Sri Lanka Migration Health Study
Study on Families Left Behind

IOM International Organization for Migration

Assessment of mental health and physical wellbeing of 'left behind' family members of international labour migrants a national comparative study in Sri Lanka

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Kolitha Wickramage[1*], Chesmal Siriwardhana[2, 3], Athula Sumathipala[2, 3], Sisira Siribaddana[4], Gayani Pannala[2], Anushka Adikari[2], Kaushalya Jayaweera[2], Puwalani Vidanapathirana[2], Sulochana Weerawarna[2], Buddhini Jayasekara[2], Sharika Pieris [1, 5], Susie Perera[5], David Mosca[6]

[1] International Organization for Migration, Colombo, Sri Lanka
[2] Institute for Research & Development, Colombo, Sri Lanka
[3] Institute of Psychiatry, King's College London
[4] Department of Medicine, Faculty of Medicine & Allied Sciences, Rajarata University of Sri Lanka
[5] Ministry of Health, Sri Lanka
[6] International Organization for Migration, Geneva, Switzerland

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Abstract

Background: Journal PLoS Medicine series '*Migration & Health'* in 2011 prompted a calling for an evidence-based research agenda on migrant health. Nearly one-in-ten Sri Lankans are employed abroad as International Labor Migrants (ILM). Little is known about the impact of their migration on the health status of the families they 'leave behind'.

Methods and Findings: This national study utilized both quantitative and qualitative methods to study associations between the health status of 'left-behind' spouses, children and caregivers, and comparative non-migrant families. A cross-sectional study design with multi-stage random sampling was used. We surveyed a total of 1990 persons; 875 adults (from 410 migrant and 410 non-migrant families), 820 children from 410 migrant and 410 non-migrant families matched for both age and sex, and 295 school teachers linked to these children. Socio-demographic and health status data were derived using standardized pre-validated instruments. Univariate and multivariate analyses were used.

Nearly one-in-three migrant families were from single-parent households. Forty-four percent of left-behind children had some form of psychopathology, with over a quarter of those under 5-years being underweight or severely underweight (29%). Association of emotional, hyperactivity, conduct problems and having any psychiatric diagnosis was strongest in children from migrant family households [Odds ratio 1.62 (CI: 1.16-2.27)], and was exacerbated in families where the sole parent was the overseas based migrant worker. Significantly high levels of depression were found in caregivers [12.3% *(CI: 12.23-12.31)*] and spouses from left-behind families [*25.5% (CI:25.47-25.60*], with physical health status showing similar trends.

Conclusions: Findings provide Empirical evidence on health consequences of heavy out-migration for families 'left-behind'. These are relevant for many labour 'sending countries' in Asia relying on ILM remittances. Whilst cross-sectional studies can only suggest, but not prove a cause–effect relation, this study highlights a number of major challenges for policy makers at the nexus of balancing rights, remittances and health consequences. We advocate the adaptation of migrant sensitive health policy frameworks guided by the 2008 World Health Assembly *Health of Migrants Resolution,* which promotes safe, healthy and economically beneficial 'migration for all'.

Key words: International Labour migrants; Migrant workers, Migration Health; Mental health; Migrant children; Health Policy; Sending Country; Sri Lanka.

Introduction

Human mobility is considered to be one of the most important geo-political phenomena of the modern era (1, 2). The growing economic aspirations of international labour migrants (ILMs) are driven by the labour market demands of rapidly developing regions/economies of the world. ILM from Sri Lanka has grown ten-fold during the past decade, with 23.8% of Sri Lanka's total labour force currently employed abroad (3). In what was once a highly feminized labour force, today 49% percent of ILMs are women, and out of these, 86% are 'domestic housemaids'(4) with the majority (over 93%) employed in the Middle Eastern countries. The large number of registered migrant workers (730) that depart Sri Lanka each day is considered an under-estimation due to limited data on volumes of 'irregular' or unregistered migrant workers. ILMs contributed 4.1bn USD (8% of GDP) to the Sri Lankan economy in 2011 (second highest contributor), with foreign remittance earnings expected to increase up to 7bn USD by 2016 (3).

Despite the clear monetary benefits for the State, studies examining household savings and socio-economic status of returning Sri Lankan ILMs show mixed economic gains (5-7) . Most achieve only marginal and short term increases in income (7), within a few income deciles (8). Many ILMs also choose continuous cycles of re-migration ('circular migration') to increase their savings potential. A study revealed that the average ILM contract is for two years, with many reporting work durations of ten years or more (9). Whilst several studies have provided insights into the social, legal and economic impacts of ILMs in Sri Lanka (7, 10 – 14) , an in-depth literature review utilizing Pubmed's MEDLINE, Web of Science, Cochrane, and Google Scholar databases found three published studies from Sri Lanka that examined health status of left-behind family members utilizing standardized surveys or clinical measures (15-17). Results from all three studies indicated that the absence of the mother was associated with mental health and behavioural problems of the left-behind children. However, the following limitations were common to all studies: they only included households where the mother was the overseas worker, and focused exclusively on impacts on left-behind children. Purposive samples were obtained in all studies from only one district (Colombo), derived exclusively from an urbanized setting, with inclusion of only one ethnic group (Sinhalese). The health status of left-behind spouses or caregivers was not examined.

Even though the enormous contribution from international migrant workers to Sri Lanka's economic development is well documented, politically encouraged, socially accepted and commercially stimulated, little is known on the actual health status and health consequences of the 'left behind' members of their families.

Despite the political discourse on migration moving up the global development agenda (18, 19), the public health implications for migrants and their families have received little attention. A PLoS medicine series on *Migration & Health* in 2011 prompted public health attention and called for an evidence-based research agenda on health of migrants (20). In the current study, the association of spousal migration with socio-demographic factors and health status of left-behind family members (spouse,

children and care givers) were compared with families without a history of migration, using standardized instruments with diagnostic values. This study was undertaken by the International Organization of Migration and the Institute for Research & Development in partnership with the Ministry of Health as part of the 'National Migration Health research' agenda. The study was recommended by the Government of Sri Lanka's 'Inter-Ministerial Taskforce on Migration Health', and sought to contribute to an evidenced-based 'National Migration Health Policy' process.

