JOURNAL OF POPULATION AND SOCIAL STUDIES Volume 15 Number 1 July 2006

The Effect of Migration on Health

Rumana A. Saifi *
Chai Podhisita **
Philip Guest ***
John Bryant **

Introduction

Around the world, there is a growing concern about the effect of migration on health, though till to date, there has been limited research on this issue and often the available research findings are inconclusive. Why would migration affect health? Migrants live in a new environment, which may be different from the one they come from (Liamputtong, 2003). Therefore, migration is often associated with uncertainty, vulnerability and stress. For example, a rural farmer migrated to an urban area may have to work in a factory and live in a slum area. An urban to rural migrant may have to work in an agricultural field. In both of these examples, migration exposes individuals to a different socio-economic, environmental and cultural situation. As migration brings change in an individual's life, it can have either a positive or a negative effect on health. If migration brings positive changes to migrant's life, such as, a better living condition, it is expected to have some positive effect on health. On the other hand, if it brings negative changes to migrant's life, such as, major decline in income, it is expected to have negative effect on health. With this background, the present study intends to examine the relation between migration and health.

Theoretically, health status of migrants can be (1) worse off than their origin (2) better off than their origin (3) worsen or improve than the non-migrants at

* International Centre for Health and Population Research, Mohakhali, Dhaka 1212, Bangladesh. E-mail: rumanasaifi@hotmail.com
** Institute for Population and Social Research, Mahidol University, Salaya, Phutthamonthon, Nakorn Pathom 73170, Thailand. E-mail: prcps@mahidol.ac.th; john.r.bryant@gmail.com
*** The Population Council, 37/1 Petchaburi Soi 15, Bangkok 10400, Thailand. E-mail: philip@popcouncil.th.com

destination (IOM, 2001). A study conducted among the internal migrants in South Africa found that prevalence of tuberculosis was high among mine migrant workers in comparison with the non-migrants at their origin (Kahn, et al., 2003). High prevalence of tuberculosis among mine migrant workers was explained by their nature of occupation. On the contrary, Iyer (2003) showed Filipina domestic workers in Singapore to have better health than their origin population. In this case, healthy environmental conditions in Singapore, seemed to be important. Migration to Thailand offered Burmese maids the opportunity to access safe water sources, healthy sanitation facilities and thus, good health status (Toyota, 2003).

A study in the U.K. found that internal and international migrants had low level of depression than non-migrants at destination (Berthoud, 1997). Conversely, refugees in Thailand, Ethiopia, and Mozambique showed high prevalence of malaria when compared with non-migrants at destination (Martens and Hall, 2000; Bloland and Williams, 2003).

It should be noted that there are migration-health studies, which used health risk behaviors (for example: smoking, alcohol drinking) as proxies for health status. In this regard, Stoto (1988) stated that in general, smokers tend to have higher morbidity and mortality. Therefore, it is reasonable to assume that smokers possess low health status. Shuval (2001:135) expressed that migrants practice health risk behaviors, like smoking, due to psychological distress. In terms of alcohol drinking, it is found that Thai migrant labors drink alcohol the most (Wongboonsin, 1996).

So far, migration studies in Thailand focused mainly on causes of migration. Little has been done to look at the effect of migration. Particularly, health issues as an effect of migration remains almost unexplored in Thai context. The very few studies considering the issues of migration and health in Thailand explored migrant's health in terms of malaria transmission (Martens and Hall, 2000), tuberculosis (Castro and Singer, 2003) and HIV/AIDS (World Bank, 2000). However, with the increasing number of migrants in Thailand over the years, it becomes crucial to assess their health status thoroughly. It is expected that the findings of the present study will aid policy

makers towards appropriate health intervention strategies. If migrants maintain a worse health status than non-migrants, Thai health policies may target migrants as a specific target group for health promotion interventions. If migrants maintain a better health status than non-migrants, strategies can be formulated to enable migrants' to sustain their health status at destination.

To demonstrate for how migration shapes health in Thailand, the present research is conducted in Kanchanaburi – an interesting setting with population comprising both migrants and non-migrants. The present study focuses on the in-migrants at destination. In-migrants are compared with the non-migrants at destination (details are given in the following section). Due to data limitation migrants in Kanchanaburi are not compared with the non-migrants at origin.

Data and Methods

Data

The data employed for this study are obtained from the Kanchanaburi Demographic Surveillance System (KDSS) 2000 and 2001, conducted in selected areas of Kanchanaburi province, Thailand, by the Institute for Population and Social Research (IPSR), Mahidol University and supported by the Wellcome Trust, United Kingdom.

The study villages and census blocks for KDSS are selected using a stratified systematic sample design. As Kanchanaburi is a mixture of both rural and urban areas, the primary selection units for rural areas are villages and for urban areas are census blocks. First, Kanchanaburi area is divided into five strata according to the main occupation of the population and land use patterns. They are: (1) urban/semi urban (industrialized) area (2) rice producing area (3) plantation area (4) upland areas and (5) mixed economy area. From all villages / census blocks of these strata, 100 villages / census blocks are selected systematically as study villages / census blocks.

For data collection, three sets of questionnaires are used: village, household and individual. The Village questionnaire provides basic background information on villages. The Household data questionnaire provides basic information on households' members, their background characteristics, occupation, land use, agricultural products, migration, and mortality. The Individual questionnaire is for respondents aged 15 years and over. It consists of personal data, occupation and income, migration, health, childbearing, contraception, marriage and women's role in community development (KDSS, 2001). The present study utilizes information from both individual and household questionnaires.

