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- Campaign for Elder Rights
- Campaign Against Elder Abuse especially toward Elderly Women
- Training of Social Workers and Caregivers
- Capacity Building of Civil Servants or Organizations Working on Ageing
- Research & Publication

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Ageing Experience of Club Sandwich Generation: The Case of Kattunayakan Tribe, Kerala

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ABSTRACT

The present article uses the term club sandwich generation (Carol Abaya) among Kattunayakan community of Kerala, to indicate the young old group who are the care givers of two extreme age groups; grandchildren and aged parents. The researcher tried to examine: how does socio-economic life of sandwich generation influence their later phase of life and how do they deal with the challenges and problems created by their multiple roles? To explore the key information for these questions, the researcher took two cases for the detailed study and used ethnographic case study method. The findings revealed that this generation had to face number of problems, financial hardships, family and social issues and challenges in the care of grandchildren, aged parents and in making linkages with the migrated generation.

Key words: Sandwich generation, Vulnerable Tribal Groups, Challenges and Problems, Multiple roles.

Ageing is a sum of multifarious experience in the course of life of a person. The influence of biological and social factors behind such experience varies from person to person, community to community and even region to region. A number of attempts were previously made in the caregiving challenges of sandwich generations in general

population by writers like, Robinson, M. *et al*., (2003), Donorfio and Kellett (2006), Pierret (2006), Rubin and White-Means (2009), and Parker and Patten (2013). They analyze the caregiving challenges of sandwich generation in the various spheres of general society all around the world. The studies on sandwich generation in Indian context were conducted by a few scholars such as Charles and Stephan, (2008) and Suchita Shenoy-Packer (2014), and so on. Their analyses were based on the family structure, demographic and health context of sandwich generation in Indian context.

Among tribal communities, old age is considered as the most revered stage of life and a sign of authority. In the past, the age old tradition, rites, rituals and folklore were strictly handed over from older generation to younger generation. But today, because of the changing social structure, tribal communities are categorized as an alienated social grouping in a segregated social system. Since the younger generation among these communities is on move towards modernity, a group of older people set apart by metaphors encompassing traditional ritual, pattern of dress, occupation, dialect and family life. A sandwich category of people in between the aged family members and younger members move through the life cycle facing lot of struggles and challenges. These groups of people are bread winners as well as care takers of their aged parents as well as grandchildren.

In the past decades the tribal communities irrespective of their age, moved collectively and formed firmly age based responsibilities. The elegant practices of such cultural systems exist among particularly vulnerable tribal groups in Kerala especially among Kattunayakans. Newly married Kattunayakan people move into a separate house nearby the ancestral home. So that, each family consists of a man, his wife and their unmarried children. But today, due to the migration of younger generation among Kattunayakan, their aged parents are compelled to take care of their grandchildren along with their aged parents. Among Kattunayakan community who inhabit in Wayanad District of Kerala, the middle aged elders, in their fifth and sixth decades, burdened with significant responsibilities of looking after immediate family members comprising aged parents, children and grandchildren and struggling for attaining money through their small scale income generation activities. Since the families are not multi-generational, the role and responsibilities of sandwich generation is tougher. In a sense, a type of sandwich generation or club sandwich

generation (Aswathy, 2015) among Kattunayakan tribes is an emerging trend (Charls B. *et al.,* 2011).

Statement of the Problem

Tribes are facing more problems than non-tribes. The situation of aged people who are responsible for taking care of their parents and grandchildren has become worse in the case of tribal people. The Kattunayakan tribes are illiterate, ignorant and innocent (Aswathy, 2015). Their occupations in the forest area are seasonal and make insufficient income. Hence they have moved into the peripheral forest land and taking up agricultural related works. The income from traditional job is neither enough to provide education for their children nor is it able to avail of better medical facilities. Gradually younger generation has moved away from the traditional social life. Some of them migrated to the nearby cities for better job opportunities. Thus the responsibility of taking care of their children was transferred to their parents. The person belonging to middle age group who are still living in their native place are forced to work in day and night to earn their daily bread for their children, grandchildren and for themselves. It doubled the duty and responsibility of aged parents (aged club sandwich generation).[1]

Specific Research Questions

1. How does socio-economic life of sandwich generation influence their later phase of life?
2. How do they deal with the challenges and problems created by their multiple roles?

Methodology

Sample

The persons who were aged 60 years and above, and who belonged to Kattunayakan community[2] constituted the universe of this study. The selection of 60 plus population was a challenge for the researcher as the aged tribal people were unaware about their chronological age. So the generational age was chosen as the criterion to identify the aged people. Researcher selected the grandparents who were the care givers of their aged parents as well as their grandchildren.

In this study, the researcher purposively selected Maalappadi Kattunayakan settlement that is endemic to Chethalayam-Muthanga

region of Wayanad District for present study.[3] Two key informants from Maalappadi Kattunayakan settlement were selected as cases on the basis of purposive sampling.

Tools of Study

The data were collected using two qualitative methods such as participant-observer notations and in-depth face to face interviews. The Researcher participated in many of their daily activities as a participant-observer.

Analysis of data

Analysis of the data, collected by face to face interview and participant observation, was analysed on the basis of certain themes which were identified during the course of study. Themes are; socio-economic barriers, ageing experience in responsible roles, health and health care facilities, livelihood and intergenerational conflict.

Findings

Socio-economic Barriers in Performing Multiple Roles

Kattunayakan people are mostly dependent on agriculture. The sandwich generation rarely involve in the agricultural sector as well as traditional works. The care giver role becomes a villain in between the role of income earner as well as livelihood mobiliser. At this old age, with multiple roles, it becomes tougher for aged sandwich generation to involve themselves directly or indirectly in agriculture as it demands significant physical power. Bommi says;

> "In the morning time, I should make some food for my grandchildren before they leave to school. In between the household works – I should clean the bed of my bed ridden mother, give food for her, and take her out of the room for sunlight. We live in this small hut because my mother hesitates to move towards the concrete building given by the Government. My grandchildren used to sleep and study in the new house. After sending my grandchildren to school, I have to wash their clothes, my mother's clothes and my husband's clothes. After completing all these works, I cannot go to the farm works because it starts in morning at 8'O clock. I may get work in 10–15 days in a month only. It is insufficient for fulfilling

> the needs of our family. Even I don't get enough time to work in the agricultural land of mine."

Therefore, she cannot utilize her cultivable land and sometimes has to invite sharecroppers. Researcher observed that some workers from other tribal communities come to her paddy field and work for her. She also joined with them after lunch. Landlessness is another important socio-economic issue confronted by some sandwich generation in the settlement. It limits them to yield crops for their subsistence. Though day labouring requires considerable physical power which is negotiated by their old age, those aged persons are not able to vend their labor power on a consistent basis. Having no other alternative, these Kattunayakan older people, who belong to sandwich generation, involve themselves in vending their labor skill as part time laborers in shops and houses. Moreover, some sandwich generation have dependent children like unwed mothers or bedridden children. Chokkan says;

> "My wife cannot go for work. I should find money for all five members in my family. My daughter is an unwed mother. I should take care of my daughter, her daughter, my bedridden father, mother and my wife. My daughter won't go for outside work. After her delivery, she became mentally challenged. She tried to commit suicide two times and also tried to kill her daughter. So my wife must be with her all the time. Doctors suggested medicines for her. But all those are expensive and with my income only we cannot buy it regularly. My sons and daughter migrated into the nearest city for construction works. They have lot of financial problems and there fore they are not able to give us money or other resources. Here we have ourselves. What else?"

The earning is insufficient to meet their meagre needs. It is observed that Kattunayakan Sandwich generation who have economic crisis; their poverty is the combination of their own inadequate income as well as the lack of support from community members and even from their children. Children left the ancestral home for occupational purpose and they left behind their own children at home on one side and their own earning is so minimal that they cannot support their parents on the other. These are the major important reasons behind this situation.

> Bommi, an aged sandwich generation said; "I do not have stable source of income. My sons don't have enough money to look after his children or us. My old age pension and my husband's support are not sufficient to meet all of our needs. In rainy season, we have only one time meal at home. That is really a hard time in our life. We do not share our problem with anyone else because it might be a harassment of our sons. If we were in the forest area, forest would have given everything for us at any time. The shift from forest land to here created all problems. Our children left us for better jobs and livelihood. In my earlier days, forest was everything. We had one time meal, but we never felt hungry. Today, we cannot feed our grandchildren and parents. I cannot spend time with my peer group. I am not able to attend functions related with marriage, naming of child and temple festival. My life is around this hut and with aged parents and grandchildren"

Socio-economic crisis is acute among the Kattunayakan older sandwich generation. Researcher observed that, other than sandwich generation people are financially prosperous compared to their older days in the forest, most of the healthy elders can meet their needs successfully. Financial prosperity in the sense that aged members gets old age pension, according to them, the amount of old age pension is enough. The reason behind this is that need of money is not important in their life. They don't spend much money for food, clothing and even for their household accessories. Hence the aged sandwich generation has more liabilities than resources at their hand as Chokkan mentioned how he suffers from economic hardship. His sons have migrated to cities in search of jobs. That's why they cannot work in vegetable farming with him. Due to physical limitations in old age, the ability of income generation is considerably limited or compromised. Researcher noticed in the field work that some of the aged sandwich generation borrows money from non tribes based on strict terms and conditions. Once they failed to repay, the grandchildren or the aged man or woman should go for work in their paddy field or other crops estates.

Kattunayakan younger generation is not ready to follow the traditional occupations such as agriculture, honey cultivation, making handicrafts with bamboo and making traditional medicines. Instead of this, they are running behind the new income generation methods

such as road and building construction works, hotel and bakery works, sales jobs in textile and other industries located in the nearest city. This has forced them to migrate into city and as a result of this their parents, wife and children are left behind in the ancestral land. Among the two cases, their children do not maintain contact with the aged parents. In such a situation, aged sandwich generation is forced to adopt the responsibilities of younger generation. This situation doubled the burden during their later years of life. This situation affects their physical and psychological well-being. In this ageing stage of life, sandwich generation is remaining only income earners so that it is necessary to engage in agriculture, cultivation of crops, wage laborers in farmland, and performing all other family duties along with it. Researcher observed that Chokkan and Bommi have lot of responsibilities in their family. Bommi and Chokkan used to visit their grandchildren's school whenever there has PTA meeting once in a year. On the occasion of annual day celebration of their school, both of them participated. They shared their happiness being a responsible proud grandparent of tribal children. Bommi says; "this is the happiest moment in my life. I should maintain multiple responsibilities for the education of my grandchildren and well-being of my aged parents. I know that without proper education younger generation can't attain anything in their life. Likewise, if I look after my aged parents, it will definitely be a great lesson for my grandchildren."

Health and Health Care Practices

Health care facilities in earlier days were completely based upon traditional herbs and roots. Gradually the situation changed due to the interaction with outsiders and influence of modern education. Health condition of sandwich generation is pathetic. With such a situation, they look after their aged parents and grandchildren. Age related ailments such as memory loss, body as well as joint pain, loss of eye sight and hearing are common among this sandwich generation. The following statements of Bommi say everything:

> "My two daughters live in Kozhikkode and Malappuram for household works and textile works. I have knee pain and my eyesight is not good but still I am the care taker of my daughters' children as well as my parents. Many times I felt like running away from here. I

> cannot sleep well for a few minutes even at the time of my illness. I have no way of relieving myself of this situation. My husband used to stay outside at each night to protect our ginger and plantain from wild animals. I can't sleep well at night because my mother wakes up many times in the night. So I should give her hot water and help her for urination. I used herbal medicines for the body pain and other ailments. But the herbal medicine is not good for fast relief. Hence my children brought some ointments and tablets from the medical shop. Those medicines could bring fast relief from the ailments. But these medicines create some other minor health issues such as shivering, dizziness and sleeping problems. The unavailability of herbs and lack of time for the collection of herbs together lead me to start the modern medicine. If I am free from all these family responsibilities, I could have used traditional medicinal practices. Now what should I do? I am helpless."

Chokken has another experience as he belongs to sandwich generation. Chokken leave his hut in the night time and spend whole night in the paddy field. He comes back early morning and sleeps for few a hours and again goes to the agricultural works. He says;

> "I am the only male breadwinner in my home and all the duties have been upon my shoulder. I should find the money for bringing medicine for my daughter and bedridden father. I can't hear properly. I don't give more importance for my health problems. My wife is also not well. She uses traditional medicines for all of her health issues. But those medicines take much time for cure. That is not suitable for me. I use modern medicines occasionally. I don't know how to use it. But still I use. Who cares for me?"

The health condition of sandwich generation among Kattunayakan needs proper attention. Responsibility over grand-children and aged parents forces them to do the household works and wage laborers. Sometimes this burden becomes intolerable and painful for the sandwich generation. They are ignorant of some vulnerable health conditions that lead them to loss of life. The unawareness and improper use of modern medicine without proper consultation lead them into severe health issues. Absence of time and money for health care checkups might be a reason for the creation of more vulnerable 'spouse' category among this sandwich generation.

Livelihood and Inter-Generational Conflict

The problem of livelihood and intergenerational conflict is prevalent among the sandwich generation among Kattunayakan community. In these days the issue of livelihood has become an important matter of concern among the sandwich generation especially those who belong to tribal communities. The displacement from the ancestral land is the major shock over the livelihood of tribal communities. Likewise, among Kattunayakan, the rehabilitation is not properly implemented. The problem of improper rehabilitation leads the tribal community into a pathetic livelihood situation today. Transition from traditional hunting and food gathering life towards a modern agricultural and wage labor life created a livelihood shift among the Kattunayakan community. The present livelihood challenges affect the socio-economic life of sandwich generation.

> "My daughter left her children with me and migrated to the nearest city. She doesn't get enough money to give us. At the same time, I should find money for my mother. She is not able to cook food, collect edible resources from the farm and even walk alone. The responsibilities over grandchildren such as, visit to the school, buying educational accessories from the shop, visit tribal hostel, where my grandchild is staying and modern medicine for grandchildren's health ailments. All these things should be done by me. I don't get enough time to spend on the agricultural land. I can't go for household works in the nearby non-tribe house. My younger children don't like to live in this locality. They cannot accept our forest tradition. We quarrel with them occasionally. Even my grandchildren don't like me using old bamboo utensils and this hut. They don't know how much I am attached to it, says Bommi.

Chokkan says that the traditional livelihood practices were most suitable for the daily life of tribal people. The alternatives of traditional livelihood are not tribal friendly. In the initial stages, the forest department recruited the tribal people for making various tree plantations and other activities in the forest land. After the completion of such project Kattunayakan needed to find some other jobs in the forest land and outside. This made the Kattunayakans as agriculturalists and wage laborers in the non-tribal houses.

> "I was trained in traditional methods of honey collection and bamboo produts making. At that time, need of money is not important and we depended upon forest only. But today, we don't have enough land to cultivate. If we had own land and security for crop from wild animals, our children would not have gone for nearest cities. So the migration of our children into cities doubled the burden of us in this old age. I want alcohol every night. I bought alcohol from the non-tribes. Earlier days, we made it in the forest land. That was healthy. But today, making traditional form of alcohol is not possible as we are living outside. So need lot of money for buying alcohol. Here, we should buy each and everything from the market. We need lot of money. My income alone can't make it possible here. We struggle lot. I am planning to join with pastors, who offer me lot of money and better living condition. My community cannot give anything more than this. So I don't think it's better to stick on here. My children who live in the city quarrel with me occasionally about the neatness of my dress. They don't like our 'naicken bhasha' (common dialect between Kattunayakan). My children compelled me to use Malayalam to converse with their children. What to do, this is my situation here.

The major problems related with livelihood of Chokkan is acute alcoholism and addiction to narcotics. It spoils the good health of Chokkan. Researcher observed that Chokkan used alcohol and other chewing narcotics occasionally. All these substances are distributed by the outsiders. A large part of his income spends for buying these products. Cultural invasion by non-tribes is another major issue in his life. Chokkan's family lives in very pathetic situation. By understanding his situation two young men from the Pentecost mission visits his house. They offer him better living condition if he is willing to join their community. Chokkan's wife and grandchildren are against them. These people could convert a few Kattunayakan families in the same locality. They offer job in the city, healthy food, new dress and medical as well as education aid. It threatens the cultural life of older people as well as the entire community. Inter-generational conflict is common among the two cases. The younger generation are against the traditional values and rituals at the same time they compel them to avoid such traditional activities from their aged life.

Spiritual Life among Aged Sandwich Generation

The spiritual life of Kattunayakan tribe was ironic with creative mythologies and religious stories. Spirituality and traditional medicine were closely related. But with the impact of modernization and development initiatives the age old traditional spirituality were sidelined by the younger generation of the Kattunayakan. Listen to Bommi's words;

> "Our ancestors and forest God guided us when we were in the forest land. They have taught us various healing practices. Without their permission we were not allowed to practice that knowledge for the needy. Grandparents had lot of responsibilities to perform the religious rituals related with each stage of life of a Kattunayakan child. Now we don't have such duties or authority over our grandchildren. At present the only thing we should do for them is give them food and modern medicine. My grandparents taught me about religious practices, rituals, stories related with our ancestors and moral values to be performed by us in our community. Now a day, we should work and earn money as well as other livelihood means for our grandchildren."

Spirituality in the final phase of life is losing its importance recently. In the case of Bommi, at the micro level she doesn't get time to perform spiritual responsibilities and rites but in the macro level, younger generation hesitates to follow the religious practices and rituals. It is observed that Bommi finds little time to spend in the nearby temple. The spirituality in this age limits her occasional temple visit only. Chokkan shared his experience;

> "I won't go any temple for spiritual relief. I cannot get my old peaceful days back. In my childhood and youth, I could enjoy the traditional religious rituals and practices. Each and everything in my life was guided by the spiritual leader and spirits. Ceremonies related with harvesting, marriage, child birth, puberty and after death rites were done on the basis of certain norms and rites. Now a day, I don't get enough time to perform all those rites and my children don't like to follow such rituals. My son told me that, this tradition is the only reason for the worst status of his social life. He started to blame our tradition. I am helpless in this age."

Chokkan's life situations, economic burden and responsibility of taking care of grandchildren and aged father drag him from the traditional spiritual rituals and duties. The traditional rituals need more time and physical effort. In the multiple role conflict at this ageing phase of life, he left behind his tradition with utmost pain.

Arguments Raised by this Study

The aged sandwich generation, those between grandchildren and aged parents in their ageing phase of life are undergoing various socio-economic and spiritual crises. This 'hanging' generation cannot perform their adult duties because they are responsible to take care of two extreme generations at the same time. It negatively influences the health, economy and spirituality in later life. The social security and authority pattern diminished due to the changing social structure as a result of modernization and migration of younger generation among Kattunayakan inhabitants in the Maalappadi Kattunayakan settlement. Migration of younger generation created new category of aged members; that is sandwich generation among this tribes.

Care givers of the aged parents and grandchildren become more vulnerable and helpless group in their own family. The care givers are already in a category of aged members. They have lot of physical ailments. But the circumstances forced them to take care of their aged parents and grandchildren. Though their age demands proper relaxation and meagre physical activities in this old age, they are fully engaged in agricultural works and household activities. It becomes a reason for the economic insecurity and poor health condition of them. Care giving for two extreme groups by aged sandwich generation creates existential problems and alienation from the society. The two extreme groups denote aged parents belong to the traditional social system on one side and the grandchildren belong to the modern social system on the other. The multiple role conflict arises among the care giving sandwich generation as they are in the ageing stage of life.

