

Indian Journal of GERONTOLOGY

(a quarterly journal devoted to research on ageing)

Vol. 34 No. 2, 2020

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Indian Journal of Gerontology

(A quarterly journal devoted to research on ageing)

ISSN : 0971-4189

Approved by UGC - (Care List, Science)

SUBSCRIPTION RATES

Annual Subscription

US \$ 80.00 (Including Postage)

UK £ 50.00 (Including Postage)

Rs. 800.00 Libraries in India

Free for Members

Financial Assistance Received from :

ICSSR, New Delhi

Printed in India at :

Aalekh Publishers

M.I. Road, Jaipur

Typeset by :

Anurag Kumawat

Jaipur

Contents

1. Burden of Women Caregivers Looking After Persons with Dementia 153
Sam Sangeeth, G., M. Daniel Solomon and P. Illango
2. Home Away from Home: Profile of Old Age Home and its Inmates 170
Sukanya Rajan and Sudhir
3. Mediating Role of Social Media Network on the Relationship
between Ageing Perception and Loneliness 177
S. Gopal Jee
4. Music Therapy: A Catalyst for Promoting Well Being of
Institutionalised Seniors 189
Anoop C Choolayil and Laxmi Putran
5. Are The Elderly Economically Dependent in India: An Analysis
From Census Data 203
P. Premalatha and C. Aruna
6. Demographic Ageing and Social Characteristics of Elderly: A Micro
Study among the Tiwas of Morigaon District of Assam 225
Barnali Das, and Chandana Sarmah
7. Unlocking The Potentials of an Older Workforce: The
Singapore Case 243
Kalyani K Mehta
8. The Role of Social Workers in the Care of Elderly 255
Chandrakala Diyali
9. Science of Ageing: Causes, Effects and Treatments 264
*Aishwarya Dash, Athira, K.S., Ipsita Pradhan, Ishani Panda,
Misriya, P.P.M, Mohammed Anshad, A.R, Ruksana Mahamood,
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Indian Journal of Gerontology

2020, Vol. 34, No. 2, pp. 153–169

ISSN: 0971–4189, UGC, Care List, Science

Burden of Women Caregivers Looking After Persons with Dementia

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ABSTRACT

The purpose of this study was to describe the burden of women care givers of persons with dementia. Forty rural women caregivers of persons with dementia were selected as respondents of the study. The persons with dementia were registered in the District Mental Health Programme (DMHP) Thiruvananthapuram in 2014. Regarding community-based community outreach center in Primary health centers. The carers were administered The Zarit Burden Interview (1980) individually. The Survey method was adopted to collect the demographic data from the selected respondents. The collected data was analyzed using the Statistical Package for Social Science and parametric z tests were used to draw the meaningful inferences. The less than half 42.5 per cent of the respondents were having a moderate level of burden, More than one third 35 per cent of the respondents were experiencing mild burden and Minimum 15 per cent of the respondents were experiencing severe burden and only 7.2 per cent reported to experience a little or no burden in caregiving. Based on the present findings, the researcher may conclude that the informal care rendered to chronically disabled older-adults and their burden has to be prevented and intervened.

International Labour organization must recognize the informal care. It is suggested that the future carers have to be attached to wellbeing centers for lessening the burden of informal caring and to provide sustainability to informal caregivers.

Keywords: Psychological burden, Informal Caregivers, Dementia.

Dementia is a public health problem that has been given priority (Mehta *et al.*, 2018). Apart from neurotic plaques, beta-amyloid, neurofibrillary tangles, Neuro-degeneration in the brain, and synaptic loss in areas like entorhinal cortex, amygdala, frontal, temporal, parietal, occipital, hippocampus and Para hippocampus is involved. (Banerjee *et al.*, 2016) There are 50 million persons with dementia around the world. It is estimated that 74.7 million by 2030 and 131.5 million by 2050 which triggers future preparedness to combat the disability. Dementia is increasing fast in Asia. There are 90 per cent are not diagnosed and they are without any mediation which great failure to health care (ADI 2015). Timely and early diagnosis has to be provided for older adults, who are more prone by creating awareness and training on insights of cognitive related deviations in older adults. Failing in awareness and timely and early diagnosis may boom in to serious outcomes in the future in terms of dementia. It is the responsibility of the family and government to provide health facilities and care to older adults with dementia.

The term dementia is extracted from the Latin term “demens” meaning “without mind”. Dementia is a brain disorder leading to disability. It is a cluster of diseases and not a single disease, so is called a syndrome, it is chronic degenerative disease without cure (Scoot, K.R., *et al.*, 2007). It is one of the main causes of disability prominently during an older adult stage and it is a great progressing concern in Asia to be mediated. Dementia is burdensome disease all over the world. (Dow *et al.*, 2018). It affects not only the person with dementia but also the carers of persons with dementia. It brings loss in cognitive functioning like thinking, remembering, and reasoning—and behavioural abilities to such an extent that it interferes with a person’s daily life and activities. These functions include memory, language skills, visual perception, problem-solving, self-management, and the ability to focus and pay attention. The neuropsychiatric problems or behavioural problems are listed as irritability, euphoria, dysphoria, aberrant

motor behaviours, agitation/aggression, anxiety, delusion, hallucination, disinhibiting (Cummings, *et al.*, 1994). First line of intervention is Non-pharmacological Intervention followed by pharmacological interventions (Lee, G.E., 2019).

Families are the oldest institution in society. Families are significant members in care chronic disability and in long term care. Even though the family is responsible the primary carer is located in the family to care for their loved ones. Carer's is "A person of any age, who provides unpaid support to a daughter, daughter in law, daughter, or friend who couldn't manage to live independently or whose health or wellbeing would deteriorate without carer's help". The neglect of older-adults is offensive Burden of care linked with upshots of caregiving, the coping strategies, and support system. Neurobehavioural symptom reflects the lower quality of life, in turn, predict higher burden in carers of persons with dementia (Chio, *et al.*, 2010). Carers experience invisible agony and found as the second patient.

Caregiving is a vital and mandatory component in dementia care (Das, *et al.*, 2014). Care and protection is a right. Care is manifested reciprocal care or intergenerational care to their parents and sometimes care is exhibited through constraining due to power dynamics and gender inequality. The primary women carers' burdens have to be put off by building support systems, installation of resilience, promoting respite, psycho-education, and enhancing health. The Carers wellbeing (without burden) has to be focused and promoted. The care to persons with dementia is rendered due to dependence and disability for the enhancement of dignity and quality of care to promote wellbeing among persons with dementia. Carer's health conditions like physical, mental, social and environmental are interrupted and detrition of health in every domain of life is fostered (Dow, *et al.*, 2018)

Informal care is an art and it is mandatory for persons with dementia. It is a contribution of family members to societal wellbeing. These costs and effects of informal caregiving are often excluded in economic evaluations of healthcare interventions that have to be included through the support of countries that are well established. The informal care is rendered by family members or relatives are

without monetary or materialistic benefits. This informal care in a family mostly without pay/remuneration and there is no earning member. The earning member will be with a disability or a 24/7 informal care, experiencing the empty nest stage. In this scenario the probability of burden is high. The mandates of dementia carers are Activities of daily living like bathing, grooming, dressing, exercising, toileting, and Instrumental activities of daily living like laundering, housekeeping shopping, and meal preparation and other foods since the functionality of their care recipients has failed them. Caring depends on the fulfillment of needs. Care is rendered for many reasons: - as free will offering, or as reciprocal care in the family system is given as a good amount of support to the recipients (persons with dementia). Length Informal caring (in terms hours in a day, days in a year) unmet needs, availability/Scarcity of resources and intensity of care rendering are some indicators which affect psycho-social health prominently. In addition, more setbacks to psychological health, physical, social, spiritual domains, and total quality of life and wellbeing of carers are affected by the burden of care. The burden is reflected as strain and stress. The effects of caring also affect the care delivery provision of persons with dementia. When caregivers are not healthy with good quality of life, burden encroaches. The social and community exclusion, lack of social network, and participation has more influence on family carers to experience burden (Rand and Malley 2014).

The caregiver burden has been defined as “a multidimensional response to the negative appraisal and perceived stress resulting from taking care of an ill individual” (Kim, H., *et al.*, 2012). The burden is “multidimensional and the imbalance between the social, psychological and economic consequences that permeate care unable to use strategies to cope effectively with care demands”(Burgio, L.D, *et al.*, 2016). When coping strategies fail burden increases. The family carers are informal carers they are not ascribed monthly payment for their labour but considered labour of love to care recipients without pay. Physiological, psychological, social, spiritual and ecological backwardness in carers aids carers of persons with dementia to fuel more with burden. The strong the association was found with more stress leading to more with burden (Pattanayak, R., 2016). The influence of care burden promotes distress like depression, anxiety, and stress (vise-versa). Informal carers experience less quality of life

due to the burden of care (Thomas, *et al.*, 2015). Due to more negativity engulfs, the quality in care deduces as the passing of time. It has been found by researchers that frequently female carers have more serious deterioration in the quality of life and by which burden proliferates. (Argimon, *et al.*, 2005; Thomas, *et al.*, 2015). This creates more vulnerability in the female population which is noticed in care pathways. The burden of carer's decreased when care recipient is subject to nursing –home admission, because it is the last resort of care (Thomas, *et al.*, 2005). Care needs greater patience, the mind of suffering more than all resilient spirit is mandatory. Women are labeled to be involved in the care of family with a multiplicity of roles and responsibilities which are ingrained in society as socially constructed ideology. These social constructive ideologies have to be uprooted and willingness to care must be conceived with both the genders through the enhanced support system. The gender-neutral approach has to be proposed in terms of informal care. Care labour has to be shared among primary carer and other members of the family which lessen the burden of care of primary carer. With care, engagement of older adults with chronic disability in different stages with various needs has to be met without which unmet needs persist at a large magnitude. Informal carers encounter deficits that may due to poverty underlying the family system and may be less labour force in the family. Assigning primary carer must be from their free will of the individuals in the family. The secondary carer's in the family has to support the primary carers which can be the factor to minimize the primary carers' burden. Collaborative partnership fetches ease in the process of care rendering.

The burden in carers depends on the behaviours problems of persons with dementia. The neuropsychiatric problems or behaviours problems are listed as: irritability, euphoria, dysphoria, aberrant motor behaviours, agitation/aggression, anxiety, delusion, hallucination, disinhibiting (Cummings, *et al.*, 1994). Neurobehavioural symptom reflects the lower quality of life, in turn, predict higher burden (Chio, *et al.*, 2010). Managing care and self-regulation are greater challenges of informal carers in the process of care i.e., the labour of love.

The women carers meet vivid problem in pathways of care especially persons with late-onset dementia, they are unable to manage

most of the situations in care labor because they are entrapped with lack of planning and scarcity of resources, lack of awareness/education and don't involve in timely and early identification are some drawbacks of carers. The physical ailments of carers dismay and fail them where health problems escalate and make them shed their hopes in caring for their loved ones and makes them resort to nursing home care. It is necessary to rescue the women carers from their noiselessness to voice out their demands like unmet needs in terms of carers of persons with dementia and their recipients, unwillingness to care, to promote gender equity among the informal carers of a person with dementia. To combat the menace against the women carers' with a chronic disability has to receive support or aid or help from stakeholders like local self-government, community, state, and governments. Supportive mediation, formal carer's psychosocial aid and subsidies for carers or care allowances/pension are essential from stakeholders to encourage and maintain sustainability of informal carers for persons with dementia.

