

## CHAPTER 5

### RESULTS AND DATA ANALYSIS

#### 5.1 Characteristics of Respondents

We collected the data by interviewing the respondents from 8 hamlets in study area. Supposing we gave the name of hamlets A to H, the numbers of respondents from each hamlet are 33 (33.7%), 4 (4.1%), 3 (3.1%), 9 (9.2%), 12 (12.2%), 12 (12.2%), 18 (18.4%) and 7 (7.1%) respectively. Some socio-demographic characteristics are shown in Table A.1 Appendix 1.

Most of the respondents are male (79.6%). It was rearranged into 5 groups. Age and sex distributions of respondents is shown in Table A.2 Appendix 2. Although there are 5 categories for marital status in the questionnaire our respondents have only 3 categories, viz., married, single and widow/widower. Regarding with level of education, although there are 6 levels of education in questionnaire, the sampled population has only 3, named as illiterate, primary and secondary. Education and sex distribution of respondents is shown in Table A.3 Appendix 2. There are 6 kinds of occupation. They are farmer, general labor, public servant, self-employed, trader and others.

#### 5.2 Utilization of Malaria Diagnosis and Treatment Services

The utilization was expressed in terms of frequencies of use of formal malaria diagnosis and treatment services by the patients within past one year. 19 out of 98 respondents (19.4%) did not use those formal services, although they have attacks of malaria. 55 out of 98 respondents (56.1%) used those services once 17 (17.3%) used twice 6 (6.1%) used thrice and 1 respondent (1%) used those services four times within one year. Total percentage of utilizing those formal malaria services within past one year is 80.3% (Table 5.1). In this table use of services means that those who used the formal malaria services regardless of frequency, we put them under "yes" category and those who never use the formal services are put under "no" category. Frequencies of utilization at the different facilities can be seen in the graph of Figure 5.1.

When we compare the frequencies of attack of malaria during same period 42 (42.9%) respondents have one attack of fever, 27 (27.6%) of them have two attacks, 14 (14.3%) of them have three attacks, 3 (3.1%) have four attacks, 7 (7.1%) have five attacks, 2 (2%), 1 (1%) and 2 (2%) have six, seven and ten attacks respectively Table A.5 Appendix 3. Table A.4 Appendix 3 showed the relationship between utilization of formal malaria services and frequency of malaria attack. The Figure 5.3 showed the relationship between total frequencies of visit and frequencies of malaria attack. It indicates that the highest

frequency of visit occurred in the early attack (first and second attack) of malaria.

Regarding with patterns of utilization we asked about utilization of different health facilities when they suffered from malaria within past one year. Only 14 respondents used both formal malaria services and drug stores/self-treatment. At first they treated malaria attacks themselves by the drugs from drug stores. When the symptoms were not subsided they went and took the treatment at the formal malaria services. When we look at the patterns of utilizations of different facilities within one year, 55.4% used malaria clinic, 17% used village malaria volunteer (VMV), and 7.1% used health center. Some are using more than one facilities for one episode of malaria attack. So total 79.5% of respondents used the formal malaria services. The rests are 17.9% of respondents used drug stores and self-treatment, 0.9% used private clinic of health assistant and 1.8% used hospital services. Those who used the hospital services were referred from malaria clinic because of severe and complicated malaria. There is no one who uses these facilities such as traditional healer, private clinic and private clinic of nurses/midwives (Table 5.2). There is no private clinic in the study area.

The relationship between the utilization of formal malaria services and socio-demographic characteristics has been shown in the Table 5.1. The strong associations between utilization of formal malaria services and perceived quality of service and frequencies of malaria attacks according to regression analysis can be seen in Table A.4 Appendix 3. The perceived quality of service is determined by (i) Regular availability of health personnel (ii) Availability of antimalarial drugs (iii) Good dealing of staffs and (iv) Faithfulness on skill. For severity of disease there is only three rating score, viz, (i) mild (ii) severe and (iii) very severe. Those findings are shown in Table A.4 Appendix 3. Utilization in relation with average distance between home and service points was shown in Table 5.3. Table A.6 Appendix 3 showed the different means of travel to seek care at the formal malaria services.

