Impact of Migration on Health in Kanchanaburi, Thailand*

Evi Nurvidya Arifin[†]
Aris Ananta[‡]
Sureeporn Punpuing[§]

1. Introduction

The current magnitude and pattern of population mobility, within a country or across the country, has been changing very quickly. Because migration involves people and people bring different norms and cultures, the intensified interaction of people of different social, economic, and political backgrounds may result in complex problems in the receiving areas. It has become a major challenge for policy makers.

In this respect, health is a fundamental and inevitable part of all population movement and resettlement. Whether the health of people who move is promoted and protected can affect how receiving societies cope with migrant's needs. It can also influence the way in which migrants adapt, and the ability is likely to determine the capacity of newcomers to contribute to social and economic development of the receiving communities.

At the same time, the interrelationship between health and population has been one of the widely discussed themes in the human history. Knowledge on how they influence each other is very important to produce policies and intervention for development. This is a two-way relationship, but historical demography and evolution of health problems are often examined separately, though they are very closed interconnected. (Ramalingaswami, 1994).

Theoretically, the relationship between migration and health can be from migration to health, health to migration, or both ways. Findley (1988) argued that the important link from migration to health is the migration-related stress. Therefore, this model excludes short-distance mobility, which may not result in stressful conditions. The assumption is that the greater the impact of migration on the adaptation to the new area, the more likely is the migration accompanied by stress and hence by deteriorating health status. Hence, this model also excludes minor changes in health status.

He then identified several possible relationships between migration and health. First is from health to migration. The relationship can be positive and linear, that is people with poorer health are less likely to migrate. However, some people with poorer health may be more likely to migrate because they seek better treatment. In this case, the relationship is a J-shaped curve: the probability of migrating first declines when the health status improves, but, quickly, the probability of migrating starts rising as health status keeps improving. Interaction with other variables such as age and living

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[†] Visiting fellow at Institute of Southeast Asian Studies, Singapore.
[‡] Senior research fellow at Institute of Southeast Asian Studies, Singapore.
[§] Researcher at Institute for Population and Social Research, Mahidol University, Thailand.

arrangement may complicate the relationship. Old people with poor health status may be very likely to migrate to obtain better medical treatment. Old people with poor health may not like to migrate if they live within the family and friends network. Further, the impact of health status on migration may also occur with a lag.

The second relationship is from migration to health. The pattern depends on the selectivity of the migrant, type of migrant, the extent of change or stress associated with the migration. Those who migrate to improve their welfare are not expected to have a deterioration effect on the health status. Indeed, the migration may improve the health status, if the health status is not good before migrating. On the other hand, if the migration results in major changes, or decline in income, health status may deteriorate after migration. Living arrangement also affects this causality. Those who live with their spouses may have better health after migrating than those who live alone. Another possibility is a temporary decline in health status after migration. After the migrants are settled in the new areas, the health status then returns to the condition before migration

The third relationship is a simultaneous causality. Health status may affect decision to migrate and the decision to migrate may also affect the health status.

This paper aims to contribute a better understanding on the complex relationship between migration and health, as a part of the much more dynamic interaction between population and health. Specifically, this paper has a modest aim, focusing on the impact of migration on health in Kanchanaburi, Thailand. We use lifetime migration status as the measurement of migration, the main exogenous variable in our equation. We utilise two measurements of health: the health status and health risk behaviour. The health status is indicated with self-reported health, while the health risk behaviour is proxied with seven indicators: four indicators related to drinking habit, one indicator on eating raw or half cooked meat, one on sleeping in a mosquito net/ a screened room, and another on consuming cigarettes.

Section 2 presents the theoretical framework of the relationship between migration and health, to show some possible patterns of relationship between two variables. Section 3 presents a brief review of studies on Migration and Health in Kanchanaburi. The data, variables used in the analysis and statistical method are presented in Section 4. Section 5 presents the results of the statistical analysis and the paper is closed with concluding remarks in Section 6.

2. Theoretical Framework

The literatures on determinants of health-related behaviour have shifted from mainly being concerned with individual variables as the determinants ("who you are") to a combination of individual variables and geographical variables ("where you live"). Duncan, Jones, and Moon (1996) and Malmstrom, Johanson, and Sundquist (2001) argued the need of relating the actions of individuals to the geographical condition within which the actions are performed. If there is no geographical impact, then individuals with the similar characteristics will experience similar health, regardless where they live. Pure geographical impact will mean that individuals with similar characteristics will have different health status depending on which geographical condition they live in. The use of geographical variables in the analysis is also argued to be beneficial for policy makers in deciding at which level the interventions should be aimed at. Davey (1996) argued that

contextual variables may better explain morbidity than mortality at individual level.

With US data for 1990-1992, Subramian, Kawachi, and Kennedy utilised self-rated health as the dependent variable, constructed as a dichotomous variable from "Would you say that in general your health is excellent, very good, good, fair, or poor?" The dichotomous dependent variable is whether it is fair-poor or otherwise. Idler and Kasl (1995) showed that this simple dichotomous measurement of self-rated health is powerful in predicting mortality, independent of other factors.

The individual variables include: age, sex, race, income, health care coverage, health check-up in last year, smoking habit, and marital status. The geographical variables include: per capita median income, gini coefficient on inequality, and mistrust (percentage of respondents say "yes" to the following question "Would other people take advantage of you if they could?"

Using the 1991 British Census, Boyle, Gatrell, and Duke-Williams (2001) attempted to find out the impact of area-level deprivation and variation in deprivation on self-rated health, once the impact of individual variables has been accounted for. They also included migration as one of the independent variable. In their model, migration is measured as a geographical variable, namely the log percentage of the population who had been in-migrants for one year.

Gleave, Bartley, and Wiggins's study (1997) is another model which have included migration as one of the independent variables. However, unlike in Boyle, Gatrell, and Duke-Williams, they measured migration at the level of individual. The migration variable has three categories: same district, different district but same county, and different county.

The patterns of social networks the migrants had after they move to the destination area would influence migrants' health. Bond (1999) used network concepts to explore the sexual relationships, patterns of sexual partner selection, and the potential health risks among the unmarried urban migrants in the northern Thailand. In this study, it is found that "urban friendship networks reveal continuity with village networks in that they provided support and companionship, replacing the role of village kinship". It is also found that there was a gender difference of the network. Men had less opportunity to discuss problems or other serious issues with other men, while women always like to share of gossipy, problems one another.

