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ARTICLE



## Status of migration and socio-reproductive impacts on migrants and their families left behind in Nepal

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### ABSTRACT

This study describes the nature of migration and its socio-reproductive impacts in Nepal. This study utilized the household survey data conducted between April to August 2013, and 15 qualitative interviews with migrants or their family members. About 29.9% of households had at least one member migrated. Almost all migrants (98%) were male with a majority (73.1%) being the husbands of women interviewed. Logistic regression showed the higher proportion of migration in the Western (38.1%) and the Far-western (33.1%) regions of Nepal. The study explored that migration resulted in positive improvements such as meeting family aspirations and economy, and negative impacts such as deception by their employers, feeling loneliness due to separation, an experience of conflicting marital relations, and termination of pregnancy and inability to conceive a baby.

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## 1. Background

People migration from one place to another has been a regular phenomenon since ancient human civilization (Joshi, Simkhada, & Prescott, 2011). In recent years, international migration has been increasing intensely which has had a greater impact on socio-economic, ethnic, political, health care and the global environment (Castles & Miller, 2009; WHO, 2007). Worldwide, between 1990 and 2015, the number of international migrants, rose by over 91 million, which is equivalent to a 60% increment during that period. Globally, it is reported that there were 244 million international migrants in 2015 (UN, 2015). According to the International Organization of Migration (IOM), about 3.2% of the world population (232 million globally and 740 internally) migrated in 2014 (International Organization for Migration, 2014). The total percentage of international migration is around 50% (105 million), and they mainly migrate for the purpose of labour.

Migration is seen as an escape from the poverty and unemployment in developing countries (Khan, Mahmood, Yasin, & Shahbaz, 2010). Limited job opportunities, poverty and high expectations of young people have encouraged them to migrate to industrial/developed countries where labour demands are high. Both legal and illegal migration is becoming the only immediate option for those who are struggling with their day to day survival needs (Golini, Righi, & Bonifazi, 1991).

Migration within Asia has grown since 1990, particularly from developing countries to fast-growing countries. It has been a major driver of social and economic change in the Asia-Pacific region (United Nations ESCAP, 2015). Countries in Asia Pacific region are experiencing both emigration and immigration – and often transit migration (United Nations ESCAP, 2015). The main destination countries within Asia are Brunei, China (mainly Hong Kong and Taiwan), Japan, Singapore, South Korea, Malaysia and Thailand, and the main origin countries are Bangladesh, Burma, Cambodia, China, India, Indonesia, Laos, Pakistan, Philippines, Sri Lanka, Vietnam and Nepal. The migration of people from Asia to Europe, America and Australia has also grown significantly. As of 2009, a total of 20 million Asians migrated worldwide; medical and information technologists, female domestic workers and labour workers, often moving illegally (Castles & Miller, 2009).

Similar to other Asian countries, labour migration for employment opportunities has been a popular choice for many Nepalese. In particular, after 1990, Nepal adopted a liberal economy and formalized labour migration as an opportunity for employment in more than 27 countries in the world (Department of Foreign Employment, 2014). Since then, foreign migration has been the top source of the nation's revenue (Paudel, 2015). In the year 2014, a government report showed that a total of 397.8 billion rupees (USD 4.1 billion), or almost 30% of the country's total Gross Domestic Product (GDP) was remitted to Nepal (Department of Foreign Employment, 2014).

One recently available report (Ministry of Labour and Employment, 2016) and anecdotal evidence mention that domestic workers, especially in Gulf countries, are not safe; they experience abusive and discriminating environments. The report describes that workers are not able to escape from abusive employers, are denied of a day off, confined to strict working hours, and are not paid any compensation for work-related injuries. In 2011 alone, about 25% of unskilled construction workers including labourers, scaffolders, plumbers and carpenters suffered from injuries or accidents (Ministry of Labour and Employment, 2016). Only one-third of the respondents had health insurance covered by their employers. A study showed that 4,322 Nepalese migrants including 85 women died between 2008/09 to 2014/15 (Joshi et al., 2011).

In the case of migration, the separation of migrants from their families is a stressful event that severs the support network of both migrants and migrants' family members. The strain of migration, therefore, immediately highlights breakdowns in the support structure. Beyond the initial shock, however, daily life stressors may continue to cause exaggerated strain due to diminished support networks, particularly in the case of spousal migration. Studies examining migrants separated from their spouses and children indicate these individuals experience greater levels of depression than those who migrate with their families (Silver, 2006).

Despite labour migration being a common occurrence in the country, there are a few reports (Central Bureau of Statistics, 2011, 2012), which are limited to official data available at different levels of government institutions. Trend of migration has been increasing

tremendously, and the Families have to adjust themselves socially, financially and are always concerned about their husbands' work situation (physical and mental) and worried about their relationship. Additionally, most of them who migrate leave behind huge amount of loans for families to pay off, but they do so with the hope of building a happy family and easing of their livelihood. However, if it comes to infidelity, then it leads to an increase in their stressor and as a result, this will adversely affect their health. Ultimately, with all these, they will become hopeless with their lives. Occasionally this gets reported in the news media, but the scientific literatures measuring their adjustment and health behaviour are still lacking. Perceived perception of stress can be modified only with the availability of support system and family resources. Lacking of social support system will lead to the inability to adjust healthily. They are likely to engage in unhealthy behaviours such as smoking, alcoholism and extramarital affairs. It is hard to find out that the studies have addressed the socio-reproductive impacts of migration and its consequences in Left-Behind Spouses. There is limited literature in these issues in our context, despite an ever growing trend in labour migration. We did not note a single systematic nation-wide study (survey) that elucidated a national picture of migration and its' health and socio-reproductive consequences in Nepal. The present study aims to describe the status of migration, and socio-reproductive aspects of Left-Behind Families. This also discusses the impacts of migration with the voices of migrant returnees.

## 2. Materials and methods

This study utilized both survey data and qualitative information. The survey data came from a nationally representative household survey carried out among 9000 married women of reproductive age (MWRA) in Nepal from April to August 2013 (N. Thapa et al., 2016). Of the total 75 districts in Nepal, 16 were selected to represent three ecological belts (mountains, hills and the plains region-*Tera*i) and the five development regions. From the selected 16 districts, all village development committees (VDCs) and municipalities were listed in alphabetical order separately for the three strata (ecological belts) as primary sampling units (PSUs) and a total of 100 PSUs were selected from each of these strata using probability proportionate to size (PPS) sampling method based on national population proportion as per the housing and population census 2011 of Nepal (Central Bureau of Statistics, 2012) which led to the selection of 50 PSUs from the plains region, 33 from hills and 17 from mountains. Among 100 PSUs, 86 were VDCs and 14 were municipalities. VDC and municipality are administrative structures below the district level and wards are a bottom level administrative unit in Nepalese administrative hierarchy and each VDC composed of nine wards and number of wards in municipality ranges from 9 to 35.

