Living arrangements of older adults in India: reduced forms for co-residence model

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Living Arrangements of Older Adults in India: Reduced Forms for Co-residence Model

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Abstract

Understanding the effects of factors that determine the living arrangements of the older adults becomes crucial as their care is affected by their living arrangements. In India, the spectrum of social security schemes for the older adults needs diversification in terms of services provided and coverage. Therefore a large chunk of the support has to come from family and community. This support is reflected in their living arrangements. Often the social transition from an agriculture-based economy to an industrialized economy, with urbanization and nuclearization of families as its consequences, is cited as a reason for the changing living conditions of the older adults. This study is aimed at investigating the factors that are associated with the living arrangements of the older adults. It extracts information on Indian socio-cultural system vis-à-vis the older population from the 42nd round data of the National Sample Survey (NSS). The conceptual framework consists of availability factors, feasibility factors and cultural factors. Each of these factors is represented by a set of variables. The effect of these factors on the living arrangements of the older adults is analysed. It is asserted that the state of economic independence, the marital status, the place of residence, the sex and the age are potential factors determining the living arrangements at older ages. The analysis points to the need of planning long term policies for caring older adults, given the heterogeneity of the population and their living arrangements.

Keywords: ageing, living arrangements, co-residence, living alone, social transfers, familial transfers, modernization

1.0 Introduction

An ageing society demands as a prerequisite existence of effective systems of familial[1] and social[2] transfers (Palloni 2001). These transfers are synonymous with supports that have a positive influence on the general well being of the older adults (population units aged sixty and above). The population[3] of the older adults in the Indian society has swelled from 5.63 per cent in 1961 to 7.10 per cent in 2001. According to the 2001 census there are 76.62 million older adults in India. The decadal growth rates of the older adult population in the decades 1961-71, 1971-81, 1981-91 and 1991-2001 were 32.32 per cent, 32.01 per cent, 31.30 per cent and 35.18 per cent respectively. An all-India survey, conducted during 1995-96, estimates the older adults living alone to be 15 per cent and 12.5 per cent in rural and urban areas respectively. At the end of 2003 there were 379 old age homes running in India and the number of beneficiaries was 9575. This figure is mere 0.01 per cent of the older adult population of India. The per cent of workforce employed in public sector has been recorded 4.28, 5.91, 7.03, 6.66 and 6.13 in the five decadal censuses respectively[4]. Therefore, a large part of the workforce will remain devoid of any post-retirement benefits. Old age pensions are also not adequate. It varies from Rupees 75.00 in Andhra Pradesh state to Rupees 200.00 in Maharashtrra state.This scenario demands immediate attention concerning their state of well-being. It also gives a clear indication that the cost of economic, health and psychological support needed by the older adults has to be borne by the family.

The literature broadly classifies the living arrangements as alone and co-residence. Living alone covers the living arrangements where the older adults live alone or with spouse. Co-residence indicates living with children or other such type of arrangement. In India, living with sons at older ages had been a norm of the society and living in old age homes is still a rare phenomenon. Vlasoff (1990) has cited the importance of son in India in a case study on widows. Jeffery et al (1992) have given details of the studies from developed western societies indicating positive relationship between economic resources of the older adults and the likelihood of independent living. They have also mentioned studies indicating that disability and poor health decrease the likelihood of continuing to live separately. Shah (1999) has pointed out that joint households have been an ideal throughout the Indian society. Sokolovsky (2001), citing the western pacific survey and other case studies conducted

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[1] The transfers flowing towards older adults originating within the boundaries of kin group or family
[2] Transfers flowing towards older adults that include socio-economic resources such as pensions, disability income, health payments, and transfers in the form of subsidies for institutionalisation, home care and housing
[3] Population of India was recorded 439.23 million in 1961 census and 1027.01 million in 2001 census
[4] Census of India 1981, Series I India, Paper 3 of 1981, for the years 1970-71 and 1980-81; Statistical Abstracts 1982, 1970, 1962; www.indiastat.com and www.mospi.nic.in for the year 2001

in India, has opined that the changing socio-economic environment of this part of developing world has little impact on likelihood of co-residence. Zimmer et al (2005) have discussed education, marital status, sex, age, place of residence (rural/urban) of household members as determinants of the composition of households in the less developed countries, within the modernization[5] perspective. Walter (1960) has discussed the developments in social, economic, medical and technological aspects that are influencing the living arrangements of the older adults.

The studies conducted in various parts of the developing world indicate that no generalization of the effects could be made. It seems that these factors differ in their effects on living arrangements from one social system to another. Moreover, the older adult population is not a homogeneous population. The older adults differ by sex, marital status, availability of kin, health status and economic resources. Therefore the preferences for living arrangements are not same for the whole population. For such reasons, the heterogeneity of the older population should be considered in conducting any study on living arrangements. The respective socio-cultural system serves as a frame of reference. The effectiveness of the factors that play significant role in the socio-cultural systems outside India needs to be tested for its effect in the Indian system and this study is an attempt in this direction.

Present study homogenizes the older adult population by defining sub-groups by marital status and availability of kin. The health and economic factors, which are considered in earlier studies, are incorporated in this study also. Socio-cultural factors peculiar to the Indian system namely caste, religion, education and place of residence are controlled.

The following questions represent the objectives of the present study:

- *Research Question-1: Are the states of economic dependence and living arrangements of the older adults associated?*
- *Research Question-2: Do the states of health status affect the living arrangements?*
- *Research Question-3: What effect does disability (in terms of physical immobility) has in deciding living arrangements?*

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[5] This approach assumes that living in large and extended households is common in traditional agricultural societies and becomes less so with development, industrialization and division of labour

- *Research Question-4: For the older adults having children, do older adults prefer living with son? And if it is so, does having a number of sons ensures that the older adults live with sons?*
- *Research Question-5: Does place of residence has any effect on the choice of living arrangements?*

2.0 Methodology

In India, at present we lack comprehensive database to study the living arrangements of the older adults. The 42nd round data of the NSS is of great help to initiate such studies. The data was collected in the forty-second round (July 1986-June 1987) of the National Sample Survey Organization (N.S.S.O), Government of India, to access the nature and dimensions of the socio-economic problems of the older adults. The survey covered the whole of India except Ladakh and Kargil districts of Jammu & Kashmir and rural areas of Nagaland. The survey covered 64993 households spread over a sample of 8312 villages and 4546 U.F.S. blocks.