It is found that migrants are less likely to use the health services since they may not know how and where to obtain the health services. Access is a concept involving awareness of people's need for medical care service, availability of services and acceptability of the service and affordability to the service (Fosu, 1989).

Housing satisfaction is related to health. Crowded household is a potential factor of chronic stress and psychological well-being (Fuller, T.D., et al, 1996). There are no doubt that majority of short-term migrants live in a worse house situation than long-term migrants and local residents. This implies that migrants' health may be affected by the housing conditions.

Poverty and health insurance influence on migrants' health. Tangchroensathien, et al (2000) investigated health impacts of the economic crisis in Thailand in 1997. They pointed out that during the economic crisis, household health expenditure reduced by 24 percent in rural areas. The proportion of severe stress, suicidal ideation and hopeless feelings about the future was higher among unemployed than the employed.

Finally, as argued by Evans (1987), the use of health perspective in the design of migration research will improve the quality of the researches, compared to the traditional migration researches based only on various types of population movement. The use of health perspective on migration research has seen migration as a human process, rather than simply a discrete event.

Migrants may have higher morbidity because of differences in disease prevalence at the place of origin, the psychological and physical stress of moving, and the adaptation to the new environments. On the other hand, migrants may appear healthier as they tend to be younger because of factors such as selectivity in migration streams and the legal barriers against entry for those in poor health (Leslere, Jensen, and Biddlecom, 1994). Health can be used as criteria for allowing immigration. It can also be used as an indicator of the success of assimilation between migrants and no-migrants. If they have become assimilated, their health status becomes similar.

3. Brief Review on Migration and Health in Kanchanaburi

3.1 Migration in Thailand

Throughout the world population's long history, the movement of people is not a new phenomenon. Significant fluctuations in the volume and direction of the population movement have occurred in the past and are expected to continue in the future. For example, international population movement either within or from Asia was little from the early 1950s to early 1970s. After that period, the flow of migration from Asia increased especially to the oil-rich countries of the Middle East (Skeldon, 1999). After the Gulf conflict in 1990/91, there was a shift in direction of population movement, towards destinations within Asia and particularly countries exhibiting rapid and sustained economic growth such as Japan, Hong Kong, Taiwan, Korea, Singapore, Malaysia, Brunei Darussalam and Thailand.

Thailand is an interesting case. Migration within Thailand makes up the vast majority of moves. Internal mobility can take forms of short-term or long-term mobility. Short-term mobility (commuting or seasonal mobility) is quite high. Commuting has become a major contributor to traffic congestion in Bangkok. Expanding economy, increasing urban population, expansion of built-up areas, improved transportation and communication networks, and government policies encourage commuting and increase commuting distance in Bangkok (Punpueng 1999). While Nanthamongkolchai, 2000 examined factors associated with choice of destination among the out-migrants from Bangkok. It was found that the provinces of destination of out-migrants from Bangkok were vicinity provinces, growth cities and other provinces.

Though there is a high level of internal migration, there is also considerable numbers of international migrants (Chamratrithirong et al. 1995. It sends a large number of workers overseas, but recently it also received an even larger number of workers from its neighbouring poorer countries, mostly from Myanmar, China, Laos, and Cambodia. (Tsai and Tsay, 2004). Migration from Myanmar was partly economic and partly political.

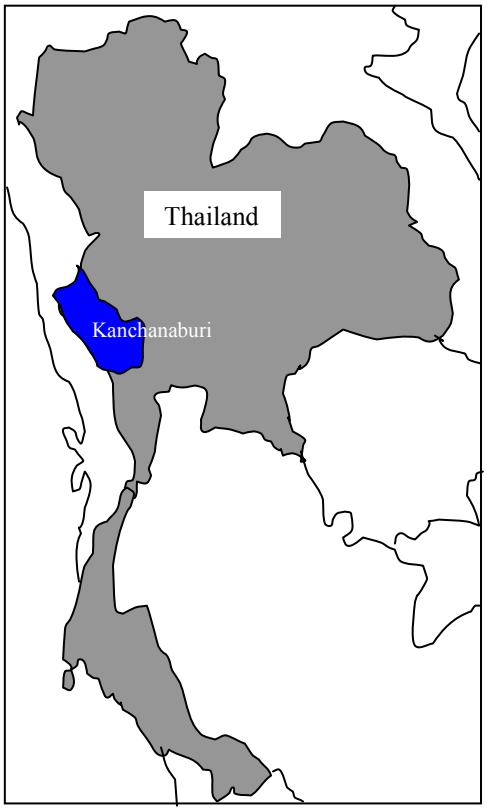
While a significant amount of Thai workers left for overseas employment, those who stayed preferred not to do the dangerous, difficult and dirty jobs. Thus, foreign

workers accepted the jobs that Thai nationals did not want, especially in fisheries, construction work and farming. Some female migrants were employed in industrial and service sectors. They worked in factories, as domestic workers and in the entertainment business.

3.2 Kanchanaburi

Covering an area of 19,486 square kilometres out of Thailand's total land area of 500,000 square kilometres, Kanchanaburi is Thailand's third largest province (Kanchanaburi.com, 2000; College of Population Studies, 1999). Kanchanaburi is home to an estimated 775,198 people (College of Population Studies, 1999), residing in the 13 districts or amphoe.

Kanchanaburi is located in the western part of the country and the location of many industries and also within an easy reach from Bangkok. It is a major tourist destination, in part because of the many national parks contained in the upland districts. The province shares a long border with Myanmar and comprises an important watershed area for the lower part of Central Thailand, containing some of the few natural forested areas remaining in Thailand. It attracts both internal migrants and undocumented migrants from neighbouring Myanmar.



Kanchanaburi borders Myanmar on its northern and western reaches, and this shared boundary has been the source of conflicts and interests for both countries. There are three official gateways to Myanmar in Kanchanaburi province, as well as numerous

illegal access points. Recent tensions near the border have culminated in conflicts such as the raid on Ratchaburi Hospital by Karen rebels who had infiltrated through Kanchanaburi from Myanmar (Bangkok Post, Jan 25, 2000). The encouragement of research on the province by the government, therefore, is founded in the desire to gather better information on the province.

The province is mountainous and heavily forested in the northeast. Forest areas of Kanchanaburi province are concentrated in the uplands. Forest destructions in Kanchanaburi, has been partly because of illegal logging in the Wildlife Sanctuary, Thong Pha Phum National Park, and Saiyoke National Park since 1991. Undocumented migrants have often been blamed for forest destruction in the uplands of Kanchanaburi (Krungthep Turakit 18/05/98).