From the each PSU, three wards were selected by simple random technique as secondary sampling units (SSUs). In the final step, 30 households were selected from each 300 SSUs using systematic random sampling. One eligible MWRA was interviewed from each household using a pre-tested semi-structured questionnaire in the Nepali language. In case of more than one eligible respondents in a sampled household, one MWRA was selected randomly for the interview, and adjoining household was sought when eligible respondents were not met in the sampled household.

Interviewers and supervisors had health science diplomas and/or bachelors of public health, who were locals, recruited from the study regions. They were provided 2 days of training about sampling and interview techniques. Respondents' information was obtained on socio-demographic characteristics, reproductive history, and migration status and alcohol consumption practice. This study has analysed participants' socio-demographic information and migration status.

Following the survey, to explore further about migration and its impacts, we conducted in-depth interviews with migrants and their families left behind in Nepal. A total of 15 participants were purposively selected to explore rich information about migrants' and their families' experiences regarding how they went through it, and what impacts it had on both migrants and their families. Participants were either returnee migrants in the last 1 year or a member of migrant's family currently residing in the survey districts and willing to participate in an in-depth interview. These were 11 migrant returnees (10 males and 1 female), two wives of returnees, one husband of migrant and one mother of a migrant (see [Table 8](#)). Interviews were conducted by two interviewers who were public health graduates with prior experience in conducting qualitative interviews. They were provided with additional orientation along with two days training for the survey. An in-depth interview guide (Boyce & Neale, 2006) facilitated these interviewers. The guide covered expectations and achievements, physical and psychosocial impact, socio-economic impact. Information was recorded in field notes with permission from participants, and the interview lasted for approximately 1–2 h.

The recruitment of qualitative interview participants was facilitated by the survey interviewers. The survey interviewers informed their field supervisors about a potential participant for a further qualitative interview when they found that a participant was returnee migrant or a family member left behind, and who was believed by the interviewer to contribute in exploring further in-depth information about impacts of migration and gave the approval to be contacted by the field supervisors. We utilized eight number of field supervisors in this study; all of them had at least a bachelor's degree in public health or social science and were trained to conduct qualitative interviews. These field supervisors together with the survey interviewers located the households and further consulted the participant, confirmed that they were appropriate participants for the study purpose, and asked their permission for an in-depth interview. The supervisors conducted the interviews at home settings where maintaining privacy of an interviewee was compromised as it was not culturally possible to do so. Interviewing in a family setting when other members naturally joined the interview or leave on their own wish is considered culturally respectful in Nepalese context.

We continued interviewing only until the 15<sup>th</sup> participants we found the information provided by former participants was repeating, and no significant new information was added after our first 13 interviews.

This study fully complied with the ethical guidelines of the Nepal Health Research Council (Nepal Health Research Council, 2011). The ethical approval (Ref. No. 554; date. 12 November 2012) was obtained from NHRC. Permission was also taken from the district health offices in the study districts, VDCs and municipalities. Informed written consent was obtained from all the participants before the interview.

## 2.1 Data analysis

Data entry, data cleaning and management were done in Epi-Info version 3.5.1, and Statistical Package for Social Science (SPSS) version 16.0 and R (R Core Team, 2017) was used for the data analysis. Descriptive statistics (Proportion, Mean) were calculated to describe the major findings and statistical significance of migration by independent variables was analysed using logistic regression. The variables with a significance level below 0.05 in univariate analysis were taken to the logistic regression model. The results from logistic regression were presented with 95% Confidence Intervals (CIs).

This study utilized sum contrasts (Guragain, Paudel, Lim, & Choonpradub, 2017; Tongkumchum & McNeil, 2009) as each determinant did not have control or reference groups. This method measures the difference for each level of the determinants from the overall mean of the outcome. The estimated proportion of migrants with 95% CI of each parameter was obtained from the models by using the coefficients and standard errors.

Qualitative interviews were conducted in the Nepali language. The Nepali written 15 interview transcripts were analysed by two researchers from InREACH-Nepal (NT & AMG), and it was further scrutinized by a third researcher (MP). Because of sensitive issues, participants did not consent for recording of the interviews. It was deemed sensitive to the participants as they also naturally spoke about the mistreatment and deception by their contractors – the human resource companies coordinating to send labour workers overseas from Nepal. Analysing Nepali language transcripts was believed to maintain a greater involvement of the researcher in the participants' data, and thus to maintain a rigour on accurately representing participants voice and opinions. We then translated the selected quotes into the English language, and stated them in the present study – a similar approach was utilized by some previous studies (Fielden, Sillence, & Little, 2011). The analysis was informed by the conventional approach of qualitative content analysis technique as described in (Hsieh & Shannon, 2005). Hsieh and Shannon describe three different approaches to qualitative content analysis: conventional, directed and summative. The conventional approach is different from the rest of the two approaches in that coding conducted inductively, and the generation of themes is not guided by any prior theoretical frameworks. We started open coding on the transcripts, and codes with similar patterns were collated under the two emerging themes.

## 3. Results

### 3.1. Status of migration

#### 3.1.1 Prevalence of migration

The findings revealed that of the 9000 sampled households, 2685 (29.9%) of them have at least one migrated member. Further, of the 2685 households, more than one member migrated from 273 (10%) households, thus, the total number reaching 3014 migrants from the 2685 households (Table 1).

#### 3.1.2 Who does migrate, where and why?

Among the total migrants ( $N = 3014$ ), almost all (98%) were male. Majority of them (73.1%) were husbands followed by brothers-in-law (11.8%) and sons (11.7%). The top destination countries were Middle East (39.7%), India (27.4%) and South East Asia

**Table 1.** Distribution of respondents by migration status of family members.

Variables	Response	N	%
Households with migrated family members (N = 9000)	Yes	2685	29.8
	No	6315	70.1
Households with number of migrants (n = 2685)	One member	2412	89.8
	Two members	221	8.2
	Three and more	52	1.9
Migrated members from 2685 households	Yes	3014	100
Migration by gender status (n = 3014)	Male	2952	98.0
	Female	62	2.0
Relationship of respondent with migrants (n = 3014)	Husband	2202	73.1
	Brother in law	357	11.8
	Son and son in law	352	11.7
	Daughter/daughter or mother in law	62	2.0
	Father in law and others	41	1.4
Place of migration (n = 3014)	Middle East and Gulf countries*	1198	39.7
	India	826	27.4
	East Asia/South East Asia**	480	15.9
	America/Europe/Australia/UK	40	1.3
	Africa	7	0.23
	South Asia excluding India	17	0.56
	Internal migration	446	14.8
Purpose of migration (n = 3014)	Income generation	2757	91.5
	Service	152	5.0
	Study	91	3.0
	Business	14	0.46
Duration of migration	12 month	1583	52.5
	13–36 months	952	31.6
	> 36 months	479	15.9

\*Middle East and Gulf countries: Dubai, Qatar, Saudi Arabia, UAE, Kuwait, etc.

