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Household Migration, Remittances, and Its Impact on Health in Indonesia¹

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Abstract

The growing flow of migrant's remittances has generated much interest in understanding the socioeconomic consequences of household migration for individuals and families in migrant-sending areas. This paper examines the effect of household migration on health status, as measured by nutritional status, of adults who remained behind in rural Indonesia, a setting with high rate of out-migration and poor nutritional profiles. Assuming that remittances may improve household economic resources and thus change dietary intake and health-related investment, household migration may be associated with both the risks of undernutrition and overnutrition. The analyses use longitudinal data from the Indonesian Family Life Survey and fixed-effect regressions. The results show that adults in emigrant household were significantly less susceptible to being underweight than those in non-migrant households, but they did not have increased risk of being overweight. The improved nutritional status was restricted to people in households with labor migrants, highlighting the role of remittances in improving nutritional intake. The health gain also was concentrated among women, increased with the number of out-migrants, and was revealed over time as remittances arrived. Overall, this study demonstrates the beneficial role of household migration, especially the resulting remittances, in the health status of household members in resource-constrained settings. Improving transfers of remittances would be helpful in reducing the problem of undernutrition in poor migrant-sending areas.

INTRODUCTION

Fueled by urbanization and globalization, migration has become an integral feature of family life in many parts of the world and is projected to accelerate in the coming decades (Lucas, 1997; Massey et al., 1998;). Hundreds of millions of people in developing countries migrate to urban areas or emigrate to more developed countries in search of work and better living conditions. About 214 million people in developing nations live outside their home country, sending back over 180 billion dollars (United Nations, 2009). Internal migration and remittances occur at even higher rates (International Organization for Migration, 2005). While some migrants bring their families, most leave their family members behind because of the cost and uncertainty associated with migration (IOM, 2005). Therefore, most people touched by migration are not necessarily migrants themselves but those left behind.

In fully assessing the consequences of migration, a core element is to understand its impact on the remaining household members. Migration as a socioeconomic process potentially confers economic benefits from remittances. Hence, the impact of migration is likely to extend to family members left behind. There has been heated debate as to whether the impact of out-migration extends beyond short-term consumption improvement to include longer-term socioeconomic benefits, such as health status and health behaviors. This is reflected in the growing literature linking household migration with children's birth weight

¹Household migration is defined as out-migration of one or more household members.

and mortality, women's reproductive health, and health utilization (Frank and Hummer, 2002; Hirsch et al., 2002; Hildebrandt and McKenzie, 2005;). Most of this existing work has focused on children and women left behind by international migration in Mexico. Almost no studies have explicitly examined the consequences of internal migration or the effect of emigration on the nutritional status of adults left behind, a critical health measure that is closely related to morbidity and mortality.

The present study examines the association between household migration and adult nutritional status in Indonesia, a country with high rate of contemporary migration and a changing health landscape. In particular, malnutrition has remained a persistent public health concern in many parts of the developing world including Indonesia (Flood, 1997; Muller and Krawinkel, 2005). In recent decades, the country has joined many other developing settings in a nutrition transition that is accompanied by lifestyle changes (unhealthy diet and reduced physical activity) with deleterious consequences for nutritional status (Caballero and Popkin, 2002). Such changes are especially salient among people with adequate resources. This pattern drastically differs from that in the developed world, where unhealthy behaviors are negatively associated with socioeconomic status. As a result, overweight and obesity have emerged as a health burden, mostly among the well off, in low-income countries (Popkin, 1998). This change has led to the coexistence of under- and overnutrition problems.

Because increased economic resources from household migration tend to change lifestyles and health-related investment, thereby bearing important implications for both nutritional problems discussed above, the present study examines whether living in households with out-migrants is associated with lower risks of undernutrition (being underweight) and higher risks of overnutrition (being overweight) in Indonesia. To assess whether the observed difference is a result of remittances, this study distinguishes households with labor migrants from those with other types of migrants, because remittances are generated largely from labor migration. It further explores the variations in the relationship by length and number of out-migration and by gender of people left behind.