The study population consists of adult population aged 15 and older living in Kanchanaburi field area. The sample size for this study is 24,412 consisting of both migrants and non-migrants. It should be clarified here that there are individuals who reported themselves as non-migrants in 2001, however, no information on them is available in 2000. Those 'unknown non-migrants' are deleted from the analysis.

Developing migration-health and migration-health risk models. In order to investigate the relation between migration and health in Kanchanaburi, the study develops two models: (1) migration-health model and (2) migration-health risk model. Two separate data files are constructed to develop these two models.

The migration and health model examines the relation between migration and health. This model uses health status as dependent variable. Health is measured in the year 2001. In order to investigate migration history of an individual, data for the years 2000 and 2001 are used. This gives an opportunity to examine the migration status of an individual during the period of 1999-2000 and 2000-2001. It is interesting to know how migration status during 1999-2000 and 2000-2001 affects health status of the migrants in 2001. All other independent variables for this model are measured in 2001.

As there are limited information on health status in the data set, the study utilizes additional proxy measures of health, i.e., health risk behaviors. Thus, the study

develops another model on migration and health risk behaviors, where health risk behaviors are used as dependent variables.

The migration-health risk model examines the relation between migration and health risk behaviors. Health risk behaviors (smoking and alcohol drinking) are measured in the year 2001. Similar to migration-health model, information on migration history of an individual is obtained from 2000 and 2001. All other independent variables are measured in 2001.

Measurement of variables

Outcome variable : Health status. The outcome variable 'health status' is firstly measured by a dichotomous self-reported health status, assessing the overall health reported by individuals. The respondents are asked to report any illness that was serious enough that they could not work as usual. The question is phrased as "Did you feel sick and have to absent yourself from work or could not do normal activities?" This question is asked with regard to the year prior to data collection. Respondents who answered "yes" are coded 1, those who answered "no" are coded 0.

Secondly, health status is measured by types of diseases – constructed from questions asking about the disease respondent was suffering from. In the present study, diseases are categorized into general (coded 1), infectious (coded 2), and non-infectious (coded 3). The categorizations follow the global classification of diseases (WHO, 1999). For example, malaria, tuberculosis, typhoid, reproductive tract infection (RTI) are treated as infectious diseases. Blood pressure, diabetes, heart disease, thyroid, asthma are treated as non-infectious diseases. Common fever, allergy, migraine are noted as general illnesses. Those who reported to be healthy are coded 5. However, there are respondents who reported that they have poor health , but could not specify any type of disease. This group is treated as 'undiagnosed'(coded 4) .

Outcome variable : Health- risk behavior. The health risk variables are smoking and alcohol drinking. Based on reported smoking habits, respondents are

categorized as non-smokers (coded 1), irregular smokers who smoke 1-6 days per week (coded 2) and regular-smokers who smoke everyday (coded 3). For alcohol drinking, respondents who do not drink alcohol are categorized as "non-drinkers" (coded 1), those who drink alcohol 1-6 days per week are categorized as "irregular drinkers" (coded 2) , those who drink alcohol everyday are considered as "regular drinkers" (coded 3).

Major Independent variable: Migration. Migration status is the main independent variable for the analysis. Several aspects of migration are taken into account (a) migration experience (b) migration year (c) duration of stay at destination and (d) type of destination.

The basic question on migration is phrased as 'Did you ever move to stay somewhere else for one month or more?' This question is asked with regard to the year prior to data collection in each year of data collection. To be identified as migrants, the minimum duration of stay at destination is one month. Village/census blocks are used as the boundary to measure migration. Those who answered 'yes' to the basic question on migration are coded as migrants. This variable is constructed by using data from year 2000 and 2001.

Although several aspects of migration have been taken into account for descriptive statistics, for multivariate analyses, only 'duration of stay at destination' has been used. This is due to very high colinearity among the migration variables.

Duration of stay is a categorical variable with four categories. Migrants staying at destination for 0-9 months are coded 1, migrants staying for 10-18 months are coded 2, migrants staying for 19 months and more are coded 3. Those who stay in the place of destination for the entire period of two years are the non-migrants and coded 4.

Other Independent Variables. The present study uses age, sex, education, marital status, occupation, household wealth and ethnicity as socio-demographic and economic characteristics of respondents. A number of environmental factors, such as,

dwelling structure, cooking fuel, water, sanitation, use of mosquito net, geographical location have also been used in the study. Both migration-health and migration-health risk models use the same set of independent variables. As the study uses health risk behaviors as proxy measures of health, same set of independent variables are used in both the models. In this regard, the environmental factors used in this study require further clarification. The environmental factors explain about an individual's quality of life, which can have relation with both health and health risk behaviors. Therefore, the study includes environmental factors in both the models.