Exploitation and alienation from mainstream society is a byproduct of excessive responsibility in the aged sandwich generation. The unawareness about modern social system alienated the poor aged groups from the activities of mainstream society. Economic exploitation is the most important one they face each day from the society. The non-tribes alienated this Kattunayakan aged group from the

involvement in the activities of temple festival and other seasonal celebrations such as Onam and Vishu. The alienation from own children and from society is the important problem faced by this sandwich generation. Lack of time to maintain good health and unawareness about modern medicine together create lot of health issues among them. Tuberculosis, diabetes, arthritis, gastroenteritis, vision problems, measles, hearing impairment, tetanus, vitamin deficiencies, whooping cough, constipation and skin diseases are prevalent among them. Researcher accompanied Bommi in a medical camp conducted by the health department. On that occasion it was diagnosed that Bommi was affected with acute tuberculosis, occasional constipation, vitamin deficiencies and vision impairment. Bommi got a few medicines from the camp team. But she hesitates to continue the medicine due to lack of time and money. Bommi and Chokkan are not the only persons diagnosed with these severe health problems. Almost all aged persons in the settlement are diagnosed with the ailments. The aged persons who are bedridden are not examined by the medical team, because they are in the forest area and they are not ready to be a part in the modern medical practices. The sandwich generation in the Kattunayakan settlements is moving towards economic hardship, alienation and exploitation from the micro as well as the macro level.

Conclusion

The in-depth analysis of the problems and challenges faced by the aged sandwich generation of Kattunayakan community revealed that the two cases under study as well as the other persons in the same settlement are affected by physical (health related), economic (indebtedness) and psychological problems (alienation from family and society). Considering the nature and background of family and way of life, sources of livelihood, economic burden and multiple role conflict together have forced the poor elder sandwich generation to lead miserable life in their final phase of life.

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* The author is a Research scholar in the Department of Sociology.

Notes

1. The term Sandwich Generation was coined by Miller Dorothy (1981) in her study to denote inequality in the exchange of resources and support between generations. Miller referred sandwich generation that women in their early 40's caring for their young children, while caring for their ageing parents between the ages of 60 and 70 years old. Carol Abaya coined the term club sandwich generation (See George James, 1999) which denote those in their 50s or 60s, sandwiched between ageing parents, adult children and grandchildren or those in their 30s and 40s, with young children, ageing parents and grandparents. Carol was a pioneer in opening up discussion of the many challenges of elder parent care and ageing issues.
2. In the case of Kattunayakan community early marriage is prevalent among them. As per their custom, a girl or a boy should be getting married soon after attaining their puberty. So the age of grandparenthood will be between 50 or 60. In this context, the challenge and problem faced by the sandwich generation need to be understood scientifically.
3. The researcher conducted an ethnographic field work for one and half years among the Kattunayakan tribes of Wayanad, Kerala. On that particular period, researcher noticed a few families having grandchildren, their great grandparents and grandparents with pathetic social life. In this context researcher chose this area of study to find out the problems and challenges of club sandwich generation among Kattunayakan tribal community in Wayanad district of Kerala.

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Is there Similar Decline in Visual and Spatial domains of Visuo-spatial Working Memory with Ageing?

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ABSTRACT

Visuo-spatial working memory (WM) decline with advancing age is a well-established fact. But, there is no agreement on whether, a particular visual or spatial information declines as similarly as the visuo-spatial information as a whole. The present study addressed this question in a lifespan sample of 80 participants between 40-80 years old. Three specific tasks were designed for visual, spatial and visuo-spatial working memory. It was found that, a performance across visual WM was better than the spatial WM. Moreover, significant differences were found between visual and spatial WM score [$F(4, 75) = 32.65$, $p < .05$]; visual and visuo-spatial WM score [$F(4, 75) = 34.43$, $p < .05$]. However, no significant difference was found between spatial and visuo-spatial WM score. In addition, the decline pattern of spatial domain was similar to visuo-spatial domain as a whole. This result revealed that the decline of visuo-spatial WM system with aging is primarily a decline of information associated with the location of the objects appeared in the visual system. Hence, possible interpretations of these findings are suggested and the theoretical and clinical implications considered.

Key words: Visuo-spatial WM, visual WM, spatial WM, ageing.

The visuo-spatial working memory (WM) is a unit of memory system responsible for the momentarily retention and manipulation of basic visual and spatial features of an object with respect to the surrounding environment (Baddeley 2006). The ability to retain numerous visual (e.g., color, shape, size, texture) and spatial (e.g. orientation and spatial location) features of a visual object in a brief moment of time, refer to visual WM and spatial WM respectively. Indeed, precise recall of an object depends on the quantity of the visual and spatial information about the object retained in short-term memory system of an individual (Brockmole and Logie 2013). Recent studies have investigated whether the information retention capacity, in addition to memory capacity varies as a function of age advancement.

Visuo-spatial working memory (WM) decline with aging is a well established fact by the available studies (Park D. *et al*., 2002; Myerson J, *et al*., 2003;Bopp and Verhaeghen 2007; Borella E. *et al*., 2008; Fiore F. *et al*., 2012; Kumar and Priyadarshi 2013; Cansino S. *et al.,* 2013**).** Moreover, these studies considered the visual and spatial WM as an inseparable unit, and analyze the visuo-spatial WM capacity as a whole. However, a group of functional imaging and neuropsychological studies viewed the visuo-spatial WM as a multi-component system(Cowan *et al.*, 2006; Brockmole *et al*., 2008, Brown and Brockmole 2010; Maylor and Logie 2010 Brockmole and Logie 2013,). These studies reported that visual pattern component leads to the activation of the occipital lobe, whereas spatial aspects activates parietal regions of the brain. Both these activations are coordinated and controlled by frontal region activation (Smith and Jonides1996). Dorsal frontal cortex usually involved in the processing of spatial WM, whereas the ventral frontal cortex is more involved in the processing of WM for face and objects. In fact, the recent researchers found that, the premotor cortex (PMC), lateral prefrontal cortex (PFC), posterior parietal cortex (PPC), and temporal brain regions act as a neural network, typically activated during the spatial WM tasks (Todd and Marois 2005). These cortical areas found to be more affected as compared to other areas of the brain, with age advancement (Kennard 2005).

Surprising findings were noticed from the studies of aging on visual and spatial components. The spatial working memory was observed to be selectively affected with ageing. A study was conducted to compare the object location tasks between older adults and young adults (Cowan *et al.*, 2006). It was found that the older adults were having significantly more difficulties in identifying the object location as compared to the younger adults. Moreover, the performance of children and adults were varied in spatial WM tasks (Maylor and Logie, 2010; Brockmole and Logie, 2013). Therefore, the age related effect on visual WM, appeared different from spatial WM. Working memory about visual features such as color and shape of objects are found not affected by normal aging (Brockmole *et al*., 2008; Cansino *et al*., 2013). This finding poses some surprise, that differential effects of aging on visual and spatial component of working memory, but still there is no conformity either visual WM or spatial WM; or both declines similarly as the visuo-spatial WM as a whole with aging. The existing empirical evidence is still insufficient to explain the effect of aging on visuo-spatial WM. Therefore, precise cognitive processes underlying age-related visuo-spatial working memory impairments need to be explored.

Present study is part of a sequence of ongoing research intended to explore the effects of aging on visuo-spatial WM. The aim of the present study was to examine whether both visual and spatial working memory decline equally across the adult lifespan. In addition, another aim was to examine whether both visual and spatial working memory is equally contributing to visuo-spatial decline. It was assumed that the decline in visuo-spatial WM is primarily due to the selective decline of spatial WM. Therefore a decline of visual WM would be relatively less significant in contributing to visuo-spatial decline.

Method

Participants

Participants were 80 adults of five age-related groups, who participated during the previous study – *cognitive-linguistic assessment protocol (CLAP) in Hindi: An adaptation of CLAP in Kannada* (Kumar 2012) – conducted during June 2011–to- May 2012. The group I: aged 40-50 years (M = 45.12, SD = 2.7); Group II: aged 51-60 years (M = 55.87, SD

= 3.5); Group III: aged 61- 70 years (M = 65.81, SD = 2.5); Group IV: aged 71-80 years (M = 75.62, SD = 1.7); and Group V: aged above 80 years (M = 84.25, SD = 4.3). Each group had an equal number of 16 participants.

Informed consent was obtained from participants or family members. All consented to their participation, after the experiment's purpose and procedure were explained to them. Socio-demographic information (age, gender, education, and occupation status) records were reviewed. All the participants were right handed, native Hindi speakers, and belonged to middle socioeconomic strata (SES). Kuppuswamy's socioeconomic status scale was used to compute the SES. (Kumar *et al.* 2012) All had normal or corrected to normal vision, having visual acuity 6/6. The hearing skill was adequate to understand the normal conversation level. Exclusion criteria included medical conditions, record of smoking and alcohol consumption habit, that is prone to memory impairment (Gupta and Warner 2008, Heishman *et al.,* 2010). All the Participants had no previous episode of any neurological, psychological problems, smoking and alcohol consumptions. The selected participants had scored? 25 on Hindi mental state examination (HMSE). (Ganguli *et al.,* 1995) The data record did not show signs of cognitive impairment or dementia, according to the DSM-IVTR. (APA, 2000) Participants were not using medications that affect the central nervous system at the time they participated in the study.

Material and Procedure

To our knowledge, this would be the first study that compared the effect of aging on visual, spatial and visuo-spatial WM altogether. Hence, three specific tasks were designed to measure the visual, spatial and visuo-spatial WM. The visuo-spatial WM task study was based on visuo-spatial running memory task used in one of a recent study (Fiore F, *et al.,* 2013). To understand the effect of aging on all these three WM domains, the designed tasks should be controlled. Keeping this view in account, both visual and spatial WM tasks designed for this study, utilizing the visual and spatial paradigm respectively of the visuo-spatial WM task. Visual and spatial WM task were

counterbalanced across the participants and performed prior of visuo-spatial WM task.

Visual WM tasks: The task followed the random recall of symbols, representing the solid filled shapes (e.g. square, triangle, star, circle, hexagon, oval, cylindrical, rectangle) in black color. Each stimulus symbol of 1" x 1" dimension was printed on 3" x 3" white flash card. The Symbols were selected with the help of three experienced speech-language pathologists (SLPs) working in the area of cognitive aging, with an idea of the homogenous cognitive load to recall each symbol. They judged the appropriateness of flash card using five point rating scale (0 = *very poor* and 4 = *excellent*) on 15 parameters: Simplicity, proverbility, the size of the picture, color and appearance, arrangement, presentation, volume, relevancy, complexity, iconicity, accessibility, flexibility, trainability, stimulability, and feasibility. All the symbols were rated as excellent. The Cronbach's alpha coefficient values for all the parameters were greater than 0.90, indicated higher inter-judge reliability.

The stimuli ranged from a set of two flash cards to a set of eight. Each stimulus set was tried thrice. The test started with a set of two flash cards. If the participants correctly identified the set of two flash cards, at least two times out of three trials, then the next stimulus (a set of three flash cards) followed. The test was maximally continued up to a set of eight cards. Therefore, the maximum number of possible trails was twenty-one (3- trails x 7-sets). Each flash card was displayed for two seconds, with a gap of one second. Now, the participant was asked to recall and randomly identify a set of symbols, displayed just before. For identification purpose, all the eight symbols were printed altogether in a row on a 3" x 17" white card. Each symbol was separated with an inch gap. Finally, twenty-one identification cards were prepared, one card for each trail, varying in the sequence of symbols.

Visual WM was calculated as a maximum set, where two out of three trials were identified correctly. An example of the visual WM task is shown in Table 1. Visual WM score ranged from two to eight. If a minimum set of two flash cards were not correctly identified, then it was scores as one.

Table 1

Example of a Visual Working Memory Recall Task

Set/ trial	Stimulus	Identification	Response
1. (i)	■□	■$_1$ ◆□$_2$ ⟲ ✶	□
(ii)	□✶	■◆□$_1$ ⟲ ✶$_2$	□
(iii)	⟲	■◆□ ⟲$_2$ $_1$ ✶	□
2. (i)	◆□⟲	◆$_1$ ■ ⟲$_3$ ✶□$_2$	□
(ii)	⟲✶	◆$_1$■ ⟲$_2$ ✶$_3$□	X
(iii)	■◆□	◆$_2$■$_1$ ⟲$_3$ ✶□	X
Visual VM			2

Two sets of the symbols are shown in stimulus column. In the first set, all the three trails are correct. Whereas in the second set, two out of three trials are correct up. Therefore, the visual WM score is 2. Correct identification is marked as '?' and wrong as 'x', shown in response column. Numerical (1, 2 and 3) in red color in identification column indicates the sequence of response obtained.

Spatial WM task- The tasks, utilized the recall of spatial locations of the dot symbol presented in matrices of 5 x 5 blank squares. A matrix was 5" x 5" in dimension, and each grid of the matrix was 1" x 1". A dot symbol of 1" x 1" in a grid of one matrix was printed on a 6" x 6" white flash card. A total of nine flash cards were prepared. Eight stimuli cards with a dot in a matrix, representing the eight different spatial orientations; and one card with a blank matrix for the identification task. A set of dot matrices was displayed to the participant, and was asked to recall and identify these dots' locations randomly, in a blank matrix. Apart from that, the appropriate judgment of flash cards, test administration procedure and scoring, followed the similar procedure utilized over the visual WM task. An example of the visual WM task is shown in Figure 1.

Figure 1

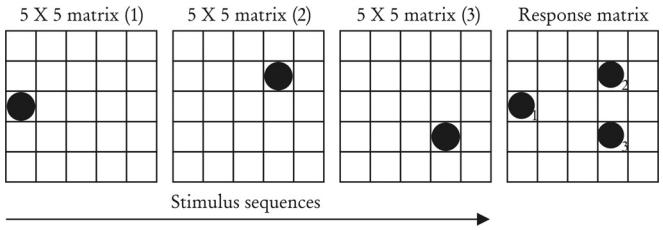

Figure 1 Example of a spatial WM task. Three dots are presented over three consecutive 5 x 5 matrices (1, 2, and 3). The response was marked on response matrix. In response matrix numerical (1, 2, and 3) in red color indicates the sequence of spatial response obtained.

Visuo-spatial WM task- This is a combination of visual and spatial tasks. Like visual WM task, eight symbols (square, triangle, star, circle, hexagon, oval, cylindrical, rectangle) were used to construct eight stimulus cards. Each card contained a symbol printed in a grid of the matrix representing the spatial orientations of the respective symbol. A set of matrices with different symbols were displayed to the participants, and they were asked to identify the correct symbol with their specific spatial location, as presented. For identification task, same card as visual task (all the eight symbols altogether in a row on a white card), and spatial task (one card with a blank matrix) were used. Apart from that, test administration procedure and scoring followed the similar procedure utilized over the visual WM task. An example of the visuo-spatial WM task is shown in Figure 2.

Figure 2

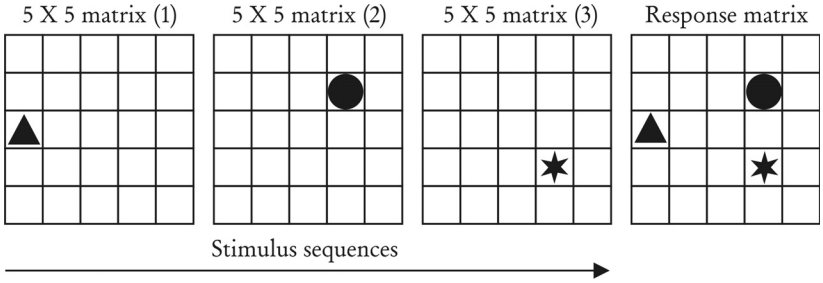

Figure 2 Example of visuo-spatial WM task. Three symbols are presented over three consecutive 5 x 5 matrices (1, 2, and 3). Visuo-spatial ability was obtained in response matrix.

All the above tasks were performed in quiet, noise free settings, either at home or clinical setting. On an average, a participant completed each of the tasks within ten minutes. Two to three minutes of gap was provided after a task. Therefore, a set of three tasks was completed within thirty to forty minutes time duration by a participant. The entire experiment data was video recorded with a digital camera (Sony 1080). Lastly, the recorded data of 10 participants (two from each five groups) were retested by three SLPs for computing inter-judge reliability.

Statistical Analysis

The raw score of participants were computed for a descriptive statistics (mean and standard deviation) and the analysis of variance (ANOVA) in the Statistical Package for the Social Science (SPSS) version 18.0. The repeated measure ANOVA (RM-ANOVA) was conducted investigating the degree of significant difference among WM measures. However, the age-related group effect was computed using a multivariate ANOVA (MANOVA) test. Despite the small sample size (16 participants in each age group), these parametric tests were preferred over the non parametric counterparts, due to the fact that the data set was normally distributed, along with an appropriate ratio of a skewness value and standard deviation which did not exceed ±3.29 (Tabachnick and Fidell, 2006). The Pearson's correlations were computed to examine the relationship between age of the participants and their scores on WM measures. Two-tailed tests and a significance level of 0.05 were selected all over the statistical analysis.

Results

A first analysis of data revealed the separate means on the WM task measures for each of the age-related groups. The mean scores and standard deviations of the five groups have been summarized in Table 2.

Table 2

Means (M) and Standard Deviation (SD) of Visual, Spatial and Visuo-Spatial WM Tasks Across the Age Groups.

Age Grou	*Visual WM*	*Spatial WM*	*Visuo-spatial WM*
	M(SD)	*M(SD*	*M(SD)*
40–50 (n = 16)	7.23 (0.1)	4.34 (0.3)	4.25 (0.3)
51–60 (n = 16)	6.33 (0.6)	3.31 (0.5)	3.3 (0.4)
61–70 (n = 16)	5.34 (0.3)	3.17 (0.3)	2.89 (0.2)
71–80 (n = 16)	5.30 (0.5)	2.05 (0.2)	2.0 (0.2)
Above 80s (n = 16)	5.23 (0.8)	1.0 (0.2)	1.0 (0.4)

Table 2 reveals that participants scored the highest in the visual WM task. This, moreover, is greater as compared to the other two tasks: spatial WM task and visuo-spatial WM task. Comparisons of relative WM scores for visual, spatial and visuo-spatial tasks are shown

in Figure 3, which depicts the pattern of decline as a function of aging. The correlation results (Table 3) revealed that, the visuo-spatial WM score was significantly higher as correlated with spatial scores (r =.89, p < .001).

Figure 3

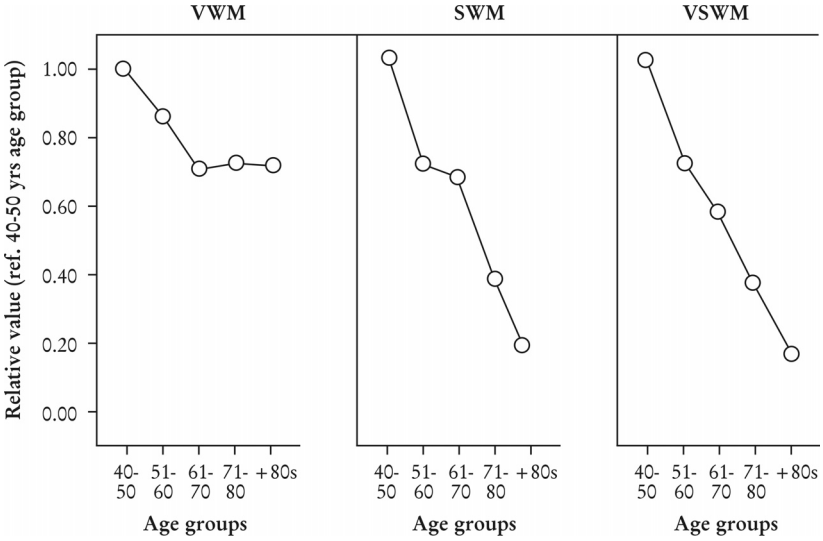

Figure 3 A comparison of visual WM (VWM), spatial WM (SWM) and visuo-spatial VM (VSWM) score across age groups: relative values of WM score with reference to 40-50 years of age group, for visual, spatial and visuo-spatial tasks are shown on Y-axis, whereas age groups are shown on X- axis.