CONSEQUENCES OF MIGRATION: FROM THE PERSPECTIVE OF SENDING AREAS

Migration has become a global phenomenon that is changing the lives of individuals and the structures of family units and societies. A number of theories have been developed to understand this phenomenon. The New Economics of Labor Migration links migration and the families left behind (Stark and Bloom, 1985). This theory contends that migration decisions are made collectively by families to diversify risks and maximize household economic welfare, particularly in less developed societies with inadequate credit systems and little institutionalized provision for insurance against crop failure, illness, or loss of productivity in old age. Thus, families send some of their members out to work in wage labor while others tend the fields, generating surplus capital from the savings of the migrant workers. In this sense, remittances can play a crucial role in reducing the level of poverty, offering strong potential for regional economic development (Adams, 2006).

Remittances are increasingly shifted to the center stage as the most visible outcomes of emigration. This perspective is supported by many studies finding that remittances have become a crucial source of family income in poor settings, accounting for up to 40 per cent of the income (Rempell and Lobdell, 1978). Remittances serve as a family welfare system that smoothes consumption, alleviates liquidity constraints, and provides a form of mutual insurance. This has generated heated debate as to whether households increasingly spend remitted earnings on longer-term productive investments that may contribute to poverty

reduction and economic development, such as investment in health, human capital and entrepreneurship. Several studies document the role of remittances in promoting development by facilitating small business and agricultural investment (Woodruff and Zenteno, 2007). Others have argued that remittances are generally spent on consumption, limiting their long-term developmental consequences (Reichert, 1981).

Household migration and health

Previous research on migration and health has largely concentrated on the health of migrants. Only recently have researchers begun to examine the health implications of migration for the people left behind, and most such research has focused on children. Kanaiaupuni and Donato (1999) find higher rates of infant mortality in Mexican communities with high levels of U.S. migration, although this negative effect diminishes with the level of remittances. By contrast, other studies (Frank and Hummer, 2002; Hildebrandt and McKenzie, 2005) find a protective effect of migration in Mexico—children in households with emigrants have lower risks of low birth weight and child mortality.

There is growing but still limited evidence regarding the adult population. Kuhn (2005) examines the impact of adult children's migration on the health of their parents in a rural area of Bangladesh, showing a strong positive effect of adult children's migration on their parents' physical functioning and survival. The negative impact of migration is illustrated in a study on sexually transmitted diseases in rural India (Roy and Nangia, 2005). It shows that wives left behind report a higher prevalence of reproductive morbidity, which is speculated to be a result of husband's risky sexual behavior at migratory destinations and wives' poor health-seeking behaviors at the origin.

The deleterious impact of household emigration has usually been perceived as a result of family disruption and reduced social support, which often carries detrimental consequences for psychosocial health. This is because that the absence of family members likely increases the emotional burden and results in added stressors to compensate for the reduced labor supply needed at home. Nevertheless, the deleterious consequences may be cushioned by the economic and social transfers from migrants.

The positive impact of household migration is predominately attributed to the substantial economic contributions of migration, which provide remaining households with considerable financial advantages. These remittances can increase household consumption and improve living standards, such as sanitation, nutrition, and housing. They also can improve utilization of health services and other health-seeking behaviors by directing more resources to health-related investments. Over the long run, as migration becomes an integral feature of a community, it can lead to concomitant improvements in local infrastructure and promote local development that is conducive to good health (Taylor et al., 1996).

Beyond financial remittances, emigration can also bring about social transfers of knowledge, attitudes, and practices (Levitt, 1998), which may confer both benefits and costs to the well-being of the people left behind. Such transfers often take place as a result of migrants' exposure to multifaceted contexts, leading to a greater amount of available information; increased awareness of the benefits of nutrition, sanitation, and healthcare; and probably also a new set of lifestyles predominant at the places of destination. These social remittances can have direct effects on health and also moderate the impact of monetary remittances.

THE STUDY CONTEXT

Indonesia's high rate of contemporary migration and a changing health landscape make the country a compelling setting to study many questions related to migration and health.

Indonesia is the fourth most populous nation with 234 million people. Over the past few decades, Indonesia has experienced rapid economic and social change. The country has also experienced concomitant improvements in access to health care and in common measures of health status, such as life expectancy and infant mortality rate (Frankenberg and Thomas, 2000a). However, as a developing country, Indonesia still faces many health problems, including malnutrition and infectious diseases such as malaria and tuberculosis (WHO, 2002). The country's health profile has gradually changed following the nutrition transition. Modifications in diet and lifestyles have caused more people to become overweight, although it is not as prevalent as undernutrition and is mostly concentrated in the more developed urban areas (Flood, 1997). Overall, combating nutritional problems—both undefeated undernutrition and emerging overnutrition—have become the national public health priorities.

