

RESULTS

RESULTS

Control Group-Group(B):

This group included 15 normal children; 7 males (46.7 %) and 8 females (53.3%).

Their age varied between 1 2/12 & 6 years with a mean of 3.5 ± 1.8 .

The weight varied between 9.4 and 23 kg with a mean of 14.6 ± 3.9 .

The height varied between 76 and 120 cm with a mean of 96.6 ± 13.7 .

These results are summarized in table (4).

Hematologic Findings :

The hemoglobin level of this group varied between 10.9 and 15.5 gm/dl with a mean of 13 ± 1.4 .

The leukocytic count varied between 4200 and 10200 with a mean of 7040 ± 1703 .

The hematocrit level varied between 34 and 45 vol. % with a mean value of 39 ± 3.3 .

The MCV varied between 77.1 and 93 μ^3 with a mean of 86.3 ± 4.3 .

The MCH varied between 26.1 and 31.4 pg with a mean of 28.6 ± 1.4 .

The MCHC varied between 29.7 and 36.5 % with a mean value of 33.2 ± 1.7 .

These results are summarized in table (5) .

Clinical Data :

Out of 25 anemic patients, only 6 patients(24%) noticed and complained of pallor.

Anorexia was complained of in 20 patients (80%).

Delayed milestones of development was found in 5 patients (20%).

Pica was prominent in 4 patients (16%).

10 patients (40%) presented with manifestations of alimentary or respiratory tract infections .

Poorly localized abdominal pain was complained of in 4 patients (16 %).

General weakness and easy fatiguability were troublesome in 3 patients (12%).

Prominent headache was a presenting complaint in 2 patients (8 %).

Pallor was clinically evident in all (100%) patients; 9 patients (36%) showed mild pallor , 7(28%) showed moderate pallor, and 9(36%) showed a severe degree of pallor.

Examination of the heart revealed a hemic systolic murmur in 5 patients (24%) and heart failure in 2 patients (8 %).

Examination of the abdomen revealed a just palpable spleen in 3 patients (12%).

Hematologic Findings :

The hemoglobin level of this group ranged between 3.1 and 10.2 gm/dl with a mean value of 7.9 ± 1.9 . The difference between the hemoglobin level of this group and the control group was found to be statistically highly significant ($P < 0.001$).

The group with mild pallor had a mean hemoglobin level of 9.5 ± 0.6 gm/dl. The group with moderate pallor had a mean of 8.2 ± 0.4 gm/dl. The group with severe pallor had a mean of 5.9 ± 1.6 gm/dl. Thus, it was clearly evident that the degree of pallor assessed on a clinical basis correlated well with the severity of anemia. These results are summarized in table (5).

The mean hemoglobin level of the group of patients presenting with infection was 8.3 ± 1.1 gm/dl compared to 7.6 ± 2.6 gm/dl in patients presenting with no infection. However, the difference was found to be statistically insignificant ($P > 0.05$).

The mean hemoglobin level of the patients presenting with heart failure was 3.8 ± 1 gm/dl, compared to 8.2 ± 1.5 gm/dl in patients with no failure. The difference is statistically significant

($P < 0.05$).

The leukocytic count of the iron deficient group ranged between 4200 and 16200/mm³, with a mean value of 7880 ± 3036 . No statistically significant difference was found between this figure and that of the control group ($P > 0.05$).

The hematocrit level ranged between 10 and 32 vol. % with a mean value of 25.4 ± 5.7 . The difference between this figure and that of the control group was found to be statistically highly significant ($P < 0.001$).

The MCV ranged between 66.7 and 76.1 u³ with a mean of 72.7 ± 2.2 . A highly significant difference was found between this figure and that of the control group ($P < 0.001$).

The MCH ranged between 18 and 23.8 pg with a mean of 22.4 ± 1.5 . The difference compared with the control group was found to be statistically highly significant ($P < 0.001$).

The MCHC ranged between 26.5 and 32.9% with a mean of 30.9 ± 1.6 . The difference between this figure and that of the control group is statistically significant ($P < 0.02$).

All the hematologic data of both iron deficient

and control groups with statistical comparison are shown in table (5).

Biochemical Findings :

The serum iron of this group ranged between 6.1 and 45.5 ug/dl, with a mean value of 27.7 ± 9.3 .

The TIBC of the 21 patients in which it was estimated ranged between 282 and 681 ug/dl with a mean value of 439.2 ± 91.9 .

The percentage saturation ranged between 2.6 and 10.2 % with a mean value of 6.5 ± 2 .

Skin Tests :

P.P.D.: All patients were tested. The diameter of induration ranged between 0 and 8 mm with a mean value of 2.3 ± 0.5 (mean $\pm$ S.E.).

4 out of 25 patients (16%) showed a positive reaction and 21 were considered negative.

Statistical comparison revealed a significant difference between the mean skin induration in case of P.P.D. antigen test between this group and the control group ($P < 0.05$).

