



## CHAPTER V RESULTS AND DISCUSSIONS

According to the methodology outlined in the previous chapter, 300 people who are suitable as research design were interviewed basing on questionnaire. A selected team was established with the aim is to support to collect data. The data was collected from 15 to February, 30 in Thaibinh City. This chapter will show research results and discuss about results to answer research questions, objectives exposed in the first chapter of this study.

### 5.1 Data Description

Table 5.1 Knowledge and WTP description

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
KNOWLEDGE	300	40%	100%	80.55%	12.37%
WTP	300	0	20	6.1367	3.5899

In relation to knowledge of people about HIV/AIDS and WTP for HIV counseling and testing service showed that people interviewed can correctly answer 80.55% questions in the questionnaire and knowledge of people about HIV/AIDS varied from 40.00% to 100% of the questionnaire's content. WTP for HIV counseling and testing service ranged from 0 to 20,000 VND with the mean of WTP was 6,137 VND (*see Table 5.1*).

Table 5.2 Education, income and age description

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Education	300	4	17	10.79	2.618
Income	300	100	2400	640	331.183
Age	300	19	49	29.93	7.315

Table 5.3 Frequency of gender and living place

		Frequency	Percent
Gender	Male	154	51.30%
	Female	146	48.70%
	Total	300	100%
Living place	Urban	165	55%
	Rural	135	45%
	Total	300	100%

Table 5.4 Distribution of gender classified by education level

GENDER	EDUCATION LEVEL			
	Mean	N	Std. Deviation	% of Total N
Female	10.51	146.00	2.48	48.67
Male	11.07	154.00	2.72	51.33
Total	10.80	300.00	2.62	100.00

From the table 5.2; 5.3 and 5.4, the proportion of male in the sample size was a little higher than female (51.33% and 48.67%) with the mean of age was 29.93 years old (Range from 19 to 49). The educational level was the number of year of schooling that people got education; mean of its was 10.79 years and range from 4 to 17 in which the educational level of male was little higher than female. Income ranged from 100,000 VND to 2,400,000 VND with the average of monthly income was 640,000 VND.

Concerning with the living place, 45.00% of people interviewed were living in rural area and 55.00% were living in urban area with the mean of income was 640,000 VND per month (*see Table 5.5*) and income of people ranges from 100,000 to 2,400,000 VND, in which income of people was listed as 3 following groups: group 1 was people who had income less than 400,000 VND per month; group 2 was people who had income from 400,000 VND to 700,000 VND and group 3 was people who had income more than 700,000 VND per month. There were 26.00% of respondents ranked in group 1; 46.67% of respondents ranked in group 2 and 27.33% of respondents ranked in group 3 (*see*

Table 5.6). That means 26.00% of respondents are the poor and most of them were living in rural area. The sources of income were variety in which most of respondents got income from salary, agriculture and trading (91.3%) (See table 5.7)

Table 5.5 **Distribution of living place classified by income**

LIVING PLACE	INCOME			
	Mean	N	Std. Deviation	% of Total N
Rural	507.78	135.00	206.96	45.00
Urban	748.18	165.00	372.57	55.00
Total	640.00	300.00	331.18	100.00

Table 5.6 **Income group description**

INCOME GROUP	FREQUENCY	PERCENT
Group 1	78	26.00
Group 2	140	46.67
Group 3	82	27.33
Total	300	100

Table 5.7 **Sources of income**

SOURCE OF INCOME	FREQUENCY	PERCENT
Salary	146	48.70%
Agriculture	64	21.30%
Trading	64	21.30%
Outside support	15	5.00%
Supplement benefit	10	3.30%
Other	1	0.30%
Total	300	100.00%

In Table 5.8 Group 1 (Low income group) had lowest education, knowledge about HIV and WTP. Inversely, high income (group 3) had highest education, knowledge about HIV/AIDS and WTP. The differences between three groups of income in terms of education, knowledge and WTP were very statistically significant (P values <0.001) (See Table 5.9)

**Table 5.8 Mean of education level, knowledge and WTP classified by income groups**

INCOME GROUP		EDUCATIONAL LEVEL	KNOWLEDGE	WTP
Group 1	Mean	8.45	68.00%	3.04
	N	78.00	78	78.00
	Std. Deviation	2.20	11.00%	1.62
Group 2	Mean	10.68	81.00%	5.31
	N	140.00	140	140.00
	Std. Deviation	1.92	9.00%	1.51
Group 3	Mean	13.23	91.00%	10.49
	N	82.00	82	82.00
	Std. Deviation	1.75	6.00%	3.40
Total	Mean	10.80	81.00%	6.14
	N	300.00	300	300.00
	Std. Deviation	2.62	12.00%	3.59
	% of Total N	100.00	100%	100.00