Urbanization has occurred at a rapid pace in Indonesia. United Nations reports (2002) show that urbanization in the country has advanced substantially to over 40% in 2000, exceeding that of many other developing countries. The 2000 census reports that one in ten Indonesians can be classified as migrants (Hugo, 2000). The internal migrant stream is largely characterized by economically motivated migration. As is common throughout the world, migrants are largely drawn from young males, though female migration has been increasing. Migrants often come from relatively less well-off households and generally take labor-intensive or service jobs. Due to the large rural-urban income gap, the earning advantage of migrants is evident. Indonesia also is one of the world's major sources of international migrant workers into Southeast Asian countries and the Middle East, sending a total of around 2.5 million immigrants (Hugo, 2002). But this migrant stream is small relative to the scale of internal migration.

Migrants maintain strong ties with their families and return periodically to their home areas. As in many other settings, Indonesian migrants remit a considerable proportion of their income to their families, usually once or twice a year (Hugo, 1982; FDC, 2007). These remittances have become an important source of income, with total remittances accounting for as much as 50 percent of the family income (Hugo, 1982). As documented in a case study in rural Java over 30 years, in the 1960s many families had very few sources of income; but now a large proportion have at least one person working outside the village (Collier et al., 1993). More precisely, in the late 1990s 25% of rural households in the country relied on labor migration and remittances (Hugo, 2002). The remittances were largely used to aid daily family needs.

THE CURRENT STUDY

This study examines the health consequences of household migration in Indonesia. On the positive side, the widely documented protective effect of economic resources against malnutrition (Gwatkin et al., 2000) highlights the importance of out-migration because it often entails substantial economic improvement through remittances. They are likely to benefit the left-behind family members by improving health-related investment such as nutritional intake and sanitation. These improvements in turn can reduce the risk of undernutrition and infectious diseases. On the negative side, because in nutrition transition settings overnutrition has been largely observed among the well off (Popkin, 1998), increased economic resources from remittances may lead to diet change (such as more processed, sugary, high fat diets) and sedentary lifestyle, which subsequently contributes to a higher risk of overnutrition. In a similar vein, the social transfers accompanied monetary remittances also may confer both benefits and costs to nutritional status. These social transfers from migrants working in more developed areas may increase the awareness of the benefits of nutrition, sanitation, and healthcare. However, they can also bring about

unhealthy lifestyles as migrants adopt a new set of behaviors that are commonplace in host societies.

Overall, we expect that household migration may decrease the risk of undernutrition while increasing the risk of overnutrition. Because remittances are generated largely from labor migration, we expect the relationship to be driven by people in households with labor migrants. We also expect differential effects by the length and number of out-migration. The influence of household migration may not be immediate but may reveal over time as remittances arrive, and the impact tends to increase with the number of out-migrants as more migrants bring more remittances. Finally, there also may be some gender differences in the observed relationship. Because women generally are more likely to invest in their own health than men (Paringer, 1983), especially when they are empowered to manage resource allocation (which can happen when the male member has migrated), the association between household migration and nutritional status is likely to be stronger for women.

DATA AND METHODS

The data used are from the 1997 and 2000 waves of the Indonesia Family Life Survey (IFLS), a longitudinal multi-stage probability sample survey representative of 83% of the national population. The first round (IFLS1) of the survey was conducted in 1993 and included interviews with 7,224 households and 22,347 individuals. In 1997, IFLS2 was conducted to interview all IFLS1 households and respondents as well as all household members not interviewed in 1993 (Frankenberg and Thomas, 2000b). In 2000, the IFLS3 was conducted to re-interview all households and all respondents from previous rounds (Strauss et al., 2004). Considerable efforts were made to minimize attrition. The IFLS2 and IFLS3 included over 90% of the households and over 80% of the individuals from previous waves. The high follow-up rate substantially reduces the concerns that can arise from selective attrition.

Professional interviewers accompanied by trained nurses to collect a broad array of information in each wave about demographic and socioeconomic characteristics and histories, as well as health behaviors and health measurements including self-reported health and physical assessments such as weight and height. Important for the purpose of this study, the IFLS contained a detailed household roster with information about whether a member who lived in the household in previous waves had moved out, and, if so, the main reason for their migration. The study described herein mainly used the IFLS2 and IFLS3 because the measure of household migration was not available in the IFLS1.