T.T.: All patients were also tested. The diameter of skin induration ranged between 0 and 10 mm with

a mean value of 2.5 ± 0.6 (mean $\pm$ S.E.).

6 out of 25 (24%) showed a positive reaction and 19 were considered negative.

Statistical comparison between the mean skin induration of this group and the control one showed a significant difference ($P < 0.05$).

Results of skin tests of both iron deficient and control groups together with their statistical difference are shown in table (6).

We considered the skin tests of the group of patients presenting clinically with infection and we compared their results with those of the remaining patients. Statistically insignificant difference was obtained ($P > 0.05$ for both P.P.D. & T.T.).

These results are shown in table (7).

Table () : Iron deficient group.

Serial No.	Sex	Age		Weight in kg	Height in cm	Hb (gm/dl)	Hct (%)	MCV (fl)	MCH (pg)	MCHC (g)	Serum iron (ug/dl)	TIBC (ug/dl)	% sat-uration	P.P.D (mm)	T.F. (mm)
		Yr	Month												
1	M	1	1	9.5	75	9.2	8200	25	71.8	23.6	32.9	35.3	—	0	0
2	M	2		11	85	7.0	4800	24	72.7	21.2	29.2	23.5	—	6	0
3	M	4	6	16	102	8.5	4200	24	72.2	23.6	32.7	45.5	—	0	0
4	F	3	6	14	98	9.0	5500	30	73.2	22.0	30.0	23.2	387.3	6.0	2
5	F	1	6	10.5	79	8.2	6700	28	74.3	23.4	31.5	35.5	415.6	8.5	2
6	M	4	3	17	107	9.2	6100	31	73.8	21.9	29.7	33.3	391.0	8.5	0
7	F	1	9	11	85	9.7	5300	32	75.3	22.8	30.3	41.0	402.0	10.2	4
8	F	6	-	20	115	7.2	5400	32	73.3	24.0	32.7	27.3	373.0	7.3	3
9	M	1	2	11	77	6.9	16200	21	72.4	23.8	32.9	26.0	342.0	7.6	0
10	F	6	-	17	105	4.5	12600	15	71.4	21.4	30.0	32.0	418.7	7.6	0
11	F	1	8	11	80	3.1	12300	16	71.4	22.1	31.0	43.0	583.0	7.4	3
12	F	4	8	17	103	7.7	7800	28	72.2	21.4	29.6	24.7	417.0	5.9	3
13	M	5	-	19	110	10.2	8800	32	73.7	23.5	31.9	29.0	392.0	7.4	4
14	F	6	-	16	108	7.6	8000	25	71.4	21.7	30.4	20.0	470.0	4.3	0
15	F	3	-	12.5	91	8.3	11600	25	73.4	21.5	29.3	29.0	390.0	7.4	4
16	F	2	-	11.5	84	4.5	5800	17	68.0	18.0	26.5	31.0	520.0	6.0	7
17	F	6	-	18	114	5.1	7300	14	66.7	18.9	28.3	35.0	390.0	9.0	0
18	M	6	-	21	115	8.0	7200	25	71.4	22.9	32.0	30.0	440.0	6.8	3
19	F	6	-	20	115	10.2	5100	31	72.1	23.7	32.4	18.2	282.0	6.5	8
20	M	1	3	10.5	76	9.7	12100	31	75.6	23.7	31.3	6.1	—	0	4
21	M	1	6	10.5	83	8.3	7000	27	76.1	23.4	30.7	10.5	369.2	2.8	0
22	M	3	-	14	95	8.1	6300	25	73.5	23.8	32.4	27.8	485.0	5.6	0
23	M	2	6	13	91	9.0	4700	28	70.0	22.5	32.1	23.8	505.0	4.7	0
24	M	1	6	11	80	7.1	10000	24	75.0	22.2	29.6	26.0	572.0	4.6	0
25	F	1	3	11	76	10.0	7000	25	75.3	23.5	31.3	17.5	681.0	2.6	6
Range		1 1/2-6		9.5-21	75-115	3.1-10.2	4200-16200	15-32	66.7-76.1	18-23.8	26.5-32.9	6.1-45.5	282-681	2.6-10.2	0-10
Mean		3.3		14.1	94	7.9	7880	25.4	72.7	22.4	30.8	27.7	439.2	6.5	2.4
S.D.		1.9		3.6	14.4	1.9	3036	3.7	2.2	1.5	1.6	9.3	91.9	2	3.2
S.E.		0.4		0.7	2.9	0.4	607.2	1.1	0.4	0.3	0.3	1.9	20	0.4	0.6

Table (2): Control group.

