

Adult Out-Migration and Multi-Dimensional Well-Being of Elderly Parents 'Left Behind': A Cross-Sectional Study of India

Shinjini Ray* & Pravat Bhandari**

Abstract

Obtaining data from a nationally representative survey of old age population—Building a Knowledge Base on Population Ageing in India (BKPAI) comprising 9852 older adults, the present study empirically evaluates different dimensions of wellbeing among Indian elderly individuals left behind by their adult migrant children. We focus on five different dimensions of well-being among elderly, viz., physical, psychological, subjective, social and housing. Data were analyzed using propensity score matching technique. Findings suggest that the elderly individuals with adult migrant children were more likely to attain better physical and subjective well-being whereas the migration of adult children showed adverse effect on the psychological and social well-being indicators. However, results did not show any statistically significant association between migration and housing well-being of left behind elderly. Given the rising proportion of ageing population in India combined with an increasing trend in rural-urban adult migration, our findings suggest that the policy-makers should pay more attention to the migration status of adult children to keep track of the psychological and social welfare among Indian older adults.

Key words: Adult out-migration, left behind elderly, well-being of elderly, India.

I. Introduction

India, like other Asian countries, has been experiencing a rapid demographic shift by declining mortality and falling fertility. Increasing life expectancy and delayed parenthood lead to a substantial growth of geriatric population. With older adults living longer life, a reduction in working age population as well as increased old age dependency ratio has taken place all over the country. According to Census 2011, the proportion of older adults in India was about 8.6 per cent which has increased from 4 per cent in 2001. It is projected that the country's proportion of elderly will rise from 7.5 per cent to 11 per cent from 2010 to 2025 respectively (United Nations, 2009). Apart from the population ageing, an increasing trend of internal and international migration has also been noticed in the country (IOM, 2018). This nationwide growth of outmigration is the outcome of regional imbalance in economic development, rapid urbanization and globalization (Bhagat, 2016). The most common features of the migrants are to be male, young and have completed their primary or secondary schooling. This group of population creates a surplus labour flow to the bigger cities (Laczko et al., 2017). Another push factor behind this adult out-migration is the poorly developed agrarian economy in the rural areas, frequently characterised by lower per capita income, fragile economic infrastructures, poor health care facilities and so on. In Indian scenario, the highest rate of international out-migration as well as in-flow of remittances have been witnessed in states like Kerala and Punjab. Reports by UNICEF and UNESCO in 2012 also suggest that a high rate of internal migration has been recorded in West Bengal. Therefore, the out-migration of adult members from the household results older family members being left behind (Toyota et al., 2007).

* Shinjini Ray, Research Scholar, International Institute for Population Sciences, Govandi Station Road, Deonar, Mumbai 400088. Email: shinjiniray24@gmail.com

** Pravat Bhandari, Research Scholar, International Institute for Population Sciences, Govandi Station Road, Deonar, Mumbai 400088. Email: pravat784@gmail.com

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Traditionally, Indian elderly were blessed with home-based care provided by family members, as the most preferred type of living arrangement was to be living with married son(s) and other family members (Prasad & Rani, 2007). Earlier, this was possible due to the prevalence of large-sized joint family system, which often placed several generations under one roof and they acted as the “convoy” for the aged family members (Singh, 2010). With changing employment patterns rural –urban adult migration has also changed the structural organization of a conventional joint family. As a consequence, the proportion of left behind elderly has increased many fold over a period of time. Therefore, large scale of adult out-migration with a simultaneous growth of ageing population has inspired an emerging research question of whether the migration of adult children play an intermediary role on the well-being status of the left behind elderly parents.

II. Evidence on the well-being status of migration on elderly left behind

Well-being is a multi-dimensional concept that has several dimensions like physical and mental health status, functionality and mobility, social connectedness, emotional health, material security including housing and financial stability (Vanore et al., 2017). A growing body of literature sheds light on the substantiated association between adult out-migration and its impact on the well-being of older parents living at their place of origin. Studies show that the positive impact of remittances could compensate the adverse effect of adult out-migration like loss of required physical, emotional and social support, day to day care and assistance, decreased face-to-face interaction with family members, etc. Some studies suggested that the inflow of remittances helps left behind older parents to improve their overall physical well-being.

A study by Kahn et al. (2003) conducted in South Africa demonstrated that the remittances sent by the adult migrant children helped to increase the household income that led to improved living condition. Evidence also suggests that with the help of remittances, the older parents can consume nutritious and better-quality food, buy expensive medicines, access required health care facilities and also their psychological distress caused by poverty may reduce gradually (Böhme et al., 2015). However, there are a few notable exceptions. For example, a study conducted in rural China by Scheffel and Zhang (2019) using China Health and Retirement Longitudinal Study (CHARLS) data showed poor physical well-being of rural older parents in the absence of their adult children.