2.1 Living Arrangements and Supports

The term support stands for co-residents, providing economic, health care, and psychological supports. This concept is developed further so as to form the core of the conceptual framework for the present study. From the classification of the living arrangements it is evident that marital status and availability of kin are deciding factors for the choices available from a set of alternative living arrangements. For instance, for those older adults having no chid, co-residence with children is not possible and for never married older adults living with spouse is not possible. This indicates the need for first homogenising the older adult population with respect to marital status and the availability of kin so that the available choices of living arrangements are crystallized to facilitate further analytical exercises. It is also necessary because the prevailing social structure may make the effects of various factors differ from one homogeneous sub-group to another.

2.2 The Living Arrangements and Homogenous sub-Groups

The data cites seven types of living arrangements namely *living with spouse*, *living with children*, *living with grand children*, *living with other relatives*, *living with non-relatives*, *living alone as an*

inmate of old age home and *living alone but not as an inmate of old age home*. Those who are living alone are classified as follows:

1. Living with spouse
2. Living alone but not as an inmate of old age homes
3. Living in old age homes

Those who are co-residing are classified as follows:

1. Living with children
2. Living with grand children
3. Living with relatives
4. Living with non-relatives

The seven states of living arrangements indicated in the survey are classified into four support groups as shown in Table 1. *Living Alone-I* indicates spouse as the primary support. When the unit lives with children or grandchildren and receives support from them, the support is termed as *Co-Residence-I*, living and receiving support from relatives or non-relatives classifies the support as *Co-Residence-II*, those staying alone or in old-age homes are grouped under *Living Alone-II*. Though in principle, all older adults can opt freely for supports Co-residence-II or Living Alone-II the option of Living Alone-I or Co-Residence-I is constrained by the marital status and the availability of kin.

Availability of kin is indicated by two possible states namely *having kin* or *not having kin*. Marital Status has four states namely *currently married*, *widowed*, *never married* and *separated/divorced*. So the group of older adults is divided into eight mutually exclusive homogeneous *Sub-Groups* based on their marital status and availability of kin. Based upon the common supports available, four *Sets* are formed each consisting of sub-groups sharing common support. Thus, we have $U_1 = \{G_1\}$, $U_2 = \{G_2, G_3, G_4\}$, $U_3 = \{G_5\}$ and $U_4 = \{G_6, G_7, G_8\}$ as four *Sets*. The sub-groups and the supports available to them are shown in Table 2.

2.3 Conceptual Framework for Analysis

The conceptual framework has been developed based on a framework originally given by Dixon (1971) and later modified by Jeffery et al (1992) in their study titled "Living Arrangements of the Unmarried Older adults Hispanic Females". The original framework groups the factors, namely marital status, availability of kin, economic factors, knowledge of English and age affecting the living arrangements of the older adults into Availability, Feasibility and Desirability factors. The present

study attempts to control for the cultural factors for their effect on the choice of living arrangements. Therefore, in the present study the term desirability factor is replaced by cultural factors. The effect of sub-groups is controlled for in the analysis whenever a set consisting of more than one sub-group is analysed.

We shall frame the following hypotheses to investigate our research questions:

- *Research question 1*
    - **Hypothesis 1**: Higher economic dependence implies decreased likelihood of living alone.
- *Research question 2*
    - **Hypothesis 2-a**: Prevalence of chronic diseases decreases the likelihood of living alone.

    OR

    When the information about chronic diseases is not taken separately the hypothesis for this research question is:
    - **Hypothesis 2-b**: The likelihood of living alone decreases with increase in prevalence of chronic diseases.
- *Research question 3*
    - **Hypothesis 3**: Severe disability or partial disability decreases the likelihood of living alone.
- *Research question 4*
    - **Hypothesis 4-a**: having no son increases the likelihood of living alone.
    - **Hypothesis 4-b**: less number of sons increases the likelihood of living alone.
- *Research question 5*
    - **Hypothesis 5**: Choices of living arrangement differ by place of residence.

Figure-I gives a pictorial description of the conceptual framework. It shows the links between living arrangements, supports, homogeneous sub-groups and sets.

2.3.1 Availability Factor

The availability factor is the availability of son, whenever living arrangements of older adults with children are analyzed. For this group, a further categorization is made into having no son, having one, two, three and more than three sons to assess the impact of availability of sons. However in situations

where the available data are inadequate such detailed categorization is replaced by simple binary classification as members having son and the ones having no son. For sets U_3 and U_4 the availability factor is not relevant. (Figure-II)

2.3.2 Feasibility Factors

The feasibility factors are economic and health factors that may condition living alone kind of living arrangements. The variables included here under feasibility factors are information on economic dependency, information on having one or more of seven chronic diseases and information on physical mobility.

The state of economic dependency of an older adult is captured by a categorical variable with three states namely *dependent on others*, *partially dependent on others* and *not dependent on others*.

The seven chronic diseases have been *chronic cough*, *pain in joints and limbs*, *urinary problems*, *piles*, *hypertension*, *diabetes* and *heart disease*. The chronic diseases are classified into two categories. The first category includes the diseases that do not need diagnosis for being detected viz. *chronic cough*, *pain in joints and limbs*, *urinary problems*, *piles* and the second one includes the diseases which need diagnosis for being detected viz. *hypertension*, *diabetes* and *heart disease*. For the former one, a binomial indicator variable, indicating the prevalence or otherwise of the disease is considered. For the latter one, a categorical variable with three categories, indicating having knowledge about the presence of the said diseases, having no knowledge about the presence or absence of the said diseases and having knowledge about the absence of the said diseases has been considered.

In certain situations, where the size of the data does not permit inclusion of many variables, the information on presence of the chronic diseases is analysed by using a single categorical variable with three categories. The categories have been absence of any chronic disease, presence of at most two chronic diseases and presence of more than two chronic diseases. The category absence of any chronic disease also includes no knowledge about presence or absence of a chronic disease. This simply means that the older adult is not aware of the presence of a chronic disease and considers one self to be free of that particular disease.