Methodology

Study Design and Participants

This study utilized a mixed method approach using both quantitative and qualitative methods. Paper presents findings from the quantitative study component. A cross-sectional survey was conducted in six districts of Sri Lanka which encompassed the highest number of outbound departures for foreign employment (62% of total migrant worker population). The study population included the families of migrant workers (employed abroad for at least six months), residing in one of the selected six districts. Families without a history of migration abroad were considered as the reference population or 'comparative group' **(see *Box 1*).**

The inclusion criteria for the 'study group' were families where one or both spouses were international labour migrant workers, and where the left-behind family has been living at the same residential address for a period of (at least) six months prior to the time of data collection. Families where one or both spouses had been away for more than 6 months (either through divorce/ due to marital disputes) were excluded from the study. The comparison group included families where neither spouse has a history of migration, and who had their own or adopted child/children under 18 years of age. Families where one or both parents were absent from the same household for more than 60 days (average more than 2 days per week) continuously, or alternatively for the preceding six months, were excluded from the study. These inclusion/exclusion criteria ensured a more accurate comparison of the effect migration plays on left-behind families of ILMs.

Sampling

A multi-stage random sampling method was used in the selection of families. Grama Niladhari Divisions (GND) or 'village unit' is the smallest administrative population unit in Sri Lanka. Divisional Secretariat Divisions (DSD) administrates a cluster of GNDs, and is responsible for coordinating social services to these villages. A total of 41 DSDs were included in six districts with the highest ILMs (Colombo, Gampaha, Kandy, Kurunagala, Batticaloa, Puttalam). These were listed, along with all GNDs they contain, and forty one GNDs (one from each DSD) were randomly selected using a random number generation tool. A registry of all migrant families in each selected GND was made according to the information obtained from the Grama Niladhari (village administrator), Public Health Midwife, and "Samurdhi Niyamaka" (village welfare worker). This list was then used for random selection of study families. Each randomly selected family was checked for inclusion and exclusion criteria, and up to ten families from each GND were recruited. A total of four hundred and ten families were recruited for the study group and the same number recruited for the comparative group. To mitigate limitations in sampling such as inaccurately maintained village registries, or in situations where families had either left or migrated out of the area, a single GND out of the total list from a selected DSD was selected randomly as the substitute where necessary, and the inclusion/exclusion criteria applied.

The study group children between 6 to 17 years of age were individually matched with children of same school and class to find a comparative child and family. Children attending school were matched according to gender and age, and a list of children with both parents and non-migrant history was prepared from the attendant register. There after, a single child was randomly selected from the list. Pre-school children (under 5 years of age) were also matched similarly according to gender and age, and a list of children from the register having both parents with non migrant history was prepared. The sample size was decided using standard sampling power calculations (21).

To summarize, a total 1990 persons were surveyed: 875 adults (from 410 migrant and 410 non-migrant families) that were randomly selected from the districts with the highest recorded rates of international labour migration and which met the inclusion/exclusion criteria; 592 children aged between 6 to 17 years; 228 children under 5-years of age and their school teachers were interviewed for purpose of completing the SDQ.

Instruments and outcome variables

Health status (both physical and mental health) data were derived from standardized health instruments which measured overall quality of life, adult mental health, child and adolescent mental health, suicidal ideation, health seeking behaviors and health care utilization. Socio-economic, environmental and demographic data were also harnessed across a range of variables. Additional measures on frequency of foreign remittance, type of work and indebtedness were also obtained. Anthropometric data on child's growth, development milestones and immunization history were captured from individual Child Health Development (CHDR) report cards. These hard-copy records are held by the parent/care-giver, and are usually maintained by Public Health Midwives in child health clinics at village level.

Summary of all instruments and outcome variables measured are summarized in ***Box 2.*** We used the nominal group technique to translate and generate general consensus, quantify the agreement and then adapt it to suite the Sri Lankan population using culturally appropriate instruments (22). All instruments used have been adapted from original questionnaires and translated to both Sinhalese and Tamil languages. The instruments have been extensively validated and then utilized by the study authors in many larger scale studies in Sri Lanka, including twin and singleton studies on Common Mental Disorders (23-25) and a Randomized Control Trial (26).

Ethics, Data collection & Analysis

Ethical approval was granted by the Ethical Review Committee of Faculty of Medicine, University of Colombo. Data collection was conducted using a team of 22 trained field research assistants under the guidance of a psychiatrist, physician and two public health specialists. Written Informed consent was obtained from the parents/guardian for all children participating in the study after providing an information leaflet.

The written informed consent was obtained from the parents before interviews were conducted with children. The consent forms have been stored securely and are available upon request. The ethics committee endorsed the described consent procedure along with the scientific protocol and data collection methods. Eligible families were recruited to the study after obtaining written informed consent for participation. The selected individuals were briefed about the nature and aim of the study. Informed consent was obtained from the parents or guardian for minor children after providing an information leaflet.

Data collection for this national study was supervised and managed by two dedicated project coordinators and a statistician. Double data entry and data analysis was conducted using SPSS (Statistical Package for Social Sciences) version 17 (SPSS Inc, 2009). Statistical analysis included descriptive analysis and regression models. Descriptive analysis was carried out to determine demographic information of participants and frequency of the exposure and outcome variables in the initial stage. Chi-square tests were performed to check differences in data between migrant and comparative non-migrant groups. We used multivariate linear regression models for continuous outcomes and multivariate logistic regression models for dichotomous outcomes. Study group for spouse, caregiver and child were separately analyzed to determine respective risk factors for mental health problems.

Univariate and multivariate analyses were used to estimate the differences in health outcomes between migrant and non-migrant families. Univariate analysis were undertaken to 1) Assess the prevalence of depression (major and other) in adults from migrant vs. non-migrant families across selected socio-demographic variables; 2) Assess child psychopathology scores for children from migrant vs. non-migrant families; and 3) Analyze the association between abnormal scores in left-behind children with and without the presence of a parent. Multivariate analyses were performed on both mental and physical health scores from the SF-36 instrument, where spouses and caregivers of left-behind families were compared across selected socio-demographic strata.

Results

Socio-demographic profile, household economy and remittance characteristics

We studied 410 randomly selected families having a spouse working overseas as a migrant worker, and 410 'comparative families' with both spouses living in Sri Lanka with no migration history. When the inclusion/exclusion criteria were applied to selected households, a total of 277 spouses and 188 care-givers were included in the migrant family category (the study group). Despite the high degree of specificity embedded in the inclusion/exclusion criteria (Box 1), many older members of the household fulfilled the criteria set on being a 'caregiver' (Table 1). Whilst we did not seek to determine the nature or extent of care provided by the left-behind spouse, it was noteworthy that 72 of the 119 male left-behind spouses were the sole carers of their child/children (none were linked with care-givers). Of these 134 children, 16% were also less than five years of age. In 54.2% of migrant worker families (n=222), the left-behind spouse was the sole carer of the child (no care-giver identified). In 32.4% of migrant worker families (n=133), the left behind child/children were under the exclusive care of the caregiver, in absence of any parent. Almost one third of left-behind migrant families were comprised of single-parent households, where the single parent was the overseas based migrant worker.