Relatively, a smaller number of studies have examined the association between adult out migration and psychological wellbeing. A comparative study by Guest (1998) based on a longitudinal survey data in Thailand found that elderly parents with a migrated son were more likely to have symptoms of poor physical well-being than those who had not a migrant son. AO et al. (2016) using Rural Urban Migration in China (RYMiC) data examined the effect of adult out-migration on elderly parents. They concluded that older parents having migrant adult children had poor psychological and emotional well-being.

A case-control psychological autopsy study in rural China reported that the migrated adult son’s parents who were living alone or with their spouse reported poor subjective well-being (Zhou et al., 2015). Studies suggested that regular social engagement significantly associated with the better status of psychological well-being and at the same time it is worth mentioning that lower level of social well-being of the elderly are the contributing factors of loneliness, increased risk of morbidity, lower functional ability and poor mental health.

Available literature deals with how adult out-migration impacts different dimensions of well-being of their older parents at the originating place, but there is a dearth of empirical evidence on this topic in the Indian context. Few geriatric studies shed light on how the adult out-migration is associated with the health outcome of the older parents in India. They revealed diverse impact of adult son’s migration on different aspects of health of left behind elderly. Another strand of studies shed light on the potential association of adult migration on elderly well-being through qualitative accounts, but this method generally involved smaller and selective samples of elderly individuals

that restricts to understand the actual impact of adult migration on the well-being of left behind elderly parents. Overall, there is no empirical evidence on the overall well-being of the left behind elderly parents in the absence of their adult children in the Indian context. Hence, in the current scenario it is necessary to understand how adult out-migration affect the overall well-being of left behind older adults. The present study empirically contributes to the literature by assessing the potential linkages between adult out-migration and multidimensional well-being of left behind older parents obtaining a nationally representative cross-sectional dataset from India.

III. Materials and methods

Data

Data for this study was obtained from a nationally representative survey—namely, Building a Knowledge Base on Population Ageing in India (BKPAI). This survey was carried out between January 2011 and December 2012 in seven demographically progressive states (where proportion of 60+ population was higher than the national average) in India by collaborators from the Institute for Social and Economic Change, Bangalore, Institute of Economic Growth, New Delhi, and Tata Institute of Social Sciences, Mumbai. To retain the BKPAI survey as nationally representative, sample states were selected covering four major geographic regions in India (i.e., north, south, east and west). The states surveyed are Punjab and Himachal Pradesh from the north, Maharashtra from the west, Odisha and West Bengal from the east, and Kerala and Tamil Nadu from the south. The survey collected information on living arrangement, family relationship, living status of sons and daughters, income, current working status and different aspects of health and wellbeing directly from the elderly respondents.

The survey fielded face-to-face interviews with 9,852 elderly respondents aged 60 and above from 8,329 households by implementing a stratified two-stage sampling scheme. In the first stage, a total of 80 primary sampling units (PSUs)—divided equally in rural and urban areas—were chosen from the seven selected states. In the second stage, within each selected PSU, sample households were systematically chosen following the criteria that sample households should be comprised of at least one 60+ member. Detailed information about the survey design is provided in main BKPAI report (UNFPA, 2012). Of 9,852 elderly individuals included in the survey sample, 9,261 had at least one adult child (aged 18+) (591 were never married or childless or with a minor child). We, however, restrict our study sample to respondents having at least one adult male child (adult son) and those with full information on the essential covariates. Thus, our final analytical sample comprised 9261 observations of elderly individuals aged 60 years and above.

Ethical consent

Our study is based on secondary survey data available on the official website of ISEC (<https://www.isec.ac.in/prc-AginginIndia.html>). Therefore, no formal ethical clearance was required from Institutional Review Board. BKPAI survey was approved by Ethical Review Committee of the ISEC. The survey report also shows that informed consent was obtained by the survey team from each respondent prior to face-to-face interview.

Main explanatory variable (Adult Migrant Children)

The survey collected information on the place of residence of each adult child not residing with the elderly person (the respondent) with four response options: 1) within district; 2) outside the district but within the state; 3) outside the state but within India; and 4) outside India. We, then, identified the number of total male adult children (sons) who migrated outside parental residential districts for each elderly person. Further, we added our key variable of interest, that is, total number of adult migrant children (sons) as a continuous variable instead of a binary variable (i.e., at least one son has migrated) to capture the marginal effect of one additional adult child's migration on the health outcome of the left-behind elderly.

Table 1: Background characteristics of study sample (N = 9261)

Background characteristics	
	Mean (SD)
Age (years)	68.02 (7.25)
Years of schooling	4.16 (4.83)
Number of adult children	3.41 (1.76)
Number of male adult children	1.80 (1.18)
Age of male adult children	36.91 (8.77)
Years of schooling of male adult children	8.35 (5.06)
	n (%)
Gender	
Male	4416 (47.68)
Female	4845 (52.32)
Marital status	
Currently married	5620 (60.68)
Divorced/Separated	3641 (39.32)
Living status	
Living with All others	7462 (80.57)
Living with Spouse only	1313 (14.18)
Living alone	486 (5.25)
Currently working	
No	7178 (77.51)
Yes	2083 (22.49)
Poverty status	
Non-poor	6193 (66.87)
Poor	3068 (33.13)
Caste group	
General	3857 (41.65)
SC/ST	2219 (23.96)
OBC	3185 (34.39)
Place of residence	
Urban	4448 (48.03)
Rural	4813 (51.97)
Region	
North	2646 (28.57)
East	2644 (28.55)
West	2624 (28.33)
South	1347 (14.54)