For the older adults having difficulty in mobility, support from others is required to carry out day to day activities. The data provides information on physical mobility. Those, who didn't have difficulty in mobility, were questioned about having restriction on mobility. In the present study a categorical variable is defined to include all the states of mobility. Severe mobility difficulty is a state of being

immobile. Partial mobility difficulty indicates some restriction on mobility. No mobility difficulty is the third state. (Figure-III)

2.3.3 Cultural Factors

The cultural factors are included to take into consideration the effect of cultural differences on living arrangements that may arise due to religion, caste, educational background and place of residence.

The place of residence is broadly classified as either rural or urban one. The rural one based on agriculture and other primary occupations whereas the urban one based upon the secondary and tertiary occupations. Thus, by controlling for place of residence the effect of occupation on the living arrangements of the older adults can be studied.

There are seven distinct religious groups classified in the data and one group called "others" which includes any entry other than the previous seven. Living with son in a multigenerational household as a norm has roots in ancient Indian tradition and the cults indigenous to India do not differ on this matter. It is for this reason that Hinduism, Sikhism, Jainism and Buddhism have been considered together under a single category called Indigenous religions. Other religion categories are Islam, Christianity and Others. The religion has been included, with all the four categories, in the analysis, where detailed analysis is permitted namely set U_1 males, set U_1 females (category others excluded), and set U_3 males.

The castes categories included Scheduled Tribes, Scheduled Casts, neo-Buddhists and others. The variable caste is dichotomized into a binomial variable with Scheduled Tribes, Scheduled Casts and neo-Buddhists in one category and others in another category.

Level of education is also included as a cultural factor. A categorical variable with three states namely illiterate, literate but below matriculation and matriculation and above or completed vocational/technical course defines the level of education for set U_1 males. For rest of the analyses a binomial variate indicating illiterate or otherwise is included (Figure-IV).

2.3.4 Demographic Factors

Sex and age are included as demographic factors in the analysis. Separate analysis is conducted for older males and older females for sets U_1 and U_3, for there exist couples in these groups who may not be independently deciding when comes to living arrangements. Sex is included as a factor in the analysis of sets U_2 and U_4 since for this set couple do not exist as members.

The living arrangement preferences may differ depending on the age group of the older adults. Therefore age is the other demographic variable included in the analysis. Three categories of the aged are defined. The "young old" constitute the 60-64 years age group. The "old" constitute the 65-69 years age group and the "old-old" consists of 70+ age group.

2.4 The Model

The model fitted is reduced forms for co-residence: simple representations. It is a multinomial logit model. In this model, the observed probabilities of living alone are modelled against a set of alternative options (for co-residence). The covariates included in the model good indicators of properties identified in a number of alternative theories about co-residence (Palloni 2001). Appropriate controls are also included and empirical specifications include characteristics of the older adults.

Let p_1, p_2, p_3 and p_4 denote the estimated probabilities of living arrangements Living Alone-I, Living Alone-II, Co-residence-I, and Co-residence-II respectively. It is clear from the context that:

1) $p_1+p_2+p_3+p_4=1$ (for U_1)
2) $p_2+p_3+p_4=1$ (for U_2)
3) $p_1+p_2+p_4=1$ (for U_3)
4) $p_2+p_4=1$ (for U_4)

2.4.1 Model for Set U_1

Units belonging to U_1 can opt for any of the four supports namely Living Alone-I, Co-residence-I, Co-residence-II and Living Alone-II. This study aims to model the observed probability of Living Alone-I against Co-residence-I, Co-residence-II and Living Alone-II.

The multinomial logit model, taking Co-residence-I as reference category, consists of the following three equations:

$$\log\left(\frac{p_i}{p_3}\right) = \sum_k a_k^i X_k, i = 1,2,4. \quad \text{... (1)}$$

Where $X_k, k = 1,2...n_1$ are predictor variables and a_k^i are coefficients indicating the effects of the regressors. Similar equations represent the models where co-residence-II and alone-II are the reference categories.

2.4.2 Model for Set U_2

Units belonging to U_2 can opt for all any of the three supports namely Living Alone-II, Co-residence-I and Co-residence-II. This study aims to model the observed probability of living alone-II against co-residence-I, and co-residence-II.

The multinomial logit model, taking co-residence-I as reference category, consists of the following equations:

$$\log\left(\frac{p_i}{p_3}\right) = \sum_k b_k^i Y_k, i = 2,4 \quad\text{.. (2)}$$

Where $Y_k, k = 1,2...n_2$ are predictor variables and b_k^i are coefficients indicating effects of the predictor variables. Similar equations represent the models where co-residence-II is considered as reference category.

2.4.3 Model for Set U_3

Units belonging to U_3 can opt for supports Living Alone-I, Living Alone-II, and Co-residence-II. This study aims to model the observed probability of Living Alone-I against Co-residence-II and Living Alone-II.

The multinomial logit model, taking Co-residence-II as reference category, consists of the following equations:

$$\log\left(\frac{p_i}{p_4}\right) = \sum_k c_k^i Z_k, i = 1,2 \quad\text{... (3)}$$

Where $Z_k, k = 1,2...n_3$ are predictor variables and c_k^i are coefficients indicating the effects of predictor variables. Similar equations represent the models where Living Alone-II is the reference categories.

2.4.4 Model for Set U_4

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A logistic model is appropriate in this case as there are only two choices of supports namely Living Alone-II and Co-residence-II.

$$\log\left(\frac{p_2}{1-p_2}\right) = \sum_K d_K P_K \quad \text{.. (4)}$$

Where $P_K, k = 1, 2...n_4$ are predictor variables and d_k are the coefficients denoting the effects of the predictor variables.

For the explanatory variables, the levels indicating well-being are taken as reference category. The category not dependent on others is taken as the reference category for the factor economic condition. The absence of disability and the absence of chronic disease are taken as the reference categories for their respective factors. For the place of residence, urban is taken as the reference category. For the factor children, having at more than three sons is taken as the reference category, whenever this factor is relevant in the analysis. In some analyses, availability of at least one son is the reference category.

Keeping the framework intact the categories of explanatory variables are modified for the sets where size of data limits a detailed analysis. Feasibility factors are included in all the analyses. The large size of U_1 enables us to use the detailed information on all the chronic diseases. For the rest of the sets due to small size of the data, information on chronic diseases had to be modified. A single variable was included indicating prevalence of one, more than one or none of any of the chronic disease. Detailed categorization for availability of kin is included for U_1 only whereas for U_2 a binomial explanatory variable indicating availability or otherwise of son is used. The cultural factors are included in all the analyses. Of the demographic variables age group is included in all the analyses whereas sex is included as a factor only where probability of opting for a living arrangement is unconditional i.e. is not influenced by spouse (U_2 and U_4).