Serial No.	Sex	Age		Weight in Kgms	Height in cms	Hb (gm/dl)	W.B.Cs count/mm ³	Ht (%)	MCV (v ³)	MCH (pg)	MCHC (%)	P.P.D. (mm)	T.T. (mm)
		Yrs	Month										
1	M	1	2	9.5	80	111.0	9400	36	90.0	27.5	30.6	4	11
2	F	6	-	18.0	117	10.9	6100	34	85.0	27.3	32.1	3	0
3	M	6	-	20.0	120	13.5	55700	37	77.1	28.1	36.5	0	0
4	F	2	-	14.0	89	11.3	6000	35	87.5	28.3	32.3	4	7
5	F	3	6	15.0	98	13.4	4200	40	87.0	29.6	34.0	6	9
6	M	2	-	11.0	87	14.0	6200	41	85.4	29.2	34.2	4	8
7	M	2	6	12.0	88	13.5	9800	39	86.7	30.0	34.6	4	3
8	M	1	4	9.4	76	11.3	10200	38	92.7	27.6	29.7	14	7
9	M	3	-	13.0	94	13.0	7000	39	90.7	30.2	33.3	9	6
10	M	4	6	15.0	100	15.5	5700	45	86.5	29.8	34.4	5	2
11	F	5	-	17.0	103	12.0	5900	38	82.6	26.1	31.6	4	6
12	F	6	-	23.0	116	14.0	7100	42	84.0	28.0	33.3	5	8
13	F	4	8	16.0	105	12.5	8000	36	83.7	29.1	34.7	3	6
14	F	1	6	11.0	81	15.0	7090	45	81.8	27.3	33.3	7	3
15	F	3	-	15.0	95	13.5	6500	40	93.0	31.4	33.8	8	12
Range		1 6	2/12-	9.4- 23	76- 120	10.9- 15.5	4200- 10200	34- 45	77.1- 93	26.1- 31.4	29.7- 36.5	0- 14	0- 12
Mean		3.5		14.6	96.6	13	7040	39	86.3	28.6	33.2	5.3	5.9
S.D.		1.8		3.9	13.7	1.4	1703	3.3	4.3	1.4	1.7	3.2	3.6
S.E.		0.5		1	3.5	0.4	436.7	0.9	1.1	0.4	0.4	0.8	0.9

Table (3) : Clinical data of iron deficient group.

Serial No.	Sex	Age		Weight in Kgs	Height in cms	Pallor	Present-ation with infection	Hemic systolic murmur	Palpable spleen
		Yr.	Month						
1	M	1	1	9.5	75	+	-	-	-
2	M	2	-	11	85	+++	+	+	-
3	M	4	6	16	102	+	-	-	-
4	F	3	6	14	98	+	-	-	-
5	F	1	6	10.5	79	++	-	-	-
6	M	4	3	17	107	+	+	-	+
7	F	1	9	11	85	+	+	-	-
8	F	6	-	20	115	+++	+	+	-
9	M	1	2	11	77	+++	+	-	-
10	F	6	-	17	105	+++	-	+	-
11	F	1	8	11	80	+++	-	+	+
12	F	4	8	17	103	+++	+	-	-
13	M	4	-	19	110	+	-	-	-
14	F	6	-	16	108	++	-	-	-
15	F	3	-	12.5	91	++	-	-	-
16	F	2	-	11.5	84	+++	-	+	-
17	F	6	-	18	114	+++	-	-	-
18	M	6	-	21	115	++	+	-	-
19	F	6	-	20	115	+	-	-	-
20	M	1	3	10.5	76	+	-	-	-
21	M	1	6	10.5	83	++	-	-	+
22	M	3	-	14	95	++	+	-	-
23	M	2	6	13	91	++	+	-	-
24	M	1	6	11	80	+++	-	+	-
25	F	1	3	11	76	+	+	-	-

M = Male

F = Female

+ = mild pallor

++ = Moderate pallor

+++ = Severe pallor

Table (4) : General data of iron deficient and control groups.

Variables studied	Iron deficient group		Control group	
	Mean	± S.D.	Mean	± S.D.
Age (in years)	3.3	1.9	3.5	1.8
Weight (in kgs)	14.1	3.6	14.6	3.9
Height (in cms)	94.0	14.4	96.6	13.7

Iron deficient group - 12 males (48 %).

Control group - 7 males (46.7 %).

Table (5) Hematological data of Iron deficient and control groups.

Variables studied	Iron deficient group		Control group		Statistical comparison		
	Mean	± S.D.	Mean	± S.D.	t-value	p-value	Sig.
Hemoglobin (gm/dl)	7.9	1.9	13	1.4	9.130	< 0.001	H.S.
Hematocrit (vol. %)	25.4	5.7	39	3.3	8.517	< 0.001	H.S.
R.B.Cs (per mm ³)	7880	3036	7040	1703	0.992	> 0.05	N.S.
M.C.V (v ³)	72.7	2.2	86.3	4.3	13.429	< 0.001	H.S.
M.C.H (pg)	22.4	1.5	28.6	1.4	13.137	< 0.001	H.S.
M.C.H.C (%)	30.8	1.6	33.2	1.7	4.546	< 0.02	S.