**Table 5.9 Comparison between income groups**

	F Stat.	P value
EDUCLEVEL * INCOMEGROUP	120.616	0.000
KNOWLEDGE * INCOMEGROUP	133.471	0.000
WTP * INCOMEGROUP	244.098	0.000

There were some channels that provided information related to HIV counseling and testing service in Thaibinh City. Most of people (86.33%) interviewed in this study have ever heard about this service, there was still 13.67% respondents have not heard about this service before. Most of people who have ever heard about this service received information from television and health personnel (63%) (See Table 5.10).

Table 5.10 Channels provided information about VCT service

	FREQUENCY	PERCENT
Friend	26	8.67
Health personnel	92	30.67
Newspaper	31	10.33
Other	6	2.00
Radio	7	2.33
Television	97	32.33
Don't know*	41	13.67
Total	300	100.00

Note: Don't know that means respondents interviewed have not ever heard about this service before.

When compare means of income, educational level, WTP and knowledge between male and female, data showed (Table 5.11 and 5.12): There was a significant difference between two groups in terms of income ( $P= 0.001$ ), knowledge ( $P= 0.007$ ) and WTP for HIV counseling and testing service ( $P=0.000$ ). On average, male have higher knowledge, can earn more money and were willing to pay more money than female for VCT service. Male have higher education than female, but the difference was not statistically significant ( $P=0.62$ ) at 95% of confidence.

Table 5.11 Mean, Std. Deviation of gender classified by educational level, knowledge, income and WTP

	Male (N=154)		Female (N=146)	
	Mean	SD	Mean	SD
EDUCLEVEL	11.07	2.72	10.51	2.48
KNOWLEDGE	82.00%	12.00%	79.00%	13.00%
INCOME	702.27	404.16	574.32	212.96
WTP	7.04	4.01	5.18	2.8

Table 5.12 Comparison means between two groups of gender

	F stat.	P value
EDUCATION LEVEL * GENDER	3.516	0.062
KNOWLEDGE * GENDER	7.270	0.007
INCOME * GENDER	11.584	0.001
WTP * GENDER	21.351	0.000

Data also showed the significant difference between people interviewed in urban and rural area in terms of educational level, knowledge about HIV/AIDS, income and WTP for VCT service because all P values of F test of all pairs in Table 5.14 are less than 0.01. These mean people in urban area have higher educational level, knowledge, income and they are willing to pay more than people in rural area.

Table 5.13 Mean, Std. Deviation of living place classified by educational level, knowledge, income and WTP

	Rural (N=135)		Urban (N=165)	
	Mean	Std. Deviation	Mean	Std. Deviation
EDUCLEVEL	9.98	2.8	11.47	2.26
KNOWLEDGE	76.00%	14.00%	84.00%	10.00%
INCOME	507.78	206.96	748.18	372.57
WTP	4.49	2.51	7.48	3.78

Table 5.14 Comparison means between two groups of living place

	F VALUE	P VALUE
EDUCLEVEL * LIVINGPLAC	26.035	0.000
KNOWLEDGE * LIVINGPLAC	38.537	0.000
INCOME * LIVINGPLAC	44.864	0.000
WTP * LIVINGPLAC	62.317	0.000

There were differences between age groups in terms of knowledge, WTP, educational level and income. In this study age of respondents was divided into three groups. Group 1 included people from 19-29 yrs, group 2 included people from 30-39 yrs and group 3 included people from 40-49 yrs. In term of knowledge about HIV/AIDS group 3 had highest knowledge (84.56%). Group 3 was willing to pay most for HIV/AIDS counseling and testing service (8,030 VND) and also had highest educational level (11.94 yrs) and income (919,120 VND). (See Table 5.15)

**Table 5.15 Distribution of knowledge, WTP, educational level and income by age groups**

AGE GROUP		EDUCLEVEL	KNOWLEDGE	INCOME	WTP
19-29 yrs	Mean	10.49	78.99%	565.98	5.51
	N	169.00	169.00	169.00	169.00
	Std. Deviation	2.52	0.12	285.95	3.28
	% of Total N	56.52	56.52	56.52	56.52
30-39 yrs	Mean	10.92	81.76%	663.54	6.48
	N	96	96	96	96
	Std. Deviation	2.33	0.11	287.04	3.34
	% of Total N	32.11	32.11	32.11	32.11
40-49 yrs	Mean	11.94	84.56%	919.12	8.03
	N	34	34	34	34
	Std. Deviation	3.48	0.14	461.39	4.64
	% of Total N	11.37	11.37	11.37	11.37
Total	Mean	10.79	80.52%	637.46	6.11
	N	299	299	299	299
	Std. Deviation	2.62	0.12	328.79	3.56
	% of Total N	100.00	100.00	100.00	100.00

The differences between these groups in terms of knowledge, WTP, educational level and income were statistically significant because all of P values were less than 0.05 (see Table 5.16).