Table 3

Variable Correlation (p- values)

	Visual WM	*Spatial WM*	*Visuo-spatial WM*
Visual WM	1.00 (—)		
Spatial WM	.55 (.06)	1.00 (—)	
Visuo-spatial WM	.65 (.05)	.89 (<.001)**	1.00 (—)

(* p < .001, highly significant)

RM- ANOVA revealed a significant difference between visual and spatial WM scores [F (4, 75) = 32.65, p < .05]; visual and visuo-spatial WM scores [F (4, 75) = 34.43, p < .05]. However, no

significant difference was found between spatial and visuo-spatial WM scores [F (4, 75) = 25.32, p > .05].

Results of MANOVA suggested a significant effect of age group [F (16, 280) = 5.5, p < .01] on dependent measures of WM (Table 4). This suggests that among the five age groups, at least one pair of age groups have produced a significant difference on the WM measures. Hence, the Bonferroni pair wise comparison was performed between all the possible pairs of age groups on each of the WM measures, to find which pair of age groups differ significantly (Table 5).

Table 4

F and p- value of age effect on visual, spatial and visuo-spatial WM tasks.

	Visual WM		*Spatial WM*		*Visuo-spatial WM*	
	F	*P*	*F*	*P*	*F*	*P*
Age group	30.12	< .05*	14.43	< .05*	30.43	< .001**

(* p < .05, significant difference; ** p < .01, highly significant difference)

Table 5

Pairs of age groups having significant differences on visual WM, spatial WM and visuo-spatial WM tasks

Visual WM	*Spatial WM*	*Visuo-spatial WM*
40-50 & 71-80 yr;	40-50 & 71-80 yr;	40-50 & 71-80 yr;
40-50 & 71-80 yr;	40-50 & above 80s;	40-50 & 71-80 yr;
	51-60 & 71-80 yr;	51-60 & 71-80 yr;
	51-60 & above 80s	51-60 & above 80s

Discussion

Using a common metric consistently measured across the 40-to-above 80s years on an interval of a decade basis, the present study have shown like many previous studies, that visual WM, spatial WM and visuo-spatial WM abilities change across the life span. The first aim of the present study was to compare the visual and spatial working memory performances across the adult lifespan. The result of the present study is in concurrence with the previous studies, that both the visual and spatial WM decline as a function of aging (Reuter-Lorenz and Sylvester 2005; Park and Payer 2006; Brockmole and Logie 2013).

These age-related differences might be because of the limited attentional resources of older people, which do not allow them to modulate activation and to efficiently retrieve information, leading to poor control of interfering non-target items (Borella *et al.*, 2009).

Other than this, the present study also brings out a pattern of visual WM and spatial WM. At the age of 40-50 years, participants remembered 7.23 different symbols on an average. Afterwards age of 70 years the capacity decreased up to 5.34 symbols, and 5.23 till above 80 years. Therefore, it can be concluded that, the visual WM capacity drops by a nearly 1/4th from 40- to-70 years of age, and 1/10th from 71-to-above 80s years of age. However, a nearly 1/4th drop in spatial WM capacity was noted between 40-to-60 years, and later on between 61-to-above 80s the drop was nearly 3/4th. In comparison, during 40-to-above 80 years of age, overall visual capacity declined by slightly more than 1/4th, and spatial capacity by more than 3/4th. Indeed, the assumptions that there would be the differential effect of aging on visual WM and spatial WM, matched with the present findings.

Visual and spatial WM systems vary in the information retention of visual images. Similar to the previous observation, the effect of aging was more pronounced on spatial capacity as compared to visual (Brockmole *et al.*, 2008). The visual WM system generates and retain the continuous images of objects presented in visual mode, whereas, spatial domain stores only the location-image of an object (Kosslyn 1990). The different symbols of visual recall tasks, generate varying images, which might remain active in focus of attention of longer duration, as compared to the relatively similar image i.e., dot within square grid, generated from spatial recall tasks. This might be a reason for relatively better performance of visual WM as compared to spatial WM.

Another purpose of the present study was to understand, whether both visual and spatial working memory is equally contributing to visuo-spatial decline or not, after hence visuo-spatial WM was also investigated along with the individual's visual and spatial domain. The novel finding is that the changes in visuo-spatial capacity are similar to the changes observed in spatial domain, across age-groups studied for. The similarity in spatial and visuo-spatial performances might be because of relatively similar images processed by spatial WM

alone and visuo-spatial WM as a whole. Both WM systems generated images of 'symbol within a square grid'. Studies have found that grid arrangement is sensitive to spatial movements (Logie *et al.*,1990). The symbols used in the present study were of the same color, and similar size; varying only in shape. Hence, predominance of relatively similar type of images might affect the focus of attention and image updating procedure, inhibiting no-longer-relevant ones (Cornoldi, *et al.,* 2008 Fiore,*et al*., 2011).

Based on statistical comparison of WM performances across 40-to-above 80 years of age, the age groups could be classified into two sub-groups. First sub-group includes the participants upto 70 years of age (age group: 40-50, 51-60 and 61-70 years), and second sub-group includes above 70 years of age (age group: 71-80 and above 80 years). Significant difference was not observed between age groups of a sub-group. Moreover significant differences were found only between sub-groups (spatial WM, visuo-spatial WM: 40-50 & 71-80 yr; 40-50 & above 80s; 51-60 & 71-80 yr; 51-60 & above 80s. visual WM: 40-50 & 71-80 yr; 40-50 & above 80s) suggest some significant changes in human body around 70 years of age which persist even after decade i.e. after 80 years of age.

Studies reported that dramatic change in cognitive performances around 70 years might be biological and psychosocial in nature. A range of biological scheme including, inflammation of blood-brain barrier; hormone balance; and cerebrovascular system works in synchronization to maintain optimal cognitive abilities (Ryan J *et al.,* 2010; Muller M. *et al*., 2011) . Inflammation of blood-brain barrier starts between 60-70 years of age in healthy individuals stimulating the production of inflammatory proteins, which damage and destroy the existing neurons. Higher level of the proteins leads to persistent steeper decline in memory performance (Schram *et al*., 2008). Studies also reported that imbalance or deficiencies of testosterone and estrogen hormones are negatively associated with cognitive functions (Yaffe K, *et al.,* 2007). In healthy men, the decreasing level of testosterone around 60-70 years of age causes significantly reduced number of synapses in the hippocampus, inturn declines the short-term memory (Mac Lusky *et al.,* 2006). The optimum cerebrovascular health is associated with the high density lipid (HDL) level in the

blood. In the elderly population decrease in HDL in plasma significantly affects the cognitive performances (Ward M.A. *et al*., 2008). Although these biological issues were not considered in this study, which might be considered as limitation of the study. Future studies should carry out incorporating these factors to explore the effect of aging on visual, spatial and visuo-spatial WM performance in better way.

The psychosocial researchers reported that people with social disengagement are prone to cognitive decline (Rook *et al.,* 2008). In India, at the age of 60 years service people get retired from their job. Retirees male participants as well as elderly female participants reported themselves less active now, as staying at home most of the time. Therefore, a social network of friends, and regular participation in social and other productive activities became less frequent them when they were the age of 40s-50s years. Moreover, decline in cognition of people after six-to-seven years of retirement has been reported in recent study (Rennemark and Breglund, 2014). Hence decreasing social involvement started after retirement might be a reason for decline of WM performances around 70 years of age.

In conclusion, our results suggested that, the domain specific decline of visuo-spatial WM is a function of normal aging. Age-related decline is significant in spatial domain, affecting the visuo-spatial WM capacity significantly. Visual WM capacity remains significantly higher than spatial WM. Moreover, both the domains follow a different trajectory of decline across life span, which would help in separating the individual with pathological ageing from normal ageing.

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Survival Strategy of Elderly Headed Households of Rural West Bengal: An SNA Approach

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ABSTRACT

In the course of daily life of rural people, situations often arise when a need is faced by a household which has to be fulfilled immediately even by taking help from others. Households gradually build up social networks among themselves to meet these situations effectively. These social networks are marshaled at household level and play an important role as a kind of survival strategy for the rural people. Several gerontologists have studied on both involuntary and voluntary ties of elderly people from the point of their well-being, (including their mental and physical health). In West Bengal, socio-economic and political/organizational changes have been brought about by redistribution of land through land reforms, increase of wage rate and effective functions of Gram Panchayat, effecting changes in the life opportunities of (as a source for the) rural people in West Bengal. A study on the survival strategy of elderly (= 50 yrs.) headed households in rural West Bengal was conducted applying Social Network Analysis (SNA) approach to

capture the changes. The findings would serve as useful inputs to policy-makers by reckoning the importance of elderly heads of the rural households in social networks found in their survival strategy.

Key words: Social network, Daily living, Strategy of resource mobilization.

The household is basic unit of the society. However it varies across cultural settings in its form and structure. The Indian society has been transformed fast in the last few decades by economic, social and demographic changes that have had large-scale effects on the well being of the family. Rural poverty, shrinking land holdings, mechanization of agriculture, industrialization, large scale migration to the urban areas and rapidly changing ethos have brought major changes in the basic social unit – the household (Gandotra and Jha, 2003). In emergency, rural households invoke potential ties and receive (s) various supports as their survival strategy; these social ties are mostly among neighbours, kins, friends, employers/employees and sometimes money lenders (Choudhuri, *et al.,* 2006; Bandyopadhyay, *et al.,* 2010; Jana and Choudhuri 2013), since they have less access to bank loans (Gandotra and Jha, 2003). The actual process of such survival strategy is (related to) influenced by caste, class of the households as well as age and education of the household heads. The headship of the rural households assumed by both young adults and old adults is not a new phenomenon in India. In the present study, those who are18–49 years, are considered young adults and, as discussed in Minimum Data Set (MDS) Workshop Report (WHO, 2000), those 50 years and older are treated as old adults (elderly). The patterns of social ties in survival strategy of the households headed by elderly persons may differ from that of the households headed by young adults. Keeping this in mind, the present paper applies Social Network Analysis (SNA) approach for studying survival strategy of the elderly-headed rural households in West Bengal in comparison to that of young-adult-headed households and hope this study will provide useful inputs to the policy-makers in the context of decentralization and devolution of planning not only at state level but also at national level.

One of the survival strategies of the rural households is their potential and ability to (get) mobilize and act as a class in order to fulfill their needs or demands. On many issues, particularly the ones which are of collective interest or which require bargaining with those who have power and authority, mobilization as a class plays a key role (as a matter of) in their strategy. Again, in course of their daily life, situations often arise when a household is required to fulfill a need immediately even by taking help from others. In such circumstances they act exclusively as a household or a family unit. They might also interact with (one another as) neighbours, friends, kins, Employers/employees, etc. Thus they gradually build up networks of regular interaction through these ties. We label these networks as social networks. These social networks work at household/family level and play an important role as a kind of strategy for survival of the rural households since a member of such a social network can seek, or even demand, help and support from others in the same network. Such help and support flows in an unnoticed manner, so to say, either directly, pair-wise, or through intermediaries in the network. Thus this process works beneath the surface, keeping a low profile, but steadily, to meet various urgent requirements of daily life and living that one cannot fulfill with one's own resources at hand. Social networks, in this sense, provide an opportunity of resource mobilization by individuals or households from those with whom they have network connections.

In literature one can trace discussions on social networks in various contexts. A few landmarks are: Homans (1950); Moreno (1934, 1956); Moreno *et al.,* (1960); Lazarsfeld and Menzel (1962); Simmel's concepts of dyads and triads in Wolff (1964); Mitchell (1969); Laumann and Pappi (1976); Berkowitz (1982); Burt and Minor (1983). Rao A. *et al.,* (1987) analyze various measures of reciprocity in social networks. The findings show a marked variation in pattern of articulation of ties among the villagers in twenty-one villages studied in West Bengal. In most of the villages reciprocity is only moderate or even quite low. Social mobility, cohesion and inter-group integration in terms of social network has been discussed in Collins (1988). Wellman and others (1991) integrate individual, relational and network data. That

the study of social network can be used to compare effectiveness of different systems of stratification, such as "caste" and "class" in India, in organising reciprocity has been shown by Chatterjee, *et al*., (1993). Wellman (1997) makes a comprehensive chronological review of the major streams of network studies. In the briefing of Social Policy Research Centre (SPRC 2013), it is mentioned that older people's participation in networks is a significant component of their wellbeing and such participation focuses on the survival strategy of the households to which they belong. (As described by) Carr and Moorman (2011) find older adults often relying on members of their social networks for emotional and instrumental (i.e., practical or financial) support, yet they may expect and desire different types of support based on the nature of a particular relationship.

The process of economic reforms was started in 1991 for taking India out of economic difficulty and speeding up the development process. It is now the 2nd fastest growing economy and, according to PPP (Public-private partnership), 4th largest economy of the world. On the other hand, 20 per cent of the rural population lives only on Rs 12 (1/4th of a dollar) per capita a day. It is also well known that the rural society in India is stratified by sharp economic inequality. During the last three decades socio-economic and administrative measures in West Bengal (namely, implementation of land reforms, Patta distribution, minor irrigation schemes, Panchayats, Total Literacy Campaign, minimum wage rate, share cropper registration, etc.) as well as market factors (such as opening of facilities for jobs and small business, mini-entrepreneurial opportunities, construction and improvement of road and transportation communication, etc. providing greater outreach) have impacted significantly upon pattern of articulation of social relation in the villages (Bandyopadhyay and von Eschen, 1980). Specially noteworthy is the articulation and emergence of a new power structure and rise of new centers of power from within the lower rung of the village society (Rao *et al.,* 1998a & 1998b; Bandyopadhyay 2003). Under such conditions, the study investigated the extent to which, in the absence of officially induced socio-economic and administrative measures as above, the informal mechanism of spontaneous social interaction can play an important

role as a strategy for life and living of the rural households with an emphasis on elderly headed households. The study also investigated the pattern of articulation of social relations and emergence of any new structure of power relations in the villages with respect to the basic characteristics of a social network which are relevant for the present study.

Because of socio-economic and administrative measures implemented officially, West Bengal becomes a typical case whereas, left to traditionally continuing mechanism of market-based spontaneity. In a way our findings from rural West Bengal, in this sense, can be more representative in so far as the country as a whole is concerned.

Methodology

Terms and Concepts of Social Network

In most types of standard analysis including surveys, the object of investigation is a unit which may be an individual or a household, etc. Data like income and land holding are collected on each unit. However, this does not take into account the interaction between units. In SNA, the respondent is again an individual or a household but the object of study is which pairs of units interact and how. The analysis of such data calls for an entirely different type of methodology. A discussion of SNA in general may be found in Scott (1991), and Holland and Leinhardt (1979) and a discussion of reciprocity in social networks may be found in Rao (1987).

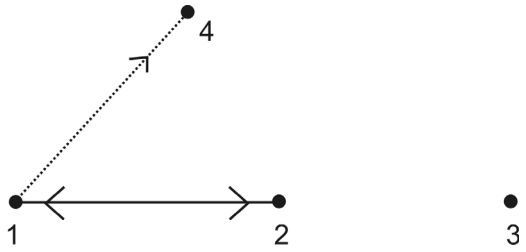
The present study denotes a social network as an articulation of ties of a social relationship among social units such as households/families. The ties are links between the individual household and others in the network. The three elementary parameters of a social network are the *number of units* in it, the total *number of ties* in a network and the *number of reciprocal pairs of units* in it. The number of ties may be further disaggregated as the number of ties going out from a unit (*out-degree*) and the number of ties coming to a unit (*in-degree*). Incidentally, one may note that the total of out-degrees of all the units in a network and the total of all the in-degrees in it will be the same as the total number of ties. The numbers of units and the ties (including

their directions) provide the basic data necessary to study a network in terms of social network theory. Using these social network data some sociologically useful measures can be derived as follows.

Reciprocity is the number of pairs of households which are mutually tied up, standardised with respect to the range between the maximum and the minimum numbers of reciprocal pairs obtainable given the out-degrees of all the households as data (Rao and Bandyopadhyay 1987). It can be taken to be an indicator of *cohesion* among the households. Incidentally, in this case and subsequently, the household is our unit. Concentration of in-degrees provide a measure of *power* whereas out-degrees show the *extent of buffer* against vulnerability to risks, that is, the *potential* to mobilise social resources. As studied by Jana and Choudhuri (2013), a few more parameters relevant for the present study are operationally defined as follows. *Distance* is a measure of closeness (or separation as well) between a pair of households in a social network. It is the minimum number of steps (that is, links of the network) one has to take to reach the other. Distance can be measured in two ways, by considering the direction of a tie, or ignoring it.

Figure 1

A Hypothetical Social Network among Four Units/Actors



Hence, in Figure 1 above, reckoning direction, distance from 1 to 4 is one and 2 to 4 is two since linked through 1 and not directly. But from 4 to 1 or 4 to 2 as well as from 3 to 1 or 2 or 4 is infinity, since 1 and 2 are not reachable from 4 and 1,2,4 not from 3. Ignoring direction, distance from 4 to 1 is one and 4 to 2 is two. *Reachability* is the proportion of ordered pairs of households (i,j) such that j is

reachable from i in one or more steps out of all the pairs that can be formed given the total number of households. It indicates *connectedness* of households in a network. This, again, can be measured differently considering direction of a tie or not. For all practical purposes reachability in 2 or 3 steps is much more meaningful than, say, reachability through 5 or 6 intermediaries (Laumann and Pappi 1976: 104; Mitchell 1969: 14). Besides, it becomes possible to indicate degree of *hierarchisation* and *fragmentation* within the society.

With this introduction to social network theory, it is not intended to study all the aspects of the theory in this paper, but only to investigate how this theory can be applied to capture the survival strategy of the rural households by examining the pattern of articulation of ties among the social units within local communities such as villages, in the (backward) or background/context of socio-economic conditions in the larger societal milieu.

Village Selection for the Study

Since the study setting is (based on) the rural community and study unit is the rural household of West Bengal, a village from West Bengal, was considered for the study. The West Bengal village is Raspur (J.L. No. 174) in Charicha Gram Panchayat under Police Station and Block Md. Bazar. The village was purposively selected for an earlier study in 2006 considering the fact that there had been easy accessibility and scope of easy rapport building.

Data Collection

All the households in the aforesaid village have been enumerated. A complete enumeration of households in the village was done because, otherwise, many of the parameters of social network couldnot be analyzed from a sample (Knoke and Kuklinski, 1988; Wasserman and Faust, 1999; Jana, 2005). In the study, both the quantitative and qualitative methods of obtaining data and analysis have been used. Structural data have been mostly collected by quantitative survey, interviewing respondents with questionnaires. This was supplemented by qualitative data collected from group discussions held in the village, historical narratives told by locally knowledgeable

"aged villagers" and so on. This part of investigation was focused to delineate villagers' perception and evaluation of a phenomenon. Similarly, in addition to conventional tools of analysis of quantitative survey data, methods of qualitative data analysis such as obtaining standardized entropy or index of qualitative variation were applied (Weisberg, 1993).

Analysis of Findings

Location and other Facilities of the Villages

In brief, the study village Raspur is un-irrigated rain-fed, mono-crop agricultural village. The village is far from wholesale markets and hence has less urban exposure. As such, it is an interior village without much road and transport connection with any urban or market center. In this context, it is to be noted that although both agriculture and non-agriculture sectors provide sources of livelihood to the villagers (in the selected village), the latter is particularly the major source in the village (Table 1: Panel C). The summary data regarding the village also show the presence of different categories of Hindu castes and other communities in the village (Appendix A). A broad outline of locational characteristics and socio-economic composition of the village is given in Panel-A, B & C of Table 1.