Abbreviations :

- S.D. - Standard deviation
- Sig. - Significance
- R.B.Cs - White blood cells
- M.C.H - Mean corpuscular volume
- M.C.H - Mean corpuscular hemoglobin
- M.C.H.C - Mean corpuscular hemoglobin concentration
- H.S. - Highly significant
- S. - Significant
- N.S. - Not significant

Table (6) : Skin tests of iron deficient and control groups.

Variables studied	Iron deficient group		Control group		Statistical comparison		
	Mean	± S.E.	Mean	± S.E.	t-value	p-value	Sig.
P.P.D. (mm)	2.3	0.5	5.3	0.8	3.215	<0.05	S.
T.T. (mm)	2.5	0.6	5.9	0.9	3.205	<0.05	S.

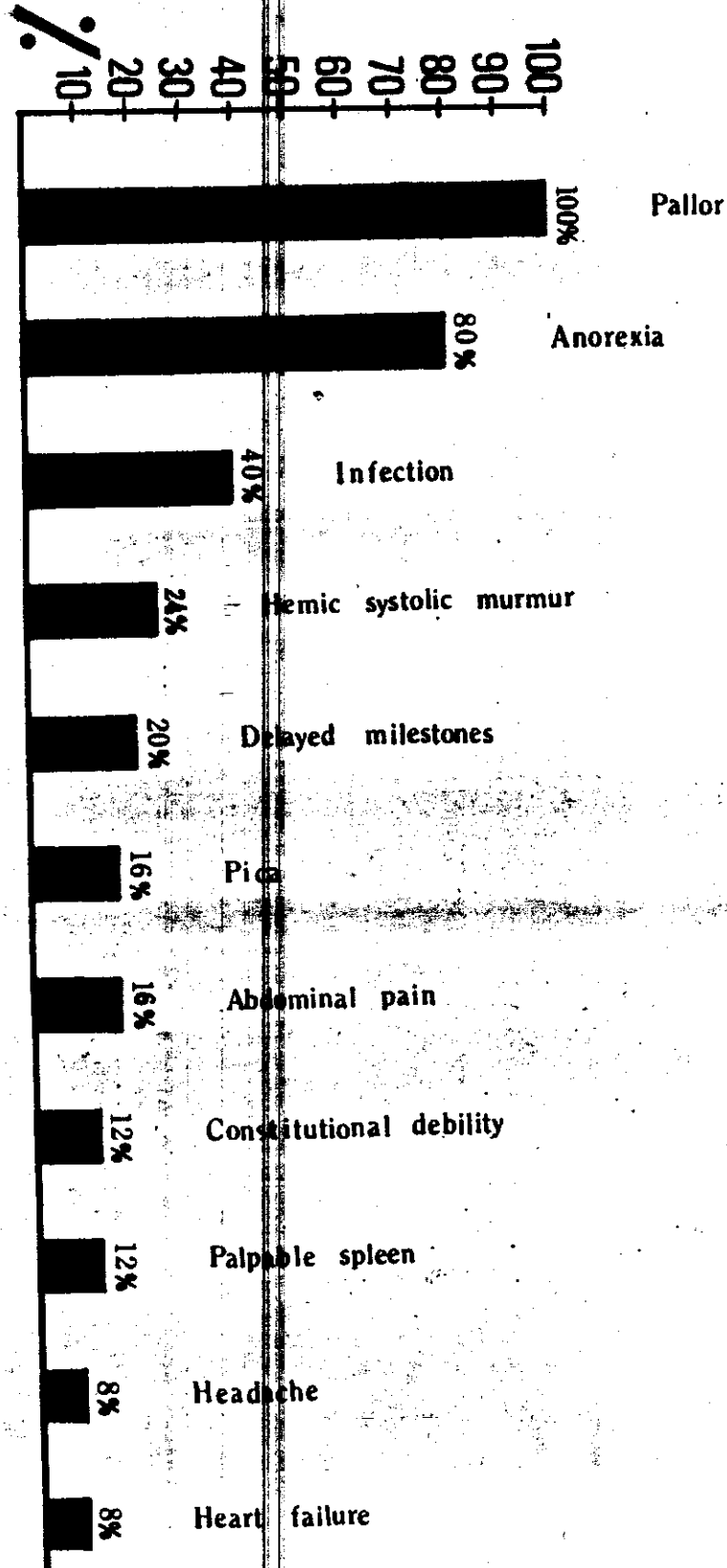
Table (7) : Skin tests of iron deficient patients presenting with