Economic reasons also constitute another determinant of migration. The Andaman Sea, with its deep-sea port and proximity to trading/shipping routes, is just 80 km from the Thai border in Kanchanaburi province, and access to the port has become an economic priority in several ways. (Bangkok Post, Nov. 20, 1996). Plans are also afoot to build a road linking Tavoy in Myanmar to Kanchanaburi's Ban Bongti in Sai Yok, which will offer Thailand access to the deep-sea port in Myanmar. Spanning 110km, it is also hoped that the road will help turn Kanchanaburi into a tourism hub in the upper west of Thailand by enabling faster access into Myanmar (Bangkok Post, Mar 10, 1999). Currently, Kanchanaburi Province is host to numerous historically significant sites showcasing the 'relics' of World War II, during which the occupying Japanese army forced thousands of Allied prisoners of war to build the infamous Death Railway, which runs along the Kwae Noi River through a pass on the Thai-Myanmarese border.

Kanchanaburi has a higher Malaria prevalence rate than other parts of Thailand. Migrants, especially the cross-border migrants are more likely to be infected by the Malaria as they always live in the forest area of Kanchanaburi province. Singhanetra-Renard (1993) used the data from the three northern Thai villages to examine the relationship between Malaria transmission and migration. It is pointed out that movement across the border from Burma or Laos to Thailand "either brings infected people into Thai communities or exposes Thais to infected vectors inside Burma". Seasonal, temporary, and illegal migrants who were always outside the net of public health or Malaria control programs.

4. Data and Method

4.1. Source of Data

This paper uses data from the Kanchanaburi Project, conducted by the IPSR, Mahidol University. The fieldwork of the project is conducted every year during the five-year period. With support from the Wellcome Trust, the Kanchanaburi Project commenced in January 2000. The primary objective of the project is to monitor population change within a field site selected from communities in Kanchanaburi province. In July of each year, commencing in 2000, a census of all communities in the field station population is undertaken. The census includes the application of a household questionnaire for all households, and individual questionnaires for household members aged 15 years and over.

The census questionnaire consists of two main components. In the first component, data on fertility, mortality, and migration is collected annually. The second component includes questions related to social, economic, health and environmental issues. The issues included in this component change each year in order to maintain the survey instrument at an acceptable size and to respond to the changing social and policy contexts.

This paper utilises data from the first rounds of population census collected from the Kanchanaburi Field Station from July 1 to August 15, 2000 to examine the impact of migration on population health in Kanchanaburi province. In the 2000 census of communities, data was collected on 27,902 individual aged 15 and above living in 11,612 households. It covers all 13 districts of Kanchanaburi and comprises a study area of 100 field site communities consisting of 86 villages and 14 urban blocks. The selected villages/urban blocks are one-eight of the total villages/urban blocks. They are selected using five strata: urban/semi-urban, rice producing, plantations, upland areas, and mixed economy. There are 20 villages/census blocks in each stratum. The strata were defined to reflect the diversity in social, economic and ecological conditions found in the province (see IPSR, 2001). There were 27,770 observations after the cleaning process based on the variables used in the analysis.

4.2 Statistical method

We focus on the impact of migration on health, because migration is measured by lifetime migration, an event which is measured since the time of birth of the respondent, while health is measured as the condition during the interview. In other words, with this data set, the direction of causality is from migration to health, rather than from health to migration.

The statistical analyses are performed using logistic regression (Hosmer and Lemeshow, 1989) by means of SPSS software. We have two equations because we have two measurements of the left-hand side variable. The first one is performed to examine the impact of migration status on health risk behaviours controlling for socio-demographic-geographic variables. The second one is carried out to examine the impact of migration status on self-rated health status controlling for socio-demographic-geographic variables. The results are presented as odd ratios.

4.2.1 Left-hand Side Variables

There have been many ways to measure self-rated or self-reported health (SRH). However, Fayer and Sprangers (2002) concluded that the most frequent way of measuring SRH is by asking the patients to scale their overall health from excellent to very poor. They argued that this simple question has been able to provide an important indicator on how patients rate their health status. The wording may be different, but the essence is the same. They may ask, “In general, would you say your health is...”, “Your own health state today”, or “How would you rate your overall quality of life during the past week?”

Nevertheless, they also argued that a question “How would you rate your overall health” may produce a reaction “compared to when and who?” Some patients may compare their condition with others with the same age, some may compare with their

own condition before they become sick, and some others may have developed coping ability with their sickness. Similar perception may be held by respondents who are not patients. In short, there are still many unresolved questions on the SRH assessment.

Yet, despite all these shortcomings, Fayers and Sprangers also concluded that SRH could predict mortality and morbidity and it can screen high-risk groups. It is related to functional ability, medical diagnoses, and physical and mental symptoms. They also asserted that some studies have shown the strength of the prognostic power of the SRH.

Bailis, Segall, and Chipperfield (forthcoming), Reyes-Gibby, Aday, and Cleeland (2002), Blakely, Lochner, and Kawachi (2002), and Subramanian, Kawachi, and Kennedy (2001) scaled the answer with excellent, very good, good, fair, and poor. The dependent variable is equal to 1 if the answer is excellent, very good, or good; and 0 otherwise. Carlson (2000) used a similar method. Being healthy includes an answer of very good and good, and unhealthy for answers of fair, bad, and very bad. The reason for dichotomisation is uncertainty on whether the scale forms a continuous measurement.

In this paper, we employ a dichotomous self-reported health status, assessing the health status reported by the individual. We have an indicator measuring current self-reported health status, relating to condition during the survey. Self-reported health status is equal to 1 if the respondent answered yes to the following question "Do you suffer from any persistent illness? (An illness that makes you sick and off)" and 0 otherwise. Therefore, health status measures chronic illnesses referring to those health problems associated with specific diseases, health disorders and symptoms associated with abnormal bodily functions.

Furthermore, we also examine variables measuring health risk behaviours. We include several health risk behaviours: eating raw or half-cooked meat, sleeping in a mosquito net/a screened room, consuming cigarettes and drinking addictive substances (beer, liquor, energy drinks, canned coffee). All these variables in the analysis are treated as a dichotomous variable.

