

# Morbidity in Bilharzia

Study Of An Outbreak In A Primary School Near Kitwe

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## SUMMARY

In a study of bilharzia in a school where 60% of the children were found to be infected with *Schistosoma haematobium*, a comparison was made between the infected and uninfected children in respect of Hb. percentage, weight, height, systolic and diastolic blood pressure and abnormalities found on clinical examination. Blood urea was determined in the infected children only, and were all found normal.

Finally backwardness at school was compared between the two groups.

The results of the examinations showed no significant difference between the infected and uninfected children.

## INTRODUCTION

There have been innumerable studies of bilharzia prevalence throughout the world and in recent years these have been carried out in increasing numbers in Zambia.

In very few of these studies, however, have serious attempts been made to investigate the disabilities accompanying the infection, though there have been some notable exceptions.

Gopsil (1931) in a survey in Nyasaland (now Malawi), where an incidence of 20% urinary bilharziasis was found, noted that none of the patients gave any history of urinary disease, none had cystitis and none appeared to be inconvenienced at all by their infection.

Fisher (1934) carried out a study of school children near Stanleyville in the Congo (now Zaire) where he found an incidence of 50% *S. intercalatum* ova in the stools. Not only were all his cases symptomless but a clinical examination revealed no difference between the infected and uninfected children.

Walker (1958) states that "observations up to the present suggest that differences between child populations with and without bilharziasis are small. The general impression therefore is that the handicap imposed by bilharziasis may well be less than is usually believed".

Wyndham (1966), in a study of African school children in Johannesburg, found that between the ages of nine and sixteen, bilharzia-infected children are not significantly different from non-infected with respect to height, weight and oxygen consumption and therefore mechanical efficiency.

Forsyth (1964), following a population study at Bukumbi, near Mwanza, Tanzania, also found no clinical evidence of differences between infected and uninfected groups of children.

"Bilharzia", writes Forsyth "has been said to cause tiredness, apathy and vague ill health."

"Absentee rates of infected and uninfected school children were virtually identical in Usagara and other schools, and it was not possible even with specially designed tests to demonstrate excessive lassitude in the infected."

"The estimation of haemoglobin has been routine, and after 4,500 such examinations, we have been unable to relate anaemia to infection with S. haematobium in any age or sex group."

"We have not found that bilharzia caused impairment of general physique or in the mean height and weight of population groups of any age."

Forsyth did, however, find a considerable percentage of children with hydronephrosis and hydroureter: the seriousness of this finding was open to doubt when later (1969) he reported that in many of the cases the radiological findings were reversible.

Bilharzial hydronephrosis and its reversibility have also been noted by Lucas et al (1966).

**Investigation of the effects of bilharzia in Mwambashi Primary School near Garneton (now Itimbi), Kitwe**

**INCIDENCE**

Following preliminary examinations with established an unusually high incidence of bilharzia in this school, it was decided to investigate the effects of the disease on the haemoglobin, blood urea, the general nutrition was reflected in the height and weight, and the mental ability as assessed by the school masters: other data examined were blood pressure, both systolic and diastolic. Finally any abnormalities found in the course of a clinical examination were noted, and the two groups, bilharzia positive and bilharzia negative, were compared.

Incidence of urinary bilharzia in Mwambashi School.

No. of children	333
Ova present in urine	201
Ova absent in urine	132
Incidence =	60%

**EFFECTS ON HAEMOGLOBIN**

Estimation of Hb. was carried out in 319 children:

190 with ova in the urine  
129 without ova in the urine, and the results recorded by a dot diagram (Fig. 1)

The two groups were then compared in two ways. Firstly, by calculating the average Hb. in each group and secondly, by constructing Hb. distribution curves so as to reveal any differences which might be concealed by mere average figures.

The curves were prepared by first tabulating the results to show the number and the percentage of children in each Hb. range \*7-8 gms% etc.). For example in the range 11-12 gms% Hb. there were 36 cases of positive ova (=19%, or 36/190 x 100), and 18 cases of negative ova (14%, or 18/129 x 100).

From this table, charts were constructed in Hb. ranges were plotted against percentages of children in each range.