Table 5.1 Utilization of Formal Malaria Services and Socio-Demographic Characteristics. (N=98)

Socio-demographic Characteristics	Use of services				% of utilization
	Yes		No		
1. SEX	No	%	No	%	
Male	64	65.3	14	14.3	69.3
Female	15	15.3	5	5.1	11.7
2. AGE					
15-24	27	27.6	7	7.1	27.0
25-33	25	25.5	1	1.0	23.3
34-44	12	12.2	4	4.1	14.6
45-58	13	13.3	5	5.1	14.6
59-65	2	2.0	2	2.0	1.5
3. MARITAL STATUS					
Married	59	60.2	16	16.3	61.3
Single	18	18.4	3	3.1	17.5
Widow/Widower	2	2.0	0	0.0	2.2
4. EDUCATION					
Illiterate	46	46.9	12	12.2	43.8
Primary	32	32.7	7	7.1	36.5
Secondary	1	1.0	0	0.0	0.7
5. OCCUPATION					
Farmer	58	59.1	8	8.2	59.1
General Labor	15	15.3	9	9.2	15.3
Public Servant	2	2.0	0	0.0	2.9
Selfemployed	1	1.0	0	0.0	1.5
Trader	1	1.0	2	2.0	0.7
Others	2	2.0	0	0.0	1.5
Total		80.6		19.4	80.3

**Table 5.2 Patterns of Utilization of Different Health Facilities**

Facilities	Frequency	%
1.Malaria clinic	76	55.4
2.Village malaria volunteer	22	16.1
3.Health center	12	8.8
4.Drug store/ Self-treatment	24	17.5
5.Health assistant	1	0.7
6.Others(Hospt)	2	1.5
Total	137	100.0

**Table 5.3 Utilization in Relation to Average Distance to Service Points**

Service points	Distance(Km) (Average)	% of utilization
1.M.C	6.7	55.4
2.V.M.V	1.7	16.1
3.H.C	5.0	8.8
4.Drug store Self-treatment	6.1	17.5
5.H.A	3.0	0.7
6.Others(Hospt)	23.0	1.5
Total		100.0

Utilization of those formal malaria services has been determined according to localities (hamlets). Our study area has 8 hamlets and they have their cumulated incidence for six month but one hamlet has been missing this data. It was shown in Table A.7 Appendix 4.

### 5.3 WTP for Malaria Diagnosis and Treatment Services

We asked about the willingness to pay (WTP) for malaria diagnosis and (WTP) for drug treatment of malaria .From our data analysis, WTP for malaria diagnosis minimum amount is zero. 10 respondents have no willingness to pay for malaria diagnosis and maximum amount is 200 bahts for one episode. The mean WTP for malaria diagnosis is 25 bahts and standard deviation (S.D) is 26.49. Regarding with WTP for drug treatment of malaria the minimum amount is zero by one respondent. The maximum amount is 100 bahts, mean WTP is 31 and S.D is 21.67. Although we asked the reason for why not willingness to pay for malaria diagnosis and treatment separately some person gave the reasons and some did not. The discuss of the reasons will be presented in next chapter.

The following Tables (5.4 and 5.5) show the level of willingness to pay for diagnosis of malaria and drug treatment of malaria. The level will be zero, low and high. The low and high level are arbitrarily demarcated by specific value for each category. In case of WTP for diagnosis 20 Bahts and above will be considered as high, for drug treatment 25 Bahts and above will be considered as high.

TABLE 5.4 Level of WTP for diagnosis and some independent variables

Independent variables	Level of WTP					
	Zero		Low		High	
	No	%	No	%	No	%
1.Hamlet						
A	2	2.0	7	7.1	24	24.5
B	0	0.0	2	2.0	2	2.0
C	0	0.0	1	1.0	2	2.0
D	0	0.0	2	2.0	7	7.1
E	0	0.0	8	8.2	4	4.1
F	0	0.0	7	7.1	5	5.1
G	7	7.1	8	8.2	3	3.1
H	1	1.0	3	3.1	3	3.1
2.Sex						
Male	10	10.2	27	27.6	41	41.8
Female	0	0.0	11	11.2	9	9.2
3.Marital status						
Married	7	7.1	30	30.6	38	38.8
Single	2	2.0	7	7.1	12	12.2
Window	1	1.0	1	1.0	0	0.0
4.Education						
Illiterate	8	8.2	24	24.5	26	26.5
Primary	2	2.0	14	14.3	23	23.5
Secondary	0	0.0	0	0.0	1	1.0
5.Occupation						
Farmer	9	9.2	23	23.5	34	34.7
General labor	0	0.0	15	15.3	9	9.2
Public servant	0	0.0	0	0.0	2	2.0
Self-employed	0	0.0	0	0.0	1	1.0
Trader	0	0.0	0	0.0	3	3.1
Others	1	1.0	0	0.0	1	1.0
6.Debt						
No	4	4.1	7	7.1	21	21.4
Yes	6	6.1	31	31.6	29	29.6
7.Perceived severity						
Mild	2	2.0	10	10.2	14	14.3
Severe	5	5.1	18	18.4	24	24.5
Very severe	3	3.1	10	10.2	12	12.2

