CHAPTER IV

RESEARCH RESULTS

4.1 Descriptive of dependent and independent variables

There were a total of 637 HIV infected TB patients identified in An Giang for the study period. This includes 133 patients in 2001, 159 in 2002, 163 in 2003 and 178 in 2004 (Figure 3).
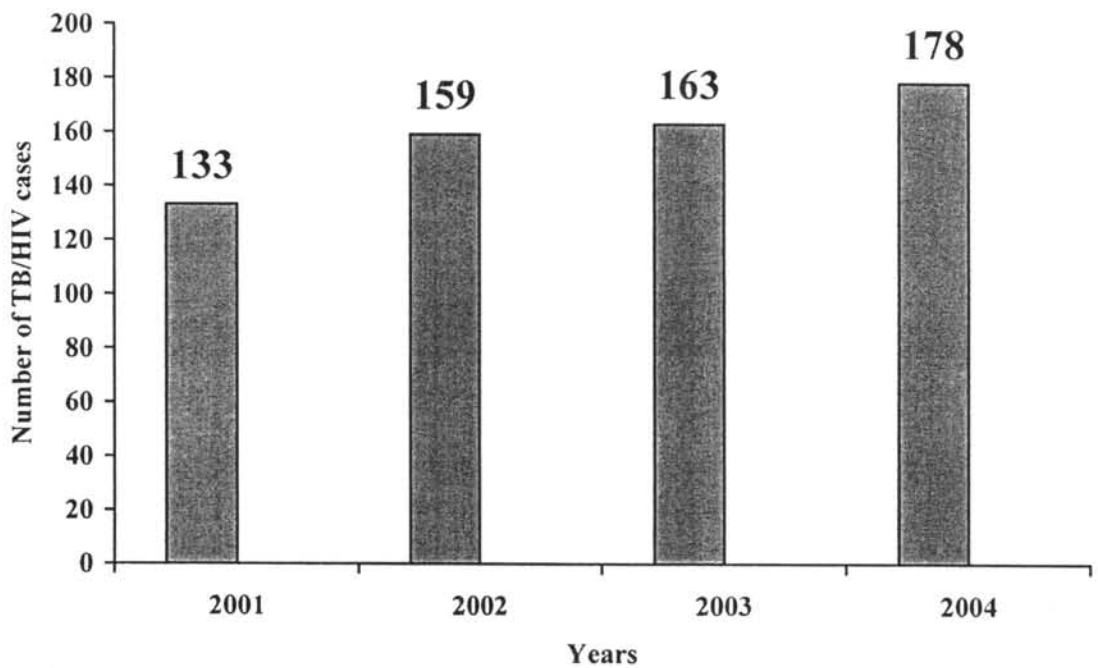

Figure 3 Number of HIV-infected TB patients in An Giang from 2001 to 2004.

The median age of the HIV-infected TB patients was 32, range 15-78 years. The majority of the patients were male (79%), their major age groups were from 25 to 44 (74%). Most of them had low income jobs (farmer and unskilled worker) or no jobs (55%), and more than half of them had secondary education level (64%). Forty seven percent of them were married. Eighty percent of them were Vietnamese; 3% was Chinese. Sixty seven percent of them were Buddhist, 5% Protestant, and 4% Christian. Twenty six percent of them were from urban area (Long Xuyen city and Chau Doc town). Thirty five percent of the patients reported that they had been clients of a commercial sex workers (CSWs), 11% were injecting drug users (IDUs). Eighty one percent had HIV related symptoms at the time of HIV diagnosis that could be weight loss, fever, diarrhea, tuberculosis, candidasis, and others (Table 3).

Table 3 Demographic characteristics of HIV-infected TB patients (n=637), An Giang province, 2001-2004

Characteristic	n	(%)
Age: Mean, Median, Min - Max		
34, 32 (15-78)		
Sex		
Male	502	79
Female	135	21
Age group		
15-24	67	11
25-34	320	50
35-44	155	24
45-54	71	11
55-64	13	3
65 or older	5	1
Occupation		
Farmer	107	17
Worker (any type)	50	8
Driver	36	6
Unemployed*	185	30
Other (soldier, public servant and scholar)	140	22
Missing	119	19
Marital Status		
Married	300	47
Single	144	23
Divorced	33	5
Separate	30	5
Widowed	13	2
Missing	117	18
Ethnicity		
Vietnamese	507	80
Chinese	13	3
Khmer	1	<1
Missing	116	18
Religion[5]		
None	25	4
Buddhist	426	67
Christian	23	4
Protestant	2	<1
Other	35	5
	126	20