Generally, women are discriminated against in the labour market. Women are ascribed with unpaid labors (domestic) converting their labour as informal by up staining them from formal labour. Women informal carers have to be liberated through a policy lens. In this situation, women were prevented to contribute to GDP. The care crisis is hampering women were 4 times as they are unpaid than men in Asia and Pacific (International Labour Organization 2018). It also interesting that men care rendering is mushrooming in a small fractions; it has to be encouraged in the families and stakeholders. Many feminist movements from various venues in the world are alarming on gender equity and justice yet total equal justice in terms of informal care has to be conceived. The negative effect of caregiving is a burden that has to be turned positive through precautionary measures. The cost of care and severity of the illness modulates burden (Keranena, *et al.*, 2003; Sales, 2003).

Activities to persons with dementia lessen the burden in carers (Dooley & Hinojosa 2004). The burden of carers can be lessened through sharing responsibility, spending quality time for self and their recipients with a neurocognitive disability, visiting recreational spots, arranging a get-together with friends and family members, enhanced

quality of care practices for recipients, accessible services, the proximity of care and care information, awareness and understanding, financial support, having secondary carer and flexible time are themes which emerged for obtaining wellbeing which decreases the carers' burden. Respite breaks are mandatory in care assignments which decreases the care burden of care laborer's. (Oliveira, D., *et al.*, 2017). Lack of Social support, Absence of social networking, social distancing, lack of neighbourhood relationships, absence of resilience, stress, strained hope, and humour, and lack of healthy family dynamics, no good planning, and decision making are some susceptible factors of burden. These negative factors have to be overcome for curbing burden.

Review of Literature

Some of the previous studies on the burden highlighted by various authors are as follows: -Shaji. K.S *et al.*, (2009) had invested through cross-sectional, non-randomized study. It aimed to determine the relationships between behavioural and psychological symptoms of dementia (BPSD), cognitive impairment, and burden of care of patients, with dementia. A of 65 elderly patients with dementia and their caregivers were respondents conducted over a 3-month period in January 2007 at the memory clinics. Cognitive impairment did not contribute significantly to Carers Burden. Multiple linear regression analysis showed that high BPSD scores contributed 0.27 more in Burden. Hong, G. R. S., & Kim, H. (2008) conducted a cross-sectional survey which compared demographic, clinical characteristics of caregivers and care recipients by caregiver type (i.e., daughter, son, daughter-in-law, and spouse) and to equate the caregiver burden among each type of caregiver with diagnosed persons with dementia. Spouse caregivers graded themselves as having poorer health and a reduced amount of social support than-adult child caregivers did. Those cared for by daughters-in-law were older and demonstrated more memory and behavioral problems than those by spouses, sons, or daughters. Spouses perceived the highest-burden among caregivers. Kim, M., *et al.*, (2012) retrieved a nationwide database to identify factors that affect caregiver burden in Korea. Stepwise multiple linear regression analysis was then accomplished to identify significant independent predictors of caregiver burden. Among caregiver-related factors, caregiver burden was higher in those who were female, had a

history of home care during the previous year, and had less education. Among patient-related factors, poor ADL/IADL function was significant. The most interesting result was that subjective sense of socioeconomic status (good/fair/poor) was a stronger predictor of caregiver outcome than actual economic costs. Schulz, R., *et al.*, (1995) reported that on dementia caregiving all studies reported elevated levels of depressive symptomatology among caregivers, and studies using diagnostic interviews reported high rates of clinical depression and anxiety. The evidence generally weaker for the association between caregiving and physical morbidity, psychiatric morbidity in caregivers was linked to patient problem behaviors, income, self-rated health, perceived stress, and life satisfaction. Physical morbidity was associated with patient problem behaviors and cognitive impairment and with caregiver depression, anxiety, and perceived social support.

Keeping in mind the issues of care burdon the present study was planned to understand the level of burden of care among informal primary carers of a person with dementia. The following were the objectives of this study:

1. To understand the demographic characteristics of informal primary carer's of persons with dementia.
2. To know the statistical difference between the age of the respondents and Burden.
3. To know the statistical difference between migration status of household and no migration status and burden
4. To know the statistical difference between years of caring and Burden

Methodology

Sample

Forty rural women caregivers of persons with dementia were selected as respondents of the study. The persons with dementia were registered in the District Mental Health Programme (DMHP) Thiruvananthapuram 2014 with reference to community-based outreach center in Primary health centers. The respondents were the carers of these people with dementia. All the 40 respondents of the sample were surveyed at their homes.

Tool Used

To measure the burden of care among informal carers' rendering care labour to persons with dementia, the Zarit Burden Interview (ZBI) was administered to primary women carers individually. ZBI (Zarit, *et al.*, 1980) was developed to measure subjective burden among caregivers of adults with dementia. It contains 22 items, which were generated on the basis of clinical experiences with caregivers and prior studies. The 22 item of this self-report inventory examines the burden associated with functional/behavioural impairments and the home care situation. The items are worded subjectively, focusing on the affective response of the caregiver.

Scoring/Interpretation

Each question is scored on a 5 point Likert scale ranging from never to nearly always present. Total score range from 0 (low burden) to 88 (high burden). The range from 0–20 score means little or no burden, 21–40 mild to moderate burden, 41–60 moderate to severe burden and 61–88 stands for severe burden.

The face to face interview was done in the home setting (community)caregivers

Analysis of Findings

The collected data was analyzed using the Statistical package for Social Science and parametric tests were exercised like T-test to draw meaningful inference.

Results and Discussion

Table 1
Demographic characteristics of woman primary informal carers

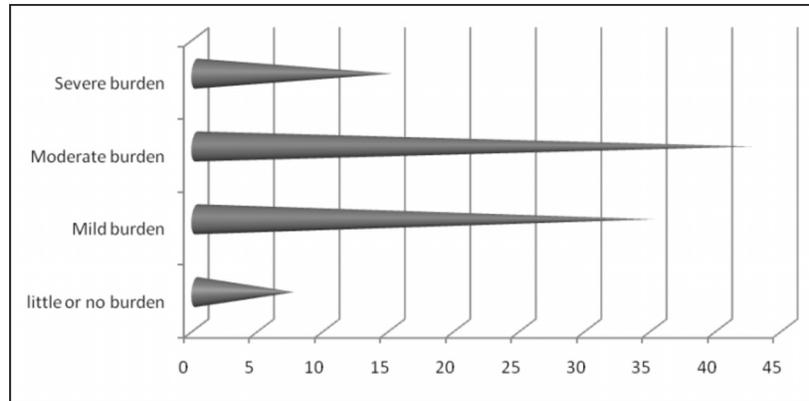
<i>Independent Variable</i>	<i>Classification</i>	<i>Frequency (N=40)</i>	<i>Percentage (%)</i>
<i>Basic profile of carers</i>			
Age	Above 40	20	50
	Below 40	20	50
Religion	Hindus	9	22.5

Cont'd...

Cont'd...

Caste	Muslims	17	42.5
	Christians	14	35.0
	OC	9	22.5
	OBC	17	42.5
	SC	14	55.0
Marital Status	Unmarried	5	12.5
	Married	31	77.5
	Divorced/ separated/ widowed	4	10.0
<i>Educational Detail</i>			
Educational in years	Up to 9 years	10	25.0
	10-11 years	11	27.5
	Above 12 years	19	47.5
<i>Family details</i>			
Family size	Upto 3 members	5	12.5
	4-5 members	24	60.0
	6-7 members	11	27.5
<i>Carers Migration</i>			
Migration in household	Has Migration	21	52.5
	No Migration	19	47.5
Type of Migration	Internal	6	15.0
	National	5	12.5
	International	10	25.0
	No Migration	19	47.5
<i>Carers details</i>			
Carer's Relationship	Wife	9	22.5
	Daughter	9	22.5
	Daughter-in-law	22	55.0
Years of care	Below 3	20	50.0
	4 and above	20	50.0
<i>Health perception</i>			
Perception on health	Very Good	6	15.0
	Good	5	12.5

Figure 1
Levels of burden of care in women carers with dementia care recipients



It is inferred that from pictorial representation concerning the level of burden of care. The less than half 42.5 per cent of the respondents were having a moderate level of burden, More than one third 35 per cent of the respondents were experiencing mild burden and Minimum 15 per cent of the respondents were experiencing severe burden and only 7.2 per cent reported to experience a little or no burden in care giving.

Table 2
Showing the significant of difference between age of the respondents and burden

Variables	Classification	Mean	Standard Deviation	Statistical Inference
Age of the carer	Below 40	40.35	13.651	Z = 842
	Above 40	44.10	14.498	P > 0.05 NS

The ‘z’ test analysis portrays in the above table stating that there is no statistical significance difference between age of the respondents and burden, ($z = 842, p > 0.05$) where calculated value is lesser than 1.96 and alpha is greater than 0.05. Additionally the mean score of respondent’s age below 40 years is 40.35 and mean score of the respondents above 40 years is 44.10 slight differences. Even thou there is no statistically significant difference between age of the respondents and

burden. The mean scores indicate respondents who had above 40 years of age experienced slightly higher burden (mean scores=44.10). This may be due age factor, creates burden by the accomplishment of more care related task.

Table 3
Showing significant of difference between migration status of carers of the respondents and burden

<i>Variables</i>	<i>Classification</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Statistical Inference</i>
Migration status in carers household	Has Migration	48.60	12.223	Z= 3.196
	No Migration	35.85	12.999	P<0.05 S

The 'z' test analysis expresses in the above table revealing that there is statistical significance difference between emigrational status of the respondents and burden ($z= 3.196$, $P<0.05$) where calculated value is greater than 1.96 and alpha is lesser than 0.05. Additionally the mean score of the respondents with migration status in the household has mean score (48.60) and no migration statuses in the household has mean score (35.85) and it is inferred from mean scores of households of having migrants has higher burden. This may be due to physical absent of a family member may be cause. Mostly migrations of husband will create burden to wives along with care obligations cares for the mother-in-laws

There is a significant difference between care in years of the respondents and burden

<i>Variables</i>	<i>Classification</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Statistical Inference</i>
Care in years	Below 3 years	44.65	13.747	Z=1.096
	Above 4 years	39.80	14.233	P>0.05 NS

The 'z' test analysis portrays in the above table stating that there is no statistical significance difference between years of care of the respondents and burden, ($z = 1.096$, $p > 0.05$) where calculated value is lesser than 1.96 and alpha is greater than 0.05. Additionally the mean

score of respondent's age below 3 years is 44.65 and mean score of the respondents above 4 years is 39.80. Even though there is no statistically significant difference between years in care of the respondents and burden but the mean scores indicate respondents who have care experience below 3 years possess slightly higher burden noticed in mean scores. This may be because without knowledge and lack of acquaintance with care procedure according to care situations according to personal manifestations of persons with dementia which creates more burdens. Tailor-made mediation is essential for informal carers, failing which triggers negative emotions are activated.

Conclusion

Informal care is an issue that has to be viewed in the policy lens. The burden has to be reduced in carers which is vital in addition to sustainability is obligatory. It is due to demand in labour supply and sustainability in terms of long term care. Care labor is challenging as persons' symptomological manifestation abounds but care procedures must be systematically planned and organized. The study states that, carer's burden must be reduced through multiple ways like yoga, breathing, and relaxation exercises. They are through policy planning, making and recommendation must on emancipation and empowering carer's psychological burden. The wellbeing centers must have a wing for persons with dementia and carers must be linked with psychological care, support, wellbeing link to psychosocial rescue satellite centers or wellbeing centers in the country or dementia care helpline connected all over the country. Timely diagnosis, early diagnosis, comprehensive assessments (socio-economic status) by which interventions have to plan interventions in the light of person-centered care must be timely and early where carers can lessen burden. The promotion of good family dynamics has to be initiated to loosen the burden of carers. Training, support groups of informal carers of persons with dementia have to be ensured. Utilizations of services like psycho-education on dementia, fostering respite services, attending social groups, exercising through aerobics, planning care plans systematically, practice of daily prayer, reading and meditating secret books like Bible can ease your problems. Regulating emotions through catharsis reduce the burden of care-giving. These have to be educated in early exposure to diagnosis and care which can reduce early-stage burden.