**RESULTS**

Average Hb. values

Positive ova group of 190 children  
12.84%Hb.

Negative ova group of 129 children  
13.02%Hb.

The results can be regarded as identical.

**Comparison of Hb. distribution curves**

The ova positive and ova negative charts are close to coincidental. The percentage of anaemic and of high Hb. in the two groups are practically identical while the intermediate values do not differ significantly. (Fig. 2a & 2b).

**3. Measurement of Weight**

A total of 344 children were weighed: 201 were positive for ova in urine; 133 were negative. The results were recorded in a dot diagram (Fig. 3) with the aid of which weight distribution curves were constructed in the same way as in the case of Hb.

**Results**

Mean weight of positive group 30.1 kilos

Mean weight of negative group 30.3 kilos

These results can be regarded as identical.

The positive and negative distribution curves of weight are close to coincidental. (Fig. 4a & b)

**4. Measurement of Height**

The number of children measured for height was 335: of these 204 were positive for ova in urine and 131 were negative. Mean heights were calculated. The results were recorded in a dot diagram from which the heights were tabulated and height distribution curves constructed. (Fig. 5)

**Results**

Mean height of ova positive group  
138.6 cms

Mean height of ova negative group  
134.2 cms.

The difference is not significant.

Figure I  
HAEMOGLOBIN IN RELATION TO BILHARZIA

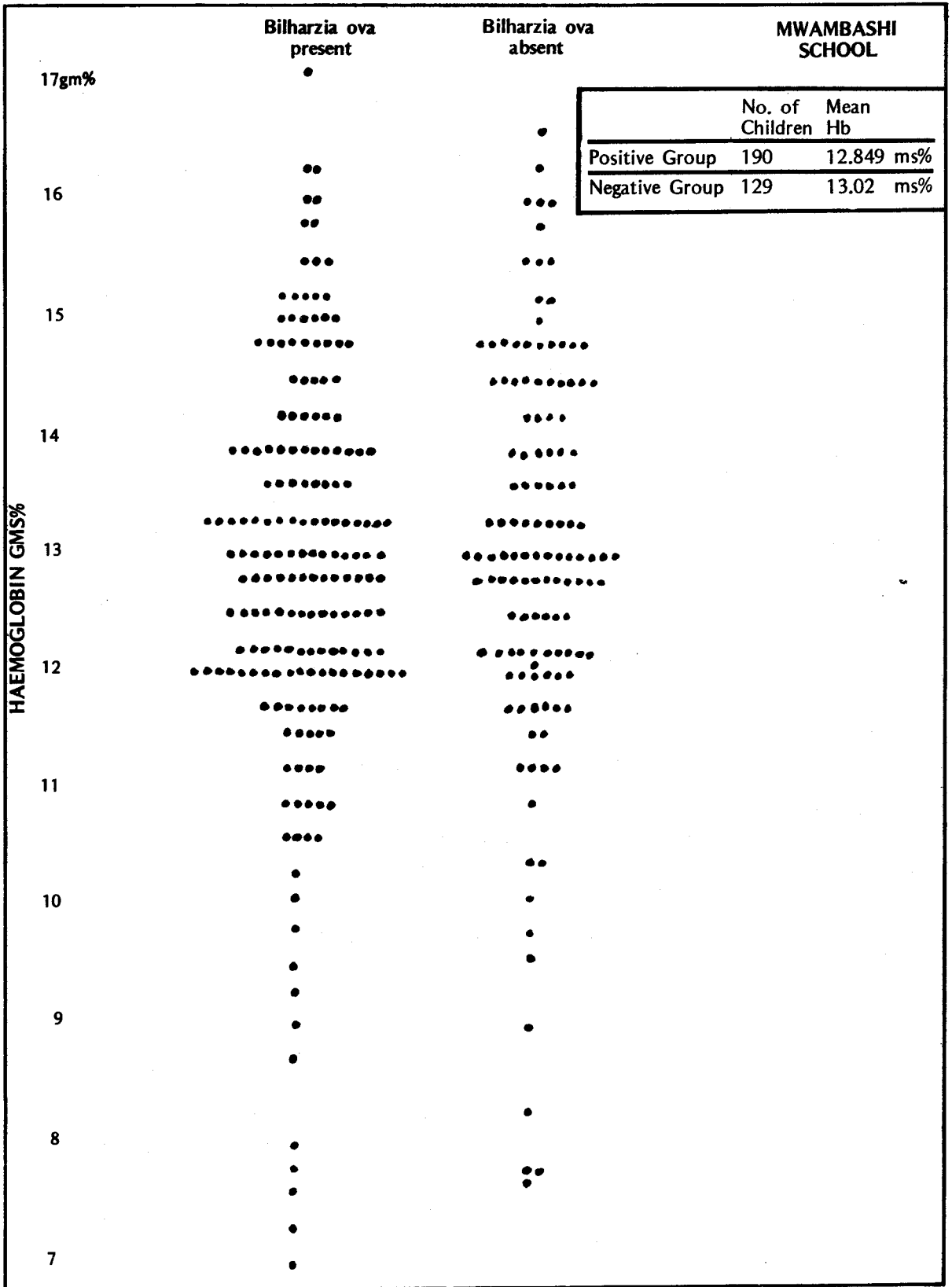


Fig. II

Comparison of Haemoglobin Distinction Curves

(a) HAEMOGLOBIN IN RELATION TO BILHARZIA

Tabulation of results to show no. of children in each Hb range		7-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18
Positive Group 190 Cases	No. of cases	5	2	3	11	36	54	38	26	12	2	1
	% of Positive	3	1	1.5	6	19	28	20	14	6.3	1	.5
Negative Group 129 cases	No. of cases	3	2	2	4	18	43	21	25	9	2	0
	% of Negatives	2	1.3	1.3	2.7	24	33	26	29	7	2.3	0