Table 1

Panel A: Location of the Village

State	*Village Name*	*Total Households*	*Area in Acres*	*Distance from District H.Q. (km)*		*Distance from the Nearest Wholesale Market (km)*	
				By road	*Walking*	*By road*	*Walking*
West Bengal	Raspur	174	575	15	15	8	8

Panel B: Different distances of the village

Distance from (in km)												
Police Station	*RS**	*Block office*	*Bank*	*Bus route*	*CS**	*Post office*	*GP**	*Hospital*	*PHC**	*Collage*	*Primary School*	*High School*
12	15	15	12	3	12	3	6	15	4	15	0	6

Panel C: Summary of socio-economic composition of villages

Principal sector of source of livelihood of a household (% in bracket)			*Distribution of households by caste/community categories in the village (Exact number of sub-castes/communities in a category within brackets)***							
Agri-culture	*Non-agri-culture*	*Total*	*H1*	*H2*	*H3*	*ST*	*M*	*Total*	*% (H1+ H2)*	*% (H3+S T+M)*
101 (58.05)	73 (41.95)	174 (100.00)	1 (1)	44 (4)	56 (3)	64 (3)	9 (1)	174 (12)	25.86 (5)	74.14 (7)

* RS = Railways Station, CS = Co-operative society, GP = Gram Panchayat, PHC = Primary Health Centre

** Traditionally followed ritual categories; Hindu high (H1), middle (H2), low castes including SC (H3), Tribal (ST) and Muslim (M).

Social Stratification of the Village

By Caste Community

For each case of elderly and young headed households as well as the entire village, the households have been distributed into two categories, CCI and CCII according to broadly ascribed status based on the basis of caste – community ranking in the local social milieu. In many instances it is conceptually more meaningful, as it is said, to see the "forest" rather than each "tree" by itself.

In CC-I, there are Hindu High (H1) and Hindu Middle (H2) castes (Appendix A). Incidentally, the Hindu Middle castes occupy most of the land in the village and they enjoy political and social power as well. Thus, they are no less "dominant" than the High – castes. Occupationally, they are engaged in cultivation, business and services. The only social difference between them concerns customs, which, however, are noticeably narrowing down. Our observations during the course of field study indicated that the economic condition of the Hindu High and Middle level castes was, more or less, the same.

In the second category CCII, we include the remaining Hindu Low (H3) castes (i.e., Scheduled Castes), Scheduled Tribes and the Muslims. However, as and where found possible, the category H3 has been treated separately, because the people belonging to the castes in this category happen to be placed socially and culturally on the same plane. Moreover, living condition, occupational pattern and

distribution of land owned are similar. For their livelihood they often depend upon non –agricultural activities, mainly labour of various types.

Table 2

Panel A: Distribution of Households by Caste/Community Categories in the Village (% in first bracket)

Caste/Community Category	*Old Adults*	*Young Adults*	*Entire Village*
H1	1 (2.70)	0 (0.00)	1 (0.58)
H2	7 (18.92)	37 (27.01)	44 (25.29)
H3	15 (40.54)	41 (29.93)	56 (32.18)
ST	11 (29.73)	53 (38.68)	64 (36.78)
Muslim (M)	3 (8.11)	6 (4.38)	9 (5.17)
Total	37 (100.00)	137 (100.00)	174 (100.00)
CC1: H1+H2	8 (21.62)	37 (27.01)	45 (25.86)

*Panel B: Standardized Entropy**

Caste/Community Category	*Old Adults*	*Young Adults*	*Entire Village*
H1 + H2	8 (21.62)	37 (27.01)	45 (25.86)
H3	15 (40.54)	41 (29.93)	56 (32.18)
ST +M	14 (37.84)	59 (43.06)	73 (41.96)
Total	37 (100.00)	137 (100.00)	174 (100.00)
Standardized entropy	0.9694	0.9907	0.9822

St. En. (J) = $-\sum_{i=}^{K} p_i \log(p_i)/\log k$, [0 # J # 1], where k = No. of categories;

p_i = fractional value of the % of the i-th category; logarithm with base 10.

On the whole, Panel B of Table 2 reveals that the village is numerically more predominated by CCII (i.e., Hindu Low, ST and Muslim communities) than by CCI (i.e., Hindu High and Middle castes). If we consider H3 as the mid-point, the distribution is notably flatter/platykurtic.? Thus their social compositions are considerably stratified, only shapes are different. The values of standardized entropy for elderly and young headed households as well as the entire village are 0.9694, 0.9907 and 0.9822 respectively.

Stratification by Source of Livelihood Categories and Ownership of Land

From the standpoint of occupational affiliation, the village shows a significant level of stratification. From Panel-C of Table 1, it is seen that the villagers of the village are mostly dependent on agricultural activities – more than 58 per cent of the households depend upon agriculture, cultivation in particular.

Table 3

Panel A: Distribution of Households by Family Principal Source of Livelihood (SL) in the Village (% in first bracket)

Source of Livelihood	*Old Adults*	*Young Adults*	*Entire Village*
Farmer + cultivator + share cropper (FC)	24 (64.86)	77 (56.20)	101 (58.06)
Profession + Service (PS)	2 (5.41)	2 (1.46)	4 (2.30)
Trade & Small business (TB)	3 (8.10)	17 (12.41)	20 (11.49)
Petty business + Craft & Artisan (PB/CA)	2 (5.41)	5 (3.65)	7 (4.02)
Labourers (L)	4 (10.81)	33 (24.09)	37 (21.26)
Others (O)	2 (5.41)	3 (2.19)	5 (2.87)
Total	37 (100.00)	137 (100.00)	174 (100.00)

Panel B: Standardized Entropy

Source of Livelihood	*Old Adults*	*Young Adults*	*Entire Village*
Farmer + cultivator + share cropper	24 (64.86)	77 (56.20)	101 (58.05)
Profession + Service + Trade & Small business	5 (13.51)	19 (13.87)	24 (13.79)
Petty business + Craft & Artisan + Labourers + Others	8 (21.63)	41 (29.93)	49 (28.16)
Total	37 (100.00)	137 (100.00)	174 100.00)
Standardized entropy	0.5730	0.8728	0.8609

Panel-B of Table 3 shows that elderly and young headed households as well as their combination (i.e., entire village) are steeply stratified with respect to occupational class and the distribution of households across the occupational classes is more polarized in cultivation than others. In West Bengal, agricultural developmental measures of the State Government and land reforms have strengthened the farming activities of particularly the middle and lower rung of the farmers.

The Table 4 (given below) reveals that, in case of ownership of land, there is a significant degree of stratification. However, on the

whole, the distribution of households by land ownership is skewed to some extent.

Table 4

Panel A: Distribution of Households in the Village by Class on Land Ownership (in bigha) (% in bracket)

Landholding in bigha (L)	*Old Adults*	*Young Adults*	*Entire Village*
Nil	2 (5.40)	19 (13.87)	21 (12.07)
0< L #1.5	4 (10.81)	33 (24.09)	37 (21.26)
1.5< L #3.0	11 (29.73)	34 (24.82)	45 (25.86)
3.0< L #7.0	10 (27.03)	43 (31.38)	53 (30.46)
7.0< L #15	7 (18.91)	5 (3.65)	12 (6.90)
15<L	3 (8.12)	3 (2.19)	6 (3.45)
Total	37 (100.00)	137 (100.00)	174 (100.00)

Panel B: Standardized Entropy

Landholding in bigha (L)	*Old Adults*	*Young Adults*	*Entire Village*
L # 3.0	17 (45.94)	86 (62.78)	103 (59.19)
3.0< L #15.0	17 (45.94)	48 (35.03)	65 (37.36)
15.0< L	3 (8.12)	3 (2.19)	6 (3.45)
Total	37 (100.00)	137 (100.00)	174 (100.00)
Standardized entropy	0.8361	0.6766	0.7231

The Table 4.1 (given below) also shows that the distribution of households by Head's education is positively skewed in all cases.

Table 4.1

Panel-A: Distribution of Households in the Village by Class on Head's education (% in bracket)

Head's Education	*Old Adults*	*Young Adults*	*Entire Village*
Illiterate + Literate	24 (64.87)	74 (54.01)	98 (56.32)
Class-I to Class-IV	2 (5.40)	22 (16.06)	24 (13.79)
Class-V to Class-IX	10 (27.03)	31 (22.63)	41 (23.57)
Class-X & above	1 (2.70)	10 (7.30)	11 (6.32)
Total	37 (100.00)	137 (100.00)	174 (100.00)

Panel B: Standardized Entropy

Head's Education	*Old Adults*	*Young Adults*	*Entire Village*
Illiterate + Literate	24 (64.87)	74 (54.01)	98 (56.32)
Class-I to Class-IX	12 (32.43)	53 (38.69)	65 (37.36)
Class-X & above	1 (2.70)	10 (7.30)	11 (6.32)
Total	37 (100.00)	137 (100.00)	174 (100.00)
Standardized entropy	0.6768	0.8114	0.7879

Findings from SNA

Rao and Bandyopadhyay (1987) have studied different measures of reciprocity. It is also available in several studies (Rao, 1987; Jana, *et al.*, 2013) that the s_3-measure with given out-degrees is more suitable for standardizing the observed reciprocal pairs of a social network. Hence, for standardizing the number of reciprocal pairs, we adopt the s_3-measure of reciprocity. Besides, the other measures adopted here have been discussed in detail by several researchers (Jana and Choudhuri, 2013). Now we discuss the network analysis by giving summary measures of the relevant characteristics of the social networks of the village as in Table 5 given below.

It is already mentioned that, as per selection scheme, the village in West Bengal is far from town. Data in Table 5 are described now. The interaction among the people inside the village is greater (more than 59%) than the people outside the village. It indicates that the people of the village have less tendency to establish connection/be connected to their outer world. Within the village boundary, ties from elderly headed households to young headed households are more than ties among the elderly headed households, whereas ties among the young headed households are larger than ties originating from young-headed households to elderly-headed households. It indicates that the elderly headed households depend more on young headed households and young headed households depend more among themselves. Ties within a village flow within the castes more than between the castes. It shows that caste-based interaction for getting help is preferred in the village. But the picture is reverse in case of articulation of ties going to outside village(s) in case of elderly headed households and entire village and the picture is about 50:50 in case of young adult headed

households. This indicates that when people transact with those outside the village, they get more help from other castes than from their own.

Table 5

Summary Measures of the Social Networks of the Village

Measure	*Old Adults*	*Young Adults*	*Entire Village*
No. of hhs. (n)	37	137	174
No. of ties inside vill. (T1)	53	247	300
No. of ties outside vill. (T2)	36	122	158
Total no. of ties (inside+outside) (T)	89	369	458
Ties inside vill. (=T1/T) in %	59.55	66.94	65.50
Ties outside vill. (T2/T) in %	40.45	33.06	34.50
Ties (Aw) within old/young (=Aw/T1) in %	16.98	72.06	62.33
Ties (Ab) between old?young/young?old (Ab/T1) in %	83.02	27.94	37.67
Ties (Iw) within caste inside vill. (=Iw/T1) in %	60.38	65.18	64.33
Ties (Ib) between castes inside vill. (=Ib/T1) in %	39.62	34.82	35.67
Ties (Uw) within caste outside vill. (=Uw/T2) in %	33.33	50.82	46.84
Ties (Ub) between castes outside vill. (=Ub/T2) in %	66.67	49.18	53.16
Ties (Jw) within caste inside & outside vill. (=Jw/T) in %	49.44	60.43	58.30
Ties (Jb) between castes inside & outside vill. (=Jb/T) in %	50.56	39.57	41.70
Average out-degree: Inside village	1.43	1.80	1.72
Outside village	0.97	0.89	0.91
Total (inside + outside)	2.41	2.69	2.63
No. of reciprocal pair	0	8	10
s3- measure of Reciprocity (in %)	0.00	8.99	6.67
No. of isolates within old/young in %	64.86	10.22	-
No. of isolates inside vill. (within old/young+ between old?young/young?old) in %	2.70	0.00	4.02
No. of isolates. (inside vill. + outside vill.) in %	2.70	0.00	0.57
Percentage of reach. Pairs (dir.)	3.51	3.30	4.34
No. of strong components (p)	37	124	159
Size of largest strong comp.	1	4	4
Average finite distance (dir)	0.27	1.62	2.37
Maximum finite distance (dir)	2	6	9
Percentage of reach. Pairs (undir.)	5.62	69.47	92.14
No. of weak components (q)	28	18	8

Cont'd...

Cont'd...

Size of largest weak comp.	6	114	167
Average finite distance (undir)	0.99	4.85	4.33
Maximum finite distance (undir)	4	13	11
Connectedness (dir.): strong [(n-p)/(n–1)] in %	0.00	9.56	8.67
Connectedness (undir.): weak [(n-q)/(n–1)] in %	25.00	87.50	95.95

The details of relevant mathematical exercises are in Appendix-B as described by Jana and Choudhuri (2013).

Again, when we go through the distribution of inside village ties across the classes/groups by family's main source of livelihood or land ownership or Head's education, an almost opposite picture is observed (Table 6) as compared to the distribution of within village ties regarding within-between castes (Table 5). That is, it is greater between the classes/groups than within class/group. It indicates that people of the village depend more on the people belonging to other classes/groups. Different groups are endowed possibly with varying resources to draw from.

Table 6

Percentage Distribution of Inside Village Ties of Help by Class in the Village

Class/Group	*Old Adults*	*Young Adults*	*Entire Village*
Panel A: Class by source of livelihood			
Within class	43.40	48.12	47.33
Between classes	56.60	51.82	52.67
Total	100.00 (T1=53)	100.00 (T1=247)	100.00 (T1=300)
Panel B: Class by Land Ownership			
Within class	18.87	21.05	20.67
Between classes	81.13	78.95	79.33
Total	100.00 (T1=53)	100.00 (T1=247)	100.00 (T1=300)
Panel C: Group by Head's education			
Within group	37.74	34.01	34.67
Between groups	62.26	65.99	65.33
Total	100.00 (T1=53)	100.00 (T1=247)	100.00 (T1=300)

The average out-degree indicating individual expansiveness or the percentage of isolation reflecting the self-dependence of households is not high throughout the village. But, isolation among the elderly headed households is high (64.86%). The measure (s_3) of reciprocity illuminating the solidarity/cohesiveness among the households is not also high in all cases. Even reachability (i.e. possibility of a household approaching another, either directly or indirectly through intermediaries for getting help) is not high. If we ignore directions (i.e. if we assume that A can go to B and B can go to A whenever at least one of them goes to the other), reachability (becomes) increases tremendously to 69.47 per cent and 92.14 per cent in case of young headed households and entire village respectively, whereas in case of elderly headed households it is not high. It shows that connectedness (when direction is ignored) representing the intensity of becoming tied up with each other among young adult headed households is higher than elderly headed households and it is also reflected in the values of the measures of weakly connectedness. In this context, the articulation of the ties across the elderly, young headed households and entire village as mentioned earlier is presented separately in Appendix A.

Now, to make an in-depth analysis, we concentrate data pertaining to: to whom (i.e. relation) people go for help; the amount/quantity and type of help sought; and what purposes served by help received.

From whom help was sought

Table 7

Percentage Distribution of Ties by Sources of help in the Village

Sources of Help	*Old Adults*	*Young Adults*	*Entire Village*
	Panel A: On Inside Village Ties		
Kin	16.98	19.03	18.67
Neighbour	67.92	71.25	70.67
Friend	11.32	4.86	6.00
Employer-Employee	1.89	2.43	2.33
Others	1.89	2.43	2.33
Total	100.00 (T1=53)	100.00 (T1=247)	100.00 (T1=300)

Panel B: On outside village ties			
Kin	13.89	21.31	19.62
Neighbour	69.44	60.65	62.66
Friend	8.33	9.02	8.86
Employer-Employee	2.78	4.92	4.43
Others	5.56	4.10	4.43
Total	100.00 (T2=36)	100.00 (T2=122)	100.00 (T2=158)

Sources to which requests for help at different times of emergency were made and received by the villagers, were gathered and classified. This is shown in Table 7. It is clearly understood from the Table 7 (given above) that non-formal help from kin, neighbours, employers, etc., are much in abundance in village society under our study. However, among inside village ties, the neighbours give the lion's share of informal support, even in case of outside village ties. It is known from the group discussion that the outside village people, with whom the people of the study village interact as neighbours for getting help, reside in the boarder line of the boundary of the study village.

Amount/Quantity and Type of Help Sought

We have classified the requests for help by its type, as financial, material, and physical (man-power, advice, etc.) in Table 8 (given below). It is obvious from this Table that non-formal ties extending material exchange are higher than those providing monetary aid in all categories, i.e., across the old adult and young adult headed households as well as the entire village. But non-formal advice or man-power help is almost nil in all cases.

Table 8

Distribution of Ties (Inside + Outside Vill.) by tyPes ("at all") of Help in the Village (% in bracket)

Type of help	*Old Adults*	*Young Adults*	*Entire Village*
Financial	28 (31.46)	128 (34.69)	156 (34.06)
Material	61 (68.54)	244 (66.12)	305 (66.59)
Physical	0 (0.00)	4 (1.08)	4 (0.87)
Total	100.00 (T=89))	100.00 (T=369)	100.00 (T=458)

The distribution of the monetary ties according to the total amount (in rupees in a whole year) is furnished in Table 9 (given below). In case of young adult headed households, these are marginally more (34.69%) than in old adult headed households (31.46%). In this context, we mention here that the monetary help is not necessarily a loan, because it is, in most cases, without interest and the borrower generally repays at his convenience. The group discussions among the people of the village brought out possible reasons behind such difference of monetary help between two groups of households. Cash income of young adult headed households generated from out-migration of other members to non-agricultural jobs is more than elderly headed households. Again if we look at help in kind received in the form of food (mainly rice) in Table 9 (given below), a reverse picture between the old adult headed and young adult headed households (68.54% and 65.31% respectively) is observed. Due to comparatively less land ownership of large size by young adult households (Table 4), such requests become low.

Table 9

Percentage Distribution of Ties (inside + outside vill.) of help on cash and kind in the village

Cash in Rs (C)/Kind in Kg. (K)	*Old Adults*	*Young Adults*	*Entire Village*
	Panel A: Cash (in Rs)		
0 (noncash)	68.54	65.31	65.94
0 < C #100	4.49	6.23	5.89
100 < C #250	7.87	7.05	7.20
250 < C #500	10.11	11.38	11.14
500 < C #1000	7.87	4.61	5.24
C > 1000	1.12	5.42	4.59
Total	100.00 (T = 89)	100.00 (T = 369)	100.00 (T = 458)
	Panel B: Kind (in Kg)		
0 (non-kind)	31.46	34.69	34.06
0 < K #20	44.95	43.90	44.10
20 < K #60	4.49	8.67	7.86
60 < K #200	8.99	8.13	8.30
200 < K #500	6.74	3.25	3.93
K > 500	3.37	1.36	1.75
Total	100.00 (T = 89)	100.00 (T = 369)	100.00 (T = 458)

Purpose of help

The Table 10 (given below) shows that the purpose of help in case of elderly headed households poses a little level of difference with that of the young adult headed households. Medical facilities are not poorly shaped for both the cases. At the same time, the villagers belonging to young adult headed households spend lavishly in order to perform their rites in a pompous way. The households headed by old adults make more requests for getting help related to production/agriculture than young adult headed households. However, such ties are generated for their maintenance of "sudden" consumption needs for social reasons. Therefore, help becomes very much essential there.

Table 10

Distribution of Ties (insIde + outSide Vill.) by Purposes ("at all") of Help in the Village (% in bracket)

Purposes of help Served	*Old Adults*	*Young Adults*	*Entire Village*
Survival	24.72	33.87	32.10
Medical	3.37	5.15	4.80
Family rites	8.99	18.97	17.03
Family crisis and household requirements	29.21	24.66	25.55
Production	31.46	17.61	20.31
Others	3.37	0.05	1.09
Total	100.00 (T = 89)	100.00 (T = 369)	100.00 (n1 = 458)

Conclusion and Suggestion

In village life of West Bengal, usual structural-functional categories come out rather as residuals. The concept of social group, rather, appears to be more appropriate unit for understanding social structure. In rural West Bengal, presently the prime issue is of reducing the level of unevenness/disparity in development, i.e., some villages have moved far ahead leaving other ones lagging behind. Implementation of land reforms and the Panchayat Raj have been instrumental in shifting the political and social power to the down-to-the soil villagers, and consequently the villagers are coping up with the problems of their life and living by getting themselves identified as a

social class or group, that is, by developing and sharing a sense of oneness. This has brought about a noticeable qualitative difference in socio-economic base of network support among the villagers in Birbhum. It comes out from our study that the savings of the villagers in West Bengal, which are generated internally, are being invested inside the rural areas in both agricultural and non-agricultural sectors, ensuring thereby a sort of recycling of the internal resources in the state. Under the circumstances, as a way of conclusion, we would discuss about different aspects on the basis of SN data (what the authors have) presented in various ways.