It would be worth mentioning how household wealth, dwelling quality and water-sanitation facility are measured in this study. Three major variables are used to measure wealth endowment in a household: television, refrigerator, and motor cycle. A composite wealth index is built on the basis of the market prices of these items (NSO, 1996). After constructing this index, households of the individuals are categorized as 1= high, 2=middle and 3=low. These three categorizations are done on the basis of the average value of wealth in the household. Housing structure is defined according to the materials from which the house is built. There are two categories, modern materials (coded 1) and traditional materials (coded 0). Original categories of concrete/brick/stone, tile, zinc and wood are classified as "modern materials", whereas, elephant grass/palm leaf/ teak leaf/bamboo and used materials are classified as "traditional materials". For water and sanitation facility of the household, a 2x2 index is created. If the household has access to both 'safe water sources' (underground and purchased water) and 'healthy sanitation facility' (flush or a water sealed toilet) it is categorized as a household with 'healthy water and sanitation' (coded 1). If the household does not have any one of the basic water and sanitation facility it is categorized as a household with 'unhealthy water and sanitation' (coded 0).

Method of Analysis

As mentioned earlier, in migration and health model, health is measured by (1) self-reported overall health status and (2) types of diseases. For migration and health model, binary logistic regression and multinomial logistic regression have been used.

Binary logistic regression measures the dichotomous self-reported health status, whereas, multinomial logistic regression measures self-reported types of diseases. The measurement of health variable through 'self-reported overall health status' shows whether migrants and non-migrants report sickness or not. 'Types of diseases' explores health status further – through this variable it is known from which disease the migrants' and non-migrants' suffer with. Therefore, multinomial logistic regression gives more details on migrants' and non-migrants' health.

For migration and health risk model, ordinal regression is used. As mentioned, the study uses smoking and alcohol drinking to measure health risk behaviors of the migrants and non-migrants. Two separate ordinal regression analyses have been done for each of the health risk behaviors, i.e., smoking and alcohol drinking.

Description of Dependent Variables. Tables 1 - 3 show descriptive statistics for the dependent and independent variables. More than two thirds of the individuals (both migrants and non-migrants) in Kanchanaburi reported ill health (68%). Overall, infectious diseases are the most common type in Kanchanaburi. In fact, in any developing country, prevalence of infectious disease is always high – Kanchanaburi is no exception.

Majority of the respondents in the sample are non-smokers (about 69%). This finding is applicable for alcohol as well, i.e., majority of the respondents do not drink alcohol (around 61% are non-consumers). The percentages for regular and irregular smokers are 28 and 3 percent respectively. For alcohol, the percentages for regular and irregular drinkers are 3 and 36 percent respectively.

Table 1: Description of Dependent Variables (N=24412)

Dependent Variables	N	Percent
Migration-health model		
Reported sickness		
Yes	16590	68.0
No	7822	32.0
Total	**24412**	**100**
Type of diseases		
General	578	2.4
Infectious	6214	25.5
Non-infectious	4550	18.6
Undiagnosed	5248	21.5
Healthy	7822	32.0
Total	**24412**	**100**
Migration-health risk model		
Frequency of smoking		
Non-smoker	16774	68.7
Irregular smoker	836	3.4
Regular-smoker	6800	27.9
Total	**24410**	**100**
Frequency of alcohol drinking		
Non-drinker	14905	61.1
Irregular drinker	8743	35.8
Regular drinker	762	3.1
Total	**24410**	**100**

Description of the Major Independent Variable: Migration Characteristic. As migration is the main independent variable, multiple aspects of migration are explored in the study. Description of the sample according to their migration characteristics are presented in table 2. About 20 percent of the sample are migrant. Most of the migrants in the sample are recent migrants. Among the migrants, 68 percent are staying at destination for 0-9 months. Twenty one and eleven percent of the migrants are staying at destination for 10-18 and for 19 months and longer respectively.

Table 2: Description of the Major Independent Variable – Migration Characteristic (N=24412)

	N	Percent
Independent variable		
Migration		
Migrant	4796	19.6
Non-migrant	19616	80.4
Total	**24412**	**100**
Migrants' duration of stay (excluding non-migrants)		
0-9 months	3261	67.99
10-18 months	1021	21.28
19 and more	514	10.72
Total	**4796**	**100**
Year of migration (excluding non-migrants)		
Migration exposure during 1999-2000	1225	25.54
Migration exposure during 2000-2001	3571	74.45
Total	**4796**	**100**
Destination of the migrants (excluding non-migrants)		
Migrants in urban area	768	16.01
Migrants in rural area	4028	83.99
Total	**4796**	**100**

Description of Other Independent Variables: Kanchanaburi is a predominantly rural area, and the general characteristics of the sample are similar to most rural settings. These characteristics are presented in table 3. The study population in Kanchanaburi is young. In comparison with other age groups, higher proportion of respondents are observed in 15-29 years. In the sample, females outnumber their male counterparts. In general, the study population is not highly educated. About half of the sample have elementary level of education (56%). More than two-thirds of the sample identify themselves as married. As expected, the most common occupation is farming. About one in every two individuals are associated with agricultural activities (51%). Majority of the sample is ethnically Thai (94%). Around 84 percent live in traditional household. More than half of the respondents belong to households identified as

'middle' according to household wealth endowment. Around two-third of the individuals are in households where gas and electricity are the major source of fuel consumption. To be specific, 63 percent of the respondents use gas and electricity for cooking. Around 70 percent of the individuals have access to clean water and sanitation facility. Mostly all use mosquito nets – approximately 95 percent of the respondents sleep under mosquito nets.