Independent variables

An array of demographic and socio-economic aspects of elderly were added as control variables in the present analysis. Individual's age and educational attainment were measured in single years and used as continuous variables. The information on older parent's adult children—that is, total number of living adult son, the mean age (in years) and the mean years of schooling were also considered as continuous variables. In our analysis, we have included binary dummies for individual's sex (male: reference category, female), marital status (currently married: reference category, divorced/separated), and place of residence (rural: reference category, urban). Older person's health and wellbeing, especially in low and middle income countries, are thought to be shaped by their personal income due to unavailability of formal old age pensions and limited social security provisions (Kumar et al., 2016). Accordingly, the present analysis controls for the income-effect at individual level by adding two sets of explanatory variables: the first one is whether or not older person worked during the last year; and the second one implies whether or not older individual

receives pension (including formal and social pension). Furthermore, we included a set of dummies to indicate the religion (Hindu: reference category, Muslim and Others) and caste (General: reference category, SC, ST and OBC) of older parents. Household's economic status was measured from the available estimates on wealth index that was computed using principal component analysis (PCA). We categorized wealth index as: poorest (reference category), poor, middle, rich and richest. We also included regional dummies for four major geographic regions: North (reference category), East, Central and South. The sample characteristics are presented in Table 1.

Measures of wellbeing indicators

In order to assess the impacts of adult out-migration on the multi-dimensional wellbeing of elderly, we constructed an elderly-specific wellbeing index which allowed us to compare the wellbeing outcomes of elderly individuals with respect to their adult children's migration status. The index comprised of seven indicators allocated to one of four dimensions of wellbeing, namely physical wellbeing, housing wellbeing, social wellbeing and emotional wellbeing. The dimensions and indicators along with their threshold levels and weights are presented in Table 2.

Table 2: Dimension-wise wellbeing indicators and their thresholds and weights

Dimensions	Indicators	Thresholds	Weights
Physical Wellbeing	Individual has no difficulty in basic daily activities	Individual's ADL score not less than 10	1/12
	Individual has no difficulty in self-administering medication	Individual is able to self-administer medication	1/12
	Individual has a good self-rated health	The SRH score is not less than 3	1/12
Housing Wellbeing	Individual is living in a house having access to safe drinking water, improved sanitation and electricity	Household has access to all three basic amenities	1/4
Social Wellbeing	Individual has regularly visited relatives or friends	At least once in a month	1/4
Emotional Wellbeing	Individual has no depressive symptoms	The GHQ-12 score is not less than 9	1/8
	Individual is satisfied with his/her current life	The SUBI-18 score is not less than 9	1/8

Physical Wellbeing dimension included three indicators: an individual's ability to perform basic self-care activities, which was measured on a 12-point scale by examining individual's level of difficulties in each of six day-to-day activities including walking, toileting, bathing, dressing, eating, and continence; an individual's ability to self-administering medication (i.e., whether or not individuals can take their medication without help) which is typically used as a proxy measure for old age functional independence (Waidler et al., 2017); and an individual's self-perceived health status which was measured on five-point Likert scale: "excellent (5 points)", "very good (4 points)", "good (3 points)", "fair (2 points)" and "poor (1 points)".

Housing Wellbeing is a composite indicator that mirrors the standard of living. Older persons living in households with access to basic amenities like clean drinking water, improved sanitation and electricity were considered well-off in this dimension. It should be noted that indicators selected to capture the housing wellbeing were based on information at the household level, but assuming equal access to all the available materials to all household members we have used it at individual level. It

should be noted that indicators chosen to reflect the housing wellbeing of elderly were based on the information at the household level, but we used it at the individual level, assuming that all household members had equal access to all available resources.

Social Wellbeing dimension indicates whether and to what degree elderly individuals are functioning the social contacts or relationships with their relatives or friends. There has been a strong agreement on the concept that a healthy relationship with people in the society helps improve overall quality of life (Helliwell & Putnam, 2005). In this study, an older person who had visited relatives and friends at least once in a month was considered well-off in this dimension.

Emotional Wellbeing dimension included two subjective indicators: self-reported depression and self-reported life satisfaction. Depression was measured using a 12-item General Health Questionnaire (GHQ-12). Each item of GHQ-12 instrument has four response categories: 'less than usual', 'no more than usual', 'rather more than usual' and 'much more than usual' and those were coded as '0', '0', '1', and '1' respectively. We, then, compute an aggregate score by summing up these values which has a range between 0 and 12. In line with GHQ-12 scoring thresholds (Shelton & Herrick, 2009), an elderly with a score of 9 or above was considered to be depressed or mentally unwell. Measures on life satisfaction are based on 9-item Subjective Wellbeing Inventory (SUBI-9). Responses for each question were recorded into three categories: 'very much/very happy', 'to some extent/quite happy' and 'not so much/not so happy'. However, we coded them as '2', '1' and '0' respectively. Similar to depression indicator, we used aggregate scoring method for measuring older individual's level of life satisfaction, and thus the resulting indicator of life satisfaction ranged from 0 and 18.

