UNIVERSITY OF CAPE TOWN

DEPARTMENT OF MATHEMATICAL STATISTICS

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A STATISTICAL ANALYSIS OF THE CERES PROJECT

BY

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A thesis prepared under the supervision of Professor C.G. Troskie of the Department of Mathematical Statistics in fulfilment of the requirements for the degree of Master of Science

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TO ROB
AND MY PARENTS

P R E F A C E

This thesis has the dual purpose of fulfilment of the requirements for the degree of Master of Science as well as a statistical report to Blair Research Laboratory, Salisbury, to whom I am indebted for allowing me to use the data they had collected. I am grateful to the director, Dr. V. de V. Clarke, for his help and co-operation.

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D. Bradshaw
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C O N T E N T S

CHAPTER ONE

1.1 INTRODUCTION

There is still a controversy about the importance of Schistosomiasis as a cause of mortality or of morbidity. However, the majority of researchers accept that it can be detrimental to health, especially where the transmission is intense and the worm load is consequently high. More objective evidence is required to assess the severity of the disease and in particular the relationship, if any, between the degree of infection and morbidity in the individual. There is considerable speculation that sub-clinical infections due to Bilharzia can depress productivity and thus have an economic consequence.

Rhodesia is one of the most progressive countries in Africa in the field of water conservation and in the development of irrigation and water resources. The pattern of Schistosome infections and transmission is therefore changing and it is expected that the disease is becoming more prevalent and more intense. For this reason the Ceres Programme was instituted by the Blair Laboratory, Rhodesia, to investigate the Social, Economic and Health Impact of Schistosomiasis.

1.2 THE CERES PROGRAMME

An investigation took place on a group of farms situated in a small catchment area in the Poti River Valley in the Shamva District in Rhodesia. This was undertaken by the Blair Research Laboratory with the support of the Blair Research Trust and in co-operation with specialists from various complementary fields of study. The farms to be included were Palm Grove, Ceres D, Ceres R, Bamboo Creek, Woodlands and Burnleigh, as well as a small Pyrites mine, Dodge Mine, situated on Palm Grove Farm. Schistosomiasis is known to be highly prevalent in this area and the 7 employers involved were directly supporting over 2000 people, ranging in socio-economic level from farm managers, clerks, teachers to labourers as well as their families. The farmers were co-operative with the research programme as they were anxious to improve the situation.

1.3 OBJECTIVES

The purpose of the study was to investigate the Social, Economic and Health Impact of Schistosomiasis as follows:

(a) To assess the frequency of occurrence of clinical manifestations of Schistosome infections;

(b) To assess the influence of intensity of infection, as measured by egg output, on frequency and severity of clinical manifestations of these infections;

(c) To assess the influence of apparently sub-clinical infections on physical and mental activity and well-being;

(d) To investigate why some people do not become infected;

(e) To investigate the interactions of schistosome infections and other diseases and illnesses.

1.4 CHARACTERISTICS OF THE AREA

It was expected that most of the people in this area would have been exposed to the infections of Schistosoma Mansoni, Schistosoma Haematobium and Shistosoma Mattheei. Since Schistosoma Mattheei is a parasite of domestic stock which is only occasionally found in man, it was expected that the prevalence and the intensity of this disease would be low.

Malnutrition was not common and housing was largely traditional (thatched, wood and mud plaster huts), although an exceptionally high standard of housing was available to the higher grades of employees. Sanitation was almost non-existent for the labourers and domestic water was drawn mostly from the river, the canal or from the numerous reservoirs, weirs and dams on the farms. The canal draws water, via a tunnel through and under the watershed, from the Umwindzi River to which four of the farms had irrigation rights resulting in approximately 500 hectares being irrigated. Where there was dry land cultivation the most important crop was cotton and hence there was a large migrant labour force which visited during the cotton-picking season. However, over 500 people were permanently employed by the

farmers and the mine resulting in over 2000 people being in the area.

Unfortunately the political problem in Rhodesia caused this area to suffer an intimidation persuading the Blacks to refuse to co-operate with the Whites resulting in two of the farms going broke (Palm Grove Farm and Ceres D Farm) and the labourers leaving the area. This resulted in the study being much smaller than had been originally hoped with Palm Grove Farm not contributing at all. In fact only 674 people were investigated but it has been assumed that the sample was not biased by this reduction. Furthermore, the threat of terrorists was heightened when the medical assistant who ran the clinic turned in a terrorist, and in fact the clinic had to be moved to another site.

1.5 DETAILS OF THE INVESTIGATION

A questionnaire was constructed by members of the Department of Mathematical Statistics, University of Cape Town and the Blair Research Laboratory, Rhodesia which would cover all aspects to be investigated. A copy of the questionnaire may be found in Appendix One and comprises the following nine pages:

1. Individual Identification, Personal Information and Socio-Economic Information;
2. Parasitology;
3. Biochemistry and Haematology;

4. Clinical and Physical Examination;

5. Symptoms and Complaints;

6. Mental Performance and Skin-Fold Thickness;

7. Anthropometry;

8. Treatment History;

9. History of Occasional Illnesses.

The socio-economic factors which were thought possibly to be related to Schistosomias were included in the questionnaire and in particular the water source of the person was noted. Specimens of urine and stool were examined for Schistosome infections as well as other parasites. Laboratory tests were done to investigate the biochemistry of the urine and the blood and also to investigate the haematology. Each person was to have a physical and clinical examination by medical personnel and have anthropometric measurements taken to give an indication of nutrional status. A record of all complaints or illnesses occurring in the people was maintained at the clinic and psychological tests were used to indicate the person's basic or potential mental ability as well as their power of concentration. The Eysenck Personality tests were used to investigate the possibility that mental stability, supposed to depend on emotional state, is influenced by health and in particular by Bilhazia. When a person was found to be suffering from a Schistosome infection they were treated with the necessary drugs; Metrifonate for Schistosoma Haematobium and Oxamniquine for

Schistosoma Mansoni or both Schistosome infections. The history of all medical episodes was to be recorded, however due to Dr. Rittey's unfortunate death, this was omitted from the analysis as it would lack continuity in evaluation of diagnosis. Many cases were not complete as a result of the political problem in Rhodesia, as mentioned earlier, which makes the statistical analysis even more difficult.

C H A P T E R T W O

2.1 STATISTICAL APPROACH

Before any data analysis is performed, a preliminary data screening should be done to assess the validity of the observations and to try to eliminate punching errors in the computer cards. The BMDP2D programme providing simple descriptive measures such as frequency distributions, mean values, standard deviations and ranges was used to investigate the feasibility of the data. Once this was established the statistical analysis could be performed.

The statistical technique used was determined by the particular factor being investigated and also by the fact that the survey was of a case-control design (i.e. a group of individuals affected by the disease to be compared with a group of individuals not affected by the disease). In many instances the data formed contingency tables in which case the non-parametric χ^2-test was used. When the data was thought to follow an approximately normal distribution, the Student's t-test was used to compare sample means. Cluster Analysis was applied to investigate the grouping of similar variables. For the particular analysis of the Geometric Shapes test for the power of concentration, the technique of Analysis of Covariance was used to compare the groups over the 4 repetitions of the test. Various BMDP programmes were used on a UNIVAC

1106 computer for the required calculations. The following sections explain briefly the statistical theory of the techniques which were used.

2.2 CONTINGENCY TABLES

Data is said to form a contingency table when it can be categorised into the levels of 2 factors simultaneously (i.e. r rows and c columns). We are concerned with the null hypothesis that the factors involved are independent of each other (i.e. that the probabilities of falling into the various rows are independent of the columns). The maximum likelihood statistic ℓ used to test this null hypothesis against an alternative does not have a known distribution although it can be shown that when the null hypothesis is true $-2 \log \ell$ is asymptotically χ^2-distributed with $k-1$ degrees of freedom (where k is the number of classes). It can be shown that $-2 \log \ell$ is the statistic

$$\chi^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{(o_{ij}-e_{ij})^2}{e_{ij}}$$

where o_{ij} = observed frequency of the cell in i^{th} row and j^{th} column.

e_{ij} = expected frequency of the cell in i^{th} row and j^{th} column when the factors are independent.

which is approximately $\chi^2_{(k-1)}$-distributed, (Kendal and Stuart (1973), Chapters 30 and 33).

This approximation is not very good for the case of e_{ij} being small. There are various opinions concerning this, however, it is generally accepted that the e_{ij} should not be less than 5 for at least 80% of the cells, and also that no e_{ij} should be less than 1 for the approximation to be reasonable. When smaller e_{ij} are used, the result of the significance test should be regarded with caution.

2.3 STUDENT T-TEST BETWEEN TWO SAMPLE MEANS

To test the hypothesis that the means from 2 populations are the same against the hypothesis that they are different we use the sample test statistic

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}\sqrt{\frac{(n_1-1)S_1^2+(n_2-1)S_2^2}{n_1+n_2-2}}}$$

where $\bar{X}_i$ is the mean of the i^{th} sample

S_i is the standard deviation of the i^{th} sample

n_i is the size of the i^{th} sample.

This statistic has a Student t-distribution with n_1+n_2-2 degrees of freedom, (Armitage (1971)).

2.4 CLUSTER ANALYSIS

This is a multivariate technique of grouping similar variables based on some index of similarity (it could also be used to group similar individuals). The technique can be

divided into the following 2 steps:

1. Defining a meaningful measure of association/ similarity/distance between each pair of individuals.
2. Defining a clustering criterion and a clustering algorithm which uses the measure already defined.

Many measures of association between 2 variables have been defined and successfully used. The product moment correlation coefficient r is a very common measure and in the case of binary data r^2 is proportional to χ^2. Further, since the BMDP1M uses r as a measure of association it was decided to use r for the analysis of this data.

To cluster variables an hierarchical method must be used, i.e. either by the joining of clusters (from clusters of one variable each to one cluster containing all the variables) or by breaking down of clusters (starting with one cluster with all the variables until there are many clusters of one variable only). Once the variables have been clustered hierarchically a cut-off is chosen such that the clusters differ enough not to be amalgamated. Numerous algorithms to achieve the hierarchical clustering have been devised and each has its own attributes. Again the availability of computer programmes dictated the choice and the method of Average Linkage was used as an Amalgamation Rule, i.e. once the clusters are being formed then the correlation r between 2 clusters is taken to be the average correlation between a variable in the one

cluster with a variable in the other cluster, (Anderberg (1973)).

2.5 ANALYSIS OF COVARIANCE

The one-way Analysis of Covariance is the technique used to compare different groups where the measurements need to be adjusted in a linear manner by one or more covariates, (i.e. it is the comparison of several regressions). This was used to investigate the Geometric Shapes test by comparing the score of the correct, adjusted by the number of errors and the particular run.

The one-way Analysis of Covariance with 2 concomitant variables has the underlying model

$$y_{ij} = \mu + \alpha_i + \beta_1 X_{1ij} + \beta_2 X_{2ij} + e_{ij} \qquad \begin{matrix} i = 1,\ldots,I \\ j = 1,\ldots,n_i \end{matrix}$$

$$\Sigma_i \alpha_i = 0$$

$$e_{ij} \ \text{IND}(0,\sigma_e^2)$$

Firstly we may test the hypothesis that the slopes are the same, i.e. $H_0: \beta_1 = \beta_2$ and if this is accepted we may proceed to test the hypothesis that the lines coincide, i.e. $H_0: \alpha_1 = \alpha_2 = 0$. The required formula for the sums of squares used to test these hypotheses may be found in Scheffé (1959), Chapter 6, and will not be given here.

If a significant difference between the groups is found, then multiple comparisons (S-method) should be computed to

determine which of the groups differ from each other. However, when only 2 groups are being investigated and a significant difference has been established, the nature of the difference may be ascertained by observation, (Scheffé (1959), Dunn and Clark (1974)).

2.6 YOUDEN'S STATISTIC OF DIAGNOSTIC VALUE

When a diagnostic test can be compared with a true diagnosis, or at least with one based on more refined methods, then it is desirable that there will be few misclassified cases. For each class of individual, true positive and true negative, we can consider the proportions that the test classifies as positive or as negative in the following manner:

		True Diagnosis	
		-	+
Test Diagnosis	-	$1-\alpha$	β
	+	α	$1-\beta$

Hence β is the proportion of false negatives and α is the proportion of false positives. If the two errors are of approximately equal importance then the Youden diagnostic index, J, is useful in evaluating the test.

$$J = 1 - (\alpha+\beta)$$

If the test has no diagnostic value then $\alpha = 1-\beta$ and $J = 0$, and if the test if invariably correct then $\alpha = \beta = 0$ and $J = 1$.

When a sample is taken then we may estimate these properties with the sample proportions to get an estimate of the diagnostic value of the test, (Armitage (1971))

$$\hat{J} = 1 - (\hat{\alpha}+\hat{\beta}).$$

CHAPTER THREE

3.1 PRESENTATION OF RESULTS

The results of the investigation are extremely detailed and hence a systematic approach has been adopted whereby each factor is analysed and presented separately following the same order as the questionnaire. In the subsequent sections the distribution of the infection for each factor is tabulated as well as the collapsed distribution which was used for the calculation of the significance test (levels had to be joined to ensure that the frequencies were not too small to perform the χ^2-test). Each factor was analysed with respect to Schistosoma Haematobium and then with respect to Schistosoma Mansoni.

3.2 INCIDENCE

Of the 674 subjects in the survey the following numbers were found to be initially infected with Bilharzia.

Infection	Frequency	Percentage
Schistosoma Haematobium	221	32,8%
Schistosoma Mansoni	166	17,2%
Schistosoma Mattheei	6	0,9%

Due to the low incidence of Schistosoma Mattheei, it was not analysed further. Some subjects were found to be infected by both Schistosoma Haematobium and Schistosoma Mansoni and the distribution is as follows:

Infection	Frequency	Percentage
Schistosoma Haematobium and S. Mansoni	92	13,6%
Schistosoma Haematobium only	129	19,1%
Schistosoma Mansoni only	74	11,0%
Neither	379	56,2%

3.3 PERSONAL INFORMATION

The distributions for the infections are as follows:

3.3.1 SEX

T A B L E 3.3.1.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
MALE	309 68,2%	81 57,0%	18 54,5%	25 71,4%	4 50,0%	2 66,7%	439 65,1%
FEMALE	144 31,8%	61 43,0%	15 45,5%	10 28,6%	4 50,0%	1 33,3%	235 34,9%
TOTAL	453	142	33	35	8	3	674

Note: The following will be used to indicate significant test statistics

* $p < 0,05$
** $p < 0,01$

T A B L E 3.3.1.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
MALE	309 68,2%	81 57,0%	49 62,0%	439 65,1%
FEMALE	144 31,8%	61 43,0%	30 38,0%	235 34,9%
TOTAL	453	142	79	674

$\chi^2 = 6,32^*$ df = 2

The calculated χ^2-value from Table 3.3.1.1b is significant at the 0,05 level of significance which means that the infection Schistosoma Haematobium has different distributions for males and females. From Table 3.3.1.1a it can be seen that females have a higher incidence than males.

T A B L E 3.3.1.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
MALE	337 66,3%	74 56,5%	25 86,2%	1 25,0%	2 100%	439 65,1%
FEMALE	171 33,7%	57 43,5%	5 13,8%	3 75,0%	0 0%	235 34,9%
TOTAL	508	131	29	4	2	674

T A B L E 3.3.1.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
MALE	337 66,3%	74 56,5%	28 80,0%	439 65,1%
FEMALE	171 33,7%	57 43,5%	7 20,0%	235 34,9%
TOTAL	508	131	35	674

$\chi^2 = 8,03^*$ df = 2

The significance of the χ^2-value at the 0,05 level indicates that Schistosoma Mansoni has different distributions for males and females. From Table 3.3.1.2a it can be seen that the females have a higher incidence than the males, although the males have relatively more severe cases.

3.3.2 FARM

TABLE 3.3.2.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
CERES D	54 11,9%	32 22,5%	1 3,0%	2 5,7%	0 0%	0 0%	89 13,2%
CERES R	103 22,7%	31 21,8%	10 30,3%	7 20,0%	0 0%	2 66,7%	153 22,7%
BAMBOO CREEK	69 15,2%	40 28,2%	6 18,2%	6 17,1%	1 12,5%	1 33,3%	123 18,2%
WOODLANDS	154 34,0%	29 20,4%	6 18,2%	15 42,9%	3 37,5%	0 0%	207 30,7%
BURNLEIGH	73 16,1%	10 7,0%	10 30,3%	5 14,3%	4 50,0%	0 0%	102 15,2%
TOTAL	453	142	33	35	8	3	674

TABLE 3.3.2.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
CERES D	54 11,9%	32 22,5%	3 3,8%	89 13,2%
CERES R	103 22,7%	31 21,8%	19 24,1%	153 22,7%
BAMBOO CREEK	69 15,2%	40 28,2%	14 17,7%	123 18,2%
WOODLANDS	154 34,0%	29 20,4%	24 30,4%	207 30,7%
BURNLEIGH	73 16,1%	10 7,0%	19 24,1%	102 15,2%
TOTAL	453	142	79	674

$\chi^2 = 42,33^{**}$ df = 8

Note: * $p < 0,05$

** $p < 0,01$

The calculated χ^2-value is significant at the 0,01 level, which implies that the incidence and severity of Schistosoma Haematobium differs from farm to farm. It can be seen from Table 3.3.2.1a that Ceres D and Bamboo Creek experienced a higher, while Woodlands and Burnleigh experienced a lower incidence. The severe cases occurred at Ceres R and Bamboo Creek.

T A B L E 3.3.2.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
CERES D	62 12,2%	27 16,3%	0 0%	0 0%	0 0%	89 13,2%
CERES R	113 22,2%	40 24,1%	9 31,0%	0 0%	0 0%	153 22,7%
BAMBOO CREEK	82 16,1%	41 24,7%	10 34,5%	0 0%	0 0%	128 18,2%
WOODLANDS	177 34,8%	30 18,1%	3 10,3%	2 50%	1 50%	207 30,7%
BURNLEIGH	74 14,6%	28 16,9%	7 24,1%	2 50%	1 50%	102 15,2%
TOTAL	508	166	29	4	2	674

T A B L E 3.3.2.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
CERES D	62 12,2%	27 16,3%	0 0%	89 13,2%
CERES R	113 22,2%	40 24,1%	9 25,7%	153 22,7%
BAMBOO CREEK	82 16,1%	41 24,7%	10 28,6%	128 18,2%
WOODLANDS	177 34,8%	30 18,1%	6 17,1%	207 30,7%
BURNLEIGH	74 14,6%	28 16,9%	10 28,6%	102 15,2%
TOTAL	508	166	35	674

$\chi^2 = 31,37^{**}$ df = 8

The significance of the χ^2-value at the 0,01 level, means that the incidence and severity of Schistosoma Mansoni differs from farm to farm. From Table 3.3.2.2a it can be seen that Ceres D, Ceres R and Bamboo Creek have experienced a higher incidence while Woodlands and Burnleigh have experienced a lower incidence. The severe cases occurred at Woodlands and Burnleigh.

3.3.3 COUNTRY OF ORIGIN

T A B L E 3.3.3.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
RHODESIA	243	53,6%	92	64,8%	22	64,7%	29	85,3%	7	87,5%	3	100%	396	58,8%
MALAWI	147	32,5%	31	21,8%	10	29,4%	3	8,8%	1	12,5%	0	0%	200	29,7%
MOZAMBIQUE	56	12,4%	10	7,0%	2	5,9%	2	5,9%	0	0%	0	0%	70	10,4%
ZAMBIA	7	1,5%	1	0,7%	0	0%	0	0%	0	0%	0	0%	8	1,2%
TOTAL	453		142		34		34		8		3		674	

T A B L E 3.3.3.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
RHODESIA	243	54,5%	92	65,2%	61	77,2%	396	59,5%
MALAWI	147	33,0%	31	22,0%	14	17,7%	200	30,0%
MOZAMBIQUE	56	12,6%	10	7,1%	4	5,1%	70	10,5%
TOTAL	446		141		79		666	

$\chi^2 = 20,71^{**}$ df = 4

The calculated χ^2-value from Table 3.3.3.1b is significant at the 0,01 level which means that the incidence and and severity of the infection Schistosoma Haematobium is dependent on the country of origin. From Table 3.3.3.1a it can be seen that the people originally from Rhodesia experienced a high, severe incidence while those people originally from Malawi, Mozambique or Zambia experienced a lower incidence.

T A B L E 3.3.3.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
RHODESIA	290 57,1%	83 63,4%	19 65.5%	3 75%	1 50%	396 58,8%
MALAWI	155 30,5%	34 26,0%	9 3,1%	1 25%	1 50%	200 29,7%
MOZAMBIQUE	57 11,2%	12 9,2%	1 3,4%	0 0%	0 0%	70 10,4%
ZAMBIA	6 1,2%	2 1,5%	0 0%	0 0%	0 0%	8 1.2%
TOTAL	508	131	29	4	2	674

T A B L E 3.3.3.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
RHODESIA	290 57,8%	83 64,3%	23 65,7%	396 59,5%
MALAWI	155 30,9%	34 26,4%	11 31,4%	200 30,0%
MOZAMBIQUE	57 11,4%	12 9,3%	1 2,9%	70 10,5%
TOTAL	502	129	35	666

$\chi^2 = 4,18 \quad df = 4$

The calculated χ^2-value from Table 3.3.3.2b is not significant which implies that the incidence of Schistosoma

Mansoni is independent of the person's country of origin.

3.3.4 AGE

T A B L E 3.3.4.1a

YEARS	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
0-3	2	0,4%	0	0%	0	0%	0	0%	0	0%	0	0%	2	0,3%
4-6	14	3,1%	4	2,8%	5	15,2%	2	5,7%	0	0%	0	0%	25	3,7%
7-9	26	5,7%	11	7,7%	2	6,2%	6	17,1%	1	12,5%	2	66,7%	48	7,1%
10-12	19	4,2%	16	11,3%	2	6,2%	6	17,1%	0	0%	0	0%	43	6,4%
13-15	15	3,3%	11	7,7%	2	6,2%	5	14,3%	4	50,0%	1	33,3%	38	5,6%
16-20	38	8,4%	26	18,3%	6	18,2%	6	17,1%	2	25,0%	0	0%	78	11,6%
21-40	219	48,3%	52	36,6%	9	27,3%	10	28,6%	1	12,5%	0	0%	291	43,2%
41+	120	26,5%	22	15,5%	7	21,2%	0	0%	0	0%	0	0%	149	22,1%
TOTAL	453		142		33		35		8		3		674	

T A B L E 3.3.4.1b

YEARS	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0-12	61	13,5%	31	21,8%	26	32,9%	118	17,5%
13-20	53	11,7%	37	26,1%	26	32,9%	116	17,2%
21-40	219	48,3%	52	36,6%	20	25,3%	291	43,2%
41+	120	26,5%	22	15,5%	7	8,9%	149	22,1%
TOTAL	453		142		79		674	

$\chi^2 = 65,27^{**}$ df = 6

The grouping of the ages follows that originally chosen by the Blair Research Laboratory. The significance of the χ^2-value at the 0,01 level indicates that the incidence and severity of Schistosoma Haematobium differs from age group to

age group. It can be seen from Table 3.3.4.1a that the incidence in the young age groups was high, reaching a peak in the age group 13-15 years. The age groups over 20 years experienced a low incidence.

The mean age of the group infected by Schistosoma Haematobium was compared with the mean age of the group not infected, using the Student t-test. The mean ages, the standard deviations and the sample sizes are as follows:

T A B L E 3.3.4.1c

Schistosoma Haematobium	Mean	Standard Deviation	Sample Size
Not Infected	35,5 years	15,8 years	453
Infected	24,3 years	16,0 years	221

t = 6,32** df = 672

The calculated t-value is significant at the 0,01 level which indicates that the infected group was significantly younger than the group not infected by Schistosoma Haematobium. This supports the previous result.

T A B L E 3.3.4.2a

YEARS	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0-3	2	0,4%	0	0%	0	0%	0	0%	0	0%	2	0,3%
4-6	22	4,3%	2	1,5%	1	3,4%	0	0%	0	0%	25	3,7%
7-9	43	8,5%	4	3,1%	0	0%	1	25,0%	0	0%	48	7,1%
10-12	31	6,1%	11	8,4%	0	0%	1	25,0%	0	0%	43	6,4%
13-15	22	4,3%	10	7,6%	4	13,8%	2	50,0%	0	0%	38	5,6%
16-20	52	10,2%	20	15,3%	6	20,7%	0	0%	0	0%	78	11,6%
21-40	219	43,1%	58	44,3%	12	41,4%	0	0%	2	0%	291	43,2%
41+	117	23,0%	26	19,8%	6	20,7%	0	0%	0	0%	149	22,1%
TOTAL	508		131		29		4		2		674	

T A B L E 3.3.4.2b

YEARS	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0-12	98	19,3%	17	13,0%	3	8,6%	118	17,5%
13-20	74	14,6%	30	22,9%	12	34,3%	116	17,2%
21-40	219	43,1%	58	44,3%	14	40,0%	291	43,2%
41+	117	23,0%	26	19,8%	6	17,1%	149	22,1%
TOTAL	508		131		35		674	

$\chi^2 = 15,53^*$ df = 6

The calculated χ^2-value is significant at the 0,05 level of significance which means that Schistosoma Mansoni has different incidences in the different age groups. From Table 3.3.4.2a it can be seen that the young age groups, 0-9 years experienced a low incidence, the middle age groups, 10-12 years experienced a high incidence and the older age groups, older than 41 years, experienced a low incidence.

T A B L E 3.3.4.2c

Schistosoma Mansoni	Mean	Standard Deviation	Sample Size
Not Infected	30,0 years	16,4 years	508
Infected	29,2 years	16,0 years	166

t = 0,54 df = 672

The calculated t-value is not significant which means that the averate ages of the 2 groups do not differ significantly. This does not contradict the previous result.

3.3.5 LENGTH OF RESIDENCE ON FARM

T A B L E 3.3.5.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
YEARS	NOT INFECTED	1	2	3	4	5	TOTAL
0-1	104 23,0%	24 16,9%	11 33,3%	14 40,0%	1 12,5%	3 100%	157 23,3%
2-4	116 25,6%	37 26,1%	6 18,2%	9 25,7%	3 37,5%	0 0%	171 25,4%
5-10	124 27,4%	41 28,9%	13 39,4%	8 22,9%	1 12,5%	0 0%	187 27,7%
11-20	71 15,7%	24 16,9%	2 6,1%	3 8,6%	3 37,5%	0 0%	103 15,3%
21+	38 8,4%	16 11,3%	1 3,0%	1 2,9%	0 0%	0 0%	56 8,3%
TOTAL	453	142	33	35	8	3	674

T A B L E 3.3.5.1b

YEARS	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0-1	104	23,0%	24	16,9%	29	36,7%	157	23,3%
2-4	116	25,6%	37	26,1%	18	22,8%	171	25,4%
5-10	124	27,4%	41	28,9%	22	27,8%	187	27,7%
11-20	71	15,7%	24	16,9%	8	10,1%	103	15,3%
21+	38	8,4%	16	11,3%	2	2,5%	56	8,3%
TOTAL	453		142		79		674	

$\chi^2 = 15,28$ df = 8

The calculated χ^2-value is not significant which indicates that the incidence of Schistosoma Haematobium is independent of the length of residence on the farm.

T A B L E 3.3.5.1c

Schistosoma Haematobium	Mean	Standard Deviation	Sample Size
Not Infected	8,0 years	9,7 years	453
Infected	8,0 years	9,2 years	221

t = 0,12 df = 672

The t-value is not significant which indicates that there is no difference between the average length of residence on the farm for the infected group and that for the group not infected by Schistosoma Haematobium. This supports the previous result.

T A B L E 3.3.5.2a

YEARS	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
0-1	104 20,5%	34 26,0%	15 51,7%	2 50%	2 100%	159 23,3%
2-4	124 24,4%	39 29,8%	6 20,7%	2 50%	0 0%	171 25,4%
5-10	148 29,1%	32 24,4%	7 24,1%	0 0%	0 0%	187 27,7%
11-20	85 16,7%	17 13,0%	1 3,4%	0 0%	0 0%	103 15,3%
21+	47 9,3%	9 6,9%	0 0%	0 0%	0 0%	56 8,3%
TOTAL	508	131	29	4	2	674

T A B L E 3.3.5.2b

YEARS	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED		1	2+	TOTAL	
0-1	104	20,5%	34 26,0%	19 54,3%	157	23,3%
2-4	124	24,4%	39 29,8%	8 27,9%	171	25,4%
5-10	148	29,1%	32 24,4%	7 20,0%	187	27,7%
11+	132	26,0%	26 19,8%	1 2,9%	159	23,6%
TOTAL	508		131	35	674	

$\chi^2 = 27,87^{**}$ df = 6

The calculated χ^2-value is significant at the 0,01 level of significance which indicates that Schistosoma Mansoni is not independent of the length of residence on the farm. From Table 3.3.5.2a it can be seen that the incidence is high for the people who have been resident on the farm for 4 years or less while the incidence is lower for the people who have been resident for more than 4 years.

T A B L E 3.3.5.2c

Schistosoma Mansoni	Mean	Standard Deviation	Sample Size
Not Infected	8,6 years	10,0 years	508
Infected	6,0 years	7,6 years	166

t = 3,03** df = 672

The significance of the t-value at the 0,01 level indicates that the group infected by Schistosoma Mansoni has been resident in the area for a shorter time on average than the group who are not infected, supporting the previous result.

3.3.6 YEARS OF SCHOOLING

T A B L E 3.3.6.1a

YEARS	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
0	286	63,1%	81	57,0%	21	63,6%	20	57,1%	6	75,0%	3	100%	417	61,9%
1-2	45	9,9%	20	14,1%	5	15,2%	7	20,0%	1	12,5%	0	0%	78	11,6%
3-5	74	16,3%	30	21,1%	6	18,2%	7	20,0%	0	0%	0	0%	117	17,4%
6-12	47	10,4%	11	7,7%	1	3,0%	1	2,9%	1	12,5%	0	0%	61	9,1%
13+	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,1%
TOTAL	453		142		33		35		8		3		674	

T A B L E 3.3.6.1b

YEARS	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	286	63,1%	81	57,0%	50	63,3%	417	61,9%
1-2	45	9,9%	20	14,1%	13	16,5%	78	11,6%
3-5	74	16,3%	30	21,1%	13	16,5%	117	17,4%
6+	48	10,6%	11	7,7%	3	3,8%	62	9,2%
TOTAL	453		142		79		674	

$\chi^2 = 9,40$ df = 6

The calculated χ^2-value is not significant which means that the incidence of Schistosoma Haematobium is independent of the number of years of schooling.

T A B L E 3.3.6.2c

Schistosoma Haematobum	Mean	Standard Deviation	Sample Size
Not Infected	1,6 years	2,6 years	453
Infected	1,5 years	2,3 years	221

t = 0,42 df = 672

The calculated t-value is not significant which indicates that there are no significant differences between the average number of years of schooling of the group infected by Schistosoma Haematobium and that of the group not infected. This supports the previous result.

T A B L E 3.3.6.2a

YEARS	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0	313	61,6%	83	63,4%	17	58,6%	3	75%	1	50%	417	61,9%
1-2	64	12,6%	9	6,9%	4	13,8%	1	25%	0	0%	78	11,6%
3-5	79	15,6%	32	24,4%	6	20,7%	0	0%	0	0%	117	17,4%
6-12	51	10,0%	7	5,3%	2	6,9%	0	0%	1	50%	61	9,1%
13+	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,1%
TOTAL	508		131		29		4		2		674	

T A B L E 3.3.6.2b

YEARS	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	313	61,6%	83	63,4%	21	60,0%	417	61,9%
1-2	64	12,6%	9	6,9%	5	14,3%	78	11,6%
3-5	79	15,6%	32	24,4%	6	17,1%	117	17,4%
6+	52	10,2%	7	5,3%	3	8,6%	62	9,2%
TOTAL	508		131		35		674	

$\chi^2 = 10,71 \quad df = 6$

The calculated χ^2-value is not significant which indicates that the incidence of Schistosoma Mansoni is independent of the number of years of schooling.