Constant caregiving without interruption or a break may bring adverse effects on informal carer's in care practice. Financial lag can promote migration to satisfy their needs. Volunteerism in youth has to be promoted or neighborhood assistance in terms of older adults, youth clubs have to be facilitated to assist the carers of persons with dementia in the community by bringing civic engagement in youth. The absence of jobs in the natives leads to migration but these people can come up as small entrepreneurs locally, if the scope is traced. Carers with migrants relatives can use social support groups. More labours of love (a long hour and prolonged care for more than 6 months) will be engulfed the carers with deviant health projecting due to overburden and lessening the quality of life. There is a chance of psychosomatic disorder. New learning has to be fostered in the individuals across the life span is the prime note for all to prevent dementia or neurocognitive disorder. Dementia care services have reached very minimal in Kerala, God's own country itself. DMHP is instrumental in diagnosis and distribution medicines in outreach but Home/community based psycho-education, psychosocial mediations has to fostered with rigor through psychosocial clinics or dementia care helplines in all parts of Kerala where the burden of care diminishes.

Acknowledgements: The author is thankful to ICSSR (Indian Council Social Science Research) for providing fellowship to carry out this research. The author also extends gratitude from the depths of his heart to Dr. Kiran, DMHP, and his team, Trivandrum for his encouragement and guidance. Finally he thanks to his brother Milton for the technical help.

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Indian Journal of Gerontology

2020, Vol. 34, No. 2, pp. 170–176

ISSN: 0971–4189, UGC, Care List, Science

Home Away from Home: Profile of Old Age Home and its Inmates

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ABSTRACT

This study was planned to prepare a profile of randomly selected five old age homes and their inmates in Madurai, (Tamil Nadu). All the OAHs were registered under the Society Act of the state. A questionnaire was prepared to explore the infrastructure of the old age homes and to prepare a profile of the inmates (N=95). Findings of the study suggest that connective tissue disorder (arthritis, pain in joints, etc.) is the most prevalent disorder among the elderly residing in these OAHs. The results show the pattern of living arrangements, recreation activities of the inmates. On the basis of the findings of this survey that these Old Age Homes lack the facilities of recreational and daily activities which may promote well being of these elderly persons.

Keywords: Old age homes, Living arrangement, Morbidity.

The recent trend of modernization and urbanization has given way to the emergence of the nuclear family systems and aged are considered as the burden in the family and society. Moving (migration) of youngsters from homes to faraway places in search of a job, which is common nowadays, has worsened the situation for elderly parents. There is a shift in the living arrangement of the aged

form family to old age home (Kaur, *et al.*, 2015). Around 52 per cent of old age homes are located in south India and Kerala is in lead with the highest number of old age homes followed by Tamilnadu. (Suganya, 2018). Old age homes are also categorized according to gender and some old age also have both the genders. The subcategories of old age homes are free old age homes, paid old age homes and free cum paid old age homes (Ibid.). Ageing also has an influence on the physical, psychological, and social aspects of an individual. It is also evident from the literature that the majority of the aged has more than one physical ailments. Health is also looked at in the broader way that is in the above-mentioned aspects. (Jacobs *et al.*, 2012).

The recent trend of Old age homes (OAH) in India is not as effective as the care system of senior citizens that are existing in the Western countries (Kaur *et al.*, 2015) . The present study was broadly divided into two parts: (1) to prepare the profile of the old age homes (or to find out the facilities provided in these OAHs) and (2) to prepare the profile of the inmates of these OAHs.

Methodology

Sample

There are around 32 old age homes registered under the Social Welfare Department in Madurai. The study included paid as well as unpaid old age homes, even geriatric care centre and old age homes for destitute were also included . For the current study, only five old age home were selected randomly. Written consent was obtained from the participant as well as from the supervisors of these OAHs. Ethical clearance was approved by the Gandhigram Rural Institute, Deemed to be university.

Tool Used

A self-prepared questionnaire and socio-demographic sheet including age, gender, physical health status were administered among the inmates individually.

Results

Profile of the old age home: OAH-A was established in the year 1976 under Societies Act, Sec 21 of 1866. It is managed by Christian

Missionary, Tamilnadu Theological Seminary, Madurai. Help age India donates Rs 500 per inmate every month. This home also gets donations from other sources. OAH-B was registered in the year 2009 but started functioning from 2003 itself. It was registered as Public Charitable Trust under Section 12 AA, 1961. It is especially for the bedridden and sick aged. Most of the inmates have difficulty in ADL activities. It is managed by the monthly fee of Rs 8,000 per inmate. OAH-C was established in the year 2007 under the Trust act. It is managed by the fee paid by the inmates, which is around Rs 5,000 per month. OAH-D was established in the year 1956 under the Societies act. It is one of the oldest homes in Tamilnadu. It is managed by the government. OAH-E was registered under the Societies act in 2003 and is managed by the Social Welfare Department. For the number of staff and living space of each OAH see table No. 1 given below.

Table 1
Structure of OAH (N=5)

Old Age Home	Type	No of inmates		Staff	Details of Infrastructure
		Males	Females		
A	Unpaid	60		Warden, Coordinator, Driver, Fund raiser, Cook, Accountant, Cleanser	Dormitory Two Blocks, dining room, prayer room
B	Unpaid	30	0	Supervisor Cook	Dormitory, dining room, yoga room, garden
C	Paid (Rs 8,000 pm)	2	63	physiotherapist, General Manager, Cashier, public relation officer, cashier, 2 sanitary workers, a mess supervisor and three cooks	2-3 sharing room,
D	Paid		10	Managing Trustee, a cook, a helper, cleaner and watchmen	2 sharing room
E	Unpaid		10	one supervisor and a watchman	Dormitory

As far as other facilities in the OAH are concerned, only OAH-A has transport facilities available for the inmates that is Van, Bike &

Auto. Monthly Medical checkup is done in all the OAH except OAH-B.

Table 2
Socio-demographic Profile (N=95)

<i>Variable</i>		<i>Frequency</i>	<i>Percentage</i>
Gender	Male	34	36
	Female	61	64
	Young old (60-69)	23	24
	Old-Old (70-79)	34	36
	Oldest old (79 and above)	38	40
Religion	Hindu	68	72
	Islam	24	25
	Christian	3	3
Marital status	Single	13	14
	Married	10	10
	Widow	49	52
	Widower	20	21
	Separated	3	3
Educational status	Illiterate	17	18
	Primary	38	40
	Senior secondary	27	28
	Graduates	13	14

Table 2 shows that the number of elderly women inmates is 64 per cent which higher than the male counterpart (36%). The majority of these women inmates were widows (52%) and separated (3%). It shows that the condition of elderly widows in the society is better. After the death of the husband, children/ relatives do not give proper attention to the condition of a widow. Elderly who are not properly educated and do not have financial security will have to live in unpaid old age home. 86 per cent inmates of in this study are not highly educated. Elderly of the age group from 70 yrs. and above have to face different kinds of morbidities and need proper care in the family. The common reason for joining old age homes was the inability of caregiver in the family (85%). The other reasons were to avoid conflicts at home (10%), children were working elsewhere /abroad (4%) and not interested to live with their daughter (1%).

Table 3
Physical health status

<i>Physical health</i>	<i>Presence of disease</i>	
	<i>Frequency</i>	<i>Percentage</i>
Vision	44	46
Hearing loss	35	37
Diabetics	46	48
Hypertension	38	40
Cardiovascular diseases	14	15
Gas intestinal problems	4	4
Respiratory problems	16	17
Connective tissue disorder	72	76
Skin problems	3	3
Neuro	9	10

Physical Health Status

Almost all the inmates had more than one disease at the time of admission in OAH. The majority of inmates had connective tissue disorders which include Arthritis and joint pains etc. followed by Diabetes (48%) and Hypertension (40%). As far as functional impairment is concerned only 40 per cent of the respondents are independent and 41 per cent need some assistance for ADL activities. The remaining 19 per cent of the respondent are dependent for ADL activities

Discussion

The present survey was conducted to prepare a profile the old age home and its inmates. It explored two sets of questions: (1) what facilities are available in the old age home ? and (2) what is the profile of the inmates residing in it.

The proportion of women inmates was more as compared to the men in these OAHs. This has also been found in the study done by (Jacobs *et al.*, 2012). Similarly, the proportion of respondents in the old-old category (70–79 yrs.) was highest as compared to the other age groups. The reason for residing in Old age home was given by these

inmates was that they did not have caregiver facility in their families (that there was nobody to look after them in their families).

Functional status can be seen to decline progressively with age. The independence of performing daily tasks also declines with age. (Ibid.) That has also noticed in the present study. The burden of comorbidity also rises with age. It was found out that some of the inmates had cerebrovascular diseases, heart disease, diabetes simultaneously. Similarly, hypertension and connective tissue disorders are the most common disease in females (Rowe & Kahn, 1997; Sahyoun, *et al.*, 2001, Jacobs, *et al.*, 2012)

In the present study, the most common reason for joining OAH was the inability of the family members to take care of the elderly person, which corresponds to the study done by (Liebig, 2003). Most of the aged preferred to stay in a familiar environment where they already have a social network. This is one of the contributory factors for the well being of the elderly. (Gilleard, *et al.*, 2007; Wiles, *et al.*, 2012).

Certain implication emerges from the present findings of this survey. Research specifically among aged needs to be streamlined according to the need of the aged. Most of the focus should be on the qualitative aspect to get more specific and accurate findings. One of the limitations of the study is the sample size was small and this group cannot be taken into account for representing the institutionalized aged population.

Conclusion

It was observed in the study that most of the old age homes are congested and don't have the infrastructural facilities which are needed for an old age home. The condition of unpaid old age homes (which are getting a grant from the Government) is very poor. Such OAHs do not have the required number of rooms and staff. Some old age homes, not charging money from inmates, are getting donations from various agencies are better to run in comparison to run by Government or dependent on grants from the Government (an example is OAH-A). No old age home of this study has proper facilities for recreational activities. Medical facilities are also very poor and some of the old age homes did not have immediate medical facilities in any emergency.

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Indian Journal of Gerontology

2020, Vol. 34, No. 2, pp. 177–188

ISSN: 0971–4189, UGC, Care List, Science

Mediating Role of Social Media Network on the Relationship between Ageing Perception and Loneliness

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ABSTRACT

The present study was attempted to explore the positive role of social media network in explaining the relationship between ageing perception and loneliness of the elderly population. Hundred elderly people (52 male and 48 female) age range between 60–78 years (mean = 66.50, SD = 5.13) were assessed on self-report measure of ageing perception questionnaire, Social media use integration scale, and UCLA loneliness scale. The analysis revealed that the status of social media networking was positively correlated with various dimensions of ageing perception (except control negative) and negatively correlated with loneliness. The findings of stepwise multiple regression analysis revealed that social media networking emerged as the best predictor of loneliness followed by consequences negative and consequences positive (dimensions of ageing perception). To examine the mediating role of social media networks in ageing perception-loneliness relationship a mediation analysis was carried out. The results explained the mediation role of social media network on the relationship between ageing perception and loneliness decreased when social media network is introduced as a mediator. The results have been discussed in the light of available researches.