In the study village, the ties (both inside and outside) have been developed more among the members of neighbours, friends, employer-employee and others than the same kin group. The impact of the pattern of land ownership, principal sources of livelihood and Head's education on the articulation of social ties is, to some extent, different from each other in all cases of elderly headed and young adult headed households as well as the entire village. It is more vividly observed in cases of pattern of land ownership and Head's education than principal sources of livelihood in all cases. In village, mostly non-kin group based social networks have been developed owing to social compulsion in the direction of strengthening a social safeguard or insurance on the part of weaker sections of the village against the manifold sources of vulnerabilities in life and living, particularly aggression and exploitation by land owning caste groups, in a situation where there are socially and politically effective structural remedies to ameliorate the condition of their life and living whatever the cases of old adult and young adult headed households may be. In fact, this raises the level of social depth of social network analysis to a higher dimension. In fact, unlike structure-function based methodology of a study, SNA does not begin with any apriority given boundary. Being able to empirically identify its boundary, the parameters of social networks remain quite amenable to respond to the variations in social reality. The focus group discussion (FGD) in the village supports mostly the above findings. In addition, the FGD also says that there are many schemes offered by public sector (like banks) for upliftment of rural households. But, on account of greater illiteracy and less

awareness in case of old adult heads than the young adult heads, the former (s) are not able to take considerable advantage of these schemes. It indicates that the support structure and the survival strategies adopted by old adult heads are not (much rich) effective because they depend on others and lack their own social resources. Due to their old age, they are also ignorant about the sources from which they can get help. They lack necessary competence for the task.

On the basis of the study, it is suggested that in the planning and decentralization process, some mechanism needs to be developed to provide some sort of institutionalized avenues for help which should be available without much botheration and at short notice with special emphasis on old adult heads regarding a few effective schemes like adult literacy programme, awareness campaign progamme and so on. In this regard, Panchayat and/or other Local Body can perhaps play an important role to some extent. Last but not the least, it is expected that as an initial attempt, the SNA methods of the present study hold great promise for future exploration, and the implications of the findings from the study have relevance for social policy.

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Appendix A

Caste/communities distribution of the village

Ritual status Category	*Caste/community*	*Village Raspur*
(1)	(2)	(8)
Hindu High Castes (H1) **	Rajput	1
	Total	1
Hindu Middle Castes (H2)	Lohar	13
	Gowala	13
	Baishnab	3
	Sadgop	15
	Total	44
Hindu Low including Scheduled Castes (H3)	Bhuia	10
	Hanri	7
	Sunri	39
	Total	56
Scheduled Tribe (ST)	Santhal	16
	Orang	44
	Kora	4
	Total	64
Community	Muslim (M)	9
Village total		174

Appendix – B

Mathematical representation of various characteristics of social network

The social network under the present study is a one-mode (actors from the same set), directional (relation from actor to another) and dichotomous (relation from actor to another exists or not) of n actors, i.e. a simple social network (SSN). This can be represented by a N x N square 0–1 matrix $X = ((X_{ij}))$ with 'structurally zero' diagonals, where

X_{ij} = 1 if i has relation to j

= 0 if not.

Reachability matrix:

$R^T = X + X^2 + X^3 + \ldots + X^p$

Where

$R^T = ((r_{ij}))$ is called reachability matrix and r_{ij} counts the total no. of walks of length p or less.

Distance matrix:

$D^P = X + X^{2\hat{}} + X^{3\hat{}} + ... + X^{P\hat{}}$

$D^P = ((d_{ij}))$ is called distance matrix and dij gives the length of the shortest path linking i & j.

$X^{P\hat{}} = X^P$ in which all non-zero elements are set equal to p except for those elements that have been replaced by zero because they were non-zero in matrix X raised to some power less than p.

The longest path distance in a network will equal to p when X^{P+1} has no zero elements in lower power of the matrix.

The out-degree (d_i) of the i-th actor, indegree (e_j) of the j-th actor, total ties (m) of the network and total reciprocal pairs (s) of the network are respectively given below.

$$d_i = \sum_{j=1}^{n} X_{ij} = X_{i+} = \text{i-th row sum of the matix};$$

$$e_j = \sum_{i=1}^{n} X_{ij} = X_{+j} = \text{j-th column sum of the matrix}$$

$$m = \sum_{i=1}^{n}\sum_{j=1}^{n} X_{ij} = X_{++} = \text{grand total; and}$$

$$s = \sum_{i<j} \sum X_{ij}X_{ji} = \text{no. of reciprocal pairs}.$$

Different measures:

Suppose,

n = no. of hhs in the village

m = no. of ties within the village

p = no. of strong components (*strong component* is a set of actors in a digraph, who are tied each other directly or indirectly)

q = no. of weak components (weak component is a set of actors in a undirected graph, who are tied each other directly or indirectly)

→ **Indices for**

— Density (within village ties) = 100m/n(n–1);

— Strong connectedness = 100(n-p)/(n–1);

— Weak connectedness = 100(n-q)/(n–1);

— Strong fragmentation = 100(p–1)/(n–1);

— Weak fragmentation = 100(q–1)/(n–1);

— Hierarchy = 100(p-q)/(n–1).

→ **Measure of reciprocity**

Suppose,

s_0 = observed no. of reciprocal pairs in a given social network,

s_{min} = minimum value of s under a model on certain given conditions,

s_{max} = maximum value of s under a model on certain given conditions,

Then, as Rao and Bandyopadhyay (1987), the deterministic/graph-theoretic standardized measure under the condition when out-degrees are given is as follows:

$s_3 = [(s_0 - s_{min})/(s_{max} - s_{min})] \times 100$

As suggested by Rao and Bandyopadhyay (1987) from the sense of practical utility, the approximate expression of s_3 to be used for the present study is given below:

$S_3 \approx 200 \times s_o/(\Sigma d_i - \delta)$, where * is 0 or 1 according as Σd_i is even or odd.

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The Socio-economic Conditions of the Rural Elderly in Bangladesh: A Sociological Analysis

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ABSTRACT

The present study, based on empirical findings from the four villages of Gopalnagar union of Dhunat upazila of Bogra district of Bangladesh, has mainly explored the socio-economic conditions of the elderly in rural Bangladesh. 203 elderly (age varying from 60 years to 90 years) of both the sexes (M=96 and F=107) were selected randomly. Mixed approach, which included survey, observation, case study and life history methods and focus group discussion technique, was used in data collection. Data from secondary sources was also collected. The findings of the study revealed that the socio-economic conditions of the rural elderly was not satisfactory in the areas of study. That is, about 75 per cent male elderly and 79.4 per cent female elderly still have no formal education. About 80.8 per cent elderly earn below 2,000 taka in a month. Nearly 15.8 per cent elderly are still homestead and 41.9 per cent cultivable landless. About 64 per cent elderly are leading their life without sanitary latrine and 72.4 per cent of them are taking bath without bathroom. The findings of the study may be useful for both academicians and policy makers in making strategies for tackling seriously the problems of elderly and form a policy framework to the welfare of them with a view to making the socio-economic conditions of the rural elderly in Bangladesh in a better shape.

Key Words*:* Socio-Economic-Conditions, Rural elderly, Living conditions, Bangladesh

Demographically, population ageing is a global phenomenon and Bangladesh is also not left untouched by this demographic reality (Rahman, 2010). Demographers are almost unanimous that until the year 1961, both the birth and death rates were high. With the result that the proportion of aged population was at a low level. But at present the number of elderly population is increasing rapidly. In Bangladesh, the percentage of elderly population is about 8.56 (BBS, 2008). In 2025, it will be about 9 per cent and in 2050 it will be about 17 per cent. Bangladesh is one of the most densely populated countries (966 persons per sq. km in 2007) in the world and has started to experience another emerging issue of population ageing. The population of aged is highly vulnerable population. The trend of increasing percentage of elderly stated above is shown in a table:

Table 1
The Percentage of Elderly (1951–2025)

Year	*1951*	*1961*	*1974*	*1981*	*1991*	*2001*	*2007*	*2012*	*2025*	*2035*	*2050*
Per cent	4.4	5.2	5.7	5.5	5.4	6.2.	6.6	8.56	9.9	11.9	17.0

Source: (BBS 2011, 2008, Help Age International 2006).

Bangladesh right now has the third largest number of old people after India and China and it is also a frightening problem in the rural areas (Help Age International, 2006). About 77 per cent aged people are living in rural areas in Bangladesh (Islam, 2005).

From the literature it is evident that the elderly in the past contributed a lot for the betterment of family, society and country by their stock knowledge, experience, wisdom and activities. They were also treated as the important guardians, mediators and members of the family and society. Now they are considered as the threat to national income, source of increasing dependency, creator of generation gap and social problems. Moreover, they are, according to Burgess (1960), thrusting into a state of social inactivity that may be termed as role less role. The elderly even in our own society observe in their everyday life that the society focuses, advertises, and welcomes the young rather

than the old. So they feel that society is just for the young generation. They think that they have no option but to be treated in many cases as an unattractive, unproductive, unintelligent, unemployable and less important social group. Family is still the primary source of care for the elderly in our country. In the traditional joint family system, elderly people enjoyed respectable and honorable life. But, the scenario today is almost totally different. The process of becoming old is taking place at a time when the family pattern is breaking down due to urbanization, migration, economic hardship, declining social values, self-interest, quarrels, maladjustment, etc. This changing situation and impact of other disadvantageous socio-economic conditions are creating problems and unhappiness for many elderly people, especially for the poor families. Hence, it is an urgent need to explore the socio-economic condition of the rural elderly in Bangladesh.

Objectives of the Study: The objective of this study was to assess the socio-economic conditions of the rural elderly in Bangladesh.

Method

Sample

In this study, four villages (namely-Konagaty, Sholiabari, Razarampur and Ariamohan) of Gopalnagar union from Dhunat upazila of Bogra district were selected randomly. The socio-economic, cultural and demographic features of these villages are almost the same.

Only 203 respondents (Male=96 and female=107) out of total 609 elderly persons were randomly chosen as the sample of this study.

Tools Used in the Study

In this study qualitative and quantitative research approaches were adopted. A questionnaire was administered individually to all the respondents. Observation, focus group discussion, case study, life history were also used simultaneously.

The researcher belongs to this region. and therefore it is more convenient for him to collect data. The researcher had visited the villages several times before the fieldwork. During those visits he met the inhabitants of the area and discussed their issues with them and

also convinced them about the purpose of the study. They shared their problems whole heartedly with him.

It the time of data collections some respondents were hesitant. Most probably they thought that if they share real picture about their family it might compromise their future existence and care from the family. Utmost care was taken especially when the problem arose at time of data collection. The researcher solved the issues tactfully. Ethical issues were also maintained by the researcher during the collection of data.

Findings and Discussion

The number of the elderly is increasing in Bangladesh rapidly. The socio-economic condition of the elderly in the rural areas is also changing at high speed. That is, they are living longer. Their occupations, marital status, type of family structure, ownership of land, house, income, expenditure, etc., are becoming very complex. The researcher, during the discussion with the respondents, observed that the consequences of social, physical and economic dependency of the elderly upon the family members have become increasingly a challenge for the elderly and family as well. The burden of caring for the older people has traditionally been carried by the family, especially when the elderly are ill, incapacitated, or financially dependent. Unfortunately, the breakdown of the joint family, decline of socio-cultural and religious values (due to industrialization, urbanization and westernization), widespread poverty, media revolution and generation gap alienated them from the mainstream of the society. Besides, the socio-economic condition of Bangladesh has dual nature. In the rural areas, normally, the elderly do not retire formally. Rather they are engaged in various domestic and socio-economic activities. Maximum people in the study area were still engaged in agricultural and housewifery activities. The level of education is low among the people let alone higher education. Religious heterogeneity is absent in the study area, that is, all the people in these areas are Muslims. So, the marital condition and dimension are also homogeneous. The people in these areas still do not enjoy electricity facilities and media coverage largely. The traditional features of rural society are traceable here. Both cultivable and homestead land plays an important role for

playing their individual role and enjoying status. Surely, education, occupation, income, pattern of housing, land property stratified the people of society into different categories. In maximum cases, social structure determines the division of labour on the basis of sex in the research area. Housing facilities are essential for all the elderly though in a developed country it is still the government responsibilities to ensure housing facilities. In the research areas it is observed that this situation is not satisfactory, that is, they are to share their rooms with their son's children and daughters. So, this paper has made an attempt to describe the socio-economic conditions of the elderly in the research area.

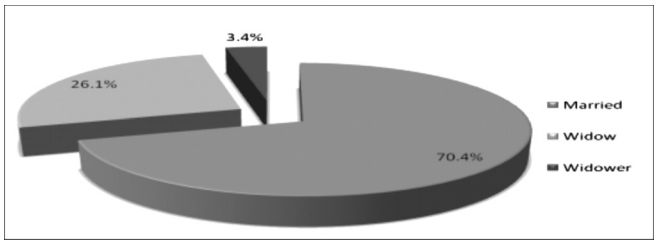
Table 2
Age of the Elderly

Age Categories	*Frequency of the Respondents (Male)*	*%*	*Frequency of the Respondents (Female)*	*%*	*Total Number of the Respondents*	*%*
60–65	46	22.7	72	35.5	118	58.1
65 – 70	15	7.4	14	6.9	29	14.3
70 – 75	24	11.8	11	5.4	35	17.2
75 – 80	5	2.4	3	1.5	8	3.9
80 – 85	3	1.5	4	1.9	7	3.4
85 – 90	3	1.5	3	1.5	6	3.0
Total	96	47.3	107	52.7	203	100.0

The age categories of the respondents show that (60–75) represents the highest concentration of elderly considering age while (80 and above that is old-old) are the lowest. People in this age cohort are less active, very old, normally dependent, disabled and lack physical and mental strength. The interesting fact is that the female elderly are higher in the age group (60–65) than the male one. After all, the percentage of young old is highest in the population structure in the research area.

The table above indicates that among the total elderly the percentage of male elderly is 47.3 whereas the female elderly is 52.7. So, it is easily understandable from the table that the percentage of female is higher than the male elderly in the study area.

Figure 1
Marital Status of the Elderly



Marriage is an important event for our social life. It is also mentionable that arranged marriage is still dominant in these villages. Considering marital status of the elderly it can be said that all the respondents were married. Among them, 70.4 per cent respondents were living with their spouses whereas 26.1 per cent were widowed and 3.4 per cent were widower. In our society, the status of widower is much better than that of widow especially in rural areas. Here, widowhood is a social problem; because, men can remarry after the death of their wives but widows do not have same privilege. For this reason, this problem is very acute among elderly women. In this study it was found that a significant number of the elderly are living with their spouses. That is, 70.4 per cent elderly still enjoy their conjugal life as their spouses are still alive.

Table 3
Level of Education of the Elderly

Level of Education	*Frequency of Male*	*%*	*Frequency of Female*	*%*	*Total*	*%*
Nil	72	35.5	85	41.8	157	77.3
Signature ability	12	5.9	13	6.5	25	12.3
Primary	5	2.5	6	2.9	11	5.4
Secondary	5	2.5	3	1.5	8	4.0
Higher secondary	1	0.5	0	0	1	0.5
Graduate	1	0.5	0	0	1	0.5
Total	96	47.4	107	52.6	203	100.0

From the table it is easily understood that maximum number of (157; 77.3%) elderly are illiterate. Only 35.5 per cent male and 41.8 per cent female could acquire the ability of sign as it is necessary for some purposes. Only 5.9 per cent elderly males and 6.5 per cent elderly

females can write their names and have no formal education. Again, the ratio of higher education is very poor and limited among them. About 4.0 per cent crossed the level of secondary examination and 0.5 per cent merely passed higher secondary examination. Only 0.5 per cent has crossed the level of graduation among the elderly.

Table 4
Occupational Status of the Elderly on Basis of Sex

Occupation	*Sex*				*Total*	*%*
	Male	*%*	*Female*	*%*		
Agriculture	86	42.4	16	7.9	102	50.2
Business	6	3.0	3	1.5	9	4.4
House Wife	-	-	55	27.1	55	27.1
Others	4	2.0	33	16.3	37	18.2
Total	96	47.3	107	52.7	203	100.0

The above table clearly indicates that 42.4 per cent male elderly are engaged in agricultural activities whereas the percentage of female in this case is 7.9 per cent. Though, women in Neolithic age invented agriculture, it is clear that their participation in this sector is lower than male elderly. In maximum cases, our social structure determines the division of labor on the basis of sex in our society. About 3.0 per cent male elderly engaged in business activities and the percentage of female in this sector is 1.5. The table also focuses that women have highest engagement in housewifery activities. It is also mentionable here that the women who are related to business, agriculture and other activities are also involved in housewifery activities.

Table 5
Monthly Income of the Elderly

Monthly Income	*Frequency*	*Per cent*
0,000–2,000	164	80.8
2,000–4,000	23	11.3
4,000–6,000	10	4.9
6,000–8,000	3	1.5
8,000–10,000	1	0.5
10,000–12,000	1	0.5
12,000–14,000	1	0.5
Total	203	100.0

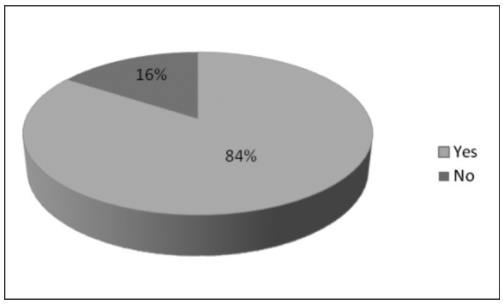
The table indicates that monthly income of the elderly is below 2,000 taka. About 80.8 per cent of the elderly face this situation. Nearly 11.3 per cent elderly are in the 2,000–4,000 taka income level. Approximately 4.9 per cent elderly earn 4,000–6,000 taka in a month but their number is very few.

Table 6
Monthly Expenditure of the Elderly

Monthly Expenditure	*Frequency*	*Per cent*
0,000–2,000	188	92.6
2,000–4,000	9	4.4
4,000–6,000	1	.5
6,000–8,000	3	1.5
8,000–10,000	2	1.0
Total	203	100.0

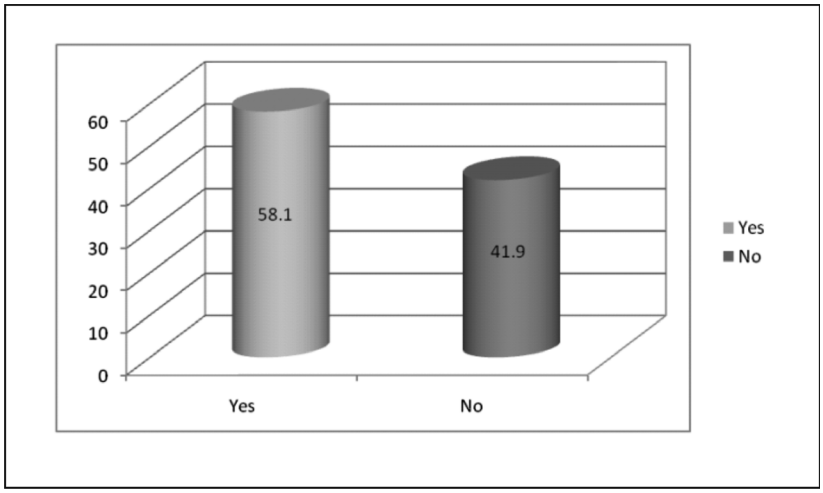
It appears from the data in the table that monthly expenditure of the elderly is below the 2,000 taka. More than ninety per cent of the elderly face this situation. It may seem to us that they are capable of spending their life. The fact is quite different because they have to spend a small amount of money for not having too much that can meet up their demand. So, maximum of them live from hand to mouth. For this reason they depend on government relief program and people's help. Households of a rural society consider their income as family secret and they do not want to disclose it, estimation of income, convert income in monetary terms, fluctuation of prices in different seasons are the problems for calculating monthly expenditure also.