3.0 Findings and Analysis

The analysis was conducted using SPSS 11.0 software. The tables presented here show the odds ratios, the level of significance and agreement with hypothesis or otherwise for each of the research questions for each set. The detailed results are available and can be produced when requested.

3.1 *Research Question-1*

Table-3.1 presents the results of multinomial logistic regression analysis for all the sets for Research Question-1.

3.1.1 Set U_1 Older Males and Older Females

The results for this set are to be looked into two different perspectives. The first one being when Co-residence-I or Co-residence-II is taken as reference category. The second is the one when Living Alone-II is taken as reference category. In the former case, for older males as well as older females, being partially dependent or dependent decreases the likelihood of Living Alone-I. This agrees well with the hypothesis-1. In the latter case, for older males as well as older females, the states of partial dependence and dependence, Living Alone-I living arrangement is more likely. One of the reasons may be that the kin support may condition them maintaining Living Alone-I living arrangement than to go for Living Alone-II.

3.1.2 Set U_3

The results agree with the hypothesis-1. Not having spouse and economic dependency makes the older adults seek support from kin or relatives.

3.1.3 Set U_2 Older Males

This is a group where older adults have spouse but no kin. Like U_1 the results have to be seen in two different perspectives. When Co-residence-II is taken as reference category the results agree with hypothesis-1. When Living Alone-II is taken as reference category, this group shows a markedly different tendency when compared to U_1. Non availability of kin distinguishes this group from U_1. Living Alone-I is less likely than Living Alone-II for partially dependent and dependent older males. Non-availability of kin makes them seek support from old age homes may be one of the reasons for such tendency. It also points to separation of married older adults who are economically dependent and who do not have not have kin.

3.2 *Research Question-2*

Table-3.2.1, Table-3.2.2 and Table-3.2.3 present the results of multinomial logistic regression analysis for all the sets for Research Question-2.

3.2.1 Set U_1 Older Males and Older Females

For older males the analysis includes all the chronic diseases. When Co-residence-I is taken as a reference category, for older males positive associations between Living Alone-I and prevalence of chronic diseases namely pain in joints and limbs, piles, hypertension, diabetes and heart disease is observed. Where as the diseases chronic cough and urinary problems showed negative association with Living Alone-I. It seems that chronic diseases differ in their impact on Living Alone-I.

When co-residence-II is taken as a reference category, for older males, negative association is observed between Living Alone-I and prevalence of chronic diseases namely chronic cough, pain in joints and limbs, hypertension, diabetes and heart disease. The odds ratios indicate decreased likelihood of living alone when the above mentioned diseases are prevalent, agreeing to the earlier studies. For the diseases urinary problems and piles, a positive association was observed between Living Alone-I and prevalence of the two diseases. Older males with these diseases are more likely to opt for Living Alone-I type of living arrangement.

When Living Alone-II is taken as reference category, the prevalence of chronic diseases namely pain in joints and limbs and urinary problems shows a negative association with Living Alone-I. Rest of the chronic diseases showed positive association with Living Alone-I. For older females the severity of prevalence of chronic diseases was defined differently. For older adults females the associations found are not significant. Except for the case where Living Alone-II is the reference category, prevalence of chronic diseases showed an increased likelihood of Living Alone-I. These results disagree with the hypothesis 2-b. For Living Alone-II as reference category, the state two or less chronic diseases reported showed

a decreased likelihood of Living Alone-I, whereas the state more than two chronic diseases prevalent showed an increased likelihood of Living Alone-I. These results indicate spouse as a better source of support in case of prevalence of chronic diseases.

3.2.2 Set U₃

For this set support of spouse is absent. Interesting to observe is the fact that the effect of prevalence of any of the seven chronic diseases is not significant. But for prevalence of piles and heart disease prevalence of all other diseases indicate a decrease in the likelihood of living arrangement Living Alone-II. Barring piles and heart disease the results are in agreement with the null hypothesis 2-a.

For Co-residence-II as the reference category, the likelihood of Living Alone-II increased in case of prevalence of chronic cough, pain in joints and limbs and heart disease. For the rest of the diseases the results agree with hypothesis 2-a.

3.2.3 Set U₃ Older Males

The effects are not significant for any of the categories namely two or less chronic diseases and more than two chronic diseases. For Co-Residence-II as reference category, living alone is less likely for the category two or less chronic diseases. For the category more than two chronic diseases the likelihood of living alone is greater.

With alone-II as reference category, the increasing number of chronic diseases result in increasing likelihood of alone-I type of living arrangement. The reason may be that in the absence of kin spouse is a better support than any other possible choice of living arrangements.

3.3 *Research Question 3*
Table-3.3 presents the results of multinomial logistic regression analysis for all the sets for Research Question-3.

3.3.1 Set U_1 Older Males and Older Females

There are two states of mobility difficulty namely partial mobility difficulty and severe mobility difficulty. To analyze the effects of these states of disability on the likelihood of Living Alone-I let us first consider the results obtained by considering Co-residence-I and Co-residence-II as reference category.

For older males, the effects of categories of mobility difficulty were found to be significant for the former reference category only. The results indicate that older males with disability are more likely to opt for Living Alone-I an exception being the state of partial mobility difficulty when Co-residence-II is considered as reference category. Barring this exception, all other odds ratios do not agree with the hypothesis 3. It seems that for older males spouse is a better care provider in case of disability. For older females, the scenario differs from that of older males. Here the state of severe mobility difficulty has significant negative effect on the likelihood of Living Alone-I, which is in agreement with the hypothesis 3. The effect of partial mobility difficulty is not significant for older females. For Co-residence-I as reference category the state of partial mobility difficulty indicated an increased likelihood of Living Alone-I and for Co-residence-II as reference category it showed a decreased likelihood of Living Alone-I. The latter case agreed with the hypothesis 3.

The effect of severe mobility difficulty was significant for older males in case of Living Alone–II as reference category. For the rest of the cases the effects were not significant. For older females the results indicated that Living Alone-I state is more likely for all states of disability. Whereas for older males the state of severe mobility difficulty increased the likelihood of alone-I and for the state of partial mobility difficulty opposite was observed.