To identify who is multidimensionally well-off among the total sample/among the old age population, a two-step procedure is applied using two different kinds of cut-offs. First the *within indicator* cut-offs were applied to determine whether an individual is well-off or not in each indicator. Second, we need to identify who is to be considered multidimensionally well. To do so, a *cross-indicator* cut off was applied to determine if the weighted combination of indicators has reached the sufficient level of well-being. In this study, the sufficient level of well-being is set at 70 per cent and this decision follows the cut-off used by in previous studies in measuring elderly wellbeing (Halleröd & Seldén, 2013) as well as child wellbeing (Bradshaw et al., 2007). This is called a *dual cut-off* method, as it uses the *within dimension* cut-offs to determine whether an individual is well-off or not in each indicator, and the *cross-dimensional* cut off to determine who is to be considered poor.

The percentage of elderly reaching the specified threshold per indicator was denoted as the *indicator wellbeing rate*. This can be expressed as:

$$IWB = \frac{\sum_{i=1}^n I_i}{N}$$

Where N stands for the denominator which corresponds to the total number of elderly for whom the indicator is measurable and I_i represents a dichotomous variable with a value of 1 if the elderly individual has reached the indicator threshold and thus considered to be well-off and a value of 0 if the elderly individual does not meet the indicator threshold and is deprived.

The rates for *multidimensional wellbeing* can be written as follows:

$$MWB = \frac{\sum_{i=1}^n WB_i}{N}$$

Where N stands for the total number of elderly for whom the indicator is measurable and WB_i represents a dichotomous variable with a value of 1 if the elderly individual is multidimensionally well:

$$WB = 1 \text{ if } \sum_{i=1}^n W_i I_i \geq 70$$

where I_i represents indicator well-being for every older person and W_i denotes the indicator weight.

Methods of Analysis

The present study adopts a 2-step analytical strategy to empirically examine whether migration of adult children can be attributed to wellbeing of older parents left behind. In the first step, we perform separate probit regression models for each wellbeing indicator and/as well as for multidimensional wellbeing index. The goal is to test if the association between adult-out migration and elderly wellbeing is statistically significant after accounting for the effects of demographic and socio-economic factors. The probit model takes the following form:

$$P(y_i = 1|x_i) = \Phi(\beta_0 + \beta_1 x_i)$$

Where, y_i is the dependent variable with the binary outcome, Φ indicates the cumulative density function (CDF) of standard normal distribution, β_0 is a regression constant, β_1 is a vector of coefficients and x_i is a vector of explanatory variables.

In the next step, we employ propensity score matching (PSM) analysis to assess the impact of adult out-migration on wellbeing outcomes of older parents' comparisons of different dimensions of well-being between two groups, i.e., elderly with adult migrant children and elderly with no adult migrant children. PSM is an innovative statistical method widely used in evaluating the treatment effects for cross-sectional/observational/non-experimental data when randomized clinical trials are not available. The left-behind elderly parents were considered as treatment groups whereas non-left behind elderly were included as control groups. However, before we employ the PSM method, two conditions must be satisfied. First, the propensity scores of the treated and control groups should have sufficient common support. Second, no obvious differences between the control variables in the treated and control groups should exist. We used nearest-neighbour (within caliper) matching technique in the present analysis.

III. Results

Descriptive findings

Table 3 compares indicator wellbeing rates and selected background characteristics for the elderly by migration status of their adult children. The third column of the Table comprises Chi-square or t test statistics, demonstrating whether the differences in wellbeing outcomes and baseline covariates are statistically significant across the groups. In our sample nearly 93 per cent of the elderly individuals are reported to have no difficulties in performing self-care activities such as walking, toileting, bathing, dressing, eating and continence. In regard to migration status of adult children, finding reveals little difference for this indicator across the groups, older individuals with adult migrant children having a slightly greater wellbeing rate although this difference was not statistically significant. Almost 60 per cent of all elderly persons were reported to perform self-administering medication and thus were considered as functionally well. A greater share of elderly persons with adult migrant children (67.9%) than those without (56.2%) were considered well in this indicator and the difference was statistically significant. Nearly half (46%) of the elderly persons had rated their own health status to be good. In regard to migration status of adult children, finding revealed a little difference for this indicator across the groups, older individuals with adult migrant children having slightly greater wellbeing rate although this difference was not statistically significant. In terms of housing wellbeing, about 67 per cent of the total elderly population was considered well-off. We find that older individuals with adult migrant children had significantly greater housing wellbeing rates (75.5%) in comparison with those without adult migrant children (65.5%). Surprisingly, social wellbeing rates are very low: approximately one-fifth (21.1%) of the total elderly sample had regularly (at least once in a week) visited their relatives or friends. With regards to emotional wellbeing, significant differences are observed between two cohorts. More specifically, 64.7 per cent and 60.0 per cent of the older individuals whose adult children had migrated were not diagnosed with depressive symptoms and were reported to be satisfied with their current life respectively. This compares to 58.9 per cent and 51.2 per cent of the elderly with no