T A B L E 3.3.6.2c

Schistosoma Mansoni	Mean	Standard Deviation	Sample Size
Not Infected	1,6 years	2,5 years	508
Infected	1,5 years	2,3 years	166

$t = 0,12 \quad df = 672$

The calculated t-value is not significant which indicates that the average number of years of schooling does not differ between the group infected by Schistosoma Mansoni and the group not infected. This supports the previous result.

3.3.7 RELATIONSHIP TO HOUSEHOLDER

T A B L E 3.3.7.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
HOUSEHOLDER	265	58,5%	61	43,0%	16	48,5%	10	28,6%	1	12,5%	0	0%	353	52,4%
WIFE	108	23,8%	26	18,3%	16	18,2%	4	11,4%	1	12,5%	0	0%	145	21,5%
CHILD	76	16,8%	55	38,7%	11	33,3%	21	60,0%	6	75,0%	3	100%	172	25,5%
STEP-CHILD	3	0,7%	0	0%	0	0%	0	0%	0	0%	0	0%	3	0,4%
OTHER	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,1%
TOTAL	453		142		33		35		8		3		674	

T A B L E 3.3.7.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
HOUSEHOLDER	265	59,0%	61	43,0%	27	34,3%	353	52,7%
WIFE	108	24,1%	26	18,3%	11	13,9%	145	21,6%
CHILD	76	16,9%	55	38,7%	41	51,9%	172	25,7%
TOTAL	449		142		79		670	

$\chi^2 = 59,20^{**}$ df = 4

The significance of the χ^2-value at the 0,01 level of significance indicates that the incidence and severity of Schistosoma Haematobium differs for the different members of the household. It can be seen from Table 3.3.7.1a that the children experience a high and severe incidence of the infection while the other household members experience a lower incidence.

T A B L E 3.3.7.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
HOUSEHOLDER	264	52,0%	63	48,1%	24	82,8%	0	0%	2	100%	353	52,4%
WIFE	109	21,5%	34	26,0%	2	6,9%	0	0%	0	0%	145	21,5%
CHILD	131	25,8%	34	26,0%	3	10,3%	4	100%	0	0%	172	25,5%
STEP-CHILD	3	0,6%	0	0%	0	0%	0	0%	0	0%	3	0,4%
OTHER	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,1%
TOTAL	508		131		29		4		2		670	

T A B L E 3.3.7.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION						
	NOT INFECTED		1		2+		TOTAL	
HOUSEHOLDER	264	52,4%	63	48,1%	26	74,3%	353	52,7%
WIFE	109	21,6%	34	26,0%	2	5,7%	145	21,6%
CHILD	131	26,0%	34	26,0%	7	2,0%	172	25,7%
TOTAL	504		131		35		670	

$\chi^2 = 9,32 \quad df = 4$

The calculated χ^2-value is not significant which indicates that the incidence of Schistosoma Mansoni is independent of the relationship of the person to the householder.

3.3.8 NUMBER OF CHILDREN, IF WIFE

T A B L E 3.3.8.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0	4	3,7%	5	19,2%	2	33,3%	1	25,0%	1	100%	13	9,0%
1-3	35	32,4%	7	26,9%	2	33,3%	1	25,0%	0	0%	45	31,0%
4-7	47	43,5%	7	26,9%	0	0%	2	50,0%	0	0%	56	38,6%
8+	22	20,4%	7	26,9%	2	33,3%	0	0%	0	0%	31	2,14%
TOTAL	108		26		6		4		1		145	

T A B L E 3.3.8.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION					
	NOT INFECTED		INFECTED		TOTAL	
0	4	3,7%	9	24,3%	13	9,0%
1-3	35	32,4%	10	27,0%	45	31,0%
4-7	47	43,5%	9	24,3%	56	38,6%
8+	22	20,4%	9	24,3%	31	21,4%
TOTAL	108		37		145	

$\chi^2 = 16,14^{**}$ df = 3

The calculated χ^2-value is significant at the 0,01 level of significance which indicates that the incidence of Schistosoma Haematobium differs among wives depending on the number of children. Wives who have had no children or who have had more than 7 children experience a high incidence, while wives who have had between 1 and 7 children experience a lower incidence of the infection.

T A B L E 3.3.8.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2		TOTAL	
0	10	9,2%	3	8,8%	0	0%	13	9,0%
1-3	32	29,4%	13	35,3%	1	50,0%	45	31,0%
4-7	44	40,4%	12	35,3%	0	0%	56	38,6%
8+	23	21,1%	7	20,6%	1	50,0%	31	21,4%
TOTAL	109		34		2		145	

T A B L E 3.3.8.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED		INFECTED		TOTAL	
0	10	9,2%	3	8,3%	13	9,0%
1-3	32	29,4%	13	36,1%	45	31,0%
4-7	44	40,4%	12	33,3%	56	38,6%
8+	23	21,1%	8	22,2%	31	21,4%
TOTAL	109		36		145	

$\chi^2 = 0,78 \quad df = 3$

The calculated χ^2-value is not significant which indicates that Schistosoma Mansoni in wives is independent of the number of children they have had.

3.4 SOCIO-ECONOMIC INFORMATION

The distributions of the infections are as follows:

3.4.1 RELIGION

T A B L E 3.4.1.1a

RELIGION	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION												TOTAL	
	NOT INFECTED		1		2		3		4		5			
NONE	294	64,9%	107	75,4%	26	78,8%	24	68,6%	4	50%	2	66,7%	457	67,8%
CHRISTIAN	136	30,0%	27	19,0%	7	21,2%	11	31,4%	3	37,5%	1	33,3%	185	27,4%
MOSLEM	19	4,2%	4	2,8%	0	0%	0	0%	0	0%	0	0%	23	3,4%
OTHER	4	0,9%	4	2,8%	0	0%	0	0%	1	12,5%	0	0%	9	1,3%
TOTAL	453		142		33		35		8		3		674	

T A B L E 3.4.1.1b

RELIGION	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						TOTAL	
	NOT INFECTED		1		2			
NONE	294	65,5%	107	77,5%	56	71,8%	457	68,7%
CHRISTIAN	136	30,3%	27	19,6%	22	28,2%	185	27,8%
MOSLEM	19	4,2%	4	2,9%	0	0%	23	3,5%
TOTAL	449		138		78		665	

$\chi^2 = 10,32$ df = 6

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Haematobium are independent of the religion of the person.

T A B L E 3.4.1.2a

RELIGION	LEVEL OF SCHISTOSOMA MANSONI INFECTION										TOTAL	
	NOT INFECTED		1		2		3		4			
NONE	339	66,7%	101	77,1%	14	48,3%	2	50%	1	50%	457	67,8%
CHRISTIAN	146	28,7%	25	19,1%	13	44,8%	1	25%	0	0%	185	27,4%
MOSLEM	18	3,5%	3	2,3%	1	3,4%	0	0%	1	50%	23	3,4%
OTHER	5	1,0%	2	1,5%	1	3,4%	1	25%	0	0%	9	1,3%
TOTAL	508		131		29		4		2		674	

T A B L E 3.4.1.2b

RELIGION	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NONE	339	67,4%	101	78,3%	17	51,5%	457	68,7%
CHRISTIAN	146	29,0%	25	19,4%	14	42,4%	185	27,8%
MOSLEM	18	3,6%	3	2,3%	2	6,1%	23	3,5%
TOTAL	503		129		33		665	

$\chi^2 = 10,52$ df = 6

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the religion of the person. From Table 3.4.1.2b it can be seen that the Christians and the Moslems experienced a slightly lower incidence than the incidence experienced by the other people.

3.4.2 NUMBER OF WIVES

T A B L E 3.4.2.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
0	63	23,8%	19	31,1%	7	43,8%	5	50,0%	1	100%	95	26,9%
1	182	68,7%	42	68,9%	9	56,3%	5	50,0%	0	0%	238	67,4%
2	19	7,2%	0	0%	0	0%	0	0%	0	0%	19	5,4%
3	1	0,4%	0	0%	0	0%	0	0%	0	0%	1	0,3%
TOTAL	265		61		16		10		1		353	

T A B L E 3.4.2.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	63	23,8%	19	31,1%	13	48,1%	95	26,9%
1	182	68,7%	42	68,9%	14	51,9%	238	67,4%
2+	20	7,5%	0	0%	0	0%	20	5,7%
TOTAL	265		61		27		353	

$\chi^2 = 13,59^{**}$ df = 4

The calculated χ^2-value is significant at the 0,01 level which indicates that the incidence and severity of Schistosoma Haematobium is related to the number of wives the householder has. From Table 3.4.2.1a it can be seen that the unmarried householders experienced a high, severe incidence while those with 1 or more wives experienced a low incidence.

T A B L E 3.4.2.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3	4		TOTAL		
0	63	23,9%	19	30,2%	12	50,0%	0	1	50,0%	95	26,9%	
1	185	70,1%	41	65,1%	11	45,8%	0	1	50,0%	238	67,4%	
2	15	5,7%	3	4,8%	1	4,2%	0	0	0%	19	5,4%	
3	1	0,4%	0	0%	0	0%	0	0	0%	1	0,3%	
TOTAL	264		63		24		0	2		353		

T A B L E 3.4.2.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	63	23,9%	19	30,2%	13	50,0%	95	26,9%
1	185	70,1%	41	65,1%	12	46,2%	238	67,4%
2+	16	6,1%	3	4,8%	1	3,8%	20	5,7%
TOTAL	264		63		26		353	

$\chi^2 = 8,69$ df = 4

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni in the householders are independent of the number of wives they had.

3.4.3 OCCUPATION

T A B L E 3.4.3.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
NONE	13	2,9%	2	1,4%	0	0%	0	0%	0	0%	0	0%	15	2,2%
LABOURER	218	48,1%	48	33,8%	12	36,4%	9	25,7%	2	25%	0	0%	289	42,9%
DRIVER	26	5,7%	6	4,2%	2	6,1%	1	2,9%	0	0%	0	0%	35	5,2%
SENIORHAND	25	5,5%	3	2,1%	2	6,1%	0	0%	0	0%	0	0%	30	4,5%
ARTISAN	8	1,8%	2	1,4%	0	0%	0	0%	0	0%	0	0%	10	1,5%
CLERICAL	5	1,1%	3	2,1%	1	0,3%	0	0%	0	0%	0	0%	9	1,3%
DEPENDENT	158	34,9%	78	54,9%	16	48,5%	25	71,4%	6	75%	3	100%	286	42,4%
TOTAL	453		142		33		35		8		3		674	

T A B L E 3.4.3.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NONE, LABOURER, DRIVER, SENIOR HAND, ARTISAN	290	64,0%	61	43,0%	28	35,4%	379	56,2%
CLERICAL, DEPENDENT	163	36,0%	81	67,0%	51	64,6%	295	43,8%
TOTAL	453		142		79		674	

$\chi^2 = 35,19^{**}$ df = 2

The significance of the calculated χ^2-value at the 0,01 level of significance indicates that the incidence and severity of Schistosoma Haematobium differs from occupation to occupation. It can be seen from Table 3.4.3.1a that the dependents experienced a high and severe incidence, the clerical workers experienced a high incidence, while the people with other occupations experienced a lower incidence. Some severe cases occurred in the labourers although they had experienced a lower incidence.

T A B L E 3.4.3.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
NONE	14	2,8%	1	0,8%	0	0%	0	0%	0	0%	15	2,2%
LABOURER	214	42,1%	53	40,5%	21	72,4%	0	0%	1	50%	289	42,9%
DRIVER	28	5,5%	3	2,3%	3	10,3%	0	0%	1	50%	35	5,2%
SENIORHAND	25	4,9%	5	3,8%	0	0%	0	0%	0	0%	30	4,5%
ARTISAN	7	1,4%	3	2,3%	0	0%	0	0%	0	0%	10	1,5%
CLERICAL	8	1,6%	1	0,8%	0	0%	0	0%	0	0%	9	1,3%
DEPENDENT	212	41,7%	65	49,8%	5	17,2%	4	100%	0	0%	286	42,4%
TOTAL	508		131		29		4		2		674	

T A B L E 3.4.3.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NONE, DRIVER, SENIORHAND, CLERICAL	75	14,8%	10	7,6%	4	11,4%	89	13,2%
LABOURER	214	42,1%	53	40,5%	22	62,9%	289	42,9%
ARTISAN, DEPENDENT	219	43,1%	68	51,9%	9	25,9%	296	43,9%
TOTAL	508		131		35		674	

$\chi^2 = 12,22^*$ df = 4

The calculated χ^2-value is significant at the 0,05 level of significance which indicates that the incidence and severity of Schistosoma Mansoni differs from occupation to occupation. From Table 3.4.3.2a it can be seen that the labourers experienced a high and severe incidence, the artisans and dependents also experienced a high incidence, while the drivers, senior hands and clerical workers experienced a low incidence. A severe case occurred amongst the drivers although they had experienced a lower incidence.

3.4.4 HOUSING TYPE

T A B L E 3.4.4.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
TRADITIONAL	242	53,4%	84	59,2%	22	66,7%	19	54,3%	3	37,5%	2	66,7%	372	55,2%
BRICK	207	45,7%	58	40,8%	11	33,3%	16	45,7%	5	62,5%	1	33,3%	298	44,2%
OTHER	4	0,9%	0	0%	0	0%	0	0%	0	0%	0	0%	4	0,6%
TOTAL	453		142		33		35		8		3		674	

T A B L E 3.4.4.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
TRADITIONAL	242	53,9%	84	59,2%	46	58,2%	372	55,5%
BRICK	207	46,1%	58	40,8%	33	41,8%	298	44,5%
TOTAL	449		142		79		670	

$\chi^2 = 1,47$ df = 2

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Haematobium are the same for people living in traditional housing as that for people living in brick housing. There was no incidence among the 4 people living in other types of housing.

T A B L E 3.4.4.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
TRADITIONAL	262	51,6%	85	64,9%	22	75,9%	2	50%	1	50%	372	55,2%
BRICK	243	47,8%	45	34,4%	7	24,1%	2	50%	1	50%	298	44,2%
OTHER	3	0,6%	1	0,8%	0	0%	0	0%	0	0%	4	0,6%
TOTAL	508		131		29		4		2		674	

T A B L E 3.4.4.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
TRADITIONAL	262	51,9%	85	65,4%	25	71,4%	372	55,5%
BRICK	243	48,1%	45	34,6%	10	28,6%	298	44,5%
TOTAL	505		130		35		670	

$\chi^2 = 11,42^{**}$ df = 2

The significance of the calculated χ^2-value at the 0,01 level of significance indicates that the incidence and severity of Schistosoma Mansoni differ for the different house types. From Table 3.4.4.2a it can be seen that a high incidence was experienced by the people living in traditional housing and a low incidence was experienced by the people living in brick housing. It can also be seen that severe cases occurred in both the traditional and brick housing types. One mild case of the infection occurred among the 4 people living in other housing types.

3.4.5 HOUSING STANDARD

T A B L E 3.4.5.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
POOR	63 13,9%	24 16,9%	6 18,2%	2 5,7%	1 12,5%	1 33,3%	97 14,4%
AVERAGE	71 15,7%	26 18,3%	6 18,2%	5 14,7%	0 0%	1 33,3%	109 16,2%
GOOD	319 70,5%	92 64,8%	21 63,6%	28 80,0%	7 87,5%	1 33,3%	468 69,4%
TOTAL	453	142	33	35	8	3	674

T A B L E 3.4.5.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION					
	NOT INFECTED		1		2+		TOTAL	
POOR	63	13,9%	24	16,9%	10	12,7%	97	14,4%
AVERAGE	71	15,7%	26	18,3%	12	15,2%	109	16,2%
GOOD	319	70,5%	92	64,8%	57	72,2%	468	69,4%
TOTAL	453		142		79		674	

$\chi^2 = 1,97$ df = 4

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Haematobium are independent of the standard of the person's housing.

T A B L E 3.4.5.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
POOR	65 12,8%	26 19,8%	6 20,7%	0 0%	0 0%	97 14,4%
AVERAGE	81 15,9%	22 16,8%	6 20,7%	0 0%	0 0%	109 16,2%
GOOD	362 71,3%	83 63,4%	17 58,6%	4 100%	2 100%	468 69,4%
TOTAL	508	131	29	4	2	674

T A B L E 3.4.5.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED		1		2+	TOTAL
POOR	65	12,8%	26	19,8%	6 17,1%	92 14,4%
AVERAGE	81	15,9%	22	16,8%	6 17,1%	109 16,2%
GOOD	362	71,3%	83	63,4%	23 65,7%	468 69,4%
TOTAL	508		131		35	674

$\chi^2 = 6,68$ df = 4

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the standard of the person's housing, however, it can be seen from Table 3.4.5.2a that the people living in good housing experienced a lower incidence, although it was not significantly lower. It can also be seen that the severe cases occurred in the group with good housing.

3.4.6 HOUSING STATE

TABLE 3.4.6.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
POOR	40 8,8%	26 18,3%	6 18,2%	1 2,9%	0 0%	0 0%	73 10,8%
GOOD	413 91,2%	116 81,7%	27 81,8%	34 97,1%	8 100%	3 100%	601 89,2%
TOTAL	453	142	33	35	8	3	674

TABLE 3.4.6.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION					
	NOT INFECTED		1		2+	TOTAL
POOR	40	8,8%	26	18,3%	7 8,9%	73 10,8%
GOOD	413	91,2%	116	81,7%	72 91,1%	601 89,2%
TOTAL	453		142		79	674

$\chi^2 = 10,42^{**}$ df = 2

The significance of the χ^2-value at the 0,01 level of significance indicates that the incidence and severity of Schistosoma Haematobium for people living in housing of a poor state are different from those for the people living in good housing. From Table 3.4.6.1a it can be seen that the people in poor housing experienced a high incidence of the infection, however, the severe cases occurred among the people living in good housing.

T A B L E 3.4.6.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
POOR	46 9,1%	23 17,6%	4 13,8%	0 0%	0 0%	73 10,8%
GOOD	462 90,9%	108 82,4%	25 86,2%	4 100%	2 100%	601 89,2%
TOTAL	508	131	29	4	2	674

T A B L E 3.4.6.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
POOR	46 9,1%	23 17,6%	4 11,4%	73 10,8%
GOOD	462 90,9%	108 82,4%	31 88,6%	601 89,2%
TOTAL	508	131	35	674

$\chi^2 = 7,81$ df = 3

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the state of the housing in which the person lives.

3.4.7 USE OF LATRINE

T A B L E 3.4.7.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
NONE	245 54,1%	77 54,2%	19 57,6%	15 42,9%	4 50%	3 100%	363 53,9%
NOT USED	58 12,8%	19 13,4%	4 12,1%	12 34,3%	2 25%	0 0%	95 14,1%
USED	150 33,3%	46 32,4%	10 30,3%	8 22,9%	2 25%	0 0%	216 32,0%
TOTAL	453	142	33	35	8	3	674

T A B L E 3.4.7.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NONE	245	54,1%	17	54,2%	41	51,9%	363	53,9%
NOT USED	58	12,8%	19	13,4%	18	22,8%	95	14,1%
USED	150	33,3%	46	32,4%	20	25,3%	216	32,0%
TOTAL	453		142		79		674	

$\chi^2 = 6,16$ df = 4

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Haematobium is independent of the person using or not using a latrine.

T A B L E 3.4.7.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
NONE	259	51,0%	78	59,5%	23	79,3%	2	50%	1	50%	363	53,9%
NOT USED	80	15,7%	12	9,2%	1	3,4%	1	25%	1	50%	95	14,1%
USED	169	33,3%	41	31,3%	5	17,2%	1	25%	0	0%	216	32,0%
TOTAL	508		131		29		4		2		674	

T A B L E 3.4.7.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NONE	259	51,0%	78	59,5%	26	74,3%	363	53,9%
NOT USED	80	14,7%	12	9,2%	3	8,6%	95	14,1%
USED	169	33,3%	41	31,3%	6	17,1%	216	32,0%
TOTAL	508		131		35		674	

$\chi^2 = 10,97^*$ df = 4

The calculated χ^2-value is significant at the 0,05 level of significance which indicates that the incidence and severity of Schistosoma Mansoni in people using latrines are different from those for people not using latrines. From Table 3.4.7.2a it can be seen that the people with no latrines experienced a high incidence, while the people with latrines, whether they used them or not, experienced a relatively low incidence.

3.4.8 GARDEN

T A B L E 3.4.8.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
NO	347 76,6%	102 71,8%	22 66,7%	20 57,1%	3 37,5%	3 100%	497 73,7%
YES	104 23,0%	40 28,2%	11 33,3%	15 42,9%	5 62,5%	0 0%	175 26,0%
MISCLASSIFIED	2 0,4%	0 0%	0 0%	0 0%	0 0%	0 0%	2 0,3%
TOTAL	453	142	33	35	8	3	674

T A B L E 3.4.8.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
NO	347 80,5%	102 71,8%	48 60,8%	497 74,0%
YES	104 15,5%	40 28,2%	31 39,2%	175 26,0%
TOTAL	431	142	79	672

$\chi^2 = 9,57^{**}$ df = 2

Two cases were misclassified and were excluded from the analysis. The calculated χ^2-value is significant at the 0,01 level of significance which indicates that the incidence and

severity of Schistosoma Haematobium in people who have gardens are different from those who do not have gardens. It can be seen from Table 3.4.8.1a that the people with gardens experienced a higher and more severe incidence of the infection.

T A B L E 3.4.8.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
NO	373 73,4%	96 73,3%	25 86,2%	2 50%	1 50%	497 73,7%
YES	134 26,4%	34 26,0%	4 13,8%	2 50%	1 50%	175 26,0%
MISCLASSIFIED	1 0,2%	1 0,8%	0 0%	0 0%	0 0%	2 0,3%
TOTAL	508	131	29	4	2	674

T A B L E 3.4.8.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED		1		2	TOTAL
NO	373	73,6%	96	73,8%	28 80,0%	497 74,0%
YES	134	26,4%	34	26,2%	7 20,0%	175 26,0%
TOTAL	507		130		35	672

$\chi^2 = 0,70 \quad df = 3$

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the person having access to a garden.

3.4.9 WATER SUPPLY - DOMESTIC

T A B L E 3.4.9.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
DAM	4	0,9%	0	0%	0	0%	0	0%	0	0%	1	33,3%	5	0,7%
RIVER	40	8,8%	44	31,0%	5	15,2%	3	8,6%	3	12,5%	0	0%	93	13,8%
CANAL	5	1,1%	2	1,4%	1	3,0%	0	0%	0	0%	0	0%	8	1,2%
WELL	18	4,0%	3	2,1%	1	3,0%	2	5,7%	0	0%	0	0%	24	3,6%
BOREHOLE	292	64,5%	69	48,6%	25	75,8%	29	82,9%	7	87,5%	2	66,7%	424	62,9%
PIPED PURE	93	20,5%	24	16,9%	1	3,0%	1	2,9%	0	0%	0	0%	119	17,7%
NOT APPLICABLE	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,1%
TOTAL	453		142		33		35		8		3		674	

T A B L E 3.4.9.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
DAM,WELL, BOREHOLE	314	69,5%	72	50,7%	67	84,8%	453	67,3%
RIVER,CANAL	45	10,0%	46	32,4%	10	12,7%	101	15,0%
PIPED PURE	93	20,6%	24	16,9%	2	2,5%	119	17,7%
TOTAL	452		142		79		673	

$\chi^2 = 58,75^{**}$ df = 4

The calculated χ^2-value is significant at the 0,01 level of significance which indicates that there is a relationship between Schistosoma Haematobium and the source of the person's domestic water supply. From Table 3.4.9.1a it can be seen that people using water from the river or from the canal experienced a high incidence while the people using water from the dam, wells or boreholes experienced a low incidence (but the cases were severe). The people using piped pure water experienced a low incidence.

T A B L E 3.4.9.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
DAM	5	1,0%	0	0%	0	0%	0	0%	0	0%	5	0,7%
RIVER	59	11,6%	34	26,0%	0	0%	0	0%	0	0%	93	13,8%
CANAL	4	0,8%	4	3,1%	0	0%	0	0%	0	0%	8	1,2%
WELL	12	2,4%	2	1,5%	10	34,5%	0	0%	0	0%	24	3,6%
BOREHOLE	328	64,6%	77	58,8%	13	44,8%	4	100%	2	100%	424	62,9%
PIPED PURE	99	19,5%	14	10,7%	6	20,7%	0	0%	0	0%	119	17,7%
NOT APPLICABLE	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,1%
TOTAL	508		131		29		4		2		674	

T A B L E 3.4.9.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
RIVER, CANAL	63	12,9%	38	29,5%	0	0%	101	15,7%
BOREHOLE	328	66,9%	77	59,7%	19	76,0%	424	65,8%
PIPED PURE	99	20,2%	14	10,9%	6	24,0%	119	18,5%
TOTAL	490		129		25		673	

$\chi^2 = 30,02^{**}$ df = 4

The significance of the calculated χ^2-value at the 0,01 level indicates that there is relationship between Schistosoma Mansoni and the source of the person's domestic water. From Table 3.4.9.2a it can be seen that people using water from the river, canal or wells experienced a high incidence. People using borehole water experienced a low incidence although some severe cases occurred in this group. People using piped pure water experienced a low incidence. None of the 5 people using water from the dam were infected.

3.4.10 WATER SUPPLY - LAUNDRY

T A B L E 3.4.10.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
DAM	10	2,2%	0	0%	0	0%	1	2,9%	0	0%	1	33,3%	12	1,8%
RIVER	54	11,9%	48	33,8%	8	24,2%	4	11,4%	1	12,5%	0	0%	115	17,1%
CANAL	8	1,8%	3	2,1%	2	6,1%	0	0%	0	0%	0	0%	13	1,9%
WELL	11	2,4%	3	2,1%	1	0,3%	1	2,9%	0	0%	0	0%	16	2,4%
BOREHOLE	279	61,6%	65	45,8%	21	63,6%	28	80,0%	7	87,2%	2	66,7%	402	59,6%
PIPED PURE	91	20,1%	23	16,2%	1	0,3%	1	2,9%	0	0%	0	0%	116	17,2%
NOT APPLICABLE	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
TOTAL	453		142		33		35		8		3		674	

T A B L E 3.4.10.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
DAM, WELL, BOREHOLE	300	66,2%	68	47,9%	62	78,5%	430	68,8%
RIVER, CANAL	62	13,7%	51	35,9%	15	19,0%	128	19,0%
PIPED PURE	91	20,1%	23	16,2%	2	2,5%	116	17,2%
TOTAL	453		142		79		674	

$\chi^2 = 49,00^{**}$ df = 4

The calculated χ^2-value is significant at the 0,01 level of significance which indicates a relationship between the incidence and severity of Schistosoma Haematobium and the source of the person's laundry water. From Table 3.4.10.1a it can be seen the incidence experienced by people using water from the river and the canal was high. People using water from wells experienced a medium incidence and people using water from the dam and from boreholes experienced a low incidence although

severe cases occurred among them. People using piped pure water experienced a low incidence of the infection.

T A B L E 3.4.10.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
DAM	10	2,0%	0	0%	2	6,9%	0	0%	0	0%	12	17,1%
RIVER	72	14,2%	41	31,3%	2	6,9%	0	0%	0	0%	115	17,1%
CANAL	6	1,2%	7	5,3%	0	0%	0	0%	0	0%	13	1,9%
WELL	7	1,4%	2	1,5%	7	24,1%	0	0%	0	0%	16	2,4%
BOREHOLE	314	61,8%	69	52,7%	13	44,8%	4	100%	2	100%	402	59,6%
PIPED PURE	99	19,5%	12	9,2%	5	17,2%	0	0%	0	0%	116	17,2%
NOT APPLICABLE	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
TOTAL	508		131		29		4		2		674	

T A B L E 3.4.10.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
RIVER,CANAL	78	15,9%	48	37,2%	2	7,7%	128	19,8%
BOREHOLE	314	65,0%	69	53,5%	19	73,1%	402	62,2%
PIPED PURE	99	20,2%	12	9,3%	5	19,2%	116	18,0%
TOTAL	491		129		26		646	

$\chi^2 = 34,49^{**}$ df = 4

The significance of the χ^2-value at the 0,01 level indicates that the incidence and severity of Schistosoma Mansoni are related to the person's source of water used for laundry. It can be seen from Table 3.4.10.2a that people using water from the river, the canal or from wells experienced a high incidence. People using borehole water experienced a low incidence but some of the cases were severe. People using dam water or piped pure water experienced a low incidence.

3.4.11 WATER SUPPLY - BATH

T A B L E 3.4.11.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
DAM	12	2,6%	0	0%	0	0%	1	2,9%	0	0%	1	33,3%	14	2,1%
RIVER	52	11,5%	46	32,4%	8	24,2%	4	11,4%	1	12,5%	0	0%	111	16,5%
CANAL	8	1,8%	3	2,1%	2	6,1%	0	0%	0	0%	0	0%	13	1,9%
WELL	10	2,2%	3	2,1%	1	3,0%	1	2,9%	0	0%	0	0%	15	2,2%
BOREHOLE	278	61,4%	66	46,5%	21	63,6%	28	80,0%	7	87,5%	2	66,7%	402	59,6%
PIPED PURE	92	20,3%	24	16,9%	1	3,0%	1	2,9%	0	0%	0	0%	118	17,5%
NOT APPLICABLE	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,1%
TOTAL	453		142		33		35		8		3		674	

T A B L E 3.4.11.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
RIVER,CANAL	60	14,0%	49	35,3%	15	20,0%	124	19,3%
BOREHOLE	278	64,7%	66	47,5%	58	77,3%	402	62,4%
PIPED PURE	92	21,4%	24	17,3%	2	2,7%	118	18,3%
TOTAL	430		139		75		644	

$\chi^2 = 45,10^{**}$ df = 4

The calculated χ^2-value is significant at the 0,01 level of significance which indicates that the incidence and severity of Schistosoma Haematobium are related to the person's bath water supply. Table 3.4.11.1a shows that the incidence pattern for the bath water supply is very similar to that of the laundry water supply (Table 3.4.10.1a).

T A B L E 3.4.11.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
DAM	11	2,2%	1	0,8%	2	6,9%	0	0%	0	0%	14	2,1%
RIVER	72	14,2%	38	29,0%	1	3,4%	0	0%	0	0%	111	16,5%
CANAL	6	1,2%	7	5,3%	0	0%	0	0%	0	0%	13	1,9%
WELL	6	1,2%	2	1,5%	7	24,1%	0	0%	0	0%	15	2,2%
BOREHOLE	313	61,6%	70	53,4%	13	44,8%	4	100%	2	100%	402	59,6%
PIPED PURE	99	19,5%	13	9,9%	6	20,7%	0	0%	0	0%	118	17,5%
NOT APPLICABLE	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,1%
TOTAL	508		131		29		4		2		674	

T A B L E 3.4.11.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
RIVER,CANAL	78	15,9%	45	35,2%	1	3,8%	124	19,3%
BOREHOLE	313	63,9%	70	54,7%	19	73,1%	402	62,4%
PIPED PURE	99	20,2%	13	10,2%	6	23,1%	118	18,3%
TOTAL	490		128		26		644	

$\chi^2 = 29,69^{**}$ df = 4

The calculated χ^2-value is significant at the 0,01 level of significance which indicates that there is a relationship between the incidence and severity of Schistosoma Mansoni and the source of the person's bath water. Inspection of Table 3.4.11.2a shows that the incidence pattern for the bath water supply is very similar to that of the laundry water supply (Table 3.4.10.2a).