Measures

We used body mass index (BMI) constructed from measures of height and weight to assess adult nutritional status: Underweight (BMI < 18.5 kg/m²) indicated undernutrition and overweight (BMI ≥ 25.0 kg/m²) indicated overnutrition. These are the standard cutoffs defined by WHO.

The key explanatory variable was household migration status, which indicated whether someone from the household had migrated for work. This measure was constructed from the household rosters. Specifically, a member was considered a labor migrant if he or she was absent from the original household and was reported to have moved out for work-related reasons. While this procedure can capture most out-migrants, it may have underestimated highly circular migration and recent return migrants. Sensitivity analysis was conducted to take account of these migrants—who had moved back to the current household within six months of the interview—which yielded highly consistent results. In general, the measure of household migration was successful at capturing households with emigrants, as the estimate

was close to those reported in other studies (Hugo, 2002). Because internal migration occurs at a more extensive rate in Indonesia than international migration, the vast majority of the migrant households (over 90%) sent out internal migrants. This study did not distinguish between internal and international migrant households because of lack of sufficient information.

To better evaluate the role of remittances, we constructed a variable that distinguished among non-migrant households, households with labor migrants, and households with other types of migrants (for short visits, family-related reasons, marriage, education, etc.). To separate the immediate and the longer-term impact of household migration, we created a discrete variable of length of out-migration that differentiated among non-migrant households, households with recent migrants (within 2 years), and households with longer-term migrants (> 2 years). We also constructed a continuous measure indicating the number of out-migrants in the household.

Other covariates included factors previously demonstrated to be important predictors of migration or nutritional status: age (both linear and quadratic age terms to capture nonlinear health trajectories); gender; years of schooling; current work status; logged per capita annual household income (sum of income of current household members divided by current household size); family structure; household size; female head of household; marital status; household economic shock (whether the household experienced any economic shock in the past 5 years, such as unemployment of a household member, crop loss, household loss due to disasters, etc.); and province of residence.

Analyses

The analytic sample consisted of adults in rural Indonesia because the vast majority of migrants originate from rural areas. The analysis was limited to people aged 18–65 to avoid bias due to differential mortality at older ages. Age 65 was the life expectancy in Indonesia in the late 1990s. By definition, migrants themselves were eliminated to avoid confounding the effect of out-migration with that of a person's own migration experience. In the sample, the quantity of missing information was relatively small. Seven percent of cases had missing data and were deleted. The individual attrition rate between 1997 and 2000 was 18%. Because a large fraction of the people lost to follow-up were migrants (over 85%) and thus would not qualify for inclusion in the sample, concerns about selective attrition were greatly reduced. In addition, after controlling for demographic and socioeconomic characteristics, nutritional status at the earlier wave is not associated with sample attrition. The final sample for analysis consisted of 6,012 people surveyed in IFLS2 and 3. To study the differential effects by gender, stratified analysis for males and females were conducted.

We exploited the longitudinal structure of the data and used fixed-effects (or conditional) logistic regression models to estimate the likelihood of within person changes in nutritional status as a function of changes in explanatory variables, including household migration status (Wooldridge, 2002). The fixed-effects regression models essentially compared the same individuals over successive IFLS waves; that is, before and after out-migration took place. This approach helps adjust for the possibility that the effect of migration may be plagued by unobserved heterogeneity (as long as it is stable over time)—that is, unmeasured factors influencing migration decisions (i.e., previous life exposure, household socioeconomic circumstances, personal traits) may also affect the health of household members. If such factors are not adequately controlled for and are negatively related to health (as is almost certainly the case), regression results would be overstated. This was accomplished using conditional maximum likelihood estimation. The interpretation of the fixed-effects logistic models was similar to that for logistic regressions. A caveat was that time-invariant factors (i.e., gender) could not be explicitly modeled. The models also

excluded individuals without outcome variations. This was not a major concern because the sample provided sufficient variation to sustain the analysis. In all analyses, the Huber-White robust estimator was used to correct the standard errors for clustering of individuals within households (White, 1980). The analysis also accounted for potential bias from socioeconomic shocks, external or internal to the household, that might have been an impetus for migration and might also have caused health problems. This was accomplished by controlling for province-level contextual effects and time-varying effects of macroeconomic shocks, as well as an indicator of household socioeconomic shock.