depressive symptoms and with being satisfied in present life respectively for those whose adult children had not migrated elsewhere. For both the indicators, the observed differences were statistically significant. The overall index measure reveals that 53.1 per cent of the total elderly population had achieved multi-dimensional wellbeing. Comparing multidimensional wellbeing rates by adult children's migration status, a significant difference appears: older individuals with adult migrant children had achieved higher wellbeing (63.1%) in comparison with those without adult migrant children (51.2%).

Findings from regression

Findings from the descriptive analysis, as presented above, have indicated that the migration status of adult children is an important factor that defines some differences in the level of elderly wellbeing. However, such differences in the wellbeing outcomes could also be influenced by characteristics other than the migration status of adult children. Therefore, further examination on the effect of adult children's migration on elderly wellbeing controlling for confounding factors is required. In order to do so, we employed separate probit regression models for each wellbeing indicator in which confounding factors were taken into account.

In Table 4, we report results obtained from the probit regression models. Migration of adult children appeared to be a significant factor improving the older parent's level of wellbeing in the self-administering medication ($\beta=0.174$, $p=0.001$), housing ($\beta=0.024$, $p=0.700$) and life-satisfaction ($\beta=0.019$, $p=0.708$) indicators. At the same time, however, migration restricts older persons achieving emotional wellbeing, as is evident from the regression result showing higher depression rates ($\beta=-0.289$, $p=0.000$) among older persons with adult migrant children as compared with the older persons without adult migrant children. As for overall indicator, result shows that older persons with adult migrant children were more likely ($\beta=0.091$, $p=0.088$) to achieve multidimensional wellbeing.

Findings from PSM

The regression results presented above are useful to understand the impact of adult-out migration on wellbeing of older persons left behind. However, these results may suffer from selection bias as the adult children decide whether to migrate outside the parental district. In order to have more reliable estimate of the impact of adult out migration on older parent's wellbeing, we employed PSM technique.

Results from the PSM analysis are reported in Table 5. These results largely confirmed the results of the probit regression. The ATET, which reflects the effects for the individuals that actually received treatment (in our case those older parents who have adult migrant children), is 0.218 ($p<0.000$) for the indicator of *self-administering medication*, which implies that older person with adult migrant children had about 22 per cent higher chance of being considered well than did older persons without adult migrant children. In the case of housing indicator, older individuals with adult migrant children were nearly 18 per cent (ATET=0.177; $p<0.000$) more likely to attain wellbeing as compared to the control group. Again, compared with the control group, older individuals whose adult children migrated had about 18 per cent (ATET=0.178; $p<0.000$) greater chance of suffering from depression. Migration of adult children is again associated with better life-satisfaction: about 11 per cent (ATET=0.107; $p<0.05$) higher chance than the control group. Finally, older individuals with adult migrant children had 17 per cent (ATET=0.167; $p<0.000$) higher chance to achieve the multidimensional wellbeing as compared with the control group.

Table 3: Wellbeing rates by migration characteristics

	Total		No migrant son		Have migrant son		χ^2 (p-value)
	%	n	%	N	%	N	
Individual has no difficulty in basic daily activities	92.85	8599	92.85	7232	92.87	1367	0.00 (0.98)
Individual has no difficulty in self-administering medication	58.06	5377	56.19	4377	67.93	1000	70.08 (0.00)
Individual has a good self-rated health	46.07	4267	46.00	3583	46.47	684	0.11 (0.742)
Individual is living in a house having access to safe drinking water, improved sanitation and electricity	67.01	6211	65.48	5100	75.48	1111	56.04 (0.00)
Individual has regularly visited relatives or friends	21.15	1959	20.64	1608	23.85	351	7.60 (0.006)
Individual has no depressive symptoms	59.79	5537	58.87	4585	64.67	952	17.36 (0.00)
Individual is satisfied with his/her current life	52.58	4834	51.18	3958	60.00	876	38.29 (0.00)
Individual achieves multi-dimensional wellbeing	53.13	4884	51.23	3962	63.15	922	70.02 (0.00)