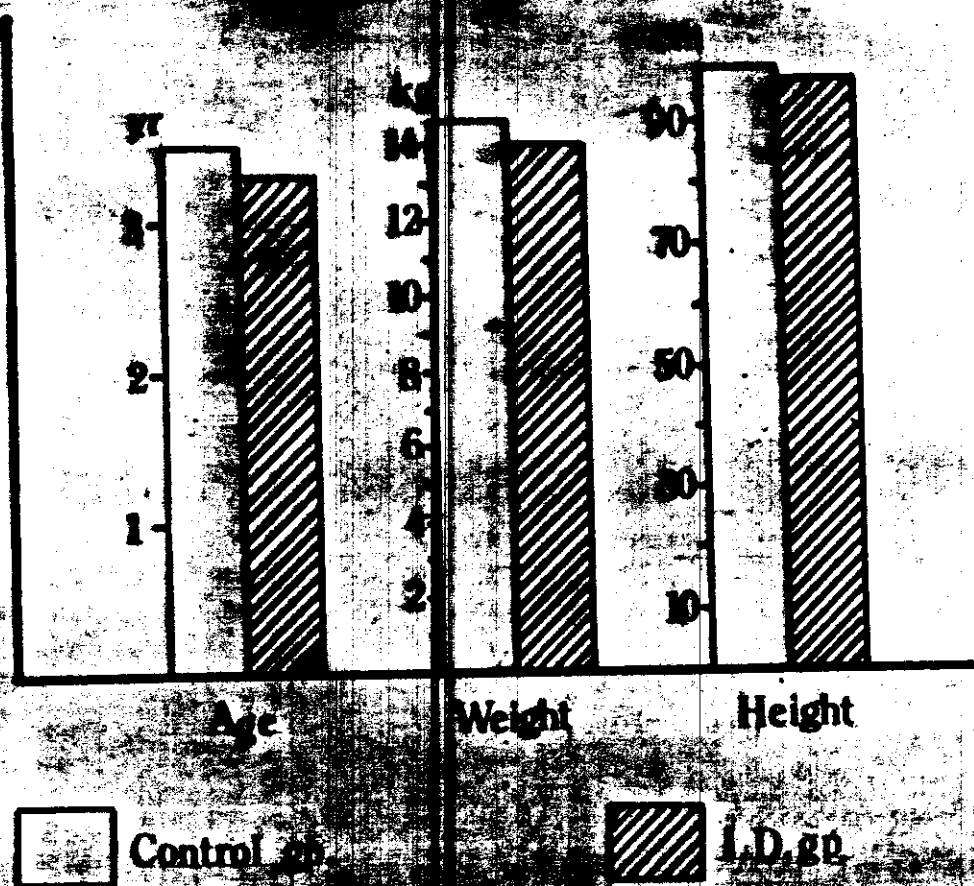
Variables studied	With infection		Without infection		Statistical comparison		
	Mean	± S.E.	Mean	± S.E.	t-value	p-value	Sig.
P.P.D. (mm)	2.8	0.9	1.7	0.7	0.983	>0.05	N.S.
T.T. (mm)	2.5	1.8	2.3	0.9	0.154	>0.05	N.S.

Abbreviations :

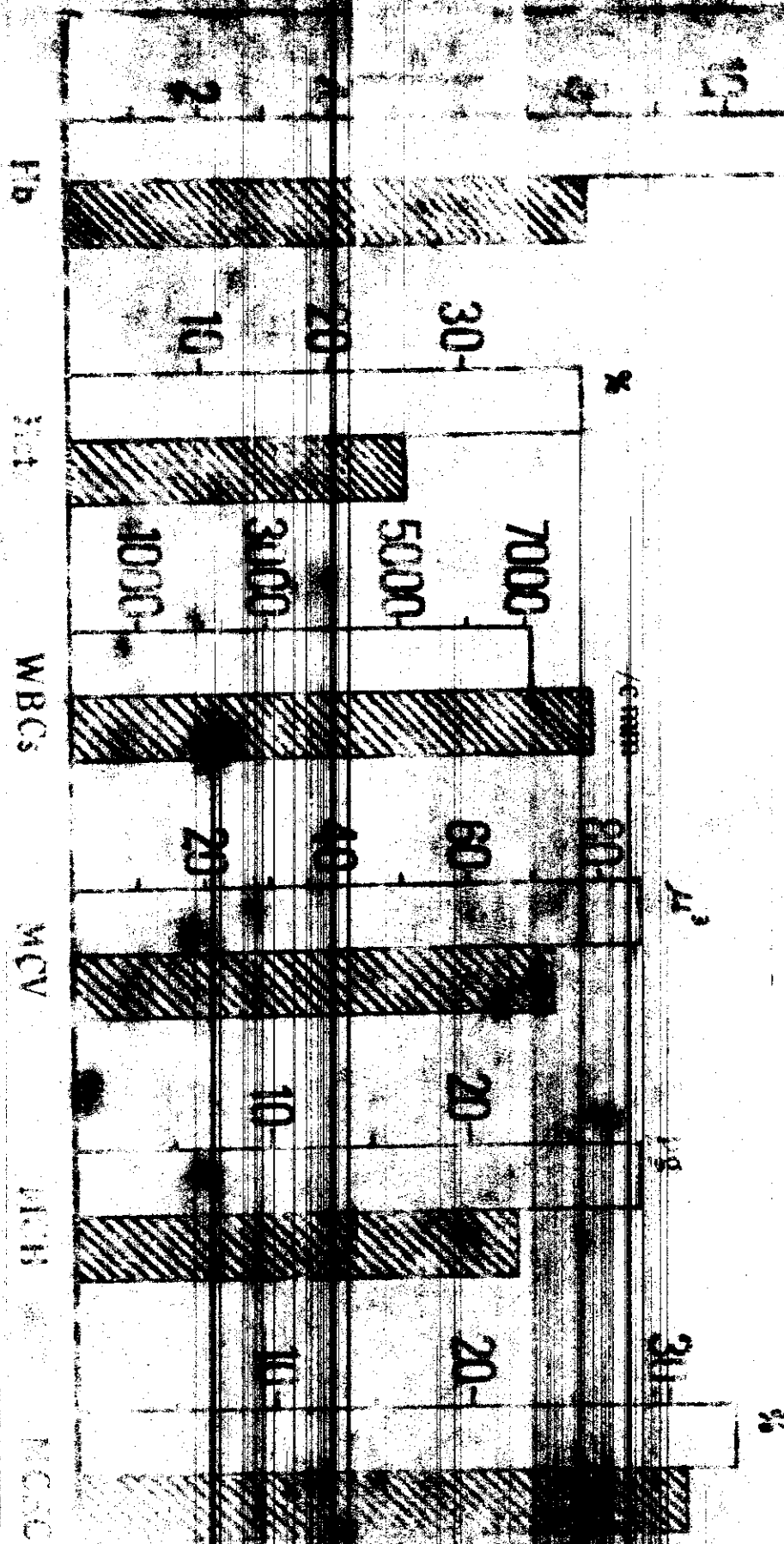
- P.P.D. = Purified protein derivative
- T.T. = Tetanus toxoid
- Sig. = Significance