Figure 2
Ownership of Homestead Land



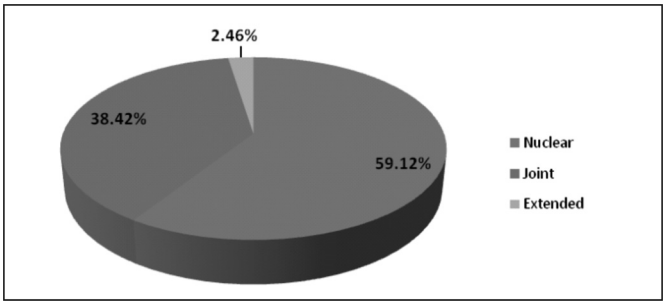
The Figure 2 shows that 84.2 per cent elderly has homestead land. On the other hand, 15.8 per cent elderly is still homestead landless. Todaro (1981) identifies three values of development: (i) Life sustenance: the ability to provide basic needs, (ii) Self esteem: to be a person; (iii) Freedom from servitude: to be able to choose. So, the elderly also have self esteem and want freedom from servitude.

Figure 3
Ownership of Cultivable Land



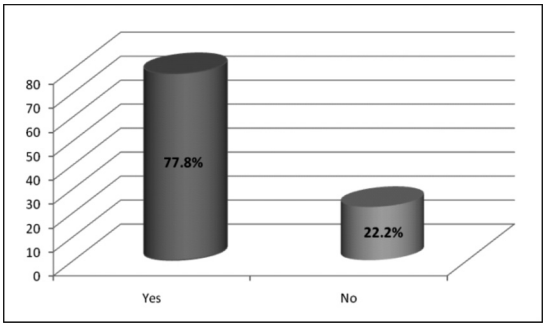
The table shows that 58.1 per cent elderly have cultivable land; on the other hand, those who have no cultivable land of their own are 41.9. Land is one of the indicators of enjoying role and status. It is also found that some elderly take others' land on sharecropping or on lease basis in some seasons as they have limited amount of cultivable land. A significant number of the elderly are not able to enjoy this facility due to lack of sufficient cultivable land. In peasant society, the socio-economic position of a person depends on land ownership. How much land people own determines the position of people in the society.

Figure 4
Type of Family



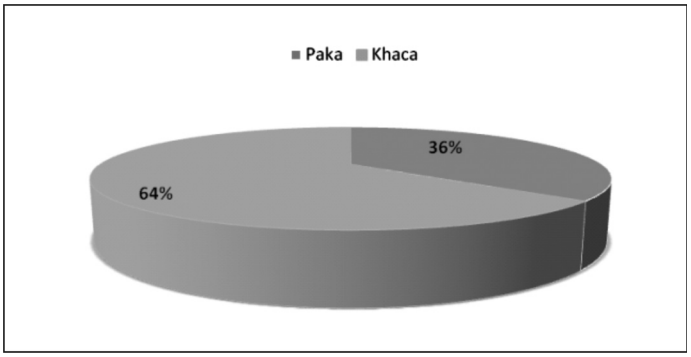
The table shows that more than half of the elderly live in nuclear family, that is, about 59.12 per cent elderly live in nuclear family. Nuclear family consists of husband, wife and off spring living independent families of orientation to the demand of occupational or geographical mobility. Many nuclear families are found consisting of the elderly with their unmarried offspring where the eldest son, though living in another place and living in another nuclear family helps to his parents financially. So, the function of nuclear family in Bangladesh is different from western one. On the other hand 38.42 per cent elderly still live in joint family. The percentage of extended family is very low no doubt because, the percentage of joint and extended family is decreasing due to increasing urbanization, influence of education, impact of industrialization, change in marriage system, influence of western values, awareness among women, etc.

Figure 5
Separate Room for the Elderly



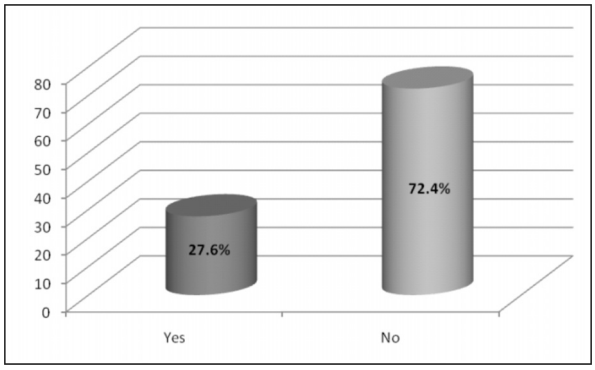
It is evident from the data in the above table that about 77.8 per cent elderly have separate rooms. On the other hand 22.2 per cent replied that they do not have any separate rooms at all. That is, they are to share their rooms with their son's children. Through FGD, it has been identified that the elderly feel that they cannot maintain privacy in conducting their conjugal relations due to this problem.

Figure 6
Type of Toilet of the Elderly



The information in this table shows that about 64 per cent elderly are living without sanitary latrine. Only 36 per cent elderly have sanitary latrines. In our rural area, the opportunity of using sanitary latrines did not actualize properly. So, it is a dreadful scenario of our society.

Figure 7
Bathroom Facilities of the Elderly



Most of the elderly females have bathroom facilities within the house whereas more elderly males have the facility outside the house. This implies that rural males prefer to go out for bathing, as the fields are open and irrigation tube wells available. But this causes various water born diseases to them. The table also shows that about 72.4 per cent elderly take bath without bathroom. They are to take bath in ponds, canals and rivers. At the time of conducting FGD questions asked to the elderly as to why they take bath outside home. They replied that they feel easy and comfortable in taking bath outside bathroom.

Observations Based on FGD

At time of conducting focus group discussion some needs of the elderly were identified by the researcher These needs were: economic stability, better living condition, recreational facilities, sanitation facilities, etc. Among these needs they mentioned that economic crisis is their main constraint to the enjoyment of their better socio-economic condition. So, something should be done for them so that they can enjoy better socio-economic conditions.

Bangladesh government has some social security programmes for the elderly. But these programmes are insufficient and limited in terms of resource capacity, lack of monitoring, transparency and are full of nepotism at the level of implementation. The facilities related to social securities of elderly should be increased and government should ensure that all the deserving elderly are benefited.

It is necessary to develop more income generation projects for the elderly in rural areas of Bangladesh so that the elderly can be self sufficient and economically active. If they are able to do this, it will be easy for them to play role and enjoy status in the family and society successfully.

For the measures of the ageing problem, the non-government organization should take some voluntary programmes for the destitute, low or no income, displaced or disabled elderly groups. They should take necessary programmes for improving the quality of life, income generating steps; create recreation centre, motivational and consciousness programme. Though they have some programmes such as Bangladesh Association for the Aged and Institute of Geriatric Medicine (BAAIAM), Probin Hitaishi Sangha (PHS), etc., for the

elderly, this is not enough and all the elderly do not have access to this. In this respect the government should put funds into programmes and services which allow families to take better care for the elderly. For this the government should fix a handsome fund for the family.

Acknowledgement

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Ageing in Kerala: Some Key Issues

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ABSTRACT

Ageing of population has been rapid in Kerala. The problems associated with it have been the focus of studies which are mostly sample based. But the recent Census of India 2011 data provides ample scope to explore the magnitude of the problems associated with ageing which have never been dealt with before. With this aim, the authors used the Census data on household wise distribution of aged population, disability, labour force participation and marital status distribution which indirectly speaks about the problems of loneliness, living arrangements, widowhood and financial security. The percentage of aged population 60+ years in Kerala is 12.6 per cent. Gender differentials are discernible with the proportion of aged females being greater than males. Out of the total aged population distribution in Kerala, 55.6 per cent of the households with aged persons had only one aged person. Female domination was evident here. An almost alarming situation of loneliness was that more than half of the single member households in Kerala were constituted by aged persons. Gender differential among the proportion of aged was more conspicuous in the single member household. Almost nine out of ten aged males were currently married. But only one third of the aged females were currently married which reflect the problem of widowhood. Proportion of widows was almost five times more than widowers. In Kerala, the researchers found that one in ten elderly population were economically active. Almost 30 per cent of the aged constitute

the disabled population in Kerala. Disability was more among females compared to males in all the districts in the State. Sensory disability common in old age was more prominent here. Other types of sensory disabilities were also noticed in the elderly population. The findings of this study call for policy responses to focus on specific areas where the aged population in the absence of family members were more concentrated and where with the greater likelihood of psychological problems, financial and emotional security is needed.

Key words: Aged population of Kerala, Disability, Living arrangements, Financial Security, Loneliness

Ageing is a global issue today as the developed and most of the developing countries are experiencing ageing process. Ageing results from demographic transition. Reductions in mortality and fertility eventually lead to smaller proportions of children and larger proportionate shares of older people in the population. Globally the extent and speed of ageing vary. Developed countries have been experiencing this process quite early, but in developing countries, ageing has taken place relatively recently. The global share of older people (aged 60 years or over) increased from 9.2 per cent in 1990 to 11.7 per cent in 2013 and is projected to continue to grow and form 21.1 per cent of the World population by 2050. Older persons are projected to exceed the number of children for the first time in 2047. Presently, about two thirds of the World's older persons live in developing countries (United Nations, 2013).

Every country is confronted with fundamentally newer challenges due to the rapid ageing process. With increasing life expectancy, people have longer lives but the immediate challenge is that of making it a healthier ageing process. Societal, individual and also organizational changes are required to adapt to the process. So ageing becomes a matter of concern more because it requires policy changes. Every Government has to address the problems arising due to the increasing aged population. Health care and social support emerges as the most important issues that demand policy changes. The United Nations International Conferences on Population and Development in the 1990s stressed these issues related to ageing of population quite strongly. Later the social and economic impact of ageing population

was accorded due emphasis at the ICPD Conference in 1994 (United Nations, 1994). In the Conferences that followed, a review of programme of actions was made. In 2007, the changing age structures of populations and their implications for development was given emphasis (United Nations, 2007). Later in 2013, ensuring social integration of older persons and the promotion and protection of their rights form an integral part of the development agenda at the national and global levels was stressed (United Nations, 2013).

India has a population of 1.21 billion people in 2011 with about 103.8 million elderly who constitute 8.6 per cent of India's population. Increasing life expectancy and declining fertility bringing about changes in the age structure is said to be fueling India's population growth. Fertility rates in India's southern states of Kerala and Tamil Nadu had dropped to 1.7 children per woman by the year 2009, while the fertility rates in the northern states of Bihar and Uttar Pradesh were twice as high. But declining infant mortality and survival at older ages in response to public health improvements has also taken place (Haub and Gribble, 2011; Arokiasamy *et al.,* 2012). So the rising numbers of older people would eventually put new and increasing demands on the health care system. The health care services now need to shift resources and services to respond to an aging population (Chatterji *et al.,* 2008). Simultaneously public health spending in India also needs to respond to demand for more services to facilitate increased survival of the elderly and other vulnerable groups. A 10 per cent increase in public health spending has been shown to decrease deaths by about 3 per cent among the elderly, women, and children in India (Farahani, *et al.*, 2010).

One of the problems associated with rapid ageing is the living arrangement of the elderly population. As countries develop and their populations continue to age, living alone or with a spouse only would be much more common among older people in the future. Although leading an independent life is more common in the developed countries, it is a cause of concern in a developing country like India. The profound shift in the share of older Indians living independently, taking place in the context of changing family relationships and

severely limited old-age income support brings with it a variety of social, economic, and health care policy challenges

Why Kerala?

Kerala is one of the southern States in India that achieved earlier transition from high fertility and mortality rates compared to the other States in India. The transition process is often compared to that of the developed countries and the changes subsequent to the transition have been literally the same as that of the developed countries. Higher life expectancy (74.2 years) particularly among females (76.9 years) compared to males (71.5 years) coupled with very low fertility rates (TFR of 1.7) resulted in rapid ageing in the State. Kerala has 4.2 million elders (60+ years) constituting 12.6 per cent of the population. Growth rate of elderly is double that of the overall growth rate of population. This is one of the demographic patterns the State exhibits comparable to the developed countries.

The State Government responded to the changing needs of the population and drafted the Old Age Policy in response to the changing needs of the old age population in 2013. The policy emphasizes the wellbeing and care of older persons, especially the more vulnerable group like the widowed and the disabled. The policy also aims to protect the rights of senior citizens, helps them to come into the mainstream and utilize their experience and knowledge for the betterment of the society. Now the work of the Primary Health Centres in the State has been reoriented in such a way that all the health care needs of older persons in a locality are met by these institutions.

Kerala has the highest number of old age homes in the State with 80 per cent of the old age homes in India being in Kerala. The demand for old age homes in the State may also rise in the future because of the large scale migration of adult children. However the amendment of the Kerala Maintenance and Welfare of Parents and Senior Citizens Act has laid strict conditions in this regard. Old Age Care homes have been instructed not to take in senior citizens having relatives. Exceptions are allowed only in select cases, after high-level deliberations on the genuineness of the request.

The issues related to faster ageing in Kerala like loneliness, living arrangements, disability, economic dependency, etc. has been dealt with in many similar research studies and large scale surveys. However the Census of India, 2011 data has thrown open ample scope to analyse the magnitude of some of these issues. The distribution of aged population by household size in the districts and also the cities are provided in detail. This vital data on aged is being used in this study to throw some light on the distribution of aged population by household size. The data on disability, work participation and marital status are also considered to highlight the problems of the aged population.

Objectives

The main objectives of the study were:

- To analyse the distribution of aged population in Kerala to elicit the quantum of lowliness and living arrangements
- To examine the marital status, work participation and disability among the aged based on information provided by the Census data 2011.

Data and Method

The Census of India data of 2011 form the main source of information. Data on distribution of population by household size, disability among the population, distribution of population by marital status and data on work participation are used (Registrar General, 2011). Univariate and bivariate techniques are used to derive the findings.

Findings and Discussion

Kerala has the distinction of having the maximum number of old age homes in the country even when many research studies show that the elderly in the state still prefer that the family takes care of them during old age (Alam *et al.,* 2012). So knowledge about the living arrangements of the aged population gains importance here and is examined in this section.

Table 1
Percentage Distribution of Aged to Total Population, Kerala 2011

	Percentage Aged		
	Persons	*Males*	*Females*
Kerala	12.6	11.8	13.3
Kasaragod	9.8	9.1	10.4
Kannur	12.5	11.7	13.3
Wayanad	9.5	9.0	10.1
Kozhikode	11.7	11.1	12.2
Malappuram	8.3	7.9	8.7
Palakkad	11.9	10.8	12.8
Thrissur	13.7	12.5	14.8
Ernakulam	13.7	12.6	14.8
Idukki	11.6	10.9	12.3
Kottayam	15.8	14.7	16.8
Alappuzha	15.1	14.2	16.0
Pathanamthitta	17.8	17.2	18.4
Kollam	13.3	12.7	13.8
Thiruvananthapuram	13.0	12.4	13.6

The percentage of aged population 60+ years in Kerala is 12.6 per cent. Gender differentials are discernible with the proportion of aged females being greater (13.3%) than males (11.8%). District wise disparity is also visible in the proportion of aged persons (Table 5.1). Fertility in the small district of Pathanamthitta touched replacement levels much earlier and consequently the percentage of aged persons is also the highest in the district. One in every six persons in the district is an aged person here (17.8%).

Kottayam and Alappuzha districts follow with over 15 per cent of the population being aged. Malappuram being the district with highest fertility rate in Kerala also has the least proportion of aged persons in the State (8.3%). Wayanad and Kasaragod are the other two districts with less than 10 per cent of the population 60+ years.

Gender differentials in the proportion of aged are also visible in every district. The difference is more prominent in Thrissur, Ernakulam and Kottayam districts (over 2 percentage points). In all the districts, proportion of aged are higher among females than the males. As in the State average, in Pathanamthitta where the aged

proportion is highest, 18.4 per cent of the females and 17.2 per cent of the males are aged persons. On the other hand, in Malappuram with least proportion of aged, only 8.7 per cent of the females and 7.9 per cent of the males are aged.

Household wise Distribution of Aged

Registrar General India has for the first time provided information on distribution of Census population in households by age, sex and household size. Here we find that with regard to the distribution of aged population in the households 41.1 per cent of the households in Kerala have at least one aged person. Nearly 30 per cent of the households have one aged member, slightly more than one in ten households have 2 aged members and less than one per cent of the households have 3 aged persons. The number of households with four or more aged persons is negligibly small. The proportion of households with one aged member varies between 33.2 per cent in Kannur to 23.4 per cent in Idukki.

Table 2
Household wise Distribution of Aged, Kerala 2011

	Percentage of Households with				
	No aged	*1 Aged*	*2 Aged*	*3 Aged*	*4+ Aged*
Kerala	58.9	29.6	11.0	0.5	0.03
Kasaragod	62.0	29.7	7.9	0.3	0.03
Kannur	55.3	33.2	10.9	0.6	0.05
Wayanad	67.8	24.0	8.0	0.2	0.01
Kozhikode	59.0	30.9	9.7	0.4	0.03
Malappuram	65.0	27.2	7.5	0.3	0.02
Palakkad	58.7	30.9	9.9	0.4	0.04
Thrissur	56.8	31.0	11.7	0.5	0.04
Ernakulam	58.8	28.0	12.6	0.5	0.04
Idukki	65.7	23.4	10.5	0.3	0.02
Kottayam	54.2	29.3	15.7	0.7	0.05
Alappuzha	54.3	32.1	13.0	0.6	0.04
Pathanamthitta	51.6	31.6	16.0	0.7	0.04
Kollam	59.5	29.3	10.7	0.4	0.02
Thiruvananthapuram	60.3	28.8	10.5	0.4	0.03

Among the districts, households without aged persons is least in Pathanamthitta (51.6%). So in Pathanamthitta, 48.4 per cent of the households have one or more aged members and in Wayanad only 32.2 per cent of the households have aged members. Percentage of households which have only one aged member is highest in Kannur (55.3%) and least in Idukki (23.4%). Percentage of households with two or more elderly persons is highest in Pathanamthitta (16.7%) and least in Malappuram (7.8%).

The older population is predominantly female. Because women tend to live longer than men, older women outnumber older men almost everywhere. In 2013, globally, there were 85 men per 100 women in the age group 60 years or over and 61 men per 100 women in the age group 80 years or over. These sex ratios are expected to increase moderately during the next several decades, reflecting a slightly faster projected improvement in old-age mortality among males than among females. Kerala presents a similar picture.

In the households with one aged person, 57.2 per cent are females and the share of female aged member is even greater in households with three (58.8%) and four (59.9%) aged persons (Figure 1). Only in households with 2 aged persons, the gender differential is less although it maintains female dominance.