The caregivers were not only older (mean age of 54.1 years) but also showed a larger age variation indicated by high standard deviation. The caregivers were predominantly female (95.7%), and almost a third were over 60 years of age (29.3%). The ethnic profile of the study sample closely matched national population ratios, with 73% of migrant families, and 77% comparative families being of Sinhalese ethnicity. Disaggregated analysis on both gender and ethnicity also revealed the majority of Muslim ILMs to be male (94%), compared with Sinhalese and Tamil (49% and 33% respectively). This current study pattern indicating higher proportion of female migrant workers from these two ethnic groups also corresponded with gender ratios of the National Foreign Employment Bureau database (4). The majority (73%) of migrant families surveyed lived in rural and regional areas.

Typology of employment of the ILM worker was assessed according to the Sri Lanka Bureau of Foreign Employment Classification of occupations (4). Analysis revealed 66% were in low-skilled classification of 'manual laborers' and 'housemaids'. More than half (54%) of migrant workers have not returned to Sri Lanka since going abroad for work (Table 2). The frequency for those who visited was only once every two to five years. Forty five (11%) migrant workers did not send any remittances to their families. Only half of the left-families (50.2%) reported receiving some form of monthly remittances, and of those receiving remittances 48.7% (n=200 families) found it adequate or sufficient.

Figure 1 graphically presents two variables; 'satisfaction in the quality of life' (as measure of economic well-being) and the 'level of indebtedness' of the left-behind families, against the duration of work abroad by the migrant worker. Chi-square test for independence indicated significant association with satisfaction in living conditions and quality of life, with duration of the time working abroad, χ^2 =(5, n=404) 14.35,

p=0.01,Cramers V = 0.19. Significant association with family indebtedness was also realized; $\chi 2$= (5, n=407) 19.03, p =0.02,Cramers V=0.22. Figure 1 indicates that duration of work ranging from two to five years abroad resulted in reducing the overall indebtedness in migrant families. A term of overseas employment between two to ten years was shown to be optimal in improving economic wellbeing for migrant families.

Mental Health and Physical wellbeing of spouses and caregivers

Prevalence of Depression measured using the PHQ was higher in left-behind spouses 12.3% *(CI: 12.23-12.31)*, than for spouses in comparative families 7.3% *(7.29-7.34)*. The level of depression was highest among caregivers at 25.5% *(CI: 25.47-25.60)* (Table 3). Prevalence of Somatoform disorder in spouses of migrant families was 3.6% *(CI: 3.59-3.63)* and 11.7% in caregivers *(CI: 11.65-11.74)*, compared to 2.9% in the non-migrant spouse group *(CI: 2.91-2.95)*. Examination of health seeking behaviors (Table 1), as measured by the number of visits made to a medical practitioner during last 3 months, revealed caregivers as the leading group (64.9%), followed by the migrant (45.2%) and comparative spouses (46.6%). The link between somatoform disorder and health seeking behaviors evident here is explored in the discussion. When analyzing the gender dimension, depression and somatoform disorders were highest among female spouses in left-behind migrants than males. Univariate analysis of the prevalence of depression (major and other) in adults from migrant vs. non-migrant families revealed marital status and educational level to be significantly associated with depression in the caregiver group ($p<0.05$).

Screening questionnaire for suicidal ideations was conducted based on the ascending severity of suicidal ideations among participants (Table 4). Helplessness, hopelessness, passive and active suicidal ideations were highest among care givers compared to spouses of migrants. These ideas were lowest among comparative families. When examining the gender differences in suicidal ideations, male spouses in left-behind families reported high prevalence of suicidal ideations than males of the comparative group.

The norm based scoring of SF-36 given in Table 5 indicated distinct differences between left-behind migrant spouse and the comparative spouse group. Whilst these two groups cannot be compared since they were not matched, they had similar mean age at 37.9 and 37.2 years respectively ($p<0.05$). The migrant worker spouse group reported a low quality of life scores across all measured domains, with the mental health score (MCS) lower than physical health score (PCS) by five points (0.5 SD). In marked contrast, comparative family spouses show above average quality of life measures in almost all domains. Caregivers had the lowest quality of life scores, although this was expected considering their advanced age/aging process.

The independent variables with statistically significant ($p < 0.05$) associations with PCS and MCS in multivariate linear regression analyses are presented in Table 6. In left-behind spouses, the age of the spouse was positively associated with the PCS score, and educational status was positively associated with the MCS score. Amongst caregivers, independent variables with significant positive associations with MCS were educational status, age and Tamil ethnicity.

Physical growth, development and mental health status of 'left behind' children

We matched 228 'left-behind' children for age and gender, with children from non-migrant families. A limitation of the study arose from that fact that many of the CHDR records of children were not maintained correctly or were missing in many of the selected families. This limited the number of records for analysis to 228 (114 from each of migrant and non-migrant child groups). CHDR record keeping is a core function of the preventative health services at village level, and the poor reporting in this study highlights a systemic public health issue which warrants a separate discussion.

Health condition of the new born babies was normal at birth in 93.8% of migrant and 97.4% of comparative families according to data contained in the CHDR. The completeness of vaccination records of the children were assessed according to the guidelines of the expanded program in immunization schedule (EPI) of the Ministry of Health. Coverage of 93.8% was achieved in migrant children and 90.3% in comparative children. The EPI was not completed or missing in 6.2% of children from migrant families compared to 9.7% in the matched group of non-migrant children. A quarter of all left-behind family children (29%) were underweight or severely-underweight, compared to 16.7% of the children in the comparative families (Table 8). The proportion of children that were in normal weight range (z-score of < + 2 to – 1 SD) were lower in the migrant group (39.5%) than in matched children of the comparative group (47.4%). The risk of underweight in both categories were relatively similar with children from comparative families (33%) showing slightly higher prevalence than the migrant group (28.1%)

Univariate analysis of Child psychopathology scores derived from the SDQ were performed for children from migrant vs. non-migrant families, and the association of abnormal scores in left-behind children with and without the presence of a parent were analysed (Table 9). Emotional difficulties, hyperactivity and behavioural problems were higher among the children of migrant families than non-migrant children. A 'borderline' SDQ prediction for any given disorder correctly identified 81-91% of the children who definitely had that clinical diagnosis (27).The SDQ domain "any psychiatric diagnosis" is a composite of all three emotional, conduct and behavioural scores to provide a potential measure a person has to develop or have a psychiatric disorder. The 'risk potential' to develop psychopathology in children was also calculated by the aggregated 'abnormal' and 'borderline' scores, and revealed 13% for emotional, 40% for conduct and 9% for hyperactivity disorder. Over 2 in every 5 left-behind children (44%) have clinically relevant mental health symptoms.