Fig(1) Clinical data of iron deficient group.



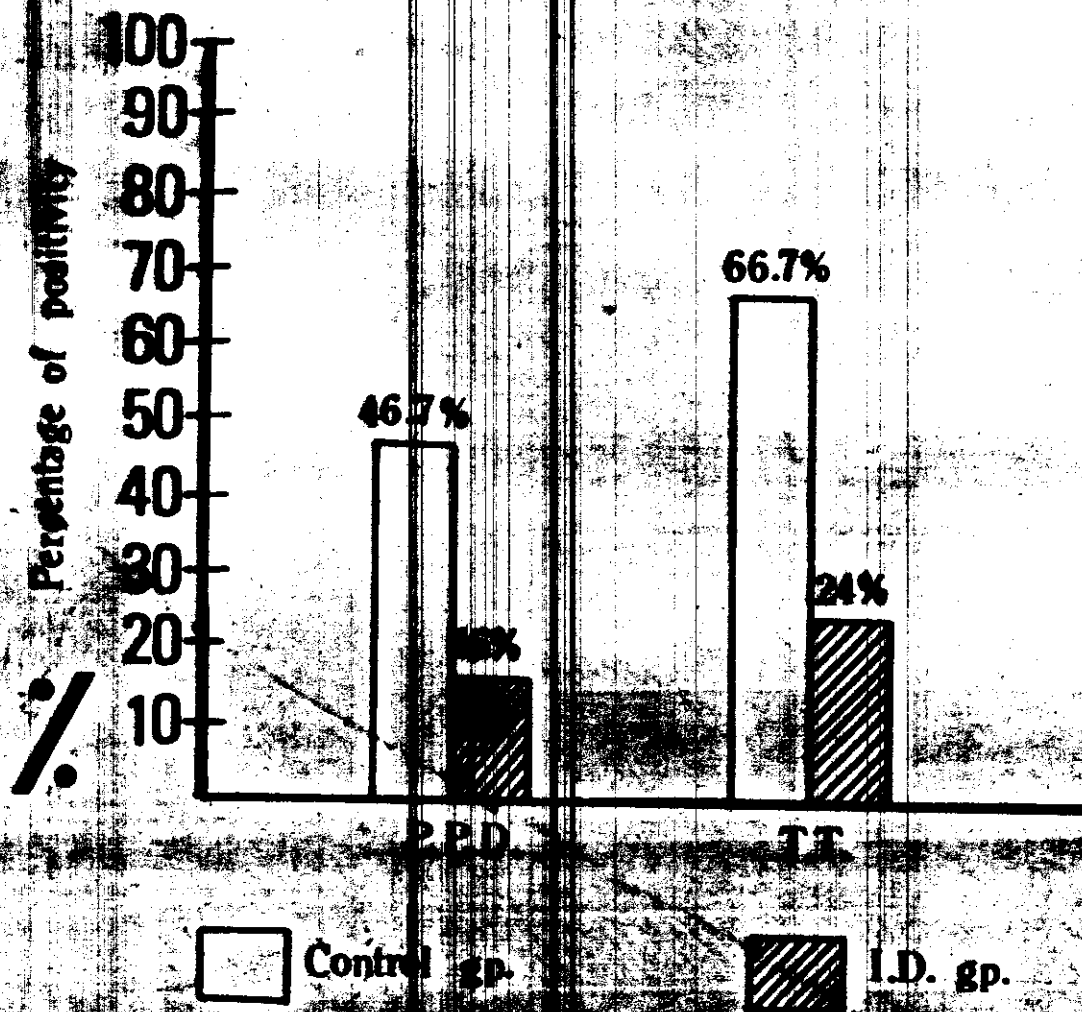


Fig(2) General data of control and iron deficient groups.