\*\* East Asia/South East Asia = Malaysia, Thailand, China, Japan, etc.

(15.9%). About one in seven (14.8%) were internal migrants. Livelihood was the main purpose of migration (90%) and some of them were away for the purpose of study (3%). Mean duration of migration was 25.5 months with 15.9% of being away from home for more than 3 years (Table 1).

### 3.1.3 Migration by eco-development region, urban-rural residence, and study districts

The study analysed data to see a picture of migration as per eco-development regions and urban-rural residence status. Table 2 shows that more than one-third of the households had at least one member away from home in the Hill (33%) followed by plains (*Terai*) (31%) and mountain ecoregion (21%). This study found a significantly different proportion of migration across eco-developmental and urban-rural residence. Migration was significantly higher among households from the western (41.5%), far-western regions (33%) and rural residence (33%) then that of other regions and urban resides of Nepal.

### 3.1.4 Who (districts) does migrate where?

Table 3 reveals that the Middle East, South Asia and India were the most common places of migration amongst the Nepalese people. The Middle East was the first choice for the migrants from Mustang district (87%), followed by Dhankuta (69%), Jhapa (62%) and Chitwan (57%).

Similarly, Table 3 adds that people living in Eastern districts were more likely to go to the Middle East (38–69%) and East Asia (16–25%) whereas people from the Central region were destined migrated to the East Asia (19–22%), and America/Europe/Australia/UK (AER)



**Table 2.** Number of households with migrated family members by eco-development region and residence ( $N = 9000$ ).

Development region and residence (N = 9000).			
Variable description	Migrated 2685 N (Row %)	Total 9000 N (Column %)	P value
<b>Ecological region</b>			
Mountain	320 (21.0)	1530 (17.0)	<0.001
Hill	972 (33.0)	2970 (33.0)	
Terai	1393 (31.0)	4500 (50.0)	
<b>Development region</b>			
Eastern	529 (27.0)	1980 (22.0)	<0.001
Central	669 (24.0)	2790 (31.0)	
Western	635 (41.5)	1530 (17.0)	
Mid-western	313 (29.0)	1080 (12.0)	
Far western	539 (33.0)	1620 (18.0)	
<b>Type of Residence</b>			
Rural	1758 (33.0)	5318 (59.0)	<0.001
Peri-urban	524 (27.0)	1965 (22.0)	
Urban/city	403 (23.5)	1717 (19.0)	

**Table 3.** Migrated members by districts and place of migration ( $n = 3014$ ).

District	Total HH	Total migrant N (Column %)	Place of migration by districts (Row %)						
			ME	EA	AER*	SA	India	Africa	Internal
Eastern region	1980	570 (18.9%)	346	109	4	5	58	–	48
Jhapa	1260	328 (10.8%)	62.2	16.7	0.3	1.2	14.6	–	4.8
Dhankuta	450	159 (5.3%)	69.0	21.0	–	0.6	5.0	–	4.4
Solukhumbu	270	83 (2.8%)	38.5	25.5	3.6	–	2.4	–	30.0
Central Region	2790	729 (24.2)	313	145	26	7	62	5	171
Sindhupalchowk	630	174 (5.8%)	29.5	19.0	2.3	1.7	4.0	1.0	42.5
Bhaktapur	540	93 (3.0%)	49.5	19.4	10.7	–	4.4	1.0	15.0
Dhading	810	193 (6.4%)	32.6	22.3	1.5	–	18.7	0.5	24.4
Chitwan	810	269 (9.0%)	57.0	19.0	3.3	1.5	5.5	0.3	13.3
Western region	1530	770 (25.5%)	370	143	4	4	191	1	57
Mustang	90	8 (0.3%)	87.5	–	–	–	–	–	12.5
Palpa	360	262 (7.7%)	42.0	11.4	–	0.7	34.5	0.4	11.0
Rupandehi	1080	500 (16.6%)	50.6	22.8	0.8	0.2	20.2	–	5.4
Mid -Western	1080	334 (11.1%)	107	51	2	–	102	1	71
Jumla	180	8 (0.3%)	–	–	12.5	–	50.0	–	37.5
Salyan	360	142 (4.8%)	27.5	16.9	–	–	32.4	–	23.2
Dang	540	184 (6.0%)	37.0	14.7	0.5	–	28.3	0.5	19.0
Far Western	1620	611 (20.9%)	62	32	4	2	412	–	99
Bajhang	360	91 (3.0%)	17.6	1.1	–	1.1	64.8	–	15.4
Dadeldhura	450	241 (8.0%)	8.3	4.1	0.4	–	68.5	–	18.7
Kailali	810	279 (9.0%)	9.3	7.5	1.1	0.4	67.4	–	14.3
Total	9000	3014 (100%)	1198	480	40	17	826	7	446

\* America/Europe/Australia/UK (AER)

Note: Region migrant's information are on number; district migrant's information are on percentage.

(1.5–10%). However, for people living in the Western districts of Nepal, India was reported as the most common destination for work. In the Far-western districts, among the total migrants, 64–68% of the people were found currently working in India. Internal migration was more prominent in Sindhupalchowk district (42%), Jumla (37%) and Solukhumbu (30%).

Table 4 illustrates the background information of the migrant's family. Since the motivation for internal and external migration may differ, we included only external migration in the analysis of the above data. These findings revealed that migration out of the country was higher among the family belonging to the *Kirat* religion, (38.6%)

**Table 4.** Households with migrated family members in different eco-regions stratified by socio-demographic characteristics excluding internal migration [ $n = 8613$ ].