Figure 1

Gender Differentials in Distribution of Aged Population, Kerala, 2011

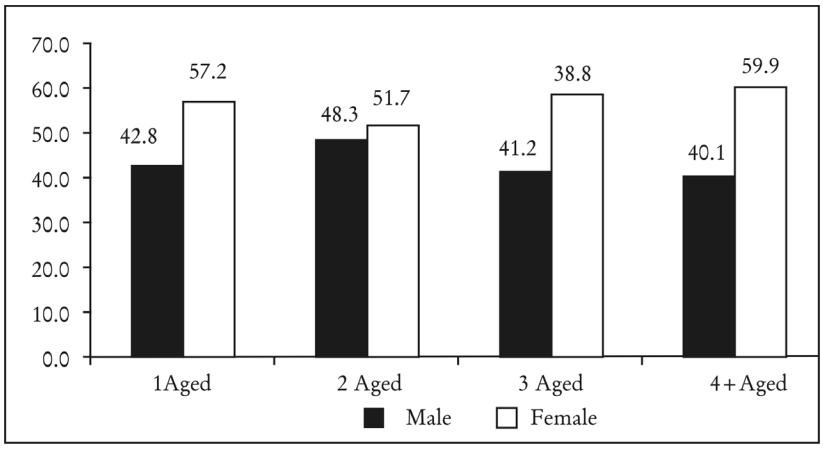


Table 3
Percentage distribution of Aged by residence in Households

	Percentage of households with				
	No aged	*1 Aged*	*2 Aged*	*3 Aged*	*4+ Aged*
			Urban		
Kerala	58.3	30.3	10.8	0.5	0.04
Kasaragod	61.6	30.7	7.3	0.3	0.03
Kannur	52.7	35.6	10.9	0.7	0.07
Wayanad	71.3	23.0	5.6	0.1	0.00
Kozhikode	57.8	31.9	9.8	0.5	0.04
Malappuram	64.5	27.7	7.5	0.3	0.02
Palakkad	58.6	30.5	10.3	0.5	0.05
Thrissur	56.6	31.2	11.6	0.5	0.05
Ernakulam	60.0	28.0	11.5	0.5	0.04
Idukki	62.4	25.0	12.0	0.6	0.03
Kottayam	54.8	29.5	14.9	0.7	0.06
Alappuzha	55.2	31.8	12.4	0.6	0.03
Pathanamthitta	52.1	30.7	16.3	0.8	0.07
Kollam	60.4	28.8	10.4	0.4	0.02
Thiruvananthapuram	59.6	28.5	11.3	0.5	0.04

Comparing rural and urban areas in Kerala, one finds that households with no aged persons and those with two aged persons is higher in rural areas compared to urban areas. In rural areas 28.9 per cent of the households have one aged person compared to 30.3 per cent in urban areas. All the districts exhibit a similar trend.

Now we look at the distribution of aged population in terms of sheer numbers, or in other words living arrangement in terms of number of 'one', 'two', 'three' and 'four or more' aged persons among the household population in Kerala, which highlights the problems of living arrangements.

Table 4
Percentage Distribution of Aged Population by Number of Aged in Each Household, Kerala, 2011

	Percentage distribution to total aged population			
	1 Aged	*2 Aged*	*3 Aged*	*4+ Aged*
Kerala	55.6	41.5	2.6	0.3
Kasaragod	63.6	34.1	2.1	0.3
Kannur	58.3	38.1	3.1	0.4
Wayanad	59.0	39.3	1.6	0.1
Kozhikode	59.8	37.6	2.4	0.3
Malappuram	63.2	34.9	1.8	0.2
Palakkad	59.1	38.0	2.6	0.3
Thrissur	55.3	41.6	2.8	0.3
Ernakulam	51.0	38.0	2.6	0.3
Idukki	51.5	46.2	2.1	0.2
Kottayam	46.3	49.8	3.5	0.4
Alappuzha	53.4	43.4	2.9	0.3
Pathanamthitta	48.0	48.4	3.3	0.3
Kollam	56.3	41.2	2.4	0.2
Thiruvananthapuram	56.3	40.9	2.6	0.2

Out of the total aged population in Kerala, 55.6 per cent of the households with aged population, there is only one aged person, 41.5 per cent fall in the 'two aged person' category, 2.6 per cent of the aged population come under the 'three aged persons' category and 0.3 per cent in 'four or more aged persons'. This is true for all the districts.

Table 5
Gender wise Distribution of Aged Population by Number of Aged in Each Household, Kerala, 2011

	1 Aged		*2 Aged*		*3 Aged*		*4+ Aged*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
Kerala	42.8	57.2	48.3	51.7	41.2	58.8	40.1	59.9
Kasaragod	43.6	56.4	47.7	52.3	42.4	57.6	43.9	56.1
Kannur	41.9	58.1	46.5	53.5	39.4	60.6	38.0	62.0
Wayanad	44.3	55.7	49.1	50.9	43.5	56.5	47.0	53.0

Cont'd...

...Cont'd

Kozhikode	44.3	55.7	47.6	52.4	39.7	60.3	37.2	62.8
Malappuram	43.6	56.4	48.0	52.0	38.8	61.2	38.9	61.1
Palakkad	42.2	57.8	47.7	52.3	40.2	59.8	41.5	58.5
Thrissur	40.6	59.4	47.8	52.2	38.6	61.4	38.7	61.3
Ernakulam	42.9	57.1	47.7	52.3	40.2	59.8	41.5	58.5
Idukki	45.2	54.8	49.3	50.7	42.9	57.1	41.1	58.9
Kottayam	43.3	56.7	49.1	50.9	42.5	57.5	40.3	59.7
Alappuzha	41.9	58.1	48.4	51.6	41.9	58.1	42.0	58.0
Pathanamthitta	42.0	58.0	48.9	51.1	43.1	56.9	42.9	57.1
Kollam	42.7	57.3	48.6	51.4	44.1	55.9	44.3	55.7
Thiruvananthapuram	44.0	56.0	48.2	51.8	42.4	57.6	41.7	58.3

Yet another noteworthy finding is the female domination in all the categories. The gender differentials increases in general as the number of aged persons in the household increases except in the 'two aged member' category (Figure 1). When there are two aged persons among the household population, the gender differential is the least although there is female dominance. District wise analysis also reveals the same pattern.

Distribution of Aged Population in Cities

Now it is worthwhile exploring the information available from Census on distribution of aged population in important cities in Kerala. As the families become more and more nuclear, the problems of living arrangement among aged population is likely to be more severe in cities. Data pertain to Municipalities, Corporations and Municipalities with Out Growths. In cities, life is said to be faster, families are extremely nuclear, and the population includes a good share of migrant population who have moved to cities for jobs. In this context, the living arrangement of aged population in the households in these cities are examined.

Table 6

Percentage Distribution of Aged Population in City Households, Kerala, 2011

	Percentage of households with at least one elderly			
	Among households in the Municipal/ corporation area	*District in which the area is located*	*Among total households in the District*	*Among urban households in the District*
Kanhangad(M+OG)	39.7	Kasaragod	38.0	38.4
Kozhikode(MCorp+OG)	43.4	Kozhikode	41	42.2
Malappuram(M+OG)	34.1	Malappuram	35	35.5
Palakkad(M)	44	Palakkad	41.3	41.4
Thrissur(MCorp.)	44.2	Thrissur	43.2	43.4
Kochi(Mcorp+OG)	39.7	Ernakulam	41.2	40
Alappuzha(M+OG)	42.3	Alappuzha	45.7	44.8
Kollam(MCorp+OG)	39.8	Kollam	40.5	47.9
Trivandrum(MCorp+OG)	41.6	Trivandrum	39.7	40.4

Most of the Municipalities and Corporation areas have slightly higher proportions of households with aged persons, compared to the proportion in Kerala (41.1%) although with certain exceptions. The cities with higher proportion of households with elderly persons, compared to the State percentage are Kozhikode, Palakkad, Thrissur, Alappuzha and Trivandrum.

Proportion of households with elderly persons is higher in the municipal and corporation areas in Kerala, than the proportions among the households in the urban areas of concerned districts except in Malappuram, Kochi, Alappuzha and Kollam.

Table 7

Household wise Distribution of Aged Population in Cities, Urban Kerala, 2011

	Percentage of Households with				
	No aged	*1 Aged*	*2 Aged*	*3 Aged*	*4+ Aged*
Kanhangad(M+OG)	60.3	31.3	8.0	0.3	0.0
Kozhikode(MCorp+OG)	56.6	31.8	10.8	0.7	0.1
Malappuram(M+OG)	65.9	26.1	7.8	0.2	0.0
Palakkad(M)	56.0	30.8	12.3	0.8	0.1
Thrissur(MCorp.)	55.8	30.4	13.0	0.7	0.1
Kochi(Mcorp+OG)	60.3	27.7	11.4	0.5	0.0
Alappuzha(M+OG)	57.7	30.5	11.3	0.5	0.1
Kollam(MCorp+OG)	60.2	28.4	10.9	0.4	0.0
Trivandrum(MCorp+OG)	58.4	28.3	12.6	0.6	0.1

Household wise distribution of aged population in the urban municipal/corporation areas in Kerala is evident in the different districts also.

Loneliness among the aged population

Although there is growing evidence of the problems associated with loneliness based on sample studies, quantifying the problem has been possible only with the release of the Census data 2011. Data on distribution of aged population by household size is used here to highlight one ageing related issue that has profound importance. Loneliness is a complex and usually unpleasant emotional response to isolation or lack of companionship. Loneliness typically includes anxious feelings about a lack of connection or communication with other beings. It is the elderly population that feels this sting the most. One aged person or an aged couple having to live without any support from their dear or near ones translates itself as a serious societal issue. This problem is expected to worsen in the coming years with the families in Kerala becoming nuclear. Shrinking average household size on the one hand and the increasing life expectancy on the other hand are two sides of the same coin. As the socio cultural setting in the State fosters children to take care of the elderly parents, this was not a problem a few decades earlier. But decline in fertility, nuclearization of families and large scale migration of the adult population in search of employment both within and outside the country broke down this system leaving serious implications on the living arrangement pattern as well as the provision of care (BKPAI, 2011) for the elderly. But almost half the elderly in Kerala prefer to live with their sons while 5 per cent of elderly men and 10 per cent of elderly women preferred to stay with their daughters and only a very small proportion of the elderly prefer to live alone (Ibid.).

An almost alarming situation of loneliness is highlighted in the single member households with a lone aged person and two member households with both members above 60 years (Table 8). Here there is no one to support the aged. More than half (52.6%) of the single member households in Kerala are constituted by aged persons. Among the single member households in rural and urban areas also, 52.6 per cent each are formed by aged persons living alone. District wise

analysis shows that the percentage of single member households with one aged person is least in Wayanad (39.6%) and highest in Pathanamthitta (59.1%). In the urban and rural areas also the observed pattern is the same.

Table 8

Percentage of Single Member Households with one Aged Person

	Total	*Rural*	*Urban*	*Males*	*Females*
Kerala	52.6	52.6	52.6	42.8	57.2
Kasaragod	45.4	44.7	46.4	43.6	56.4
Kannur	53.4	49.9	55.3	41.9	58.1
Wayanad	39.6	40.0	31.5	44.3	55.7
Kozhikode	45.0	43.4	45.9	44.3	55.7
Malappuram	40.2	40.4	39.9	43.6	56.4
Palakkad	55.8	55.9	55.4	42.2	57.8
Thrissur	52.1	52.7	51.8	40.6	59.4
Ernakulam	52.4	55.3	51.0	42.9	57.1
Idukki	44.1	43.8	52.3	45.2	54.8
Kottayam	56.4	55.2	58.9	43.3	56.7
Alappuzha	57.8	58.2	57.5	41.9	58.1
Pathanamthitta	59.1	59.0	60.0	42.0	58.0
Kollam	53.3	53.7	52.6	42.7	57.3
Thiruvananthapuram	58.3	58.9	57.7	44.0	56.0

Figure 2

Single Member Household with Lone Aged Person, Kerala, 2011

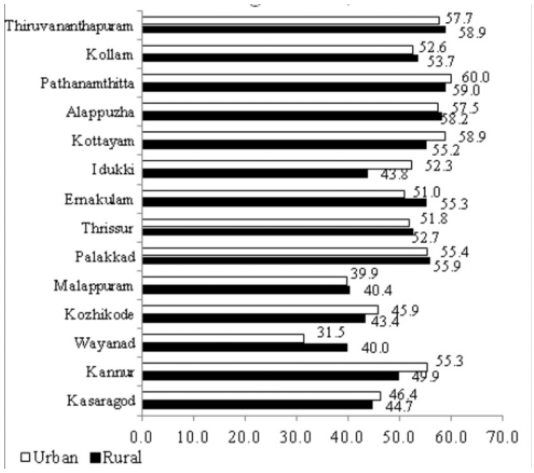
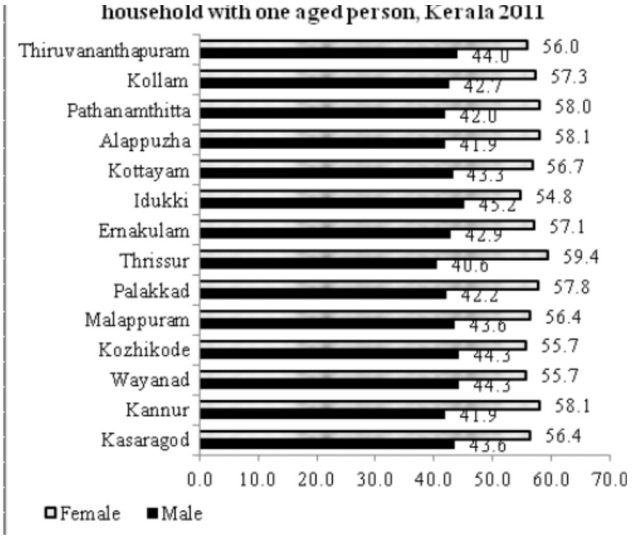


Figure 3
Gender Differentials in Single Member Household with One Aged Person, Kerala, 2011



Gender differential among the proportion of aged is more conspicuous in the single member household. The proportion of females in all the districts is relatively higher than males. It varies between a low of 54.8 per cent in Idukki to 59.4 per cent in Thrissur (Figure 3). The proportion of males varies between 40 and 45 per cent only.

Table 9
Percentage distribution Aged population in Two member Households, Kerala, 2011

	Percentage of two member Households with					
	Total		*Rural*		*Urban*	
	1 Aged	*2 Aged*	*1 Aged*	*2 Aged*	*1 Aged*	*2 Aged*
Kerala	27.8	19.4	27.0	19.4	28.8	19.5
Kasaragod	27.5	10.9	26.9	11.1	28.5	10.7
Kannur	33.0	16.4	28.2	16.4	36.0	16.4
Wayanad	24.1	12.6	24.1	12.7	22.7	10.3

Cont'd...

Cont'd...

Kozhikode	29.6	14.2	27.1	13.3	31.0	14.8
Malappuram	24.3	10.0	24.6	10.0	23.8	10.0
Palakkad	30.9	18.5	30.7	17.5	31.4	21.3
Thrissur	28.6	18.5	28.0	18.2	28.9	18.7
Ernakulam	26.2	22.3	25.4	25.1	26.5	21.0
Idukki	22.1	17.8	22.0	17.5	24.1	26.3
Kottayam	26.5	27.0	26.3	26.5	26.9	28.3
Alappuzha	28.8	21.2	28.6	21.9	29.0	20.5
Pathanamthitta	26.5	28.3	26.6	27.8	25.9	32.9
Kollam	27.0	18.6	26.9	18.5	27.0	18.7

In the two member households in Kerala, one in five households has two aged persons and well over a quarter of the households have one aged member. Rural-urban differentials are not conspicuous (Table 9).

The distribution of population in important cities are also examined here to examine the problem of loneliness (Table 5.3.3).

Table 10

Percentage Distribution of Aged Population in Households by Number of Aged Persons

	Percentage of Households with					
	One member Hh	*Two member Hhs*		*Three member Hhs*		
	1 Aged	*1 Aged*	*2 Aged*	*1 Aged*	*2 Aged*	*3 Aged*
Kanhangad (M+OG)	53.0	29.9	11.5	21.8	4.7	0.3
Kozhikode (MCorp+OG)	46.9	31.5	20.2	23.1	6.3	0.8
Malappuram (M+OG)	42.0	24.4	11.9	15.0	3.0	0.2
Palakkad(M)	61.7	31.7	28.9	21.0	7.8	1.3
Thrissur (MCorp.)	56.3	30.9	25.0	21.9	7.2	0.9
Kochi (Mcorp+OG)	51.2	26.5	22.3	18.1	6.2	0.6
Alappuzha (M+OG)	51.5	28.8	20.2	20.6	6.4	0.5
Kollam (MCorp+OG)	54.5	27.4	21.4	18.9	6.0	0.5
Trivandrum (MCorp+OG)	57.7	27.3	28.2	18.9	7.4	0.9

Loneliness among the aged persons in the municipal and corporation areas in terms of the proportion of aged who live alone in single member households varies between 61.7 per cent in Palakkad (M) and 42 per cent in Malappuram (M+OG). Proportion of households in which elderly persons live alone is more than half of the total single member households in all the municipal and corporation areas except in Kozhikode (MCorp+OG) and Malappuram (M+OG). Almost one in three households with 2 members have one aged member and a quarter of them have both the members as aged persons. Proportion of households with only two elderly persons ranges between 31.7 per cent in Palakkad (M) and 29.9 per cent in Kanhangad (M+OG). In almost one in five households the aged are not alone with regard to the households with three members.

Table 11
Gender wise Percentage Distribution of Aged Population in Households

	One member Hh		*Two member Hhs*			
	1 Aged		*1 Aged*		*2 Aged*	
	Males	*Females*	*Males*	*Females*	*Males*	*Females*
Kanhangad(M+OG)	14.3	85.7	55.0	45.0	46.2	53.8
Kozhikode(MCorp+OG)	22.1	77.9	65.6	34.4	46.9	53.1
Malappuram(M+OG)	15.1	84.9	60.5	39.5	47.0	53.0
Palakkad (M)	23.0	77.0	69.5	30.5	49.0	51.0
Thrissur (MCorp.)	20.0	80.0	68.3	31.7	48.1	51.0
Kochi (Mcorp+OG)	24.4	75.6	67.4	32.6	48.9	51.1
Alappuzha (M+OG)	21.4	78.6	62.1	37.9	47.2	52.8
Kollam (MCorp+OG)	25.4	74.6	62.6	37.4	48.9	51.1
Trivandrum(MCorp+OG)	25.0	75.0	63.7	36.3	48.8	51.2

Gender differentials are evident in the loneliness in cities. Among the single member households with aged persons living alone, more than three fourths are lone aged female in each municipality/corporation area. Among the households with one aged member, proportion of households with lonely aged female is highest in Kanhangad and lowest in Kollam. However among the two member households, in all the municipal/corporation areas proportions of households with one aged favours the males as one-third of aged population are males. But as the household size increases to three members, gender differentials

favour the females slightly as more than one in two of the '2 aged' category in two member households are female elderly.

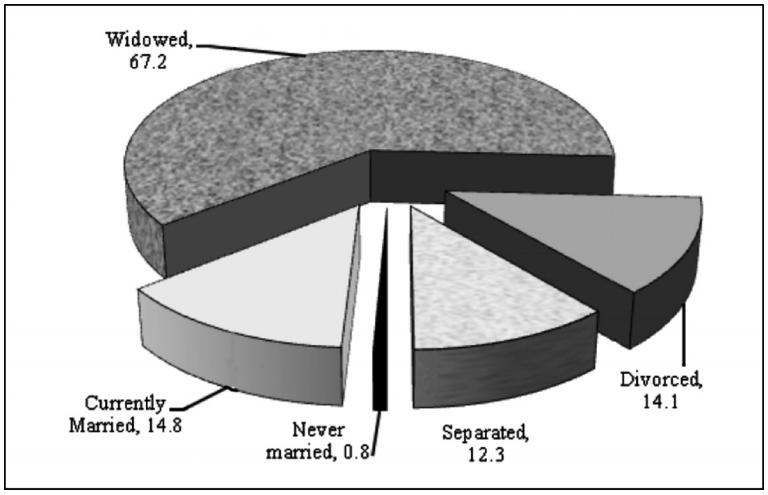
Marital Status

Marital status of the elderly population is an important determinant of the social and economic status. Myers (1986) contends that marital status of elderly plays an important role in economic, social and emotional dimensions and care giving. The death of a spouse is rated as among the most stressful life event (Amster & Krauss, 1974). Loss of a spouse may result in the loss of a person who assists in monitoring and supporting attempts to change one's health behaviors. Major life events such as widowhood are also associated with a disturbance in one's normal routine and an increase in stress (Wilcox, 2003). The increasing proportion of women and the gender disparity in widowhood due to increased life expectancy deserves specific attention in this regard. So an assessment in this regard is made here.