Keywords: Elderly person, Social media, Ageing perception, Loneliness.

One of the major hazards to older people's well-being is loneliness. Loneliness is the subjective, unwelcome feeling of lack or loss of companionship. It is distinguished from social isolation; While the latter reflects an objective social situation characterized by a lack of relationships with others, loneliness is a marker of the quality of a person's social interactions. As such, loneliness develops when one's social relationships are not accompanied by the desired degree of intimacy (De Jong Gierveld 1998, and Dykstra 2009). Impairment in social interactions and isolation, and contradiction in communications are major sources of stress, while supportive social relationships and intimacy cause increased emotional strength social communications further strengthen self-confidence in the elderly, and strengthening the social networks of the elderly can be a solution to the problem of loneliness in the elderly. Reduced social networks increase the sense of loneliness in the elderly and incoherent social networks are associated with depression, despair, and loss of well-being in the elderly, and subsequently affect the condition of loneliness of them (Holmén, and Furukawa, 2002; Giordano and Bjork 2012).

The social participation and integration of older adults are important aspects of healthy ageing. However, in general, older adults have smaller social networks than their younger counterparts due to changes in their life cycle stage, such as retirement or age-related losses, along with declining health and increasing mobility limitations. Consequently, with increasing age, an increasing proportion of older people experience feelings of loneliness, and social isolation (Umberson and Montez 2010; Delmelle *et al.*, 2013).

A social networking site is a part of social participation which represents an online community wherein members share their personal information by creating "profiles" with the purpose of communicating with other users of SNS (social network service) in different ways and an array of topics. They serve a variety of purposes like 'social searching' – with the purpose of finding information regarding offline contacts, and 'social browsing'-developing new connections with different individuals, befriending new people increasing social capital. Social media has grown in popularity and a plethora of social network sites (SNS) exist today. People can build up

their personal networks as social media enables them to meet others, develop relationships, as well as maintain relationships via online platforms (Lin & Lu, 2011). Researchers have established the existence of a positive relationship between SNS's usage and the psychological well-being of an individual (Kim & Lee, 2011). Having a large number of friends on facebook increases an individual's sense of well-being due to a favorable representation of oneself to others; this can also, be mediated by self-disclosure and friendship quality rather than have a direct influence on well-being (Wang *et al.*, 2014). Huang (2010) has reported that social communication via internet is a positive predictor of psychological well-being.

Attention to the needs of the elderly is a social necessity and it seems that evaluating the social network and the well-being of the elderly can be useful in a better understanding of their needs. Previous studies that have analyzed the relationships between loneliness, social media networks, and the living environment have often been based on bivariate relationships or included only a limited number of variables. Nevertheless, previous research work did not present the mechanism of using social media networking on the relationship between ageing perception and loneliness. Therefore, the aim of this study was to explore the mediation role of social media networking in ageing-loneliness relationship.

The major objectives of the study were

1. To determine the association between positive ageing perception uses of social media networking and loneliness conditions.
2. To explore the relative contribution of using social media network and ageing perception in predicting the isolation conditions of the elderly persons.
3. To examine the use of social media network as a mediator between ageing perception and isolation conditions of elderly person.

Method

Sample

The present study was conducted on 100 elderly people (52 male and 48 female), age varying from 60 to 78, (Mean age = 66.50, SD = 5.03) from Varanasi by purposive sampling technique. The elderly people who were willing to cooperate and gave verbal consent were included in this study. Maximum number of participants belonged to the middle class socio-economic status.

Tools

The following tools were individually administered on the participants

1. *Hindi version of Brief Ageing Perceptions Questionnaire (B-APQ)*: The Brief-APQ (B-APQ) was developed by Sexton *et al.*, (2014) is a concise, multi-dimensional measure of ageing perceptions, which is psychometrically valid for the elderly. The APQ measure comprises 32 Likertscale items that represent seven ageing perception domains: timeline-chronic (items 1–5), timeline-cyclical (items 27, 28, 30–32), consequences-positive (items 6–8), consequences-negative (items 16–20), control-positive (items 10–12, 14, 15), control-negative (items 21–24) and emotional-representations (items 9, 13, 25, 26, 29). Participants rate their agreement with a five-point response scale with the options: Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree. The negative control and consequences scales were reverse coded so that higher scores indicated more positive perceptions of aging.
2. *Hindi version of UCLA loneliness scale*: Developed by psychologist Daniel Russell (1996). A 20-item scale designed to measure one's subjective feelings of loneliness as well as feelings of social isolation. Participants rate each item as either O (often) 4 score, S (sometimes) 3 score, R (rarely) 2 score, N (never) 1 score. The Scale includes 10 negatively worded and 10 positively worded items that have the highest correlations with a set of questions that are explicitly related to loneliness. The revised version of the scale has high discriminative validity. The revised loneliness scale

also has a high internal consistency, with a coefficient alpha of 0.94.

3. *Social media use integration scale*: Social media use integration by utilizing the ten-item SMUIS suggested by Jenkins-Guarnieri *et al.* (2013). Six of the items represent Social Integration and Emotional Connection (SIEC), while the other four represent Integration into Social Routines (ISR). The ten items were operationalized using a fivepoint Likert type scale format, anchored 1=strongly disagree and 5=strongly agree. High mean values would, therefore, represent high levels of social media use integration.

Procedure

The participants of the present study were contacted individually. Before the administration of the questionnaires, the participants were briefed about the purpose of the study. After getting the consent of the participants the aforesaid questionnaires were administered as per the standard instructions of each questionnaire. All participants were requested to ensure that they have responded to each item of every questionnaire.

Results and Discussion

One of the major objectives of the present study was to determine the correlation between positive ageing perceptions, using of Social media network and the loneliness of elderly people. In order to determine this relationship, bivariate correlation was computed and obtained results have been displayed in Table 1.

It is evident from table-1 that total positive ageing perception as well as consequences positive and timeline cyclical is positively and significantly correlated with using social media network and negatively and significantly correlated with timeline chronic and emotional representation. The observing dimensions of ageing perception correlated negatively to loneliness (consequences positive $r = -0.19$, $p < 0.05$, control positive $r = -0.20$, $p < 0.05$) and four dimensions of ageing perception correlated positively with loneliness (timeline chronic $r = 0.23$, $p < 0.05$, consequences negative $r = 0.36$, $p < 0.01$, control negative $r = 0.20$ $p < 0.05$ and emotional

Table 1
Bivariate Correlation of various dimensions of ageing perception, using social media network with loneliness

<i>Measures</i>	<i>Ageing perception</i>								
	<i>Using social media</i>	<i>Timeline chronic</i>	<i>Consequen positive</i>	<i>Control positive</i>	<i>Consequen negative</i>	<i>Control negative</i>	<i>Timeline cyclical</i>	<i>Emotional represent</i>	<i>Total Aging perce</i>
Using social media network	-	-0.22*	0.23*	0.24*	0.18NS	0.13NS	0.25*	-0.21*	0.20*
Loneliness	-0.73**	0.23*	-0.19*	-0.20*	0.36**	0.20*	-0.14	0.24*	-0.28**

* P < 0.05, **P < 0.01

representation $r = 0.24$, $p < 0.05$). Looking at the results from this table shows that Loneliness is negatively and highly significantly correlated with using social media. It means that loneliness is reduced as using of social media increase.

The observed pattern of correlation between ageing perception and using social media network suggest that with the successful use of social media, older adults report enhanced feelings of control and expectation of positive consequences. The use of social media by older people can offer valuable additional support in cases of sickness and diseases (Leist 2013). In terms of meaningful social exchange, social media can be used as a means to provide and receive social support, overcome loneliness, as well as to enhance feelings of control and self-efficacy (Xie B *et al.*, 2012).

However, as the relative significance of various dimensions of ageing perception and using social media network in predicting the loneliness of elderly people cannot be determined by a simple bivariate correlation, stepwise regression analysis was conducted using social media network and dimensions of ageing perception as predictors and loneliness as a criterion variables. The result has been presented in table-2

Table 2
Stepwise multiple regression analysis using social media and dimensions of ageing perception as predictors and loneliness as a criterion variables.

Predictors	Loneliness (Criterion)							
	R	R2	Adjusted R2	R2 change	F change	B	Beta	t
Using social media	0.73	0.54	0.54	0.54	112.98**	-2.00	-0.71	11.08**
Consequences negative	0.77	0.59	0.59	0.07	15.17**	0.76	0.19	2.87**
Emotional representation	0.79	0.62	0.61	0.03	6.39**	0.89	0.17	2.83*

* $p < 0.05$, ** $p < 0.01$

The results revealed that using social media emerged as the best predictor of loneliness contributing 54 per cent of total variance

followed by dimensions of ageing perception “consequences negative and emotional representation which is the second-best predictor contributing 7 per cent and 3 per cent of the total variance. The findings suggest that social media confers health benefits through decreases in the loneliness of older people. Technology has the ability to enhance and enrich the lives of older adults by facilitating better interpersonal relationships. Using the Internet is associated with lower depression and loneliness and higher levels of social support, life satisfaction, purpose in life, and social capital (e.g., bonding with others and bridging social networks). Older adults often report using technology to prevent feelings of loneliness (Cotton *et al.*, 2012, Heo *et al.*, 2015, Zhang *et al.*, 2015, Vošneet *al.*, 2016). The latest researches suggested that limiting social media use to 45 minutes a day may lead to significant improvement in wellbeing. Elderly who limited their use of facebook, Instagram, and Snapchat to 40 minutes a day for three weeks had a significant reduction in loneliness as compared to control group (Chan *et al.*, 2015). A negative attitude about ageing and an older person also have significant consequences for the mental health of the older adults. Older people who feel they are a burden perceive their lives to be less valuable, putting them at risk of social isolation and loneliness.

Taken together, the preceding finding of the present study suggests that ageing perception is associated with isolation and loneliness as well as using social media. Further, it is also evident from the finding of the present study that using social media higher is associated with a low level of loneliness. This pattern of relationship among ageing perception, using social media and loneliness clearly support this speculation that the beneficial social support in elderly people is likely to be mediated by social media. However, the present study tried to empirically test this social media as a mediator between ageing perception and loneliness. The mediation analysis was conducted by running a series of hierarchical regression analyses using the spss script developed by Hays (20019).

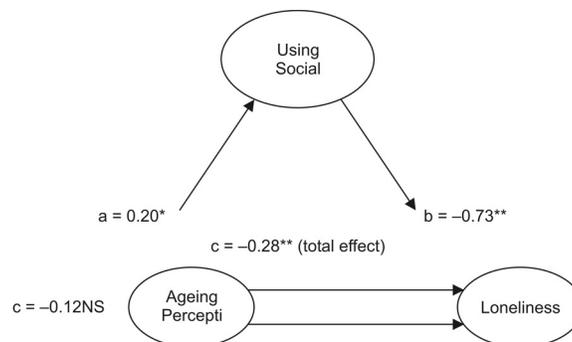
Table 3
Mediation effect of using social media on positive ageing perception–loneliness relationship

Testing step in mediational model	R	R2	R2 Change	F change	B	Beta	t
Testing step I Path a Predictor to mediator (Ageing perception to perceived stress)	0.19	0.04	0.04	4.03*	0.09	0.20	2.01*
Testing step II Path B Mediator to outcome (social media to loneliness)	0.73	0.54	0.54	112.89* *	-2.07	-0.73	10.63**
Testing step III Path C Predictor to outcome (Ageing perception to loneliness)	0.28	0.08	0.08	8.61**	-0.35	-0.28	2.93**
Testing step IV path C' mediation effect Predictor to outcome After mediation of social media					-0.15	-0.12	1.9 NS
1. Ageing perception							
2. Social media	0.745	0.55	0.55	60.59**	-0.19	-0.70	10.17**

* $p < 0.05$, ** $p < 0.01$

For this analysis total score on ageing perception was considered as predictor and the total score of loneliness was taken as a criterion variable. The mediation relationship of ageing perception and loneliness via using social media has been presented in Table 3 and Figure 1 along with the path coefficient.