Variable	Total N	Total Migrant N (Row %)	Migration by Eco-region		
			Mountain N (%)	Hill N (%)	Terai N (%)
<b>Religion</b>					
Hindu	7640	2044 (26.8)	187 (9.2)	725 (35.5)	1132 (55.3)
Buddhist	541	158 (29.2)	37 (23.4)	65 (41.2)	56 (35.4)
Christian	126	41 (32.2)	1 (2.5)	5 (12.2)	35 (85.3)
Muslim	205	16 (7.8)	0	0	16 (100)
Kirat	101	39 (38.6)	0	22 (56.4)	17 (43.6)
<b>Ethnic group</b>					
Dalit	1029	332 (32.3)	42 (12.7)	116 (34.9)	174 (52.4)
Upper cast groups	3353	945 (28.2)	102 (10.8)	357 (37.8)	486 (51.4)
Disadvantaged Janajatis	2756	747 (27.1)	62 (8.3)	280 (37.5)	405 (54.2)
Disadvantaged non Dalit- Terai Caste group	446	103 (23.1)	2 (1.9)	0	101 (98.1)
Relatively advantaged – Janajatis	897	154 (17.2)	17 (11.0)	64 (41.6)	73 (47.4)
Religious minorities	132	17 (12.9)	0	0	17 (100.0)
<b>Type of family</b>					
Nuclear	4898	1153 (23.5)	140 (12.1)	429 (37.2)	584 (50.7)
Joint	3222	941 (29.2)	71 (7.6)	333 (35.4)	537 (57.0)
Extended*	493	204 (41.4)	14 (6.9)	55 (26.9)	135 (66.2)

\*Extended family: Parents, their children, aunts, uncles, and cousins, in the same household.

followed by Christian (32.2%) and Buddhist (29.2%). Similarly, the proportion of migration was higher among the lower castes (Dalit) ethnic groups (32.2%) and among extended family (41.4%). However, when we analysed data by the total migration, a higher proportion of the migrated members were found belonging to the Hindu religion, upper caste group and from nuclear families (Table 4).

### 3.2 Age and educational background of the women left behind

Table 5 illustrates that more than half (55.7%) of the women whose husband were away, were aged between 20 and 29 years and 1 in 20 women (4.7%) were below the age of 20 years. More than 60% of the married women below the age of 30 years were living with a spousal separation.

Regarding education, two-thirds of the women have received a secondary level of education, followed by a non-formal education (22.5%) and a substantial number of women could still not read nor write (20%). Compared to those whose husbands were still at home, the women with their husbands away had higher primary and secondary educational attainment.

### 3.3 Spouse migration; alcohol consumption and reproductive/health behaviour of the women left behind

Table 6 reports about women's alcohol consumption and smoking behaviour. Of the total 9000 participants, 15.4% were current drinkers and 12.4% were current smokers. About a quarter of households brew alcohol at home, and this study showed that there was no significant difference in brewing alcohol by migration status. Alcohol consumption was significantly higher amongst the women whose husbands were currently at home than

**Table 5.** Age and Education of the women by migration status of husbands.

Variable	Total N = 9000 N (Column %)	Husband Migrant N = 2202 N (Column %)	Husband at home N = 6798 N (Column %)	P- value
<b>Age of women</b>				
15–19 years	618 (6.9)	98 (4.5)	520 (7.6)	<0.05
20–24 years	2079 (23.1)	561 (25.5)	1518 (22.3)	
25–29 years	2153 (23.9)	665 (30.2)	1488 (21.9)	
30–34 years	1615 (17.9)	457 (20.8)	1158 (17.0)	
35–39 year	1182 (13.1)	274 (12.4)	908 (13.4)	
40–49 years	1353 (15.0)	147 (6.7)	1188 (17.5)	
<b>Education of women</b>				
Cannot read and write	1826 (20.0)	307 (13.9)	1519 (22.4)	<0.001
Non-formal education	2026 (22.5)	449 (20.4)	1577 (23.2)	
Primary education	1217 (13.5)	344 (15.6)	873 (12.8)	
Secondary education	3072 (34.0)	916 (41.6)	2156 (31.7)	
Higher	859 (9.5%)	186 (8.4)	673 (9.9)	
<b>Ethnic group</b>				
Dalit	1067 (12.0%)	697 (65.0%)	370 (35.0%)	<0.001
Disadvantaged Janajatis	2860 (32.0%)	2009 (70.0%)	851 (30.0%)	
Disadvantaged non-Dalit Terai cast	461 (5.0%)	343 (74.0%)	118 (26.0%)	
Religious minorities	135 (1.5%)	115 (85.0%)	20 (15.0%)	
Relatively advantaged Janajatis	931 (10.0%)	742 (80.0%)	189 (20.0%)	
Upper cast groups	3546 (39.5%)	2407 (68.0%)	1139 (32.0%)	
<b>Type of religion</b>				
Hindu	7995 (89.0%)	5595 (70.0%)	2400 (30.0%)	<0.001
Buddhist	561 (6.0%)	383 (68.0%)	178 (32.0%)	
Muslim	128 (1.5%)	110 (86.0%)	18 (14.0%)	
Christian	214 (2.5%)	164 (77.0%)	50 (23.0%)	

**Table 6.** Alcohol consumption and smoking among women by migration status of the husband  
N = 9000.

		Total N = 9000 N (Column %)	Husband currently migrated		$\chi^2$ P-values
			Yes = 2202 N (Column %)	No = 6798 N (Column %)	
Alcohol consumption and smoking	Current drinking habit	Yes	1382 (15.4)	299 (13.6)	0.004
		No	7618 (84.6)	5715 (84.1)	
Brew alcohol at home	Yes	2085 (23.2)	502 (22.8)	1583 (23.3)	0.329
	No	6915 (76.8)	1700 (77.2)	5215 (76.7)	
Smoking habit	Current	1120 (12.4)	320 (14.5)	800 (11.8)	0.003
	Past smoker	157 (1.7)	40 (1.8)	117 (1.7)	
	Never	7723 (85.8)	1842 (83.7)	5881 (86.5)	

those of migrant (15.9% vs. 13.6%). Inversely, wives of the migrants were more likely to smoke in comparison (14.5%) to those of the non-migrants (11.8%).

Table 7 demonstrates that, of the 613 currently pregnant women, 111 had husbands away from home. However, the proportion of husband's migration was less common among the lower gravid women. It was found that husbands did not usually leave women when they were pregnant for the first or second time. It is peculiar to note that this study identified more women whose husbands were currently migrated, visited doctors and nurses for their antenatal check-up than those of their counterparts. The antenatal check-up was found significantly higher (88.3% vs. 83.3%) among the women whose husbands were currently away from home.

**Table 7.** Health seeking behaviour among currently pregnant women by migration status of husbands ( $n = 613$ ).

Variables	Total	Migrant Husband N (%)	Husband at home N (%)	$\chi^2$ P-Value
<b>Gravid (Pregnancy)</b>				
Gravid 1	324	52 (46.8)	272 (54.2)	0.00
Gravid II	190	37 (33.3)	153 (30.5)	
Gravid III +	99	22 (19.8)	77 (15.3)	
<b>ANC checkup</b>				
Yes	516	98 (88.3)	418 (83.3)	0.05
No	97	13 (11.7)	84 (16.7)	
<b>Antenatal attendants</b>				
Doctor	107	22 (22.4)	76 (18.2)	0.00
Nurse	376	71 (72.4)	284 (67.9)	
Paramedics/MCHW	33	5 (5.1)	25 (5.9)	

MCHW: Maternal and Child Health Workers.