Table 5.16 Comparison means of three groups of age

	F TEST	P VALUE
EDUCLEVEL * AGEGROUP	4.653	0.010
KNOWLEDGE * AGEGROUP	3.638	0.027
INCOME * AGEGROUP	18.772	0.000
WTP * AGEGROUP	8.255	0.000

## 5.2 Factors affecting knowledge about HIV/AIDS of people in Thaibinh City

In order to establish a model that describes the relationship between knowledge and socioeconomic factors of people, some necessary characteristics of 300 respondents were collected to analyze the association between these variables, which were gender, age, educational level, living place and income.

Use ordinary least square method (OLS) to estimate values of coefficients and other indicators. The results were listed as below:

Table 5.17 OLS estimated for Knowledge about HIV/AIDS

	COEFFICIENTS	T stat.	SIG.
(Constant)	0.121	2.013	0.0450*
AGE	0.000	0.613	0.5402
GENDER	0.015	2.116	0.0351*
LIVING PLACE	0.018	2.304	0.0219*
EDUCATION LEVEL	0.033	16.430	0.0000**
Log(Income)	0.051	3.880	0.0001**

Dependent Variable: KNOWLEDGE

R Square: 0.7721

Adjusted R Square: 0.7682

F: 199.20; P: 0.0000

\*;\*\* significant at 95%, 99% respectively



In the Table 5.17, the value of R Square was 0.7721 that means 77.21% of independent variables can explain for dependent variable, the other of 22.79 % should be needed to be modified by error term. Value of F test was 199.20 with  $P < 0,01$  this means all coefficients in above regression model were not equal to zero simultaneously or in other word dependent variable depended on some independent variables. Adjusted R Square was equal to 0.7682 it means all independent variables could explain 76.82% for dependent variable if insignificant variables were rejected from model and degree of freedom would be set off.

Coefficients of Age variables were not significant at 95% of confidence because P values  $> 0.05$  that means Knowledge about HIV/AIDS people did not depend on Age in other word Age did not affect to Knowledge about HIV/AIDS of people.

Because Age variable was insignificant so I excluded it from the model and re-estimate by using OLS. The final result of regression could be rearranged as below:

$$\begin{aligned} \text{KNOWLEDGE} = & 0.132 + 0.033 \text{ EDUCATION LEVEL} + 0.016 \text{ GENDER} + 0.020 \text{ URBAN} + \\ & \textit{T-stat.} \quad (2.28) \quad (16.91) \quad (2.26) \quad (2.63) \\ & + 0.047 \text{ Log(Income)} + e \\ & \quad (4.10) \end{aligned}$$

R Square = 0.7718

Adjusted R Square = 0.7687

F stat. = 249.43, P = 0.0000

In this model constant was statistically significant. Variable of Educational level also was very significant with P value  $< 0.01$ , basing on this coefficient we concluded that knowledge of people about HIV/AIDS depended on educational level and because of the sign of coefficient was positive that means when educational level of people increased also knowledge about HIV/AIDS of people increased. In this model when educational level of respondents interviewed increased one year knowledge about HIV/AIDS of them would increase 3.3% with the condition was other independent variables are constant. In this model educational level was a very important variable, this result was the same with other studies, same with real condition.

Gender was used under dummy variable with female considered as the base. There was statistically difference between male and female in term of knowledge about HIV/AIDS. In this model male have 1.6% knowledge higher than female.

Living place variable also was a dummy variable with rural area as the base. Coefficient of Urban variable was significant with P value  $< 0.05$ . Sign of coefficient was positive it means the knowledge of people in urban area was 2.0% higher than rural area. In fact the knowledge of people in rural and urban areas exposed in previous part were higher the number estimated in this regression model the reason caused by errors and affected by the combination of other variables in the model.

Income in this model used in natural logarithm form with the aim is to describe the change in percentage of income. Coefficient of income was significant at 95% of confidence because P value  $< 0.05$  and the sign of coefficient was positive, it means income could increase knowledge about HIV/AIDS of people. In this case when income increased one percent, Knowledge would increase 4.7% with the condition was other independent variables are constant.