3.3.2 Set U_2

The results disagree with the hypothesis-3. The effect of the state of severe mobility difficulty is highly significant. The results indicate that the state of Living Alone-II is more likely for

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partial as well as severe mobility difficulty. This group lacks spouse as support and it is expected that supports Co-residence-I and Co-residence-II would be preferably opted for as compared to Living Alone-II. But results vary a lot from what general perception could be.

3.3.3 Set U_3 Older Males

The effects of the states of mobility difficulty are not found to be significant for this set. The direction of effects changed with change in reference category. For Co-residence-II as reference category, the results showed an increased likelihood of Living Alone-I, where as for Living Alone-II as reference category a decreased likelihood of Living Alone-I was observed.

3.4 *Research Question-4*

Table-3.4 presents the results of multinomial logistic regression analysis for all the sets for Research Question-4.

3.4.1 Set U_1 Older Males and Older Females

For this set, the reference category for older males is different than that for older females. The effect of the state of having no son is significant for older females. The results agree with hypothesis 4-a. For older males the reference category is having three or more sons.   On the question investigated by hypothesis 4-b, the observations disagree with the hypothesis. The likelihood of living alone decreases with decreasing number of sons.

3.4.2 Set U_2

For this group the effect of the state of having no son was not found to be significant.

3.5 *Research Question-5*

Table-3.5 presents the results of multinomial logistic regression analysis for all the sets for Research Question-5.

3.5.1 Set U_1 Older Males and Older Females

Let us take up the case where Co-residence-I or Co-residence-II is taken as reference category. For older males as well as older females Living Alone-I is more likely for rural areas.

For Living Alone-II as reference category, the effect was found significant for older males but it was not significant for older females. The older males are more likely to go for Living Alone-I, where as older females are less likely to do so.

3.5.2 Set U_2

For this set spouse as a support is not possible. The results are in contrast to those found for the set U_1 (for Co-residence-I and Co-residence-II as reference categories). Living Alone-II is less likely living arrangement in rural areas. It indicates that for this group supports Co-residence-I or Co-residence-II serve as supports in rural areas.

3.5.3 Set U_3 older males

For this set the results indicate that alone-I living arrangement is more likely in rural areas.

4.0 About Set U_3 Older Females and Set U_4

There were 140 older females in set U_3. Out of these 129 had Living Alone-I type of living arrangement. For the rest, 7 were in Living Alone-II and 4 in Co-residence-II. For older males belonging to the set U_4, all the 97 units had Co-residence-II living arrangement. For the older females of set U_4, out of 218 units 216 had Co-residence-II living arrangement; the rest had Alone-II.

5.0 Conclusion

Rapid pace of ageing and high levels of co-residence characterize the Indian ageing scenario. Reports of 42nd and 52nd rounds of NSS show a decline in levels of co-residence. In rural areas the percentage of older adults co-residing with children or other relatives dropped from 54.8 per cent in the 42nd round to 37.9 per cent in the 52nd round. For urban areas the decline was from 58.4 per cent to 40.0 per cent. These changes occurred during a gap of a decade (1985-86, 1995-96). These changes are phenomenal and represent the effects of changing socio-economic scenario. It is interesting to observe that trend was similar urban as well as rural areas.

The present study investigated the effect of factors namely availability of son, health, economic dependency, disability and place of residence on the likelihood of alone-I living arrangement. For the older adults having kin, non-availability of son did contribute to the likelihood of living alone. However, the results obtained after refining the categories of availability of son, for set U_1 males, did reflected a need to pause and rethink. Briefly, more sons do not indicate increased likelihood of co-residence. This observation points to the need for in-depth investigation in the cases when more than one son are available and how does the characteristics of sons affect the living arrangements of the older parents?

Considering economic dependence as a factor affecting the likelihood of Living Alone-I living arrangement the results are as expected and agree with earlier studies. Increasing economic dependency leads to decreased likelihood of Living Alone-I as compared to choice of Co-residence-I or Co-residence-II.

As far as the effect of prevalence of chronic diseases on the likelihood of Living Alone-I or Living Alone-II is concerned no clear picture emerge in the sense that contrary to expectation the factors are not effective. This indicates a need for more exhaustive studies connecting health status and living arrangements of the older adults. The effect of disability also goes

contrary to expectation U_1 females are an exception. The findings should cause concern to the policy makers regarding well-being of the disabled older adults.

More likelihood of Alone-I in rural areas demands special attention from policy makers as co-residents are less likely to act as support.

The present study considers a part of the heterogeneity of the older population and models the living arrangements as choices available to the older adults. It is limited in its scope as it does not take into consideration socio-economic characteristics of the children. Any cross sectional study is limited in its scope as living arrangements of the older adults need to be looked upon as a process in space and time. This demands more sophisticated models not only taking into consideration all the factors affecting living arrangements of the older adults but also a process view of the phenomena.

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Table 1: Living arrangements of the older adults

Living Arrangements	Support	Indicator variable S
1. Living with spouse	Living alone I	1
1. Living with children	Co-residence I	2
2. Living with grand children		
1. Living with other relatives	Co-residence II	3
2. Living with non-relatives		
1. Living alone as an inmate of old age home	Living alone II	4
2. Living alone but not as an inmate of old age home		

Table 2: Homogeneous groups, sets and available supports

Group	Distinguishing Features	Set	S			
			1	2	3	4
G_1	Having children and married	U_1	1	1	1	1
G_2	Having children and widowed	U_2	0	1	1	1
G_3	Having children and unmarried	U_2	0	1	1	1
G_4	Having children and divorced/separated	U_2	0	1	1	1
G_5	Not having children and married	U_3	1	0	1	1
G_6	Not having children and widowed	U_4	0	0	1	1
G_7	Not having children and unmarried	U_4	0	0	1	1
G_8	Not having children and divorced/separated	U_4	0	0	1	1