### 3.4 Multivariate analysis

Figure 1 displays the result obtained from the Logistic regression model. The model was fitted with sum contrast to examine the regional variation in migration adjusting with age, education, the occupation of both the husband and wife, ethnic and family size. As mentioned in the methods section, the sum contrast in logistic regression model allows us to compare the proportion of each region with average proportion (Tongkumchum & McNeil, 2009). The thematic map shows that significantly high proportion of migration in the Western 38.1% [CI (34.7–41.6)] and Far western 33.1% [CI (30.0–36.6)] development region compared to the overall mean (29.8%). This proportion was significantly lower in the Eastern region 22.6% [CI (20.01–25.5)] and Central development region 27.2 [CI (24.7–29.79)].

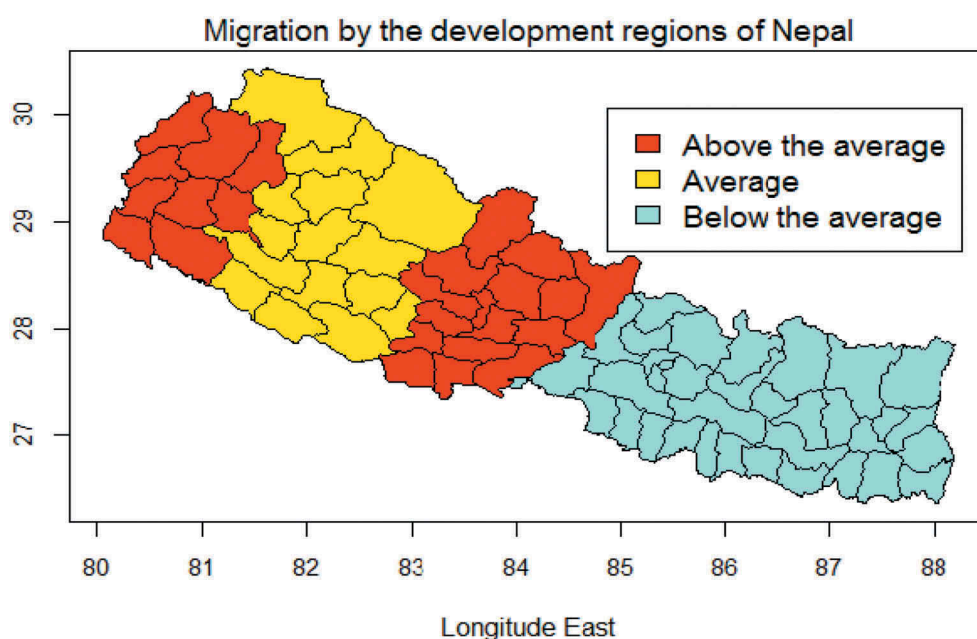
### 3.5 Impacts of migration

In the above section, we described a picture of migration in Nepal as per socio-demographic variables and presented a situation depicting whether women left behind are affected in terms of their reproductive history and pregnancy service utilization, and smoking and alcohol consumption practices. This qualitative section further explores experiences of returnee migrants and their families left behind.

From the narratives of the participants stated in Table 8, we came across two key themes, each of which is described below:

#### 3.5.1 Socio-economic and cultural impact: a compulsion to play a trade-off between gains and loss

A majority of migrants were found to be satisfied with their jobs and salary although a few had a difficult time in the beginning. They had a good support from their family members including, wife/husband, children and parents left behind. About half of the participants had improved their economic status. They had purchased land and constructed their house. About one-third of the migrant's family moved to the town from their original residence. Migrants' family members invested remittance in higher interest rate (Participant 1). They started sending their children to the private English boarding



**Figure 1.** Thematic map of Nepal shows the variation in prevalence of migration by the development region.

**Table 8.** Key features of qualitative interview participants.

ID No	Age	Sex	District	Informants	Country	Duration of migration
1	48	M	Jhapa	Temporarily returnee	Qatar	10 yrs.
2	47	M	Bhaktapur	Husband of migrant	United Kingdom	7 yrs.
3	40	F	Rupendehi	Wife of migrant	Qatar	4 yrs.
4	37	F	Bhaktapur	Wife of migrant	Dubai	6 yrs.
5	70	F	Jhapa	Mother of migrant	Qatar	10 yrs.
6	41	M	Dhading	Migrant returnee	Saudi Arabia	8 yrs.
7	39	M	Sindhupalchowk	Migrant returnee	Dubai, Oman	12 yrs.
8	28	M	Sindhupalchowk	Temporarily returnee	Malaysia	3 yrs.
9	47	M	Chitwan	Temporarily returnee	Saudi, Qatar	7 yrs.
10	28	F	Palpa	Migrant returnee	Qatar	2 yrs.
11	40	M	Rupendehi	Migrant returnee	Korea	15 yrs.
12	30	M	Kailali	Migrant returnee	Qatar	3 yrs.
13	35	M	Dang	Migrant returnee	South Korea	6 yrs.
14	37	M	Dhading	Migrant returnee	Afghanistan	3 yrs.
15	35	M	Bajhang	Migrant returnee	Dubai	2 yrs.

schools (Participants 3, 4, 6 and 10). It was noted that the migrants' family started seeking health care from private hospitals, which generally used to be avoided due to lack of affordability.

**Returnee migrant (Participant 9):** Improved living standard and better education for children

*"Our financial security is much better compared to when I was jobless. I earned roughly NPR 35,000 a month. My wife was working as an assistant teacher back home which was enough for family and the education of our children. When I was in Qatar, my wife moved to town area with a daughter. Everything is good for us".*

Different from the positive experiences as above mentioned, some participants had mixed feelings. They received less salary for the initial 3 to 4 months than their agreements done before going abroad. The income was not enough to maintain survival in their everyday life. They were stressed, nervous and carried a feeling of loss due to the labour migration:

**Returnee migrant (Participant 1): Deceived by the employer/contractor**

*"I did not receive a salary for first 3 months. I felt cheated, helpless, and very exhausted. Life was like hell during those four months. Sometimes, I felt like I wanted to cry. I regretted coming and I was so distressed and depressed. Other members of my group had suffered from the same problem. One of my friends was thinking about committing suicide. However, after 4 months passed, I received my salary, which was about 80,000 rupees per month including working 4 hours overtime as mentioned in the job agreement letter".*

**Returnee migrant (Participant 14): A cultural shock, and felt helpless during illness**

*"I became severely ill with fever, a sore throat, and abdominal pain. The food smell and taste were horrible; I couldn't eat nor sleep at all. I was restless. I felt like I was going to die. I consulted a doctor I knew in Nepal through a messenger and took medicine that I had with me from Nepal. Then I was relieved. It is the same with the most of the migrant workers; we suffer there when we become sick. It is our bad luck that we have no employment opportunity in our homeland."*

**Returnee migrant (Participant 7): Regret not being able to see adying family member back home**

*"I couldn't see my mother during her passing away. She became very sick when I was in Oman. Unfortunately, she passed away for which I always regret that I couldn't be with her during those last hours".*

**Returnee migrant (Participant 6): Returned with a lesson to work hard at home**

Although some returnees had mixed feelings as above stated, one returnee migrant appeared bold and shared that going abroad for labour work was a motivation for him to start his own business back home. He is a taxi driver of his own taxi.