In order to forecast what level of income (with condition of other independent variables were held constant) can reach knowledge about HIV/AIDS of people to 100% we can use above model to estimate as follow:

When income increased 1%, knowledge of people would increase 4.7%. In order to knowledge about HIV/AIDS of people reached from 80.52% (average level) to 100% need 19.48% added. So the percentage of income is added to make knowledge increasing from 80.52% to 100% equal:  $19.48\%/4.7\% = 4.14\%$ . From the average value of income we can calculate the absolute amount of money need to add so that knowledge could reach to 100% is  $4.14\% * 637,460 + 637,460 = 663,851\text{VND}$ .

So in order to increase knowledge of people about HIV reach to 100%, the income per month of people need to increase to from 637,460 VND to 663,851 VND on average.

### 5.3 Factors affecting WTP for HIV/AIDS counseling and testing service in Thaibinh City

Model expressed factors that affected to WTP included WTP for Counselling and Testing Service as dependent variable and characteristics of people were independent variables which were expected Knowledge (Knowledge) about HIV/AIDS, Gender, Living place, Income, Educational level and Age.

To avoid high correlated between independent variables, two-stage least square was used to estimate the model. Because, standard linear regression models assume that errors in the dependent variable are uncorrelated with the independent variable(s). When this is not the case (for example, when relationships between variables are bidirectional), linear regression using ordinary least square (OLS) no longer provides optimal model estimates. Two-stage least squares regression uses instrumental variables that are uncorrelated with the error terms to compute estimated values of the problematic predictor(s) (the first stage), and then uses those computed values to estimate a linear regression model of the dependent variable (the second stage). Since the computed values are based on variables that are uncorrelated with the errors, the results of the two-stage model are optimal.

Table 5.18 Two-stage least squares (TSLs) estimated for WTP

	COEFFICIENTS	T stat.	SIG.
(Constant)	-26.56	-14.374	0.000**
EDUCATION LEVEL	0.19	2.264	0.024*
Knowledge	3.81	2.145	0.033*
AGE	0.025	1.462	0.145
GENDER	1.27	5.851	0.000**
LIVING PLACE	1.14	4.694	0.000**
Log(Income)	4.02	9.906	0.000**
Dependent Variable: WTP			
R Square: 0.7504			
Adjusted R Square: 0.7453			
F: 146.80; P: 0.000			
*,** Significant at 95%, 99% respectively			

Table 5.19 Correlation Matrix of Parameter Estimates

	Age	Gender	Knowledge	Educ	Logincome	Place
Age	1	-0.07187	0.167144	0.175631	0.402365	-0.09808
Gender	-0.071874	1	0.154324	0.107987	0.126267	-0.07641
Knowledge	0.167144	0.154324	1	0.762492	0.728742	0.338395
Educ	0.175631	0.107987	0.762492	1	0.7414	0.283454
Logincome	0.402365	0.126267	0.728742	0.7414	1	0.372031
Place	-0.098076	-0.07641	0.338395	0.283454	0.372031	1

In this model R Square was equal to 0.7504 it means 75.04% of dependent variable could be explained by combination of independent variables. All coefficients were not equal to zero simultaneously because F value was very significant ( $P < 0.01$ ) that mean we can rejected Null Hypothesis ( $\beta_i = 0$ ), so Alternative Hypothesis ( $\beta_i \neq 0$ ) was accepted.

Constant was very significant with the negative value; it told us that if knowledge, education and income were equal to zero simultaneously, WTP would be -2,656 VND this value was impossible or in other word it meant the case of person with no knowledge, no income, no education level would not exist. In this model, in order to be willing to pay for HIV/AIDS counseling-testing service people had to have knowledge, income and education at given level.

All coefficients excepting age variable were very statistically significant because P values were less than 0.05; so that Willingness to Pay for HIV Counseling and Testing Service depended on significant variables listed on above model.

The sign of educational level variable was positive, it means education level could increase WTP, in this case when educational level of respondents increased one year WTP of them would increased 190 VND.

Similarly, Knowledge about HIV could increase WTP also, when Knowledge increased one percent WTP would increase 3,810 VND.

For Gender, there was a significant difference between male and female in term of willingness to pay for HIV Counseling and Testing Service. On average Male was willing to pay 1,270 VND more than female.

People living in urban area were willing to pay 1,140 VND than people in rural area and when income increased one percent WTP increased 4,020 VND.