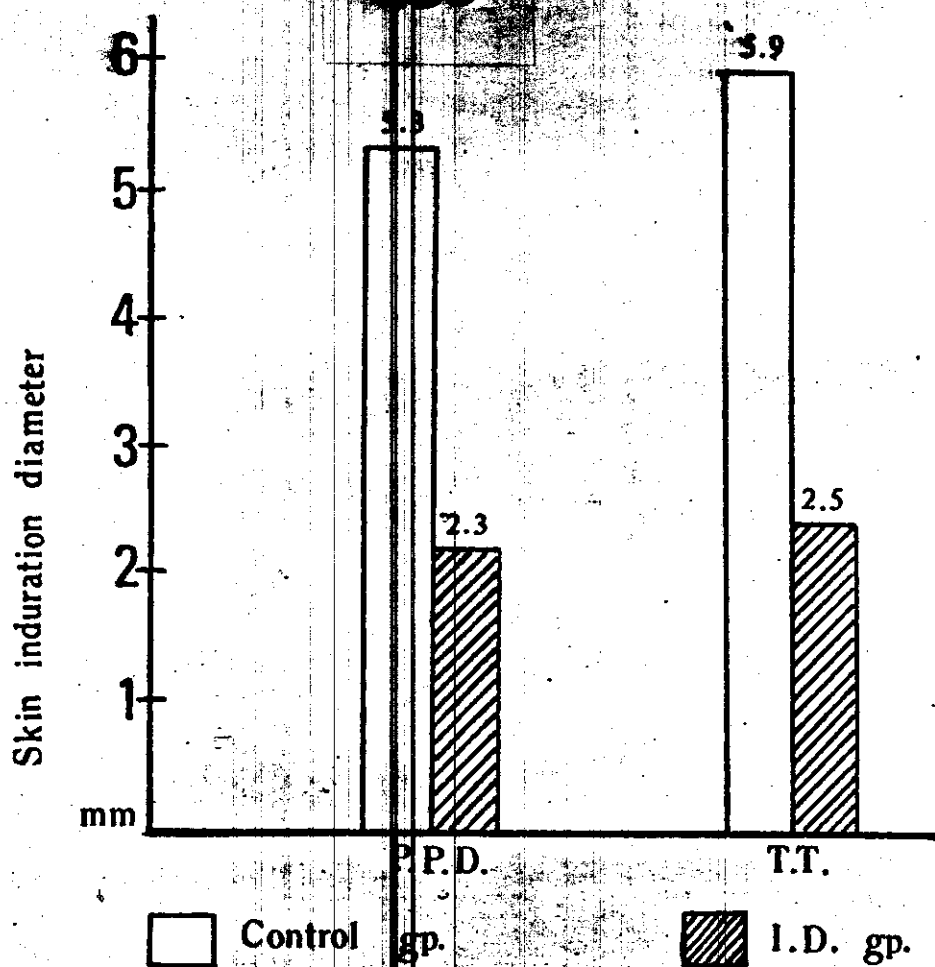


Control gp

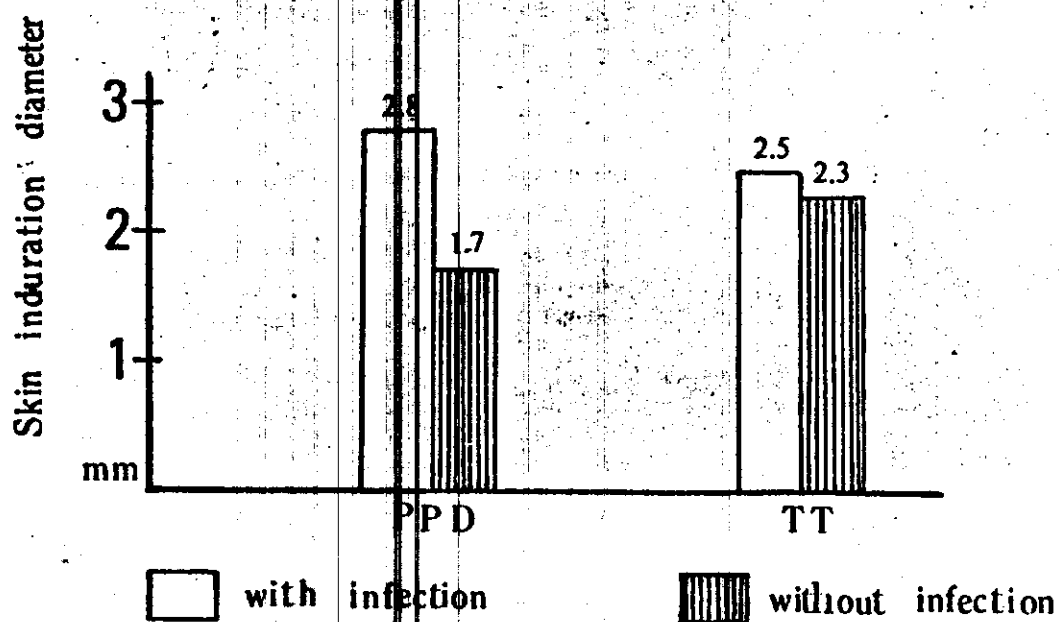
Hematologic data of control & patient groups