Continued table 5.4

Independent variables	Level of WTP					
	Zero		Low		High	
	No	%	No	%	No	%
8.Distance						
1-5 Km	10	10.2	19	19.4	35	35.7
6-10	0	0.0	18	18.4	12	12.2
>10	0	0.0	1	1.0	3	3.1
9.Patient cost						
<30	10	10.2	23	23.5	32	32.7
31-55	0	0.0	13	13.3	13	13.3
>56	0	0.0	2	2.0	5	5.1
10.Drug availability						
No	0	0.0	5	5.1	1	1.0
Yes	10	10.2	33	33.7	49	50.0
Regularity of staff						
No	0	0.0	5	5.1	1	1.0
Yes	10	10.2	33	33.7	49	50.0
Good dealing						
No	0	0.0	5	5.1	1	1.0
Yes	10	10.2	33	33.7	49	50.0
Skill of staff						
No	0	0.0	8	8.2	2	2.0
Yes	9	9.2	30	30.6	49	50.0
11.Travel time						
<1/2 hour	9	11.4	23	29.1	34	43.0
1/2- 2 hour	0	0.0	8	10.1	5	6.3

Table 5.5 Level of WTP for drug treatment of malaria and some independent variables

Independent variables	Level of WTP					
	Zero		Low		High	
	No	%	No	%	No	%
1. Hamlet						
A	1	1.0	4	4.1	28	28.6
B	0	0.0	2	2.0	2	2.0
C	0	0.0	2	2.0	1	1.0
D	0	0.0	5	5.1	4	4.1
E	0	0.0	3	3.1	9	9.2
F	0	0.0	4	4.1	8	8.2
G	0	0.0	11	11.2	7	7.1
H	0	0.0	3	3.1	4	4.1
2. Sex						
Male	1	1.0	26	26.5	51	52.0
Female	0	0.0	9	9.2	11	11.2
3. Marital status						
Married	0	0.0	27	27.6	48	49.0
Single	1	1.0	6	6.1	14	14.3
Widow	0	0.0	2	2.0	2	2.0
4. Education						
Illiterate	0	0.0	24	24.5	34	34.7
Primary	1	1.0	11	11.2	27	27.6
Secondary	0	0.0	0	0.0	1	1.0
5. Occupation						
Farmer	0	0.0	27	27.6	39	39.8
General labor	0	0.0	8	8.2	16	16.3
Public servant	0	0.0	0	0.0	2	2.0
Self-employed	0	0.0	0	0.0	1	1.0
Trader	0	0.0	0	0.0	3	3.1
Others	1	1.0	0	0.0	1	1.0
6. Debt						
No	1	1.0	9	9.2	22	22.4
Yes	0	0.0	26	26.5	40	40.8
7. Perceived severity						
Mild	1	1.0	5	5.1	20	20.4
Severe	0	0.0	14	14.3	33	33.7
Very severe	0	0.0	16	16.3	9	9.2



Continued table 5.5

Independent variable	level of WTP					
	Zero		Low		High	
	No	%	No	%	No	%
8.Distance						
1-5 Km	1	1.0	22	22.4	41	41.8
6-10	0	0.0	11	11.2	19	19.4
>10	0	0.0	2	2.0	2	2.0
9.Patient cost(Bahts)						
<30	1	1.0	24	24.5	40	40.8
31-55	0	0.0	10	10.2	16	16.3
>56	0	0.0	1	1.0	6	6.1
10.Drug availability						
No	0	0.0	1	1.0	5	5.1
Yes	1	1.0	34	34.7	57	58.2
Regularity of staffs						
No	0	0.0	1	1.0	5	5.1
Yes	1	1.0	34	34.7	5	5.1
Good dealing						
No	0	0.0	1	1.0	5	5.1
Yes	1	1.0	34	34.7	5	5.1
Skill of staffs						
No	0	0.0	5	5.1	5	5.1
Yes	1	1.0	30	30.6	57	58.2
11.Travel time						
<1/2 hour	1	1.0	27	27.6	38	38.8
1/2 - 2 hours	0	0.0	10	10.2	3	3.1