The risk potential to develop psychopathology was higher in left-behind children than for non-migrant children across all SDQ domains. Emotional problems [4.03(CI: 1.96-8.27)] and Hyperactivity disorders [3.42(CI: 1.52-7.69)] showed very high odds ratios for children from migrant families compared to those from comparative group.

Data from left-behind children group were further disaggregated into those living in families with both parents present vs. those 'single-parent' households, were the sole parent was working abroad. Result showed significantly higher odds ratio of having emotional problems [1.01 at 95% confidence interval (CI: 0.73-1.39)] and hyperactivity [1.25 at 95% confidence interval (CI: 1.09-1.44)] for left behind children with both parents present, compared to those where the single parent was the migrant worker. Odd ratio for any psychiatric diagnosis was 0.71 at 95% confidence interval (CI: 0.34-1. 47) for left behind children with both parents present, compared to those where the single parent was the migrant worker.

Discussion

This national study is the first to report on health consequences of international labour migration on the left-behind family members (spouse, caregivers and children) in Sri Lanka. Whilst the study cannot determine causality due to the cross sectional nature, the evidence suggests both positive and negative associations at the intersection of migration, health and development.

The positive effects due to remittance sent to left-behind families may be explained through the levels of indebtedness that originated in the pre-migration stage and the debts carried over to post-migration phase. Household remittance studies have revealed the pre-migration pathway results in significant financial costs (including hidden costs due to agent exploitation) to most labour migrants and their families, especially those within low-skilled categories (5). Most of these migrants seek employment abroad due to pre-existing poverty and acting as a pre-emptive causative factor in developing debt.

Our study shows international labour migration has undoubtedly increased access to financial resources to left-behind families, although the effects are not-universally realized. Findings corroborate with research which has shown that the average wages earned by either male or female ILMs during the first cycle of migration of two years was insufficient to cover pre-migration debts; hence the need for repeated migratory movements (30, 31). Dissanayake (2003) and Jayaweera (2010) concluded that positive economic benefits were only achieved by repeated cycles of outbound labour migration, consolidating findings of the current study (5, 11).

A number of studies have indicated separation and divorce to be high among Asian migrant workers (32, 34). Whether migration is a push-factor for marital disputes, separation and/or divorce is unclear, and empirical research on migration's impacts on gender relationships is still in its infancy (35). A few studies have explored the gender dimension, power relations and migrant family dynamics within the Sri Lankan context and showed no evidence of patriarchal control (9, 10, 14).

In the current study, the negative effects of migration were observed in measures associated with mental health status and physical well-being of the left-behind spouse, caregiver and child. The study highlights the important role caregivers play in caring for the left-behind children. However, their burden of care may come at the cost of poor mental and physical wellbeing outcomes, and an increased propensity to seek health services. It is well established that those suffering from somatoform disorders also cause increase burden on heath care system, a finding also confirmed in this study (36, 37).

Left-behind migrant spouses having low physical and mental health scores than non-migrant spouses may be due to chronic stressors affecting the left-behind parent together with increased burden of care. An Indonesian study on internal migrant workers demonstrated considerable psychosocial costs, with adults left behind by migrants more susceptible to stress-related health impairments and to psychological distress (38). Although not directly comparable to current study on International labour

migrants, the negative health consequence on adult members of families left behind are similar.

Despite the Government push towards a skilled 'knowledge' economy, the vast majority of Sri Lankans entering into international labour markets are over-represented in low-skilled employment categories, and are from rural settings. Most of the 'receiving countries' are in Gulf States. The majority of migrant workers were also found to be within low-skilled categories of 'labourers' and 'housemaids'- a finding compatible with the statistics of government's foreign employment agency (4). Whilst an examination of occupational types, and if they were indeed engaged in '*difficult, dirty or dangerous*' jobs (39) were beyond the scope of this research, findings did reveal that the majority of migrant workers had not returned to Sri Lanka since going abroad. It has been hypothesised that long-term absence from family may cause problems with re-integration, acculturation, family conflict and re-establishment of livelihoods for the returning migrant workers (40). For left-behind children, the main concerns centre on how separation from parents affects their social, educational, behavioral and psychological development. Higher mental disorder findings suggest that socio-emotional maladjustment can result in higher behavioural problems in left-behind children.

The worst psychopathological outcomes in children were seen those left-behind children of single parent households. The higher risk of child psychopathology observed in the study group of this national study support findings from smaller studies done previously (15, 16).

The evidence on impact of parent migration on child health, gender roles, relationship formation and other development dynamics are still in its infancy, with current data standing very country specific (35). Despite these clear associative patterns in Sri Lanka, studies from other Southeast countries show mixed patterns of psychological well-being of left-behind children, with children from Philippines having little evidence of poorer psychological well-being (44, 45). It is hypothesised that in high out-migration areas, the cultural 'normalization' of transnational migrant families, mediated by adaptive social norms coupled and supportive government programs which enable a safe and managed regular migration process, may be protective for the psychological well-being of children with migrant parents, even when the mother is absent.

Furthermore, even when multiple risk factors and adverse conditions are present, 'at risk' children can develop along normal and adaptive trajectories (46). Resilience is often characterized as consisting of multiple dimensions or features that may change over time (47), thus 'susceptibility' lies upon a continuum which may be exacerbated by extended periods in the 'left-behind' experience of a child. A study which identifies resilience factors in left behind children may be useful in tailoring enabling and protective programs/policies. Further research is needed to study the association of such variables.

An important finding was the high number of underweight/severely-underweight children aged 6–59 months, from migrant families. The finding that the comparative group also had a high proportion of children at 'risk of underweight' is also indicative of an underlying nutritional trend in Sri Lankan children. Despite achieving excellent health indicators, nutritional status of children remains a persisting problem in Sri

Lanka, impeding progress in achieving child health targets encapsulated in the Millennium Development Goals (49). The nutritional status of children is a function of an inter-play of multiple social, economic and biological health determinants, which includes but is not limited by; household food security, food habits, micronutrient deficiencies, lack of healthy choice, parenting effects, child health services and a range of other push and pull factors (50). Although the findings of this study report moderate to severe nutritional impacts among left-behind children, the interrelationships between malnutrition, migration and child health are complex, unclear and warrant further investigation.

A cross-sectional study can only suggest, but not prove, a cause–effect relation. Prospective cohort and longitudinal studies are needed to reveal true impact of migration on physical wellbeing and mental health outcomes, and whether the workers and their families left-behind truly recover from the migration experience. The study component assessing the migration impact on children under 5 years had many CHDR records that were either missing or absent due to poor record keeping practices by both family and Public Health Midwife. Whilst this study provided an insight into the trans-national parenting effects on child-health, further research is needed to explore the impact of male versus female headed households, and how migration affects intra-household power dynamics and relationship outcomes such as divorce.