RESULTS

Table 1 presents the descriptive statistics separately for IFLS2 and IFLS3 and by household migration status. In 1997, 16% of rural households had sent someone out for work. This fraction increased by almost 8% by 2000. Over half of the people surveyed were females and over 80% were currently married in both years. The results confirmed the low levels of education and earnings reported in earlier studies in rural Indonesia: half of the respondents had primary school education or less and an average per capita annual income of Rupiah 1,250,000 (roughly 150 US dollars) in 1997, and this pattern remained in 2000. The results also were consistent with previous work showing that migrants are largely drawn from relatively poor households and households with some educated members. In addition, emigrant households were more likely to be extended in structure. This may be because extended households were more likely to have surplus labor and thus to send out migrants, or because when facing emigration, many families tend to adopt the extended living arrangements as a coping strategy. With respect to nutritional status, in 1997 around 18% of the people surveyed were underweight and this value remained stable over time. Importantly, the risk of being underweight was lower in emigrant households than in non-migrant households. On average, over 11% of the sample was overweight in 1997 and the fraction increased to over 13% by 2000. Emigrant households seemed to experience a slightly lower risk of being overweight. Overall, the study regions witnessed an increasing burden of overnutrition, while undernutrition remained a dominant health issue. Nevertheless, these bivariate relationships in weight status should be interpreted with caution because the considerable socioeconomic differences between the emigrant- and non-emigrant households were not adjusted. I next provided a more accurate understanding using multivariate regressions.

Table 2 illustrates the relationship between household migration and nutritional status, adjusting for the possibility that people in migrant and non-migrant households differed on a wide array of characteristics. Results showed a negative association between household migration and underweight: adults in migrant households were significantly less likely to suffer from undernutrition than those in non-migrant households. The odds of being underweight dropped by more than 40% for adults in migrant households. Because a binary change in health indicates a substantial state transition, this result illustrated the beneficial role of migration for nutritional status. In contrast, household migration was not related to overweight. The odds ratio was indistinguishable from 1 and was insignificant. Thus, during the 3-year study period, there was no clear evidence of a lifestyle change associated with migration that might raise the risk of overweight. The result was the same when we distinguished among different types of household migration and stratified the data by gender. Thus, the subsequent analysis focused on the problem of undernutrition.

In Table 3, we first differentiated labor migrant households from other types of households. The observed relationship was largely driven by adults in households with labor migrants. In other types of non-labor migrant households, the effect of migration was small and insignificant. This finding lent support to the premise that remittances, and consequently

improved living standards such as food intake, underlie the association between migration and nutritional status. In contrast, in households where people migrated for social reasons, people left behind did not receive the economic contribution of migrants and may even experience income declines due to the reduction of available household labor. With respect to the length of migration, the nutritional benefits of household migration were not immediate but appeared to accumulate over time. Within the first two years of out-migration the relationship was in the expected direction, but only marginally significant. This was presumably because households received little or no remittances immediately after out-migration, as migrants were still struggling to find work and repay debts incurred during migration. This is especially true in the first year after migration, the relationship was insignificant (95% CI of OR is [0.305, 2.609]). Over a longer period of time, the impact of migration on undernutrition became more evident as remittances grew over the course of migrants' settlement in their host societies and began to shape household living standards. In addition, when the household has multiple out-migrants, the positive effect of emigration is amplified. This is what we would expect because multiple migrants can lead to more sources of transfers.

The analysis also pointed to noticeable gender differences. Women were especially likely to take advantage of remittances, as the benefit with respect to nutritional status was mostly evident in females. This result confirmed the hypothesis that women were more likely to allocate more resources to health and nutrition than men.