1 indicates availability of support and 0 otherwise

Figure-I
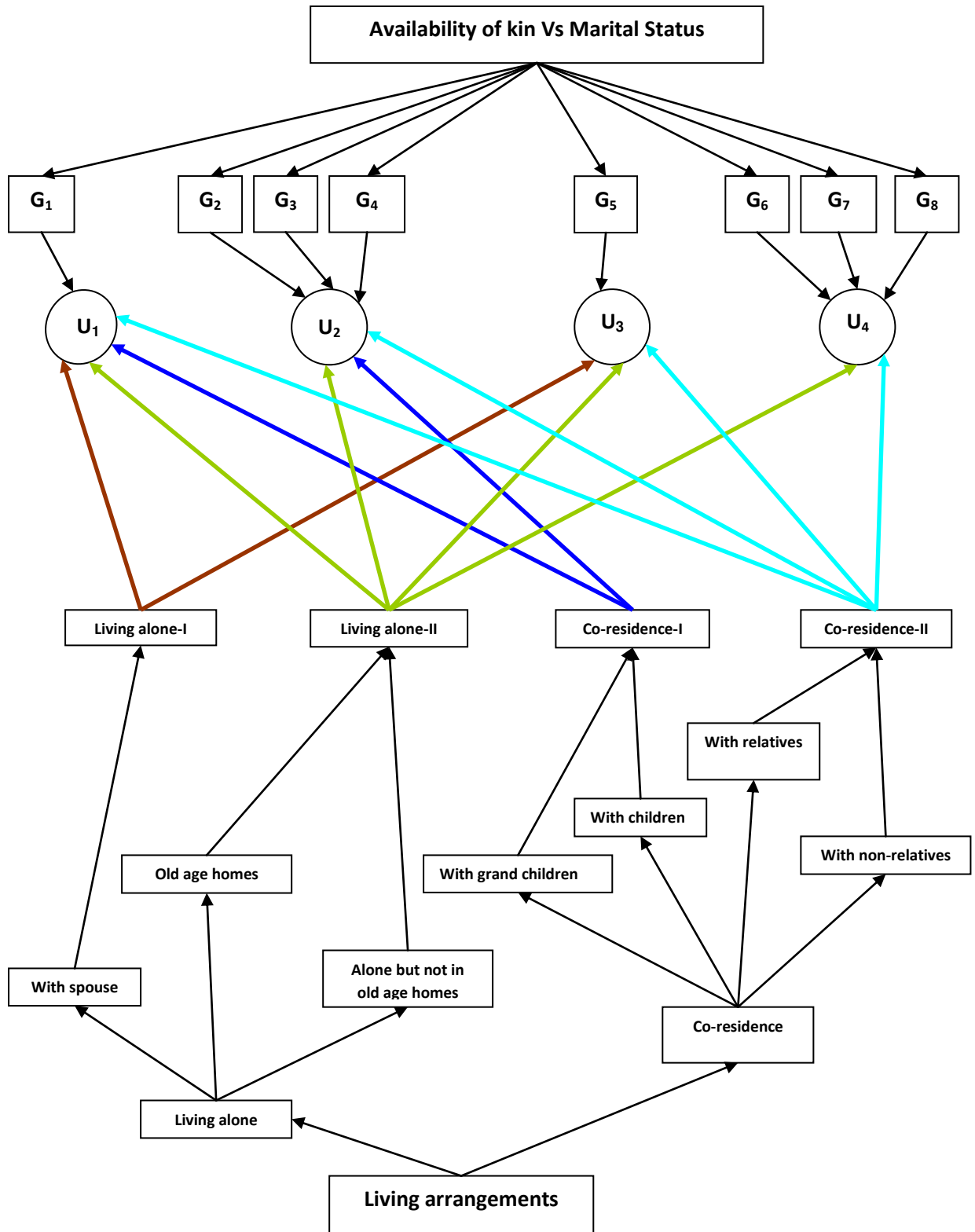
Figure-II

Figure-III

Figure-IV

Cultural factors

Place of residence | Religion | Caste | Education

Place of residence → Rural, **Urban**

Religion → Christianity, Islam, **Hinduism, Jainism, Buddhism and Sikhism**, Zoroastrianism and other religions

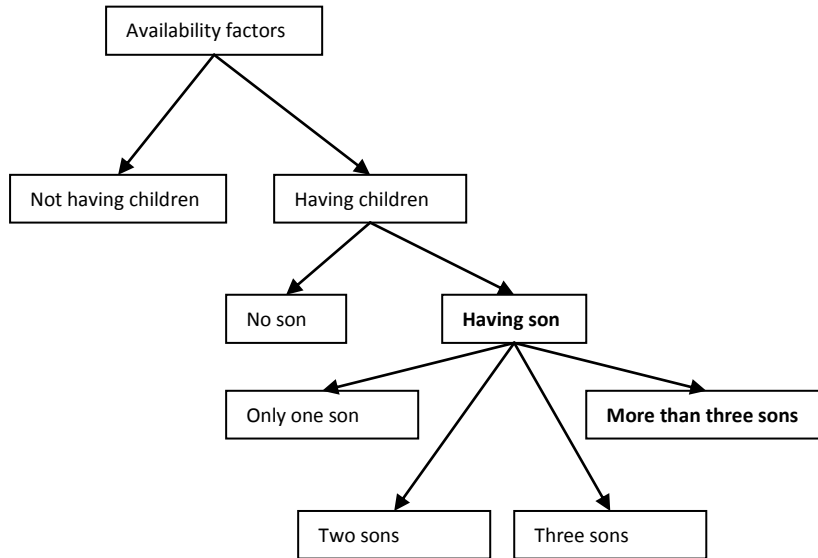Caste → Scheduled casts, Scheduled tribes, **Others**