Distribution of aged persons in Kerala and the districts by their marital status is given in Figue 4. Out of the total population in Kerala less than 1 per cent are never married aged persons and around 14 per cent each are currently married and divorced. Also over two thirds of the widowed and 12.3 per cent of the separated are aged persons.

Figure 4

Aged Population by Marital Status (among total population), Kerala, 2011



Gender wise differential in never married status among aged population is more in Thrissur, Kottayam, Ernakulam, Kozhikode and Kannur. About one fifth of the aged males are currently married as against one-tenth of currently married female aged persons. Gender differential among districts are more pronounced in Kannur, Kozhikode, Kasaragod and Pathanamthitta.

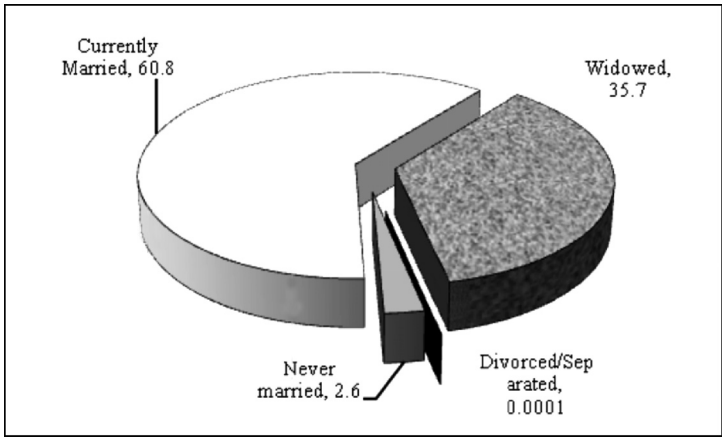
More than one-third are in their widowhood aged (Figure 4) and the proportion is relatively higher among males (76.3%) compared to females (66.2%). So we find that almost four fifths of the population in Kerala without a partner is aged. Proportion of aged divorced and also separated is greater among males than females in all the districts.

To have a deeper understanding of the problems among the aged population now we examine the marital status distribution out of the total aged population. Distribution of aged persons by marital status out of the total aged population in Kerala and the districts by their marital status is given in Figure 5.

In Kerala 2.6 per cent of the aged persons are never married and the proportion among females is almost double that of males. Out of the total aged population, three fifths are currently married aged persons in the State. Gender wise comparison shows that almost nine out of ten aged males are currently married. But only one third of the aged females are currently married which reflect the problem of widowhood. More than one-third of the aged persons are in their widowhood status and gender differentials in widowhood also are clearly evident. Proportion of widows (57.6%) is almost five times more than widowers (8.8%). The higher life expectancy among females in the State explains this phenomenon. Gender differentials are relatively more pronounced in Kasaragod, Kannur, Kozhikode, Malappuram and Palakkad. So we find that almost two fifths of the aged population in Kerala lives without partner (never married/widowed/divorced/separated). Proportion of aged persons without partner is also higher among females (62.2% among females, compared to 11.1% among males).

Figure 5

Aged Population by Marital Status (among total aged population), Kerala, 2011



District wise pattern shows that the proportion of never married aged persons is highest in Thrissur (3.8%) followed by Kottayam and Kannur (3.4% each) and lowest in Malappuram and Wayanad (1.7% each), followed by Kasaragod (1.8%). Kottayam district once again tops the list of districts in the proportion of never married category and Malappuram figures in the bottom order. District wise picture follows the same pattern as evident in the State total.

Economic Dependency

The economic dependence of the aged population can be understood from the analysis of labour force participation. The small labour earnings that the elderly get helps them in many ways. It offers them psychological satisfaction on the one hand and provides a feeling of independence on the other hand. They often try to work as long as they can so that they do not have to depend on others. For those who have no financial security in the form of pensions, the little income they earn through manual labour or other self employment schemes provides them a feeling that they are still physically capable of doing work overcoming their functional limitations.

Secondary sources of data like the census and other sample based studies have shown that work participation among elderly is usually

higher among the rural population compared to the urban counterparts. In Kerala, half the currently working elderly work out of choice and the other half work out of economic and other compulsions. Around three fourths of the women and 40 per cent of the men work due to economic compulsion indicating strong gender differentials in the need for current work (Alam et. al , 2012).

Table 12
Percentage Distribution Aged Population by Labour Force Participation, Kerala, 2011

	Marginal workers				*Non-workers*	
	Main workers	*Worked for < 3 months*	*Worked for 3 to 6 months*	*Seeking/ available for work*	*Non-workers*	*Seeking/ available for work*
Kerala	8.3	13.3	10.1	3.5	14.5	1.7
Kasaragod	7.4	9.4	7.1	2.3	11.1	1.3
Kannur	8.3	14.7	11.1	3.4	14.3	1.5
Wayanad	8.0	10.7	7.7	2.9	10.6	1.1
Kozhikode	7.4	11.7	9.3	3.3	13.4	1.7
Malappuram	6.1	10.9	7.3	2.8	9.0	1.3
Palakkad	8.4	14.7	10.1	3.2	13.7	1.2
Thrissur	8.5	14.5	11.2	3.3	16.3	1.5
Ernakulam	7.8	14.7	11.1	3.6	17.0	1.9
Idukki	9.5	15.1	10.8	3.7	13.1	1.6
Kottayam	10.3	15.1	12.0	3.8	18.8	1.9
Alappuzha	9.3	13.9	11.6	3.8	18.3	2.0
Pathanamthitta	11.3	14.9	12.5	3.6	20.8	1.9
Kollam	8.5	12.6	9.7	3.1	15.6	1.7
Thiruvananthapuram	8.4	13.8	10.1	4.6	15.4	2.4

In Kerala, we find that one in ten elderly population are economically active. Census 2011 data reveals that out of the total main workers of Kerala, 8.3 per cent are aged population, 13.3 per cent of marginal workers who worked for a period less than 3 months are aged population and 10 per cent of the marginal workers who worked for a period 3 to 6 months are the elderly population. Aged non-workers constitute about 14.5 per cent of the nonworking population in Kerala. The proportion of aged main workers varies between 11.3 per cent in Pathanamthitta to 6.1 per cent in Malappuram if the district

wise scenario is examined. Kottayam district also has over ten per cent of the main workers aged 60+ years.

Information on marginal workers seeking/available for work and also non-workers in this category is available. Aged population constitutes 3.5 per cent of the marginal workers seeking/available for work and this percentage is 1.7 per cent among non workers. Both these proportions account for over one lakh aged population in Kerala who are available for doing some kind of work or capable of working. District wise variation in both these categories is less. Thiruvananthapuram district reports more aged population seeking or available for work while Kasaragod and Wayanad has the least proportion in the marginal and non workers category respectively.

Physical health does decline with age; this does not necessarily mean that older adults are incapacitated. So the manpower among the aged could also be used for income generating activities in the State as we find a good proportion of the aged are capable of working. Providing them a chance would create a kind of financial and psychological security to those without any functional limitations.

Disability among the Aged Population

Chronic diseases, mental impairment, HIV/AIDS, injuries and other age related problems are often the most common causes of disability among older adults. Among the major chronic conditions of an aging population, cardiovascular diseases, hypertension, stroke, diabetes, cancer, chronic obstructive pulmonary disease, musculo-skeletal conditions including arthritis and osteoporosis, mental health conditions such as dementia and depression, and blindness and visual impairment are the most prominent ones (McKenna, *et al.,* 2005). Among these causes the disability due to seeing, hearing, speech, movement, mental retardation and mental impairment, etc. are identified in the Census of India data and this information is used to illustrate the problems of the aged population in Kerala.

Here we find that almost 30 per cent of the disabled population are the aged persons in Kerala. When one in four elderly males are disabled, one in three females are disabled. Pathanamthitta, Kozhikode, Kottayam and Alappuzha districts have relatively higher

Figure 6
Percentage Distribution of disabled Aged to Total Disabled Population, Kerala, 2011

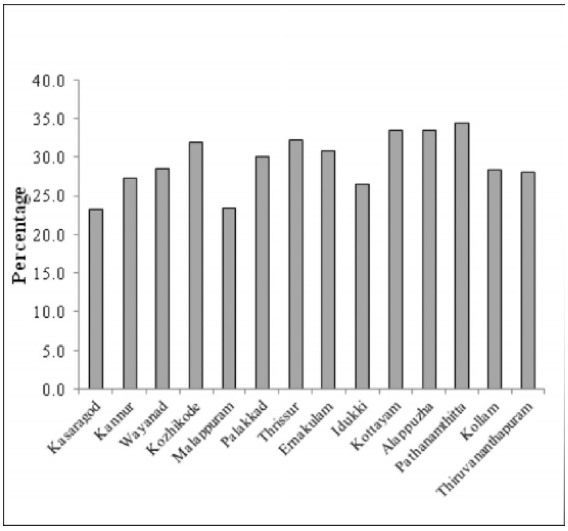
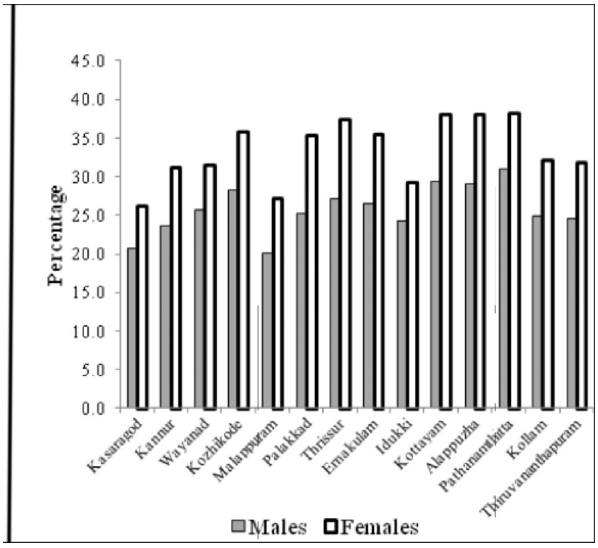


Figure 7
Gender Differentials in Distribution of Disabled Aged by Type of Disability, Kerala, 2011



proportion of aged among the disabled population whereas, Kasaragod and Malappuram have lower proportion.

Disability figures are higher among females compared to males in all the districts in the State. . Gender differentials in disability are more pronounced in Thrissur, Palakkad, Kottayam, Alappuzha and Thrissur districts.

With regard to the rural-urban differentials, much variation is not observed. However Kottayam is the only district where disability among the aged is greater in the urban areas and Kasaragod is the only district where gender wise variation in disability is absent. Here too Pathanamthitta, Alappuzha and Kozhikode districts occupies the top positions in the list of districts with higher disability. Kasaragod and Malappuram figures in the bottom order.

A quick look at the type of disability reveals interesting findings that need attention (Figures 8, 9 and 10). Sensory disability common in old age is more prominent here. Among these sensory disability in seeing in more common. Nearly half of the population with seeing

Figure 8

Sensory Disability among Aged Population, Kerala, 2011

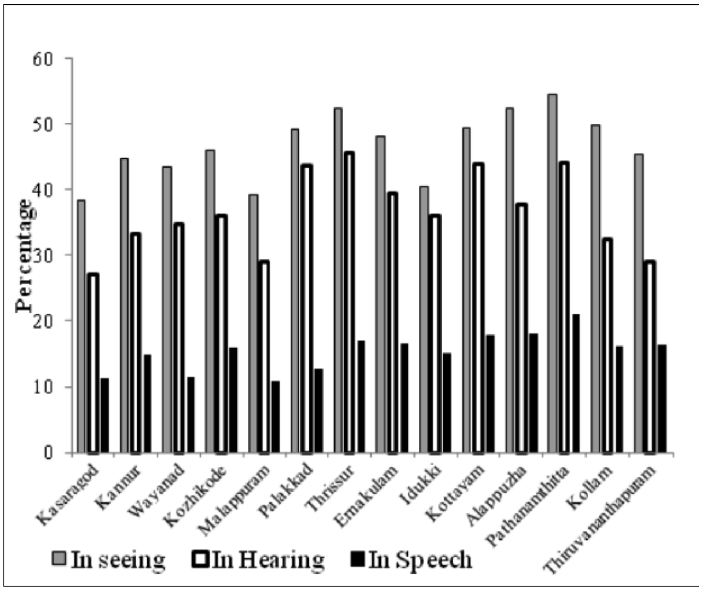
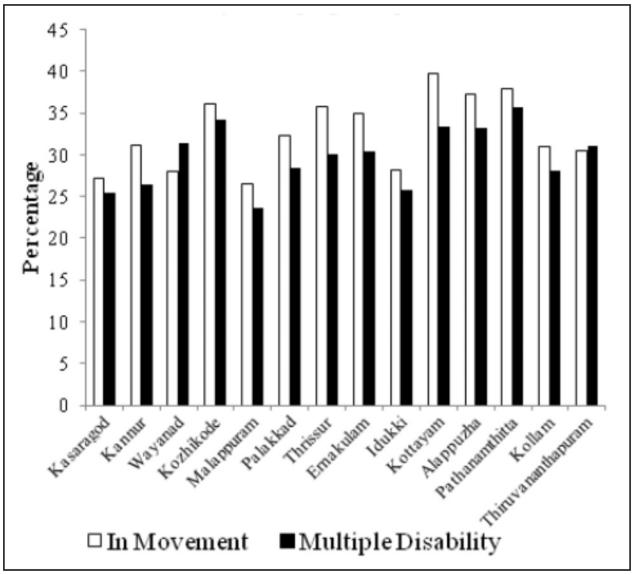


Figure 9
Locomotor and Multiple Disability among Aged Population Kerala 2011



disability are the aged, more than one-third of those with hearing disability and 15.5 per cent of those with disability in speech are the aged population.

Locomotor disability in the form of movement disability is also a cause of concern as one in three persons with movement disability is an aged person. Although mental retardation is less common, mental illness has gripped the aged population as almost one in five of those with mental illness are the aged population. Elderly constitute one-third of those with multiple disability. District wise variation ranges between 35.7 per cent in Pathanamthitta to 23.6 per cent in Malappuram district.

If we observe the gender differentials by type of disability, all types of disabilities are more among female elderly than males. Both among male and female elderly population, disability in seeing is the most common form of disability. Disability in hearing and that in movement is also more among male and female elderly population. When one-third of the female population with multiple disabilities is

Figure 10
Mental Disability among Aged Population, Kerala, 2011

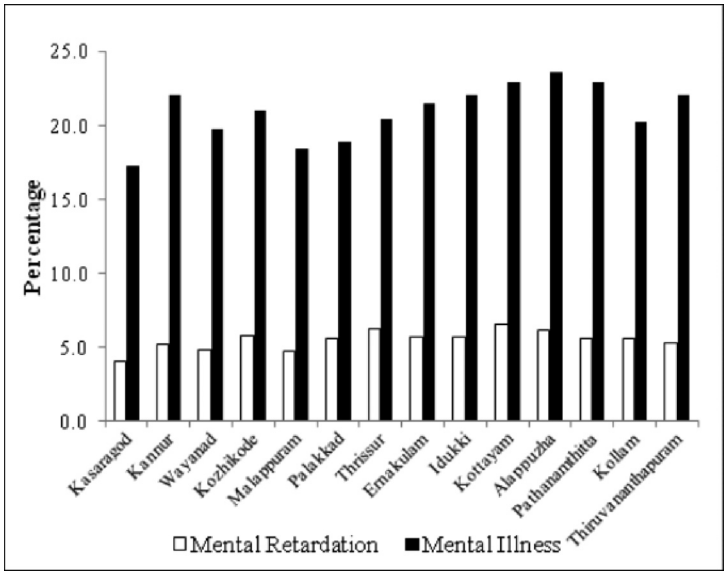
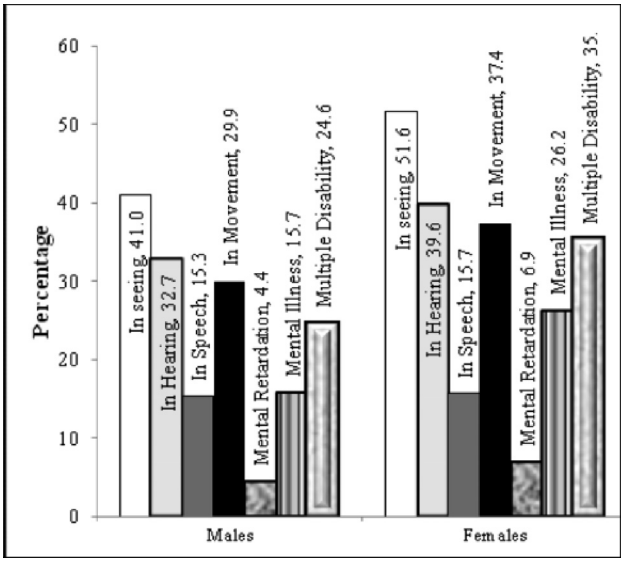


Figure 11
Gender Differentials in Type of Disability among Aged Population, Kerala, 2011

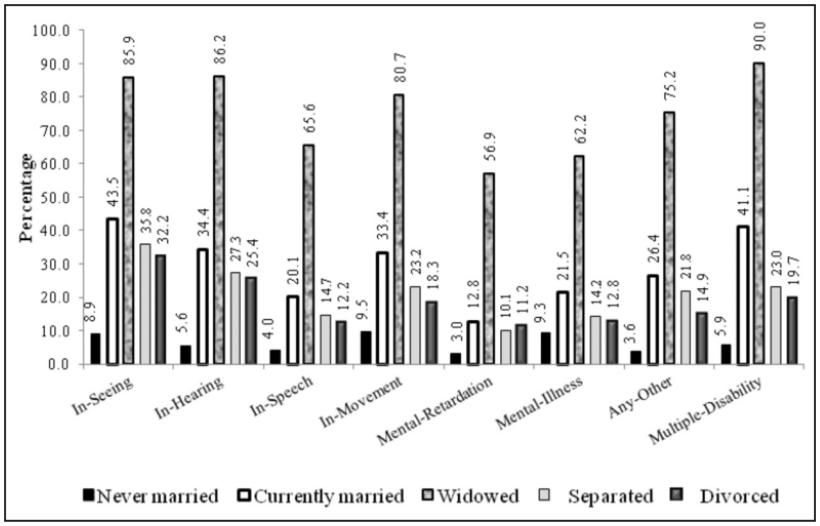


elderly population, one in four males with multiple disabilities is elderly population.

It is worthwhile examining the distribution of disabled elderly by marital status as it highlights the twin problems of loneliness and disability.

Figure 12

Type of Disability among Aged Population by Marital Status, Kerala, 2011



All types of disabilities are found more among widowed elderly. Regarding the divorced and separated categories, various types of disabilities are more or less in the same proportion. Never married elderly have relatively smaller share when compared to the various types of disabilities in the State. Elderly with multiple disabilities are relatively more in number irrespective of marital status when the other types of disabilities are considered.

So analysis of distribution of aged population reiterates the fact that the problems of loneliness and widowhood coupled with disabilities among the aged population is a matter of serious concern. Analysis so far portrays the magnitude of the problem which is not discernible from sample studies. These findings could be used for policy formulation and implementation of programmes for the welfare of the elderly.

Conclusion

The magnitude of the problems derived from the Census and discernible from present study projects the situation of elderly to be quite grave. A sizeable share of the 4.2 million elderly population in Kerala are found to be facing problems specific to old age, social transformations, health problems mostly chronic diseases, etc. Although functional limitations have been highlighted in many studies to be a major concern among the aged, we find here that the number of aged seeking or available for work forms a good share and hence providing them with opportunities for income generating activities could be one of the solutions to enhance the financial security which would indirectly improve the psychological well being. The study findings calls for policy responses to focus on specific areas where the aged population in the absence of family members are more concentrated and where the likelihood of psychological problems is greater, financial and emotional security is needed.

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