Fig(4) Percentage of positive skin tests
in control and iron deficient groups.



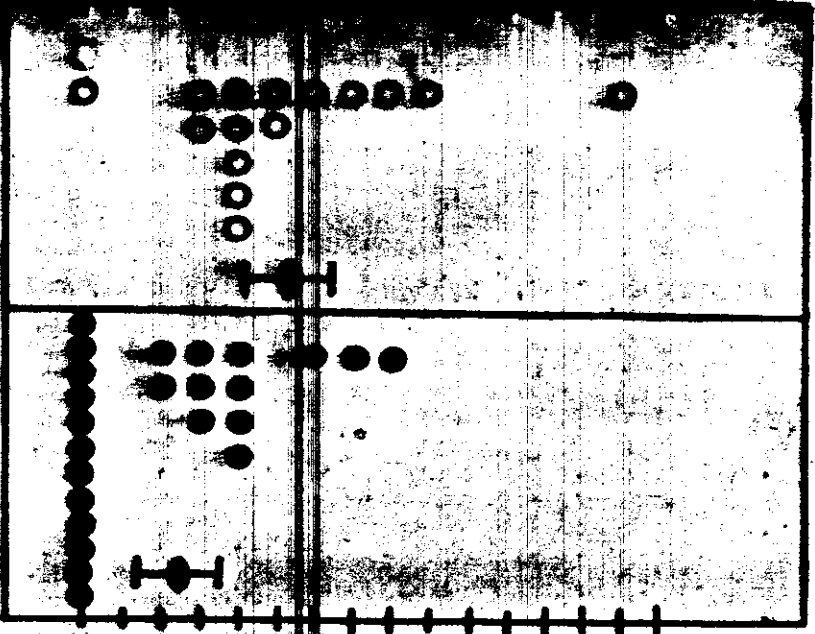
Fig(5) Mean skin induration diameter in control & iron deficient groups.



Fig(6) Mean skin induration diameter of patients presenting with & without infection, in iron deficient group.

Control gp. I.D. gp.

• Mean



Control gp. I.D. gp.

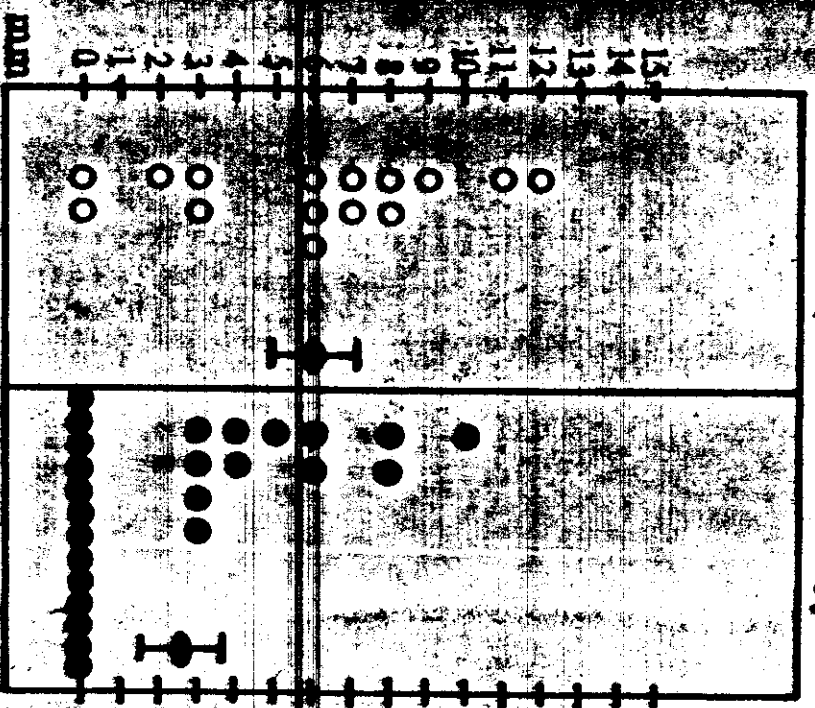


Fig. 7 Skin test results of control & iron deficient groups.