Basing on estimated coefficient detailed regression could be written as below:

$$\text{WTP} = -26.56 + 0.19 \text{ EDUCATION LEVEL} + 3.81 \text{ KNOWLEDGE} + .025 \text{ AGE} + 1.27 \text{ GENDER} + 1.14 \text{ URBAN} + 4.02 \text{ Log(Income)} + e$$

In order to forecast how much of income added to increase willingness to pay of people for HIV counseling and testing service to the maximum value (with condition of other independent variables were held constant) we can use above model to estimate as follow:

When income increased 1% WTP would increase 4,020 VND. In order to WTP for VCT service reached from 6,140 (average level) to 20,000 VND (maximum value) need 13,860 VND added. So the percentage of income is added to make WTP increasing from 6,140 to 20,000 equal:  $20,000/6,140 = 3.26\%$ . From the average value of income we can calculate the absolute amount of money need to add so that WTP could reach to 20,000VND is  $3.26\% * 637,460 + 637,460 = 655,241$  VND.

So in order to increase knowledge of people about HIV reach to 20,000 VND, the income per month of people need to increase from 637,460 VND to 655,241 VND on average.

#### **5.4 Discussion:**

Table 5.17 (OLS estimated for Knowledge about HIV/AIDS) and 5.18 (Two-stage least squares estimated for WTP) showed the results of regression analysis. Both models indicated that age did not affect to knowledge about HIV/AIDS and WTP for VCT of people. This result was the same with some previous researches implemented in Vietnam and other countries. Because, HIV/AIDS is a global epidemic, every one can be

infected regardless of age, gender, race, educational level etc... It also proved that unlikely old people had higher knowledge about HIV/AIDS than young people, inversely in particular cases young people had better knowledge and they may had better skill of HIV/AIDS prevention than old people. Similarly, WTP for VCT did not depend on age of customers. The difference of age between customers did not affect to willingness to pay for particular goods and service in this case was VCT service.

In the model illustrated the factors affecting knowledge about HIV/AIDS of individual indicated that educational level and income were very important factors and they had a positive strong relationship with knowledge. Clearly, people with high education should be good at knowledge in many fields including HIV issue. In this study, most people with high education were government officers. Basing on this information we found that education and communication about HIV/AIDS through official channel might play an important role in improvement the knowledge about HIV/AIDS for officers. Obviously, the self finding and self studying of people about HIV/AIDS could be the key for their knowledge but we could not disclaim the role of mass media in term of education and communication about HIV/AIDS especially in the office. Simultaneously, income affected strongly to not only knowledge about HIV/AIDS but also many other issues. When the income of people did not meet their essential need, people would ignore social issues because they had to focus on earning money to feed their families and themselves although that was global issue like HIV/AIDS. Inversely, when income could meet their need they would care about related thing and had chance to improve their knowledge by joining education course, workshop and they were able to pay and were willing to pay more than female for the service that could improve their knowledge about HIV/AIDS like VCT service.

We could see the difference between male and female in terms of knowledge about HIV/AIDS and WTP for VCT. In this study, male had higher knowledge and were willing to pay more than female. These convinced that female may not have much chance to access mass media and service provided knowledge about HIV/AIDS because their time were occupied by taking care children, housewife and other things related to family. Concurrently, knowledge about HIV/AIDS could illustrate the un-equity of gender in

society especially developing societies with the un-favor to female. There were many evidences showed the high risk with HIV in male and WTP for VCT would become a proxy to support the conclusion that the risk of male about HIV was higher than female nowadays basing on the statistics of WTP male was higher than female. The existing question is why the knowledge about HIV of male was higher than female but male infected more than female. The answer is, right now in Vietnam and also in Thaibinh City most of HIV infected persons are injecting drug user (78.5%-Do Huy Giang, 2001) and most of drug user are male, that why the number of infected people in male is higher than in female.

We always agree that there are gaps between urban and rural areas in term of living standard, wealthy and poverty, education, availability of good and service including the knowledge about HIV/AIDS and WTP for VCT. These proved that education and communication about HIV/AIDS did not reach to rural area or the way of information providing was not suitable in rural area. The ability of health personnel in rural area had many limitations especially the skill of providing prevention knowledge about HIV/AIDS to target groups. The allocation of budget also had an important role in making the gaps between rural and urban area. Some socioeconomic factors listed above especially knowledge about HIV/AIDS were favoured to urban area, but why the number of HIV infected people in urban was higher in rural, because most of social evils such as drug use, prostitute, homosexual relation were focused on urban rather rural area. These social evils are accompanied with HIV in every society including Vietnam.