3.4.12 WATER SUPPLY - PLAY

T A B L E 3.4.12.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
DAM	139	27,4%	49	37,4%	14	48,3%	2	50%	1	50%	205	30,4%
RIVER	2	0,4%	2	1,5%	0	0%	0	0%	0	0%	4	0,6%
CANAL	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
WELL	1	0,2%	0	0%	2	6,9%	0	0%	0	0%	3	0,4%
BOREHOLE	31	6,1%	5	3,8%	2	6,9%	0	0%	0	0%	38	5,6%
PIPED PURE	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
NOT APPLICABLE	335	65,9%	75	57,3%	11	37,9%	2	50%	1	50%	424	62,9%
TOTAL	508		131		29		4		2		674	

T A B L E 3.4.12.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
DAM	139	81,8%	49	90,7%	17	89,5%	205	84,4%
BOREHOLE	31	18,2%	5	9,3%	2	10,5%	38	15,6%
TOTAL	170		54		19		243	

$\chi^2 = 3,06$ df = 2

The calculated χ^2-value is not significant which indicates no significant difference in the incidence and severity of Schistosoma Mansoni between the different play water sources.

3.4.13 WATER SUPPLY - GARDEN

T A B L E 3.4.13.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
DAM	13	2,9%	1	0,7%	0	0%	0	0%	0	0%	0	0%	14	2,1%
RIVER	6	1,3%	6	4,2%	1	3,0%	0	0%	0	0%	0	0%	13	1,9%
CANAL	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,1%
WELL	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,1%
BOREHOLE	73	16,1%	24	16,9%	9	27,3%	14	40,0%	3	37,5%	0	0%	123	18,2%
PIPED PURE	11	2,4%	4	2,8%	0	0%	0	0%	0	0%	0	0%	15	2,2%
NOT APPLICABLE	348	76,8%	107	75,4%	23	69,7%	21	60,0%	5	62,5%	3	100%	507	75,2%
TOTAL	453		142		33		35		8		3		674	

T A B L E 3.4.13.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
DAM,CANAL,WELL,PIPED PURE	26	24,8%	5	14,3%	0	0%	31	18,6%
RIVER,BOREHOLE	79	75,2%	30	85,7%	27	100%	136	81,4%
TOTAL	105		35		27		167	

$\chi^2 = 9,25^{**}$ df = 2

A large proportion of the cases fall into the not applicable category, however, the calculated χ^2-value is significant at the 0,01 level which indicates a relationship between the incidence and severity of Schistosoma Haematobium and the source of the person's garden water. Table 3.4.13.1a shows that the people using borehole water experienced a high and severe incidence. People using water from the river also experienced a high incidence, while poeple using water from the dam or wells or piped pure water experienced a low incidence.

T A B L E 3.4.13.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
DAM	12	2,4%	2	1,5%	0	0%	0	0%	0	0%	14	2,1%
RIVER	7	1,4%	6	4,6%	0	0%	0	0%	0	0%	13	1,9%
CANAL	0	0%	1	0,8%	0	0%	0	0%	0	0%	1	0,1%
WELL	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,1%
BOREHOLE	93	18,3%	22	16,8%	5	17,2%	2	50%	1	50%	123	18,2%
PIPED PURE	13	2,6%	2	1,5%	0	0%	0	0%	0	0%	15	2,2%
NOT APPLICABLE	382	75,2%	98	74,8%	24	82,8%	2	50%	1	50%	507	75,2%
TOTAL	508		131		29		4		2		674	

T A B L E 3.4.13.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED		INFECTED		TOTAL	
DAM,WELL,PIPED PURE	26	20,6%	4	9,8%	30	18,0%
RIVER,CANAL	7	5,6%	7	17,1%	14	8,4%
BOREHOLE	93	73,8%	30	73,2%	123	73,7%
TOTAL	126		41		167	

$\chi^2 = 6,93^*$ df = 2

The calculated χ^2-value is significant at the 0,05 level which indicates a relationship between the incidence and severity of Schistosoma Mansoni and the person's source of garden water. Table 3.4.13.2a shows that people who used river or canal water experienced a high incidence. People who used borehole water experienced a low, but severe incidence. People using dam or piped pure water experienced a low incidence while the one person who used well water was not infected.

3.4.14 WATER SUPPLY - FISHING

T A B L E 3.4.14.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
DAM	219	48,3%	48	33,8%	15	45,5%	23	65,7%	8	100%	0	0%	313	46,4%
RIVER	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,1%
GARDEN	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
WELL	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
BOREHOLE	10	2,2%	4	2,8%	2	6,1%	0	0%	0	0%	0	0%	16	2,4%
PIPED PURE	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
NOT APPLICABLE	223	49,2%	90	63,4%	16	48,5%	12	34,3%	0	0%	3	100%	344	51,0%
TOTAL	453		142		33		35		8		3		674	

Table 3.4.14.1a shows that most of the people who fished used the dam, hence no comparison of incidence or severity was performed. However it can be seen from the table that the incidence of Schistosoma Haematobium was low among the people who did fish and high among the people in the not applicable category.

T A B L E 3.4.14.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
DAM	251	49,4%	46	35,1%	13	44,8%	2	50%	1	50%	313	46,4%
RIVER	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,1%
CANAL	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
WELL	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
BOREHOLE	13	2,6%	2	1,5%	1	3,4%	0	0%	0	0%	16	2,4%
PIPED PURE	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
NOT APPLICABLE	243	47,8%	83	63,4%	15	51,7%	2	50%	1	50%	344	51,0%
TOTAL	508		131		29		4		2		674	

Again no comparison of incidence or severity of Schistosoma Mansoni between the different fishing water supplies was performed because most of the people used the dam. It can be seen from Table 3.4.14.2a that the incidence among people who did fish was low and among the people in the not applicable category it was high.

3.4.15 WATER SUPPLY - SUMMARY

The relative incidence and severity of Schistosoma Haematobium have been summarized for the water sources for the different uses in the following table. Some of the incidences are based on very few observations and hence one must be very careful in interpreting the results.

Site	Domestic	Laundry	Bath	Play	Garden	Fishing
Dam	Low-severe	Low-severe	Low-severe	High-severe	Low-mild	Low-severe
River	High-severe	High-severe	High-severe	High-mild	Low-medium	No incidence
Canal	High-medium	High-medium	High-medium	-	No incidence	-
Well	Low-medium	Medium-medium	Medium-medium	High-mild	No incidence	-
Borehole	Low-severe	Low-severe	Low-severe	Low-medium	High-severe	High-medium
Piped Pure	Low-medium	Low-medium	Low-medium	-	Low-mild	-
Not Applicable	No incidence	-	No incidence	Low-severe	Low-severe	High-severe

The profiles of the relative incidence and severity of Schistosoma Mansoni for the different water supplies are given in the following table. Again, some incidences are based on small numbers of observations and hence care must be taken when interpreting the results.

Site	Domestic	Laundry	Bath	Play	Garden	Fishing
Dam	No incidence	Low-medium	Low-medium	High-severe	Low-mild	Low-severe
River	High-mild	High-medium	High-medium	High-mild	High-mild	No incidence
Canal	High-mild	High-mild	High-mild	-	High-mild	-
Well	High-medium	High-medium	High-medium	High-medium	No incidence	-
Borehole	High-severe	Low-severe	Low-severe	Low-medium	Low-severe	Low-medium
Piped Pure	Low-medium	Low-medium	Low-medium	-	Low-mild	-
Not Applicable	-	-	-	Low-severe	Medium-severe	High-severe

3.5 PARASITOLOGY

3.5.1 URINE VOLUME

An average of 77,18 mℓ urine was taken from each person to be analysed. The standard deviation of the volumes was 65,31 mℓ.

3.5.2 MACROSCOPIC HAEMTURIA IN URINE SEDIMENT

TABLE 3.5.2.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
NOT VISIBLE	444 98,0%	133 93,7%	32 97,0%	31 88,6%	7 87,5%	0 0%	647 96,0%
VISIBLE	9 2,0%	9 6,3%	1 3,0%	4 11,4%	1 12,5%	3 100%	27 4,0%
TOTAL	453	142	33	35	8	3	674

T A B L E 3.5.2.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION					
	NOT INFECTED		INFECTED		TOTAL	
NOT VISIBLE	444	98,0%	203	91,9%	647	96,0%
VISIBLE	9	2,0%	18	8,1%	27	4,0%
TOTAL	453		221		674	

$\chi^2 = 14,65^{**}$ df = 1

The calculated χ^2-value is significant at the 0,01 level of significance which indicates a realtionship between the incidence of Schistosoma Haematobium and the visibility of macroscopic haematuria. It can be seen from Table 3.5.2.1a that of the people not infected, a higher proportion than would be expected had no macroscopic harmaturia visible while of those people infected, a higher proportion than would be expected did have macroscopic harmaturia visible.

T A B L E 3.5.2.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
NOT VISIBLE	491	96,7%	123	93,9%	27	93,1%	4	100%	2	100%	647	96,0%
VISIBLE	17	3,3%	8	6,1%	2	6,9%	0	0%	0	0%	27	4,0%
TOTAL	508		131		29		4		2		674	

T A B L E 3.5.2.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED		INFECTED		TOTAL	
NOT VISIBLE	491	96,7%	156	94,0%	647	96,0%
VISIBLE	17	3,3%	10	6,0%	27	4,0%
TOTAL	508		166		674	

$\chi^2 = 2,33 \quad df = 1$

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the visibility of macroscopic haematuria.

3.5.3 SCHISTOSOMA HAEMATOBIUM EGG VIABILITY

The viability of the eggs were measured for 219 of the 221 cases infected with Schistosoma Haematobium and found to be as follows:

T A B L E 3.5.3.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION											
	1		2		3		4		5		TOTAL	
0-0,2	9	6,4%	3	9,1%	0	0%	0	0%	0	0%	12	5,5%
0,21-0,4	1	0,7%	0	0%	0	0%	0	0%	0	0%	1	0,5%
0,41-0,6	1	0,7%	1	3,0%	0	0%	0	0%	0	0%	2	0,9%
0,61-0,8	15	10,7%	6	18,2%	2	5,7%	0	0%	0	0%	23	10,5%
0,81-1,0	114	81,4%	23	69,7%	33	94,3%	8	100%	3	100%	181	82,6%
TOTAL	140		33		35		8		3		219	

T A B L E 3.5.3.1b

	LEVEL OF SCHITOSOMA HAEMATOBIUM INFECTION					
	1		2+		TOTAL	
0-0,4	10	7,1%	3	3,8%	13	5,9%
0,41-0,8	16	11,4%	9	11,4%	25	11,4%
0,81-1,0	114	81,4%	67	84,8%	181	82,6%
TOTAL	140		79		219	

$\chi^2 = 1,02$ df = 2

The viability was found to be very high for 82,6% of the infected people. However the calculated χ^2-value is not significant which indicates that there were no significant differences in the viability of the eggs between the mildly infected people and the severely infected people.

3.5.4 SCHISTOSOMA HAEMATOBIUM EGG HATCH

The hatch of the eggs was also measured for 219 of the 221 cases infected with Schistosoma Harmatobium.

T A B L E 3.5.4.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION										
GRADE	1		2		3		4		5		TOTAL
0	71	50,0%	11	33,3%	6	17,1%	5	62,5%	1	33,3%	94 42,5%
1	44	31,0%	11	33,3%	7	20,0%	1	12,5%	0	0%	63 28,5%
2	11	7,7%	8	24,2%	9	25,6%	0	0%	0	0%	28 12,7%
3	3	2,1%	1	3,0%	6	17,1%	0	0%	1	0%	13 5,9%
4	4	2,8%	2	0%	4	11,4%	1	12,5%	1	33,3%	12 5,4%
5	9	6,3%	0	0%	3	8,6%	1	12,5%	0	0%	13 5,9%
TOTAL	142		33		35		8		3		221

T A B L E 3.5.4.1b

GRADE	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION					
	1		2+		TOTAL	
0	72	50,0%	23	29,1%	94	42,5%
1+	71	50,0%	56	70,9%	127	57,5%
TOTAL	142		79		221	

$\chi^2 = 9,02^{**}$ df = 1

The calculated χ^2-value is significant at the 0,01 level of significance which indicates a difference in hatch between the mildly infected people and the severely infected people. From Table 3.5.4.1b it can be seen that a low proportion of the severely infected people had no hatch. From Table 3.5.4.1a it can be seen that high proportions of the severely infected people were measured to have high hatch grades.

3.5.5 URINE SEDIMENT R.B.C.

T A B L E 3.5.5.1a

GRADE	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
0	398 87,9%	51 35,9%	11 33,3%	11 31,4%	1 12,5%	0 0%	472 70,0%
1	43 9,5%	40 28,2%	7 21,2%	8 22,9%	4 50,0%	0 0%	102 15,1%
2	6 1,3%	28 19,7%	10 30,3%	9 25,7%	1 12,5%	1 33,3%	55 8,2%
3	4 0,9%	15 10,6%	4 12,1%	4 11,4%	1 12,5%	0 0%	28 4,2%
4	2 0,4%	4 2,8%	1 3,0%	2 5,7%	0 0%	0 0%	9 1,3%
5	0 0%	4 2,8%	0 0%	1 2,9%	1 12,5%	2 66,7%	8 1,2%
TOTAL	453	142	33	35	8	3	674

T A B L E 3.5.5.1b

GRADE	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	398	87,9%	51	35,9%	23	29,1%	472	70,0%
1	43	9,5%	40	28,2%	19	24,1%	102	15,1%
2+	12	2,6%	51	35,9%	37	46,8%	100	14,8%
TOTAL	453		142		79		674	

$\chi^2 = 235,06^{**}$ df = 4

The calculated χ^2-value is significant at the 0,001 level of significance which indicates a very significant relationship between the incidence and severity of Schistosoma Haematobium and the number of red blood cells found in the urine sediment. From Table 3.5.5.1a it can be seen that the proportion of people with no red blood cells decreases as the severity of the infection increases, and the proportion of people with red blood cells tends to increase with the severity of the infection.

T A B L E 3.5.5.2a

GRADE	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
0	381	75,0%	71	54,2%	16	55,2%	2	50,0%	2	100%	472	70,0%
1	66	13,0%	27	20,6%	6	20,7%	1	25,0%	0	0%	100	14,8%
2	32	6,3%	18	13,7%	6	20,7%	1	25,0%	0	0%	57	8,5%
3	18	3,5%	10	7,6%	0	0%	0	0%	0	0%	28	4,2%
4	5	1,0%	3	2,3%	1	3,4%	0	0%	0	0%	9	1,3%
5	2	0,4%	2	1,5%	0	0%	0	0%	0	0%	8	1,2%
TOTAL	508		131		29		4		2		674	

T A B L E 3.5.5.2b

GRADE	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	381	75,0%	71	54,2%	20	57,1%	472	70,0%
1	66	13,0%	27	20,6%	7	20,0%	100	14,8%
2+	61	12,0%	33	25,2%	8	22,9%	102	15,1%
TOTAL	508		131		35		674	

$\chi^2 = 25,46^{**}$ df = 4

The calculated χ^2-value is significant at the 0,01 level of significance which indicates that there is a relationship between the incidence and severity of Schistosoma Mansoni and the number of red blood cells found in the urine sediment. From Table 3.5.5.2b it can be seen that a higher than expected proportion of the people who were not infected had no red blood cells and the infected people had a higher incidence of red blood cells. From Table 3.5.5.2a it can be seen that some of the severe cases had no red blood cells in their urine sediment.

3.5.6 URINE VISSER-PITCHFORD EGG COUNT

T A B L E 3.5.6.1a

COUNT	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION											
	NOT INFECTED		1		2		3		4		5		TOTAL	
0	444	98,0%	35	24,6%	5	15,2%	4	11,4%	0	0%	0	0%	488	72,4%
1-10	7	1,5%	83	58,5%	23	69,8%	21	60,0%	1	12,5%	1	33,3%	136	20,2%
11-40	1	0,2%	17	12,0%	2	6,1%	3	8,6%	5	62,5%	1	33,3%	29	4,3%
41-80	1	0,2%	4	2,8%	1	3,0%	3	8,6%	1	12,5%	1	33,3%	11	1,6%
81-120	0	0%	1	0,7%	2	6,1%	1	2,9%	0	0%	0	0%	4	0,6%
120+	0	0%	2	1,4%	0	0%	3	8,6%	1	12,5%	0	0%	6	0,9%
TOTAL	453		142		33		35		8		3		674	

T A B L E 3.5.6.1b

COUNT	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	444	98,0%	35	24,6%	9	11,4%	488	72,4%
1-10	7	1,5%	83	58,5%	46	58,2%	136	20,2%
11+	2	0,4%	24	16,9%	24	30,4%	50	7,4%
TOTAL	453		142		79		674	

$\chi^2 = 467,17^{**}$ df = 4

The calculated χ^2-value is significant at the 0,001 level of significance which indicates a very significant relationship between the incidence and severity of Schistosoma Haematobium and the urine Visser-Pitchford egg count. From Table 3.5.6.1b it can be seen that a higher than expected proportion of the people who were not infected had a zero Visser-Pitchford egg count and that as the severity of the infection increased the proportion decreased.

T A B L E 3.5.6.1c

COUNT	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION					
	NOT INFECTED		INFECTED		TOTAL	
NOT INFECTED	444	98,0%	44	19,9%	488	72,4%
INFECTED	9	2,0%	177	80,1%	186	27,6%
TOTAL	453		221		674	

$\hat{\alpha} = 0,02$ $\hat{\beta} = 0,199$

$\hat{J} = 0,781$

The estimate of the Youden index of diagnostic power of the urine Visser-Pitchford egg count is not very high. From the table it can be seen that although the false positives were low (2,0%) the false negatives were high (19,9%).

3.5.7 SCHISTOSOME SPECIES IN URINE

Of the 674 cases investigated 5 cases (0,7%) were found to have Schistosoma Mansoni eggs in the urine and 6 cases (0,9%) were found to have Schistosoma Mattheei eggs in the urine.

3.5.8 STOOL CONSISTENCY

T A B L E 3.5.8.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
FORMED	435 96,0%	133 93,7%	32 97,0%	34 97,1%	8 100%	3 100%	645 95,7%
LOOSE	18 4,0%	9 6,3%	1 3,0%	1 2,9%	0 0%	0 0%	29 4,3%
TOTAL	453	142	33	35	8	3	674

T A B L E 3.5.8.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION		
	NOT INFECTED	INFECTED	TOTAL
FORMED	435 96,0%	210 95,0%	645 95,7%
LOOSE	18 4,0%	11 5,0%	29 4,3%
TOTAL	453	221	674

$\chi^2 = 0,36$ df = 1

No cases were found to have liquid stools. The calculated χ^2-value is not significant which indicates that the incidence of Schistosoma Haematobium is independent of the consistency of the stool

T A B L E 3.5.8.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
FORMED	490	96,5%	124	94,7%	26	89,7%	4	100%	2	100%	645	95,7%
LOOSE	18	3,5%	7	5,3%	3	10,3%	0	0%	0	0%	29	4,3%
TOTAL	508		131		29		4		2		674	

T A B L E 3.5.8.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED		INFECTED		TOTAL	
FORMED	490	96,5%	155	93,5%	645	95,7%
LOOSE	18	3,5%	11	6,6%	29	4,3%
TOTAL	508		166		674	

$\chi^2 = 2,89$ df = 1

The calculated χ^2-value is not significant which indicates that the incidence of Schistosoma Mansoni is independent of the consistency of the stool.

3.5.9. SCHISTOSOMA MANSONI EGG VIABILITY

The viability of the Schistosoma Mansoni eggs found in the stool were measured for all the 166 cases found to be infected.

T A B L E 3.5.9.2a

COUNT	LEVEL OF SCHISTOSOMA MANSONI INFECTION								TOTAL	
	1		2		3		4			
0-02	4	3,1%	2	6,9%	0	0%	0	0%	6	3,6%
0,21-04	1	0,8%	1	3,4%	0	0%	0	0%	2	1,2%
0,41-0,6	2	1,5%	0	0%	0	0%	0	0%	2	1,2%
0,61-0,8	7	5,3%	2	6,9%	0	0%	0	0%	9	5,4%
0,81-1,0	117	89,3%	24	82,8%	4	100%	2	100%	147	88,6%
TOTAL	131		29		4		2		166	

T A B L E 3.5.9.2b

COUNT	LEVEL OF SCHISTOSOMA MANSONI INFECTION				TOTAL	
	1		2+			
0-48	5	3,9%	3	8,6%	8	4,8%
0,41-0,8	9	6,9%	2	5,7%	11	6,6%
0,81-1,0	117	89,3%	30	85,7%	147	88,6%
TOTAL	131		35		166	

$\chi^2 = 1,38$ df = 2

The calculated χ^2-value is not significant which indicates that there were no significant differences in the viability of the eggs between the mildly infected people and the severely infected people. However, a high proportion, 88,6%, of the infected people had very high viability measures.

3.5.10 SCHISTOSOMA MANSONI EGG HATCH

The hatch of the Schistosoma Mansoni eggs found in the stool were measured for all 166 of the cases found to be infected.

T A B L E 3.5.10.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
GRADE	1		2		3		4		TOTAL	
0	36	27,5%	11	37,9%	0	0%	1	50%	48	28,9%
1	74	56,5%	12	41,4%	2	50%	0	0%	88	53,0%
2	15	11,5%	4	13,8%	0	0%	0	0%	19	11,4%
3	6	4,6%	1	3,4%	1	25%	0	0%	8	4,8%
4	0	0%	1	3,4%	1	25%	1	50%	3	1,8%
TOTAL	131		29		4		2		166	

T A B L E 3.5.10.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
GRADE	1		2+		TOTAL	
0	36	27,5%	12	34,3%	48	28,9%
1+	95	72,5%	23	65,7%	118	71,1%
TOTAL	131		35		166	

$\chi^2 = 0,62$ df = 1

The calculated χ^2-values is not significant which indicates that there were no significant differences in the hatch of the eggs between the mildly infected people and the severely infected people.

3.5.11 STOOL VISSER-PITCHFORD EGG COUNT

T A B L E 3.5.11.2a

COUNT	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0	459	90,4%	38	29,0%	1	3,4%	1	25%	0	0%	499	74,0%
1-10	17	3,3%	23	17,6%	6	20,7%	0	0%	0	0%	46	6,8%
11-40	23	4,5%	33	25,2%	5	17,2%	0	0%	0	0%	61	9,1%
41-80	4	0,8%	15	11,5%	9	31,0%	0	0%	0	0%	28	4,2%
81-150	4	0,8%	9	6,9%	3	10,3%	1	25%	0	0%	17	2,5%
121-500	1	0,2%	9	6,9%	4	13,8%	2	50%	0	0%	16	2,4%
500+	0	0%	4	3,1%	1	3,4%	0	0%	2	100%	7	1,0%
TOTAL	508		131		29		4		2		674	

T A B L E 3.5.11.2b

COUNT	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	459	90,4%	38	29,0%	2	5,7%	499	74,0%
1+	49	9,6%	93	71,0%	33	94,3%	175	26,0%
TOTAL	508		131		35		674	

$\chi^2 = 293,54^{**}$ df = 2

The calculated χ^2-value is significant at the 0,001 level of significance which indicates a very significant relationship between the incidence and severity of Schistosoma Mansoni and the stool Visser-Pitchford egg count. From Table 3.5.11.2b it can be seen that a higher than expected proportion of the not infected people had a zero Visser-Pitchford egg count and that as the severity of the infection increased the proportion decreased. The proportion of the not infected people with a positive egg count was low and as the severity of infection increased, the proportion with positive egg counts increased.

T A B L E 3.5.11.2c

COUNT	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED		INFECTED		TOTAL	
NOT INFECTED	459	90,4%	40	24,1%	499	74,0%
INFECTED	49	9,6%	126	75,9%	175	26,0%
TOTAL	508		166		674	

$\hat{\alpha} = 0,096 \qquad \hat{\beta} = 0,241$

$\hat{J} = 0,663$

The estimate of the Jouden index of diagnostic power of the stool Visser-Pitchford egg count is not very high. From the table it can be seen that the proportion of flase positives is fairly low (9,6%) and that the proportion of false negatives is quite high (24,1%).

3.5.12 SCHISTOSOME SPECIES IN STOOL

Of the 674 cases investigated 12 (1,8%) were found to have Schistosoma Haematobium eggs present in the stool and 6 (0,9%) were found to have Schistosoma Mattheei eggs in the stool.

3.5.13 OTHER PARASITES IN STOOL

When the stool was investigated for other parasites the following incidence was observed:

OTHER PARASITES	FREQUENCY	PERCENTAGE
None	594	88,1%
Hookworm only	65	9,6%
Ascaris only	1	0,1%
Strongyloides only	1	0,1%
Enterobuis only	0	0%
Taenia only	1	0,1%
Hymenolepis only	7	1,0%
Hookworm and Ascaris	1	0,1%
Ascaris and Strongyloides	4	0,6%
TOTAL	674	

3.6 BIOCHEMISTRY

3.6.1 URINE PROTEIN

TABLE 3.6.1.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
mg/100 mℓ	NOT INFECTED		1		2		3		4		5		TOTAL	
0	421	96,8%	101	78,3%	30	90,9%	33	94,3%	6	75%	1	33,3%	592	92,1%
1-50	12	2,8%	17	13,2%	3	9,1%	0	0%	2	25%	2	66,7%	36	5,6%
51-100	2	0,5%	11	8,5%	0	0%	2	5,7%	0	0%	0	0%	15	2,3%
TOTAL	435		129		33		35		8		3		643	

TABLE 3.6.1.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
mg/100 mℓ	NOT INFECTED		1		2+		TOTAL	
0	421	96,8%	101	78,3%	70	88,6%	592	92,1%
1-100	14	3,2%	28	21,7%	9	11,4%	51	7,9%
TOTAL	435		129		79		643	

$\chi^2 = 48,04^{**}$ df = 2

The calculated χ^2-value is significant at the 0,001 level of significance which indicates a significant relationship between the incidence and severity of Schistosoma Haematobium and the amount of protein in the urine. From Table 3.6.1.1a it can be seen that a larger proportion than would be expected of the people who were not infected had no portein present in their urine. Although a large proportion of people who were infected did have protein present in their urine, several severe cases of infection did not have portein present in their urine.

T A B L E 3.6.1.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
mg/100 mℓ	NOT INFECTED		1		2		3		4		TOTAL	
0	454	93,4%	106	86,9%	27	93,1%	4	100%	1	50%	592	92,1%
1-50	22	4,5%	11	9,0%	2	6,9%	0	0%	1	50%	36	5,6%
51-100	10	2,1%	5	4,1%	0	0%	0	0%	0	0%	15	2,3%
TOTAL	486		122		29		4		2		643	

T A B L E 3.6.1.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION						
mg/100 mℓ	NOT INFECTED		1		2+		TOTAL	
0	454	93,4%	106	86,9%	32	91,4%	592	92,1%
1+	32	6,6%	16	13,1%	3	8,6%	51	7,9%
TOTAL	486		122		35		643	

$\chi^2 = 5,72 \quad df = 2$

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the amount of protein in the urine.

3.6.2 URINE BLOOD

T A B L E 3.6.2.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
NONE	407	93,6%	96	74,4%	23	69,7%	19	54,3%	7	87,5%	0	0%	552	85,8%
LIGHT	17	3,9%	16	12,4%	8	24,2%	12	34,3%	1	12,5%	1	33,3%	55	8,6%
MEDIUM	5	1,1%	11	8,5%	2	6,1%	4	11,4%	0	0%	2	66,7%	24	3,7%
HEAVY	6	1,4%	6	4,7%	0	0%	0	0%	0	0%	0	0%	12	1,9%
TOTAL	435		129		33		35		8		3		643	

T A B L E 3.6.2.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NONE	407	93,6%	96	74,4%	49	62,0%	552	85,8%
LIGHT	17	3,9%	16	12,4%	22	27,8%	55	8,6%
MEDIUM,HEAVY	11	2,5%	17	13,3%	8	10,1%	36	5,6%
TOTAL	435		129		79		643	

$\chi^2 = 81,25^{**}$ df = 4

The significance of the χ^2-value at the 0,001 level indicates a significant relationship between the incidence and severity of Schistosoma Haematobium and blood in the urine. From Table 3.6.2.1a it can be seen that a high proportion of the people who were not infected had no blood in their urine, while a high proportion of the people who were infected did have blood in their urine.

T A B L E 3.6.2.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
NONE	433	89,1%	93	76,2%	22	75,9%	2	50%	2	100%	552	85,8%
LIGHT	31	6,4%	18	14,8%	5	17,2%	1	25%	0	0%	55	8,6%
MEDIUM	14	2,9%	7	5,7%	2	6,9%	1	25%	0	0%	24	3,7%
HEAVY	8	1,6%	4	3,3%	0	0%	0	0%	0	0%	12	1,9%
TOTAL	486		122		29		4		2		643	

T A B L E 3.6.2.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NONE	433	89,1%	93	76,2%	26	74,3%	552	85,8%
LIGHT	31	6,4%	18	14,8%	6	17,1%	55	8,6%
MEDIUM,HEAVY	22	4,5%	11	9,0%	3	8,6%	36	5,6%
TOTAL	486		122		35		643	

$\chi^2 = 17,74^{**}$ df = 4

The calculated χ^2-value is significant at the 0,01 level which indicates a realtionship between the incidence and severity of Schistosoma Mansoni and blood in the urine. It can be seen from Table 3.6.2.2a that a high proportion of the people not infected had no blood in their urine, while a high proportion of the people who were infected did have blood in their urine. However, there were many cases that had no blood in their urine.

3.6.3 URINE BILIRUBIN

All the urine samples investigated for bilirubin were found to be negative.

3.6.4 URINE UROBILINOGEN

T A B L E 3.6.4.1a

ERLICH UNITS PER 100 mℓ	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION											
	NOT INFECTED		1		2		3		4		5		TOTAL	
0	2	0,5%	0	0%	0	0%	0	0%	0	0%	0	0%	2	0,3%
0,1-0,4	385	88,5%	112	86,8%	27	81,8%	30	85,7%	8	100%	3	100%	565	87,9%
0,5-0,8	4	0,9%	0	0%	2	6,1%	0	0%	0	0%	0	0%	6	0,9%
0,9-1,2	43	9,9%	17	13,2%	4	12,1%	5	14,3%	0	0%	0	0%	69	10,7%
1,2+	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,2%
TOTAL	435		129		33		35		8		3		643	

T A B L E 3.6.4.1b

ERLICH UNITS PER 100 mℓ	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0,1-0,4	385	88,9%	112	86,8%	68	86,1%	565	88,1%
0,5+	48	11,1%	17	13,2%	11	13,9%	76	11,6%
TOTAL	433		129		79		641	

$\chi^2 = 0,79 \quad df = 2$

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Haematobium and the amount of urobilinogen in the urine are independent.

T A B L E 3.6.4.2a

ERLICH UNITS PER 100 mℓ	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0	0	0%	2	1,6%	0	0%	0	0%	0	0%	2	0,3%
0,1-0,4	428	88,1%	106	86,9%	25	86,2%	4	100%	2	100%	565	87,9%
0,5-0,8	3	0,6%	1	0,8%	2	6,9%	0	0%	0	0%	6	0,9%
0,9-1,2	54	11,1%	13	10,7%	2	6,9%	0	0%	0	0%	69	10,7%
1,3+	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,2%
TOTAL	486		122		29		4		2		643	

T A B L E 3.6.4.2b

ERLICH UNITS PER 100 mℓ	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2		TOTAL	
0,1-0,4	428	88,1%	106	88,3%	31	88,6%	565	88,1%
0,5+	58	11,9%	14	11,7%	4	11,4%	76	11,9%
TOTAL	486		120		35		641	

$\chi^2 = 0,01$ df = 4

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the amount of urobilinogen in the urine.