(b) Hb DISTRIBUTION CURVE

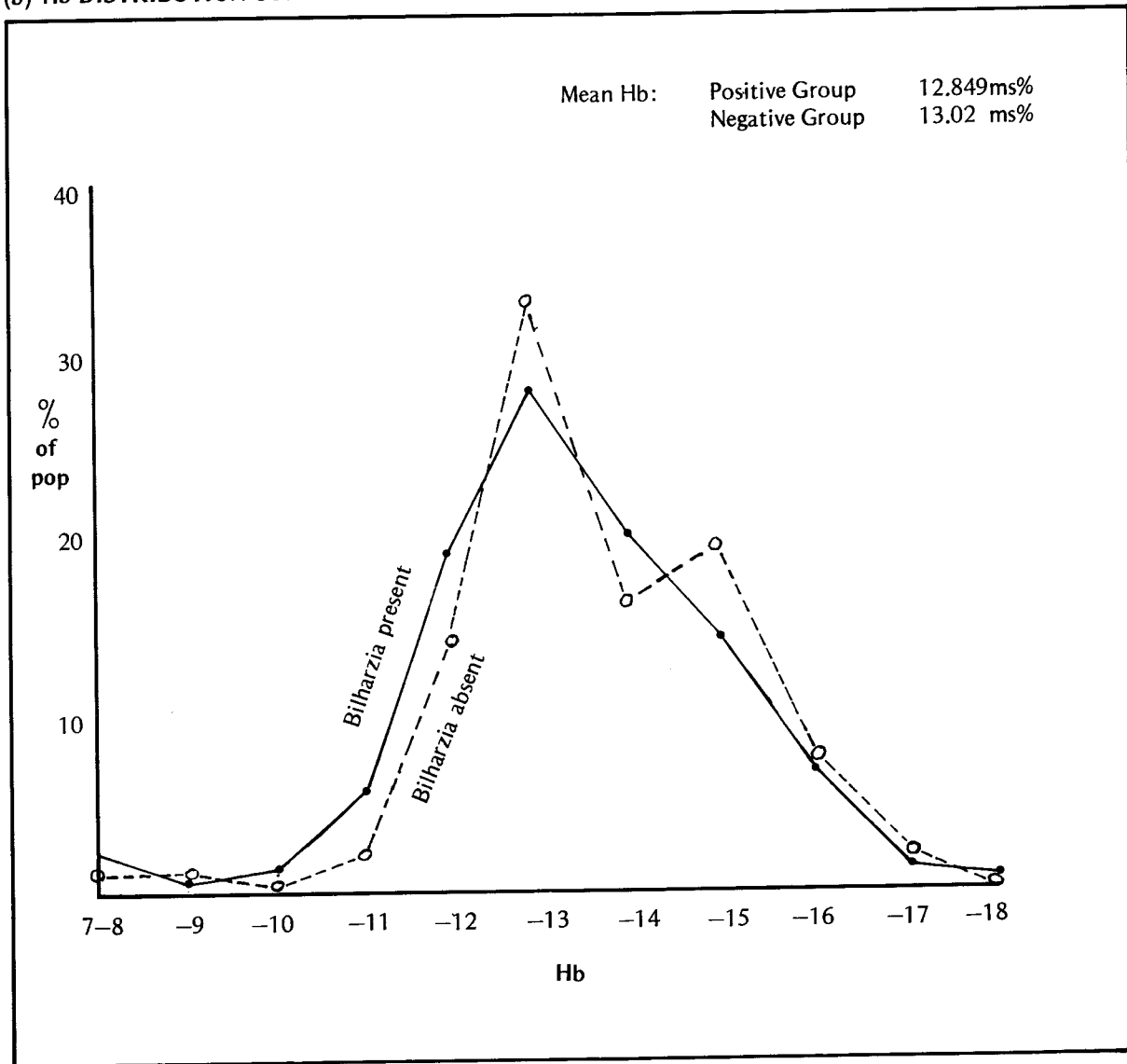


Figure III

WEIGHT IN RELATION TO BILHARZIA

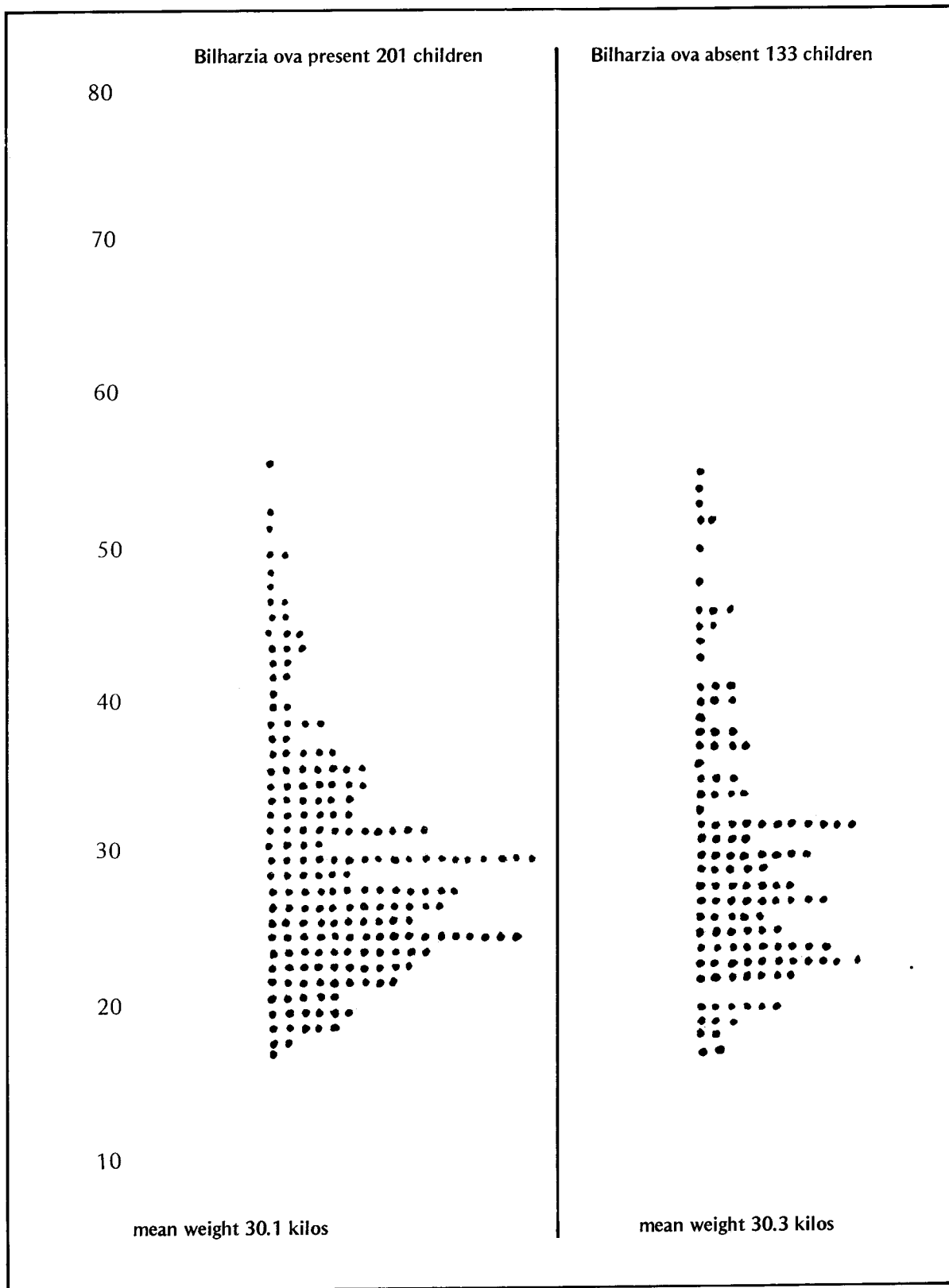


Figure IV

(a) Tabulation of results to show number of children in each weight range

Kilograms		15-20	-25	-30	-35	-40	-45	-50	-55	-60	-65	-70
Positive gp 201 cases	No. of cases	14	52	59	35	20	11	8	1	1	0	0
	& of positives	7	26	30	17	10	5	4	1	5	0	0
Negative 9p 133 cases	No. of cases	13	33	34	23	11	7	5	5	0	0	1
	% of negatives	10	25	26	17	8	5	4	4	0	0	1

