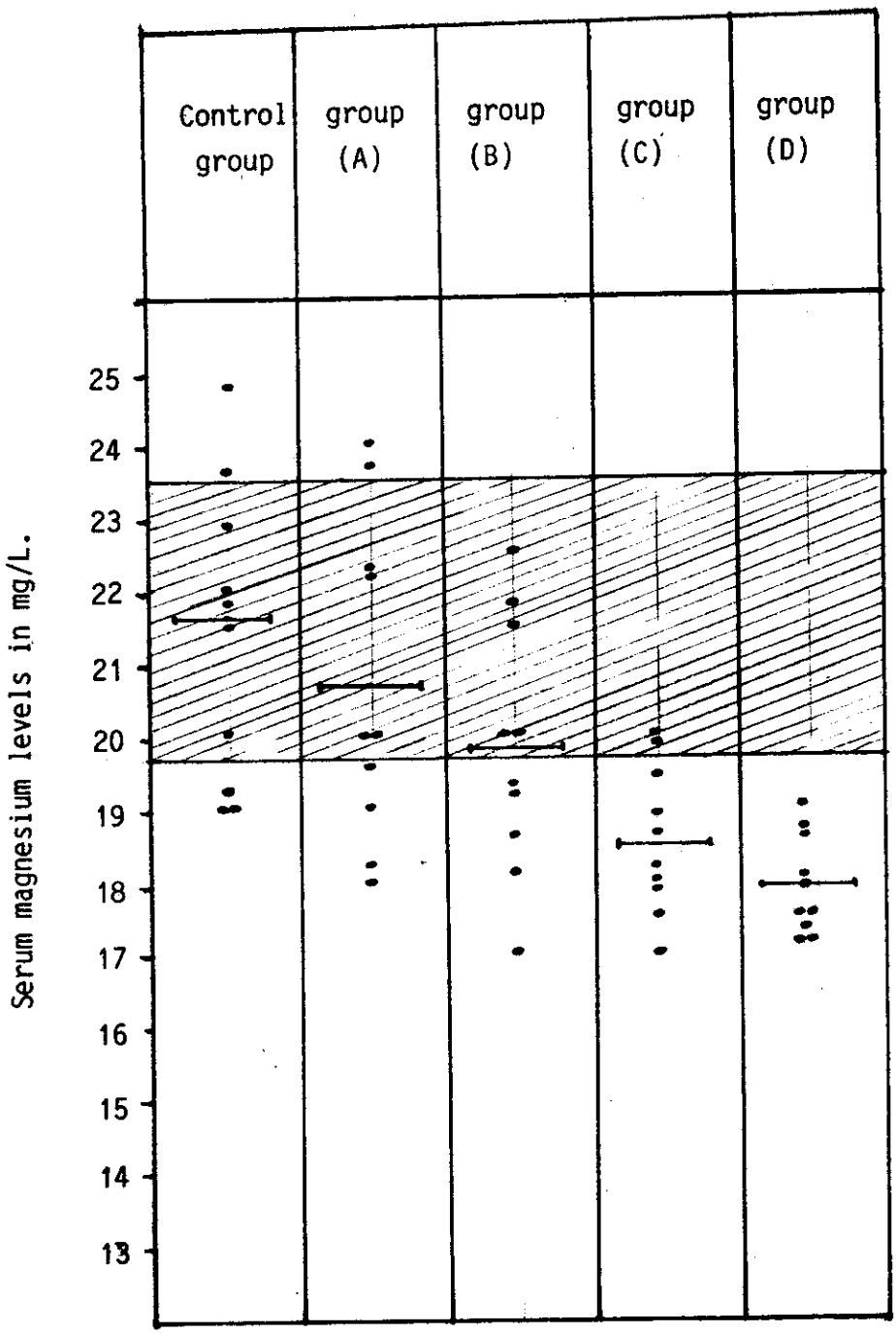


Figure (5). Scattagram of serum magnesium conc. in all the studdy groups.

Horizontal pars : mean S.copper of the group

Striated drea : mean ± SD of the control gr.