Fig. 5.1 Utilization of different facilities

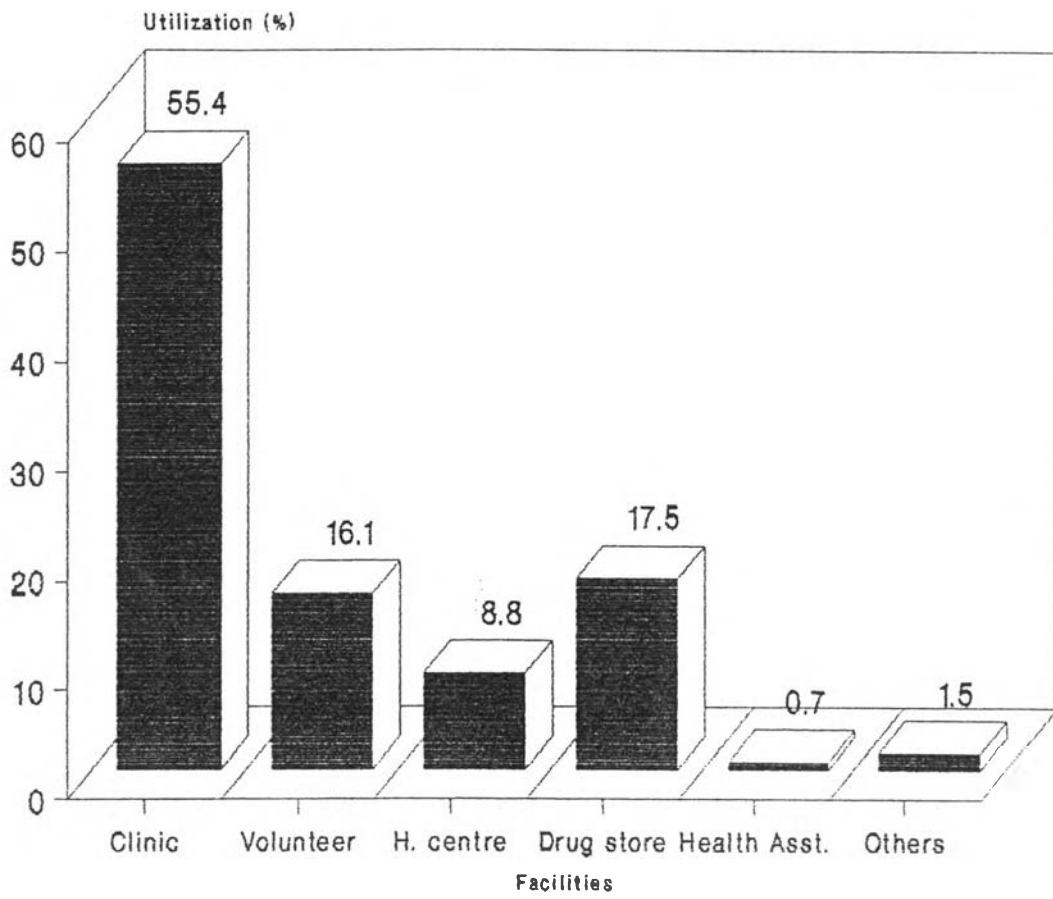


Fig.5.2 Cost Incurred by