Table 3 (continued)

Characteristic	n	(%)
District	<u>167</u>	<u>27</u>
Urban	105	17
Long Xuyen	62	10
Chau doc	<u>470</u>	<u>73</u>
Rural	42	7
An phu	77	12
Chau Phu	39	6
Chau Thanh	61	9
Cho Moi	90	14
Phu Tan	83	13
Tan Chau	24	4
Thoai Son	41	6
Tinh Bien	12	2
Tri Ton		
HIV transmission route		
Homosexual	3	<1
Sex with commercial sex worker	221	35
Sex with stable partner	84	13
Sex with multiple partner	34	5
Injection drug user	67	11
HIV-infected mother	11	3
Missing	217	34
Reported presence of HIV symptoms at time of HIV diagnosis		
Yes	514	81
No	7	1
Missing	116	18

* if they had no job, were a housewife, or were intermittently employed

The prevalence of HIV-infected TB patients per 100,000 population was higher in urban areas. It increased in urban areas from 2001-2003 (10-13 per 100,000 population) then declined slightly in 2004 (12 per 100,000 population). It was stable in rural areas from 2001-2003, then increased slightly in 2004 (Figure 4).

Among the HIV-infected TB patients, 7% of them had history of tuberculosis. Eighty-three percent was diagnosed as TB smear-positive, 5% smear-negative, and 12% as extra pulmonary TB. Of the 77 cases of extra pulmonary TB, 76% was pleural TB, 10% was TB lymphadenitis. Ninety two percent was new TB cases, 7% had previous TB treatment. Ninety five percent had cough, 70% had fever and 54 % had weigh loss symptoms at the time of TB diagnosis. Eighty eight percents of all the patients was prescribed common TB treatment regiment that included 2 months of Isoniazid (H), Ethambutol (E), Pyrazinamid (Z) and Rifampicine (R) and 6 month of
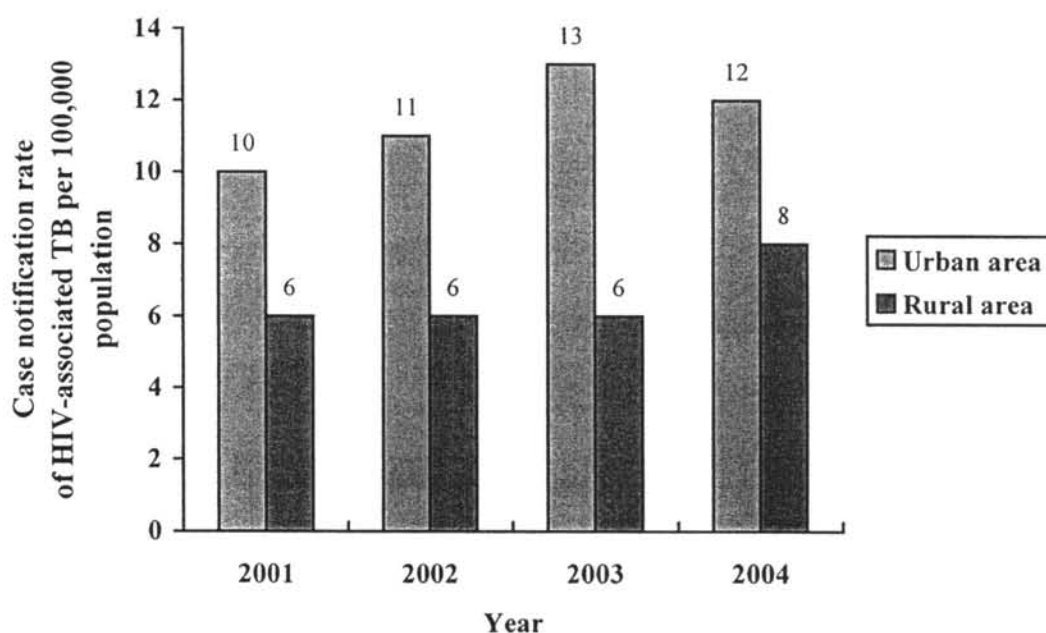

Figure 4 Number of HIV-infected TB patients stratified by urban vs. rural area of residence and by year from 2001 – 2004 in An Giang province.