Figure 1



It is evident from Table-2 and fig-1 that the total effect of positive ageing on loneliness (path C = -0.28) reduced substantially after controlling the indirect effect (mediation effect) of Social media resulting in a nonsignificant direct effect of positive ageing perception on loneliness (path C' = -0.12 NS). The product of the effect of Positive ageing perception on social media (path a = 0.20*) and effect of social media on loneliness (path b = -0.73**) was computed to determine the mediation effect of positive ageing perception on loneliness through social media. Sobel test is also significant (-1.96, $p < 0.05$) in this analysis. It indicates that social media can help alleviate the stresses of social isolation and loneliness. Social media provide social support and opportunities for engagement to older adults. The social media network has several functions including the provision of emotional, instrumental, appraisal, and financial support. At the same time, it is important to acknowledge that social media networks may involve both negative and positive interactions, with resulting health impacts (Berkman and Glass, 2000; Seeman, *et al.*, 2001; Berkman, 2009). Frequency of communication is often identified as an indicator of closeness among older people which can be increased with the help of social media. The main motivations for older adults to use social media are enjoyment, engaging in social contact, and to provide and receive social support. Especially if users engage in online social networking, they are motivated by feelings of enjoyment during use.

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Indian Journal of Gerontology

2020, Vol. 34, No. 2, pp. 189–202

ISSN: 0971–4189, UGC, Care List, Science

Music Therapy: A Catalyst for Promoting Well Being of Institutionalised Seniors

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ABSTRACT

The study was planned to assess the impact of music therapy on the general mood of institutionalised seniors objectively and to assess the general benefits experienced by the stakeholders subjectively. 15 elderly inmates (5 male and 10 female) from a government-run old age home in Kerala, (India) were the subjects of this study. The study employed a sequential design with a one-group before-after experimental design in the first phase over a period of six months followed by a qualitative exploration through interviews sampling. The therapy was designed and carried out by professional music therapists based on Carnatic music. The research findings revealed significant improvements in the mood of the participants. Besides, all the participants reported the therapy to be beneficial in three broad domains viz. physical, psychological, and social; multiple benefits reported under each domain through interviews. It may be concluded that the Music therapy has perceivable benefits on the lives of institutionalised seniors both from objective and subjective vantage points. It could, hence, be used as an intervention strategy to promote well being among institutionalised seniors.

Keywords: Music Therapy, Seniors, Old Age Homes, Well Being, Geriatric Care.

The transcendental – the truth, the goodness, and the beauty (aesthetics), is synonymous with the nature of being. These three aspects of transcendental are intertwined and attainment of any of these aspects in degrees ranging from the little to the utmost has always made man blissful and left him with a fascination for more. Aesthetics, among them all, is the one that everyone – from a little child to a senior – could appreciate and music has been an integral part of the so-called aesthetics. It fascinates men of all age groups. The soothing effect of music rightly captures the significance this transcendental has on the human psyche. It is owing to this aesthetic and soothing effect of music that it is given much importance in many of the cultures across the globe. Many studies emphasise the fact that music has a significant influence on human emotions; as music often leads to the creation of positive emotions. (Laukka, 2007). It is owing to this impact of music on the physical and psychological well being of human beings that music has gradually been developed into a therapy. Researches on music are plenty and the findings related to the effect and benefits of music on the human psyche constantly reiterate the importance of music. (Munro & Mount, 1978; Peters, 1987; Hanser & Thompson, 1994; Koger, *et al.*, 1999).

The effect of music on human beings as a whole has been a key research area but in particular, the effect of music therapy on the well being of the senior population has been a major research interest owing to the perceived effect of music therapy on both physical and psychological well being of seniors. Music therapy has been proven to be effective in helping seniors with dementia in aspects like maintaining good mental health and improvements in cognitive functioning (Ashida, 2000; Takahashi, & Matsushita, 2006; Chu, *et al.*, 2013). It is in the context of this influencing nature of music on well-being of older adults that this study was carried out among the institutionalised seniors in a government-run old age home Kerala, India.

The Benefits of Music Therapy: The Need for Capturing Subjective Voices

As a general trend, the studies on music therapy largely follow a quantifying approach to bring in objectivity to the findings. The majority of the studies had been employing a positivist approach in

understanding the impact of music therapy on particular dimensions associated with old age. A literature review on the impact of music therapy shows that most of the studies focus on medical dimensions following a quantification approach. Music therapy has been proved to be effective in enhancing the physical and mental condition of seniors with Alzheimer's disease. (Clair, & Bernstein 1990; Svansdottir & Snaedal, 2006; Guétin, *et al.*, 2009; Fukui, Arai, & Toyoshima, 2012). Music therapy has also proven to be effective in improving the health condition of seniors with dementia. (Lin, *et al.*, 2010; Ueda *et al.*, 2013; Sakamoto, *et al.*, 2013 Zhang, *et al.*, 2017;). Yet another area where music therapy has proven to be effective is the management of affective disorders, especially depression among older people. Music therapy has also been proven to be effective in reducing symptoms of clinical depression among seniors. (Chan, *et al.*, 2010; Liu, *et al.*, 2014; Werner, *et al.*, 2015).

It is notable that most of the studies on the benefits of music therapy follow a quantification approach where subjective experiences of the respondents are not often given due importance. The sense of subjective well being acquired by the seniors through music therapy is often ignored. The perception of a potential benefit and the ability to experience a benefit is subjective. The experience of well-being being as a subjective dictate requires a subjective inquiry that captures the perceived benefits and experiences of a person in place. It is against this background that this study employs a mixed methodology. In the first phase, a quantification approach is followed to capture the impact of music therapy on a single quantifiable domain viz. depression. In the second phase, an attempt is made to capture the subjective emotions and feelings of well-being among participants of music therapy.

Method

Sample

15 elderly inmates (5 male and 10 female), meeting the inclusion criteria, from a government-run old age home in Kerala, (India) were randomly selected for this study. It was made sure that the participants selected were free of any psychotic symptoms, free from any disabilities hampering mobility and willing to participate in music therapy sessions and give informed consent for the research.

Procedure

Phase I (Tools Used)

The *Beck's Depression Inventory*, (Beck *et al.*, 1996) which contains 21 items was administered individually to determine the level of depression of the respondents. and a Self-made questionnaire was also used to collect demographic information from each respondent.

The first stage in the initial phase involved collecting the baseline data, i.e. pre-intervention depression score through Beck's Depression Inventory by reading out and explaining each item to the respondents considering the fact that many of the respondents had difficulty in reading and writing. The scores obtained by individual respondents were coded and categorised.

The second stage, in the first phase, included music therapy intervention which involved daily practice over a period of 6 months. The therapy was designed in the lines of classical *Carnatic* music and the sessions were designed and implemented by professional music therapists. The third stage of the first phase involved collecting post-intervention data from the respondents using the same tool (Beck's Depression Inventory) to assess the levels of post-intervention depression scores. The data, thus collected, was coded and categorised for further analysis.

The fourth stage of the first phase involved data analysis using SPSS. The data was analysed to categorise the demographic profile, compare the mean depression scores of the group before and after intervention and test if there is a significant difference between the mean depression scores after the intervention through music therapy.

Phase II

The second phase of the study involved collecting qualitative data from the selected 15 respondents to assess the perceived effect of music therapy on the general subjective well being of the seniors. In-depth interviews were carried out at this stage and the content obtained was analysed with At last. The approach of data analysis employed at this stage was thematic analysis. Three broad themes were identified after the free coding of the interviews.

The data collected was assessed using SPSS 25 to quantify, categorise and establish relations among significant variables.

Findings and Discussion

Table 1
Demographic Profile of the Respondents

<i>Gender-wise Distribution of Respondents</i>	
Male	5 (33.3%)
Female	10 (66.7%)
Total	15 (100%)
<i>Distribution of Respondents based on Educational Qualification</i>	
Illiterate	3 (20%)
Primary	7 (46.7%)
Secondary	5 (33.3%)
Total	15 (100%)
<i>Distribution of Respondents based on Type of Admission</i>	
Voluntary Admission	5 (33.3%)
Admission by Others	10 (66.7%)
Total	15 (100%)
<i>Distribution of Respondents based on Duration of Stay</i>	
Less than one year	1 (6.7%)
One to two years	2 (13.3%)
More than two years	12 (80.0%)
Total	15 (100%)

Table 1 provides an insight into the nature of respondents chosen for the study. All the respondents were residents of the selected old age home and the majority of them did not choose institutional living voluntarily. The majority of the respondents were women. Most of the participants had been staying in an old age home for a period of more than two years. Almost everyone was able to at least read and write.

Table 2
Pre and Post Intervention Depression Score Categories

<i>Total Score</i>	<i>Frequency and Percentage</i>		<i>Levels of Depression</i>
	<i>Pre Intervention</i>	<i>Post Intervention</i>	
1-10	2 (13.3%)	15 (100%)	These ups and downs are considered normal
11-16	9 (60%)	-	Mild mood disturbance
17-20	1 (6.66)	-	Borderline clinical depression
21-30	3 (20%)	-	Moderate depression
Total	15 (100%)	15 (100%)	

Table 2 shows the depression scores of the respondents in the pre-intervention and post-intervention phases. It is noteworthy that only a minimal 13.3 per cent of the respondents were devoid of depressive features in the pre-intervention phase and the rest had some degree of mood disturbance; ranging from mild mood disturbance to moderate depression. The post-intervention depression score of the respondents fell under the single category of no traces of depression. It is noteworthy that there is a significant change in depressive symptoms after the introduction of music therapy.

Table 3
Pre and Post Intervention Mean Depression Score of the Group

<i>Stage</i>	<i>Mean</i>	<i>Standard Deviation</i>
Pre Intervention	14.2667	5.32470
Post-intervention	4.1333	2.35635

The pre-intervention depression score of the group is marked by a mean score of 14.2667 which implies that the group depression score fell under the category of mild mood disturbances. However, the standard deviation was 5.3247 which is high with respect to the small group size implying larger variations in the individual scores. In the post-intervention phase the mean depression score of the group has fallen considerably to a value of 4.1333 with a standard deviation of 2.35565 which could be accommodated in the normal depression score zone.

Testing the Hypothesis

Ho: There is no significant difference between the mean depression score of the target group after the intervention through music therapy.

Since the study has employed a mixed methodology and the initial phase is intervention based the sample size had been set to a limited number (n = 150). The test to determine the difference in mean scores before and after intervention through music therapy has hence been decided to be Wilcoxon signed rank test.

Table 4
Wilcoxon Signed Ranks Test

<i>Test Statistics</i>	
	<i>Post Test-Pre Test value</i>
Z	-3.415b
Asymp. Sig. (2-tailed)	.001

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

The Wilcoxon signed rank test shows that the observed difference between the pre-intervention phase and post-intervention phase is significant. It is hence suggested that music therapy could reduce depression among older adults living in old age homes.