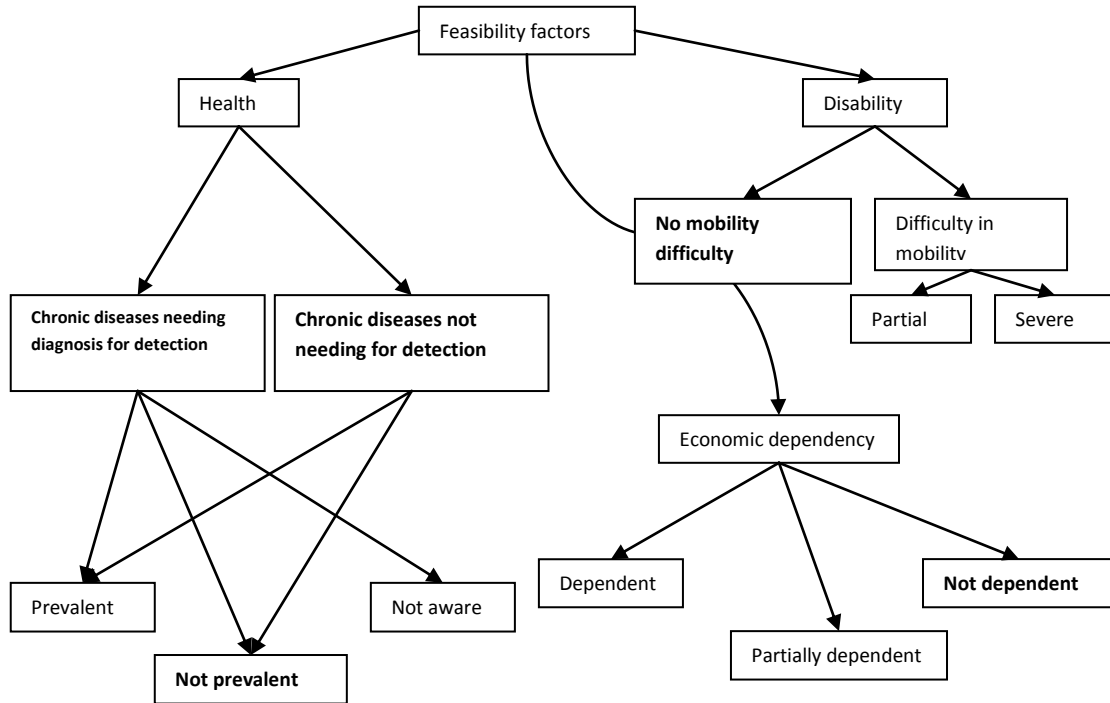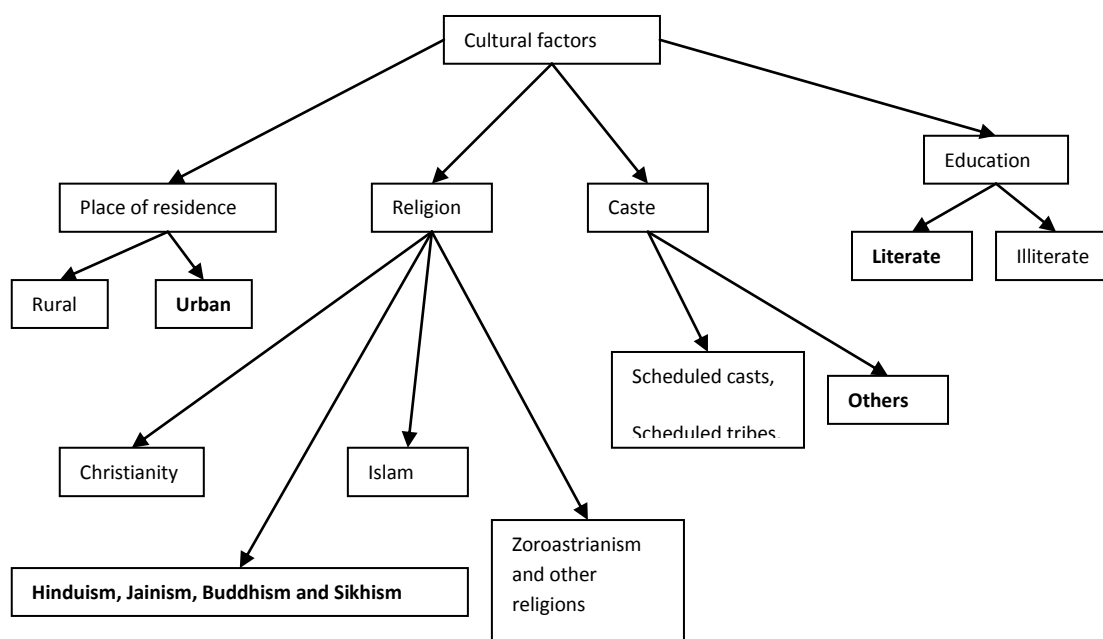Education → **Literate**, Illiterate

Table-3.1 Results for Research Question-1

Set	States of Economic Dependence	alone-I Vs co-residence-I	alone-I Vs co-residence-II	alone-I Vs alone-II	alone-II Vs co-residence-I	alone-II Vs co-residence-II
U₁ males	Dependent	Y(0.264)***	Y(0.414)***	N(1.079)	NA	NA
	Partially Dependent	Y(0.412)***	Y(0.585)***	N(1.562)***	NA	NA
U₁ females	Dependent	Y(0.511)***	Y(0.762)	N(3.151)***	NA	NA
	Partially Dependent	Y(0.423)***	Y(0.977)	N(2.406)***	NA	NA
U₂	Dependent	NA	NA	NA	Y(0.237)***	Y(0.411)**
	Partially Dependent	NA	NA	NA	Y(0.410)*	Y(0.698)
U₃ males	Dependent	NA	Y(0.195)***	Y(0.615)*	NA	NA
	Partially Dependent	NA	Y(0.170)***	Y(0.713)	NA	NA

Reference category for analysis : not dependent on others
Figures in brackets are odds ratios with respect to the reference category
* indicates significance at 10 per cent, ** indicates significance at 5 per cent, *** indicates significance at 1 per cent
Y indicates agreement with the hypothesis and N otherwise
NA denotes analysis not applicable

Table-3.2.1 Results for Research Question-2

Set	States	alone-I Vs co-residence-I	alone-I Vs co-residence-II	alone-I Vs alone-II	alone-II Vs co-residence-I	alone-II Vs co-residence-II
	Chronic cough	Y(0.925)**	Y(0.950)	N(01.190)***	NA	NA
	Pain in Joints and Limbs	N(1.076)**	Y(0.953)	Y(0.832)***	NA	NA
	Urinary problems	Y(0.941)	N(1.184)	Y(0.896)	NA	NA
	Piles	N(1.017)	N(2.434)	N(1.118)	NA	NA
	Hypertension Present	N(1.077)	Y(0.900)	N(1.390)	NA	NA
U_1 males	Hypertension not aware	N(1.005)	N(1.065)	Y(0.963)	NA	NA
	Diabetes present	N(1.077)	Y(0.900)	N(1.390)*	NA	NA
	Diabetes not aware	Y(0.197)	N(1.283)	N(0.899)	NA	NA
	Heart disease present	N(1.096)	Y(0.968)	N(1.344)*	NA	NA
	Heart disease not aware	Y(0.846)**	Y(0.949)	Y(0.889)	NA	NA
U_1 females	More than two	N(1.068)	N(1.418)	N(3.100)	NA	NA
	Two or less	N(1.009)	N(1.200)	Y(0.971)	NA	NA