HE with strict directly observed therapy (DOT). This regiments use for patients diagnosed pulmonary TB. Other TB treatment regimens prescribed for extra-pulmonary and retreated patient. Within the common TB treatment regimen, the

patients were followed-up by health care workers at commune health centers for the entire 8 months of TB treatment. Only 1% of the patients had adverse events during TB treatment (such as skin rash, peripheral neuropathy, abdominal pain, jaundice and others). Seventy one percent of all the patients were used Cotrimoxazole for Prophylaxis Therapy (CPT) and only less than 1% had ever used anti retrovirus for TB treatment. (Table 4).

Table 4 Clinical characteristics of HIV-infected TB patients (n=637), An Giang

Province, 2001-2004

Characteristic	n	%
History of TB		
Yes	47	7
No	582	92
Missing	8	1
Case start		
Pulmonary smear (+)	530	83
Pulmonary smear (-)	30	5
Extra pulmonary	77	12
. GI TB	2	3
. Miliary TB	1	<1
. Peritoneal TB	2	3
. Pleural	1	<1
. Pleural TB	57	76
. TB lymphadenitis, cervical	2	3
. TB lymphadenitis, site not specified	8	10
. TB meningitis	2	3
. Others	2	3
Characteristic	**n**	**%**
Symptoms at TB diagnoses		
Cough	605	95
. Missing	29	5
Fever	447	70
. Missing	188	30
Weightloss	347	54
. Missing	288	46
TB treatment regiment		
Common (2HRZE/6HE)	562	88
Others	70	11
Missing	5	1
CPT used		
Yes	454	71
No	47	7
Missing	136	22

Table 4 (Continued)

Characteristic	n	%
ARV treatment		
Yes	2	<1
No	415	65
Missing	220	34
Adverse even during TB treatment		
Yes	4	1
No	633	99
Final TB treatment outcome		
Successful treatment outcome	451	71
Cure	373	59
Treatment completed	78	12
Unsuccessful treatment outcome	6	1
Failure	166	26
Died	9	1
Default	3	1
Transfer out		

Successful treatment rates were consistently low (p=0.30 from trend analysis) among the HIV and TB co-infection patients, ranging from 68% to 75% for the years studied and the case fatality rate (CFR) was 26% during 2001-2004 (assessed at the end of the cohort period) (figure 5).
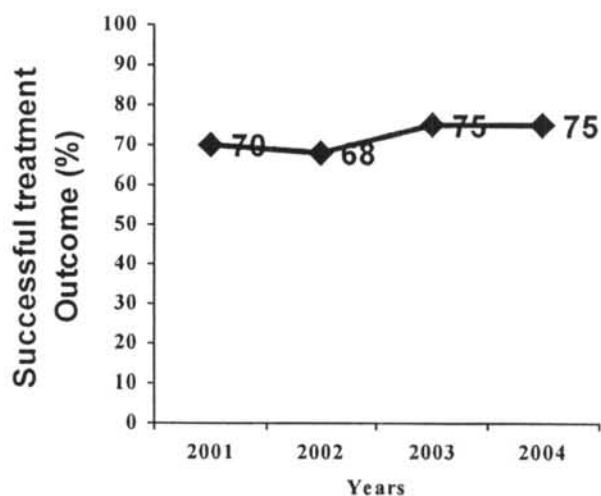

Figure 5 Trend in TB treatment outcome for HIV-infected TB patients from 2001 – 2004.

4.2 Association between factors and unsuccessful TB treatment outcome

Patients who used Co-trimoxazole Prophylaxis Therapy were less likely to have unsuccessful treatment outcome (RR 0.4; 95% CI, 0.3-0.5). Patients had adverse event during TB treatment were more likely to have unsuccessful TB treatment outcome (RR 2.64; 95% CI, 1.48-4.7). The Co-trimoxazole prophylaxis therapy and adverse event during TB treatment were the only two factors statistically significantly associated with unsuccessful treatment outcome.