Table 3: Description of Other Independent Variables (N=24412)

	N	Percent
Age		
15-29 years	6774	27.7
30-39 years	5864	24.0
40-49 years	5087	20.8
50-59 years	3191	13.1
60 and above	3496	14.3
Total	**24412**	**100**
Sex		
Male	10719	43.9
Female	13693	56.1
Total	**24412**	**100**
Marital status		
Married	17633	72.2
Marriage dissolution	2702	11.1
Single	4077	16.7
Total	**24412**	**100**
Educational level		
Illiterate and lower than elementary	4176	17.1
Elementary	13698	56.1
Secondary	3993	16.4
Higher than secondary	1417	5.8
Others	1128	4.6
Total	**24412**	**100**

Table 3: (Continued)

	N	Percent
Occupational status		
Agriculture	12482	51.1
Professional	1211	5.0
Sales and service	2691	11.0
Transport, laborer and other	3958	16.2
Not working	4070	16.7
Total	**24412**	**100**
Household wealth		
High	5468	22.4
Middle	14512	59.4
Low	4426	18.1
Total	**24406**	**100**
Ethnicity		
Thai	22828	93.5
Mon & Karen	1043	4.3
Others	312	1.3
Burmese	228	.9
Total	**24411**	**100**
Dwelling structure		
Modern	3908	16.0
Traditional	20476	83.9
Total	**24384**	**100**
Strata		
Urban/semi-urban	5078	20.8
Rice field	4220	17.3
Plantation	4027	16.5
Uplands	5790	23.7
Mixed economy	5297	21.7
Total	**24412**	**100**
Cooking fuel		
Gas and electricity	15297	62.7
Wood, charcoal and others	9115	37.3
Total	**24412**	**100**

Table 3: (Continued)

	N	Percent
Household member		
1 to 3 members	8000	32.8
4 to 5 members	9936	40.7
6 and above	6476	26.5
Total	**24412**	**100**
Water and sanitation facility		
Healthy	16821	68.9
Unhealthy	7570	31.0
Total	**24391**	**100**
Use of mosquito net		
Yes	23120	94.7
No	1278	5.2
Total	**24398**	**100**

In order to get more insights on the migrants and non-migrants, table 4 shows percentage distribution of migrants (migrants are categorized in terms of their duration of stay at destination) and non-migrants according to their major socio-demographic characteristics. As expected, it is the migrants who seem to be younger than the non-migrants. This is applicable for all three categories of migrants. Regarding sex, share of migrants in the category of males appears to be higher. This is applicable for the three categories of migrants. However, the gap between, male and female is not large. For marital status, proportions of migrants seem to be higher in the category of 'single'. While considering occupation, proportion of migrants are higher in the category of transport/ laborer/construction workers. On the other hand, proportion of non-migrants are higher in agricultural sector.

Table 4: Percentage distribution of migrants (according to duration of stay) and non-migrants according to major socio-demographic characteristics

	Migrants according to their duration of stay with non-migrants					
	0-9 months	10-18 months	19 and longer	Non-migrants	Total	N
Age						
15-29	25.7	6.8	3.4	64.1	100	6774
30-39	12.3	4.3	2.3	81.1	100	5864
40-49	8.5	2.8	1.7	87.0	100	5087
50-59	6.3	3.0	1.4	89.3	100	3191
60 and above	4.7	1.7	1.0	92.6	100	3496
						24412
Sex						
Male	15.4	4.4	2.3	77.9	100	10719
Female	11.7	4.0	2.0	82.3	100	13693
						24412
Marriage						
Married	12.2	3.8	2.0	82.0	100	17633
Marriage dissolution	10.7	4.1	2.0	83.2	100	2702
Single	20.3	5.6	2.7	71.4	100	4077
						24412
Education						
Illiterate and lower than elementary	12.2	3.3	1.0	83.5	100	4176
Elementary	11.9	4.0	2.1	82.0	100	13698
Secondary	18.0	4.9	2.5	74.6	100	3993
Higher than secondary	15.7	6.7	4.2	73.4	100	1417
Others	15.1	4.8	2.4	77.7	100	1128
						24412
Occupation						
Agriculture	12.4	3.7	2.0	81.9	100	12482
Professional	12.5	5.6	3.0	78.9	100	1211
Sales/ service	11.9	4.3	2.2	81.6	100	2691
Transport, laborer/ other	16.8	5.9	2.6	74.7	100	3958
Not working	14.2	3.3	1.8	80.7	100	4070
						24412

Results

Migration and health status. As mentioned, in order to assess the relation between migration on self-reported health, the study makes use of binary logistic regression (as the outcome variable here is dichotomous in nature; 1=sick and 0=not sick). The figures shown in table 5 are odds ratios; values greater than one indicate greater odds of reporting illness.

Five specifications are used in logistic regression analysis. In specification 1, migration status of an individual (duration of stay) is entered. Next, in specification 2, age and sex are entered. In specification 3 age, sex and other socio-demographic and economic factors are added. In specification 4, environmental factors are introduced. Finally, in specification 5, health risk factors are taken into account.

In specification 1 of logistic regression analysis (using migration as the only independent variable), migrants seem to have a better health than non-migrants. The odds of reporting illness decrease by 31 percent for migrants with shortest duration of stay (0-9 months at destination) compared to the non-migrants. For those staying at destination for 10-18 months, the odds of reporting illness decrease by 25 percent. Those staying at destination for 19 months and longer, the odds of reporting illness decrease by 14 percent. However, specification 1, does not control for any other factors. Therefore, specification 2, looks at the relation between migration and health while controlling for age and sex.