Patients at Different Facilities

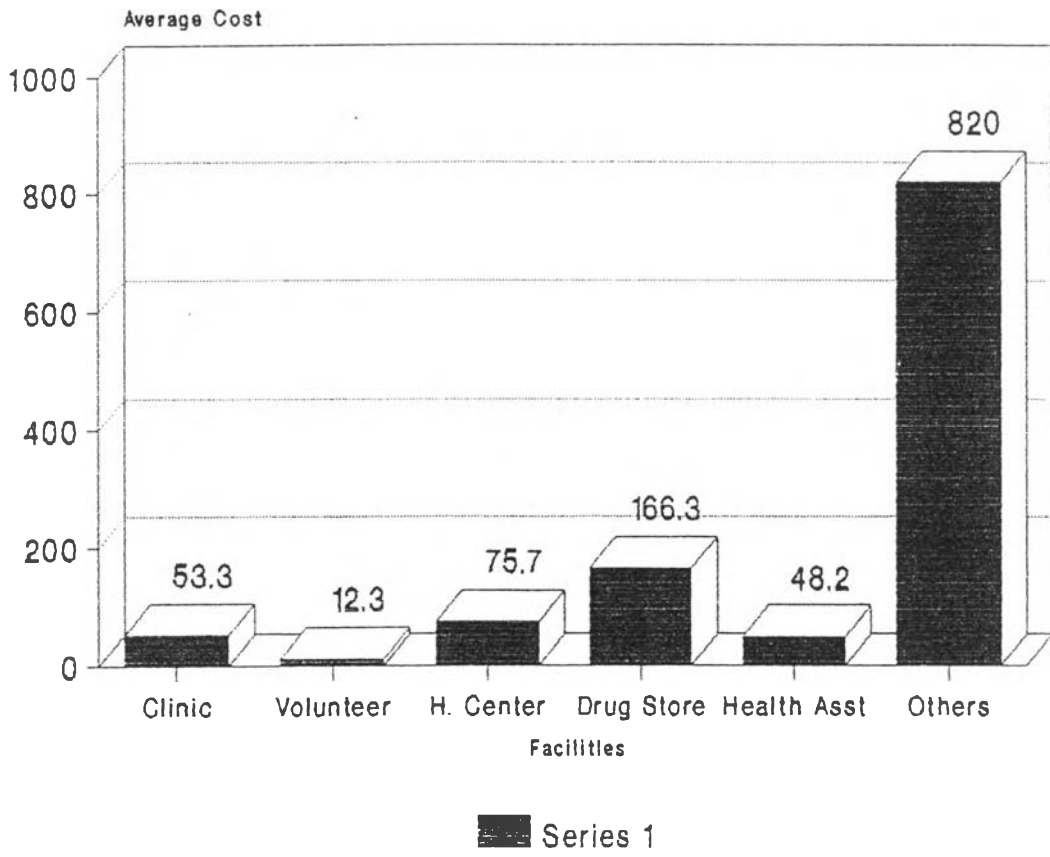
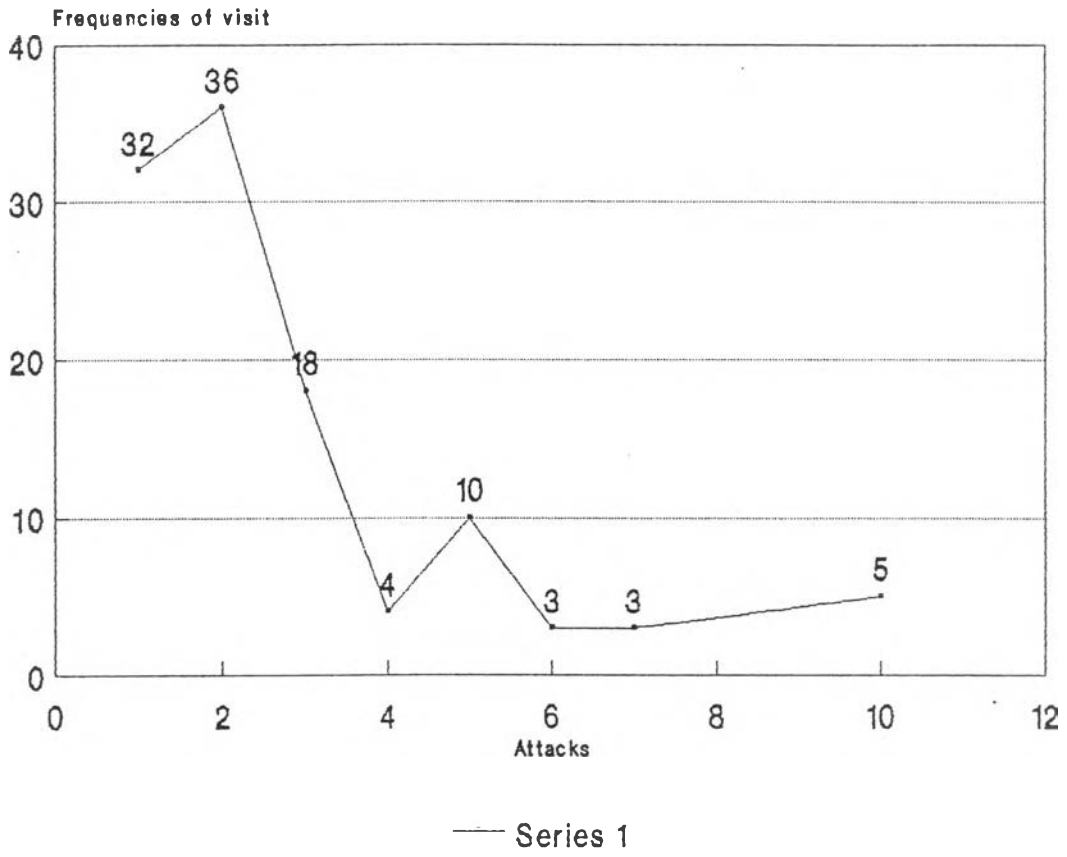