Other insignificant factors were as follow. Male was associated with unsuccessful TB treatment outcome (Relative Risk [RR] 0.8; 95% Confident Interval [CI], 0.6-1.1). Age group between 45-54 year old was more likely to have unsuccessful TB treatment outcome (RR 1.28; 95% CI, 0.9-1.9). High school or higher education level was less likely to have unsuccessful treatment outcome (RR 0.84; 95% CI, 0.47-1.50). Patients from rural area were less likely to have unsuccessful treatment outcomes (RR 0.88; 95% CI 0.60-1.10). Pulmonary smear-negative patients were more likely to have unsuccessful treatment outcomes (RR 1.26; 95% CI, 0.77-2.06), extra-pulmonary patients were less likely to have unsuccessful treatment outcome (RR 0.72; 95%CI, 0.45-1.13). Patients received TB treatment regimens other than the common regimen were less likely to have unsuccessful treatment outcome (RR 0.74; 95% CI, 0.48-1.13). However, these factors have no statistical significantly association with unsuccessful TB treatment outcome. (Table 5)

Table 5 Factors associated with unsuccessful TB treatment outcomes among HIV-

infected TB patients in bivariate analysis.

Characteristic	Total	Unsuccessful treatment outcome		RR (95%CI)	P-value
		n	%		
Gender					
Male	502	136	27	0.8 (0.6-1.1)	0.13
Female	135	45	33	Reference	
Age group					
15-24	67	18	27	0.96 (0.62-1.47)	0.83
25-34	320	90	28	Reference	
35-44	155	41	26	0.94 (0.69-1.29)	0.70
45-54	71	25	35	1.28 (0.9-1.83)	0.18
55 or older	21	6	29	1.02 (0.51-2.04)	0.96
					0.83[1]
Education					
Illiterate	76	22	22	0.97 (0.66-1.42)	0.87
Secondary school	405	121	30	Reference	
High school and higher	36	9	25	0.84 (0.47-1.50)	0.54
					0.85[1]
Marital status					
Married	300	85	28	Reference	
Single	117	29	25	0.90(0.63-1.30)	0.58
Divorced	33	9	27	0.99 (0.55-1.71)	0.98
Separated	30	10	33	1.22 (0.71-2.08)	0.49
Widowed	13	3	23	0.84 (0.31-2.31)	0.73
					0.9[1]
Urban area (Long xuyen+ Chau Doc)	168	52	31	Reference	0.34
Rural area (the other 9 districts)	469	129	28	0.88 (0.6-1.1)	
TB types					
Pulmonary, Smear +ve	530	154	29	Reference	
Pulmonary, Smear -ve	30	11	37	1.26 (0.77-2.06)	0.37
Extra Pulmonary	77	16	21	0.72 (0.45-1.13)	0.11
					0.19[1]
History of TB	46	11	24	0.82 (0.4-1.4)	0.46
Yes	591	170	29	Reference	
No					

Table 5 (Continued)

Characteristic	Total	Unsuccessful treatment outcome		RR (95%CI)	P-value
		n	%		
HIV risk group					
Homosexual	3	0	0	Undefined	
Sex with commercial sex worker	221	60	27	0.84 (0.58-1.23)	0.39
Sex with stable partner	84	27	32	Reference	
Sex with multiple partner	34	10	29	0.92 (0.50-1.68)	0.77
Injection drug user	67	25	37	1.16(0.75-1.80)	0.51
HIV-infected mother	11	2	18	0.57 (0.16-2.06)	0.28
					0.53^{1}
Registration status					
New	588	170	29	Reference	
Retreatment	47	11	23	0.9 (0.8-1.09)	0.34
TB treatment regiment					
Common (2HRZE/6HE)	562	167	30	Reference	
Others	70	17	24	0.74 (0.48-1.13)	0.14
Co-trimoxazole Prophylaxis	453	116	26	0.4 (0.3-0.5)	<0.001*
Yes	46	33	72	Referent	
No					
Adverse event during TB treatment	4	3	75	2.64 (1.48-4.7)	0.04*
Yes	633	178	28	Referent	
No					

[1] Overall P-value of the variable * P-value is significant (p<0.05)

Among the above factors there were only CPT and adverse event during TB treatment outcome were significant associated with unsuccessful treatment outcome. However, there were 136 observations missing from CPT variable so further analysis on comparing characteristics of patients with missing and non missing CPT was performed. The comparisons shows no significant difference of age, gender and

Table 6 Demographic characteristics of HIV-infected TB patients by CPT status

(N=637)

Characteristic	n=136	%	n=501	%
	CPT missing		**CPT non-missing**	
Age: Median, Min - Max				
33.75 vs. 32 (15-78),				
Sex				
Male	111	82	391	78
Female	25	18	110	22
Age group				
15-24	20	16	47	9
25-34	59	43	261	52
35-44	37	27	118	24
45-54	14	11	57	11
55-64	3	2	13	3
65 or older	2	1	5	1
Urban district	107	79	362	72
Rural area	28	21	139	28

location (P=0.381; P=0.366; P=0.10 respectively) (Table 6). This analysis also showed that questionnaire with CPT missing data also had missing with other variables including occupation, education level, marital status, ethnicity, religion, HIV transmission route and HIV symptoms at HIV diagnosis (Table 7). Thus, the comparisons between missing and non missing CPT could not be made on these variables.