(b) WEIGHT DISTRIBUTION CURVE

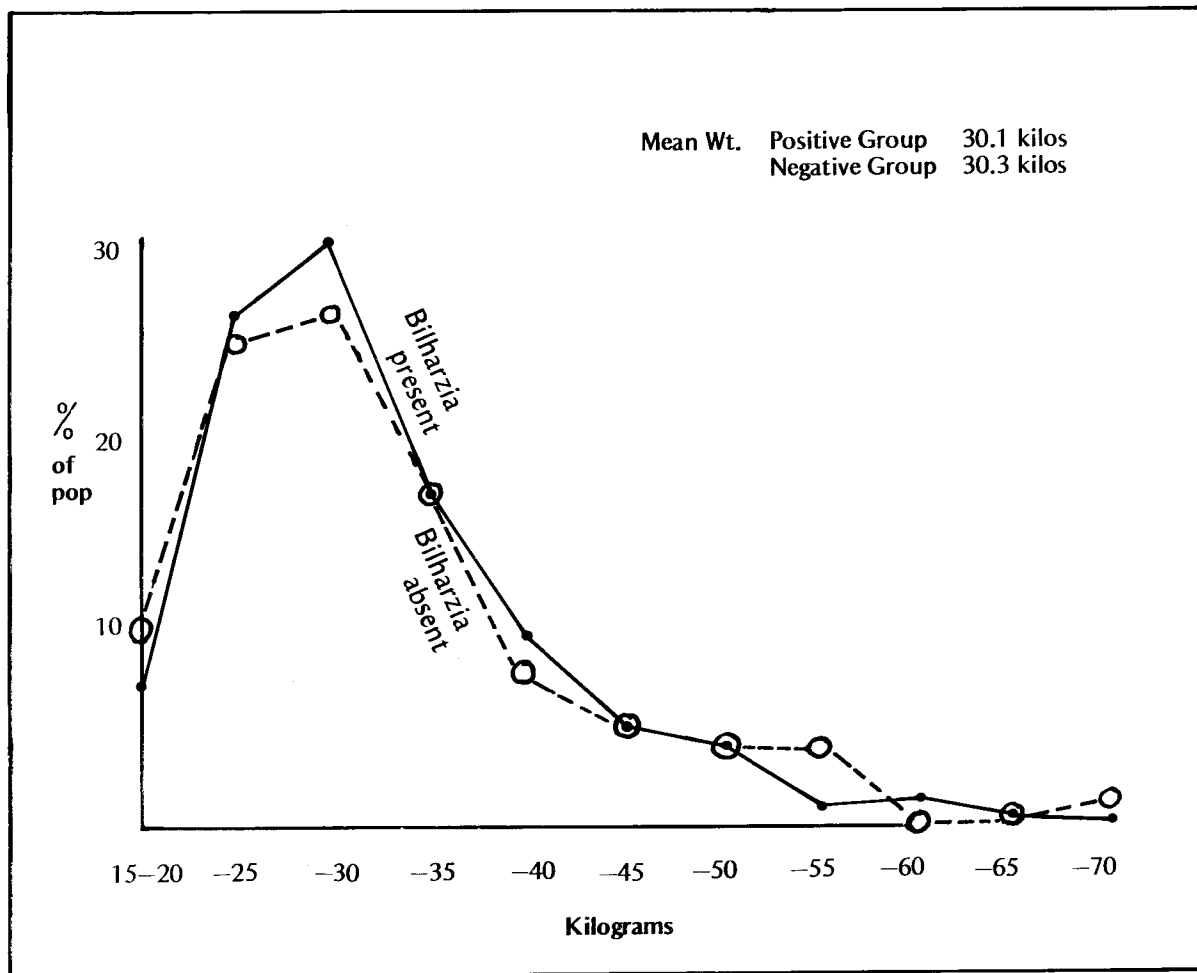