Table 5: Logistic regression odds for reporting sickness by migration, demographic, socio-economic, environmental and health-risk factors, Kanchanaburi DSS, 2000-2001

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Migration characteristic – duration of stay					
0-9 months	.690***	.980	.99	1.01	1.02
10-18 months	.746***	.962	.96	.95	.95
19 and above	.861	1.117	1.11	1.12	1.13
Non-migrants (R)	----------	----------	----------	----------	----------
Socio-demographic and economic factors					
Age		1.03***	1.03***	1.03***	1.03***
Sex					
Male		.538***	.56***	.56***	.59***
Female (R)		----------	----------	----------	----------
Education					
Higher than secondary			.70***	.63***	.61***
Secondary			.82***	.74***	.73***
Elementary			1.01	.90*	.89*
Others			.94	.85*	.83*
I lliterate /lower than elementary (R)			----------	----------	----------
Occupation					
Agriculture			.88**	.88**	.87**
Professional/ managerial			.84*	.86	.86
Sales / service			.84**	.85**	.84**
Laborer/ /transport worker			1.02	.97	.96
Not working (R)			----------	----------	----------
Household asset					
High			1.15**	.90	.89*
Middle			1.18***	.98	.97
Low (R)			----------	----------	----------
Marital status					
Married			.99	1.05	1.06
Marriage dissolution			1.13	1.17*	1.18**
Single (R)			----------	----------	----------
Ethnicity					
Burmese			.50***	.61***	.62***
Mon & Karen			.81**	1.05	1.07
Others			.82	1.03	1.04
Thai (R)			----------	----------	----------

Table 5: (Continued)

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Environmental factors					
Strata					
Urban/semi-urban				1.21***	1.21***
Rice				1.95***	1.94***
Plantation				1.13**	1.13**
Uplands				.66***	.66***
Mixed eco (R)				----------	----------
Housing quality					
Modern				.96	.97
Traditional (R)				----------	----------
Number of household members					
1-3 members				.97	.97
4-5 members				.99	.99
6 and above (R)				----------	----------
Type of fuel used for cooking					
Wood, charcoal and others				1.05	1.06
Gas and electricity (R)				----------	----------
Water and sanitation					
Healthy				1.09**	1.09**
Unhealthy (R)				----------	----------
Use of Mosquito net					
Yes				.99	.98
No (R)				----------	----------
Health risk behavior					
Smoking					
Regular					.89**
Occasional					.64***
Non-consumer (R)					----------
Alcohol consumption					
Regular					.89
Occasional					1.05
Non-drinker (R)					----------
-2log likeli	30519.89	29063.78	28914.93	28366.96	28325.21

Note: $p \leq 0.001$ (***), $p \leq 0.01$ (**) and $p \leq 0.05$ (*).

After controlling for age and sex, the relation between migration and health changes – the statistical significance, as observed in logistic regression specification 1 disappears. In other words, controlling age and sex attenuates the effect of migration and makes it statistically insignificant. After adding other socio-economic-demographic, environmental, and health risk factors in specification 3, specification 4, and specification 5, the effect of migration remains almost the same as it was in specification 2.

The results indicate that migration appears not to have any statistically significant relation with health. It is socio-demographic and economic factors that are most crucial for health. Most importantly, it is age and sex that have strong effect on health.

Migration and types of disease . In multinomial regression, the healthy segment of the population is compared across categories of population reported to have different types of diseases: (1) those who report to suffer from general illness are compared with those report to be healthy (2) those who report to suffer from infectious diseases are compared with healthy (3) those who report to suffer from non-infectious diseases are compared with healthy and (4) those who are undiagnosed (report illness but cannot specify any disease) are compared with healthy. Multinomial logistic regression odds are shown in table 5.

As the main focus of this multinomial analysis is to examine the relation between migration and types of diseases, in specification 1, relation between migration and types of diseases is explored without controlling for any other factors. Afterwards, in specification 2, 3 and 4, socio-demographic, economic, environmental and health risk factors are controlled.

According to the first specification of multinomial analysis, migrants in comparison with non-migrants are less likely to report any type of illness. Note, in table 5 only two combinations, i.e., infectious vs healthy and non-infectious vs healthy are shown. When socio-demographic, economic, environmental and health risk factors are

controlled the significant relation between migration and types of diseases disappear and the direction of the relation between the two changes. This implies that migration does not have any effect on types of diseases. It is again age and sex that have strong effect on diseases.