Raw or half-cooked meat can harbour parasites and microbes leading to disease in human beings. In the questionnaire, the question is "in the past year, have you ever eaten raw or half-cooked meat? If, so how often?". There are four possible answers, ranging from never eaten, seldom, once or twice a week, and everyday/almost everyday. For the analysis, it is dichotomised with 0 for never eat raw meat and 1 for the rest.

Malaria and dengue fever are two common mosquito-borne diseases in the study area. If people do not sleep with mosquito net or in a screened room, they may be risking themselves from getting these diseases. The people interviewed were asked with this question "Do you sleep in a mosquito net / a screened room?" Three possible answers were provided: never, some days, and everyday. It is dichotomised by grouping "some days" and "everyday" in one category and recorded as 1, while "never" is recorded as 0.

Consuming potential addictive substances may lead to a deteriorating health status and reflect to some extent emotional health. We consider examining the consumption pattern of the addictive substances such as cigarettes, beer, liquor, Gatorade (energetic beverages) and canned coffee. For these matter, the question is "do you currently consume any of the following?" If the answer "yes", it is categorised as 1 and 0 otherwise.

4.2.2 Right-hand Side Variables

Lifetime migrant is defined by comparing current place of residence and place of birth. Individuals are categorised as migrants if their current place of residence is different from place of birth. Two questions are available regarding place of birth (village, sub-district, province and country). First is 'Where is your birth place?' Second is 'At the time when you were born, was your birthplace located in a municipality or rural area?' However, for this analysis the first question is used to define migrant status.

We use district boundary to define migrant. We do not use province because the data set is for Kanchanaburi province and, therefore, the sample is respondents who lived in Kanchanaburi. With district as the boundary unit, we then have three categories of lifetime migrant, namely inter-provincial migrant (MIG1), intra-provincial migrant (MIG2) and international migrant (MIG3). The non-migrant is the reference group.

We also have a group of individual variables: age, gender, education, and marital status. Age is measured in single year (AGE1) and it is the only variable treated as a continuous variable in the analysis. Age square (AGE2) is also included to examine non-linear effect of age.

Gender is equal 1 for male and 0 for female. Individuals are classified into two groups of marital status: never married and ever married. The category of ever married is the reference group in the statistical model. Education is measured as completed educational level. For the analysis, it is categorised into four groups: Illiterate and lower than elementary (ED1), elementary (ED2), secondary (ED3), and higher than secondary (ED4). The highest educational level is the reference group.

Finally, we have a geographical variable (regional strata), classified into five group based on the main occupation of the population and land use patterns. These strata are urban/semi-urban, rice producing (RICE), plantation (CASH), upland areas (UPLAND), and mixed economy areas (OTHER). The stratum of urban/semi-urban areas is used as the reference group, where the population lived in municipal areas having a significant proportion of the labour force employed in industries. In the rice producing areas located in lowland areas, the main occupation of the population was rice farmer. Plantation areas were also in lowland areas and the majority people cultivated cassava and sugar cane. Upland areas are located in highland districts. The mixed economy was the area which did not fall to any of the previously mentioned categories.

5. Results

5.1 General Characteristics of the Sample

Descriptive characteristics of the sample are presented in **Table 1**. The analyses reported here are based on 27,770 individuals aged 15 year and above consisting of 45.32% male and 54.68% female with a mean age of 39.34 years. More than 50% of the sample is categorised as migrants consisting mostly (32.10%) inter-provincial migrants, followed by 14.97% intra-provincial migrants and 5.69% international migrants. There were always more female than male regardless the migration status.

Figure 1 shows that the intra and inter provincial migrants had older age structure than the international migrants and the non-migrants. After age 40, each of the intra and

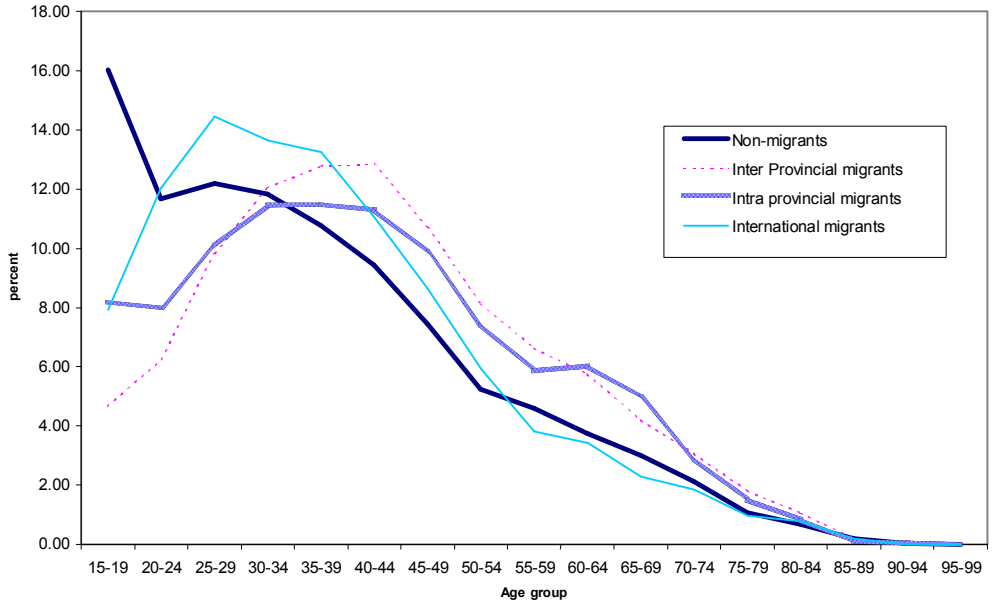
inter provincial migrants always had a higher percentage of population compared to each of the non-migrants and international migrants. On the other hand, before age 30, each of the non-migrants and international migrants had a higher percentage of population than in the intra and inter-provincial migrants.

In term of the educational level completed, about three-quarter of the sample had lower than elementary school. Table 1 shows that non-migrants had a better educational composition with the highest percentage (31.00%) of those who have completed secondary level and higher. International migrants had almost exclusively low education with about 80% illiterate or lower than elementary school. Domestic migrants (inter provincial and intra provincial migrants) had rather similar pattern of educational level with about one quarter of them graduated from secondary level and higher.

Regardless their migration status, the majority (nearly 80%) of the total sample was ever married. International migrants were mostly ever married (91.26%), and the lowest percentage (70.85%) of ever married is non-migrant.