*"I had learned driving and cooking skills while working in Saudi-Arabia. After I returned back to Nepal, I utilized my skills to be independent. I suggested others to invest and work in their own country rather than spending money going abroad."*

For family members, such as a migrant's mothers, migration was a source of managing their livelihood, as well as the left-behind family realized that it is turning them helplessness when they need someone during old age and when they become sick.

**Migrant's mother (Participant 5): A source of earning bread for the family left behind**

*"My son has been working in Qatar for the last 15 years, he visits us once in a year for 30 to 45 days. We heard from different sources that he is earning very well. He is managing a paint company. Even though he has a huge responsibility in his office, he is dedicated and enjoying his time. He has a good relationship with his daughters, his wife and us. He calls us on the landline or mobile but uses the internet to call his daughter. In the beginning, his wife and children encouraged him to migrate temporarily in Qatar."*

**Migrant's mother (Participant 5):** No one with old parents at a time when they need someone

*"When we become sick it is hard for them to come and look after us. We are worried about what will happen to us when becoming sick. Who will care us? Yes, it is true that at least now they send us money and tell us to go to the hospital [private as well] when we become sick"*

It was surprising to note that some participants were encouraged, and even forced to migrate because of their drug/alcohol consumption habit. The family members did so in the hope of correcting such behaviours rather than simply letting them indulge in, and do nothing productive at home.

**Returnee migrant (Participant 8):** Encouraged migration to help prevent drug indulgence

*"My parents forced/encouraged me to migrate temporarily to Malaysia at the age of 25 to earn money. Strict rules in Malaysia against illicit drug consumption helped me to correct my behaviour. This change was in itself more than any sum of money for my parents".*

**Migrant's wife (Participant 3):** Encouraged migration to help correct drinking habit

*"If my husband returns home, he always drinks alcohol. He should go abroad to earn money which will assist the children's education."*

### 3.5.2 Sexual and reproductive health: spousal separation, conflicting marital relations and loss of fatherhood experience by men

Sexual and reproductive health issues are more likely to be concealed and remain unaddressed by the migrants and their spouse (Keygnaert et al., 2014). Since the marital relation is based on trust, emotion, respect and surrounded by social norms, it is often hard to uncover the reality that one is going through.

From the interviews in this study, it was found that spousal separation had a substantial impact on delaying pregnancy, difficulties in conceiving a pregnancy after returning and disrupted marital relations.

**Returnee migrant (Participant 6):** New couples cannot remain longer together after marriage

*"I had just married and left my loving wife behind with my parents. We missed each other desperately but for the sake of our future and my parent's wishes, I went to Saudi Arabia to earn more money".*

It is identified that participants did not have the confidence to raise their children, and therefore to plan a pregnancy before they find a job and earn money for which they had no option other than going for a labour migration.

**Returnee migrant (Participant 12):** Terminated pregnancies as migration was felt a necessity to earn money before raising their kids

*"Married for 7-8 years, we went through financial constraints. Migration was the only option to earn some money to raise children. Due to this, we had to abort 2 pregnancies before I went abroad. After this, I went to Qatar for 3 years to earn money. Now I am back and would like to have a child, but it appears that we are unable to conceive a baby. I don't know why, we consulted doctors, but haven't been able to conceive yet. Not having a child is frustrating".*

Because of the spousal separation at sexually active age, conflicting marital relations were common, and some even ended in divorce. One of the female participants shared:

**Returnee migrant (Participant 10):** Good earning, but went through a family breakdown

*"I used to have regular communication with my husband, but after 6 months, our communication became less frequent. My husband used to call me only when he needed money. After 24 months, when I returned back home, I knew that he was not caring my son and brother well. Instead, spent all my earnings to date the woman he began an extra-marital affair. My effort was like pouring water into sand. He married that woman and moved to a new rented house".*

It was commonly found that spousal separation due to migration had resulted in negative consequences such as using luxury items, extramarital relations and increasing alcohol consumption by the wives of migrant left behind.

*"During my stay in Korea, my wife spent the money in drinking alcohol, attending parties, going for tours instead of paying back bank loans. I doubt she began an extra-marital relation with another man. After this, we couldn't stay together any longer and got a divorce."* **Returnee Migrant (Participant 11)**

A male participant shared a story of being betrayed by his wife:

*"When I came home after 2 years from Dubai, my wife had already married another man. I was shocked when my brother told me about this during my arrival at the airport. All my property was in her account; legally I had no right to claim it. I became homeless, a man in the street"* **Returnee migrant (Participant 15)**

This study also explored that for migrant men, this was a loss of a fatherhood that they missed the important time with their children, and appeared like a tourist father to them:

*"My son did not recognize me. He ignored me when I wanted to love him. He looks at me as a stranger just after being 3 years away."* **Migrant returnee (Participant 14)**

## 4. Discussion

Our study described the status of migration-both migrants and their wives left behind and attempted to explore experiences of migrants and their families.