Findings from Qualitative Phase

The analysis of the qualitative data came up with multiple benefits of music therapy reported by the participants. The method employed was free coding of the interviews with physical, social, and psychological benefits as the broad themes. Twelve thematic codes were identified falling under the broad themes. These twelve specific themes fell under three major themes reflecting the broad benefits of music therapy reported by the respondents. The three major themes and the corresponding sub-themes are as follows.

Table 5
Themes Pertaining to Subjective Benefits Experienced by the Respondents

<i>S. No.</i>	<i>Themes Pertaining to Benefits of Music Therapy</i>	<i>Corresponding Sub Themes Pertaining to Benefits of Music Therapy</i>
1.	Physical Benefits	<ul style="list-style-type: none"> • Avoiding Sedentary and Day Time Sleepiness • Sound Sleep during Night • Increase in Perceived Energy • Interest in Doing Activities
2.	Psychological Benefits	<ul style="list-style-type: none"> • Ventilation of Emotions • Sense of Happiness • Elimination of Loneliness and Boredom • Mental Relaxation
3.	Social Benefits	<ul style="list-style-type: none"> • Engagement in Group Activities • Learning New Things in Group • Group Feeling • Socialisation and Making Friends

The above table shows that all the respondents were able to relate music therapy with some benefits in their lives. Most of the seniors were able to identify more than one benefit they have gained through music therapy and the benefits they reported fell in one of the three broad benefits of music therapy identified through the literature. Surprisingly, music therapy was reported to have physical benefits than the other two domains. The seniors were experiencing benefits including better sleep, lesser day time sleepiness and sedentary, an increase in energy, and an interest in doing activities. It was also found that the respondents were able to experience benefits in psychological terms as well including ventilation of emotions, sense of happiness, elimination of Loneliness, and Boredom and Mental Relaxation. The reported social benefits included engagement in group activities, learning new things in a group, group feeling, and socialisation and making friends. A detailed outline of the first-hand statements of the participants is depicted in the networks provided in the appendices.

Conclusion

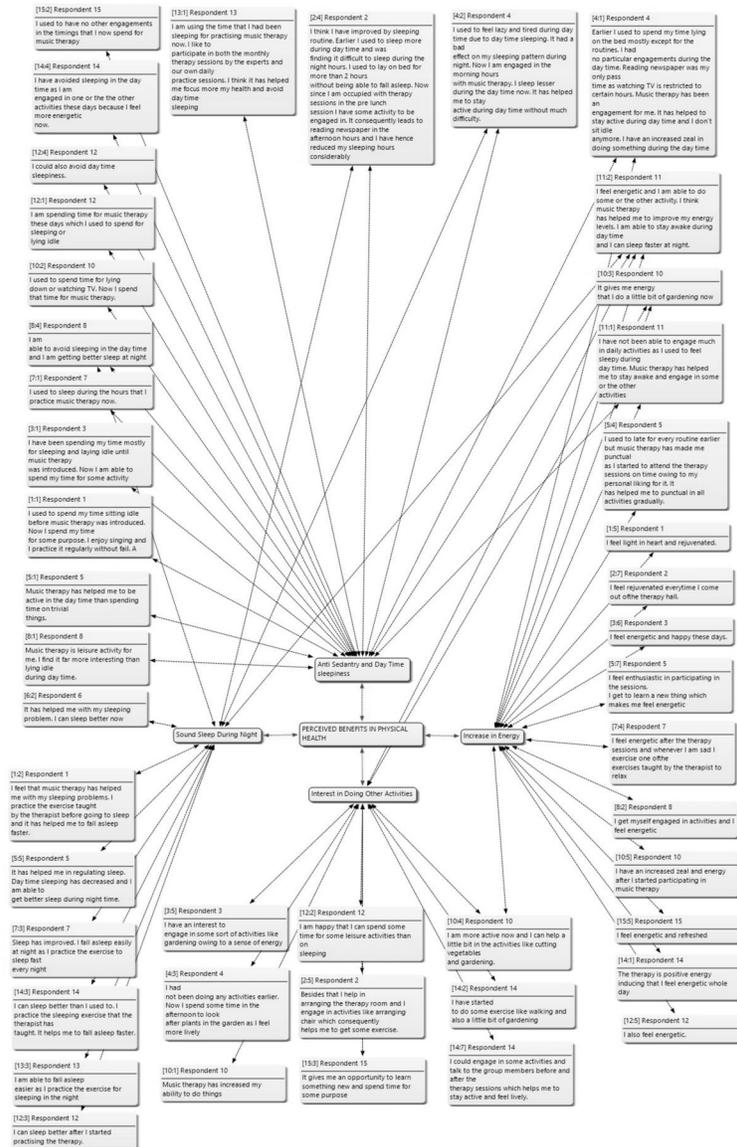
The findings of the study suggest that music therapy has a significant influence on the mood of the seniors. It is hence suggested that

Table 6
*Perceived Benefits: Content Analysis Output*****

<i>Perceived Benefits</i>	<i>Frequency of Benefits Reported by Respondents</i>															
	<i>R 1</i>	<i>R 2</i>	<i>R 3</i>	<i>R 4</i>	<i>R 5</i>	<i>R 6</i>	<i>R 7</i>	<i>R 8</i>	<i>R 9</i>	<i>R 10</i>	<i>R 11</i>	<i>R 12</i>	<i>R 13</i>	<i>R 14</i>	<i>R 15</i>	<i>Total</i>
Improvements in Physical Health	3	4	5	4	4	1	4	3	7	4	2	5	3	5	4	58
Improvements in Social Life	2	2	1	4	5	0	2	2	1	1	1	1	2	1	4	29
Psychological Benefits	3	3	3	1	3	3	2	2	1	2	1	1	3	2	1	31
Total	8	9	9	9	12	4	8	7	9	7	4	7	8	8	9	118

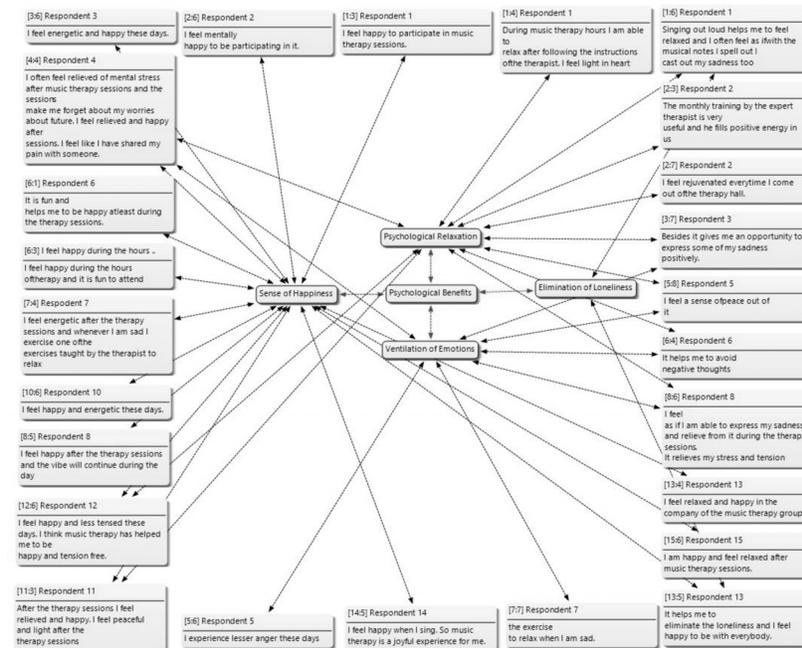
**** Generated using Atlas ti, based on interviews of participants

Figure 1
*Network of Quotes on Perceived Physical Benefits Reported by the Respondents**



* Generated using Atlas ti. based on interviews of participants

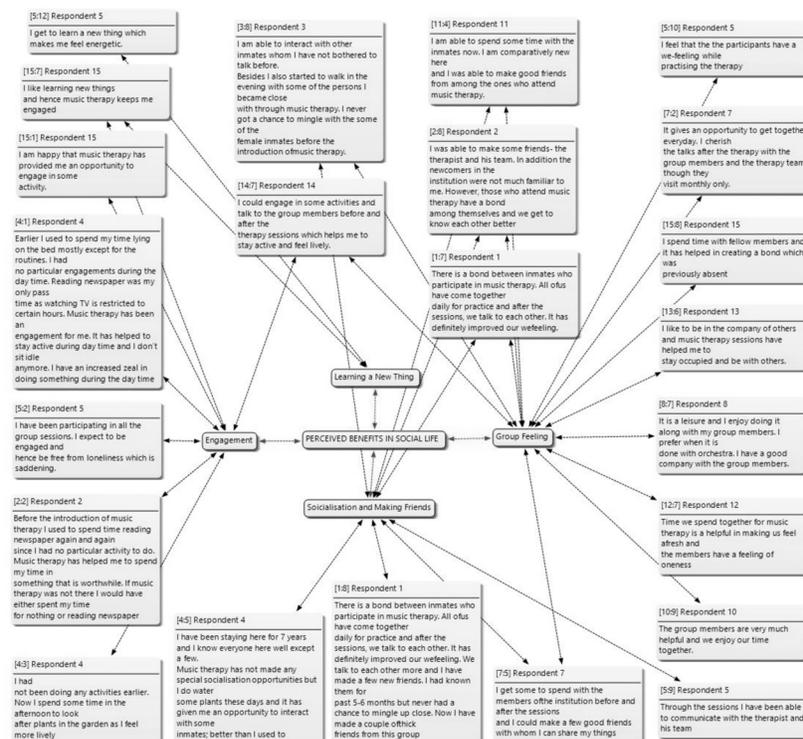
Figure 2
*Network of Quotes on Perceived Psychological Benefits Reported by the Respondents***



** Generated using Atlas ti, based on interviews of participants

music therapy be practised in old age homes where often a good number of people are vulnerable to depressive symptoms. It is also to be noted that the practice of music therapy is an opportunity for institutionalised seniors to spend time meaningfully with others. The seniors were able to experience an improvement in their overall well being in the physical, psychological and social domains. The subjective voices of the participants regarding the felt benefits of the therapy support the objective well being it promotes. Thus, music therapy is an effective intervention to assist seniors under institutional care to age in a healthy manner.

Figure 3
*Network of Quotes on Perceived Social Benefits Reported by the Respondents****



*** Generated using Atlas ti. based on interviews of participants

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Indian Journal of Gerontology

2020, Vol. 34, No. 2, pp. 203–224

ISSN: 0971–4189, UGC, Care List, Science

Are The Elderly Economically Dependent in India: An Analysis From Census Data

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ABSTRACT

The research article focuses on the pattern of workforce participation among the elderly force in India. The study examines the growth rate and sectorial changes in the elderly workforce. It also attempts to understand the linkages between the developmental process and workforce pattern of elders across the country. The analysis is based on census data of 1991, 2001, and 2011. The significance of the study lies in its attempt to understand the economic participation of older people as they are often considered as dependent populations and often remain out of the purview of scholarly research. Further, the study also focuses on how the structural changes at the macro-level affect the workforce participation of older people. The findings indicate that the elderly workforce also follows a similar pattern of normal workforce participation. An emerging trend of marginalization of the elderly workforce and declining growth rate of elderly non-workers is also noted. Sectorial changes with decreasing growth rate of cultivators in the elderly workforce and increasing growth rate in other sectors are noted. The paper negates the idea of the elderly as an economically dependent category of populations.

Keywords: Elders, Decadal pattern, Sectoral change, Workforce participation.