Table 4: Results from probit regression model

	ADL	Medication	Good SRH	Housing	Friends	Depression	SUBI	MWI
Migrant child	0.10 (0.08)	0.17* (0.05)	0.06 (0.05)	0.02 (0.06)	0.01 (0.05)	-0.29* (0.08)	0.02 (0.05)	0.09 (0.05)
Migrant child*remittances	-0.05 (0.11)	0.04 (0.08)	0.03 (0.07)	0.28* (0.09)	-0.03 (0.08)	0.05 (0.05)	0.20* (0.07)	0.19* (0.08)
Age	-0.05* (0.00)	-0.02* (0.00)	-0.02* (0.00)	0 (0.00)	-0.01* (0.00)	0.01* (0.00)	-0.02* (0.00)	-0.02* (0.00)
Female	-0.08 (0.06)	-0.08* (0.04)	0.02 (0.04)	0.17* (0.04)	-0.09* (0.04)	-0.11* (0.04)	0.02 (0.04)	0.03 (0.04)
Divorced/Separated	0.01 (0.05)	-0.08* (0.04)	0.01 (0.04)	-0.17* (0.04)	0 (0.04)	0.04 (0.04)	-0.06 (0.04)	-0.12* (0.04)
Living status								
Living with spouse only	0.23* (0.08)	0.17* (0.05)	0.08* (0.04)	-0.36* (0.05)	-0.05 (0.05)	-0.02 (0.05)	-0.14* (0.04)	-0.13* (0.05)
Living alone	0.19 (0.10)	0.21* (0.07)	0.02 (0.06)	-0.62* (0.07)	-0.09 (0.07)	0.27* (0.06)	-0.18* (0.06)	-0.32* (0.07)
Number of adult children	0.01 (0.02)	0.02 (0.01)	-0.04* (0.01)	0.01 (0.01)	0.03* (0.01)	0.00 (0.01)	0.00 (0.01)	0.03* (0.01)
Number of male adult children	-0.04* (0.02)	-0.03 (0.02)	-0.04* (0.02)	-0.06* (0.02)	-0.02 (0.02)	0.02 (0.02)	-0.03 (0.02)	-0.08* (0.02)
Mean age of adult children	0.00 (0.00)	-0.01* (0.00)	0.00 (0.00)	0.01* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)
Mean years of schooling of adult children	0.02* (0.01)	0.01* (0.00)	0.02* (0.00)	0.04* (0.00)	0.01* (0.00)	-0.02* (0.00)	0.02* (0.00)	0.04* (0.00)
Years of schooling	0.01 (0.01)	0.07* (0.00)	0.04* (0.00)	0.07* (0.01)	0.01* (0.00)	-0.06* (0.00)	0.06* (0.00)	0.07* (0.00)
Currently working	0.78* (0.10)	0.23* (0.04)	0.09* (0.04)	-0.25* (0.04)	0.20* (0.04)	-0.18* (0.04)	0.08* (0.04)	0.03 (0.04)
Receiving pension	0.15* (0.05)	0.14* (0.03)	-0.04* (0.03)	0.04 (0.04)	0.17* (0.04)	-0.08* (0.03)	0.08* (0.03)	0.15* (0.04)
Chronic morbidity								
1	-0.12* (0.05)	0.14* (0.03)	-0.43* (0.03)	0.21* (0.04)	0.25* (0.03)	0.12* (0.03)	-0.18* (0.03)	0.03 (0.03)
2	-0.34* (0.07)	0.2* (0.05)	-0.67* (0.05)	0.39* (0.06)	0.24* (0.05)	0.15* (0.05)	-0.23* (0.05)	0.01 (0.05)
3+	-0.46* (0.11)	0.25* (0.08)	-0.98* (0.09)	0.56* (0.12)	0.29* (0.08)	0.07 (0.08)	-0.16* (0.08)	0.1 (0.09)
Poverty status								
Poor household	-0.04 (0.05)	-0.17* (0.03)	0.07* (0.03)	-0.5* (0.03)	-0.07* (0.04)	0.10* (0.03)	-0.12* (0.03)	-0.31* (0.03)
Caste group								
SC/ST	0.00 (0.06)	0.02 (0.04)	0.02 (0.04)	-0.39* (0.04)	-0.07 (0.04)	0.07 (0.04)	-0.10* (0.04)	-0.25* (0.04)
OBC	-0.04 (0.06)	-0.03 (0.04)	0.06 (0.04)	-0.17* (0.04)	0.05 (0.04)	0.07 (0.04)	-0.08* (0.04)	-0.05 (0.04)
Place of residence								
Rural	-0.09 (0.05)	-0.20* (0.03)	-0.11* (0.03)	-0.89* (0.03)	-0.06 (0.03)	0.11* (0.03)	-0.04 (0.03)	-0.46* (0.03)
Region								
North	-0.18* (0.07)	0.37* (0.04)	-0.18* (0.04)	-0.31* (0.05)	0.24* (0.05)	0.57* (0.05)	-0.23* (0.04)	-0.30* (0.05)
East	-0.29* (0.06)	-0.12* (0.04)	-0.23* (0.04)	-0.84* (0.05)	-0.41* (0.04)	0.9* (0.04)	-0.96* (0.04)	-1.09* (0.04)
West	0.3* (0.09)	-0.09* (0.05)	0.33* (0.05)	-0.4* (0.05)	0.10* (0.05)	0.54* (0.05)	-0.70* (0.05)	-0.5* (0.05)
Intercept	4.82* (0.23)	1.75* (0.16)	1.19* (0.16)	0.75* (0.19)	-0.12 (0.18)	-1.8* (0.17)	1.21* (0.17)	1.76 * (0.18)

Note: Statistically significance level * p<0.05.