International migrants mostly lived in upland areas (92.65%) and they formed 22.61% of the population in these areas. Migrants altogether in upland areas comprised 63.79% of the population. In cash crops areas where people plant cassava and sugar cane, migrants even comprised higher percentage (64.35%) to the total population. The lowest percentage of migrants was found in rice producing areas. The migrants comprised 33.14% of the population. Interestingly, the highest percentage of non-migrants was found in urban/industrial areas.

Figure 1. Percentage Distribution of Sample by Age and Migrant Status



5.2 Impact of Migrant Status on Health Risk Behaviours

We use seven indicators for health-risk behaviours: eating raw or half-cooked meat, smoking, not using mosquito net or not sleeping in a screened room, and four drinking

habits: drinking liquor, drinking beer, drinking energy drink such as Gatorade, and drinking canned coffee.

In general, as shown in **Tables 2-8**, all indicators show that the majority of the population perform good health behaviour. The majority (67.9%) of the population never eats raw meat. The majority (68.3%) of the population does not smoke. Almost all (96.0%) of the population use mosquito net or sleep in a screened room. We also find that 67.3% never drinks beer, 72.9% never drinks liquor, 77.1% never drinks energy drink, and 85.6% never drinks canned coffee.

Model 1 in Table 9 shows that international migrants had the lowest probability of having bad drinking habits, measured by the four drinking habits. The second lowest probability was found among the non-migrants. The intra-provincial migrants were the third if measured with drinking beer or drinking liquor, but number fourth if measured with drinking energy drink or canned coffee.

Model 2 in Table 9 indicates the result of the statistical examination if we control the analysis with age, marital status, education, and regional strata. The international migrants still had the lowest probability of having bad drinking behaviour. The non-migrants still occupied the second position. However, intra-provincial migrants had the same probability as the non-migrants in term of drinking beer and drinking liquor, and still had the third place in term of drinking canned coffee. Inter-provincial migrants had the highest probability of having bad drinking habit, except when measured with drinking canned coffee where they had the second highest probability of having bad drinking habits.

Table 10 shows that inter-provincial migrants had the largest probability of having health risk behaviour if measured with eating raw, but the lowest probability if measured with smoking. International migrants had the lowest probability of using mosquito nets, but the highest in smoking. Measured with eating raw meat, the non-migrant had the same, and smallest, probability as the international migrants did.

In short, the international migrants always had the lowest probability in having all health-risk behaviour, except smoking. They had the highest probability of smoking. However, the results are mixed among the non-migrants, intra-provincial migrants, and inter-provincial migrants. There is no general pattern of health risk behaviour among these three migration statuses. The intra-provincial migrants were more likely to be similar, in terms of health risk behaviour, to the non-migrants, especially as related to drinking beer, drinking liquor, using mosquito net/ a screened room, and smoking.

5.3 Impact of Migrant Status on Self-Reported Health Status

The left hand variable is whether or not the respondent has a chronic illness as a measurement of self-reported health status. Overall, the population suffering from chronic illnesses constituted 40% of the respondents. As shown in **Table 11**, the percentage was the highest among female, those who were illiterate or lower than elementary, and those who were ever married. Geographically, the highest percentage of suffering from chronic illnesses was among those who lived in rice producing areas and the lowest percentage was among those who lived in upland areas with a substantial number of international migrants.

Without taking into account other variables, the migration status seems to significantly affect the health status. Model 1 in **Table 12** shows that the coefficients of both provincial migrants and internal migrants were positive, and the coefficient of international migrants was negative. Domestic migrants (provincial and internal migrants) were more likely to suffer from chronic illnesses than non-migrants. On the other hand, migrants from outside Thailand had lower probabilities of having chronic illnesses than the non-migrants.

This pattern did not change even after taking into account other individual variables (age, sex, and education) and a geographical variable (see Model 2 in **Table 12**). It should be noted that all independent variables, except the marital status, had significant correlation with the health status. In other words, persons with the same age, sex and education, but different status of migration were more likely to have different probability of suffering from a chronic illnesses. The international migrant had the lowest probability of suffering from a chronic illness, followed by the non-migrants, provincial migrants, and finally by internal migrants. In other words, the health status of the domestic migrants was worse than the non-migrants, and that of the international migrants was better than the non-migrants.

6. Conclusion

The conclusion with regard to the association between migration status and health status seemed to be robust. The international migrants had the lowest probabilities of suffering from chronic illness, followed by non-migrants, inter-provincial migrants, and intra-provincial migrants. In other words, the international migrants were the least likely to be unhealthy. The non-migrants were healthier than the domestic migrants. The result was the same whether we control with other independent variables.

The international migrants also had the lowest probability of having health-risk behaviour, except when measured with smoking. The intra-provincial migrants were more likely to have similar drinking habits (beer and liquor) to the non-migrants, probably because both of them were from the same province. There was no significant difference in smoking habit and using mosquito net among the Thais.

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Table 1. Characteristics of the Sample by Socio-Demographic-Geographic Variables

Variable	Migrant Status								Total	%
	Non-migrants		Inter provincial migrants		Intra provincial migrants		International migrants			
	Number	%	Number	%	Number	%	Number	%		
Gender										
Female	7238	55.17	4922	55.22	2224	53.49	801	50.73	15185	54.68
Male	5881	44.83	3992	44.78	1934	46.51	778	49.27	12585	45.32
Total	13119	100.00	8914	100.00	4158	100.00	1579	100.00	27770	100.00
Education										
Illiterate and lower than elementary	1401	10.68	1199	13.45	654	15.73	1266	80.18	4520	16.28
Elementary	7638	58.22	5403	60.61	2577	61.98	269	17.04	15887	57.21
Secondary	3247	24.75	1572	17.64	676	16.26	40	2.53	5535	19.93
Higher than secondary	833	6.35	740	8.30	251	6.04	4	0.25	1828	6.58
Total	13119	100.00	8914	100.00	4158	100.00	1579	100.00	27770	100.00
Marital Status										
Ever married	9295	70.85	7888	88.49	3515	84.54	1441	91.26	22139	79.72
Single	3824	29.15	1026	11.51	643	15.46	138	8.74	5631	20.28
Total	13119	100.00	8914	100.00	4158	100.00	1579	100.00	27770	100.00
Regional Strata										
Urban/industrial	3404	25.95	2097	23.52	818	19.67	21	1.33	6340	22.83
Rice field	3208	24.45	818	9.18	770	18.52	2	0.13	4798	17.28
Cash crops	1559	11.88	2124	23.83	683	16.43	7	0.44	4373	15.75
Upland	2343	17.86	1925	21.60	740	17.80	1463	92.65	6471	23.30
Others	2605	19.86	1950	21.88	1147	27.59	86	5.45	5788	20.84
Total	13119	100.00	8914	100.00	4158	100.00	1579	100.00	27770	100.00
%	47.42		32.10		14.97		5.69		100.00	