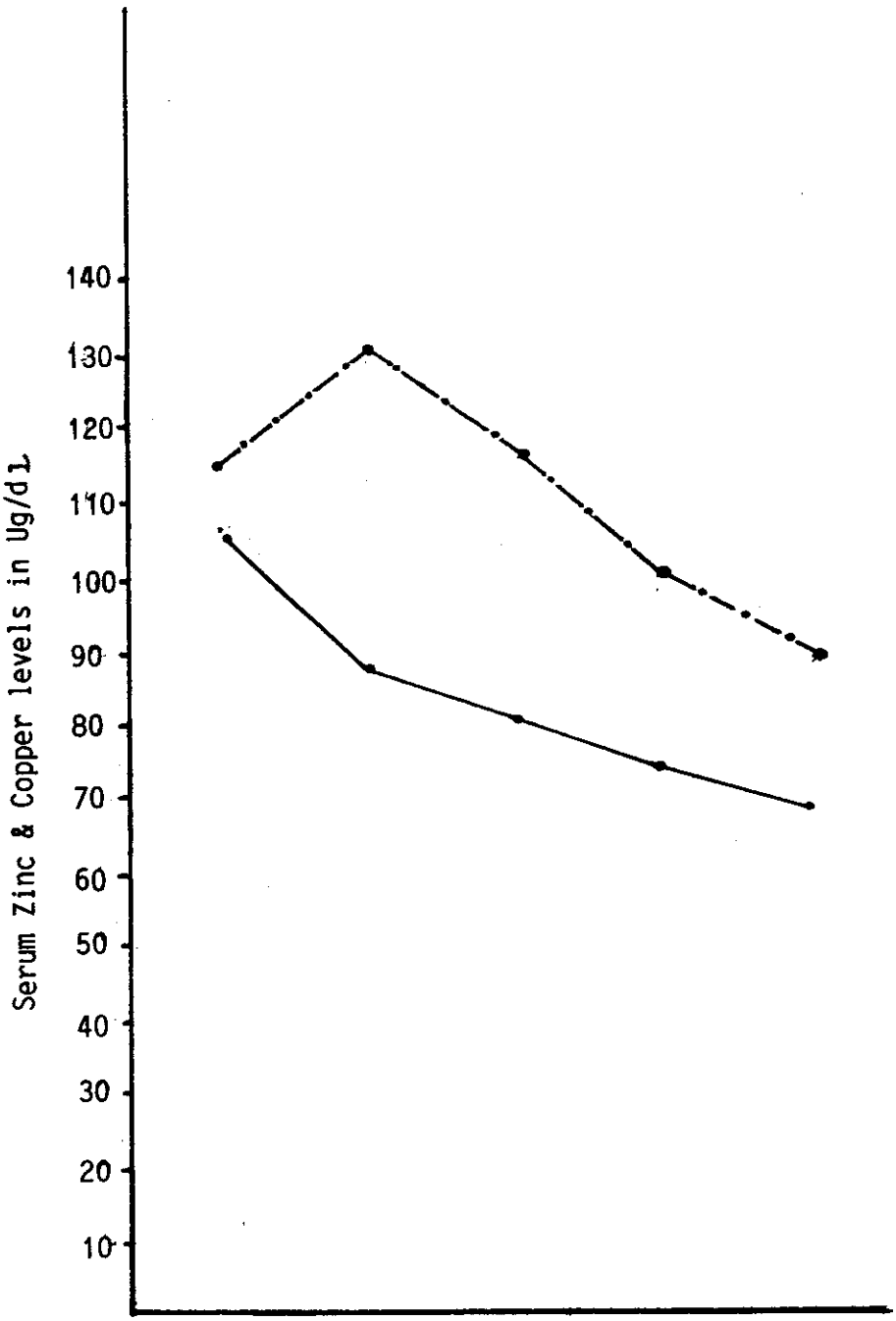


Figure (7). Curves showing serum zinc and copper levels in all patient groups.

.——. S.Zine (means) in groups A,B,C&D (respectively)

•-----• S.Copper (means) in groups A,B,C & D.