Reference category for analysis: aware about presence of the disease for males and not aware about presence of any disease for females.
Figures in brackets are odds ratios with respect to the reference category
* indicates significance at 10 per cent, ** indicates significance at 5 per cent, *** indicates significance at 1 per cent
Y indicates agreement with the hypothesis and N otherwise
NA denotes analysis not applicable

Table-3.2.2 Results for Research Question-2

Set	States	alone-I Vs co-residence-I	alone-I Vs co-residence-II	alone-I Vs alone-II	alone-II Vs co-residence-I	alone-II Vs co-residence-II
	Chronic cough	NA	NA	NA	Y(0.980)	N(1.083)
	Pain in Joints and Limbs	NA	NA	NA	Y(0.988)	N(1.021)
	Urinary problems	NA	NA	NA	Y(0.456)	Y(0.561)
	Piles	NA	NA	NA	N(1.237)	Y(0.172)
	Hypertension Present	NA	NA	NA	Y(0.560)	Y(0.712)
U_2	Hypertension not aware	NA	NA	NA	Y(0.680)	Y(0.643)
	Diabetes present	NA	NA	NA	Y(0.960)	Y(0.741)
	Diabetes not aware	NA	NA	NA	Y(0.479)	Y(0.528)
	Heart disease present	NA	NA	NA	N(1.468)	N(1.637)
	Heart disease not aware	NA	NA	NA	N(1.130)	N(1.341)

Reference category for analysis: aware about presence of the disease
Figures in brackets are odds ratios with respect to the reference category
* indicates significance at 10 per cent, ** indicates significance at 5 per cent, *** indicates significance at 1 per cent
Y indicates agreement with the hypothesis and N otherwise
NA denotes analysis not applicable

Table-3.2.3 Results for Research Question-2

Set	States	alone-I Vs co-residence-I	alone-I Vs co-residence-II	alone-I Vs alone-II	alone-II Vs co-residence-I	alone-II Vs co-residence-II
U₃ males	More than two	NA	NA	N(1.663)	N(2.070)	NA
	Two or less	NA	NA	Y(0.763)	Y(0.883)	NA

Reference category for analysis: not aware about presence of any disease
Figures in brackets are odds ratios with respect to the reference category
* indicates significance at 10 per cent, ** indicates significance at 5 per cent, *** indicates significance at 1 per cent
Y indicates agreement with the hypothesis and N otherwise
NA denotes analysis not applicable

Table-3.3 Results for Research Question-3

Set	States	alone-I Vs co-residence-I	alone-I Vs co-residence-II	alone-I Vs alone-II	alone-II Vs co-residence-I	alone-II Vs co-residence-II
U₁ males	Severe mobility difficulty	N(1.158)**	N(1.208)	N(1.609)	NA	NA
	Partial mobility difficulty	N(1.161)***	Y(0.782)	Y(0.951)	NA	NA
U₁ females	Severe mobility difficulty	Y(0.674)***	Y(0.376)**	N(1.996)	NA	NA
	Partial mobility difficulty	N(1.004)	Y(0.701)	N(1.259)	NA	NA
U₂	Severe mobility difficulty	NA	NA	NA	N(3.912)***	N(3.113)***
	Partial mobility difficulty	NA	NA	NA	N(1.978)*	N(1.724)
U₃ males	Severe mobility difficulty	NA	N(1.669)	Y(0.782)	NA	NA
	Partial mobility difficulty	NA	N(1.677)	Y(0.883)	NA	NA

Reference category for analysis: no mobility difficulty
Figures in brackets are odds ratios with respect to the reference category
* indicates significance at 10 per cent, ** indicates significance at 5 per cent, *** indicates significance at 1 per cent
Y indicates agreement with the hypothesis and N otherwise
NA denotes analysis not applicable

Table-3.4 Results for Research Question-4

Set	States	alone-I Vs co-residence-I	alone-I Vs co-residence-II	alone-I Vs alone-II	alone-II Vs co-residence-I	alone-II Vs co-residence-II
U_1 males	No son	N(0.955)	N(0.068)***	N(0.191)***	NA	NA
	One son	N(0.758)***	N(0.337)***	N(0.493)***	NA	NA
	Two sons	N(0.837)***	N(0.489)***	N(0.559)***	NA	NA
	Three sons	N(0.899)**	N(0.553)**	N(0.750)**	NA	NA
U_1 females	No son	Y(2.806)***	N(0.520)	N(0.899)	NA	NA
U_2	NA	NA	NA	NA	NA	NA
U_3 males	No son	NA	NA	Y(1.057)	N(0.188)	NA

Reference category for analysis: more than three sons for U_1 males, at least one son for U_1 females and U_3 males
Figures in brackets are odds ratios with respect to the reference category
* indicates significance at 10 per cent, ** indicates significance at 5 per cent, *** indicates significance at 1 per cent
Y indicates agreement with the hypothesis and N otherwise
NA denotes analysis not applicable

Table-3.5 Results for Research Question-5

Set	States	alone-I Vs co-residence-I	alone-I Vs co-residence-II	alone-I Vs alone-II	alone-II Vs co-residence-I	alone-II Vs co-residence-II
U_1 males	Rural	Y(1.316)***	Y(1.243)	Y(1.324)***	NA	NA
U_1 females	Rural	Y(1.329)***	Y(1.634)*	Y(0.691)	NA	NA
U_2	Rural	NA	NA	NA	Y(0.643)*	Y(0.713)
U_3 males	Rural	NA	Y(1.691)*	Y(1.713)**	NA	NA

Reference category for analysis: urban place of residence
Figures in brackets are odds ratios with respect to the reference category
* indicates significance at 10 per cent, ** indicates significance at 5 per cent, *** indicates significance at 1 per cent
Y indicates agreement with the hypothesis and N otherwise
NA denotes analysis not applicable