Conclusions

As labour migration flow increase in a rapidly developing post-conflict Sri Lanka (4), the impact on those families left-behind leave many unanswered questions. The delicate balance between promoting ILM for economic prosperity and ensuring health and social protection is a formidable policy challenge (53). The impact circular migration have on family relationship structures, parenting and health vulnerabilities is complex and need further analysis.

The current study is the first to provide evidence on the mental and physical burden on caregivers, including their health seeking behaviour in Sri Lanka. A policy process which seeks to promote the wellbeing for the left-behind child needs to also ensure 'care for the caregiver'.
Within an economic perspective, the 'left-behind' do not simply extend to families, but to entire communities (54). Appropriate policies are needed to address potential adverse effects of economic migration on the society at large. Since the social determinants of health for both migrants and their families lie within multiple domains, a multi-stakeholder approach to health policy formulation is needed.

The findings from this and other commissioned studies are currently being used to inform an evidence-based approach in formulating the National Migration Health Policy for Sri Lanka. The challenge for policy makers lies at the nexus of 'rights, remittances and responsibilities'. We advocate for migrant sensitive health policies as espoused within the World Health Assembly resolution, to promote migration for the benefit of all (55).

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Author contributions

ICMJE criteria for authorship read and met: KW CS AS SS GP AA KJ PV SW BJ SP SuP DM

Agree with the manuscript's results and conclusions: KW CS AS SS GP AA KJ PV SW BJ SP SuP DM

Designed the experiments/the study: CS AS SS KW PV

Analyzed the data: KW CS AS SS GP SP

Collected data/did experiments for the study: CS SS AA KJ BJ SW

Wrote the first draft of the paper: KW CS

Contributed to the writing of the paper: AS SS SP DM SuP

Study co-investigator; contributed to the study design, management of the fieldwork, staff training and supervision, data interpretation, and drafting of the paper: CS SS AS
Contributed to the coordination of the study, supervision of field team, and abstraction of data: CS SS AS AA BJ SW KJ KW

Contributed to interpretation of data: KW CS AS SS GP

Competing interests

KW, SP and DM are employed at International Organization for Migration. CS is funded by King's College London. SuP is employed at the Ministry of Health, Government of Sri Lanka.

Tables & Figures

Table 1. Selected socio-economic, demographic and health seeking behavioural characteristics of Migrant and Non-Migrant families

Characteristic	Migrant		Comparative
	Spouse 277 (%)	**Caregiver 188 (%)**	**Spouse 410 (%)**
Gender			
Male	119(43)	8(4.3)	51(12.4)
Female	158(57)	180(95.7)	359(87.6)
Age (years)			
Mean Age (SD)**	37.9 (SD=7.8)	54.1 (SD=11.9)	37.2 (SD=7.8)
18-30	51(18.4)	11(5.9)	78(19)
31-60	224(80.9)	120(63.8)	329(80.2)
above 60	1(0.4)	55 (29.3)	2(0.5)
Ethnicity			
Sinhalese	201(72.6)	151(80.3)	314(76.6)
Tamil	15(5.4)	20(10.6)	23(5.6)
Muslim	51(18.4)	14(7.4)	67(16.3)
Others	10(3.6)	1(0.5)	6(1.5)
Educational Status			
No education	6(2.2)	31(16.5)	7(1.7)
Grade 1-5	48(17.3)	75(39.9)	51(12.4)
Grade 6-O/L	168(60.6)	74(39.4)	274(66.8)
Grade 12-A/L	54(19.5)	7(3.7)	72(17.6)
Higher	1(0.4)	0	6(1.5)
Residential area			
Rural	203(73.3)	138(73.4)	291(71)
Urban	74(26.7)	50(26.6)	119(29)
Family indebtedness			
Yes (significant levels of debt)	124(44.8)	84(44.7)	163(39.7)
No (little or no debt)	153(55.2)	102(54.3)	243(59.3)
Health service utilization *			
Zero	152 (54.8)	66 (35.1)	219 (53.4)
At least one visit	125(45.2)	122(64.9)	191(46.6)

*measured by the Number of visits made to a medical practitioner/professional during last 3 months.

Table 2. Type of employment, frequency of return and remittance sending

Characteristic	Type/Frequency	Number (%)
Type of employment*	Labourers/housemaids	271 (66)
	Service providers	82 (20)
	Technicians/Machinists	29 (7)
	Professionals/craft/clerical	25 (6)
	Other	3 (1)
Frequency of the migrant worker returning to Sri Lanka	Haven't returned	221(53.9)
	Less than one year	63 (15.4)
	Once in 2-5 years	119 (29)
	Missing	7 (1.7)
Frequency of in-bound remittance	Monthly	206 (50.2)
	Between 2-6 months	147 (35.9)
	Once in 6 months or more	4 (10)
	Not sending	45 (11)

*The categories of migrant worker employment were classified according to the Sri Lanka Bureau of Foreign Employment (2011) Annual Statistical Report of Foreign Employment – 2010. SLFBE Publications. Colombo Sri Lanka.

Table 3. Prevalence of Common Mental Disorders in families left-behind and comparative non-migrant families

Syndrome	Gender	Migrant		Comparative
				Spouse
Prevalence (95% CI)		Spouse n (%)	Caregiver n (%)	n (%)
A. Somatoform	**Male**	3 (30)	0	0
	Female	7 (70)	22 (100)	12(100)
Prevalence		*3.61 (3.59-3.63)*	*11.70 (11.65-11.74)*	*2.93(2.91-2.95)*
B. Depression	**Male**	14 (41)	1 (2)	4 (13)
	Female	20 (59)	47 (98)	26 (87)
Prevalence		*12.27 (12.23-12.31)*	*25.53 (25.47-25.60)*	*7.32(7.29-7.34)*
C. Anxiety	**Male**	2 (67)	0	0
	Female	1 (33)	7 (100)	2 (100)
Prevalence		*1.08 (1.07-1.09)*	*3.72 (3.69-3.75)*	*0.49(0.48-0.50)*

Table 4. Prevalence of suicidal ideations

No of Positive Symptoms *Prevalence (95% CI)*	Gender	Migrant		Comparative
		Spouse (%)	Caregiver (%)	Spouse (%)
A. Helpless	Male	21 (49)	2 (4)	7 (16)
	Female	22 (51)	43 (96)	37 (84)
	Prevalence	*43 (15.5)*	*45 (23.9)*	*44 (10.7)*
B. Hopeless	Male	19 (53)	2 (4)	7 (18)
	Female	17 (47)	43 (96)	32 (82)
	Prevalence	*36 (13)*	*45 (23.9)*	*39 (9.5)*
C. Passive	Male	19 (47)	2 (4)	6 (15)
	Female	21 (53)	44 (96)	33 (85)
	Prevalence	*40 (14.4)*	*46 (24.5)*	*39 (9.5)*
D. Active	Male	14 (52)	1 (5)	2 (14)
	Female	13 (48)	18 (95)	12(86)
	Prevalence	*27 (9.7)*	*19 (10.1)*	*14 (3.4)*