DISCUSSION

This research demonstrated the important implications of migration, as an institutionalized household strategy adopted in many resource-constrained areas, for the well-being of individuals who remained behind in migrant-sending communities. To our knowledge, this is the first study to evaluate the association between household migration and the nutritional status of adults in developing countries. The study showed that the economic benefits of remittances play a beneficial role in reducing the risk of underweight in resource-poor areas such as rural Indonesia. The increased economic resources translated into health benefits because they improved the household standard of living that is conducive to good nutritional status (e.g., food consumption, sanitation, and health investment). Because remittances represented the core mechanism for the observed health improvements and that they took time to arrive, the observed relationship was detected mostly in households with labor migrants and on a longer time scale, and it increased with the number of out-migrants. The relationship was negligible for people left behind by non-labor migrants and immediately after emigration, in particular within the first year of out-migration. This study also revealed the moderating role of gender, with women more likely to secure nutritional benefits from out-migration. This was presumably a result of women's greater propensity to invest in health, especially when they are left behind and thus empowered to manage resource allocation. We further examined the potential role of migration in changing the lifestyles of family members left behind and thereby increasing the risk for overweight. The results did not support this possibility.

The findings add to the literature on the consequences of migration by showing that its influence can extend to migrant-sending areas and beyond economic improvements to individual well-being such as health status. This research also showed that the role of migration on health, which has largely been documented in the context of Mexico-US migration, generalizes to other developing countries with a high rate of migration. The process of migration can thus be understood partly as a socioeconomic process that provides households with economic advantages, which subsequently translate into health benefits.

Several limitations of this study warrant discussion. It would be informative to explicitly examine the flow and use of remittances. Unfortunately, although the dataset was good in many respects, it did not supply such information. The study also cannot disentangle the specific relationships between left-behind individuals and migrants due to inadequate information. Thus, the results should be interpreted as average rather than relation-specific patterns. The analysis also lacked sufficient information and power to examine the similarities and differences in internal and international migration. The generalizability of the results to other settings may also be restricted, as discussed in more detail below.

Despite these limitations, the finding that migration constituted a nontrivial determinant of adult nutritional status should be of general interest to the research and policy communities, as migration has become an integral feature of family life in many parts of the world. Given that migration can have positive health consequences, especially for people in resource-poor settings, programs that promote economic transfers from migrants by addressing the means and the costs of transfers would be effective in reducing undernutrition. One strategy is to boost the amount, regularity, and prompt receipt of remittances by diversifying the available transfer methods and reducing transfer costs. This would be especially helpful in reducing problems of undernutrition in poor migrant-sending areas and improving the overall well-being for people in these contexts. Also, the extent to which health benefits occur likely relies on the efforts to help migrant families make the best use of these resources to welfare and growth promotion. Recipient families would thus benefit from programs that promote productive investment of remittances.

The findings in this study certainly do not suggest that household migration is free of adverse consequences. The absence of key family members may incur emotional costs and lead to decreased social support, which can have detrimental impacts on psychosocial health. In addition, although the study did not find a relationship between household migration and overweight, the results should not be taken as evidence that it is not a valid concern. The relatively short time lag between 1997 and 2000 permitted us to study the short-term consequences of migration. Over the long term, we may observe some different patterns that are contingent on over-time social and economic transfers. With a longer time series, it may also become possible to determine whether concomitant changes in lifestyles and other health-related behaviors occur, as behavioral change often requires an extended period of time to become visible.

It should be noted that the findings may not be generalized in their entirety to other migrant-sending areas, as the influence of household migration may very well be contextualized within the larger sociocultural sphere within which migration occurs. Whereas the story told here is part of a broader picture of how migration and remittances have become ingrained in family life and have helped reshape individual well-being, the different health landscapes, developmental stages, and institutional systems across settings likely mean that a different set of conditions and varying levels and uses of economic transfers exist in different locales. While the Indonesian case mostly involves migration within a country, it has international implications. The experience of family members of cross-border migrants, especially those who go to industrialized countries, is likely intensified given the higher levels of remittances from international migrants and the health profiles of destination countries, many of which have overnutrition as a common health concern. A comparative perspective would greatly advance our understanding of migration and remittances in shaping the well-being of individuals and families.

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Table 1

Sample Descriptive Statistics, by Household Migration and Year: Indonesian Family Life Survey (IFLS) 1997–2000.