Table 2. Percentage Distribution of the Sample by Eating Raw/Half-cooked Meat and Socio-Demographic-Geographic Variables

Variable		Eat raw meat?		Total	Eat raw meat?		Total
		No	Yes		No	Yes	
Life time migration	Non-migrants	9,297	3,815	13,112	70.90	29.10	100.00
	Inter-provincial migrants	5,608	3,303	8,911	62.93	37.07	100.00
	Intra-provincial migrants	2,897	1,260	4,157	69.69	30.31	100.00
	International migrants	1,037	542	1,579	65.67	34.33	100.00
Gender	Female	10,936	4,243	15,179	72.05	27.95	100.00
	Male	7,903	4,677	12,580	62.82	37.18	100.00
Education	Illiterate and lower than elementary	3,177	1,340	4,517	70.33	29.67	100.00
	Elementary	10,637	5,245	15,882	66.98	33.02	100.00
	Secondary	3,733	1,800	5,533	67.47	32.53	100.00
	Higher than secondary	1,292	535	1,827	70.72	29.28	100.00
Marital Status	Ever married	15,077	7,052	22,129	68.13	31.87	100.00
	Single	3,762	1,868	5,630	66.82	33.18	100.00
Regional Strata	Urban/industrial	4,586	1,753	6,339	72.35	27.65	100.00
	Rice field	3,267	1,531	4,798	68.09	31.91	100.00
	Cash crops	2,673	1,697	4,370	61.17	38.83	100.00
	Upland	4,017	2,450	6,467	62.12	37.88	100.00
	Others	4,296	1,489	5,785	74.26	25.74	100.00
Total		18,839	8,920	27,759	67.87	32.13	100.00

Table 3. Percentage Distribution of the Sample by Smoking Behaviour and Socio-Demographic-Geographic Variables

Variable		Do you smoke?		Total	Do you smoke?		Total
		No	Yes		No	Yes	
Life time migration	Non-migrants	9,488	3,622	13,110	72.37	27.63	100.00
	Inter-provincial migrants	6,121	2,791	8,912	68.68	31.32	100.00
	Intra-provincial migrants	2,783	1,374	4,157	66.95	33.05	100.00
	International migrants	554	1,023	1,577	35.13	64.87	100.00
Gender	Female	13,548	1,631	15,179	89.25	10.75	100.00
	Male	5,398	7,179	12,577	42.92	57.08	100.00
Education	Illiterate and lower than elementary	2,447	2,070	4,517	54.17	45.83	100.00
	Elementary	10,634	5,245	15,879	66.97	33.03	100.00
	Secondary	4,289	1,243	5,532	77.53	22.47	100.00
	Higher than secondary	1,576	252	1,828	86.21	13.79	100.00
Marital Status	Ever married	14,407	7,721	22,128	65.11	34.89	100.00
	Single	4,539	1,089	5,628	80.65	19.35	100.00
Regional Strata	Urban/industrial	5,003	1,336	6,339	78.92	21.08	100.00
	Rice field	3,534	1,262	4,796	73.69	26.31	100.00
	Cash crops	3,001	1,370	4,371	68.66	31.34	100.00
	Upland	3,209	3,254	6,463	49.65	50.35	100.00
	Others	4,199	1,588	5,787	72.56	27.44	100.00
Total		18,946	8,810	27,756	68.26	31.74	100.00

Table 4. Percentage Distribution of the Sample by Sleeping Under Mosquito Net or a Screen Room and Socio-Demographic-Geographic Variables

Variable		Use mosquito net?		Total	Use mosquito net?		Total
		No	Yes		No	Yes	
Life time migration	Non-migrants	547	12558	13105	4.17	95.83	100.00
	Inter Provincial migrants	302	8599	8901	3.39	96.61	100.00
	Intra Provincial migrants	150	4001	4151	3.61	96.39	100.00
	International migrants	105	1473	1578	6.65	93.35	100.00
Gender	Female	496	14669	15165	3.27	96.73	100.00
	Male	608	11962	12570	4.84	95.16	100.00
Education	Illiterate and lower than elementary	194	4322	4516	4.30	95.70	100.00
	Elementary	507	15363	15870	3.19	96.81	100.00
	Secondary	326	5199	5525	5.90	94.10	100.00
	Higher than secondary	77	1747	1824	4.22	95.78	100.00
Marital Status	Ever married	637	21477	22114	2.88	97.12	100.00
	Single	467	5154	5621	8.31	91.69	100.00
Regional Strata	Urban/industrial	426	5892	6318	6.74	93.26	100.00
	Rice field	119	4673	4792	2.48	97.52	100.00
	Cash crops	106	4265	4371	2.43	97.57	100.00
	Upland	262	6207	6469	4.05	95.95	100.00
	Others	191	5594	5785	3.30	96.70	100.00
Total		1104	26631	27735	3.98	96.02	100.00

Table 5. Percentage Distribution of the Sample by Drinking Beer and Socio-Demographic-Geographic Variables

Variable		Drink beer?		Total	Drink beer?		Total
		No	Yes		No	Yes	
Life time migration	Non-migrants	8,813	4,299	13,112	67.21	32.79	100.00
	Inter-provincial migrants	5,789	3,118	8,907	64.99	35.01	100.00
	Intra-provincial migrants	2,717	1,440	4,157	65.36	34.64	100.00
	International migrants	1,372	207	1,579	86.89	13.11	100.00
Gender	Female	12,354	2,826	15,180	81.38	18.62	100.00
	Male	6,337	6,238	12,575	50.39	49.61	100.00
Education	Illiterate and lower than elementary	3,537	981	4,518	78.29	21.71	100.00
	Elementary	10,261	5,615	15,876	64.63	35.37	100.00
	Secondary	3,657	1,877	5,534	66.08	33.92	100.00
	Higher than secondary	1,236	591	1,827	67.65	32.35	100.00
Marital Status	Ever married	14,704	7,421	22,125	66.46	33.54	100.00
	Single	3,987	1,643	5,630	70.82	29.18	100.00
Regional Strata	Urban/industrial	4,397	1,940	6,337	69.39	30.61	100.00
	Rice field	2,883	1,913	4,796	60.11	39.89	100.00
	Cash crops	2,850	1,521	4,371	65.20	34.80	100.00
	Upland	4,601	1,864	6,465	71.17	28.83	100.00
	Others	3,960	1,826	5,786	68.44	31.56	100.00
Total		18,691	9,064	27,755	67.34	32.66	100.00