Fig.5.3 Utilization and Frequencies of Malaria Attack



#### 5.4 Cost Incurred by Patients for Treating Malaria

The costs incurred by patients for drugs, diagnosis and consultation for treating malaria is free in Thailand especially in area under the surveillance of malaria control department. But previous studies showed that patients incurred costs such as travel cost, time cost and food cost by both patients and their attendants. In this study the respondents are interviewed about these costs while they are seeking care at the formal malaria services such as malaria clinic, village malaria volunteer and health center. For the time cost, the time spent for treating malaria is converted into money terms by using the minimum wage rate of 90 bahts a 6 hour day in rural area (unpublished source).

For formal malaria services, the total costs incurred by patients for treating malaria included the transportation, food and time costs for both patient and attendant. In our study attendant cost was very small and could be negligible. Most patients attended the those malaria services without accompaniment of their relatives because most of them used the motorcycles. The results are shown in Table A.10 Appendix 6. Among them time cost and travelling cost are covering the larger proportion of costs incurred by patients. The reason for zero value of total patient cost is that they took the treatment of malaria at the village malaria volunteer in their hamlet which is about 12 kilometers away from malaria clinic (station).

It has been shown (Table A.10 Appendix 6) that the minimum amount for total patient costs for seeking care at the alternative services are minimum amount of 20 and maximum amount of 861 bahts (by one respondent). Mean total patient cost is 281. There is a very wide value of standard deviation because only 15 respondents (15.3%) used the alternative malaria services. The one who represented the maximum amount of total cost was a pregnant lady with malaria. During taking treatment she was complicated by abortion and referred to district hospital. The different costs incurred by patients at the different facilities could be seen obviously in the Figure 5.2.

#### 5.5 Factors Influencing the Utilization of and WTP for Formal Malaria Services

The factors influencing the utilization of formal malaria diagnosis and treatment services were explored in accordance with the multiple regression analysis.

The regression analysis was performed by putting many independent variables that are seemed to influence the utilization of those malaria services. Among many independent variables, some of them were removed one by one (step wise) because they were statistically not significant in correlation with dependent variable by looking at the P value according to " T " statistics. There are six independent variables which are statistically significant in relation to dependent variable.

They are sex, total family income per annum, total household consumption per annum, frequency of malaria attacks, patient's cost in using those services and perceived quality of services.

The value of R-squared was 0.4215 and which is not so high. The R-square is coefficient of determination that is a measure of closeness of fit of the sample regression line to the sample observations. The largest R-square may be 1 and which indicates that all of the variations in the dependent variables is explained by the regression. It means that all the observations fall on the regression line. The lower limit of R-square is 0. This result is obtained when the regression line and the line drawn through X are on the same line. In this situation non of the variation in the dependent variables is explained by the regression.