Table 5: Results from PSM analysis

	Coefficient	RSE	p-value
ADLs			
ATE	0.060	0.063	0.336
ATET	0.082	0.064	0.195
Self-administering medication			
ATE	0.190	0.043	0.000
ATET	0.218	0.042	0.000
Good SRH			
ATE	0.067	0.040	0.096
ATET	0.071	0.040	0.079
Housing			
ATE	0.130	0.050	0.010
ATET	0.177	0.048	0.000
Visiting friends or relatives			
ATE	0.016	0.015	0.299
ATET	0.020	0.018	0.263
Depression			
ATE	-0.132	0.038	0.001
ATET	-0.178	0.039	0.000
Life satisfaction			
ATE	0.097	0.041	0.018
ATET	0.107	0.040	0.008
Multi-dimensional			
ATE	0.149	0.042	0.000
ATET	0.167	0.044	0.000

Note: ATE: Average treatment effect; ATET: Average treatment effect on treated.

IV. Discussion

Since well-being is a broad concept and it is related to different arenas which are co-related with one another. Hence, the problem in one domain tends to spread to other domains of wellness, especially for the elderly individuals. Therefore, it is high time to measure multi-dimensional well-being of the Indian older adults. This study found that adult out-migration did not substantially disadvantage the older adults towards mobility as well as physical well-being. It is evident from the existing literature that individuals with parents who have low levels of physical well-being were less likely to migrate (Böhme et al., 2015). Alongside, migrants may also provide advice or health-related information as well as financial remittances that can help their elderly kin better navigate the challenges associated with ageing through accessing of anti-inflammatory medications (Taylor, 1999). In the line of past research (Waidler et al., 2017) our study also shows that older parents having adult migrant children had higher probabilities of attaining wellness in the physical well-being as well as overall multi-dimensional wellbeing index. At the same time, housing living standard would also improve with the help of remittances sent by the adult migrant children. However, we find significantly negative impact of the adult migration on the parental psychological well-being. Antman (2012) suggested that the illegal migration and the related insecurity of adult migrant children could play an important role towards the psychological distress. Feelings associated with physical separation from adult migrant children such as loss and grief also correspond to worse psychological wellness (Grant et al., 2009). The present study also suggested that the elderly individuals with adult migrant children had significantly lower social wellbeing rates compared with those individuals without adult migrant children.

Limitations

The present study is limited by cross-sectional design of the data which is unable to capture the causal relationship. Unavailability of longitudinal data also prevented us to assess reverse-causation association between adult migration and older parent's multidimensional well-being status which could have provided more valuable insights for understanding how older parent's overall well-being is associated with adult children's decision on migration. There are certain indicators of well-being such as self-reported health, participation in social events may vary across short time span and only longitudinal data can capture these observations from the same elderly individuals over time that help to understand the holistic well-being of left behind elderly. Since some well-being variables were self-reported in nature, the possibility of recall bias among the older adults cannot be ignored. The survey was conducted only in seven states in India, therefore, this study may not be generalizable for the entire nation.

V. Conclusion

In conclusion, this study shows the empirical evidence of multidimensional well-being of Indian elderly while their adult children reside outside district, state or nation. Thus, the study has enhanced the empirical understanding of outmigration of adult children and its implication on the well-being of the elderly parents left behind. Increasing trend of nuclear families both in rural and urban areas and migration of adult children from the traditional households due to change in multi-generational occupational structure affect negatively the psychological and social-well-being of the elderly parents left behind. At the same time, researchers also consider the economic prosperity of out-migration which enables enhancing the physical and subjective well-being of their elderly parents. Therefore, public health policy makers should pay attention on the pathways to alleviating depressive symptoms in left-behind parents which is urgently needed in order to enhance psychological wellbeing in this vulnerable group.