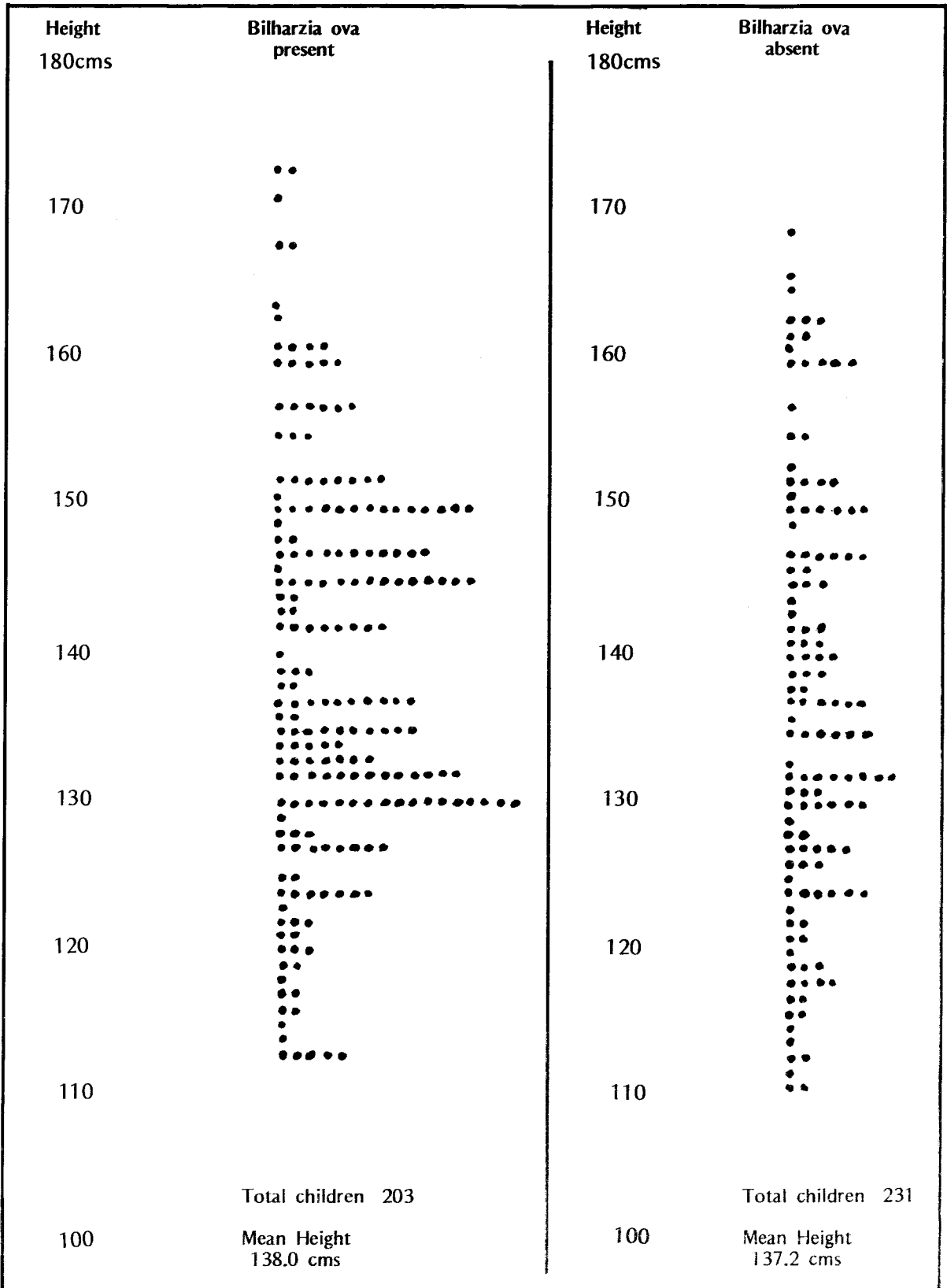