Table 6. Percentage Distribution of the Sample by Drinking Liquor and Socio-Demographic-Geographic Variables

Variable		Drink liquor?		Total	Drink liquor?		Total
		No	Yes		No	Yes	
Life time migration	Non-migrants	9,783	3,330	13,113	74.61	25.39	100.00
	Inter-provincial migrants	6,226	2,682	8,908	69.89	30.11	100.00
	Intra-provincial migrants	2,970	1,188	4,158	71.43	28.57	100.00
	International migrants	1,267	311	1,578	80.29	19.71	100.00
Gender	Female	13,390	1,789	15,179	88.21	11.79	100.00
	Male	6,856	5,722	12,578	54.51	45.49	100.00
Education	Illiterate and lower than elementary	3,500	1,018	4,518	77.47	22.53	100.00
	Elementary	11,266	4,611	15,877	70.96	29.04	100.00
	Secondary	4,111	1,423	5,534	74.29	25.71	100.00
	Higher than secondary	1,369	459	1,828	74.89	25.11	100.00
Marital Status	Ever married	15,801	6,326	22,127	71.41	28.59	100.00
	Single	4,445	1,185	5,630	78.95	21.05	100.00
Regional Strata	Urban/industrial	4,786	1,554	6,340	75.49	24.51	100.00
	Rice field	3,501	1,297	4,798	72.97	27.03	100.00
	Cash crops	3,120	1,251	4,371	71.38	28.62	100.00
	Upland	4,506	1,954	6,460	69.75	30.25	100.00
	Others	4,333	1,455	5,788	74.86	25.14	100.00
Total		20,246	7,511	27,757	72.94	27.06	100.00

Table 7. Percentage Distribution of the Sample by Drinking Energy Drinks by Socio-Demographic-Geographic Variables

Variable		Energy Drinks?		Total	Energy Drinks?		Total
		No	Yes		No	Yes	
Life time migration	Non-migrants	10,163	2,952	13,115	77.49	22.51	100.00
	Inter-provincial migrants	6,717	2,193	8,910	75.39	24.61	100.00
	Intra-provincial migrants	3,112	1,046	4,158	74.84	25.16	100.00
	International migrants	1,401	176	1,577	88.84	11.16	100.00
Gender	Female	13,926	1,255	15,181	91.73	8.27	100.00
	Male	7,467	5,112	12,579	59.36	40.64	100.00
Education	Illiterate and lower than elementary	3,886	632	4,518	86.01	13.99	100.00
	Elementary	11,594	4,286	15,880	73.01	26.99	100.00
	Secondary	4,285	1,249	5,534	77.43	22.57	100.00
	Higher than secondary	1,628	200	1,828	89.06	10.94	100.00
Marital Status	Ever married	16,809	5,320	22,129	75.96	24.04	100.00
	Single	4,584	1,047	5,631	81.41	18.59	100.00
Regional Strata	Urban/industrial	5,021	1,319	6,340	79.20	20.80	100.00
	Rice field	3,410	1,387	4,797	71.09	28.91	100.00
	Cash crops	3,250	1,121	4,371	74.35	25.65	100.00
	Upland	5,337	1,127	6,464	82.56	17.44	100.00
	Others	4,375	1,413	5,788	75.59	24.41	100.00
Total		21,393	6,367	27,760	77.06	22.94	100.00

Table 8. Percentage Distribution of the Sample by Drinking Canned Coffee and Socio-Demographic-Geographic Variables

Variable		Drink canned coffee?		Total	Drink canned coffee?		Total
		No	Yes		No	Yes	
Life time migration	Non-migrants	11,137	1,975	13,112	84.94	15.06	100.00
	Inter-provincial migrants	7,634	1,275	8,909	85.69	14.31	100.00
	Intra-provincial migrants	3,469	688	4,157	83.45	16.55	100.00
	International migrants	1,518	61	1,579	96.14	3.86	100.00
Gender	Female	14,019	1,160	15,179	92.36	7.64	100.00
	Male	9,739	2,839	12,578	77.43	22.57	100.00
Education	Illiterate and lower than elementary	4,231	286	4,517	93.67	6.33	100.00
	Elementary	13,421	2,458	15,879	84.52	15.48	100.00
	Secondary	4,544	989	5,533	82.13	17.87	100.00
	Higher than secondary	1,562	266	1,828	85.45	14.55	100.00
Marital Status	Ever married	19,149	2,980	22,129	86.53	13.47	100.00
	Single	4,609	1,019	5,628	81.89	18.11	100.00
Regional Strata	Urban/industrial	5,459	881	6,340	86.10	13.90	100.00
	Rice field	3,892	903	4,795	81.17	18.83	100.00
	Cash crops	3,619	752	4,371	82.80	17.20	100.00
	Upland	5,740	726	6,466	88.77	11.23	100.00
	Others	5,048	737	5,785	87.26	12.74	100.00
Total		23,758	3,999	27,757	85.59	14.41	100.00

Table 9. Impact of Migration Status on "Drinking Habit"