3.6.5 BLOOD ALBUMEN

T A B L E 3.6.5.1a

gm%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
0,1-2,0	8	1,8%	2	1,6%	0	0%	0	0%	0	0%	0	0%	10	1,6%
2,1-4,0	259	59,5%	64	49,6%	23	69,7%	23	65,7%	7	87,5%	2	66,7%	378	58,8%
4,1-6,0	159	36,6%	60	46,5%	10	30,3%	12	34,3%	1	12,5%	1	33,3%	243	37,8%
6,1-8,0	8	1,8%	3	2,3%	0	0%	0	0%	0	0%	0	0%	11	1,7%
8,1-10,0	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,2%
TOTAL	435		129		33		35		8		3		643	

T A B L E 3.6.5.1b

gm%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0,1-2,0	267	61,4%	66	51,2%	57	72,2%	388	60,3%
4,1-10,0	168	38,6%	63	48,8%	22	27,8%	255	39,7%
TOTAL	435		129		79		643	

$\chi^2 = 9,34^{**}$ df = 2

The calculated χ^2-value is significant at the 0,01 level of significance which indicates a relationship between the incidence and severity of Schistosoma Haematobium and the amount of albumen found in the blood. Table 3.6.5.1a shows that smaller amounts of albumen were found in the people who were not infected or who had severe infections, while larger amounts of albumen were found in the blood of people who were in general mildly infected.

T A B L E 3.6.5.2a

gm%	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0,1-2,0	7	1,4%	3	2,5%	0	0%	0	0%	0	0%	10	1,6%
2,1-4,0	289	59,5%	67	54,9%	19	65,5%	3	75%	0	0%	378	58,8%
4,1-6,0	179	36,8%	51	41,8%	10	34,5%	1	25%	2	100%	243	37,8%
6,1-8,0	10	2,1%	1	0,8%	0	0%	0	0%	0	0%	11	1,7%
8,1-10,0	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,2%
TOTAL	486		122		29		4		2		643	

T A B L E 3.6.5.2b

gm%	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0-1	296	60,9%	70	57,4%	22	62,9%	388	60,3%
1-10,0	190	39,1%	52	42,6%	13	37,1%	256	39,7%
TOTAL	486		122		35		643	

$\chi^2 = 0,61 \quad df = 2$

The calculated χ^2-value was not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the amount of albumen found in the blood.

3.6.6 BLOOD PROTEIN

T A B L E 3.6.6.1a

gm%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
0,1-1,0	2	0,5%	0	0%	0	0%	0	0%	0	0%	0	0%	2	0,3%
1,1-3,0	0	0%	0	0%	0	0%	1	2,9%	0	0%	0	0%	1	0,2%
3,1-5,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
5,1-7,0	187	43,0%	52	40,3%	15	45,5%	11	31,4%	6	75%	1	33,3%	272	42,3%
7,1-9,0	244	56,1%	75	58,1%	18	54,5%	22	62,9%	2	25%	2	66,7%	363	56,5%
9,1-11,0	0	0%	2	1,6%	0	0%	1	2,9%	0	0%	0	0%	3	0,5%
11,0+	2	0,5%	0	0%	0	0%	0	0%	0	0%	0	0%	2	0,3%
TOTAL	435		129		33		35		8		3		643	

T A B L E 3.6.6.1b

gm%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0,1-7,0	189	43,4%	52	40,3%	34	43,0%	275	42,8%
7,1+	246	56,6%	77	59,7%	45	57,0%	368	57,2%
TOTAL	435		129		79		643	

$\chi^2 = 0,40$ df = 2

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the amount of protein found in the blood.

T A B L E 3.6.6.2a

mg%	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
0,1-1,0	1	0,2%	1	0,8%	0	0%	0	0%	0	0%	2	0,3%
1,1-3,0	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,2%
3,1-5,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
5,1-7,0	216	44,4%	46	37,7%	9	31,0%	0	0%	1	50%	272	42,3%
7,1-9,0	265	54,5%	73	59,8%	20	69,0%	4	100%	1	50%	363	56,5%
9,1-11,0	1	0,2%	2	1,6%	0	0%	0	0%	0	0%	3	0,5%
11+	2	0,4%	0	0%	0	0%	0	0%	0	0%	2	0,3%
TOTAL	486		122		29		4		2		643	

T A B L E 3.6.6.2b

mg%	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
0,1-7,0	218 44,6%	47 38,5%	10 28,6%	275 42,8%
7,1+	268 55,2%	75 61,5%	25 71,4%	368 57,2%
TOTAL	486	122	35	643

$\chi^2 = 4,65$ df = 2

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the amount of protein found in the blood.

3.6.7 BLOOD GLOBULIN

T A B L E 3.6.7.1a

gm%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
0,1-2,0	44 10,1%	15 11,6%	0 0%	1 2,9%	0 0%	0 0%	60 9,3%
2,1-4,0	302 69,4%	95 73,6%	28 84,8%	25 71,4%	8 100%	3 100%	461 71,7%
4,1-6,0	83 19,1%	19 14,7%	5 15,2%	9 25,7%	0 0%	0 0%	116 18,0%
6,1-8,0	5 1,1%	0 0%	0 0%	0 0%	0 0%	0 0%	5 0,8%
8,1-10,0	1 0,2%	0 0%	0 0%	0 0%	0 0%	0 0%	1 0,2%
TOTAL	435	129	33	35	8	3	643

T A B L E 3.6.7.1b

gm%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
0,1-2,0	44 10,1%	15 11,6%	1 1,3%	60 9,3%
2,1-4,0	302 69,4%	95 73,6%	64 81,0%	461 71,7%
4,1+	89 20,5%	19 14,7%	14 17,7%	122 19,0%
TOTAL	435	129	79	643

$\chi^2 = 9,66^*$ df = 4

The significance of the calculated χ^2-value at the 0,05 level indicates a relationship between the incidence and severity of Schistosoma Haematobium and the amount of globulin found in the blood. Table 3.6.7.1a shows that a larger than expected proportion of the people who were not infected had either a large or a small amount of globulin in their blood. The infected people had a larger proportion with 2,1-4,0 mg%.

T A B L E 3.6.7.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
mg%	NOT INFECTED		1		2		3		4		TOTAL	
0,1-2,0	49	10,1%	11	9,0%	0	0%	0	0%	0	0%	60	9,3%
2,1-4,0	346	71,2%	86	70,5%	26	89,7%	1	25%	2	100%	461	71,7%
4,1-6,0	86	17,7%	24	19,7%	3	10,3%	3	75%	0	0%	116	18,0%
6,1-8,0	4	0,8%	1	0,8%	0	0%	0	0%	0	0%	5	0,8%
8,1-10,0	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,2%
TOTAL	486		122		29		4		2		643	

T A B L E 3.6.7.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
mg%	NOT INFECTED		1		2+		TOTAL	
0,1-2,0	49	10,1%	11	9,0%	0	0%	60	9,3%
2,1-4,0	346	71,2%	86	70,5%	29	82,9%	461	71,7%
4,1+	91	18,7%	25	20,5%	6	17,1%	122	19,0%
TOTAL	486		122		35		643	

$\chi^2 = 4,46 \quad df = 4$

The calculated χ^2-value is not significant which indicates a lack of relationship between the incidence and severity of Schistosoma Mansoni and the amount of globulin in the blood.

3.6.8 BLOOD ALBUMEN : GLOBULIN RATIO

T A B L E 3.6.8.1a

RATIO	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION											
	NOT INFECTED		1		2		3		4		5		TOTAL	
0,1-1,0	180	41,4%	35	27,1%	16	48,5%	15	42,9%	3	37,5%	0	0%	249	38,7%
1,1-2,0	197	45,3%	72	55,8%	16	48,5%	19	54,3%	5	62,5%	3	100%	312	48,5%
2,1-4,0	38	8,7%	17	13,2%	1	3,0%	1	2,9%	0	0%	0	0%	57	8,9%
4,1-6,0	12	2,8%	3	2,3%	0	0%	0	0%	0	0%	0	0%	15	2,3%
6,1-8,0	5	1,1%	0	0%	0	0%	0	0%	0	0%	0	0%	5	0,8%
8,1-10,0	3	0,7%	2	1,6%	0	0%	0	0%	0	0%	0	0%	5	0,8%
TOTAL	435		129		33		35		8		3		643	

T A B L E 3.6.8.1b

RATIO	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0,1-1,0	180	41,4%	35	27,1%	34	43,0%	249	38,7%
1,1-2,0	197	45,3%	72	55,8%	43	54,4%	312	48,5%
2,1-10,0	58	13,3%	22	17,1%	2	2,5%	82	12,8%
TOTAL	435		129		79		643	

$\chi^2 = 17,03^{**}$ df = 4

The calculated χ^2-value is significant at the 0,01 level of significance which indicates a relationship between the incidence and severity of Schistosoma Haematobium and the person's albumen:globulin ratio. Table 3.6.8.1a shows that a larger than expected proportion of the severely infected people had a low ratio and very few cases had high ratios, while a larger than expected proportion of the mildly infected people had high ratios. The people who were not infected tended to have a high ratio or a low ratio and a smaller than expected proportion had neither a high nor a low ratio.

T A B L E 3.6.8.2a

RATIO	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0,1-1,0	192	39,5%	45	36,9%	9	31,0%	3	75%	0	0%	249	38,7%
1,1-2,0	230	47,3%	60	49,2%	19	65,5%	1	25%	2	100%	312	48,5%
2,1-4,0	40	8,2%	16	13,1%	1	3,4%	0	0%	0	0%	54	8,9%
4,1-6,0	15	3,1%	0	0%	0	0%	0	0%	0	0%	15	2,3%
6,1-8,0	5	1,0%	0	0%	0	0%	0	0%	0	0%	5	0,8%
8,1-10,0	4	0,8%	1	0,8%	0	0%	0	0%	0	0%	5	0,8%
TOTAL	486		122		29		4		2		643	

T A B L E 3.6.8.2b

RATIO	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0,1-1,0	192	39,5%	45	36,9%	12	34,3%	249	38,7%
1,1-2,0	230	47,3%	60	49,2%	22	62,9%	312	48,5%
2,1+	64	13,2%	17	13,9%	1	2,9%	82	12,8%
TOTAL	486		122		35		643	

$\chi^2 = 4,89$ df = 4

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosome Mansoni and the person's albumen : globulin ratio

3.6.9 BLOOD S.G.P.T.

T A B L E 3.6.9.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION											
iu/ℓ	NOT INFECTED		1		2		3		4		5		TOTAL	
0	0	0%	1	0,8%	0	0%	0	0%	0	0%	0	0%	1	0,2%
1-10	334	76,8%	78	60,5%	24	72,7%	27	77,1%	6	75%	3	100%	472	73,4%
11-20	70	16,1%	27	20,9%	5	15,2%	7	20,0%	2	25%	0	0%	111	17,3%
21-30	21	4,8%	17	13,2%	3	9,1%	1	2,9%	0	0%	0	0%	42	6,5%
31-50	6	1,4%	4	3,1%	0	0%	0	0%	0	0%	0	0%	10	1,6%
51-100	2	0,5%	1	0,8%	1	3,0%	0	0%	0	0%	0	0%	4	0,6%
101+	2	0,5%	1	0,8%	0	0%	0	0%	0	0%	0	0%	3	0,5%
TOTAL	435		129		33		35		8		3		643	

T A B L E 3.6.9.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION					
iu/ℓ	NOT INFECTED		1		2+		TOTAL	
1-10	334	76,8%	78	60,9%	60	75,9%	472	73,5%
11-20	70	16,1%	27	21,1%	14	17,7%	111	17,3%
21+	31	7,1%	23	18,0%	5	6,3%	59	9,2%
TOTAL	435		128		79		642	

$\chi^2 = 18,34^{**}$ df = 4

One observation had an S.G.P.T. of 0 iu/ℓ and was omitted from the analysis. The calculated χ^2-value was significant at the 0,01 level of significance which indicates a relationship between the incidence and severity of Schistosoma Haematobium and the amount of S.G.P.T. in the blood. Table 3.6.9.1a shows that the people who were not infected had a higher than expected proportion with a low S.G.P.T. The mildly infected people had a higher than expected proportion with high S.G.P.T. and the severely infected people had low S.F.P.T. in their blood.

T A B L E 3.6.9.2a

iu/ℓ	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,2%
1-10	370	76,1%	80	65,6%	19	65,5%	3	75%	1	50%	472	73,4%
11-20	78	16,0%	25	20,5%	5	17,2%	1	25%	1	25%	111	17,3%
21-30	26	5,3%	13	10,7%	3	10,3%	0	0%	0	0%	42	6,5%
31-50	5	1,0%	3	2,5%	2	6,9%	0	0%	0	0%	10	1,6%
51-100	3	0,6%	1	0,8%	0	0%	0	0%	0	0%	5	0,6%
101+	3	0,6%	0	0%	0	0%	0	0%	0	0%	3	0,5%
TOTAL	486		122		29		4		2		643	

T A B L E 3.6.9.2b

iu/	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
1-10	370	76,3%	80	65,6%	23	65,7%	472	73,4%
11-20	78	16,1%	25	20,5%	7	20,0%	111	17,3%
21+	37	7,6%	17	13,9%	5	14,3%	59	9,2%
TOTAL	485		122		35		642	

$\chi^2 = 8,38$ df = 4

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni is independent of the amount of S.G.P.T. in the blood.

3.6.10 THYMOL TURBIDITY

T A B L E 3.6.10.1a

UNITS×10	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
0-10	81	18,6%	36	27,9%	6	18,2%	8	22,9%	2	25,0%	0	0%	133	20,7%
11-20	132	30,3%	41	31,8%	15	45,5%	8	22,9%	1	12,5%	0	0%	197	30,6%
21-30	114	26,2%	30	23,3%	5	15,2%	11	31,4%	2	25,0%	1	33,3%	163	25,3%
31-50	76	17,5%	17	13,2%	4	12,1%	5	14,3%	3	37,5%	1	33,3%	106	16,5%
51-70	22	5,1%	3	2,3%	2	6,1%	3	8,6%	0	0%	1	33,3%	31	4,8%
71+	10	2,3%	2	1,6%	1	3,0%	0	0%	0	0%	0	0%	13	2,0%
TOTAL	435		129		33		35		8		3		643	

T A B L E 3.6.10.1b

UNITS×10	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION					
	NOT INFECTED		1		2+	
0-10	81	18,6%	36	27,9%	16	20,3%
11-20	132	30,3%	41	31,8%	24	30,4%
21-30	114	26,2%	30	23,3%	19	24,1%
31+	108	24,8%	22	17,1%	20	25,3%
TOTAL	435		129		79	

TOTAL	
133	20,7%
197	30,6%
163	25,3%
150	23,3%
643	

$\chi^2 = 7,36$ df = 6

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Haematobium and the Thymol turbidity of the blood.

T A B L E 3.6.10.2a

UNITS×10	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
0-10	98	20,2%	32	26,2%	1	3,4%	1	25%	1	50%	133	20,7%
11-20	144	29,6%	40	32,8%	12	41,4%	1	25%	0	0%	197	30,6%
21-30	133	27,4%	15	12,3%	12	41,4%	2	50%	1	50%	163	25,3%
31-50	81	16,7%	21	17,2%	4	13,8%	0	0%	0	0%	106	16,5%
51-70	22	4,5%	9	7,4%	0	0%	0	0%	0	0%	31	4,8%
71+	8	1,6%	5	4,1%	0	0%	0	0%	0	0%	13	2,0%
TOTAL	486		122		29		4		2		643	

T A B L E 3.6.10.2b

UNITS×10	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0-10	98	20,2%	32	26,2%	3	8,6%	133	20,7%
11-20	144	29,6%	40	32,8%	13	37,1%	197	30,6%
21-30	133	27,4%	15	12,3%	15	42,9%	163	25,3%
31+	111	22,8%	35	28,7%	4	11,4%	150	23,3%
TOTAL	486		122		35		643	

$\chi^2 = 22,08^{**}$ df = 6

The calculated χ^2-value is significant at the 0,01 level of significance which indicates a relationship between the incidence and severity of Schistosoma Mansoni and the Thymol turbidity of the blood. Table 3.6.10.2a shows that the people who were not infected had a higher proportion than was expected with medium turbidity. The mildly infected people had a higher proportion than was expected with a high turbidity while the severely infected people had low-medium trubidity.

3.6.11 BLOOD BILIRUBIN

None of the cases were found to have bilirubin in the blood.

3.7 HAEMATOLOGY

3.7.1 W.B.C. TOTAL COUNT

T A B L E 3.7.1.1a

$10^3/mm^3$	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION											
	NOT INFECTED		1		2		3		4		5		TOTAL	
0,1-4,0	18	4,3%	5	3,7%	0	0%	0	0%	0	0%	0	0%	23	3,7%
4,1-6,0	192	46,0%	61	45,2%	9	33,3%	15	45,5%	3	42,9%	1	33,3%	281	45,2%
6,1-8,0	149	35,7%	52	38,5%	12	44,4%	14	42,4%	3	42,9%	1	33,3%	231	37,1%
8,1-10,0	43	10,3%	13	9,6%	4	14,8%	4	12,1%	0	0%	0	0%	64	10,3%
10,1-12,0	12	2,9%	3	2,2%	1	3,7%	0	0%	1	1,4%	0	0%	17	2,7%
12,1+	3	0,7%	1	0,7%	1	3,7%	0	0%	0	0%	1	33,3%	6	1,0%
TOTAL	417		135		27		33		7		3		622	

T A B L E 3.7.1.1b

$10^3/mm^3$	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0,1-6,0	210	50,4%	66	48,9%	28	40,0%	304	48,9%
6,1-8,0	149	35,7%	52	38,2%	30	42,9%	231	37,1%
8,1+	58	13,9%	17	12,6%	12	17,1%	87	14,0%
TOTAL	417		135		70		622	

$\chi^2 = 2,91 \quad df = 4$

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Haematobium are independent of the white blood cell count.

T A B L E 3.7.1.2a

$10^3/mm^3$	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0,1-4,0	16	3,3%	5	4,5%	1	4,0%	0	0%	1	50,0%	23	3,7%
4,1-6,0	216	45,1%	57	50,9%	7	28,0%	1	25%	0	0%	281	45,2%
6,1-8,0	174	36,3%	38	33,9%	15	60,0%	3	75%	1	50,0%	231	37,1%
8,1-10,0	51	10,6%	11	9,8%	2	8,0%	0	0%	0	0%	64	10,3%
10,1-12,0	17	3,5%	0	0%	0	0%	0	0%	0	0%	17	2,7%
12,1+	5	1,0%	1	0,9%	0	0%	0	0%	0	0%	6	1,0%
TOTAL	479		112		25		4		2		622	

T A B L E 3.7.1.2b

$10^3/mm^3$	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0,1-6,0	232	48,4%	62	55,4%	10	32,3%	304	48,9%
6,1-8,0	174	36,3%	38	33,9%	19	61,3%	231	37,1%
8,1+	73	15,2%	12	10,7%	2	6,5%	87	14,0%
TOTAL	479		112		31		622	

$\chi^2 = 10,65^*$ df = 4

The calculated χ^2-value is significant at the 0,05 level of significance which indicates a relationship between the incidence and severity of Schistosoma Mansoni and the white blood cell count. It can be seen from Table 3.7.1.2a that the people who are not infected tended to have a higher W.B.C. count than the infected people and that none of the severely infected people had a high W.B.C. count.

3.7.2 R.B.C. TOTAL COUNT

T A B L E 3.7.2.1a

$10^3/mm^3$	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
0,1-2,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
2,1-4,0	6	1,4%	1	0,7%	1	3,7%	0	0%	0	0%	0	0%	8	1,3%
4,1-6,0	402	96,4%	129	95,6%	26	96,3%	33	100%	7	100%	3	100%	600	96,5%
6,1+	9	2,2%	5	3,7%	0	0%	0	0%	0	0%	0	0%	14	2.3%
TOTAL	417		135		27		33		7		3		622	

Table 3.7.2.1a shows that most of the cases had a red blood cell count which was $4,1-6,0 \times 10^3/mm^3$. As there was

very little variation in the counts, no analysis was performed to investigate whether Schistosoma Haematobium and R.B.C. total count were independent.

T A B L E 3.7.2.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
$10^3/mm^3$	NOT INFECTED		1		2		3		4		TOTAL	
0,1-2,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
2,1-4,0	4	0,8%	3	2,7%	1	4,0%	0	0%	0	0%	8	1,3%
4,1-6,0	464	96,9%	106	94,6%	24	96,0%	4	100%	2	100%	600	96,5%
6,1+	11	2,3%	3	2,7%	0	0%	0	0%	0	0%	12	2,3%
TOTAL	479		112		25		4		2		622	

No analysis was performed to investigate whether Schistosoma Mansoni and R.B.C. total count were independent as most of the counts were in the same range.

3.7.3 HAEMAGLOBIN

T A B L E 3.7.3.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION											
gm %	NOT INFECTED		1		2		3		4		5		TOTAL	
0,1-10,0	2	0,5%	1	0,7%	1	3,7%	0	0%	0	0%	0	0%	4	0,6%
10,1-15,0	249	59,7%	94	69,6%	21	77,8%	25	75,8%	7	100%	3	100%	399	64,1%
15,1-20,0	162	38,8%	40	29,6%	5	18,5%	8	24,2%	0	0%	0	0%	215	34,5%
20+	4	1,0%	0	0%	0	0%	0	0%	0	0%	0	0%	4	0,6%
TOTAL	417		135		27		33		7		3		622	

T A B L E 3.7.3.1b

gm %	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
0,1-15,0	251 60,2%	95 70,4%	57 81,4%	403 64,8%
15,1+	166 39,8%	40 29,6%	13 18,6%	219 35,2%
TOTAL	417	135	70	622

$\chi^2 = 14,20^{**}$ df = 2

The calculated χ^2-value is significant at the 0,001 level of significance which indicates a significant relationship between the incidence and severity of Schistosoma Haematobium and the amount of haemaglobin found in the blood. From Table 3.7.3.1a it can be seen that the people who are not infected had a higher proportion than was expected who had high amounts of haemaglobin. The mildly infected people had high proportions with small to medium amounts of haemaglobin and the severely infected people all had medium amounts of haemaglobin.

T A B L E 3.7.3.2a

gm %	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
0,1-10,0	3 0,6%	0 0%	1 4,0%	0 0%	0 0%	4 0,6%
10,1-15,0	306 63,9%	76 67,9%	13 52,0%	4 100%	0 0%	399 64,1%
15,1-20,0	166 34,7%	36 32,1%	11 44,0%	0 0%	2 100%	215 34,6%
20,1+	4 0,8%	0 0%	0 0%	0 0%	0 0%	4 0,6%
TOTAL	479	112	25	4	2	622

T A B L E 3.7.3.2b

gm %	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
0,1-15,0	309 64,5%	76 67,9%	18 58,1%	403 64,8%
15,1+	170 35,5%	36 37,1%	13 41,9%	219 35,2%
TOTAL	479	112	31	622

$\chi^2 = 1,09$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the amount of haemaglobin in the blood.

3.7.4 HAEMATOCRIT

T A B L E 3.7.4.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
0,1-30,0	3 0,7%	0 0%	1 3,7%	0 0%	0 0%	0 0%	4 0,6%
30,1-40,0	100 24,0%	37 27,4%	8 29,6%	16 48,5%	3 42,9%	3 100%	167 26,8%
40,1-50,0	289 69,3%	92 68,1%	17 63,0%	17 51,5%	4 57,1%	0 0%	419 67,4%
50,1-60,0	23 5,5%	6 4,4%	1 3,7%	0 0%	0 0%	0 0%	30 4,8%
60,1+	2 0,5%	0 0%	0 0%	0 0%	0 0%	0 0%	2 0,3%
TOTAL	417	135	27	33	7	3	622

T A B L E 3.7.4.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
0,1-40,0	103 24,7%	37 27,4%	39 55,7%	171 27,5%
40,1+	314 75,3%	98 72,6%	31 44,3%	451 72,5%
TOTAL	417	135	70	622

$\chi^2 = 28,29^{**}$ df = 2

The significance of the χ^2-value at the 0,001 level of significance indicates a significant relationship between the incidence and severity of Schistosoma Haematobium and the haematocrit of the blood. From Table 3.7.4.1a it can be seen that the people who were not infected or mildly infected tended to have a higher haematocrit while the severely infected people tended to have a lower haematocrit.

T A B L E 3.7.3.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
0,1-30,0	4	0,8%	0	0%	0	0%	0	0%	0	0%	4	0,6%
30,1-40,0	134	28,0%	28	25,0%	4	16,0%	1	25%	0	0%	167	26,8%
40,1-50,0	315	65,8%	78	69,6%	21	84,0%	3	75%	2	100%	419	67,4%
50,1-60,0	24	5,0%	6	5,4%	0	0%	0	0%	0	0%	30	4,8%
60,1+	2	0,4%	0	0%	0	0%	0	0%	0	0%	2	0,3%
TOTAL	479		112		25		4		2		622	

T A B L E 3.7.4.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0,1-40,0	138	28,8%	28	25,0%	5	16,1%	171	27,5%
40,1+	341	71,2%	84	75,0%	26	83,9%	451	72,5%
TOTAL	479		112		31		622	

$\chi^2 = 2,77 \quad df = 2$

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the haematocrit of the blood.

3.7.5 NEUTROPHILS

T A B L E 3.7.5.1a

%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
0,1-20,0	6	1,4%	4	3,0%	1	3,7%	3	9,1%	2	28,6%	0	0%	16	2,6%
20,1-40,0	158	37,9%	49	36,3%	11	40,7%	13	39,4%	4	57,1%	1	33,3%	236	37,6%
40,1-60,0	207	49,6%	73	54,1%	14	51,9%	15	45,5%	1	14,3%	2	66,7%	312	50,2%
60,1-80,0	45	10,8%	9	6,7%	1	3,7%	2	6,1%	0	0%	0	0%	57	9,2%
80,1-100,0	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,2%
TOTAL	417		135		27		33		7		3		622	

T A B L E 3.7.5.1b

%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0,1-40,0	164	39,3%	53	39,3%	35	50,0%	252	40,5%
40,1-60,0	207	49,6%	73	54,1%	32	45,7%	312	50,2%
60,1-100,0	46	11,0%	9	6,7%	3	4,3%	58	9,3%
TOTAL	417		135		70		622	

$\chi^2 = 6,69$ df = 4

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Haematobium and the percentage of white blood cells which were Neutrophils.

T A B L E 3.7.5.2a

%	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
0	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
0,1-20,0	8 1,7%	5 4,5%	3 12,0%	2 50,0%	0 0%	16 2,6%
20,1-40,0	187 39,0%	33 29,5%	12 48,0%	2 50,0%	2 100%	236 37,6%
40,1-60,0	237 49,5%	66 58,9%	7 28,0%	0 0%	0 0%	312 50,2%
60,1-80,0	46 9,6%	8 7,1%	3 12,0%	0 0%	0 0%	57 9,2%
80,1-100,0	1 0,2%	0 0%	0 0%	0 0%	0 0%	1 0,2%
TOTAL	479	112	25	4	2	622

T A B L E 3.7.5.2a

%	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
0,1-40,0	195 40,7%	38 33,9%	21 67,7%	252 40,5%
40,1-60,0	237 49,5%	66 58,9%	7 22,6%	369 50,2%
60,1-100,0	47 9,8%	8 7,1%	3 9,7%	58 9,3%
TOTAL	479	112	31	622

$\chi^2 = 13,99^*$ df = 4

The calculated χ^2-value is significant at the 0,05 level of significance which indicates a relationship between the incidence and severity of Schistosoma Mansoni and the percentage of white blood cells which are Neutrophils. From Tables 3.7.5.2a it can be seen that the people who were not infected or mildly infected tended to have about 40-60% of white blood cells being Neutrophils. The severely infected people tended to have under 40% of white blood cells being Neutrophils.

3.7.6 LYMPHOCYTES

T A B L E 3.7.6.1a

%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION											
	NOT INFECTED		1		2		3		4		5		TOTAL	
0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
0,1-20,0	11	2,6%	2	1,5%	0	0%	0	0%	1	14,3%	0	0%	14	2,3%
20,1-40,0	147	35,3%	70	51,9%	12	44,4%	9	27,3%	1	14,3%	1	33,3%	240	38,6%
40,1-60,0	227	54,4%	57	42,2%	13	48,1%	18	54,5%	5	71,4%	2	66,7%	322	51,8%
60,1-80,0	32	7,7%	6	4,4%	2	7,4%	5	15,2%	0	0%	0	0%	45	7,2%
80,1-100,0	0	0%	0	0%	0	0%	1	3,0%	0	0%	0	0%	1	0,2%
TOTAL	417		135		27		33		7		3		622	

T A B L E 3.7.6.1b

%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED							
0,1-40,0	158	37,9%	72	53,3%	24	34,3%	254	40,8%
40,1-100,0	259	62,1%	63	46,7%	46	65,7%	368	59,2%
TOTAL	417		135		70		622	

$\chi^2 = 11,47^{**}$ df = 2

The calculated χ^2-value is significant at the 0,01 level of significance which indicates a relationship between the incidence and severity of Schistosoma Haematobium and the percentage of white blood cells which are lymphocytes. From Table 3.7.6.1a it can be seen that the people who were not infected had a higher than expected proportion with high percentages of white blood cells as lymphocytes, the mildly infected people had a higher than expected proportion with low percentages of white blood cells as lymphocytes, and the severely in-

fected people had a higher than expected proportion with high percentages of white blood cells as lymphocytes.

T A B L E 3.7.6.2a

%	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
0,1-20,0	14	2,9%	0	0%	0	0%	0	0%	0	0%	14	2,3%
20,1-40,0	178	37,2%	50	44,6%	12	48,0%	0	0%	0	0%	240	38,6%
40,1-60,0	254	53,0%	52	46,4%	12	48,0%	4	100%	0	0%	322	51,6%
60,1-80,0	32	6,7%	10	8,9%	1	4,0%	0	0%	2	100%	45	7,2%
80,1-100,0	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,2%
TOTAL	479		112		25		4		2		622	

T A B L E 3.7.6.2b

%	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0,1-40,0	192	40,1%	50	44,6%	12	38,7%	254	40,8%
40,1-100,0	287	59,9%	62	55,4%	19	61,3%	368	59,2%
TOTAL	479		112		31		622	

$\chi^2 = 0,84 \quad df = 2$

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the percentage of white blood cells which are lymphocytes.

3.7.8 EOSINOPHILS

T A B L E 3.7.8.1a

%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
0	23	5,5%	1	0,7%	0	0%	1	3,0%	0	0%	0	0%	25	4,0%
0,1-20,0	374	89,7%	119	88,1%	22	81,5%	29	87,9%	4	57,1%	2	66,7%	550	88,4%
20,1-40,0	19	4,6%	15	11,1%	4	14,8%	3	9,1%	3	42,9%	1	33,3%	45	7,2%
40,1-60,0	0	0%	0	0%	1	3,7%	0	0%	0	0%	0	0%	1	0,2%
60,1-80,0	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,2%
80,1-100,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
TOTAL	417		135		27		33		7		3		622	

T A B L E 3.7.8.1b

%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	23	5,5%	1	0,7%	1	1,4%	25	4,0%
0,1-20,0	374	89,7%	119	88,1%	57	81,4%	550	88,4%
20,1-100,0	20	4,8%	15	11,1%	12	17,1%	47	7,6%
TOTAL	417		135		70		622	

$\chi^2 = 22,54^{**}$ df = 4

The calculated χ^2-value is significant at the 0,01 level of significance which indicates a relationship between the incidence and severity of Schistosoma Haematobium and the percentage of white blood cells which are Eosinophils. From Table 3.7.1.1a it can be seen that a higher than expected proportion of the people who were not infected had low percentages of white blood cells being Eosinophils. The mildly infected people had a slightly higher proportion with high percentages while the severely infected people had a much higher than expected

proportion who had high percentages of white blood cells being Eosinophils.