Table 6: Multinomial logistic regression odds for reported disease pattern, Kanchanaburi DSS, 2000-2001

	Infectious vs healthy				Non-infectious vs healthy			
	Spec. 1	**Spec. 2**	**Spec. 3**	**Spec. 4**	**Spec. 1**	**Spec. 2**	**Spec. 3**	**Spec. 4**
Migrants duration of stay								
0-9 months	.83***	.92	.94	.94	.52***	1.03	1.06	1.07
10-18 months	.85*	.90	.88	.88	.61***	.95	.98	.98
19 and above	.97	1.02	1.04	1.04	.67**	1.07	1.08	1.11
Non-migrants (R)	--------	--------	--------	--------	--------	--------	--------	--------
Age		1.01***	1.01***	1.01***		1.05***	1.05***	1.05***
Sex								
Male		.76***	.76***	.76***		.39***	.40***	.50***
Female (R)		--------	--------	--------		--------	--------	--------
Education								
Higher than secondary		.90	.82	.80*		.82	.71**	.66***
Secondary		.94	.87	.86*		1.09	.96	.90
Elementary		1.09	.99	.99		1.25***	1.09	1.06
Others		1.18	1.07	1.05		1.13	.99	.93
Illiterate and lower than elementary (R)		--------	--------	--------		--------	--------	--------
Marriage								
Married		1.02	1.08	1.06		1.14*	1.20**	1.26***
Marriage dissolution		1.22*	1.22*	1.21*		1.20	1.21*	1.29**
Single (R)		--------	--------	--------		--------	--------	--------
Occupation								
Agriculture		1.10	1.10	1.08		.74***	.73***	.76***
Professional		.99	1.04	1.03		.96	.95	.99
Sales /service		1.01	1.03	1.02		.78***	.77***	.78**
Laborer		1.16*	1.13	1.12		.89	.83**	.86*
Not working (R)		---------	---------	---------		----------	----------	----------
Household wealth								
High		1.08	.87*	.86*		1.46***	1.15	1.11
Middle		1.10	.94	.93		1.46***	1.18*	1.16*
Low (R)								
Ethnicity								
Burmese		.57**	.64*	.66*		.25***	.33***	.33***
Mon & Karen		.92	1.08	1.10		.29***	.42***	.42***
Others		.93	1.05	1.06		.37***	.50**	.50**
Thai (R)		---------	---------	---------		----------	----------	----------

Table 6: (Continued)

	Infectious vs healthy				Non-infectious vs healthy			
	Spec. 1	**Spec. 2**	**Spec. 3**	**Spec. 4**	**Spec. 1**	**Spec. 2**	**Spec. 3**	**Spec. 4**
Dwelling quality								
Modern			.93	.93			1.00	1.01
Traditional (R)			---	---			---	---
Number of household member								
1-3 members			.86**	.86**			1.14*	1.14*
4-5 members			.96	.95			1.09	1.09
6 and above (R)			---	---			---	---
Strata								
Urban			1.29***	1.29***			1.18**	1.17**
Rice field			2.02***	2.02***			1.84***	1.80***
Plantation			1.08	1.08			1.19**	1.18**
Uplands			.79***	.79***			.62***	.65***
Mixed (R)			---	---			---	---
Water and sanitation								
Healthy			1.14***	1.14***			1.14**	1.13**
Unhealthy source (R)			---	---			---	---
Type of fuel for cooking								
Gas and electricity			.92*	.92*			1.03	1.02
Wood, charcoal and others (R)			---	---			---	---
Use of mosquito net								
Yes			1.01	1.00			1.12	1.08
No (R)			---	---			---	---
Smoking								
Regular				.94				.75***
Occasional				.65***				.51***
Non-smoker (R)				---				---
Alcohol consumption								
Regular				.88				.71**
Occasional				1.14***				.80***
Non-drinker (R)				---				---

Note: $p \leq 0.001$ (***), $p \leq 0.01$ (**) and $p \leq 0.05$ (*).

Migration and health risk behavior. As mentioned, smoking and alcohol drinking are used as health risk behavior in order to examine the effect of migration on health risk.

Migration and smoking. The purpose of migration and smoking model is to investigate whether migration has any effect on smoking. Therefore, in the first specification, effect of migration on smoking is examined without any control on any

other factors. In the second specification, effect of migration is examined while controlling for socio-demographic and economic factors. In the third specification, effect of migration is examined while controlling for socio-demographic-economic and environmental factors. Ordinal regression coefficients are shown in table 7.

In specification 1, migration is used as the one and only independent variable. There exists a positive and significant relation between migration and smoking behavior. In comparison with non-migrants, migrants are more likely to be an irregular or regular smoker. Note, even after controlling for other independent variables the significant effect of migration does not fade away.

However, when we control for socio-demographic-economic and environmental factors, though the direction of the relation between migration and smoking does not change and migration remains significant on smoking, the size of the migration coefficients change. Thus, it can be said that though migration has effect on smoking, effect of socio-demographic and economic factors are also important for determining smoking behavior.

Table 7: Ordinal regression coefficients for smoking behavior, Kanchanaburi, 2000-2001

	Specification 1		**Specification 2**		**Specification 3**	
	B	**se**	**B**	**se**	**B**	**se**
Duration of migrant's stay						
0-9 months	.30***	.40	.24***	.05	.22***	.05
10-18 months	.15*	.07	.27***	.08	.27**	.09
19 months and more	.19*	.09	.36**	.12	.34**	.12
Non-migrants (R)	-------	-----	-------	-----	-------	----
Age			.01***	.00	.01***	.00
Sex						
Male			2.93***	.04	2.94***	.04
Female			--------	-----	-------	----
Education						
Higher than secondary			-1.72***	.12	-1.52***	.12
Secondary			-1.32***	.07	-1.16***	.08
Elementary			-.70***	.06	-.56***	.06
others			-1.32***	.09	-1.17***	.09
Illiterate and lower than elementary (R)			-------	----	---	---

Table 7: (Continued)