Figure V  
HEIGHT IN RELATION TO BILHARZIA



Height distribution curves. Although the charts show some differences in distribution, the variations balance out, resulting in similar averages. (Fig. 6)

5. Measurement of Blood Pressures  
Systolic and diastolic pressures were taken of most of the children: Averages were calculated but no distribution curves constructed.

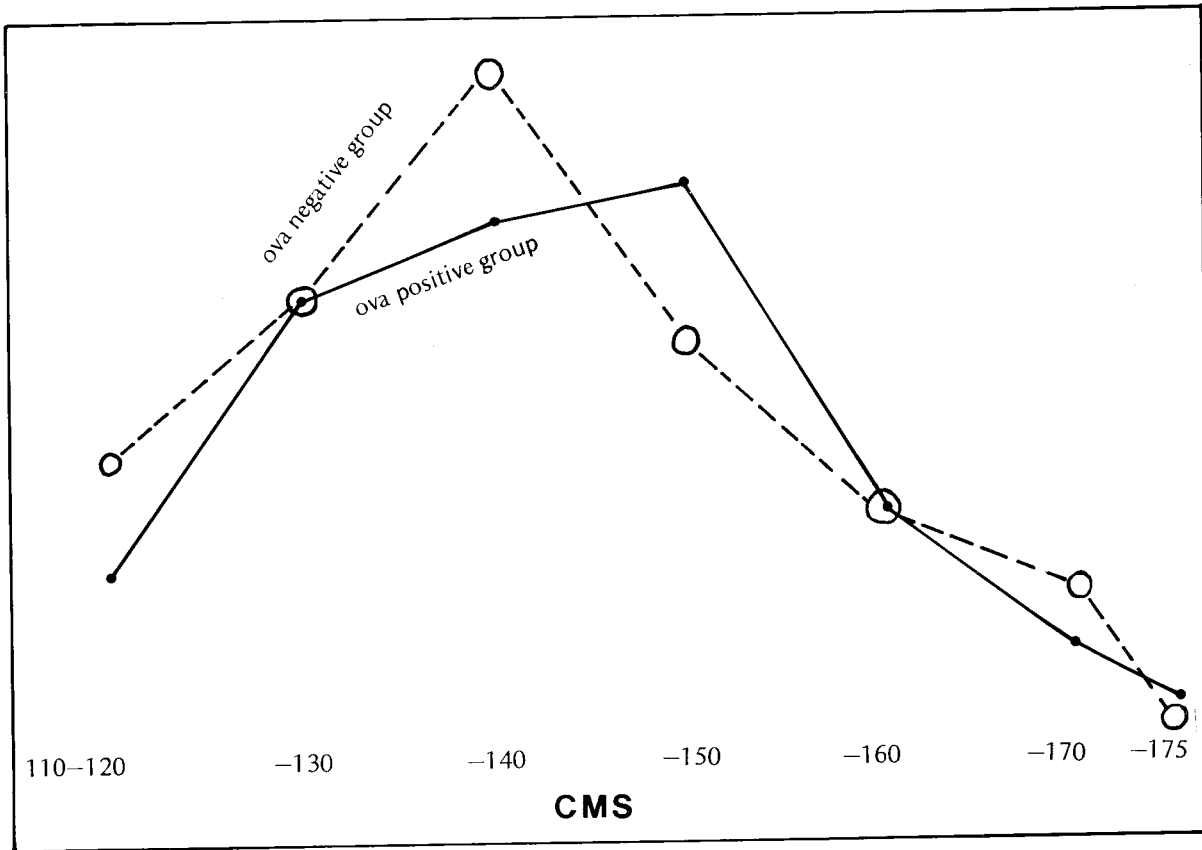
Figure VI

(a) **HEIGHT IN RELATION TO BILHARZIA**

Tabulation of results to show No. of Children in each Height-Range

Cm <sup>5</sup>		110-120	-130	-140	-150	-160	-170	-175
Positive (Total 204)	No	17	44	53	55	23	8	3
	% of total	8	22	26	28	11	4	1
Negative (Total 131)	No	19	29	44	26	14	9	0
	% of Total	14	22	34	20	11	7	0

(b) **HEIGHT DISTRIBUTION CURVE OF 335 CHILDREN**



**Note:** (a) 204 children were positive. These were compared with 131 who were ova negative.  
(b) Mean Ht. Positive Group 138 cms  
Negative 137.2



Results

Systolic: No of bilharzia positive children 203  
 mean pressure 105 mm.  
 No. of bilharzia negative children 130  
 mean pressure 104 mm  
 Diastolic: No. of bilharzia positive children 199  
 mean pressure 66.5 mm.  
 No. of bilharzia negative children 130  
 mean pressure 67.2 mm.

There is no significant difference between the blood pressures of the bilharzia positive and bilharzia negative groups.

6. Measurement of blood urea

This was estimated in all cases with ova in the urine: the results all lay within normal limits.

7. Assessment of "Brightness"

No academic tests of intelligence were used, but the masters were asked to classify the children into three groups: bright, average and dull.