T A B L E 3.7.8.2a

%	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0	25	5,2%	0	0%	0	0%	0	0%	0	0%	25	4,0%
0,1-20,0	421	87,9%	106	94,6%	18	72,0%	3	75%	2	100%	550	88,4%
20,1-40,0	31	6,5%	6	5,4%	7	28,0%	1	25%	0	0%	45	7,2%
40,1-60,0	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,2%
60,1-80,0	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,2%
80,1-100,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
TOTAL	479		112		25		4		2		622	

T A B L E 3.7.8.2b

%	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	25	5,2%	0	0%	0	0%	25	4,0%
0,1-20,0	421	87,9%	106	94,6%	23	74,2%	550	88,4%
20,1-100,0	33	6,9%	6	5,4%	8	25,8%	47	7,6%
TOTAL	479		112		31		622	

$\chi^2 = 23,34^{**}$ df = 6

The calculated χ^2-value is significant at the 0,001 level of significance which indicates a significant relationship between the incidence and severity of Schistosoma Mansoni and the percentage of white blood cells which were Eosinophils. It can be seen from Table 3.7.8.2a that the people who were not infected tended towards having lower percentages of Eosinophils, and in particular none of the 25 cases with no

Eosinophils were infected. The severely infected people tended to have higher percentages, however none exceeded 40%

3.7.9 MONOCYTES

TABLE 3.7.9.1a

%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION											
	NOT INFECTED		1		2		3		4		5		TOTAL	
0	32	7,7%	5	3,7%	5	18,5%	2	6,1%	0	0%	0	0%	44	7,1%
0,1-20,0	379	90,9%	128	94,8%	22	81,5%	31	93,9%	7	100%	3	100%	570	91,6%
20,1-40,0	6	1,4%	2	1,5%	0	0%	0	0%	0	0%	0	0%	8	1,3%
40,1-60,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
60,1-80,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
80,1-100,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
TOTAL	417		135		27		33		7		3		622	

TABLE 3.7.9.1b

%	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	32	7,7%	5	3,7%	7	10,0%	44	7,1%
0,1-100,0	385	92,3%	130	96,3%	63	90,0%	578	92,8%
TOTAL	417		135		70		622	

$\chi^2 = 3,47$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Haematobium and the percentage of white blood cells which are Monocytes.

T A B L E 3.7.9.2a

%	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
0	33	6,9%	9	8,0%	2	8,0%	0	0%	0	0%	44	7,1%
0,1-20,0	441	92,1%	103	92,0%	20	80,0%	4	100%	2	100%	570	91,6%
20,1-40,0	5	1,0%	0	0%	3	12,0%	0	0%	0	0%	8	1,3%
40,1-60,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
60,1-80,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
80,1-100,0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
TOTAL	479		112		25		4		2		622	

T A B L E 3.7.9.2b

%	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	33	6,9%	9	8,0%	2	6,5%	44	7,1%
0,1-100,0	446	93,1%	103	92,0%	29	93,5%	578	92,8%
TOTAL	479		112		31		622	

$\chi^2 = 0,20$ df = 2

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the percentage of white blood cells which are Monocytes.

3.7.10 BLOOD GROUP

Once the investigation had started, it was decided to include the blood group to investigate whether the person's blood group prevented some people from getting infected. A total of 238 people had their blood classified and the results were as follows.

T A B L E 3.7.10.1a

GROUP	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
O POS	87 41,8%	5 35,7%	4 57,1%	3 42,9%	2 100%	103 43,3%
O NEG	6 2,9%	0 0%	0 0%	0 0%	0 0%	6 2,5%
A POS	49 23,6%	5 35,7%	0 0%	2 28,6%	0 0%	56 23,5%
A NEG	3 1,4%	0 0%	0 0%	0 0%	0 0%	3 1,3%
B POS	53 25,5%	2 14,3%	3 42,9%	1 14,3%	0 0%	59 24,8%
B NEG	3 1,4%	1 7,1%	0 0%	0 0%	0 0%	4 1,7%
AB POS	7 3,4%	1 7,1%	0 0%	1 14,3%	0 0%	9 3,8%
AB NEG	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
TOTAL	208	14	7	7	2	238

T A B L E 3.7.10.1b

GROUP	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION		
	NOT INFECTED	INFECTED	TOTAL
O	93 44,7%	14 46,7%	107 45,0%
A	52 25,0%	7 23,3%	59 24,8%
B	56 26,9%	7 23,3%	63 26,5%
AB	7 3,4%	2 6,7%	9 3,8%
TOTAL	208	30	238

$\chi^2 = 0,93$ df = 3

T A B L E 3.7.10.1c

RH FACTOR	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION		
	NOT INFECTED	INFECTED	TOTAL
RH POS	196 94,2%	29 96,7%	225 94,5%
RH NEG	12 5,8%	1 3,3%	13 5,5%
TOTAL	208	30	238

$\chi^2 = 0,26$ df = 1

Since neither of the χ^2-values were significant it would appear that the incidence of Schistosoma Haematobium is independent of the person's blood group.

T A B L E 3.7.10.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
GROUP	NOT INFECTED		1		2		TOTAL	
O POS	94	42,9%	6	40,0%	1	25,0%	103	43,3%
O NEG	4	1,8%	1	6,7%	1	25,0%	6	2,5%
A POS	52	23,7%	2	13,3%	2	50,0%	56	23,5%
A NEG	3	1,4%	0	0%	0	0%	3	1,3%
B POS	54	24,7%	5	33,3%	0	0%	59	24,8%
B NEG	4	1,8%	0	0%	0	0%	4	1,7%
AB POS	8	3,7%	1	6,7%	0	0%	9	3,8%
AB NEG	0	0%	0	0%	0	0%	0	0%
TOTAL	219		15		4		238	

T A B L E 3.7.10.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
GROUP	NOT INFECTED		INFECTED		TOTAL	
O	98	44,7%	9	47,4%	107	45,0%
A	55	25,1%	4	21,1%	59	24,8%
B	58	26,5%	5	26,3%	63	26,5%
AB	8	3,7%	1	5,3%	9	3,8%
TOTAL	219		19		238	

$\chi^2 = 0,26 \quad df = 3$

T A B L E 3.7.10.2c

	LEVEL OF SCHISTOSOMA MANSONI INFECTION		
RH FACTOR	NOT INFECTED	INFECTED	TOTAL
RH POS	208 95,0%	17 89,5%	225 94,5%
RH NEG	11 5,0%	2 10,5%	13 5,5%
TOTAL	219	19	238

$\chi^2 = 1,03$ df = 1

Since neither of the calculated χ^2-values are significant, it would appear that the incidence of Schistosoma Mansoni is also independent of the person's blood group.

3.8 CLINICAL AND PHYSICAL EXAMINATION

3.8.1 NUTRITION

Only 12 people of the whole survey were classified as having poor nutrition and hence no analysis could be made to investigate the relationship with the two infections.

T A B L E 3.8.1.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
SATISFACTORY	442 98,4%	131 97,8%	33 100%	33 94,3%	8 100%	3 100%	650 98,2%
POOR	7 1,6%	3 2,2%	0 0%	2 5,7%	0 0%	0 0%	12 1,8%
TOTAL	449	134	33	35	8	3	662

From the table it can be seen that all the severe cases of Schistosoma Haematobium infection did not have poor nutrition which suggests that the infection is not related to the nutrition of the person.

T A B L E 3.8.1.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
SATISFACTORY	494	98,6%	123	96,9%	28	96,6%	3	100%	2	100%	650	98,2%
POOR	7	1,4%	4	3,1%	1	3,4%	0	0%	0	0%	12	1,8%
TOTAL	501		127		29		3		2		662	

This table shows that the severe cases of Schistosoma Mansoni did not have poor nutrition which suggests that the infection is also independent of the nutrition of the person.

3.8.2 SKIN AND SCALP CONDITION

T A B L E 3.8.2·1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
NORMAL	420	93,5%	126	94,0%	28	84,8%	30	85,7%	8	100%	3	100%	615	92,9%
DIRTY	22	4,9%	7	5,2%	2	6,1%	4	11,4%	0	0%	0	0%	35	5,3%
DISEASED	7	1,6%	1	0,7%	3	9,1%	1	2,9%	0	0%	0	0%	12	1,8%
TOTAL	449		134		33		35		8		3		662	

T A B L E 3.8.2.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
NORMAL	420 93,5%	126 94,0%	69 87,3%	615 92,9%
DIRTY,DISEASED	29 6,5%	8 5,9%	10 12,7%	47 7,1%
TOTAL	449	134	79	662

$\chi^2 = 4,24$ df = 2

The calculated χ^2-value is not significant which indicates that the skin and scalp condition is independent of the incidence and severity of Schistosoma Haematobium.

T A B L E 3.8.2.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
NORMAL	461 92,0%	123 96,9%	26 89,7%	3 100%	2 100%	615 92,9%
DIRTY	30 6,0%	3 2,4%	2 6,9%	0 0%	0 0%	35 5,3%
DISEASED	10 2,0%	1 0,8%	1 3,4%	0 0%	0 0%	12 1,8%
TOTAL	501	127	29	3	2	662

T A B L E 3.8.2.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
NORMAL	461 92,0%	123 96,9%	31 91,2%	615 92,9%
DIRTY,DISEASED	40 8,0%	4 3,1%	3 8,8%	47 7,1%
TOTAL	501	127	34	662

$\chi^2 = 3,96$ df = 2

The calculated χ^2-value is not significant which indicates that the skin and scalp condition is also independent of the incidence and severity of Schistosoma Mansoni.

3.8.3 MUCOUS MEMBRANES

Only 1 case was observed to have anaemia and this person was neither infected with Schistosoma Haematobium nor with Schistosoma Mansoni. No jaundice cases were found.

3.8.4 TONGUE

T A B L E 3.8.4.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
CLEAN	431 96,0%	132 98,5%	32 97,0%	35 100%	8 100%	3 100%	641 96,8%
COATED	18 4,0%	2 1,5%	1 3,0%	0 0%	0 0%	0 0%	21 3,2%
TOTAL	494	134	33	35	8	3	662

T A B L E 3.8.4.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
CLEAN	431 96,0%	132 98,5%	78 98,7%	641 96,8%
COATED	18 4,0%	2 1,5%	1 1,3%	21 3,2%
TOTAL	449	134	79	662

$\chi^2 = 3,19 \quad df = 2$

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Haematobium are independent of the condition of the tongue.

T A B L E 3.8.4.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
CLEAN	482 96,2%	126 99,2%	29 100%	3 100%	1 50,0%	641 96,8%
COATED	19 3,8%	1 0,8%	0 0%	0 0%	1 50,0%	21 3,2%
TOTAL	501	127	29	3	2	662

T A B L E 3.8.4.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
CLEAN	482 96,2%	126 99,2%	33 97,1%	641 96,8%
COATED	19 3,8%	1 0,8%	1 2,9%	21 3,2%
TOTAL	501	127	34	662

$\chi^2 = 2,98 \quad df = 2$

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the condition of the tongue.

3.8.5 THROAT

Only 2 cases were assessed to have infected or diseased throats. Both these cases were found to be neither infected with Schistosoma Haematobium nor Schistosoma Mansoni.

3.8.6 TEETH CONDITION

T A B L E 3.8.6.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
HEALTHY	338	75,3%	122	90,1%	28	84,8%	31	88,6%	8	100%	3	100%	530	80,1%
WORN	84	18,7%	9	6,7%	2	6,1%	2	5,7%	0	0%	0	0%	97	14,7%
CARIOUS	27	6,0%	3	2,2%	3	9,1%	2	5,7%	0	0%	0	0%	35	5,3%
TOTAL	449		134		33		35		8		3		662	

T A B L E 3.8.6.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
HEALTHY	338	75,3%	122	90,1%	70	88,6%	530	80,1%
WORN	84	18,7%	9	6,7%	4	5,1%	97	14,7%
CARIOUS	27	6,0%	3	2,2%	5	6,3%	35	5,3%
TOTAL	449		134		79		662	

$\chi^2 = 22,75^{**}$ df = 4

The calculated χ^2-value is significant at the 0,001 level of significance which indicates a significant relationship between the incidence and severity of Schistosoma Haematobium and the condition of the teeth. From Table 3.8.6.1a it can be seen that a higher proportion than was expected of the not infected people had worn or carious teeth. The mildly infected people had a lower proportion than expected with carious teeth and the severely infected people all had healthy teeth.

T A B L E 3.8.6.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
HEALTHY	392 78,2%	110 86,6%	23 79,3%	3 100%	2 100%	530 80,1%
WORN	82 16,4%	13 10,2%	2 6,9%	0 0%	0 0%	97 14,7%
CARIOUS	27 5,4%	4 3,1%	4 13,8%	0 0%	0 0%	35 5,3%
TOTAL	501	127	29	3	2	662

T A B L E 3.8.6.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
HEALTHY	392 78,2%	110 86,6%	28 82,4%	530 80,1%
WORN	82 16,4%	13 10,2%	2 5,9%	97 14,7%
CARIOUS	27 5,4%	4 3,1%	4 11,8%	35 5,3%
TOTAL	501	127	34	662

$\chi^2 = 9,20$ df = 4

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the condition of the teeth.

3.8.7 TEETH PYORRHOEA

T A B L E 3.8.7.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
ABSENT	379 84,4%	130 97,0%	28 84,8%	33 94,3%	8 100%	3 100%	581 87,8%
PRESENT	70 15,6%	4 3,0%	5 15,2%	2 5,7%	0 0%	0 0%	81 12,2%
TOTAL	449	134	33	35	8	3	662

T A B L E 3.8.7.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
ABSENT	379 84,4%	130 97,0%	72 91,1%	581 87,8%
PRESENT	70 15,6%	4 3,0%	7 8,9%	81 12,2%
TOTAL	449	134	79	662

$\chi^2 = 16,22^{**}$ df = 2

The calculated χ^2-value is significant at the 0,001 level of significance which indicates a significant relationship between the incidence and severity of Schistosoma Haematobium and the presence of pyorrhoea on the teeth. It can be seen from Table 3.8.7.1a that the people who were not infected had a higher proportion than expected with pyorrhoea, while the mildly and severely infected people had a lower proportion than expected with pyorrhoea.

T A B L E 3.8.7.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
ABSENT	437 87,2%	114 89,8%	25 86,2%	3 100%	2 100%	581 87,7%
PRESENT	64 12,8%	13 10,2%	4 13,8%	0 0%	0 0%	81 12,2%
TOTAL	501	127	29	3	2	662

T A B L E 3.8.7.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2		TOTAL	
ABSENT	437	87,2%	114	89,4%	30	88,2%	581	87,8%
PRESENT	64	12,8%	13	10,2%	4	11,8%	81	12,2%
TOTAL	501		127		34		662	

$\chi^2 = 0,61$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the presence of pyorrhoea on the teeth.

3.8.8 NUMBER OF TEETH MISSING

T A B L E 3.8.8.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
0	381	84,9%	128	95,5%	29	87,9%	33	94,3%	7	87,5%	3	100%	581	87,8%
1	16	3,6%	2	1,5%	1	3,0%	1	2,9%	0	0%	0	0%	19	2,9%
2	11	2,4%	1	0,7%	0	0%	1	2,9%	0	0%	0	0%	13	2,0%
3	6	1,3%	1	0,7%	1	3,0%	0	0%	1	12,5%	0	0%	9	1,4%
4	11	2,4%	0	0%	1	3,0%	0	0%	0	0%	0	0%	13	2,0%
5+	24	5,3%	2	1,5%	1	3,0%	0	0%	0	0%	0	0%	27	4,1%
TOTAL	449		134		33		35		8		3		662	

T A B L E 3.8.8.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	381	84,9%	128	95,5%	72	91,1%	581	87,8%
1-4	44	9,8%	4	3,0%	6	7,6%	54	8,2%
5+	24	5,3%	2	1,5%	1	1,3%	27	4,1%
TOTAL	449		134		79		662	

$\chi^2 = 12,86^*$ df = 4

The calculated χ^2-value is significant at the 0,05 level of significance which indicates that there is a relationship between the incidence and severity of Schistosoma Harmatobium and the number of teeth missing. It can be seen from Table 3.8.8.1a that a higher than expected proportion of the people who were not infected had teeth missing. The mildly, as well as the severely, infected people had a higher than expected proportion who had no teeth missing.

T A B L E 3.8.8.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
0	431	86,0%	120	94,5%	25	86,2%	3	100%	2	100%	581	87,8%
1	18	3,6%	0	0%	1	3,4%	0	0%	0	0%	19	2,9%
2	13	2,6%	0	0%	0	0%	0	0%	0	0%	13	2,0%
3	5	1,0%	4	3,1%	0	0%	0	0%	0	0%	9	1,4%
4	12	2,4%	0	0%	1	3,4%	0	0%	0	0%	13	2,0%
5+	22	4,4%	3	2,4%	2	6,9%	0	0%	0	0%	27	4,1%
TOTAL	501		127		29		3		2		662	

T A B L E 3.8.8.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	431	86,0%	120	94,5%	30	88,2%	581	87,8%
1-4	48	9,6%	4	3,1%	2	5,9%	54	8,2%
5+	22	4,4%	3	2,4%	2	5,9%	27	4,1%
TOTAL	501		127		34		662	

$\chi^2 = 7,50$ df = 4

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the number of teeth the person has missing.

3.8.9 HEART RATE

Only 4 cases out of the 662 had abnormal heart rates. The 1 person who had a rapid heart rate was infected with neither Schistosoma Haematobium nor Schistosoma Mansoni. 2 of the 3 people who had slow heart rates were infected with Schistosoma Haematobium, however none of them were infected with Schistosoma Mansoni.

3.8.10 HEART RHYTHM

Only 6 cases out of the 662 had an irregular heart rhythm. 2 of the 6 people were infected with Schistosoma Haematobium and none were infected with Schistosoma Mansoni.

3.8.11 HEART MURMURS

Only 3 cases out of the 662 were observed with heart murmers 2 of the 3 were not infected with either Schistosoma Harmatobium or Schistosoma Mansoni, however the 1 person was mildly infected with Schistosoma Haematobium and severly infected with Schistosoma Mansoni.

3.8.12 LUNGS

T A B L E 3.8.12.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
NORMAL	436 97,1%	132 98,5%	33 100%	35 100%	8 100%	3 100%	647 97,7%
ABNORMAL	13 2,9%	2 1,5%	0 0%	0 0%	0 0%	0 0%	15 2,3%
TOTAL	449	134	33	35	8	3	662

T A B L E 3.8.12.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
NORMAL	436 97,1%	132 98,5%	79 100%	647 97,7%
ABNORMAL	13 2,9%	2 1,5%	0 0%	15 2,3%
TOTAL	449	134	79	662

$\chi^2 = 3,00 \quad df = 2$

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Haematobium for people with normal lungs were not significantly different from that for those for people observed to have abnormal lungs.

T A B L E 3.8.12.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
NORMAL	488 97,4%	125 98,4%	29 100%	3 100%	2 100%	647 97,7%
ABNORMAL	13 2,6%	2 1,6%	0 0%	0 0%	0 0%	15 2,3%
TOTAL	501	127	29	3	2	662

T A B L E 3.8.12.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
NORMAL	488 97,4%	125 98,4%	34 100%	647 97,7%
ABNORMAL	13 2,6%	2 1,6%	0 0%	15 2,3%
TOTAL	501	127	34	662

$\chi^2 = 1,31$ df = 2

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni for people with normal lungs were not significantly different from those for people with abnormal lungs.

3.8.13 LIVER ENLARGEMENT

T A B L E 3.8.13.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
NOT PALPABLE	437	97,3%	130	97,0%	32	97,0%	35	100%	8	100%	3	100%	645	97,4%
PALPABLE 1	5	1,1%	1	0,7%	1	3,0%	0	0%	0	0%	0	0%	7	1,1%
2	4	0,9%	1	0,7%	0	0%	0	0%	0	0%	0	0%	5	0,8%
3	2	0,4%	1	0,7%	0	0%	0	0%	0	0%	0	0%	3	0,5%
4	1	0,2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0,2%
5	0	0%	1	0,7%	0	0%	0	0%	0	0%	0	0%	1	0,2%
TOTAL	449		134		33		35		8		3		662	

T A B L E 3.8.13.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NOT PALPABLE	437	97,3%	130	97,0%	78	98,7%	645	97,4%
PALPABLE	12	2,7%	4	3,0%	1	1,3%	17	2,6%
TOTAL	449		134		79		662	

$\chi^2 = 0,65$ df = 2

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Haematobium are independent of the presence of palpable liver enlargement.

T A B L E 3.8.13.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		4		TOTAL	
NOT PALPABLE	484	96,6%	127	100%	29	100%	3	100%	2	100%	645	97,4%
PALPABLE 1	7	1,4%	0	0%	0	0%	0	0%	0	0%	7	1,1%
2	5	1,0%	0	0%	0	0%	0	0%	0	0%	5	0,8%
3	3	0,3%	0	0%	0	0%	0	0%	0	0%	3	0,5%
4	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,2%
5	1	0,2%	0	0%	0	0%	0	0%	0	0%	1	0,2%
TOTAL	501		127		29		3		2		662	

T A B L E 3.8.13.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NOT PALPABLE	484	96,6%	127	100%	34	100%	645	97,4%
PALPABLE	17	3,4%	0	0%	0	0%	17	2,6%
TOTAL	501		127		34		662	

$\chi^2 = 5,60 \quad df = 2$

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the presence of palpable liver enlargement. The χ^2-value is in fact inflated as an expected frequency is less than 1.

3.8.14 SPLEEN ENLARGEMENT

T A B L E 3.8.14.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
NOT PALPABLE	336	74,8%	74	55,2%	17	51,5%	14	40,0%	6	75,0%	2	66,7%	449	67,8%
PALPABLE 1	72	16,0%	42	31,3%	9	27,3%	10	28,6%	0	0%	1	33,3%	134	20,2%
2	18	4,0%	5	3,7%	3	9,1%	6	17,1%	1	12,5%	0	0%	33	5,0%
3	20	4,5%	9	6,7%	2	6,1%	3	8,6%	1	12,5%	0	0%	35	5,3%
4	2	0,4%	3	2,2%	2	6,1%	1	2,9%	0	0%	0	0%	8	1,2%
5	1	0,2%	1	0,7%	0	0%	1	2,9%	0	0%	0	0%	3	0,5%
TOTAL	449		134		33		35		8		3		662	

T A B L E 3.8.14.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NOT PALPABLE	336	74,8%	74	55,2%	39	49,4%	449	67,8%
PALPABLE 1-2	90	20,0%	47	35,1%	30	38,0%	167	25,2%
3-5	23	5,1%	13	9,7%	10	1,27%	46	6,9%
TOTAL	449		134		79		662	

$\chi^2 = 32,70^{**}$ df = 4

The calculated χ^2-value is significant at the 0,001 level of significance which indicates a significant relationship between the incidence and severity of Schistosoma Haematobium and the presence of palpable spleen enlargement. From Table 3.8.14.1a it can be seen that the incidence of palpable spleen enlargement was lower than expected among the not infected people and higher than expected among the mildly and the severely infected people. The severely infected people had a very low incidence of highly graded enlargement.

T A B L E 3.8.14.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
NOT PALPABLE	369	73,7%	67	52,8%	10	34,5%	1	33,3%	2	100%	449	67,8%
PALPABLE 1	76	15,2%	47	37,0%	10	34,5%	1	33,3%	0	0%	134	20,2%
2	24	4,8%	5	3,9%	4	13,8%	0	0%	0	0%	33	5,0%
3	25	5,0%	6	4,7%	3	10,3%	1	33,3%	0	0%	35	5,3%
4	5	1,0%	1	0,8%	2	6,9%	0	0%	0	0%	8	1,2%
5	2	0,4%	1	0,8%	0	0%	0	0%	0	0%	3	0,5%
TOTAL	501		127		29		3		2		662	

T A B L E 3.8.14.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NOT PALPABLE	369	73,7%	67	52,8%	13	38,3%	449	67,8%
PALPABLE 1-2	100	20,0%	52	40,9%	15	44,1%	167	25,2%
3-5	32	6,4%	8	6,3%	6	17,6%	46	6,9%
TOTAL	501		127		34		662	

$\chi^2 = 39,81^{**}$ df = 4

The calculated χ^2-value is significant at the 0,001 level of significance which indicates a significant relationship between the incidence and severity of Schistosoma Mansoni and the presence of palpable spleen enlargement. From Table 3.8.14.2a it can be seen that the incidence of spleen enlargement is lower than expected among the not infected people while it is higher than expected among the infected people. Both the extremely severe cases of infection did not have palpable spleen enlargement.

3.8.15 ABDOMEN MASSES

Only 4 cases out of the 662 investigated were found to have abdomen masses present and hence no analysis could be performed. 2 of the cases were found to be mildly infected by Schistosoma Haematobium and 1 case was found to be mildly infected by Schistosoma Mansoni.

3.8.16 ABDOMEN TENDERNESS

Only 4 cases out of the 662 investigated were found to have abdomen tenderness present and hence no analysis could be performed. (The 4 cases with the abdomen tenderness were not the 4 cases who had abdomen masses.) 1 case was found to be mildly infected by Schistosoma Haematobium and another case was found to be mildly infected by Schistosoma Mansoni.

3.8.17 EXTREMITIES

T A B L E 3.8.17.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
NORMAL	424 94,4%	125 93,3%	28 84,8%	29 82,9%	7 87,5%	2 66,7%	615 92,9%
INJURED/ DISEASED	17 3,8%	8 6,0%	4 12,1%	4 11,4%	1 12,5%	1 33,3%	35 5,3%
OEDEMATOUS	8 1,8%	1 0,7%	1 3,0%	2 5,7%	0 0%	0 0%	12 1,8%
TOTAL	449	134	33	35	8	3	662

T A B L E 3.8.17.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NORMAL	424	94,4%	125	93,3%	66	83,5%	615	92,9%
INJURED/ DISEASED/ OEDEMATOUS	25	5,6%	9	6,7%	13	16,5%	47	7,1%
TOTAL	449		134		79		662	

$\chi^2 = 12,11^{**}$ df = 2

The calculated χ^2-value is significant at the 0,01 level of significance which indicates that there is a relationship between the incidence and severity of Schistosoma Haematobium and the condition of the person's extremities. From Table 3.8.17.1a it can be seen that the people who were not infected experienced a lower than expected incidence of injured or diseased extremities. The mildly infected people experienced a higher than expected incidence of injured or diseased extremities while the severely infected people experienced a much lower than expected incidence of healthy extremities and a high incidence of injured or diseased extremities. The incidence of oedematous extremities was high among the medium infected people.

T A B L E 3.8.17.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
NORMAL	468	93,4%	117	92,1%	26	89,7%	2	66,7%	2	100%	615	92,9%
INJURED/ DISEASED	26	5,2%	7	5,5%	1	3,4%	1	33,3%	0	0%	35	5,3%
OEDEMATOUS	7	1,4%	3	2,4%	2	6,9%	0	0%	0	0%	12	1,8%
TOTAL	501		127		29		3		2		662	

T A B L E 3.8.17.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
NORMAL	468	93,4%	117	92,1%	30	88,2%	615	92,9%
INJURED/ DISEASED/ OEDEMATOUS	33	6,6%	10	7,9%	4	11,8%	47	7,1%
TOTAL	501		127		34		662	

$\chi^2 = 1,44 \quad df = 2$

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the condition of the person's extremities.

3.8.18 EXAMINER'S SUBJECTIVE ASSESSMENT OF GENERAL STATE OF HEALTH

Only one case out of the 662 was judged to have below normal health. The person was mildly infected with Schistosomatobium but not infected with Schistosoma Mansoni.

3.9 SYMPTOMS AND COMPLAINTS

3.9.1 HEADACHES

TABLE 3.9.1.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
HEADACHES	NOT INFECTED	1	2	3	4	5	TOTAL
YES	170 39,1%	30 21,7%	7 21,9%	13 37,1%	1 12,5%	0 0%	221 33,9%
NO	265 60,9%	108 78,3%	25 78,1%	22 62,9%	7 87,5%	3 100%	430 66,1%
TOTAL	435	138	32	35	8	3	651

TABLE 3.9.1.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
HEADACHES	NOT INFECTED	1	2+	TOTAL
YES	170 39,1%	30 21,7%	21 26,9%	221 33,9%
NO	265 60,9%	108 78,3%	57 73,1%	430 66,1%
TOTAL	435	138	78	651

$\chi^2 = 16,00^{**}$ df = 2

The calculated χ^2-value is significant at the 0,001 level of significance which indicates that there is a very significant relationship between the incidence and the severity of Schistosoma Haematobium and the incidence of headaches. From Table 3.9.1.1a it can be seen that the incidence of headaches is higher than expected among the people who are not infected. The incidence of headaches was lower than expected among the mildly infected people and higher than expected among the severely infected people.

T A B L E 3.9.1.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
HEADACHES	NOT INFECTED	1	2	3	4	TOTAL
YES	181 37,2%	33 25,6%	5 17,2%	1 25,0%	1 50,0%	221 33,9%
NO	306 62,8%	96 74,4%	24 82,8%	3 75,0%	1 50,0%	430 66,1%
TOTAL	487	129	29	4	2	651

T A B L E 3.9.1.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
HEADACHES	NOT INFECTED	1	2+	TOTAL
YES	181 37,2%	33 25,6%	7 20,0%	221 33,9%
NO	306 62,8%	96 74,4%	28 80,0%	430 66,1%
TOTAL	487	129	35	651

$\chi^2 = 9,31^{**}$ df = 2

The calculated χ^2-value is significant at the 0,01 level of significance which indicates that there is a significant relationship between the incidence and severity of Schistosoma Mansoni and the incidence of headaches. From Table 3.9.1.2a it can be seen that the incidence of headaches is higher than expected among the people who were not infected and lower than expected among the infected people. The medium infected people experienced the lowest incidence of headaches.

3.9.2 CHEST PAINS

T A B L E 3.9.2.1a

CHEST PAINS	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
YES	130 29,9%	22 15,9%	3 9,4%	11 31,4%	1 12,5%	0 0%	167 25,7%
NO	305 70,1%	116 84,1%	29 90,6%	24 68,6%	7 87,5%	3 100%	484 74,3%
TOTAL	435	138	32	35	8	3	651

T A B L E 3.9.2.1b

CHEST PAINS	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	130 29,9%	22 15,9%	15 19,2%	167 25,7%
NO	305 70,1%	116 84,1%	63 80,8%	484 74,3%
TOTAL	435	138	78	651

$\chi^2 = 12,60^{**}$ df = 2

The calculated χ^2-value is significant at the 0,01 level of significance which indicates that there is a significant relationship between the incidence and severity of Schistosoma Haematobium and the incidence of chest pains. From Table 3.9.3.1a it can be seen that a high incidence of chest pain was experienced among the people who were not infected. The mildly infected people experienced the lowest incidence of chest pains.