Table 5. General Health Status of spouse and caregiver in migrant and spouses of non-migrant families

Quality of life Domains	Migrant families		Comparative family
	Spouse (95% CI)	Caregiver (95% CI)	Spouse (95% CI)
Physical Function	88.9 (87-91)	70.3 (66.2-74.3)	88 (86.4-89.7)
Role-Physical	77 (72.6-81.4)	54 (47.6-60.4)	84.2 (81.2-87.2)
Body Pain	78 (75.2-80.9)	64.1 (60.1-68.1)	78.8 (76.7-81)
General Health	56.4 (54.3-58.5)	46.1 (43-49.2)	58.6 (56.8-60.4)
Vitality	66.6 (64.3-68.9)	59.3 (56.1-62.4)	70.4 (68.6-72.2)
Social Functioning	84.5 (82.1-86.9)	75.5 (71.7-79.3)	86 (84-87.9)
Role Emotional	85 (81.1-88.8)	74.3 (68.4-80.2)	92 (89.7-94.3)
Mental Health	70.2 (68.1-72.4)	64.4 (61.4-67.5)	75.6 (73.9-77.2)
Physical Health (PCS)	73.2 (71.2-75.2)	58.6 (55.4-61.8)	75.9 (74.3-77.4)
Mental Health (MCS)	72.5 (70.7-74.4)	63.9 (61-66.8)	76.5 (75.2-77.8)

Table 6. Multivariate analysis of mental and physical health scores among spouses and caregivers of left-behind families across selected socio-demographic strata[+]

		Spouses of left-behind families				Caregivers of left-behind families			
Characteristics		**MCS n (%)**	**Adjusted OR (95%CI)**	**PCS n (%)**	**Adjusted OR (95%CI)**	**MCS n (%)**	**Adjusted OR (95%CI)**	**PCS n (%)**	**Adjusted OR (95%CI)**
Sex	**Female**	100 (63.3)		96 (60.8)		2 (25)		5 (62.5)	
	Male	60 (50.4)	0.9(0.5-1.5)	80 (67.2)	1(0.5-1.8)	99 (55)	0.2(0.0-1.2)	58 (32.2)	2.5(0.5-11.5)
Age	**18-30**	33 (64.7)		40 (78.4)		4 (36.4)		6 (54.5)	
	31-60	125 (55.8)	0.8(0.4-1.6)	135 (60.2)	**0.3(0.1-0.6)***	65 (54.2)	3.7(0.9-16.0)	44 (36.7)	0.5(0.1-2.1)
	above 60	1 (100)		0/1		31 (56.4)	**4.7(1.0-22.1)***	13 (23.6)	0.3(0.1-1.2)
Ethnicity	**Sinhalese**	108 (53.7)		140 (70)		80 (53)		56 (37.1)	
	Tamil	9 (60)	1.9(0.6-6.1)	8 (53.3)	0.4(0.1-1.3)	16 (80)	**4.8(1.5-15.5)***	4 (20.0)	0.4(0.1-1.5)
	Muslim	34 (66.7)	1.5(0.7-2.9)	20 (39.2)	0.2(0.1-0.5)	5 (35.7)	0.5(0.2-1.7)	2 (14.3)	0.2(0.0-1.1)
	Other	9 (90)	6.7(0.8-54.1)	8 (80)	2.1(0.4-10.3)	0/1		0/1	
Educational status	**up to grade 5**	20 (37)		35 (64.8)		51/106(48.1)		27/106(25.5)	
	Grade 5 up	140 (62.8)	**2.5(1.2-5.0)***	141 (63.2)	0.8(0.4-1.7)	50 (61.7)	**2.6(1.3-5.1)***	36 (44.4)	**2(1.0-3.9)***
Marital status	**Married**	159 (58)		174 (63.5)		74 (55.6)		46 (34.6)	
	Previously married* **	1 (33.3)	0.5(0.0-6.4)	2 (67)	1.3(0.1-15.6)	27 (50)	0.8(0.4-1.6)	17 (31.5)	0.9(0.4-2)

[+] Odd ratios were adjusted for all variables in this table; *Statistically significant ($p<0.05$); *** Widowed/Separated/Divorced/Never married

Table 7. Nutritional status of children under 5 yrs (children aged 6–59 months), 114 from migrant and 114 from non-migrant families

Overweight (%)[+] WFH z-score: > +2 to ≤ +3 SD		**Normal weight (%)** WFA z-score: + 2 to – 1 SD		**Risk of Underweight (%)** WFA z-score: < - 1 to - 2 SD		**Underweight (%)** WFA z-score: < -2 to -3 SD		**Severely underweight (%)** WFA z-score: < -3	
M	C	M	C	M	C	M	C	M	C
4(3.5)	3(2.6)	45(39.5)	54(47.4)	32(28.1)	38(33)	27(23.7)	18(15.8)	6(5.3)	1(0.9)

M=migrant; C=comparative. Underweight reflects both chronic malnutrition and acute malnutrition. It is measured by weight relative to age (WFA). Underweight is defined for a z-score of < -2 and ≥ -3. Severely underweight a z-score < -3. Over weight represents excessive fat accumulation that presents a risk to health. It is measured by calculating the child's Body Mass Index against their age, labeled 'weight for height' (WFH). The range for 'overweight' is a z-score > +2 and ≤ +3.