Eighty-three children were classified: of these the number with ova in the urine was 46; the number without was 37.

Result

	ova positive group	ova negative group
% of bright children	41	35
average	37	49
dull	22	16

The ova positive group had both more bright children (by 6%) and more dull ones (also by 6%).

Although interpretation must be guarded with so small a number of children tested, there was no evidence that bilharzia causes backwardness at school.

8. Abnormalities found on clinical examination.

Out of 204 children with ova in the urine, there were abnormalities in 28, or 14%.

Out of 131 children without ova there were abnormalities in 17, or 13%.

The abnormalities were divided into 2 classes:

- Class A: No relationship to bilharzia likely
- Class B: relationship to bilharzia possible.

Conclusion: There is no significant difference in the Class B abnormality incidence in the 2 groups.

9. Incidence of the serious complications of bilharzia — hydronephrosis, hepatic cirrhosis, pulmonary disease.

Dr. Mehta, who was associated with me in the investigations, examined all the children and found no evidence of any of these complications.

Although many reports have been published about them, I have been unable to find any data on their incidence, and it seems important to obtain such data if a true assessment of the seriousness of bilharzia is to be achieved.

A study of the causes, incidence and severity of hydronephrosis in a large series of post mortem examinations in Zambia has been carried out recently, and no significant correlation between this condition and bilharzia was found. It is hoped to publish details of this study shortly.

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