Variable	Drinking Habit							
	Beer		Liquor		Energy drink		Canned coffee	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
MODEL1								
MIG1	0.099	***1.104	0.236	***1.266	0.117	***1.124	-0.060	0.942
MIG2	0.083	**1.086	0.161	***1.175	0.146	***1.157	0.112	**1.118
MIG3	-1.173	***0.309	-0.327	***0.721	-0.838	***0.432	-1.485	***0.227
Constant	-0.718	0.488	-1.078	0.340	-1.236	0.290	-1.730	0.177
MODEL 2								
Migrant status								
MIG1	0.124	***1.131	0.152	***1.164	0.157	***1.171	0.129	***1.138
MIG2	0.058	1.060	0.062	1.064	0.095	**1.099	0.245	***1.277
MIG3	-1.399	***0.247	-0.975	***0.377	-0.814	***0.443	-1.272	***0.280
Age								
AGE1	0.112	***1.119	0.153	***1.165	0.097	***1.102	0.049	***1.051
AGE2	-0.001	***0.999	-0.002	***0.998	-0.001	***0.999	-0.001	***0.999
Gender								
MALE	1.581	***4.861	1.963	***7.120	2.189	***8.925	1.311	***3.712
Marital status								
SINGLE	-0.205	***0.815	-0.103	**0.902	-0.300	***0.741	-0.066	0.936
Education								
ED1	0.130	*1.138	0.352	***1.422	1.181	***3.256	-0.054	0.947
ED2	0.099	*1.104	0.151	**1.163	1.260	***3.526	0.165	**1.179
ED3	-0.020	0.980	-0.025	0.975	0.847	***2.332	0.058	1.059
Regional strata								
RICE	0.477	***1.611	0.129	**1.138	0.351	***1.420	0.410	***1.507
CASH	0.087	*1.091	0.076	1.079	-0.025	0.976	0.174	***1.189
UPLAND	-0.016	0.984	0.296	***1.345	-0.472	***0.624	-0.135	**0.874
OTHER	0.009	1.009	-0.042	0.959	0.047	1.048	-0.116	**0.890
Constant	-3.473	0.031	-5.136	0.006	-5.115	0.006	-2.954	0.052

Note : *** p<0.01 ** p< 0.05 * p < 0.1

Non-migrant, female, ever married, higher than secondary and urban/semi urban areas are reference group for each representative variable.

MIG1 = Inter-provincial Migrants, MIG2 = Intra-provincial Migrants and MIG3 = International Migrants

Table 10. Impact of Migration Status on Eating Raw Meat, Using a Mosquito Net and Smoking

Variable	Eat Raw Meat		Use mosquito net		Smoking	
	B	Exp(B)	B	Exp(B)	B	Exp(B)
MODEL 1						
MIG1	0.361	***1.435	0.215	***1.240	0.178	***1.194
MIG2	0.058	1.060	0.150	1.162	0.257	***1.293
MIG3	0.242	***1.274	-0.493	***0.611	1.576	***4.837
Constant	-0.891	0.410	3.134	22.958	-0.963	0.382
MODEL 2						
Migrant status						
MIG1	0.460	***1.584	-0.137	*0.872	-0.074	*0.929
MIG2	0.132	***1.141	-0.084	0.920	0.027	1.027
MIG3	-0.071	0.932	-0.519	***0.595	0.586	***1.799
Age						
AGE1	0.003	1.003	0.054	***1.056	0.139	***1.149
AGE2	0.000	***0.100	0.000	***0.100	-0.001	***0.999
Gender						
MALE	0.454	***1.575	-0.397	***0.672	3.026	***20.611
Marital status						
SINGLE	-0.147	***0.863	-0.631	***0.532	-0.369	***0.692
Education						
ED1	0.223	***1.245	-0.920	***0.399	2.097	***8.139
ED2	0.190	***1.209	-0.427	***0.652	1.159	***3.187
ED3	0.023	1.024	-0.367	***0.693	0.502	***1.652
Regional Strata						
RICE	0.262	***1.299	1.054	***2.870	0.071	1.074
CASH	0.370	***1.448	1.159	***3.188	0.294	***1.341
UPLAND	0.399	***1.490	0.836	***2.307	1.128	***3.088
OTHER	-0.138	***0.871	0.780	***2.182	0.162	***1.176
Constant	-0.998	0.369	2.057	7.824	-6.788	0.001

Note : *** p<0.01 ** p< 0.05 * p < 0.1

Non-migrant, female, ever married, higher than secondary and urban/semi urban areas are reference group for each representative variable.

MIG1 = Inter-provincial Migrants, MIG2 = Intra-provincial Migrants and MIG3 = International Migrants

Table 11. Percentage Distribution of the Sample
by Existence of Persistent Illness or Symptom and Other Variables

	Suffer from Persistent illness/symptom?				
	N		%		
Variable	Yes	No	Yes	No	Total
Life time migration					
Non-migrants	4689	8430	35.74	64.26	100.00
Inter Provincial migrants	3975	4939	44.59	55.41	100.00
Intra Provincial migrants	1789	2369	43.03	56.97	100.00
International migrants	361	1218	22.86	77.14	100.00
Gender					
Male	3775	8810	30.00	70.00	100.00
Female	7039	8146	46.35	53.65	100.00
Education					
Illiterate and lower than elementary	2184	2336	48.32	51.68	100.00
Elementary	6758	9129	42.54	57.46	100.00
Secondary	1350	4185	24.39	75.61	100.00
Higher than secondary	522	1306	28.56	71.44	100.00
Marital status					
Ever married	9603	12536	43.38	56.62	100.00
Single	1211	4420	21.51	78.49	100.00
Regional strata					
Urban/industrial	2342	3998	36.94	63.06	100.00
Rice field	2146	2652	44.73	55.27	100.00
Cash crops	1749	2624	40.00	60.00	100.00
Upland	2324	4147	35.91	64.09	100.00
Others	2253	3535	38.93	61.07	100.00
Total	**10814**	**16956**	**38.94**	**61.06**	**100.00**

Table 12. Impact of Migration Status on Health Status

Variable	B	Exp(B)
MODEL 1		
MIG1	0.369	***1.447
MIG2	0.306	***1.358
MIG3	-0.630	***0.533
Constant	-0.587	0.556
MODEL 2		
Migration status		
MIG1	0.139674	***1.150
MIG2	0.119889	***1.127
MIG3	-0.78113	***0.458
Age		
EAGE1	0.068135	***1.071
AGE2	-0.00026	***0.100
Gender		
MALE	-0.77963	***0.459
Marital Status		
SINGLE	-0.05767	0.944
Education		
ED1	0.364329	***1.440
ED2	0.322821	***1.381
ED3	0.115636	***1.123
Regional Strata		
RICE	0.252474	***1.287
CASH	0.066297	1.069
UPLAND	0.072024	1.075
OTHER	-0.00519	0.995
Constant	-2.73706	0.065

Note : *** p<0.01 ** p< 0.05 * p < 0.1

Non-migrant, female, ever married, higher than secondary and urban/semi urban areas are reference group for each representative variable.

MIG1 = Inter-provincial Migrants, MIG2 = Intra-provincial Migrants and MIG3 = International Migrants