There was no significant difference of characteristics among CPT missing and non-missing group. Those characteristics included history of TB (p=0.76), TB criteria (p=0.82), patient registration status (p=0.23), symptoms at TB diagnosis (p=0.63), final TB treatment outcome (p=0.35) and TB treatment regiment (Table 8).

Table 7 Missing variables in CPT missing observations

Missing Variables	n	%	n	%
	CPT missing		CPT non-missing	
Occupation	115	85	4	<1
Education level	115	85	4	<1
Marital status	115	85	2	<1
Ethnicity	115	85	1	<1
Religion	115	85	8	2
HIV transmission route	115	85	96	20
Reported presence of HIV symptoms at time of HIV diagnosis	115	85	1	<1

Table 8 Clinical characteristics of HIV-infected TB patients in CPT variable (N=637)

Characteristic	n=136	%	n=501	%
	CPT missing		CPT non-missing	
History of TB				
Yes	9	7	38	7
No	127	93	456	93
Case start				
Pulmonary smear (+)	115	85	415	83
Pulmonary smear (-)	8	6	22	4
Extra-pulmonary	13	10	64	13
Registration status				
New	127	93	461	92
Re-treatment	9	7	37	7
Transfer out	0	0	2	<1
Symptoms at TB diagnoses				
Cough	132	95	437	94
missing	26	5	3	2
Fever	102	69	349	69
missing	153	31	34	30
Final TB treatment outcome				
Cure	83	61	290	58
Treatment completed	18	13	60	12
Failure	1	<1	5	1
Died	29	21	137	27
Default	2	2	7	1
Transfer out	3	2	0	0

4.3 Multivariable Analysis (Logistic Regression Analysis):

I carried out multivariable logistic regression analysis to test association between CPT and unsuccessful TB treatment outcome while controlling other factors. Co-trimoxazole prophylaxis therapy (CPT), adverse event, rural residence, TB smear status and location, male gender, age and year of treatment were selected into the following 3 models. These factors selected based on prior evidence, data completeness and/or p-value ≤ 0.2 from the bivariate analysis.

In this multivariable analysis, the strongly protective effect of Co-trimoxazole persisted, after adjustment for sex, adverse event, rural residence, TB smear status, and location, age and year of treatment (model 1). The protective effect of CPT remained after coding all patients with missing CPT data as having received CPT (model 2) and after coding all patients with missing CPT as having not received CPT (model 3) (Table 9).

Table 9 Multivariable analysis of risk factors for unsuccessful TB treatment utcomes

among HIV-infected TB patients

Characteristic	Adjusted OR (95% CI)		
	Model 1 (n=499)	Model 2 (n=630)	Model 3 (n=630)
Adverse event during TB treatment	7.38 $(0.69\text{-}78.2)^{\dagger}$	8.62 $(0.86\text{-}85.9)^{\dagger}$	8.61 $(0.87\text{-}85.51)^{\dagger}$
Residence in a rural area	0.87 (0.55-1.39)	0.83 (0.56-1.24)	0.84 (0.58-1.25)
TB smear status and location			
Pulmonary, smear-positive	Ref	Ref	Ref
Pulmonary, smear-negative	1.38 (0.53 - 3.56)	1.43 (0.65 - 3.16)	1.45 (0.66 - 3.18)
Extra-pulmonary	0.59 (0.30-1.16)	0.53 (0.3-1.07)	0.62 (0.32-1.25)
Prescribed co-trimoxazole	0.15 (0.08-0.29)*	0.53 (0.36-0.78)*	0.58 (0.40-0.86)*
Male sex	0.63 (0.39-1.01)	0.65 (042-1.00)	0.66 (0.44-1.01)
Age	1.003 (0.98-1.03)	1.003 (0.98-1.02)	1.003 (0.98-1.02)
Year	0.98 (0.81-1.18)	0.91 (0.78-1.07)	0.91 (0.78-1.07)

† *95%CI is wide because of small cell (adverse event happened on only 4 out of 637*

patients)

* P-value is significant