Table 8. Univariate analysis of Child psychopathology scores of 592 children aged between 6 to 17 years from Migrant vs. Non-migrant families, and the association of abnormal scores in left-behind children with and without the presence of a parent

SDQ Domain	Risk potential to develop psychopathology*	Left-behind children 295 (%)	Comparative children 295 (%)	OR CI (95%)*	Families with both parents[+] 191(%)	Single parent Families[+] [+] 104(%)	OR CI (95%)*
Emotional problems	**Yes**	37 (12.5)	10(3.4)	**4.03(1.96-8.27)**	24(12.6)	13(12.5)	**1.01(0.73-1.39)**
	No	258(87.2)	281(94.9)		167(87.4)	91(87.5)	
Conduct problems	**Yes**	119 (40.1)	90(30.4)	**1.51(1.07-2.12)**	73(38.2)	46(44.2)	**0.78(0.38-1.61)**
	No	176(59.5)	201(67.9)		118(61.8)	58(55.8)	
Hyperactivity	**Yes**	26 (8.8)	8(2.7)	**3.42(1.52-7.69)**	18(9.4)	8(7.7)	**1.25(1.09-1.44)**
	No	269(90.8)	283(95.6)		173(90.6)	96(92.3)	
Any psychiatric diagnosis	**Yes**	131(44.3)	96(33.7)	**1.62(1.16-2.27)**	79(41.4)	52(50)	**0.71(0.34-1.47)**
	No	164(55.4)	195(65.9)		112(58.6)	52(50)	

Note: [+] One parent is the migrant worker. [++]Single parent is the migrant worker. *Statistically significant ($p<0.05$). SDQ was analyzed using computerized algorithms for scoring and predicting disorders (www.sdqinfo.org). Emotional, conduct, hyperactive disorders and any psychiatric disorder variables generated by this method was used to determine 'caseness'. A 'borderline' SDQ prediction for any given disorder correctly identified 81-91% of the children who definitely had that clinical diagnosis (Goodman, 2000). The risk potential to develop psychopathology in left-behind children was calculated by the composite score of both 'abnormal' and 'borderline'. The SDQ domain "any psychiatric diagnosis" encompasses and aggregates all three emotional, conduct and behavioural scores to provide a potential measure a person has to develop or have a psychiatric disorder

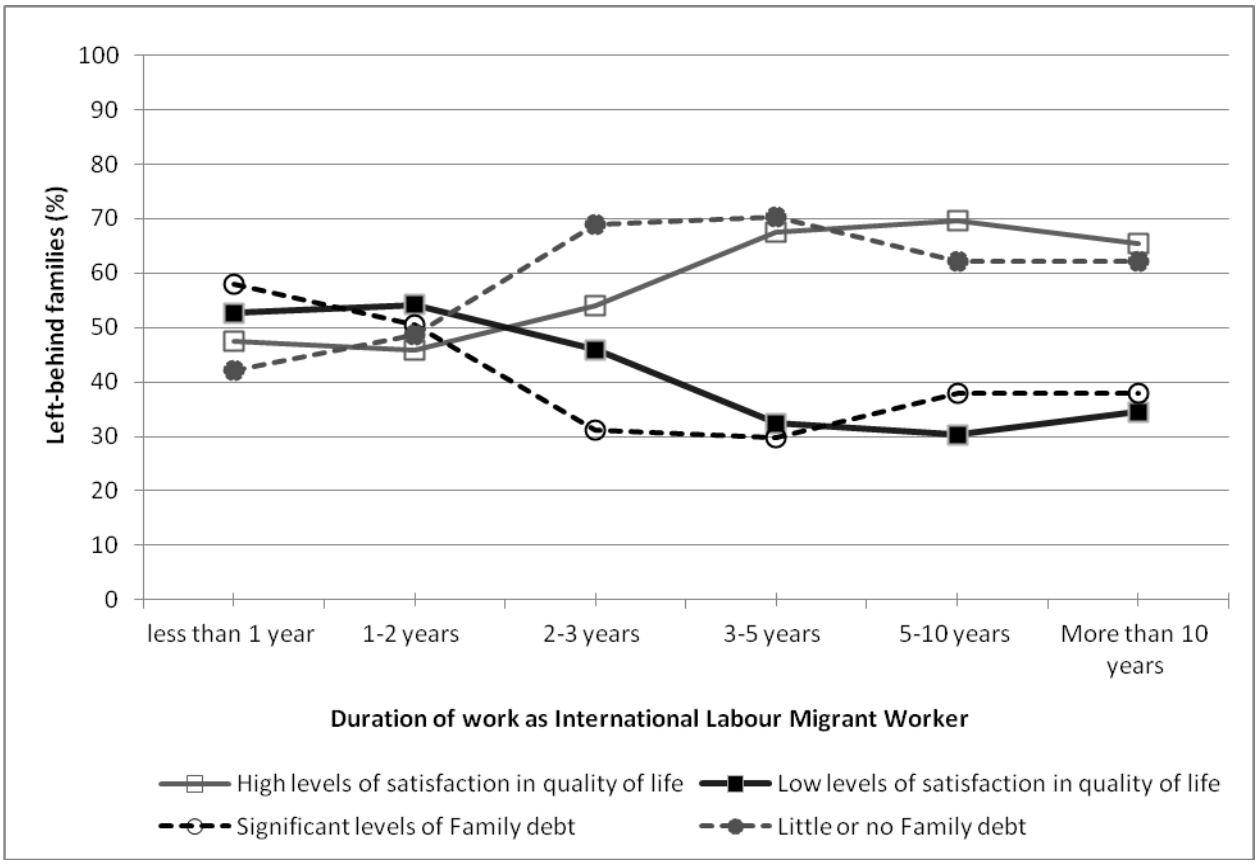
Additional Reference Material:

Table 9. Univariate analysis of the prevalence of depression (major and other) in adults from migrant vs. non-migrant families across selected socio-demographic variables

Characteristic		Spouse		Caregiver		Comparative	
		(%)	**Adj. OR (CI)**	**(%)**	**Adj. OR (CI)**	**(%)**	**Adj. OR (CI)**
Sex	Female	12.6		26.1		7.2	
	Male	11.8	0.7(0.3-1.6)	12.5	0.5(0.1-4.8)	7.8	1.3(0.4-4.0)
Age	18-30	5.9		18.2		6.4	
	31-60	13.8	2.4(0.7-8.5)	22.5	0.7(0.1-3.9)	7.6	1(0.4-2.7)
	above 60	0		34.5	1.1(0.2-6.2)	0	
Ethnicity	Sinhalese	11.9		27.2		7	
	Non Sinhalese	13.2	1.1(0.5-2.4)	17.1	0.5(0.2-1.2)	8.3	1.1(0.5-2.6)
Education	Up to grade 5	16.7		32.1		10.3	
status	Grade 5 up	11.2	0.6(0.2-1.5)	17.3	**0.4(0.2-0.8)****	6.8	0.6(0.2-1.8)
Marital status	Married	12		20.3		7.1	
	Previously married***	33.3	2.8(0.2-34.7)	38.9	**2.3(1.1-4.8)****	14.3	2.7(0.5-14.0)

Odd ratios were adjusted for all variables in this table; **statistically significant ($p<0.05$) ; *** Widowed/Separated/Divorced/Never married

Figure 1. Satisfaction in quality of life (as measure of household economic well-being) and level of Indebtedness of 'left-behind' migrant families, against Duration of work abroad



*Satisfaction scale related to quality of life were aggregated from likert scale responses from both spouse and caregivers. The nodes merged were: 'Living very comfortably/highly satisfied', 'living comfortably/satisfied'. Poor satisfaction levels were coupled from likert scale responses: "Just about getting by/not satisfied" to "Difficult to make ends meet/dissatisfied'.