Ageing has emerged as an indispensable socio economic political and demographic phenomenon both for developed and developing countries. The relative increase in the number of elderly as a result of declining mortality and increasing life expectancy has contributed to the ageing population. At the current rate of demographic transition, population ageing in India is an emerging phenomenon and it comprises of the world's second-largest population of older people (Rajan, 2010). In India, the annual growth rate of the elderly population in India is higher than the growth rate of the total population (Dhillion and Ladusingh, 2013). The 2011 census shows that the elderly population constitute 8.58 per cent of the total population of India and it depicts 1.09 per cent increase from the previous census data (Census of India, 2011). The demographic shift towards population ageing has profound impact on the economy and society (Rajan, 2010) and is conceived both as an opportunity and a challenge to the society (Nasir and Ali, 2000). The societal response to ageing largely depends upon the country's socio-economic and political scenario. In the developed nations, early retirement has been a common phenomenon as the state support the elderly with monthly pension, medicare and social security measures (Leonesio, *et al.*, 2012) but in developing countries like India, the elderly have a different set of problems compared to those in developed countries (Reddy, 2015). The state allocates only 2 per cent of GDP to social protection schemes (Krzysztof, *et al.*, 2009) and only 11 per cent of the labour force is covered by some social security measures. Most of the previous research indicates that the older people continue to participate in the workforce till their latter age to ease the social and economic burden of ageing (Dhillion and Ladusingh, 2013). The workforce participation of older people in India is largely impacted by a wide ranging factors both at macro and micro level. First, at the macro level the new economic policy of 1991, has accelerated the informalisation of the workforce and reduced the growth rate of the organized sector employment (Dhar, 2014). The shift in the state policy from agrarian to industrial and service sector has influenced the work participation of the elderly. The new employment opportunities has created the demand for acquisition of modern education, continuous updating of new skills and

knowledge that estranged the older people from active work force participation and pushed them to the lower rungs of the informal jobs. As a result they are forced to work in poor working conditions with low wage thereby further deteriorating their working capacities. Second, depending upon the different socio economic conditions the older people are conditioned to work due to compulsion rather than their free will. Older people who worked in the formal sector are given compulsory retirement at the age of 58–65 with certain monetary and health care benefits. A large majority of older people work in the informal sector and live in poverty (Reddy, 2015). They are forced to work until their physical health declines since they lack access to social security measures such as pension support and insurance facilities (Rajan, 2010). Third, older people also continue to work to reduce their dependence on family members. Traditionally, the joint family arrangements provided adequate care and support and the elderly contributed in their own ways. However, with the changing economic and social changes along with urbanization and migration, older people are either left alone or live in nuclear families with lower social support. Under the conditions of lack of institutional and family support, the elderly have to depend on their day to day earnings to meet their basic needs (Reddy, 2015). Economically independent older people to some extent receive favorable treatment from their family members (Yadava, *et al.*, 1996) and are able to cope up with their changing importance in family with respect to decision making (Bakshi and Pathak, 2016). Fourth, denial of the working status of older people. Most of the elders working in formal employment are compelled to leave the job after retirement age despite being physically capable. Further, in demographic literature, old age dependency ratio is often used as an official statistic measure to calculate the economic burden of elders on population. The ratio is structured on the assumption that elders are often dependent and does not recognize the working status of elderly (Bhagat and Unisa, 2006). Further, a significant number of elderly people are economically active and failure to recognize their working status limits their rights regarding work protection, minimum wage security and poor working conditions and elderly abuse.

Therefore, the present paper focuses on the work participation of older people in India. Largely gerontological research focused on traditional informal support and formal support from the state. The workforce participation of elders is a significant area of study since the elderly are forced to work despite their failing physical health and are less addressed as the working population. The paper attempts to discuss the trends of the elderly workforce between the time periods 1991–2011 using census data.

Objectives of the Study

The overall objective of this paper was to analyze the elderly employment scenario in India. The specific issues focused in the present paper are (i) to examine the decadal trend in the workforce participation of older people across the states and Union Territories in India using 1991, 2001 and 2011 census data (ii) to examine the difference between the developed and less developed states with respect to the elderly workforce (iii) to explore the sectoral changes in the pattern of work participation among the older people. In this backdrop the paper focuses on three dimensions, i.e. time, sectoral difference and comparison between economic development of states and their elderly workforce participation.

Methodology

To understand the stated objectives, secondary data from census 1991, 2001 and 2011 is predominantly used. To know the work participation of elders, the census classification of workers i.e. main worker, marginal worker and non-worker has been applied. In addition, to examining the elderly workforce participation across the developed and less developed states, the per capita net state domestic product at factor cost current prices of the financial year 2011–2012 is used. To understand sectoral changes in the work force participation of the elderly, worker classification by industrial category as applied in the census is used.

Elderly Population in India

India holds the second largest elderly population in the world. With the decreasing mortality rate and increasing life expectancy, the elderly population in India has shown a steady increase (Vera-Sanso, 2015).

As per the 1991 census data, the total elderly population in India was 6.76 per cent in comparison to the total population. Among them, both male elderly and female elderly constitute an equal proportion (3.50%). In 2001, the elderly population constituted 7.45 per cent of the total population while a decadal increase of (0.69%) is noted among the elderly population from 1991 – 2001. A marginal increase in the female elderly population (3.78%) is noted compared to the male elderly population in 2001 census. The elderly form (8.58%) of the total population and reflect a marginal increase in the female elderly population, i.e. (4.36%) and male elderly is (4.22%) of the total population in the 2011 census.

The data indicate that the overall elderly population has gradually but consistently increased since 1991–2011. The pattern also shows a decline in the proportion of the elderly population with increasing age, i.e. in the old-old category. The sex ratio at the latter age depicts reverse pattern that the female elderly outnumber their male counterpart in contrast to the normal pattern of males outnumbering females. The trend indicates the phenomena of “feminization of ageing” in India.

According to census “work” is defined as an individual participation in any economically productive activity with or without compensation, wages or profit. Such participation may be physical / mental in nature. Work involves not only actual work but also includes effective supervision and direction of work. It even includes part-time help or unpaid help on farm, family enterprise or any other economic activity. Workforce include both main worker and marginal worker. Main workers are those who worked for 183 days or more during the reference year preceding the date of enumeration and marginal worker are those who worked less than 183 days in a year. Nonworkers are those who have not worked at any time during the reference period (Census 2001).

Table 2
Elderly Workforce Participation by Work Category

<i>Worker Category</i>	<i>Percentage of Elderly Worker and Non Worker Category Among Elderly Population</i>		
	<i>1991</i>	<i>2001</i>	<i>2011</i>
Main Worker	2,05,46,702 36.25%	6,06,42,929 32.11%	3,26,09,054 31.40%
Marginal Worker	16,35,513 2.89%	62,80,824 8.20%	1,05,84,288 10.19%
Total Worker	2,21,82,215 39.14%	6,69,23,753 40.31%	4,31,93,342 41.59%
Non Worker	3,44,99,425 60.87%	4,57,36,168 59.69%	6,06,55,698 58.41%

Source: Census 1991, 2001 and 2011.

The data depicts that the overall growth rate of the elderly workforce comprising the main and marginal workers showed an increasing phase of 39.14 per cent (1991) to 40.31 per cent (2001) to 41.59 per cent (2011). Among the elderly workforce, though the main worker comprises a larger proportion than the marginal worker in all three decades, it reflects a declining rate of 4.85 per cent from 1991 to 2011. With respect to elderly marginal workers, the pattern showed an increased growth rate of about 7.3 per cent from the period 1991 to 2011 despite constituting a smaller proportion than elderly main and non-worker categories. The elderly non worker showed the largest proportion compared to the elderly worker category in all three decades. However, the growth rate of elderly nonworker showed a decline of 2.46 per cent from 1991 to 2011. Overall, the elderly main worker and non-worker category witnessed a declining phase while the elderly in the marginal worker category showed an increasing trend depicting “marginalization of the elderly workforce”.

Workforce Participation of Elderly

The decadal trends in the workforce participation of the elderly population across the states and union territories is examined through the census data. The work participation of elderly is understood through their engagement as the main worker, marginal worker, and non-worker category

Table 3
State-wise Distribution of Elderly Main Workers Participation in India

Name of the State	Percentage of Elderly Main workers to total Elderly Population				
	1991	2001	2011	Change (1991-2001)	Change (2001-2011)
India	36	32	31	-4	-1
Jammu & Kashmir	NA*	32	21	NA*	-11
Himachal Pradesh	40	33	25	-7	-8
Punjab	30	31	28	+1	-3
Chandigarh	19	21	19	+2	-2
Uttarakhand	NA	31	30	NA	-1
Haryana	29	25	24	-4	-1
NCT of Delhi	23	21	22	-2	+1
Rajasthan	31	29	31	-2	+2
Uttar Pradesh	43	37	34	-6	-3
Bihar	40	37	33	-3	-4
Sikkim	54	46	38	-8	-8
Arunachal Pradesh	61	51	50	-10	-1
Nagaland	77	63	61	-14	-2
Manipur	54	41	44	-13	+3
Mizoram	44	44	43	0	-1
Tripura	35	32	29	-2	-3
Meghalaya	58	51	46	-7	-5
Assam	38	34	35	-4	+1
West Bengal	29	26	24	-3	-2
Jharkhand	NA*	29	23	NA*	-6
Odisha	34	28	24	-6	-4
Chhattisgarh	NA*	36	32	NA*	-4
Madhya Pradesh	42	35	35	-7	0
Gujarat	27	27	29	0	+2
Daman & Diu	25	24	23	-1	-1
Dadra & Nagar Haveli	39	36	31	-3	-5
Maharashtra	35	32	36	-3	+4
Andhra Pradesh	41	34	35	-7	+1
Karnataka	34	32	34	-2	+2

Cont'd...

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Goa	22	18	17	-4	-1
Lakshadweep	18	9	6	-9	-3
Kerala	23	17	19	-6	+2
Tamil Nadu	38	36	36	-2	0
Puducherry	25	21	18	-4	-3
Andaman & Nicobar Islands	37	28	22	-9	-6

* 1991 census data of Jammu & Kashmir, Jharkhand and Chhattisgarh was unavailable.

Source: Census 1991, 2001 and 2011.

It is noted from the table shows that at an all India level, the proportion of elderly main workers is a significant group but reflected a declining trend in all three decades with a decreasing growth rate of 4 per cent decline in 1991–2001 and 1 per cent decline in 2001–2011. Between 1991 and 2001, all states indicated a negative growth rate of elderly main workers except Punjab and Chandigarh. A greater reduction of more than 10 per cent decline among elderly main workers was noted in states like Arunachal Pradesh, Nagaland and Manipur. Between 2001 and 2011 states like Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, Daman & Diu, Assam, Manipur, Rajasthan, National Capital Territory (NCT) of Delhi showed positive growth in elderly main workers while states like Jammu & Kashmir, Himachal Pradesh, Sikkim, Jharkhand and Andaman & Nicobar showed the highest decline of more than 5 per cent. Overall between 1991 and 2011 states such as Haryana, Uttar Pradesh, Meghalaya, West Bengal, Orissa, Madhya Pradesh, Goa, Lakshadweep, Puducherry, Andaman & Nicobar Islands showed a decrease in the negative growth rate of elderly main workers while Himachal Pradesh, Bihar, Arunachal Pradesh, Nagaland, Mizoram, Tripura and Dadra and Nagar Haveli showed an increase in negative growth rate. States like Punjab, and Chandigarh showed a change from positive to a negative growth rate of elderly main workers. States like Delhi, Rajasthan, Manipur, Assam, Gujarat, Maharashtra, Andhra Pradesh and Kerala showed a change from negative to a positive growth rate of elderly main workers.