	Specification 1		Specification 2		Specification 3	
	B	**se**	**B**	**se**	**B**	**se**
Occupation						
Agriculture			.52***	.06	.50***	.06
Professional and managerial			.20	.11	.21	.11
Sales and service			.11	.08	.13	.07
Transport, labor, other			.20**	.07	.29***	.07
Not working (R)			-------	-----	----	---
Marital status						
Married			.82***	.06	.85***	.06
Marriage dissolution			.96***	.08	1.03***	.09
Single (R)			-------	----	---	---
Ethnicity						
Burmese			.94***	.17	.64***	.17
Mon & Karen			1.17***	.09	.75***	.09
others			.76***	.15	.43**	.15
Thai (R)			------	----	---	---
Household asset						
Poor			-1.02***	.06	-.65***	.07
Middle			-.59***	.05	-.31***	.05
High (R)			------	----	----	---
Strata						
Urban/semi-urban					-.05	.06
Rice					-.22***	.06
Plantation					-.01	.06
Uplands					.65***	.06
Mixed economy (R)					---	----
Housing structure						
Modern material					.07	.05
Traditional material (R)					------	----
Type of fuel used for cooking						
Gas and electricity					-.26***	.04
Wood, charcoal and others (R)					-----	-----
Number of household members						
1-3 members					-.08	.05
4-5 members					-.09*	.04
6 and above (R)					-------	----
Water and sanitation						
Healthy					-.09*	.04
Unhealthy (R)					--------	----
Sleeping under mosquito net						
Yes					-.45***	.08
No (R)					--------	---
Cox and snell R^2	.003		.33		.34	

Note: $p \leq 0.001$ (***), $p \leq 0.01$ (**) and $p \leq 0.05$ (*).

Migration and alcohol. The purpose of migration and alcohol model is to investigate whether migration has any effect on alcohol drinking. Model specifications are similar to migration and smoking model. It is again the migrants who are more likely to drink alcohol in comparison with non-migrants. However, effect of migration on alcohol is not as strong as effect of migration on smoking. Note, in specification 3, after controlling for environmental factors, effect of migration becomes insignificant for two categories of migrants. Ordinal regression coefficients are shown in table 8.

Table 8: Ordinal regression coefficients for alcohol consumption, Kanchanaburi, 2000-2001

	Specification 1		Specification 2		Specification 3	
	B	**se**	**B**	**se**	**B**	**se**
Duration of migrant's stay						
0-9 months	.18***	.04	.09*	.04	.08	.04
10-18 months	.19**	.06	.15*	.07	.15*	.07
19 months and more	.28**	.09	.19	.09	.19	.09
Non-migrants (R)	-------	-----	-------	-----	-------	----
Age			-.01***	.00	-.01***	.00
Sex						
Male			1.93***	.03	1.93***	.03
Female			--------	-----	-------	----
Education						
Higher than secondary			-.08	.09	-.06	.09
Secondary			-.27***	.06	-.26***	.07
Elementary			-.02	.05	.05	.05
others			-.08	.08	-.05	.08
Illiterate and lower than elementary (R)			-------	----	-------	----
Occupation						
Agriculture			.70***	.05	.71***	.05
Professional and managerial			.55***	.09	.53***	.09
Sales and service			.53***	.06	.51***	.06
Transport, labor, other			.60***	.06	.59***	.06
Not working (R)			-------	-----	----	---

Table 8: (Continued)

	Specification 1		Specification 2		Specification 3	
	B	**se**	**B**	**se**	**B**	**se**
Marital status						
Married			.71***	.05	.73***	.05
Marriage dissolution			.86***	.07	.87***	.07
Single (R)			-------	----	---	---
Ethnicity						
Burmese			-1.25***	.18	-1.30***	.18
Mon & Karen			-.77***	.09	-.85***	.09
others			-.34**	.13	-.40**	.14
Thai (R)			------	----	---	---
Household asset						
Low			-.08	.05	.01	.06
Middle			-.02	.04	.04	.05
High (R)			------	----	----	---
Strata						
Urban/semi-urban					.01	.05
Rice					-.11*	.05
Plantation					-.14**	.05
Uplands					.08	.05
Mixed economy (R)					---	----
Housing structure						
Modern material					.06	.04
Traditional material (R)					------	----
Type of fuel used for cooking						
Gas and electricity					-.07*	.04
Wood, charcoal and others (R)					-----	-----
Number of household members						
1-3 members					.05	.04
4-5 members					.03	.04
6 and above (R)					-------	----
Water and sanitation						
Healthy					-.01	.03
Unhealthy (R)					--------	----
Sleeping under mosquito net						
Yes					-.27***	.06
No (R)					--------	---
Cox and snell R^2	.001		.206		.208	

Note: $p \leq 0.001$ (***), $p \leq 0.01$ (**) and $p \leq 0.05$ (*).

Discussion

The present study has been able to bring out two most interesting pieces of information from the migration-health and migration-health risk models respectively. First, migration appears not to have any relation with health. Second, migration appears to have relation with health risk behavior - migrants in comparison with non-migrants are more likely to be involved in health risk behaviors.