Box 1. Definitions of participant categories and their inclusion and exclusion criteria:

- *Migrant Family*: Inclusion criteria: a family where either one or both spouses have departed for employment abroad as a labour migrant for period of at least six months, have their own or adopted child/children under 18 years of age, and the left-behind family been living at the same residence for a period of at least six months at the time of data collection. Exclusion Criteria: families in which the migrant worker was continuously absent in the preceding six months prior to leaving the country on assignment.

- *Migrant Spouse*: the spouse of the overseas based migrant worker living in the migrant family household for at least six months.

- *Caregiver*: a person living in the migrant family household, who is not the parent of the child/children, who is mainly responsible for providing a *significant level of care* for the child/children, on a daily basis for a period of at least six months. Basic care consists of activities such as; arranging schedules, preparing or ensuring meals, assisting the child's educational and social needs (including play), washing clothes, looking after the child when he/she is sick, guardianship and representation to health and/or education authorities. According to these criteria the caregiver could also be an older sibling.

- *Child 'left-behind'*: a child under 18 years (at the time of data collection) who is living in the migrant family household for a period of at least last six months, and who's parent/parents are international labour migrant workers currently working abroad for a period of at least 6 months.

- *Comparative (Non-Migrant) Family:* Inclusion criteria: A family where both parents are present, which neither spouse has a history of labour migration (both internal and outbound), have their own or adopted child/children under 18 years of age in the family unit. Exclusion criteria: one or both parents being absent from the same house for more than 60 days (average more than 2 days per week) continuously or alternatively for the preceding six months

Box 2. List of standardized health instruments employed in study, outcome measures/diagnostic criteria and administered groups

Instrument	Outcome Measures, Diagnostic criteria, Validity and Reliability	Administered group
Questionnaire for socio-demographic data collection	Basic social, economic, environmental and demographic indicators were captured. Variables included gender, ethnicity, family size, employment type, educational status, home ownership status, household setting/conditions, household goods, income & expenditure. Additional measures such as migration history, frequency of ILM return, household indebtedness, frequency of remittance sent home were also included.	Spouse and Caregiver of migrant family; Spouse of comparative family
Check list for growth development and immunization (CHDR)	Child nutritional status (using Z-score measures) and immunization history were recorded from Child Growth and Development Records (CHDR) maintained by Public health midwife from birth. Nutritional status of children under 5 years (aged between 6–59 months) is calculated by measuring weight relative to age (WFA) using standard anthropometric tools. A child's 'Underweight' status reflects both chronic and acute malnutrition i.e. a WFA z-score between < -2 and ≥ -3 SD from mean.	Children under 5 years of age matched by age and gender from both migrant and comparative families
General Health Status (SF-36 Questionnaire)	Most widely used, self-completion measures of quality of life, developed to meet the psychometric standards necessary for group comparisons. It comprises 36 items of which all but one are used to measure eight important health concepts. These eight concepts or scales are: Physical Functioning; Role-Physical (interference with work or other daily activities due to physical health); Bodily Pain; General Health; Vitality; Social Functioning (interference with normal social activities); Role-Emotional (interference with work or other daily activities due to emotional problems); and Mental Health (symptoms associated with anxiety and depression and measures of positive affect). In addition, the eight scales yield two summary scales of health: Physical (PCS) and mental (MCS) component summary measures are transformed to fit into a scale of 0–100 using a standard formula, with the higher scores on this scale representing better functioning. Higher summary PCS and MCS scores are indicative of better health. A difference of 5 points in a particular domain is considered a minimal clinically and socially relevant change, whereas a 10-point difference indicates moderate change ([1]). It has been widely used as an important outcome measure in health services and clinical trials. The SF-36 has been shown to have reliability and internal consistency ([2],[3].), validity	Spouse and Caregiver of migrant family; Spouse of comparative family

[1]Royal Australasian College of Surgeons (2012) SF-36 Questionnaire. Link: http://www.anzjsurg.com/view/0/SF36Questionnaire.html . Last accessed 1st August 2012.

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	through measures of discriminatory power ([4]), effective construction and use ([5]), criterion ([6]), responsiveness and sensitivity ([7,8]).	
Patient Health Questionnaire (PHQ)	Clinician-based rating scale for adults. Consisting of 9 DSM-IV criteria for depressive disorders it provides provisional diagnoses of major and minor depression as well as evaluate the severity of depressive symptoms It is a self‐report scale derived from Primary Care Evaluation of Mental Disorders (PRIME‐MD), which is a standardized and rapid procedure, with demonstrated diagnostic performance (sensitivity of 83%, specificity of 88% and positive predictive value of 80%) for the diagnosis of any psychiatric disorder in primary health care.	Spouse and Caregiver of migrant family; Spouse of comparative
Service utilization form & Assessment of health seeking behaviour	Frequency of primary, secondary and tertiary care access and utilization over the past 3 months, costs incurred for health, perceptions of quality of health services rendered.	Spouse and Caregiver of migrant family; Spouse of comparative
Strengths and Difficulties Questionnaire (SDQ)	A measure of the adjustment and psychopathology of children and adolescents (4-17 years). It presents emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behaviour. The predictive algorithm generates "unlikely", "possible" or "probable" ratings for four broad categories of disorder, namely conduct disorders, emotional disorders, hyperactivity disorders, and any psychiatric disorder. The algorithm appears to be sufficiently accurate and robust to be of practical value, and the level of chance-corrected agreement between SDQ prediction and independent clinical diagnosis being substantial and highly significant (Kendall's tau-b between 0.49 and 0.73; $p<0.001$). A 'borderline' or probable SDQ prediction for any given disorder correctly identified 81-91% of the children who definitely had that clinical diagnosis. There are 3 different versions of the SDQ; the children's version, parents' version and teachers' version. Sinhalese and Tamil versions of SDQ for children, teachers and parents (multi-informant) were	SDQ specific to teachers ; SDQ specific to parents; SDQ specific for Children above 12 years of age were administer for both migrant and comparative families

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	used in this study.	
Screening Questionnaire for Suicidal Ideations	Screening Questionnaire for suicidal ideations and behaviors were derived from augmenting the *GHQ-30 and Beck's Scale* after extensive validating in the Sri Lankan context (Samaraweera S, 2011). A questionnaire provided a composite score for Positive Symptoms of 'Helpless' ,'Hopeless' ,'Passive' and 'Active' response domains.	Spouse and Caregiver of migrant family; Spouse of comparative

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