References

- Abas, M. A., Punpuing, S., Jirapramukpitak, T., Guest, P., Tangchonlatip, K., Leese, M., & Prince, M. (2009). Rural-urban migration and depression in ageing family members left behind. *The British Journal of Psychiatry*, 195(1), 54-60.
- Antman, F. M. (2012). Elderly care and intrafamily resource allocation when children migrate. *Journal of Human Resources*, 47(2), 331-363.
- Ao, X., Jiang, D., & Zhao, Z. (2016). The impact of rural-urban migration on the health of the left-behind parents. *China Economic Review*, 37(1), 126-139.
- Bhagat, R. B. (2012). Internal migration in India: are the underclass more mobile? In *India Migration Report 2011* (pp. 27-44). Routledge India.
- Böhme, M. H., Persian, R., & Stöhr, T. (2015). Alone but better off? Adult child migration and health of elderly parents in Moldova. *Journal of Health Economics*, 39(January), 211-227.
- Bradshaw, J., Hoelscher, P., & Richardson, D. (2007). An index of child well-being in the European Union. *Social Indicators Research*, 80(1), 133-177.
- Cong, Z., & Silverstein, M. (2008). Intergenerational support and depression among elders in rural China: Do daughters-in-law matter? *Journal of Marriage and Family*, 70(3), 599-612.
- Grant, G., Falkingham, J., & Evandrou, M. (2009). The impact of adult children's migration on wellbeing in later life: Voices from Moldova. *Centre for Research on Aging Discussion Paper*, 902.
- Guest, P. (1998). Assessing the consequences of internal migration: Methodological issues and a case study on Thailand based on longitudinal household survey data. In R. Bilsborrow (Ed.), *Migration, urbanization, and development: New directions and issues* (pp. 275-310). United Nations Population Fund and Kluwer Academic Publishers.
- Halleröd, B., & Seldén, D. (2013). The multi-dimensional characteristics of wellbeing: How different aspects of wellbeing interact and do not interact with each other. *Social Indicators Research*, 113(3), 807-825.
- Helliwell, J. F., & Putnam, R. D. (2005). *The social context of well-being*. In F. Huppert, N. Beylis, B. Keverne (Eds.), *The science of well-being* (pp. 435-459). Oxford University Press.

- IOM. World Migration Report 2018. International Organization for Migration, 2017. Available from: https://publications.iom.int/system/files/pdf/wmr_2018_en.pdf
- Kahn, K., Collinson, M., Tollman, S., Wolff, B., Garenne, M., & Clark, S. (2003). Health consequences of migration: Evidence from South Africa's rural northeast (Agincourt). In *Conference on African Migration in Comparative Perspective* (pp. 4-7). Johannesburg, South Africa.
- Kumar, K., Shukla, A., Singh, A., Ram, F., & Kowal, P. (2016). Association between wealth and health among older adults in rural China and India. *The Journal of the Economics of Ageing*, 7(April), 43-52.
- Laczko, F., Tjaden, J., & Auer, D. (2017). Measuring global migration potential, 2010–2015. *Global Migration Data Briefing Series*, 9(1), 1-14.
- Miltiades, H. B. (2002). The social and psychological effect of an adult child's emigration on non-immigrant Asian Indian elderly parents. *Journal of Cross-Cultural Gerontology*, 17(1), 33-55.
- Prasad, B. and Rani, N.I. 2007. Older persons, and caregiver burden and satisfaction in rural family context. *Indian Journal of Gerontology*, 21(2), 216-232.
- Registrar General, I. (2011). Census of India 2011: Final population totals-India data sheet. Office of the Registrar General Census Commissioner. Indian Census Bureau. Available from: https://www.censusindia.gov.in/2011census/population_enumeration.html: India
- Scheffel, J., & Zhang, Y. (2019). How does internal migration affect the emotional health of elderly parents left behind? *Journal of Population Economics*, 32(3), 953-980.
- Shelton, N. J., & Herrick, K. G. (2009). Comparison of scoring methods and thresholds of the General Health Questionnaire-12 with the Edinburgh Postnatal Depression Scale in English women. *Public Health*, 123(12), 789-793.
- Singh, J. P. (2010). Problems of India's changing family and state intervention. *The Eastern Anthropologist*, 63(1), 17-40.
- Taylor, E. J. (1999). The new economics of labour migration and the role of remittances in the migration process. *International Migration*, 37(1), 63-88.
- Toyota, M., Yeoh, B. S., & Nguyen, L. (2007). Bringing the 'left behind' back into view in Asia: A framework for understanding the 'migration-left behind nexus'. *Population, Space and Place*, 13(3), 157-161.
- UNESCO & UNICEF. (2012). *National Workshop on Internal Migration and Human Development in India: Workshop Compendium (Vol. II)*. New Delhi: United Nations Educational, Scientific and Cultural Organization (UNESCO) and United Nations Children's Fund (UNICEF).
- UNFPA. (2012). Building a Knowledge Base on Population Ageing (BKPAI): Report on the Status of Elderly in Selected States of India, 2011. <https://www.isec.ac.in/prc-AginginIndia.html>
- United-Nations (2009). World Population Prospects Cd-rom 2008 Revision: United Nations Publications. https://www.un.org/esa/population/publications/wpp2008/wpp2008_highlights.pdf.
- Vullnetari, J., & King, R. (2008). 'Does your granny eat grass?' On mass migration, care drain and the fate of older people in rural Albania. *Global Networks*, 8(2), 139-171.
- Waidler, J., Vanore, M., Gassmann, F., & Siegel, M. (2017). Does it matter where the children are? The wellbeing of elderly people 'left behind' by migrant children in Moldova. *Ageing & Society*, 37(3), 607-632.
- Zhou, Y., Zhou, L., Fu, C., Wang, Y., Liu, Q., Wu, H., ... & Zheng, L. (2015). Socio-economic factors related with the subjective well-being of the rural elderly people living independently in China. *International Journal for Equity in Health*, 14(1).