T A B L E 3.9.2.2a

CHEST PAINS	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
YES	140 28,7%	21 16,3%	5 17,2%	1 25,0%	0 0%	167 25,7%
NO	347 71,3%	108 83,7%	24 82,8%	3 75,0%	2 100%	484 74,3%
TOTAL	487	129	29	4	2	651

T A B L E 3.9.2.2b

CHEST PAINS	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	140 28,7%	21 16,3%	6 17,1%	167 25,7%
NO	347 71,3%	103 83,7%	29 82,9%	484 74,3%
TOTAL	487	129	35	651

$\chi^2 = 9,72^{**}$ df = 2

The calculated χ^2-value is significant at the 0,01 level of significance which indicates a relationship between the incidence and severity of Schistosoma Mansoni and the incidence of chest pains. From Table 3.9.2.2a it can be seen that the incidence of chest pains was highest among the people who were not infected. Those mildly infected experienced a low incidence and the severely infected people experienced a slightly higher incidence.

3.9.3 ABDOMINAL PAINS

T A B L E 3.9.3.1a

ABDOMINAL PAINS	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
YES	177 40,7%	42 30,4%	8 25,0%	17 48,6%	1 12,5%	0 0%	245 37,6%
NO	258 59,3%	96 69,6%	24 75,0%	18 51,4%	7 87,5%	3 100%	406 62,4%
TOTAL	435	138	32	35	8	3	651

T A B L E 3.9.3.1b

ABDOMINAL PAINS	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	177 40,7%	42 30,4%	26 33,3%	245 37,6%
NO	258 59,3%	96 69,6%	52 66,7%	406 62,4%
TOTAL	435	138	78	651

$\chi^2 = 5,39$ df = 2

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Haematobium is not related to the incidence of abdominal pains.

T A B L E 3.9.3.2a

ABDOMINAL PAINS	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
YES	200 41,1%	40 31,0%	4 13,8%	1 25,0%	0 0%	245 37,6%
NO	287 58,9%	89 69,0%	25 86,2%	3 75,0%	2 100%	406 62,4%
TOTAL	487	129	29	4	2	651

T A B L E 3.9.3.2b

ABDOMINAL PAINS	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	200 41,1%	40 31,0%	5 14,3%	245 37,6%
NO	287 58,9%	89 69,0%	30 85,7%	406 62,4%
TOTAL	487	129	35	651

χ^2 = 12,99** df = 2

The calculated χ^2-value is significant at the 0,01 level of significance which indicates a relationship between the incidence and severity of Schistosoma Mansoni and the incidence of abdominal pains. From Table 3.9.3.2a it can be seen that the incidence of abdominal pains was highest among the not infected people, decreased for the mildly and medium infected people and was lowest for the very severely infected people.

3.9.4 JOINT PAINS

T A B L E 3.9.4.1a

JOINT PAINS	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
YES	108 24,8%	16 11,6%	3 9,4%	6 17,1%	0 0%	0 0%	130 20,0%
NO	327 75,2%	122 81,2%	29 90,6%	29 82,9%	8 100%	3 100%	521 80,0%
TOTAL	435	138	32	35	8	3	651

T A B L E 3.9.4.1b

JOINT PAINS	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	108 24,8%	16 11,6%	9 11,5%	130 20,0%
NO	327 75,2%	122 81,2%	69 88,5%	521 80,0%
TOTAL	435	138	78	651

$\chi^2 = 15,60^{**}$ df = 2

The calculated χ^2-value is significant at the 0,001 level of significance which indicates that there is a very significant relationship between the incidence and severity of Schistosoma Haematobium and the incidence of joint pains. From Table 3.9.4.1a it can be seen that the incidence of joint pains was highest among the people who were not infected, and that the incidence of joint pains decrease as the severity of the infection increases.

T A B L E 3.9.4.2a

JOINT PAINS	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
YES	109 22,4%	20 15,5%	4 13,8%	0 0%	0 0%	130 20,0%
NO	378 77,6%	109 84,5%	25 86,2%	4 100%	2 100%	521 80,0%
TOTAL	487	129	29	4	2	651

T A B L E 3.9.4.2b

JOINT PAINS	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	109 22,4%	20 15,5%	4 11.4%	130 20,0%
NO	378 77,6%	109 84,5%	31 88,6%	521 80,0%
TOTAL	487	219	35	651

$\chi^2 = 4,81$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the incidence of joint pains.

3.9.5 BACKACHES

T A B L E 3.9.5.1a

BACKACHES	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
YES	146 33,6%	19 13,8%	5 15,6%	5 14,3%	0 0%	0 0%	175 26,9%
NO	289 66,4%	119 86,2%	27 84,4%	30 85,7%	8 100%	3 100%	476 73,1%
TOTAL	435	138	32	35	8	3	651

T A B L E 3.9.5.1b

BACKACHES	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	146 33,6%	19 13,8%	10 12,8%	175 26,9%
NO	289 66,4%	119 86,2%	68 87,2%	476 73,1%
TOTAL	435	138	78	651

$\chi^2 = 29,80^{**}$ df = 2

The calculated χ^2-value is significant at the 0,001 level of significance which indicates that there is a very significant relationship between the incidence and severity of Schistosoma Haematobium and the incidence of backaches. From Table 3.9.5.1a it can be seen that the incidence of backaches was highest among the people who were not infected and was lower among the people who were infected. There was no incidence of backaches among the severely infected people.

T A B L E 3.9.5.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
BACKACHES	NOT INFECTED	1	2	3	4	TOTAL
YES	148 30,4%	25 19,4%	2 6,9%	0 0%	0 0%	175 26,9%
NO	339 69,6%	104 80,6%	27 93,1%	4 100%	2 100%	476 73,1%
TOTAL	487	129	29	4	2	651

T A B L E 3.9.5.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
BACKACHES	NOT INFECTED	1	2+	TOTAL
YES	148 30,4%	25 19,4%	2 5,7%	175 26,9%
NO	339 69,6%	104 80,6%	33 94,3%	476 73,1%
TOTAL	487	219	35	651

$\chi^2 = 14,72^{**}$ df = 2

The calculated χ^2-value is significant at the 0,001 level of significance which indicates that there is a significant relationship between the incidence and severity of Schistosoma Mansoni and the incidence of backaches. From

Table 3.9.5.2a it can be seen that the incidence of backaches was highest among the people who were not infected and that as the severity of the infection of the people increased the incidence of backaches decreased.

3.9.6 CONSTIPATION

T A B L E 3.9.6.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
FREQUENTLY CONSTIPATED	NOT INFECTED	1	2	3	4	5	TOTAL
YES	78 17,9%	22 15,9%	6 18,8%	5 14,3%	0 0%	1 33,3%	112 17,2%
NO	357 82,1%	116 84,1%	26 81,2%	30 85,7%	8 100%	2 66,7%	539 82,8%
TOTAL	435	138	32	35	8	3	651

T A B L E 3.9.6.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
FREQUENTLY CONSTIPATED	NOT INFECTED	1	2+	TOTAL
YES	78 17,9%	22 15,9%	12 15,4%	112 17,2%
NO	357 82,1%	116 84,1%	66 84,6%	539 82,8%
TOTAL	435	138	78	651

$\chi^2 = 0,47$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Haematobium and the incidence of constipation.

T A B L E 3.9.6.2a

FREQUENTLY CONSTIPATED	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
YES	83 17,0%	26 20,2%	3 10,3%	0 0%	0 0%	112 17,2%
NO	404 83,0%	103 79,8%	26 89,7%	4 100%	2 100%	539 82,8%
TOTAL	487	129	29	4	2	651

T A B L E 3.9.6.2b

FREQUENTLY CONSTIPATED	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	83 17,0%	26 20,2%	3 8,6%	112 17,2%
NO	404 83,0%	103 79,8%	32 91,4%	539 82,8%
TOTAL	487	129	35	651

$\chi^2 = 2,63$ df = 2

The calculated χ^2-value is not significant which indicates that there is no significant relationship between the incidence and severity of Schistosoma Mansoni and the incidence of constipation.

3.9.7 DIARRHOEA

T A B L E 3.9.7.1a

FREQUENT DIARRHOEA	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
YES	141 32,4%	40 29,0%	7 21,9%	14 40,0%	2 25,0%	1 33,3%	205 31,5%
NO	294 67,6%	98 71,0%	25 78,1%	21 60,0%	6 75,0%	2 66,7%	446 68,5%
TOTAL	435	138	32	35	8	3	651

T A B L E 3.9.7.1b

FREQUENT DIARRHOEA	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	141 32,4%	40 29,0%	24 30,8%	205 31,5%
NO	294 67,6%	98 71,0%	54 69,2%	446 68,5%
TOTAL	435	138	78	651

$\chi^2 = 0,59$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Haematobium and the incidence of diarrhoea.

T A B L E 3.9.7.2a

FREQUENT DIARRHOEA	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
YES	158 32,4%	40 31,0%	6 20,7%	0 0%	1 50%	205 31,5%
NO	329 67,6%	89 69,0%	23 79,3%	4 100%	1 50%	446 68,5%
TOTAL	487	219	29	4	2	651

T A B L E 3.9.7.2b

FREQUENT DIARRHOEA	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	158 32,4%	40 31,0%	7 20,0%	205 31,5%
NO	329 67,6%	89 69,0%	28 80,0%	446 68,5%
TOTAL	487	129	35	651

$\chi^2 = 2,36$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the incidence of diarrhoea.

3.9.8 PERSISTENT COUGH

TABLE 3.9.8.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
COUGH	NOT INFECTED	1	2	3	4	5	TOTAL
YES	148 34,0%	57 41,3%	11 34,4%	17 48,6%	2 25,0%	1 33,3%	236 36,3%
NO	287 66,0%	81 58,7%	21 65,6%	18 51,4%	6 75,0%	2 66,7%	415 63,7%
TOTAL	435	138	32	35	8	3	651

TABLE 3.9.8.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
COUGH	NOT INFECTED	1	2+	TOTAL
YES	148 34,0%	57 41,3%	31 39,7%	236 36,3%
NO	287 66,0%	81 58,7%	47 60,3%	415 63,7%
TOTAL	435	138	78	651

$\chi^2 = 2,87 \quad df = 2$

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Haematobium and the incidence of persistent coughing.

T A B L E 3.9.8.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
COUGH	NOT INFECTED	1	2	3	4	TOTAL
YES	176 36,1%	46 35,7%	10 34,5%	3 75,0%	1 50%	236 36,3%
NO	311 63,9%	83 64,3%	19 65,5%	1 25,0%	1 50%	415 63,7%
TOTAL	487	129	29	4	2	651

T A B L E 3.9.8.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
COUGH	NOT INFECTED	1	2+	TOTAL
YES	176 36,1%	46 35,7%	14 40,0%	236 36,3%
NO	311 63,9%	83 64,3%	21 60,0%	415 63,7%
TOTAL	487	129	35	651

$\chi^2 = 0,24$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the incidence of persistent coughing.

3.9.9 SMOKING

T A B L E 3.9.9.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
SMOKE	NOT INFECTED	1	2	3	4	5	TOTAL
YES	203 46,7%	46 33,3%	5 15,6%	7 20,0%	1 12,5%	0 0%	262 40,2%
NO	232 53,3%	92 66,7%	27 84,4%	28 80,0%	7 87,5%	3 100%	389 59,8%
TOTAL	435	138	32	35	8	3	651

T A B L E 3.9.9.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
SMOKE	NOT INFECTED	1	2+	
YES	203 46,7%	46 33,3%	13 16,7%	262 40,2%
NO	232 53,3%	92 66,7%	65 83,3%	389 59,8%
TOTAL	435	138	78	651

$\chi^2 = 28,23^{**}$ df = 2

The calculated χ^2-value is significant at the 0,001 level of significance which indicates that there is a very significant relationship between the incidence and severity of Schistosoma Haematobium and the incidence of smoking. From Table 3.9.9.1a it can be seen that the incidence of smoking was highest among the people who were not infected and that as the severity of the infection increased so the incidence of smoking decreased.

T A B L E 3.9.9.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
SMOKE	NOT INFECTED	1	2	3	4	TOTAL
YES	193 39,6%	51 39,5%	16 55,2%	0 0%	2 100%	262 40,2%
NO	294 60,4%	78 60,5%	13 44,8%	4 100%	0 0%	389 59,8%
TOTAL	487	129	29	4	2	651

T A B L E 3.9.9.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
SMOKE	NOT INFECTED	1	2+	TOTAL
YES	193 39,6%	51 39,5%	18 51,4%	262 40,2%
NO	294 60,4%	78 60,5%	17 48,6%	389 59,8%
TOTAL	487	129	35	651

$\chi^2 = 1,92$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the incidence of smoking.

3.9.10 PERSISTENT COUGH AMONG NON-SMOKERS

T A B L E 3.9.10.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
YES	177 76,3%	55 59,8%	19 70,4%	13 46,4%	5 71,4%	2 66,7%	271 69,7%
NO	55 23,7%	37 40,2%	8 29,6%	15 53,6%	2 28,6%	1 33,3%	118 30,3%
TOTAL	232	92	27	28	7	3	389

T A B L E 3.9.10.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	177 76,3%	55 59,8%	39 60,0%	271 69,7%
NO	55 23,7%	37 40,2%	26 40,0%	118 30,3%
TOTAL	232	92	65	389

$\chi^2 = 11,95^{**}$ df = 2

The calculated χ^2-value is significant at the 0,01 level of significance which indicates that the incidence and severity of Schistosoma Haematobium are related to the presence of a persistent cough among the non-smokers. From Table 3.9.10.1a it can be seen that the incidence of a persistent cough was higher than average among the people who were not infected.

T A B L E 3.9.10.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION									
	NOT INFECTED		1		2		3		TOTAL	
YES	207	70,4%	54	69,2%	9	69,2%	1	25%	271	69,7%
NO	87	29,6%	24	30,8%	4	30,8%	3	75%	118	30,3%
TOTAL	294		78		13		4		389	

T A B L E 3.9.10.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
YES	207	70,4%	54	69,2%	10	58,8%	271	69,7%
NO	87	29,6%	24	30,8%	7	41,2%	118	30,3%
TOTAL	294		78		17		389	

$\chi^2 = 1,03 \quad df = 2$

The calculated χ^2-value is not significant which indicates that the incidence and severity of Schistosoma Mansoni are independent of the presence of a persistent cough among non-smokers.

3.9.11 VOMITING

T A B L E 3.9.11.1a

FREQUENT VOMITING	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
YES	57 13,1%	18 13,0%	2 6,3%	10 28,6%	0 0%	1 33,3%	88 13,5%
NO	378 86,9%	120 87,0%	30 93,8%	25 71,4%	8 100%	2 66,7%	563 86,5%
TOTAL	435	138	32	35	8	3	651

T A B L E 3.9.11.1b

FREQUENT VOMITING	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	57 13,1%	18 13,0%	13 16,7%	88 13,5%
NO	378 86,9%	120 87,0%	65 83,3%	563 86,5%
TOTAL	435	138	78	651

$\chi^2 = 0,75 \quad df = 2$

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Haematobium and the frequency of vomiting.

T A B L E 3.9.11.2a

FREQUENT VOMITING	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
YES	63 12,9%	20 15,5%	4 13,8%	1 25,0%	0 0%	88 13,5%
NO	424 87,1%	109 85,5%	25 86,2%	3 75,0%	2 100%	563 86,5%
TOTAL	487	219	29	4	2	651

T A B L E 3.9.11.2b

FREQUENT VOMITING	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	63 12,9%	20 15,5%	5 14,3%	88 13,5%
NO	424 87,1%	109 85,5%	30 85,7%	563 86,5%
TOTAL	487	129	35	651

$\chi^2 = 0,59$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the frequency of vomiting.

3.9.12 RASHES

T A B L E 3.9.12.1a

RASHES	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
	NOT INFECTED	1	2	3	4	5	TOTAL
YES	51 11,7%	22 15,9%	5 15,6%	8 22,9%	1 12,5%	0 0%	87 13,4%
NO	384 88,3%	116 84,1%	27 84,4%	27 77,1%	7 87,5%	3 100%	564 86,6%
TOTAL	435	138	32	35	8	3	651

T A B L E 3.9.12.1b

RASHES	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
YES	51 11,7%	22 15,9%	14 17,9%	87 13,4%
NO	384 88.3%	116 84,1%	64 82,1%	564 86,6%
TOTAL	435	138	78	651

$\chi^2 = 3,22$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Haematobium and the incidence of rashes.

T A B L E 3.9.12.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
RASHES	NOT INFECTED	1	2	3	4	TOTAL
YES	59 12,1%	18 14,0%	9 31,0%	1 25,0%	0 0%	87 13,4%
NO	428 87,9%	111 86,0%	20 69,0%	3 75,0%	2 100%	564 86,6%
TOTAL	487	129	29	4	2	651

T A B L E 3.9.12.2b

	LEVEL OF SCHISTOSOMA MANSONI INFECTION			
RASHES	NOT INFECTED			
YES	59 12,1%	18 14,0%	10 28,6%	87 13,4%
NO	428 87,9%	111 86,0%	25 71,4%	564 86,6%
TOTAL	487	129	35	651

$\chi^2 = 7,69^*$ df = 2

The calculated χ^2-value is significant at the 0,05 level of significance which indicates that there is a relationship between the incidence and severity of Schistosoma Mansoni and the incidence of rashes. From Table 3.9.12.2a it can be seen that the incidence of rashes among the people who were not infected was lower than expected. The incidence of rashes increased as the severity of the infection increased with the exception of the extremely severely infected cases which experienced no rashes.

3.9.13 PAIN WHEN PASSING URINE

T A B L E 3.9.13.1a

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION						
PAIN	NOT INFECTED						
YES	65 14,9%	27 19,6%	4 12,5%	6 17,1%	1 12,5%	1 33,3%	104 16,0%
NO	369 84,9%	110 79,7%	28 87,5%	29 82,9%	7 87,5%	2 66,7%	545 83,7%
MISCLASSIFIED	1 0,2%	1 0,7%	0 0%	0 0%	0 0%	0 0%	2 0,3%
TOTAL	435	138	32	35	8	3	651

T A B L E 3.9.13.1b

	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
RASHES	NOT INFECTED	1	2+	TOTAL
YES	65 15,0%	27 19,7%	12 15,4%	104 16,0%
NO	369 85,0%	110 80,3%	66 84,6%	545 84,0%
TOTAL	434	137	78	649

$\chi^2 = 1,76$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Haematobium and experiencing pain when urinating.

T A B L E 3.9.13.2a

	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
PAIN	NOT INFECTED	1	2	3	4	TOTAL
YES	82 16,8%	18 14,0%	3 10,3%	1 25,0%	0 0%	104 16,0%
NO	405 83,2%	109 84,5%	26 89,7%	3 75,0%	2 100%	545 83,7%
MISCLASSIFIED	0 0%	2 1,6%	0 0%	0 0%	0 0%	2 0,3%
TOTAL	487	129	29	4	2	651

T A B L E 3.9.13.2b

PAIN	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2		TOTAL	
YES	82	16,8%	18	14,2%	4	11,4%	104	16,0%
NO	405	83,2%	109	85,8%	31	88,6%	545	84,0%
TOTAL	487		127		35		649	

$\chi^2 = 1,11$ df = 2

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and experiencing pain when urinating.

3.19.4 DAY URINE FREQUENCY

T A B L E 3.9.14.1a

FREQUENCY	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
0	1	0,2%	1	0,7%	1	3,1%	0	0%	0	0%	0	0%	3	0,5%
1	16	3,7%	4	2,9%	1	3,1%	0	0%	1	12,5%	0	0%	22	3,4%
2	119	27,4%	44	31,9%	7	21,9%	17	48,6%	3	37,5%	1	33,3%	186	28,6%
3	162	37,2%	62	44,9%	18	56,3%	18	48,6%	2	25,0%	2	66,7%	263	40,4%
4	90	20,7%	20	14,5%	3	9,4%	4	11,4%	1	12,5%	0	0%	118	18,0%
5	26	60,0%	6	4,3%	2	6,3%	1	2,9%	1	12,5%	0	0%	36	5,5%
6+	21	49,0%	1	0,7%	0	0%	1	2,9%	0	0%	0	0%	23	3,5%
TOTAL	435		138		32		35		8		3		651	

T A B L E 3.9.14.1b

FREQUENCY	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
0-2	136 31,6%	49 35,5%	26 33,3%	211 32,4%
3	162 37,2%	62 44,9%	39 50,0%	263 40,4%
4+	137 31,5%	27 19,6%	13 16,7%	177 27,2%
TOTAL	435	138	78	651

$\chi^2 = 13,25^*$ df = 4

The calculated χ^2-value is significant at the 0,05 level of significance which indicates that there is a relationship between the incidence and severity of Schistosoma Haematobium and the frequency of passing urine during the day. From Table 3.9.14.1a it can be seen that the people who were not infected had the highest incidence of high frequencies and that as the severity of the infection increased so the incidence of high frequencies decreased.

T A B L E 3.9.14.2a

FREQUENCY	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
0	2 0,4%	1 0,8%	0 0%	0 0%	0 0%	3 0,5%
1	18 3,7%	2 1,6%	2 6,9%	0 0%	0 0%	22 3,4%
2	144 29,6%	33 25,6%	5 17,2%	2 50,0%	2 100%	186 28,6%
3	188 38,6%	61 47,3%	12 41,4%	2 50,0%	0 0%	263 40,4%
4	86 17,7%	24 18,6%	8 27,6%	0 0%	0 0%	118 18,1%
5	30 6,2%	4 3,1%	2 6,9%	0 0%	0 0%	36 5,5%
6+	19 3,9%	4 3,1%	0 0%	0 0%	0 0%	23 3,5%
TOTAL	487	129	29	4	2	651

T A B L E 3.9.14.2b

FREQUENCY	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0-2	164	33,7%	36	27,9%	11	31,4%	211	32,4%
3	188	38,6%	61	47,3%	14	40,0%	263	40,4%
4+	135	27,7%	32	24,8%	10	28,6%	177	27,3%
TOTAL	487		129		35		651	

$\chi^2 = 3,31$ df = 4

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the frequency of passing urine during the day.

3.9.15 NIGHT URINE FREQUENCY

T A B L E 3.9.15.1a

FREQUENCY	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION											
	NOT INFECTED		1		2		3		4		5		TOTAL	
0	125	28,7%	37	26,8%	11	34,4%	8	22,9%	2	25,0%	0	0%	183	28,1%
1	181	41,6%	66	47,8%	12	37,5%	17	48,6%	3	37,5%	2	66,7%	281	43,2%
2	99	22,8%	26	18,8%	8	25,0%	8	22,9%	2	25,0%	1	33,3%	144	22,1%
3	25	57,0%	7	5,1%	0	0%	2	5,7%	1	12,5%	0	0%	35	5,4%
4	5	11,0%	2	1,4%	0	0%	0	0%	0	0%	0	0%	7	1,1%
5	0	0%	0	0%	1	3,1%	0	0%	0	0%	0	0%	1	0,2%
TOTAL	435		138		32		35		8		3		651	

T A B L E 3.9.15.1b

FREQUENCY	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION			
	NOT INFECTED	1	2+	TOTAL
0	125 28,7%	37 26,8%	21 26,9%	183 28,1%
1	181 41,6%	66 47,8%	34 43,6%	281 43,2%
2+	129 29,7%	35 25,4%	23 29,5%	187 28,7%
TOTAL	435	138	78	651

$\chi^2 = 1,81$ df = 4

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Haemotobium and the frequency of passing urine during the night.

T A B L E 3.9.15.2a

FREQUENCY	LEVEL OF SCHISTOSOMA MANSONI INFECTION					
	NOT INFECTED	1	2	3	4	TOTAL
0	142 29,2%	35 27,1%	5 17,2%	0 0%	1 50,0%	183 28,1%
1	201 41,3%	60 46,5%	16 55,2%	3 75,0%	1 50,0%	281 43,2%
2	109 22,4%	29 22,5%	6 20,7%	0 0%	0 0%	144 22,1%
3	27 5,5%	5 3,9%	2 6,9%	1 25,0%	0 0%	35 5,4%
4	7 1,4%	0 0%	0 0%	0 0%	0 0%	7 1,1%
5	1 0,2%	0 0%	0 0%	0 0%	0 0%	1 0,2%
TOTAL	478	129	29	4	2	651

T A B L E 3.9.15.2b

FREQUENCY	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
0	142	29,2%	35	27,1%	6	17,1%	183	28,1%
1	201	41,3%	60	46,5%	20	57,1%	281	43,2%
2+	144	29,6%	34	26,4%	9	25,7%	187	28,7%
TOTAL	487		129		35		651	

$\chi^2 = 4,54$ df = 4

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the frequency of passing urine during the night.

3.9.16 STOOL FREQUENCY

T A B L E 3.9.16.1a

FREQUENCY	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION													
	NOT INFECTED		1		2		3		4		5		TOTAL	
0	10	2,3%	1	0,7%	1	3,1%	0	0%	0	0%	0	0%	12	1,8%
1	106	24,4%	30	21,7%	6	18,8%	10	28,6%	1	12,5%	1	33,3%	154	23,7%
2	247	56,8%	84	60,9%	19	59,4%	18	51,4%	5	62,5%	2	66,7%	375	57,6%
3	59	13,6%	18	13,0%	6	18,8%	7	20,0%	2	25,0%	0	0%	92	14,1%
4	11	2,5%	4	2,9%	0	0%	0	0%	0	0%	0	0%	15	2,3%
5	2	0,5%	1	0,7%	0	0%	0	0%	0	0%	0	0%	3	0,5%
TOTAL	435		138		32		35		8		3		651	

T A B L E 3.9.16.1b

FREQUENCY	LEVEL OF SCHISTOSOMA HAEMATOBIUM INFECTION							
	NOT INFECTED		1		2+			
1	106	24,9%	30	21,9%	18	23,4%	154	24,1%
2	247	58,1%	84	61,3%	44	57,1%	375	58,7%
3+	72	16,9%	23	16,8%	15	19,5%	110	17,2%
TOTAL	425		137		77		639	

$\chi^2 = 0,90 \quad df = 4$

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Haematobium and the frequency of passing stool.

T A B L E 3.9.16.2a

FREQUENCY	LEVEL OF SCHISTOSOMA MANSONI INFECTION											
	NOT INFECTED		1		2		3		4		TOTAL	
0	11	2,3%	1	0,8%	0	0%	0	0%	0	0%	12	1,8%
1	113	23,2%	32	24,8%	9	31,0%	0	0%	0	0%	154	23,7%
2	278	57,1%	74	57,4%	17	58,6%	4	100%	2	100%	375	57,6%
3	72	14,8%	17	13,2%	3	10,3%	0	0%	0	0%	92	14,1%
4	10	2,1%	5	3,9%	0	0%	0	0%	0	0%	15	2,3%
5	3	0,6%	0	0%	0	0%	0	0%	0	0%	3	0,5%
TOTAL	487		129		29		4		2		651	

T A B L E 3.9.16.2b

FREQUENCY	LEVEL OF SCHISTOSOMA MANSONI INFECTION							
	NOT INFECTED		1		2+		TOTAL	
1	113	23,7%	32	25,0%	9	25,7%	154	24,1%
2	278	58,4%	74	57,8%	23	65,7%	375	58,7%
3+	85	17,9%	22	17,2%	3	8,6%	110	17,2%
TOTAL	476		128		35		639	

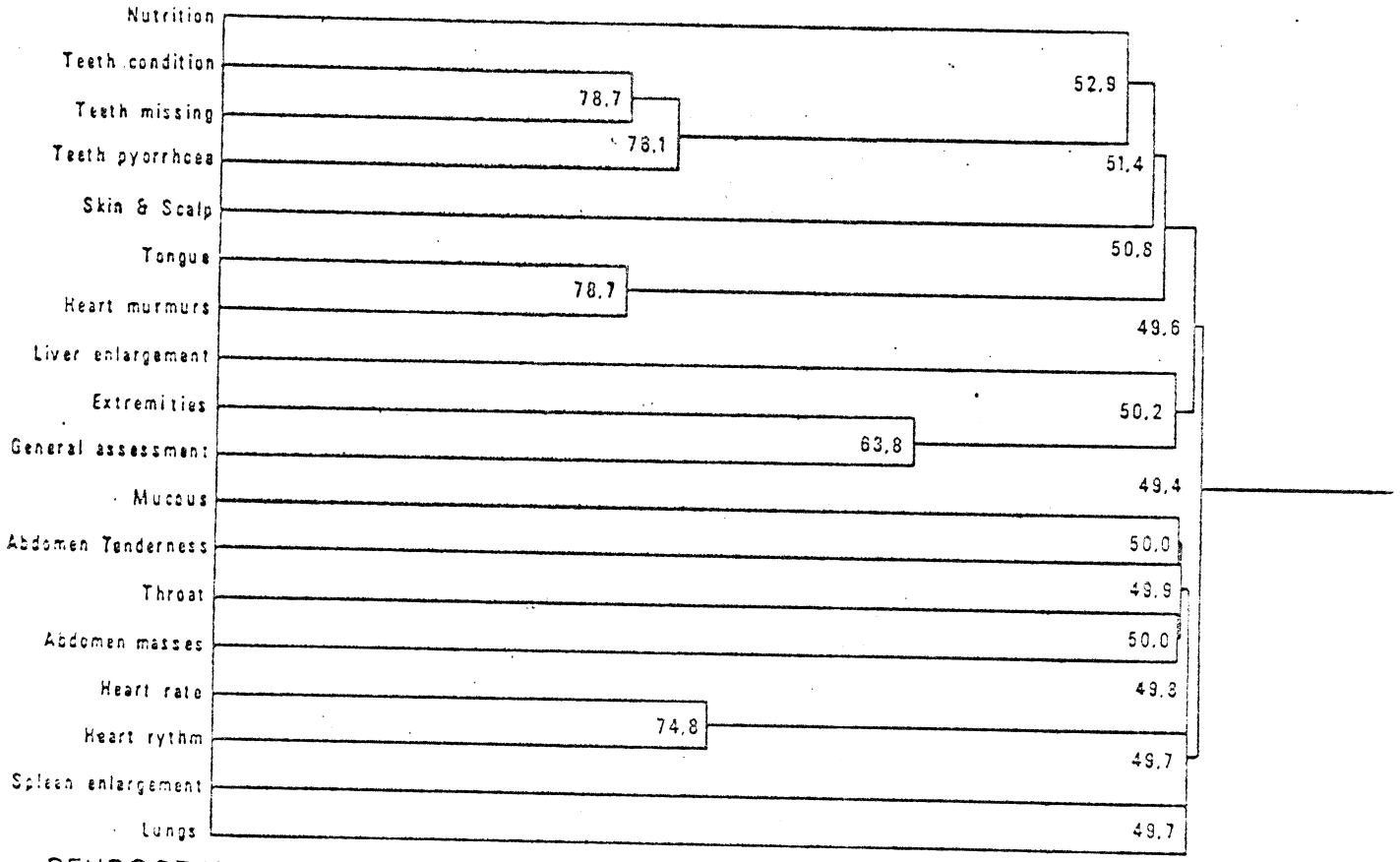
$\chi^2 = 2,06$ df = 4

The calculated χ^2-value is not significant which indicates that there is no relationship between the incidence and severity of Schistosoma Mansoni and the frequency of passing stool.