The findings that migration appears not to have any relation with health may be due to limited information in this study available for health measurements. Health in the present study is measured through self reports – possibilities are that individuals are not rightly aware of their health status. In addition, 'self-reported health' is a relative concept. What is regarded as "good health" by one person's standard may be "poor health" by another's. Another important point to note is that the present study observed migrants over the period of two years. If these migrants are followed through their life cycles, they may show a worse health status in the latter stages of their lives. Therefore, health interventions should not ignore the migrant population. This group requires policy attention and further research.

Between smoking and alcohol drinking, migration seem to have a strong relation with smoking. Migrants are always a special segment of the society (Lee, 1966) – they are the risk-takers. From the perspective of their risk-taking attitudes it seems reasonable to visualize migrants practicing health risk behaviors more than non-migrants. Migrants settle in a new environment – they may be out of family control, moreover, there is always a stress factor associated with the process of migration. Therefore, migrants may practice health risk behavior more than non-migrants.

The finding that migration leads individuals to practice health risk behavior, requires careful policy consideration. The main task for policy makers is to design appropriate intervention strategies targeting the migrants and their risk behaviors. The study identifies migrants as a clear target group for campaigns aimed at decreasing smoking and alcohol drinking. The multivariate analyses show all categories of

migrants to practice risk behaviors more than non-migrants. This is applicable for recent as well as long term migrants. Thus, policy interventions should be targeted early on the migrants. To be precise migrants call for attention as soon as they enter to a destination. In this regard, it can be said that specific strategies targeting the migrants, especially, the new migrants, may not be an easy task – it will require innovative thinking and approach. Previous studies have mentioned about establishing 'Information Centre' on employment situation, manpower demands, job types, job demands for migrants (Yongyuan, 2001). The present study recommends to provide health information from these centers as well. This can be an effective strategy to target the migrants, particularly, the new migrants. However, an additional in-depth study focusing on migrant's regular life at destination can serve as guideline for reducing health risk behaviors in this group.

Acknowledgement

The authors would like to thank the Wellcome Trust/IPSR for providing the scholarship that made this research possible. Thanks also go to all the researchers and staff of the Institute for Population and Social Research (IPSR) for their kind support.

References

Berthoud, R. 1997. The Mental Health of Ethnic Minorities. *New Community*, 23, 309- 324.

Bloland, P. B. and Williams, H.A. 2003. *Malaria Control during Mass Population Movements and Natural Disasters.* Washington, DC: National Academic Press.

Castro, M.C. and Singer, B. 2003. *Migration, Urbanization and Malaria: A Comparative Analysis of Dar-es-Salam, Tanzania and Machadinho, Rondonia, Brazil.* Paper presented at the International Conference on "African Migration in Comparative Perspective", June 4-7, 2003, Johannesburg, South Africa.

International Organization on Migration (IOM). 2001. factsheet. [Online]. Available from: http://www.IOM.int. [Accessed 2005 September 10].

Iyer, A. 2003. *Health Issues and Filipina Domestic Workers in Singapore.* Paper presented at the International Workshop on "Migration and Health in Asia", September 22-24, 2003, Bintan, Indonesia.

Kahn, K., Collinson, M., Tollman, S., Wolff, B., Garenne, M. and Clark, S. 2003. *Health Consequences of Migration: Evidence from South Africa's Rural Northeast.* Paper presented at the International Conference on "African Migration in Comparative Perspective", June 4-7, 2003, Johannesburg, South Africa.

Kanchanaburi Demographic Surveillance System Report on Round 2 (KDSS). 2001. Nakhonpathom, Thailand: Institute for Population and Social Research, Mahidol University.

Lee, S. E. 1966. A Theory of Migration. *Demography,* 3(1), 47-57.

Liamputtong, P. 2003. *Life as Mothers in a New Homeland: The Lived Experience of Southeast Asian Immigrant Women in Australia.* Paper presented at the International Workshop on "Migration and Health in Asia", September 22-24, 2003, Bintan, Indonesia.

Martens, P. and Hall, L. 2000. Malaria on the Move: Human Population Movement and Malaria Transmission. *Emerging Infectious Diseases,* 6(2): 103-109.

National Statistics Office of Thailand (NSO). 1996. [Online]. Available from: http:// www.nso.go.th/eng/index.htm. [Accessed 2005 June 25].

Shuval, J.T. 2001. Migration, Health and Stress, in *The Blackwell Companion of Medical Sociology,* Edited by W.C. Cockerham, Oxford: Blackwell, pp. 126-143.

Stoto, M. A. 1988. Estimating Age-specific Transition Rates for Population Sub-groups from Successive Surveys: Changes in Adult Rates of Cigarette Smoking. *Population Studies,* 42(2): 227-239.

Toyota, M. 2003. *Conference Report on Migration and Health in Asia.* Presented at the International Workshop on "Migration and Health in Asia". September 22-24, 2003, Bintan, Indonesia.

Wongboonsin, K. T. (1996). Social and Health Problems of Construction Labors in Lam-Chabang Municipal Area in Chonburi Pronvince. Bangkok: Design Publishing Company.

World Bank. 2000. Thailand's Response to AIDS. Bangkok: World Bank Thailand Office.

World Health Organization (WHO). 1999. International Classification of Diseases. [Online]. Available from: http://www.who.int/classifications/icd/en. [Accessed 2005 February 25].

Yongyuan, B. 2001. Migrant Adjustment to Thailand. *Unpublished doctoral dissertation.* Nakhonpathom, Thailand: Institute for Population and Social Research, Mahidol University.