Variables	1997		2000	
	Non-emigrant households	Emigrant households	Non-emigrant households	Emigrant households
Age	40.2	44.0	43.0	46.7
Male (%)	46.5	43.7	46.7	44.7
Currently working (%)	66.9	66.1	80.3	80.1
Education in years (%)				
0–5	54.4	52.8	54.6	53.2
6–9	35.2	35.9	34.8	38.8
>=10	10.4	11.9	10.6	8.1
Marital status (%)				
Never married	10.3	12.3	8.5	7.8
Married, living with spouse	79.2	69.5	79.1	79.1
Married, not living with spouse	1.5	6.2	1.3	1.4
Marriage dissolution	8.9	12.0	11.0	11.7
Per capita HH annual income (in Rupiah) ^a	1,287,685	1,055,480	1,433,105	1,339,350
Family structure (%)				
Nuclear	63.5	59.5	62.5	54.1
Extended	34.9	39.4	35.6	44.5
Other	1.6	1.1	2.0	1.4
Female-head HH (%)	10.6	16.3	10.5	15.4
HH socioeconomic shocks in past 5 yrs (%)	46.0	44.5	41.5	39.8
HH size	4.4	4.6	4.8	5.0
Underweight (%)	18.6	17.9	18.5	17.2
Overweight (%)	11.4	10.5	13.5	12.6
<i>N (individual)</i>	5,044	968	4,575	1,437

^aThe variables are adjusted for inflation (in thousands of constant 2000 Indonesian Rupiah). In 2000, 1 US dollar = 8,290 Indonesian Rupiah.

Table 2

Odds Ratios for Underweight and Overweight on Covariates, IFLS 1997–2000.

	Underweight OR (95% CI)	Overweight OR (95% CI)
HH with labor migrants ^a	0.576 ^{**} (0.378, 0.878)	0.989 (0.559, 1.750)
Age	0.734 ^{**} (0.598, 0.903)	1.388 [*] (1.033, 1.865)
Age squared	1.003 ^{**} (1.001, 1.005)	0.996 [*] (0.992, 0.999)
Currently working	0.629 [*] (0.435, 0.910)	0.120 (0.704, 1.783)
Education ^b		
6–9 years	1.074 (0.615, 1.874)	1.293 (0.570, 2.933)
>=10 years	0.322 (0.322, 5.910)	0.604 (0.176, 2.066)
Marital status ^c		
Married, living with spouse	1.936 (0.568, 6.603)	2.379 ^{***} (1.877, 3.016)
Married, not living with spouse	1.359 (0.291, 6.336)	0.420 (0.026, 6.854)
Marriage dissolution	0.814 (0.172, 3.847)	2.281 ^{**} (1.224, 4.250)
Per capita HH annual income (log)	0.991 (0.955, 1.029)	1.034 (0.990, 1.080)
Family structure ^d		
Extended families	1.066 (0.692, 1.641)	1.671 (0.876, 3.186)
Other	2.289 (0.601, 8.718)	3.609 (0.323, 40.292)
HH size	1.176 (0.950, 1.455)	1.249 (0.915, 1.707)
Female-head HH	2.708 [*] (1.031, 7.108)	0.604 (0.176, 2.065)
HH economic shocks in past 5 years	1.279 (0.970, 1.688)	1.438 (0.999, 2.072)

Note. OR = odds ratio; CI = confidence interval. Estimates for year, province dummy variables, and their interactions are not shown. Estimate for sex is dropped in conditional logistic regressions.

^aThe reference category is non-migrant households.

^bThe reference category is 0–5 years.

^cThe reference category is never married.

^dThe reference category is nuclear families.

^{***} p value < 0.001;

^{**} p value < 0.01;

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*
 $p \text{ value} < 0.05.$

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Table 3

Odds Ratios for Underweight on Types of Household Migration, Length of Migration, and by Sex, IFLS 1997–2000.

	Underweight OR (95% CI)
Types of migrants ^a	
HH with labor migrants	0.512* (0.295, 0.889)
HH with other types of migrants	1.075 (0.679, 1.700)
Length of absence ^a	
HH with labor migrants ≤2 year	0.621 [†] (0.364, 1.059)
HH with labor migrants >2 year	0.501* (0.283, 0.885)
Number of out-migrants	0.710* (0.509, 0.990)
Women	
HH with labor migrants ^a	0.522* (0.286, 0.951)
Men	
HH with labor migrants ^a	0.704 (0.351, 1.413)

Note: OR = odds ratio; CI = confidence interval. Estimates of other covariates are not shown, which are the same as those presented in table 2.

^aThe reference category is non-migrant households.

* p value < 0.05;

[†] p value < 0.1.