When R-square is large, the regression has accounted for a large proportion of the total variability in the observed values of dependent variables, and we look with favor on the regression equation. On the other hand, a small R-square, which indicates a failure of the regression to account for a large proportion of the total variation in the observed values of dependent variable, tends to cast doubt on the usefulness of the regression equation. We do not, however, pass final judgement on the equation until it has been subjected to an objective statistical test. Such a test is F-stat that is used to test the null hypothesis that

$$\beta_1 = \beta_2 = \dots = \beta_k = 0,$$

That is all independent variables are of no value in explaining the variation in the Y value. In this study, the value of F-stat for this equation is 11.053. If the calculated F value is greater than critical value which can be obtained from the table, we can reject the null hypothesis and accept the alternative hypothesis. In our case, we can look for the critical F value by knowing the numerator degree of freedom (k-1, 5), and denominator degree of freedom (n-k, 92). Thus the critical F value is 2.37 and which is less than calculated F value. Therefore, we can conclude that all independent variables in the regression are of value in explaining the variation in the value of dependent variable. These values of regression analysis were shown in Tables (5.6 & 5.7).

Table 5.6 Factors Influencing the Utilization of Malaria Diagnosis and Treatment Services

Independent variables	Utilization
	$\beta$ (SE $\beta$ )
Constant	0.283 (0.358)
SEX	-0.457 (0.170)**
QC	0.244 (0.072)**
FREQM	0.162 (0.037)**
C	0.005 (0.002)*
THC	4.38E-05 (1.16E-05)**
I	-3.106E-05 (8.117E-06)**

$R^2$  0.4215

n= 98

Adjusted  $R^2$  0.3834

F-stat 11.05

Critical F value 2.37 ( $p < 0.05$ )

$\beta$  = Coefficient of independent variables

SE  $\beta$  = Standard Error of coefficient

SEX = Gender

QC = Perceived quality of care

FREQM = Frequency of malaria within one year

C = Cost incurred by patients

THC = Total household consumption

I = Total household income

\*\* Significantly different from zero at  $\alpha = 0.01$

\* Significantly different from zero at  $\alpha = 0.05$

Table 5.7 Factors Influencing the Willingness to Pay for Malaria Diagnosis and Treatment Services.

Independent variables	Dependent variables	
	WTP for drug treatment	WTP for diagnosis
	$\beta$ (SE $\beta$ )	$\beta$ (SE $\beta$ )
Constant	40.537** (7.298)	6.304 (14.668)
PSI	-10.947** (2.719)	-12.076** (3.488)
NOCHI	2.401* (1.092)	
D	0.705* (0.324)	
C	-0.138* (0.068)	
PC	0.124** (0.046)	0.188** (0.055)
THC	-0.0007* (0.0003)	
I	0.0005* (0.0002)	
SI		16.943* (7.86)

WTP for treatment

R<sup>2</sup> 0.322

Adjusted R<sup>2</sup> 0.269

F-stat 6.112

n= 98

Critical F value= 2.25

at, P <0.05

$\beta$  = Coefficient value of independent variables

(SE  $\beta$ )= Standard error of coefficient value

WTP for diagnosis

R<sup>2</sup> 0.224

Adjusted R<sup>2</sup> 0.199

F-stat 9.068

n = 98

Critical F value = 3.15

at, P <0.05

PC = Provider cost of malaria diagnosis which was thought by respondents

C = Cost incurred by the patient

PSI = Perceived severity of malaria

SI = Actual severity of malaria according to symptoms

NOCHI= No. of children in a family

D = Distance between home and service point

THC = Total household consumption

I = Total household income

\*\* Significantly different from zero at  $\alpha$  = 0.01

\* Significantly different from zero at  $\alpha$  = 0.05



There are also the tables which showed the proportion of respondents who have different levels of amounts of WTP for malaria diagnosis and treatment in relation to numbers of children (Table A.12 & A.13 Appendix 6) and in relationship with their perceived provider costs for malaria treatment (Table A.14 & A.15 Appendix 6).

### 5.6 Ability to Pay

A score index for ability to pay (ATP) was made by consideration of the respondents' possessions such as truck, radio/cassette, sewing machine, television, motorcycle, ploughing machine, conditions of their houses and roof and presence or absence of debts (Table A.8 Appendix 5). The minimum total score is 3 and maximum score is 15. Table A.9 Appendix 5, showed the ATP scores in relation to numbers of respondents. Table A.11 Appendix 6, also showed the average WTP for diagnosis, treatment and both for treating malaria in relation to ATP scores. The regression analysis showed no significant relationship between WTP and ATP. It will be discussed in next section.