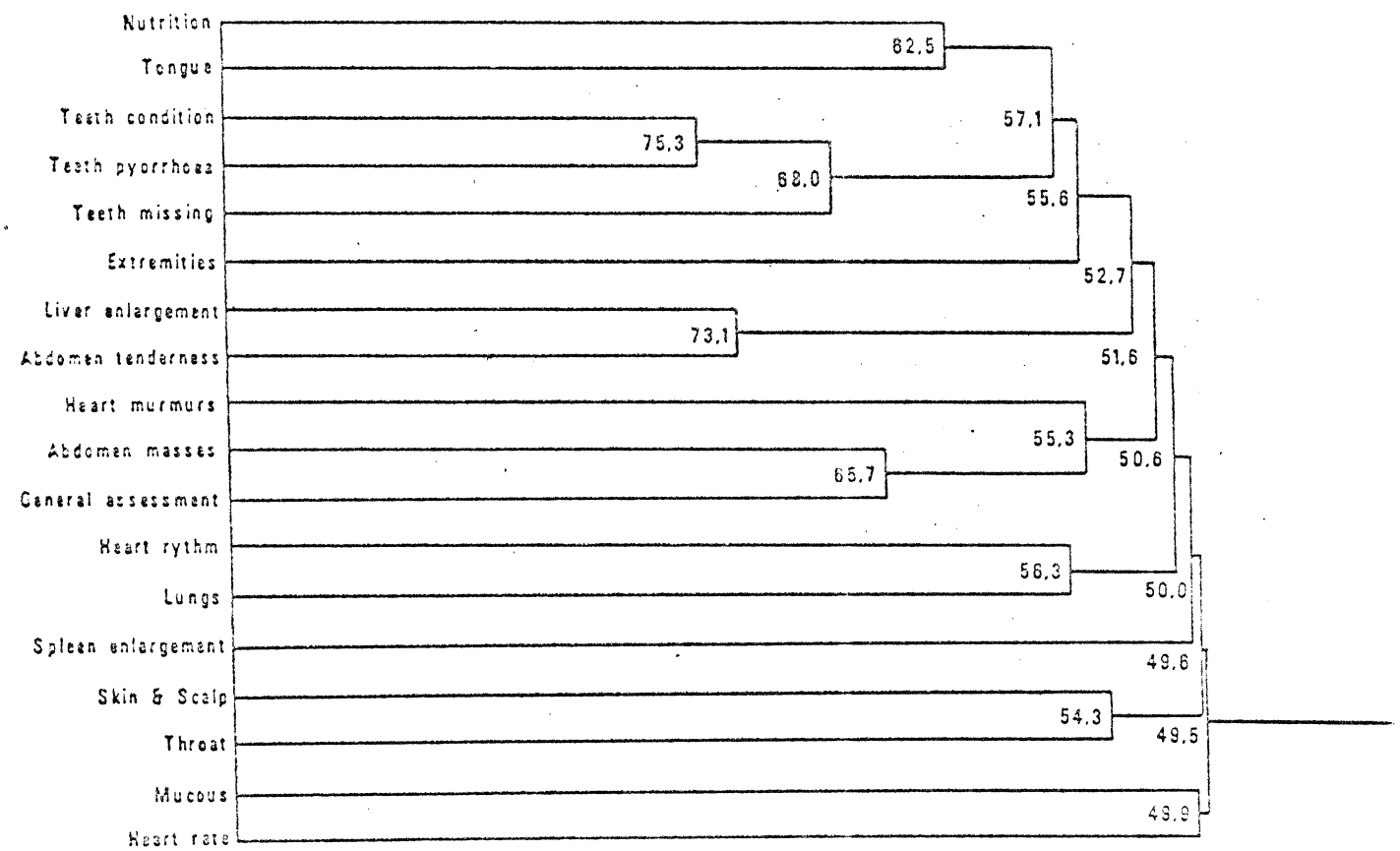
3.10 FURTHER ANALYSIS OF CLINICAL AND PHYSICAL EXAMINATION AND SYMPTONS AND COMPLAINTS

Cluster Analysis was used separately on the above two questionnaires to try and establish which factors were related to each other and perhaps to isolate factors which are yielding the same information as some other factor. The analysis has been performed for both the infections Schistosoma Haematobium and Schistosoma Mansoni, by comparing the results of the Cluster Analysis on the infected group with the results of the Cluster Analysis on the group which was not infected. The result of a Cluster Analysis is presented in a dendogram showing the factors which are similar and which from clusters. The correlations between the clusters are indicated on a scale from 0 to 100 where negative correlation is represented by the section 0 to 50 and positive correlation by the 50 to 100 section (i.e. the correlation is zero at 50 and increases to total correlation at 100).

The dendograms for the group which was infected with Schistosoma Haematobium and the group which was not infected show different clustering patterns. To interpret the differences we must consider those factors which are clustered in the same way for both groups, those factors which are clustered differently for both groups, as well as the differences in mean values of the factors for the two groups.



DENDOGRAM . . CLINICAL AND PHYSICAL EXAMINATION FACTORS FOR SUBJECTS WITH SCHISTOSOMA HAEMATOBIUM N=221



DENDOGRAM CLINICAL AND PHYSICAL EXAMINATION FACTORS FOR SUBJECTS WITHOUT SCHISTOSOMA HAEMATOBIUM N=453

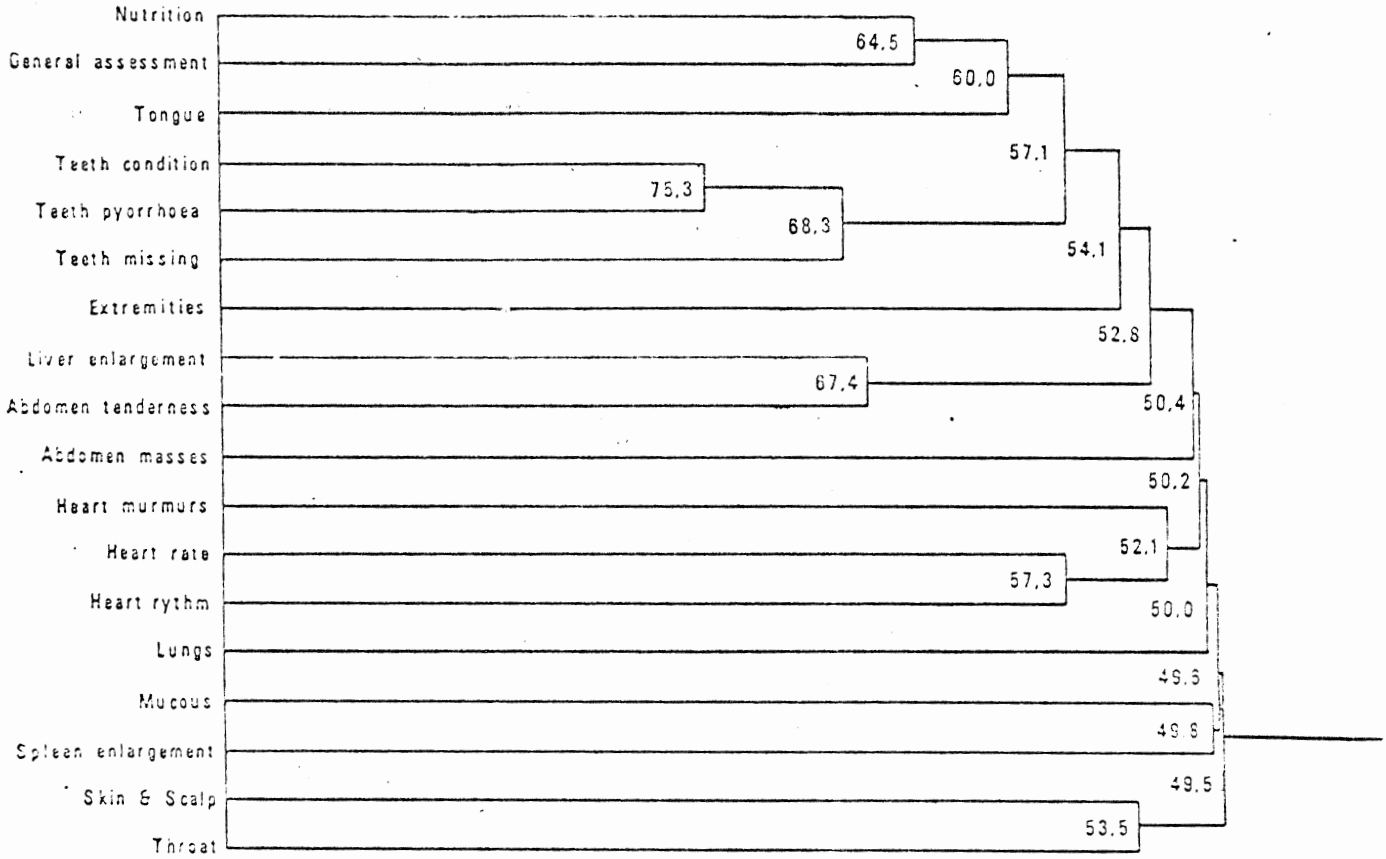
	SCHISTOSOMA HAEMATOBIUM			
	Not Infected (453)		Infected (221)	
FACTOR	Mean	Std. Dev.	Mean	Std. Dev.
Nutrition	0,02	0,12	0,02	0,15
Skin and Scalp	0,08	0,32	0,10	0,37
Mucous Membranes	0,00	0,05	0,00	0,00
Tongue	0,04	0,20	0,10	0,12
Throat	0,00	0,07	0,00	0,00
Teeth Condition	0,30	0,58	0,13	0,43
Pyorrhoea	0,15	0,36	0,05	0,22
Missing	0,64	1,96	0,21	1,06
Heart Rate	0,01	0,10	0,01	0,09
Rhythn	0,01	0,09	0,01	0,09
Murmers	0,00	0,07	0,00	0,07
Lung	0,03	0,17	0,01	0,09
Liver	0,05	0,35	0,05	0,42
Spleen	0,02	0,18	0,01	0,09
Abdomen Masses	0,00	0,05	0,01	0,09
Tenderness	0,01	0,08	0,00	0,07
Extremities	0,01	0,12	0,02	0,15
General	0,02	0,15	0,04	0,20

By making the above-mentioned considerations and combining the information, it would appear that the following factors from the clinical and physical examination are possible indicators of Schistosoma Haematobium:

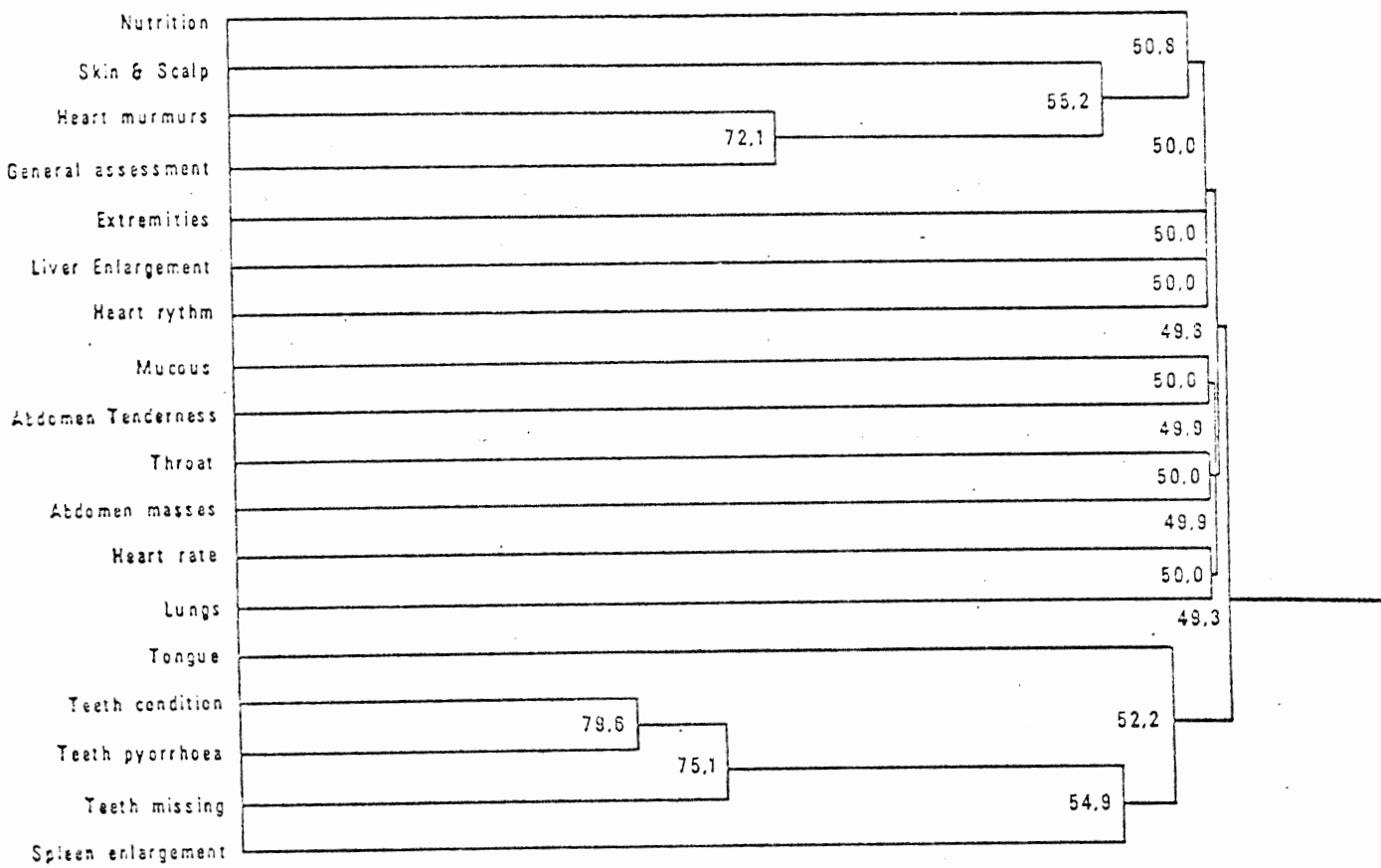
1. Tongue, Teeth (any one of the measurements), Lung, Spleen enlargement, and Abdomen Tenderness. [These have a lower mean for the infected group.]

2. Skin and Scalp and Abdomen Masses (or Extremities or General Assessment). [These have a higher mean for the infected group.]

The following dendograms for the group which was infected with Schistosoma Mansoni and the group which was not infected show slightly different clustering patterns.



DENDOGRAM : CLINICAL AND PHYSICAL EXAMINATION FACTORS FOR SUBJECTS WITHOUT SCHISTOSOMA MANSONI N=508



DENDOGRAM : CLINICAL AND PHYSICAL EXAMINATION FACTORS FOR SUBJECTS WITH SCHISTOSOMA MANSONI N=166

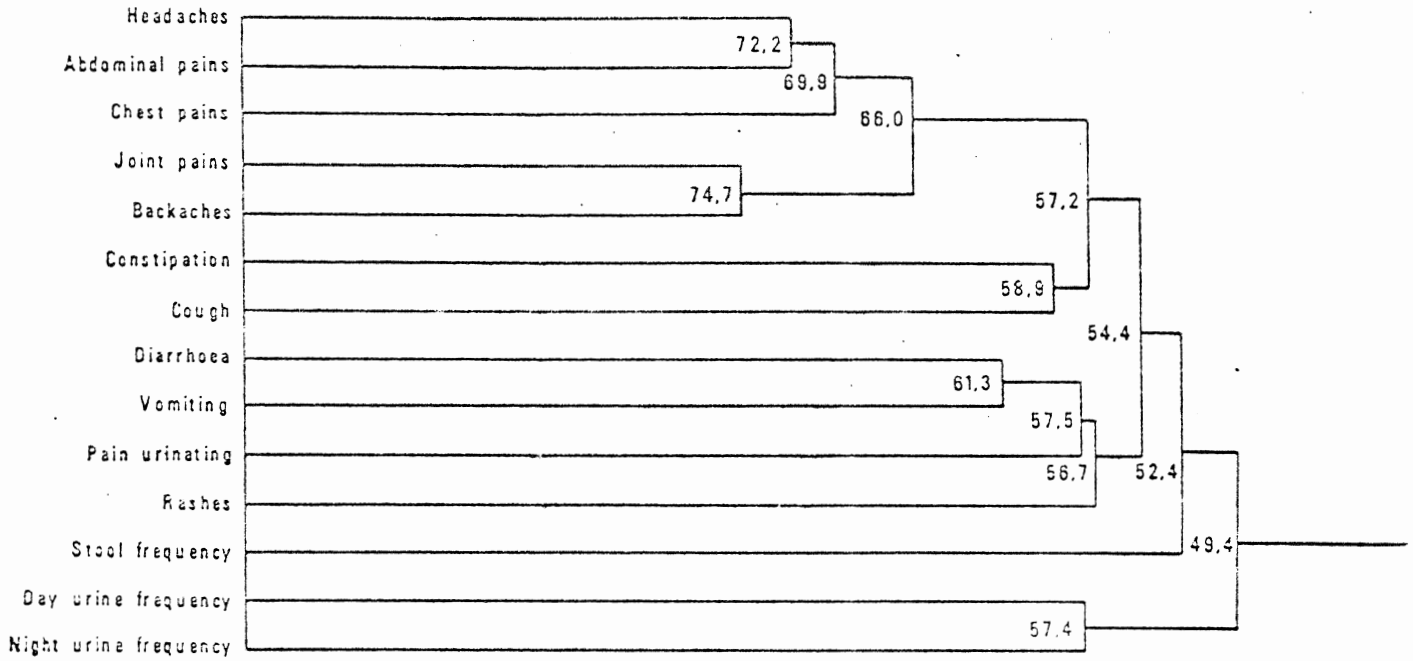
Again the mean values for the factors must be considered.

FACTOR	SCHISTOSOMA MANSONI			
	Not Infected(487)		Infected (164)	
	Mean	Std. Dev.	Mean	Std. Dev.
Nutrition	0,01	0,12	0,03	0,17
Skin and Scalp	0,10	0,36	0,05	0,28
Mucous Membranes	0,00	0,04	0,00	0,00
Tongue	0,04	0,19	0,01	0,11
Throat	0,00	0,06	0,00	0,00
Teeth Condition	0,27	0,55	0,19	0,50
Pyorrhoea	0,13	0,33	0,10	0,30
Missing	0,55	1,74	0,37	1,54
Heart Rate	0,01	0,12	0,00	0,00
Rhythm	0,01	0,11	0,00	0,00
Murmers	0,00	0,06	0,01	0,08
Lung	0,03	0,16	0,01	0,11
Liver	0,07	0,43	0,00	0,00
Spleen	0,02	0,17	0,01	0,11
Abdomen Masses	0,00	0,06	0,01	0,08
Tenderness	0,01	0,08	0,01	0,08
Extermities	0,02	0,15	0,00	0,00
General	0,03	0,16	0,03	0,17

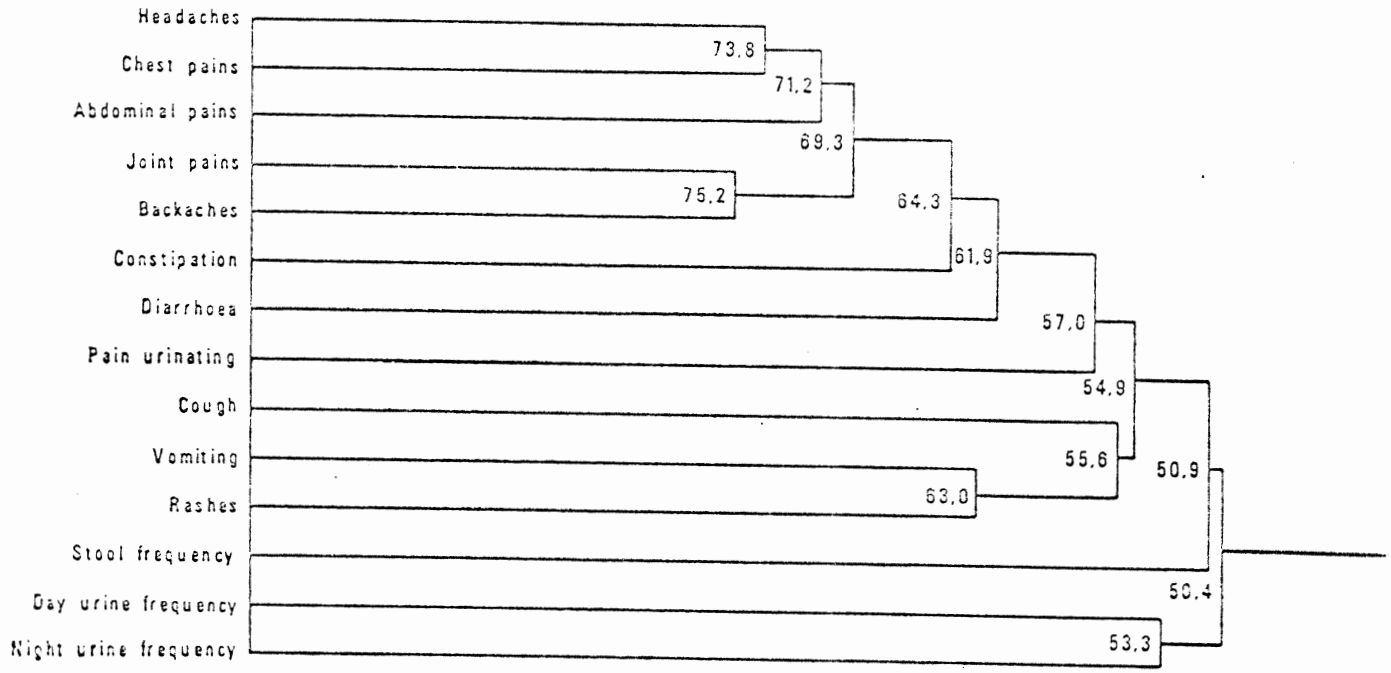
By combining the above information it would appear that the following factors from the clinical and physical examination are possible indicators of Schistosoma Mansoni:

1. Skin and Scalp , Tongue, Teeth (any one of the measurements), Heart Rate (or Heart Rhythm or Lungs), Liver enlargement, Spleen enlargement and Extremities.
   [These have a lower mean for the infected group.]

2. Nutrition, Heart Murmers and Abdomen Masses.
   [These have a higher mean for the infected group.]



DENDOGRAM ... : SYMPTOMS AND COMPLAINTS FOR SUBJECTS WITH SCHISTOSOMA HAEMATOBIUM N=216



DENDOGRAM SYMPTOMS AND COMPLAINTS FOR SUBJECTS WITHOUT SCHISTOSOMA HAEMATOBIUM N=435

The dendograms above show that the clustering of the factors in the group which was infected with Schistosoma Haematobium is slightly different from the clustering of the factors in the not infected group. The mean values of each factor must be considered for the 2 groups.

	SCHISTOSOMA HAEMATOBIUM			
	Not Infected (453)		Infected (221)	
FACTOR	Mean	Std. Dev.	Mean	Std. Dev.
Headaches	0,39	0,49	0,24	0,43
Chest Pains	0,30	0,46	0,17	0,38
Abdominal Pains	0,41	0,49	0,31	0,47
Joint Pains	0,25	0,43	0,12	0,32
Backache	0,33	0,47	0,13	0,34
Constipation	0,18	0,38	0,16	0,37
Diarrhoea	0,32	0,47	0,30	0,46
Cough	0,12	0,33	0,29	0,45
Vomit	0,13	0,34	0,14	0,35
Rashes	0,12	0,32	0,17	0,37
Pain Urinating	0,16	0,45	0,19	0,40
Day Urine Freq.	0,31	0,47	0,19	0,39
Night Urine Freq.	0,01	0,11	0,01	0,12
Stool Frequency	0,98	0,15	0,99	0,10

By combining the information above it would appear that the following symptoms and complaints could possibly by indicators of Schistosoma Haematobium:

1. Headaches (or Chest Pains or Abdominal Pains or Joint Pains or Backache), Constipation, Diarrhoea and Urine Night Frequency. [These have lower mean for the infected group.]

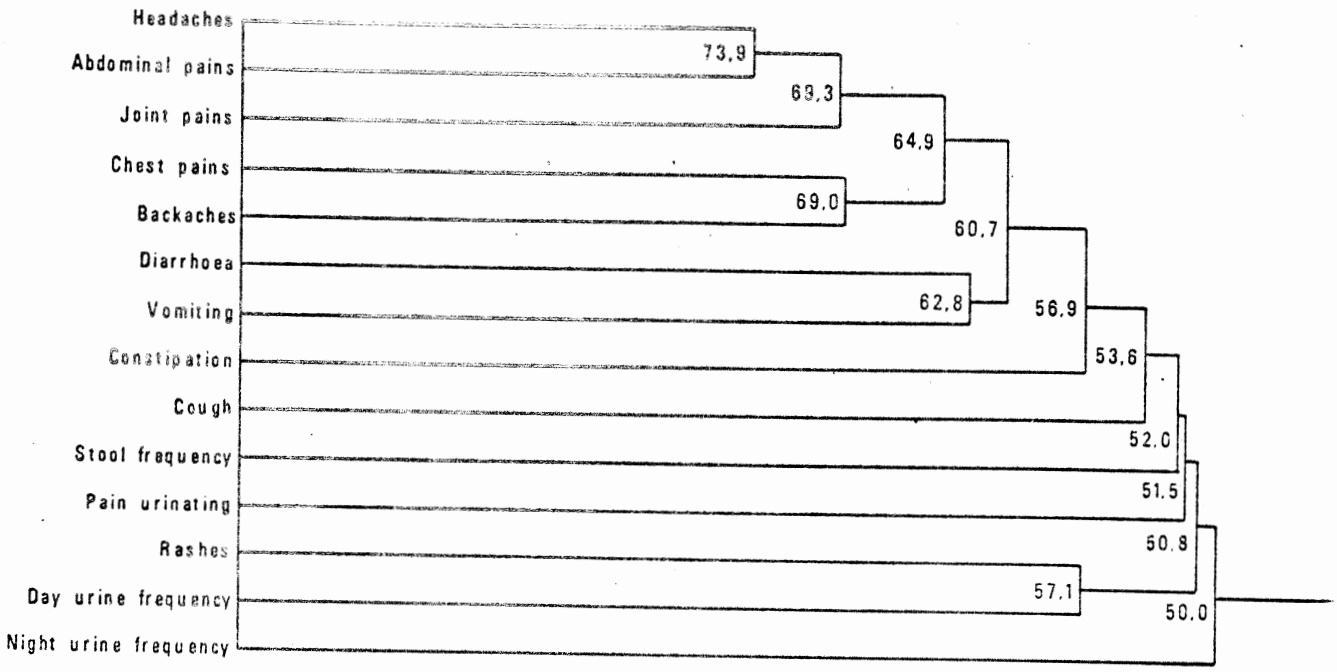
2. Non-smoker's Cough (or Vomiting or Pain when Urinating or Rashes) and Stool Frequency. [These have a higher mean for the infected group.]

The following dendograms show that the clustering of the factors in the group which was infected with Schistosoma Mansoni is slightly different from the group which was not infected. The mean values of each factor must be considered for the two groups.

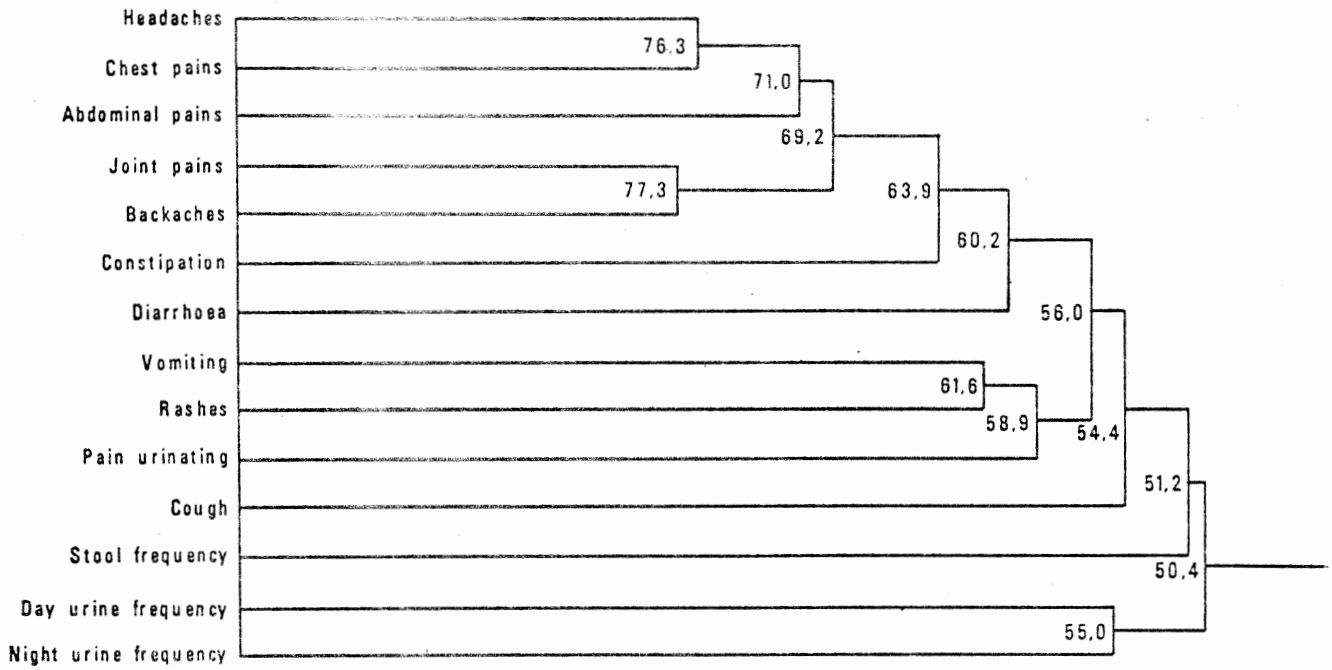
	SCHISTOMA MANSONI			
	Not Infected (487)		Infected (164)	
FACTOR	Mean	Std. Dev.	Mean	Std. Dev.
Headaches	0,37	0,48	0,24	0,43
Chest Pains	0,29	0,45	0,16	0,37
Abdominal Pains	0,41	0,49	0,27	0,45
Joint Pains	0,22	0,42	0,15	0,35
Backache	0,30	0,46	0,16	0,37
Constipation	0,17	0,38	0,18	0,38
Diarrhoea	0,32	0,47	0,29	0,45
Cough	0,17	0,38	0,19	0,39
Vomit	0,13	0,34	0,15	0,36
Rashes	0,12	0,33	0,17	0,38
Pain Urinating	0,17	0,37	0,18	0,59
Day Urine Freq.	0,28	0,45	0,26	0,44
Night Urine Freq.	0,02	0,13	0,00	0,00
Stool Frequency	0,98	0,15	0,99	0,08

By combining the above information it would appear that the following symptoms and complaints are possible indicators of Schistosoma Mansoni:

1. Headaches (or Chest Pains or Abdominal Pains or Joint Pains or Backaches or Diarrhoea) and Day or Night Urine Frequency. [These factors have lower means for the infected group.]



DENDOGRAM SYMTOMS AND COMPLAINTS FOR SUBJECTS WITH SCHISTOSOMA MANSONI N=164



DENDOGRAM SYMPTOMS AND COMPLAINTS FOR SUBJECTS WITHOUT SCHISTOSOMA MANSONI N=487

2. Constipation, Non-smoker's Cough, Vomiting, Rashes, Pain when Urinating and Stool Frequency. [These factors have higher means for the infected group.]

3.11 MENTAL PERFORMANCE AND SKIN-FOLD THICKNESS

3.11.1 PORTEUS MAZE

Of the 486 subjects whose mental performance was measured, 142 were found to be infected with Schistosoma Haematobium. The mean cut-off age was calculated for the group infected and compared with that of the group which was not infected, using a Student t-test.

Schistosoma Haematobium	Cut-off Age		
	Mean	Std. Dev.	Sample Size
Not Infected	12,46	3,40	344
Infected	12,13	3,64	142

$t = 0,95 \quad df = 484$

The calculated t-value is not significant which indicates that the mean cut-off age for the 2 groups were similar enough to be able to compare the mean points scored.