### 4.1 Status of migration

This study identified that nearly one-third of households (30%) have at least one member currently migrated. Of the total migrants from those households, 80% had migrated to foreign countries. These figures are significantly higher than the proportion reported in National Population and Housing Census 2011 and Nepal Demographic and Health Survey 2011 (Central Bureau of Statistics, 2012; Ministry of Health and Population, 2012). Both of these reports identified less than 25% absentees (migrants). The increased proportion of migration revealed that more people are migrating over time. Between the years 2007–2013, the annual number of migrant workers leaving Nepal was almost three-folds, with an increment observed each successive year (UN, 2017). Similar to other South Asian countries, a huge number of young Nepalese migrated for unskilled labour jobs to Gulf countries and Malaysia (Mallick & Etzold, 2015). Nepal Demographic and Health Survey 2011



reported that the majority of Nepalese migrants left the country to find labour jobs. Protracted political unrest in Nepal, lack of hopes from traditional types of agricultural work, and lack of employment opportunities for young men and women could have been some key reasons behind the increasing proportion of migration. As reported in the Nepal Living Standards Survey (NLSS) 2010/11, approximately 500,000 labour permits were issued in the fiscal year 2014/2015 to Nepali workers seeking foreign employment, in which 96% were male (Ministry of Labour and Employment, 2016). If the current trend of migration continues, it is estimated that the working-age cohort migrating out of the country will exceed 20 million by 2025 (Sijapati, Bhattarai, & Pathak, 2015). This may lead to devastating consequences in the long run. A few studies revealed that out-migration might cause negative consequences. Family members are likely to become more vulnerable to violation of their basic rights (UNDP, 2004). The study has also shown that labour migration is the cause of the declines in agricultural productivity in source countries due to less use of agricultural land (Massey, Axinn, & Ghimire, 2010).

The high proportion of households (53%) with migrated members reported by Nepal Living Standards Survey (NLSS) 2010/11 (Central Bureau of Statistics, 2011) could be the effect of seasonal migration of certain districts. In many of the western districts, there is an overwhelming seasonal migration to India during the winter season (October – March). Local migrants from Nepal tend to migrate to the nearby cities in India because of the open border policy between these two countries. It is believed that such a seasonal migration was contributed by seasonal food insecurity in various parts of Nepal and the hope of a higher chance at finding labour jobs or jobs as domestic help in different Indian cities (Gurung, 2012; Subedi, 1991). Data collection in the current study was carried out during the pre-monsoon period (April–June), while migrants from India and other neighbouring countries usually return home for plantation (Keshri & Bhagat, 2010; Sharma & Thapa, 2013).

The trend and destinations of migration have changed over time. According to the Nepal Demographic and Health Survey (Ministry of Health and Population, 2012), migration was higher among the people residing in urban areas and the central and eastern regions of the country. The survey report showed that first priority destination was India, which was a contrast to the current finding that a significant number of people migrated from rural areas, and from the western/far-western regions of the country. The authors did not find any significance behind why the trend has been shifted but it was found that India is not a top destination anymore, with a majority leaving to the countries in the Middle East and other East Asian countries. These countries have been increasingly accessible to many Nepalese migrants in recent years. Mushrooming brokers/manpower companies in and the provision of better payment (salary) for labours might have attracted many young people to shift their destinations.

As identified in this study, financial earning was the main objective of migration (92%), which is similar to the findings of a multicentre study in three countries, namely Bangladesh, India and Nepal. Poverty is identified as the single most reason for migration (Khan et al., 2010; The Asia Foundation, 2013). Previous studies have commonly explained that job and high expectations of the youngsters (Golini et al., 1991), and inability to manage a basic livelihood due to poverty in rural communities (Ajaero & Onokala, 2013) are some of pushing factors for the young population to look for better destinations.

## 4.2 Impact of migration on migrants and their families

This study explored a range of socio-economic, behavioural and reproductive health consequences to the migrants, their wives and families that are left behind. Alcohol consumption habit, antenatal check-up and internal migration in search of a better life were significantly associated with the husband's migration.

### 4.2.1 Positive impacts: educating kids in better school and improved health service seeking

In-depth interviews revealed some positive experiences similar to previous studies (Datta & Mishra, 2011; Paudel, 2015; Subedi, 1991). Access to a range of economic advancement from overseas remittance (Strabac, Valenta, & Al Awad, 2018) was the main factor encouraging migration. The present study found that migrant's families were utilizing modern health-care facilities and educating children in better schools. Among the total 2202 migrants husbands, 111 (5%) had left their pregnant wives behind. However, their wives were more aware of their health and pregnancy, and almost all attended a medical doctor for their antenatal check-up. Husband's migration improves the family's financial situation, as this provides an opportunity for women to be independent in exercising self-decisions regarding their family matters, health, and welfare. The present study is supported by a previous study which described that wives' responsibilities increased towards every family matters in addition to their regular jobs, became more independent in their decisions after their husbands' migration (Datta & Mishra, 2011). Contrary to the above evidence, the women from rural areas of Nepal have limited independence in decision-making (Acharya, Bell, Simkhada, Van Teijlingen, & Regmi, 2010). Beside of economic benefit, women could be empowered if husband migrated. Zhang and Gao (2014) claim that if men migrate, it creates a division of labour in families that further enhanced spouse's ability and independent. This contributed for both egalitarian gender relations as well as improving women's awareness in gender inequality.

### 4.2.2 Negative impacts

**4.2.2.1. Deception by employers.** This study also identified negative consequences due to migration as a range of other studies pointed such as health hazards, accidents and discriminatory behaviour at the workplace (Joshi et al., 2011; Sijapati et al., 2015; Subedi, 1991). The present study strongly highlights that the migrant workers are deceived by their brokers as they do not get good salary in reality as per the agreement when they were placed in workplace. A few migrant workers were rather disappointed that they did not receive any salary. Similar concerns of the migrant workers are frequently reported by national media in Nepal. A recent newspaper article reports that many of the migrants are facing difficulties due to the employer's deception, such as false assurance about salaries and work conditions, pressure from recruitment agencies to perform labour jobs, and lack of freedom of movement (The Himalayan Times, 2018).

In addition, the present study pointed that migrants are finding it difficult to adjust due to cultural shock, breach of the agreement by employers, and having a feeling of guilt while not being together with their families back home similar to a qualitative study finding (McLeod, 2008). It is undeniable that the solution to such problems is to create opportunities for young people at home country. However, this does not seem to

be happening anytime soon in Nepal because the country is still muddling with political stability and which seems not happening very soon in Nepal as the country is still muddling with political stability. The government and concerned stakeholders should take immediate measures such as providing adequate counselling to young people before labour migration, and immediate punishment to employers/brokers who breach the agreements.

**4.2.2.2 Helpless old parents left behind.** The present study explored helplessness, loneliness and feel difficulties to visit doctors especially when they are sick. They need someone to accompany them for health care. This consequence results from family disintegration due to increasing youth migration as they do not get good job opportunities for their economic growth and development within the national territory. A previous study has also described that despite an improvement in their economic status, elderly parents are missing a family cohesiveness which used to be a part of culture traditionally, as grown up and lived together for most of their time (Antman, 2013). However, this lack of togetherness could be also due to declining interest in staying in a joint family (Yabiku, Agadjanian, & Sevoyan, 2010). Similar results are described by one recent study in Kathmandu valley. The study concluded that with the increasing trend of migration, elderly parents are left behind alone in their respective places, have resorted to some senior citizen's homes (Khanal, Rai, & Chalise, 2018; S. Thapa, 2017)

**4.2.2.3 Reproductive health and conflicting marital relations.** This study found that separation between husbands and wives due to the migration did lead to unstable their relation and break up in some families. This study found that few participants went through conflicting spousal relations including divorce, and misuse of money by spouse left behind. They shared that their relationship has been broken due to the extramarital relation by the spouses, one case shared that male spouse had misused the remittance, wife lost all her earnings for the last 2 years. A similar finding has been reported by a study conducted in Sri Lanka (Wijewardhana & Kumari, 2015). The Sri Lankan study concluded that the migration has affected not only couples' marital relations but also has affected the children's overall development. One study conducted in Mexico also presents similar kinds of report that due to the spouse separation resulted by the migration jeopardise their marriage (McEvoy, 2008), likewise, Horton (2008) also states that the separation due to migration may direct for marital instability. For instance in Mexico wife who left behind started affairs and later broke up their marriage. Xiang (2006) also suggests that marriage might be at risk if husband and wife stay in different living environment whereas Hugo (2005); Zheng and Xie (2004) argues that the relationship could be stronger and affectionate if spouses migrate for short period. Mercer, Khanam, Gurley, and Azim (2007) also shared that migration of spouse for longer time more likely to have extramarital relation and their reproductive health become vulnerable in both sides.

Similarly, the family whose spouse lives away, may not have full access to the social and psychological resources receive by marriage; physical separation may reduce sexual intimacy and emotional closeness in couple, that could weaken marital quality and reduce the levels of social and emotional support from the spouse who has been residing away in comparison with couples who live together. Marital quality and social support could be the key factors for both physical and mental health (Waite & Gallagher, 2002; Williams, 2003). On

the other hands, Mazzucato and Schans (2011) from Thailand and Knodel and Saengtienchai (2007) from Italy argues that due to the modern communication technologies and means of different transportation the emotional/social support to spouse and other family members who left behind is maintained.

**4.2.2.4 Loss of fatherhood experiences, postponement of pregnancy by young couples.** The present study found that couples have been terminating or postponing pregnancy to choose jobs in foreign countries. In some participants, it is reported that they were unable to conceive a baby later which is similar with previous study conducted in six African counties (Ghana, Kenya, Mali, Senegal, Togo and Uganda) which showed a decline in fertility of the couples after migration in all studied countries except in Togo. It was identified that fertility declined to about 33% in Ghana and Kenya. The main cause of reduced fertility could be due to greater contraceptive use, spousal separation, and older ages of children (Brockerhoff & Yang, 2010) whereas in India, due to the absence of husbands for a while reduce the rate of pregnancy and deliveries and improve women's health in India (Roy & Nangia, 2005).

The present study revealed that 98% of the migrants were male, husbands of married women of reproductive age and they remain away from home for more than 2 years in average (mean 25.5 months). More than half (60.2%) of the women left behind were below age 30, and one-fifth were illiterate. Spousal separation on this active age might have a great impact on family relationships and the reproductive health. A previous study described that spousal separation may affect yearly pregnancy rates, lifetime fertility and increases risk behaviour (extramarital relationship, substance abuse). Women of the migrant husband may have higher rates of abortions and risk of STDs (Sevoyan, 2011). The present study also noted that spousal separation had a substantial impact in conceiving a pregnancy after returning migrant, a similar argument that women's lifetime fertility might decrease due to husbands' migration, is also supported by a study conducted in rural Africa (Agadjanian, Yabiku, & Cau, 2011).

The present study indicates that the health sector should pay an immediate attention to migrants and their family's health, not simply because they are one of the key disadvantaged groups, also because they are more likely to experience poor mental health due to separation, guilt feeling and family breakdown (Bucher-Maluschke, Gondim, & Pedroso, 2017). Physical and psychological illnesses are major health problems among the migrants (Bucher-Maluschke et al., 2017). It is described that migrants undergo a number of occupational health-related risks including anxiety, depression, tuberculosis, eye injury, headache, suicide attempts, cardiac arrests, mental illness and work-related accidents. And high death rates were seen among Asian migrants in the Middle East (Adhikary, Keen, & Van Teijlingen, 2011).

Based on these study findings of migrant family and increasing youth out-flow, it is recommended that government, as well as non-governmental agencies, should highly prioritize rural rejuvenation programs. Otherwise, in search of lavish life and better education for their children, the migrant's families are moving faster for urban settlement. The beauty and harmony of traditional village life and living, farming, and a stronger family ties as are part of Nepalese culture, appear at a vulnerable juncture – a point also made by a previous study from Nepal (Gautam, 2005).

## 5. Limitations of the study and implications for further research

This study has presented comprehensive information on migration status and impacts of migration on migrants and their families left behind by supplementing survey data with qualitative interviews. However, the study is not without limitations. As the national survey was primarily designed to describe alcohol consumption practices among reproductive-age women, in the present study we were able to test/describe the relationship of those variables which the survey data availed. In addition, because of the participant's consent, we could not record qualitative interviews in the audio recorder and which might have affected in capturing some detailed views/experiences of the participants.

Our study also showed that women, although in a small proportion, have started migrating for labour work, it would be imperative to document these women's experience-documenting both their experiences on destination countries and the hardships they went through while deciding to leave their families back. Such a study would be important because women in Nepal are traditionally considered to be housewives and are generally not expected to migrate. In addition, an extensive study on spousal relations and reproductive health status of migrant and their family is imperative to prevent devastating consequences and to maintain harmony in the society.

## 6. Conclusion

This study concludes that migration has both positive as well as negative consequences. Therefore, it is not just about summing the remittance from the labour migration, it is crucial that government and concerned stakeholders invest in creating opportunities for young people at home. It is also important that immediate attention, such as a provision for adequate counselling to young people, is taken to prevent helplessness of the immigrants both source and at the destination. The study indicates that immigrant health should be a national priority agenda so that measures could be taken to ensure health and well-being of returnee immigrants and their families left behind, who is one of the vulnerable group to be prioritized in national policies and programmes. As a range of other studies has pointed out internationally, a national priority on immigrant health is the must.

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## Disclosure statement

No potential conflict of interest was reported by the authors.

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## Author's Contribution

NT has a main role in designing the study protocol and actively involved throughout the study from proposal development to manuscript preparation and submission. MP involved in data management, data analysis and manuscript preparation and submission. AMG, PT, RP, PJT, KA, BP, RT, and BSP offered scientific advice, inputs and critique during the study design, data analysis and in preparing the manuscript. All authors have read and approved the final manuscript.

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