Schistosoma Haematobium	Points on Porteus Maze		
	Mean	Std. Dev.	Sample Size
Not Infected	32,82	13,28	344
Infected	31,62	14,32	142

t = 0,83 df = 484

The calculated t-value is not significant which indicates that the group infected with Schistosoma Haematobium did not differ significantly from the group which was not infected with respect to the mean points scored in the Porteus Maze test.

Of the 486 subjects, 112 were found to be infected with Schistosoma Mansoni. The mean cut-off age of the infected group was compared with the mean of the group which was not infected.

Schistosoma Mansoni	Cut-off Age		
	Mean	Std. Dev.	Sample Size
Not Infected	12,41	3,45	374
Infected	12,23	3,55	112

t = 0,47 df = 484

The calculated t-value is not significant which indicates that the mean cut-off age for the 2 groups were not significantly different and hence the means of the points scored could be compared.

Schistosoma Mansoni	Points on Porteus Maze		
	Mean	Std. Dev.	Sample Size
Not Infected	32,69	13,58	374
Infected	31,75	13,67	112

$t = 0,64 \quad df = 484$

The calculated t-value is not significant which indicates that the group which was infected with Schistosoma Mansoni did not differ significantly from the group which was not infected, w.r.t. the mean points scored in the Porteus Maze test.

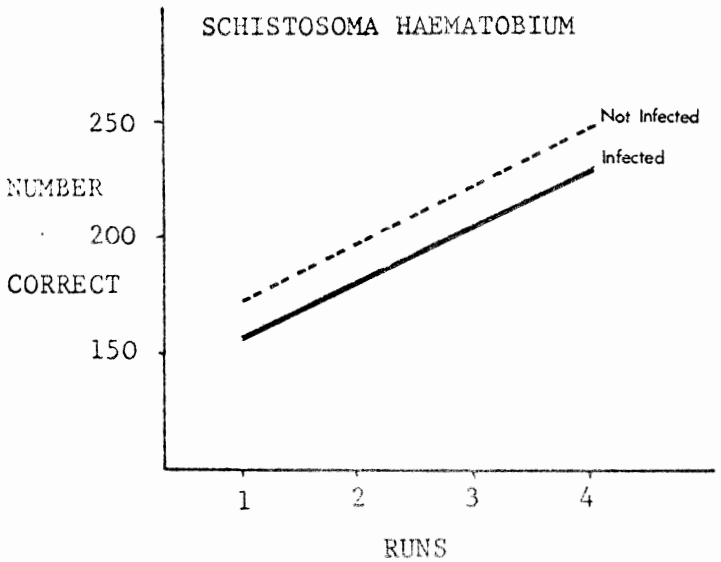
3.11.2 GEOMETRIC SHAPES

To compare the infected group with the not infected group on the series of the 4 runs of the Geometric Shapes test, the technique of ANACOVA was used whereby the score of the number correct was adjusted by the number of errors and the number of the particular run and then compared between the 2 groups. In fact it was found that the effect of the number of errors was insufficient to be included because when the number correct was regressed onto the number of errors and the run number, the t-value was not significant.

Variable	Regression Coefficient	Std. Error	t-value	df
Number of Errors	-0,20	0,27	-0,75	1749
Run Number	25,09	2,10	11,92**	1749

To compare the group which was infected with Schistosoma

Haemotobium with the group which was not infected the regression for each group was computed and then an analysis of covariance was performed.



The regressions obtained for each group when the number correct was regressed on the run number.

Source of Variance	df	Sums of Squares	Mean Squares	F-value
Equality of Slopes	1	17,25	17,25	0,0018
Error	1748	16806793,00	9614,87	

The calculated F-value is not significant which indicates that the slopes for the 2 groups do not differ significantly and hence a comparison of the adjusted means could be made.

Schistosoma Haematobium	Adjusted Number Correct		
	Mean	Std. Dev.	Sample Size
Not Infected	211,55	2,77	313
Infected	192,60	4,38	125

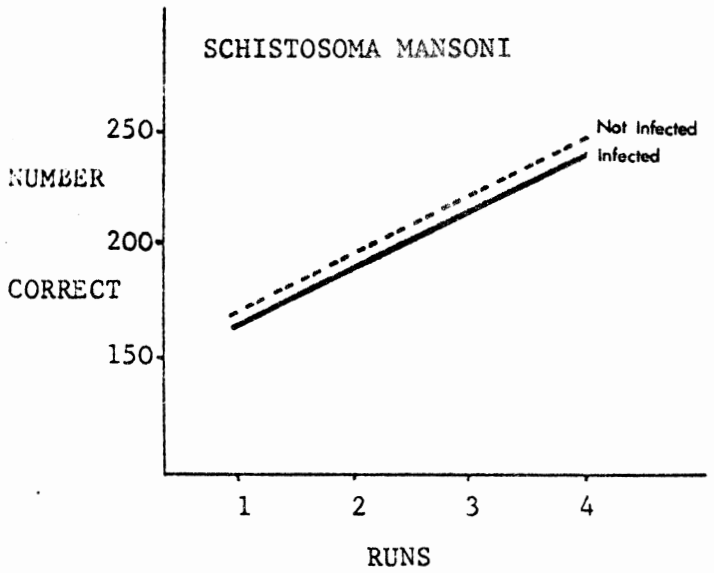
The following analysis of variance table was computed:

Source of Variance	df	Sums of Squares	Mean Squares	F-value
Equality of adj. means	1	128330,50	128330,50	13,35**
Zero Slope	1	1362189,50	1362189,50	141,76**
Error	1749	16806810,25	9609,38	

The calculated F-value for zero slope is significant at the 0,001 level of significance which indicates that the number correct increased significantly over the 4 runs for both the groups. The calculated F-value for equality of the adjusted means is significant at the 0,01 level of significance which indicates that the group of people who were not infected had a significantly higher mean Geometric shapes test score.

We can conclude that the number correct increased significantly with the runs, and that the group which was infected with Schistosoma Haematobium was consistently worse (on the Geometric shapes test) than the group which was not infected.

The regressions of the number correct on the run number were computed for the group infected with Schistosoma Mansoni and the group who were infected and then compared using ANACOVA.



The regressions obtained for each group when the number correct was regressed on the run number.

Source of Variance	df	Sums of Squares	Mean Squares	F-value
Equality of Slopes	1	218,75	218,75	0,02
Error	1748	16927101,25	9683,70	

The calculated F-value is not significant which indicates that the slopes of the 2 groups do not differ significantly and hence a comparison of the adjusted means could be made.

Schistosoma Mansoni	Adjusted Number Correct		
	Mean	Std.Error	Sample Size
Not Infected	207,29	2,68	338
Infected	202,26	4,92	100

The following analysis of variance table was computed.

Source of Variance	df	Sums of Squares	Mean Squares	F-value
Equality of adj. means	1	7817,25	7817,25	0,81
Zero Slope	1	1362188,50	1362188,50	140,75**
Error	1749	16927320,00	9678,28	

The calculated F-value for zero slope is significant at the 0,001 level of significance which indicates that the number correct increased significantly over the 4 runs for both groups, however the calculated F-value for equality of adjusted means is not significant which indicates that the 2 groups did not differ significantly on the mean Geometric shapes test scores.

We can conclude that although the number correct increased significantly with the runs, there were no significant differences in the Geometric shapes test between the group which was infected with Schistosoma Mansoni and the group which was not infected.

3.11.3 EYSENCK PERSONALITY TEST

The mean Neurotocism, Extraversion and Lie scores of the Eysenck Personality test were calculated for the group of people who were infected with Schistosoma Haematobium and compared with the mean scores of the groups who were not infected using Student t-tests.

Schistosoma Haematobium	Neurotocism		Extraversion		Lie		Sample
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Size
Not Infected	7,07	5,33	11,15	2,50	5,84	1,58	344
Infected	6,89	5,18	11,02	2,26	5,67	1,27	142

$t_N = 0,34$ $t_E = 0,55$ $t_L = 1,12$ $df = 484$

None of the calculated t-values are significant which indicates that the group which was infected with Schistosoma Haematobium was not significantly different (in any of the Eysenck Personality scores) from the group which was not infected.

The mean Neurotocism, Extraversion and Lie scores of the Eysenck Personality test were calculated for the group of people who were infected with Schistosoma Mansoni and compared with the means of the groups of people who were not infected using Student t-tests.

Schistosoma Mansoni	Neurotocism		Extraversion		Lie		Sample
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Size
Not Infected	7,00	5,37	11,06	2,22	5,78	1,50	374
Infected	7,08	4,98	11,30	3,04	5,89	1,47	112

$t_N = -0,14$ $t_E = -0,93$ $t_L = -0,78$ $df = 484$

None of the calculated t-values are significant which indicates that the group which was infected with Schistosoma Mansoni was not significantly different from the group which was not infected, in any of the Eysenck Personality scores.

3.11.4 SKIN-FOLD THICKNESS

The skin-fold thickness (in cm) of 486 subjects was measured in four regions; Pectoral region, Below scapula, Triceps area and Abdominal. The mean thicknesses were calculated for the group of 142 people who were found to be infected with Schistosoma Haematobium and compared with mean thicknesses calculated for the people who were not infected, using Student t-tests.

Schistosoma Haematobium	Pectoral Region(cm)		Below Scapula(cm)		Sample Size
	Mean	Std.Dev.	Mean	Std.Dev.	
Not Infected	3,97	1,47	6,90	1,78	344
Infected	3,68	1,40	6,50	1,91	142

t_P = 2,00* t_S = 2,20* df = 484

Schistosoma Haematobium	Triceps Area(cm)		Abdominal(cm)		Sample Size
	Mean	Std.Dev.	Mean	Std.Dev.	
Not Infected	5,65	2,20	6,31	2,12	344
Infected	6,05	2,18	5,88	2,11	142

t_T = -1,83* t_A = 2,06* df = 484

At the 5% level of significance the mean skin-fold thicknesses of the infected group in the Pectoral Region, Below the Scapula and in the Abdominal region were found to be significantly lower than the mean skin-fold thicknesses in the group which was not infected with Schistosoma Haematobium. The mean skin-fold thickness of the infected group in the Triceps area was found to be significantly higher than the mean skin-fold thickness in the infected group (at the 5% level of significance.)

The mean skin-fold thicknesses were calculated for the 112 subjects who were infected with Schistosoma Mansoni and compared with the calculated mean thicknesses of those who were not infected using Student t-tests.

Schistosoma Mansoni	Pectoral Region(cm)		Below Scapula(cm)		Sample Size
	Mean	Std.Dev.	Mean	Std.Dev.	
Not Infected	3,94	1,51	6,82	1,84	374
Infected	3,71	1,25	6,68	1,77	112

$t_P = 1,46$ $t_S = 0,67$ df = 484

Schistosoma Mansoni	Triceps Area(cm)		Abdominal(cm)		Sample Size
	Mean	Std.Dev.	Mean	Std.Dev.	
Not Infected	5,73	2,18	6,26	2,14	374
Infected	5,88	2,25	5,93	2,05	112

$t_T = -0,64$ $t_A = 1,41$ df = 484

No significant differences in skin-fold thickness were found between the group which was infected with Schistosoma Haematobium and the group which was not infected.

3.12 ANTHROPOMETRY

Various anthropometric measures were included in the questionnaire, however many people would not participate other than to have their body weight and stature measured. Consequently 494 people were measured on these two aspects only, while 48 people were measured on all the aspects. In both the case of Schistosoma Haematobium and of Schistosoma Mansoni the mean for each measure have been calculated for the infected group and compared with those of the group which was not infected using Student t-tests.

Schistosoma Haematobium	Body Weight (kg)		Stature (cm)		Sample Size
	Mean	Std.Dev.	Mean	Std.Dev.	
Not infected	54,34	10,69	158,58	17,46	345
Infected	49,42	13,64	155,81	16,67	149

$t_w = 4,32^{**}$ $t_s = 1,10$ df = 492

The calculated t-value for body weight is significant at the 0,001 level of significance which indicates that the group which was infected with Schistosoma Haematobium was significantly lighter than the group which was not infected. There was no significant difference in mean stature between these two groups.

Schistosoma Mansoni	Body Weight (kg)		Stature (cm)		Sample Size
	Mean	Std.Dev.	Mean	Std.Dev.	
Not Infected	52,93	12,07	157,40	17,99	377
Infected	52,61	11,04	158,86	14,67	117

$t_w = 0,26$ $t_s = -0,80$ df = 492

The calculated t-values are not significant which indicates that the mean body weight and the mean stature of the group which was infected with Schistosoma Mansoni were not significantly different from those of the group which was not infected.

The following comparisons have been made on a sample of size 48 and hence the results must be considered taking into account that the sample size is small.

	Schistosoma Haematobium				
	Not Infected (22)		Infected (26)		
Measure (cm)	Mean	Std.Dev.	Mean	Std.Dev.	t-value
Shoulder Height	107,55	8,30	106,69	8,07	0,37
Elbow Height	82,83	8,17	83,02	6,30	-0,09
Dactylon Height	47,78	5,97	47,74	6,62	0,02
Trochanter Height	68,31	13,67	69,86	7,20	-0,50
Tibial Height	38,81	6,06	37,70	3,32	0,80
Biachromial Height	29,19	2,59	28,88	3,04	0,38
Shoulder Breadth	31,64	2,05	31,13	2,73	0,71
Chest Breadth	20,57	2,71	20,64	2,74	-0,08
Waist Breadth	20,36	1,58	20,20	0,89	0,45
Hip Breadth	17,08	1,76	18,13	1,68	-2,11*
Biceps Circumference	18,88	3,43	19,23	2,69	-0,39
Forearm Circumference	18,94	1,49	19,03	2,37	-0,16
Waist Circumference	57,32	5,92	57,90	3,41	-0,42
Buttocks Circumference	63,17	5,02	62,31	4,31	0,64
Thigh Circumference	36,61	2,80	35,45	2,91	1,40
Calf Circumference	25,12	2,27	25,33	3,12	-0,27

df = 46

None of the calculated t-values for the above anthropometric measurements are significant other than the t-value for Hip Breadth (at the 0,05 level of significance). Hence, the group which was infected with Schistosoma Haematobium differs from the group which was not infected only for Hip breadth - the infected group had a larger mean Hip Breadth than the group which was not infected.

Measure (cm)	Schistosoma Mansoni				
	Not Infected(38)		Infected (10)		
	Mean	Std. Dev.	Mean	Std.Dev.	t-value
Shoulder Height	106,72	8,40	108,49	7,07	-0,61
Elbow Height	82,70	7,34	83,82	5,63	-0,44
Dactylon Height	47,38	5,26	49,19	9,40	-0,81
Trochanter Height	69,20	11,32	68,95	7,55	0,07
Tibial Height	38,22	5,23	38,20	2,33	0,01
Biachromial Height	29,09	2,69	28,77	3,39	0,32
Shoulder Breadth	31,16	2,53	32,12	1,94	-1,11
Chest Breadth	20,26	2,19	21,94	3,98	-1,80
Waist Breadth	20,25	1,30	20,38	1,05	-0,30
Hip Breadth	17,36	1,65	18,76	1,88	-2,32*
Biceps Circumference	18,95	3,17	19,53	2,48	-0,54
Forearm Circumference	18,92	2,07	19,26	1,78	-0,47
Waist Circumference	57,66	5,03	57,54	3,22	0,07
Buttocks Circumference	62,49	4,51	63,51	5,16	-0,61
Thigh Circumference	35,83	2,82	36,56	3,24	-0,71
Calf Circumference	24,92	2,43	26,45	3,54	-1,60

df = 46

None of the calculated t-values for the above anthropometric measurements are significant other than the t-value for Hip Breadth (at the 0,05 level of significance). Hence, the group which was infected with Schistosoma Mansoni differs from the group which was not infected only for Hip Breadth - the infected group had a larger mean Hip Breadth than the group which was not infected.

3.13 TREATMENT

Of the 221 cases who were infected with Schistosoma Haematobium, 96 were treated with Metrifonate. The results of the treatment are as follows:

84 (87,5%) were cured

8 (8,3%) had infection reduced

4 (4,2%) failed.

Of the 166 cases infected with Schistosoma Mansoni, 93 were treated with Oxamniquine and the results are as follows:

88 (94,6%) were cured

5 (5,4%) had infection reduced.

CHAPTER FOUR

4.1 SUMMARY OF ANALYSIS

Briefly, the analysis yields that several of the personal and socio-economic factors were related to Schistosomiasis although, not all of the factors that were included in the investigation were related. Significant differences were found in the parasitology of people with Schistosome infections and it appears that the Visser-Pitchford egg count technique is more reliable for urine than for stool, however the proportion of false negatives was rather high in both cases. The biochemistry appeared to yield differences for Schistosoma Haematobium, but not for Schistosoma Mansoni. A few differences occurred in the haematology, however there were no significant differences in the blood groups. The clinical and physical examination as well as the list of symptoms and complaints yielded some significant differences, however these were often in the opposite direction to what was anticipated. There were no differences in mental performance other than the effect of Schistosoma Haematobium on the Geometric Shapes test. The skin-fold thicknesses were found to differ for Schistosoma Haematobium, but not for Schistosoma Mansoni. The people infected with Schistosoma Haematobium were significantly lighter than those not infected, however the other anthropometric measures did not differ excepting the hip breadth which was different for both Schistosoma Haematobium and Schistosoma Mansoni.

4.2 COMMENTS ON ANALYSIS

The results of the statistical analysis have been presented in a form which may be used by the researchers at the Blair Research Laboratory, Salisbury, to fulfil their objectives. Hence, in this presentation, no interpretation of the results has been attempted, nor an assessment of the implications of the findings.

Unfortunately, after a major part of the analysis had been initiated (on the 674 cases), an additional 40 cases were collected which could not be included. The data of these 40 cases were, however, screened and it was apparent that they did not contradict the results of the analysis.

4.3 FURTHER ANALYSIS

When initially considering the analysis it was felt that the Multidimensional Contingency Table approach might be useful for this data, however it was extremely difficult to decide on the choice of hypotheses to test. Hence the analysis was approached in the simplest manner and it is hoped that the results obtained will make the task of further analysis, if required, easier. (For example, it can be seen from the results that Schistosoma Haematobium is age dependent as well as being dependent on the person's relationship to the householder, and the interaction of these two factors might possibly be investigated further.)

APPENDIX ONE

INDIVIDUAL IDENTIFICATION, PERSONAL INFORMATION, SOCIO-ECONIMIC INFORMATION

NAME: .....

Identification: col 1 - 13

Questionnaire no: [1]

Date; [2 3 4 5 6] day month year

Householders no: [7 8 9]

Individuals no: [10 11 12]

col 10: indicates wife no,; col 11: indicates sex, male 0, female 1; col 12 indicates children of specified sex in order of age.

Farm: [13]

Palm Grove 0; CeresD 1; CeresR 2; Bamboo Creek 3; Woodlands 4; Burnleigh 5

Personal information; cols 14 - 23

Country of origin: [14]

Rhodesia 0; Malawi 1; Mocambique 2; Zambia 3; other 4

Age: [15 16] years

Length of residence on farm: [17 18]

Years of schooling: [19 20] including kindergarten and current years

Relationship to householder: [21]

Householder 0; wife 1; child 2; step-child 3; father 4; mother 5; other 6

If wife, how many children: [22 23] including deceased

Socio-econimic information: cols 24 - 37

Religion: [24] none 0; christian 1; moslem 2; other 3

No. of wives: [25] nine or more, list as 9

Occupation: [26]

none 0; labourer 1; driver 2; senior hand 3; artisan 4; clerical 5; dependent 6

Housing: type [27] standard [28] state [29]

type		standard		state	
traditional	0	poor	0	poor	0
brick	1	average	1	good	1
other	2	good	2		

Latrine: [30] none 0; not used 1; used 2

Garden: [31] no 0; yes 1

Water Supply: [Dom. 32] [Laund. 33] [Bath 34] [Play 35] [Garden 36] [Fishing 37]

dam 0; river 1; canal 2; well 3; borehole 4; piped, pure 5

PARASITOLOGY:

Identification: cols 1 - 13

Questionnaire no; [1][2]

Date: [2][3] day [4][5] month [6] year

Householder's no: [7][8][9]

Individual's no: [10][11][12]

Farm: [13]

Palm Grove 0; CeresD 1; CeresR 2; Bamboo Creek 3; Woodlands 4; Burnleigh 5

Parasitology: cols 14 - 41

URINE: Volume, ml [14][15][16]

Macroscopic haematuria [17] not visible 0; visible 1

Sediment: S.haem.eggs [18] (graded 0, 1+ - 5+)

viability [19][20] out of [21][22]

hatch [23] (graded 0, 1+ - 5+)

RBC [24] (graded 0, 1+ - 5+)

Visser-Pitchford egg count [25][26][27] eggs/ml

Other schistosome species [28] no others 0; S.mansoni 1; S.mattheei 2

STOOL: Consistency: [29] formed 0; loose 1; liquid 2

Sediment: S.mansoni eggs [30] (graded 0, 1+ - 5+)

viability: [31][32] out of [33][34]

hatch: [35] (graded 0; 1+ - 5+)

Visser-Pitchford egg count [36][37][38] eggs/ml

Other schistosome species: [39] none 0; S.haem. 1; S.mattheei 2

Other parasites: [40][41]

none 0; hookworm 1; Ascaris 2; Strongyloides 3; Enterobius 4; Taenia 5
Hymenolepis 6; others 7. If only one other parasite list in col 40 and record 0 in col 41. If two, list separately in cols 40 and 41. If more than 2, record only the two heaviest infections.

IOCHEMISTRY AND HAEMATOLOGY:

dentification: cols 1 - 13 — 1

uestionnaire: 3

ate: 2 3 4 5 6 (day 7 8, month 9, year)

ouseholder's no: 7 8 9

ndividual's no: 10 11 12

arm: 13

alm Grove 0; CeresD 1: CeresR 2; Bamboo Creek 3; Woodlands 4; Burnleigh 5

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iochemistry: cols 14 - 37

RINE: Protein: 14 15 16 mg/100 ml

Blood: 17 -ve 0; light 1; medium 2; heavy 3

Bilirubin: 18 -ve 0; more than 1 mg/100 ml 1.

Urobilinogen: 19 20 21 Ehrlich units/100 ml

LOOD: Albumen: 22 23 gm%

Protein: 24 25 26 gm%

Globulin: 27 28 gm%

Ratio, Albumin:Globulin: 29 30 : 1

S.G.P.T.: 31 32 33 iu/l

Thymol turbidity: 34 35 units x 10

Bilirubin: 36 37 gm%

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laematology: cols 38 - 57

.B.C. total count: 38 39 40 $x10^3$/cu mm

.B.C. total count: 41 42 43 $x10^3$/cu mm

laemaglobin: 44 45 46 gm%

laematocrit: 47 48 49

eutrophils: 50 51 %

ymphocytes: 52 53 %

osinophils: 54 55 %

onocytes: 56 57 %

lood Group: 0 1 2 3 = O A B AB — 58 59

RH 0 1 = + -

LINICAL AND PHYSICAL EXAMINATION:

dentification: cols 1 - 13

	1					
estionnaire no:	4					
	2	3	4	5	6	
ate:						
	day		month		year	
	7	8	9			
ouseholder's no:						
	10	11	12			
ndividual's no:						
	13					
arm:						

alm Grove 0; CeresD 1; CeresR 2; Bamboo Creek 3; Woodlands 4; Burnleigh 5

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lynical and Physical: cols 14 - 31

utrition:	14	satisfactory 0; obviously poor 1
kin and Scalp:	15	normal 0; dirty 1; diseased 2; dirty and diseased 3
ucous membranes:	16	normal 0; anaemia 1; jaundice 2
ongue:	17	clean 0; coated 1
hroat:	18	normal 0; infected or diseased 1
eeth, condition:	19	healthy 0; worn 1; carious 2
pyorrhoea:	20	absent 0; present 1
number missing:	21	nine or more, score 9
eart, rate:	22	normal 0; slow 1; rapid 2
rythm:	23	regular 0; irregular 1
murmurs:	24	absent 0; present 1
ungs:	25	normal 0; abnormal 1
iver, enlargement:	26	not palpable 0; if palpable, degree of enlargement graded 1 - 5
pleen, enlargement:	27	not palpable 0; if palpable, degree of enlargement graded 1 - 5
bdomen, masses:	28	absent 0; present 1) Pregnancy excluded
tenderness:	29	absent 0; present 1)
xtremities:	30	normal 0; injured or diseased 1; oedematous 2
xaminers subjective assessment of eneral state of health:	31	

atisfactory 0; judged to be below normal 1; definitely poor 2

SYMPTOMS AND COMPLAINTS: (ANSWERS TO QUESTIONS)

Identification: cols 1 - 13

Questionnaire no: 1 5

Date: 2 3 4 5 6 (day 7 8 month 9 year)

Householder's no: 7 8 9

Individual's no: 10 11 12

Farm: 13

Palm Grove 0; CeresD 1; CeresR 2; Bamboo Creek 3; Woodlands 4; Burnleigh 5

Answers to questions: cols 14 - 28

"Do you suffer from headaches?" 14

"Do you suffer from chest pains?" 15

"Do you suffer from abdominal pains?" 16

"Do you suffer from joint pains?" 17

"Do you suffer from backaches?" 18

"Do you often get constipated?" 19

"Do you often have diarrhoea?" 20

"Do you have a persistent cough" 21

"Do you smoke?" 22

"Do you often vomit?" 23

"Do you have any rashes?" 24

"Do you feel pain when passing urine?" 25

"How often do you pass urine during the day?" 26

"How often do you pass urine during the night?" 27

"How often do you pass stool?" 28

Columns 14 - 25, if answer is no, score 0; if answer is yes, score 1

nine of more, score 9

nine or more, score 9

MENTAL PERFORMANCE: and SKIN-FOLD THICKNESS:

Identification: cols 1 - 13

Questionnaire no: [1 | 6]

Date: [2 | 3 | 4 | 5 | 6] (day | month | year)

Householder's no: [7 | 8 | 9]

Individual's no: [10 | 11 | 12]

Farm: [13]

Palm Grove 0; CeresD 1; CeresR 2; Bamboo Creek 3; woodlands 4; Burnleigh 5

Mental performances: cols 14 - 43

Porteus Maze, points: [14 | 15]

cut-off age: [16 | 17] (score adult as 15)

Geometric shapes, 1st run, correct: [18 | 19 | 20]

errors: [21 | 22]

In all error columns, score 99 for 99 or more

2nd run, correct: [23 | 24 | 25]

errors: [26 | 27]

3rd run, correct: [28 | 29 | 30]

errors: [31 | 32]

4th run, correct: [33 | 34 | 35]

errors: [36 | 37]

Eysenck Personality Test, N score [38 | 39]

E score [40 | 41]

L score [42 | 43]

Skin-fold thickness: cols 44 - 51

Pectoral region: [44 | 45] cm

Below scapula: [46 | 47] cm

Triceps area: [48 | 49] cm

Abdominal: [50 | 51] cm

ANTHROPEMETRY:

Identification: cols 1 - 13

Questionnaire no: 1 | 7

Date: 2 3 | 4 5 | 6 (day | month | year)

Householder's no: 7 8 9

Individual's no: 10 11 12

Farm: 13

Palm Grove 0; CeresD 1; CeresR 2; Bamboo Creek 3; Woodlands 4, Burnleigh 5

Anthropometry: cols 14 - 71

Body weight, kg: 14 15 16 . 17 18

Stature, cm: 19 20 21 . 22

Shoulder height, cm: 23 24 25 . 26

Elbow height, cm: 27 28 29

Dactylon height, cm: 30 31 32

Trochanter height, cm: 33 34 35

Tibial height, cm: 36 37 38

Biachromial diameter, cm: 39 40 41

Shoulder breadth, cm: 42 43 44

Chest breadth, cm: 45 46 47

Waist breadth, cm: 48 49 50

Hip breadth, cm: 51 52 53

Biceps circumference, cm: 54 55 56

Forearm circumference, cm: 57 58 59

Waist circumference, cm: 60 61 62

Buttocks circumference, cm: 63 64 65

Thigh circumference, cm: 66 67 68

Calf circumference, cm: 69 70 71

TREAMENT HISTORY

Identification: cols 1 - 13

Questionnaire no: 1 [8]

Date of original examination: 2 3 4 5 6 [ ][ ][ ][ ][ ] day month year

Householder's no: 7 8 9 [ ][ ][ ]

Individual's no: 10 11 12 [ ][ ][ ]

col 10 - wife no; col 11 - sex, male 0, female 1; col 12 - children of specified sex preferably in order of age.

Farm: 13 [ ]

Palm Grove 0; CeresD 1; CeresR 2; Bamboo Creek 3; Woodlands 4; Burnleigh 5

Bilharzia treatment history: cols 14 - 43

Experimental group: 14 [ ]

Infection(s) detected: 15 [ ]

S.mansoni (sm) 0; S.haematobium (sh) 1; S.mattheei (mh) 2; sm + sh 3; sm + mh 4; sh + mh 5; sm + mh 6.

Oxamniquine; month treated: 16 17 18 [ ][ ][ ] Month Year

weight: 19 20 21 [ ][ ][ ] kg

total dose: 22 23 24 25 [ ][ ][ ][ ] mg

Metrifonate: month treated: 26 27 28 [ ][ ][ ]

29 month 30 year 31 [ ][ ][ ]

weight: kg

total dose: 32 33 34 35 [ ][ ][ ][ ] mg

Evaluation: S.mansoni 36 [ ]

S.haematobium 37 [ ]

S.mattheei 38 [ ]

Cols 36, 37 and 38: not treated 0; failed 1; infection reduced 2; cured 3

Month of retesting: 39 40 41 [ ][ ][ ] month year

Interval; completion of treatment to time of re=testing 42 43 44 [ ][ ][ ] months

HISTORY OF OCCASIONAL ILLNESSES:

Identification: cols 1 - 13

Questionnaire no: 1 [9]

Date of original examination: 2 [ ] 3 [ ] 4 [ ] 5 [ ] 6 [ ]
day month year

Householder's no: 7 [ ] 8 [ ] 9 [ ]

Individual's no: 10 [ ] 11 [ ] 12 [ ]

Col 10 - wife no; Col 11 - sex, male 0, female 1; col 12 - children of specified sex preferably in order of age.

Farm: 13 [ ]

Palm Grove 0; CeresD 1; CeresR 2; Bamboo Creek 3; Woodlands 4, Burnleigh 5

History of illnesses: col 14 - 75

Complaints by signs and symptoms:

	Date:	month:	year:	complaint:	Duration in days:
Episode:	14 [ ]	15 [ ]	16 [ ]	17 [ ]	18 [ ] 19 [ ]
Episode:	20 [ ]	21 [ ]	22 [ ]	23 [ ]	24 [ ] 25 [ ]
Episode:	26 [ ]	27 [ ]	28 [ ]	29 [ ]	30 [ ] 31 [ ]
Episode:	32 [ ]	33 [ ]	34 [ ]	35 [ ]	36 [ ] 37 [ ]
Episode:	38 [ ]	39 [ ]	40 [ ]	41 [ ]	42 [ ] 43 [ ]
Episode:	44 [ ]	45 [ ]	46 [ ]	47 [ ]	48 [ ] 49 [ ]
Episode:	50 [ ]	51 [ ]	52 [ ]	53 [ ]	54 [ ] 55 [ ]
Episode:	56 [ ]	57 [ ]	58 [ ]	59 [ ]	60 [ ] 61 [ ]
Episode:	62 [ ]	63 [ ]	64 [ ]	65 [ ]	66 [ ] 67 [ ]

Diagnoses by WHO categories:

	Category:			
Episode:	68 [ ]	69 [ ]	70 [ ]	71 [ ]
Episode:	72 [ ]	73 [ ]	74 [ ]	75 [ ]

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