Table 4
State-wise Distribution of Elderly Marginal Workers Participation in India

Name of the State	Percentage of Elderly Marginal workers to total Elderly Population				
	1991	2001	2011	Change (1991-2001)	Change (2001-2011)
India	3	8	10	+5	+2
Jammu & Kashmir	NA*	11	15	NA*	+4
Himachal Pradesh	8	18	25	+10	+7
Punjab	1	5	5	+4	0
Chandigarh	0	1	1	+1	0
Uttarakhand	NA*	12	13	NA*	+1
Haryana	2	9	7	+7	-2
NCT of Delhi	0	1	1	+1	0
Rajasthan	5	10	13	+5	+3
Uttar Pradesh	2	9	13	+7	+4
Bihar	2	9	18	+7	+9
Sikkim	2	11	15	+9	+4
Arunachal Pradesh	1	9	10	+8	+1
Nagaland	0	7	10	+7	+3
Manipur	5	15	12	+10	-3
Mizoram	9	15	8	+6	-7
Tripura	2	8	9	+6	+1
Meghalaya	3	11	11	+8	0
Assam	4	7	9	+3	+2
West Bengal	2	6	7	+4	+1
Jharkhand	NA*	13	22	NA*	+9
Odisha	4	11	14	+7	+3
Chhattisgarh	NA*	12	16	NA*	+2
Madhya Pradesh	4	11	13	+4	0
Gujarat	4	6	6	+2	-2
Daman & Diu	5	4	2	-1	0
Dadra & Nagar Haveli	11	10	10	-1	-2
Maharashtra	4	8	6	+4	+1
Andhra Pradesh	2	7	8	+5	-1
Karnataka	3	7	6	+4	-1

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Goa	2	7	5	+5	-2
Lakshadweep	5	8	6	+3	-2
Kerala	3	5	6	+2	+1
Tamil Nadu	2	7	7	+5	0
Puducherry	1	3	3	+2	0
Andaman & Nicobar Islands	3	7	6	+4	-1

* 1991 census data of Jammu & Kashmir, Jharkhand and Chhattisgarh was unavailable

Source: Census 1991, 2001 and 2011

% in parenthesis

Regarding the data on elderly marginal workers, it is noted from table 4 that across the three decades (1991–2011) the elderly marginal workers showed a positive growth rate at an all India level. Between 1991 and 2001 almost all states showed an increase in the growth rate of elderly marginal workers except Daman & Diu and Dadra & Nagar Haveli. Himachal Pradesh and Manipur noted the highest positive rate of elderly marginal workers. Between 2001 and 2011, states other than Haryana, Manipur, Mizoram, Gujarat, Andhra Pradesh, Karnataka, Goa, Lakshadweep and Union territories (UT) Andaman & Nicobar and Dadra & Nagar Haveli showed positive growth rate. Bihar and Jharkhand showed the highest positive growth rate Mizoram showed the highest negative growth rate of elderly marginal workers. Overall, from 1991 to 2011 period, states like Himachal Pradesh, Punjab, Chandigarh, West Bengal, Maharashtra, Assam, Meghalaya, Nagaland, Arunachal Pradesh, Sikkim, Uttar Pradesh, NCT of Delhi, Rajasthan, Tripura, Odisha, Kerala, Madhya Pradesh and Tamil Nadu showed a decrease in their positive growth rate of elderly marginal workers. Bihar showed increase in positive growth rate, Dadra and Nagar Haveli showed an increase in negative growth rate. Haryana, Manipur, Mizoram, Gujarat, Andhra Pradesh, Karnataka, Goa, Lakshadweep and Andaman and Nicobar showed a change from positive to negative growth rate of elderly marginal workers.

Elders in many demographic and economic literature are often referred to as economically dependent populations. In order to arrive at this conception it is also necessary to analyse the growth rate of the elderly non-workforce in the country.

Table 5
State-wise Distribution of Elderly Non Workers Participation in India

Name of the States	Percentage of Elderly Non workers to total Elderly Population				
	1991	2001	2011	Change (2001-1991)	Change (2011-2001)
India	61	60	58	-1	-2
Jammu & Kashmir	NA*	57	64	NA*	+7
Himachal Pradesh	52	49	50	-2	+1
Punjab	69	65	67	-4	+2
Chandigarh	81	78	80	-3	+2
Uttarakhand	NA*	57	57	NA*	0
Haryana	69	66	69	-3	+3
NCT of Delhi	77	78	77	+1	-1
Rajasthan	64	61	56	-3	-5
Uttar Pradesh	55	53	53	-2	0
Bihar	58	54	49	-4	-5
Sikkim	45	44	47	-1	+3
Arunachal Pradesh	38	39	40	+1	+1
Nagaland	23	29	30	+6	+1
Manipur	42	44	44	+2	0
Mizoram	47	41	49	-6	+8
Tripura	63	60	62	-3	+2
Meghalaya	39	39	43	0	+4
Assam	58	58	57	0	-1
West Bengal	69	68	69	-1	+1
Jharkhand	NA*	59	55	NA*	-4
Odisha	63	60	62	-3	+2
Chhattisgarh	NA*	52	52	NA*	0
Madhya Pradesh	54	54	52	0	-2
Gujarat	69	67	65	-2	-2
Daman & Diu	70	72	75	+2	+3
Dadra & Nagar Haveli	50	54	59	-4	+5
Maharashtra	61	60	58	-1	-2
Andhra Pradesh	57	59	57	+2	-2
Karnataka	63	61	59	-2	-2
Goa	76	75	78	-1	+3
Lakshadweep	76	82	88	+6	+6
Kerala	74	77	76	+3	-1
Tamil Nadu	60	57	56	-3	-1
Puducherry	74	76	78	+2	+2

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Andaman & Nicobar Islands	60	66	72	+6	+6
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* 1991 census data of Jammu & Kashmir, Jharkhand and Chhattisgarh was unavailable.

Source: Census 1991, 2001 and 2011.

It is noted from table 5 that at an all India level the negative growth rate of elderly non-workers increased. Between 1991 and 2001, Himachal Pradesh, Punjab, Chandigarh, Haryana, Rajasthan, Uttar Pradesh, Bihar, Sikkim, Mizoram, Tripura, West Bengal, Odisha, Gujarat, Maharashtra, Karnataka, Goa and Tamil Nadu showed negative growth rate. Between 2001 and 2011, NCT of Delhi, Rajasthan, Bihar, Assam, Jharkhand, Madhya Pradesh, Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu showed a negative growth rate of elderly non-worker. Overall from 1991–2011, Himachal Pradesh, Punjab, Chandigarh, Haryana, Mizoram, Tripura, West Bengal, Odisha, Dadra and Nagar Haveli and Goa showed a change from negative to positive growth. NCT of Delhi, Andhra Pradesh and Kerala showed change from positive to negative growth rate. Arunachal Pradesh, Puducherry, Andaman & Nicobar Islands, Lakshadweep showed consistent positive growth rate while Gujarat, Karnataka showed a consistent negative growth rate of elderly non-workers.

Table 6

State Wise Comparison of Per capita Net State Domestic Product to Trends in Work force Participation of Elderly in India.

Rank of the states	Per Capita Net State Domestic Product At Factor Cost Current Prices	Change in the Elderly worker and non-worker participation rate					
		Main worker		Marginal worker		Non worker	
	2011–2012	1991–2001 2001–2011	2001–2011	1991–2001	2001–2011	1991–2001	2001–2011
Goa	1,68,024	-4	-1	+5	-2	-1	+3
Delhi	1,45,129	-2	+1	+1	0	+1	-1
Chandigarh	1,26,651	+2	-2	+1	0	-3	+2
Sikkim	1,08,972	-8	-8	+9	+4	-1	+3

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Puducherry	1,01,072	-4	-3	+2	0	+2	+2
Haryana	93,852	-4	-1	+7	-2	-3	+3
Maharashtra	99,564	-3	+4	+4	-2	-1	-2
Andaman & Nicobar islands	80,558	-9	-6	+4	-1	+6	+6
Tamil Nadu	92,984	-2	0	+5	0	-3	-1
Gujarat	77,485	0	+2	+2	0	-2	-2
Uttarakhand	73,819	NA	-1	NA	+1	NA	0
Kerala	69,943	-6	+2	+2	+1	+1	-1
Punjab	69,582	+1	-3	+4	0	-4	+2
Himachal Pradesh	68,297	-7	-8	+10	+7	-2	+1
Telangana	66,951	NA	NA	NA	NA	NA	NA
Karnataka	62,251	-2	+2	+4	-1	-2	-2
Arunachal Pradesh	60,961	-10	-1	+8	+1	+1	+1
Andhra Pradesh	58,733	-7	+1	+5	+1	+2	-2
Nagaland	55,582	-14	-2	+7	+3	+6	+1
Mizoram	50,956	0	-1	+10	-3	-6	+8
West Bengal	47,245	-3	-2	+4	+1	-1	+1
Tripura	46,050	-2	-3	+6	+1	-3	+2
Rajasthan	44,644	-2	+2	+5	+3	-3	-5
Meghalaya	43,766	-7	-5	+8	0	0	+4
Chattisgarh	41,165	NA	-4	NA	+4	NA	0
Jammu & Kashmir	40,089	NA	-11	NA	+4	NA	+7
Orissa	39,537	-6	-4	+7	+3	-3	+2
Jharkhand	34,721	NA	-6	NA	+9	NA	-4
Assam	33,087	-4	+1	+3	+2	0	-1
Madhya Pradesh	32,453	-7	0	+4	+2	0	-2
Uttar Pradesh	26,698	-6	-3	+7	+4	-2	0
Manipur	26,621	-13	+3	+10	-3	+2	0
Bihar	19,111	-3	-4	+7	+9	-4	-5

* Per capita income of Daman & Diu, Dadra & Nagar Haveli and Lakshadweep is unavailable. Include the per capita income of divided Andhra Pradesh.

Source: Handbook of statistics on Indian states, Reserve Bank of India 2016-2017.

The table shows the difference in the work participation of elderly main, marginal workers and non-workers in relation to the state's domestic product of 2011–2012. High per capita income states like Kerala, Karnataka, Maharashtra, Gujarat, NCT of Delhi and Andhra Pradesh and middle per capita income states like Rajasthan and low per capita income states like Manipur and Assam showed a positive growth rate of elderly main workers. With respect to elderly marginal workers, high per capita income states including Kerala, Uttarakhand, Himachal Pradesh, Andhra Pradesh, Sikkim, Nagaland, Arunachal Pradesh and Tripura and middle per capita income states like West Bengal, Rajasthan, Chattisgarh, Odisha and Jammu & Kashmir, and low-income states such as Uttar Pradesh, Assam, Jharkhand and Bihar showed positive growth rate. Elderly nonworkers in high per capita states such as Mizoram, Nagaland, Haryana, Punjab, Goa, Sikkim, Arunachal Pradesh, Himachal Pradesh, Tripura and UTs including Chandigarh and Andaman & Nicobar showed positive growth rate. Middle-income state comprising West Bengal, Odisha and Jammu & Kashmir showed an increase in elderly non-workers. However, none of the low income states showed positive growth in elderly non-workers.

As the elderly workforce differed across various states and showed the marginalization of the workforce, it is necessary to understand the sectoral difference between elderly main workers and elderly marginal workers to arrive at the overall scenario of elderly workforce participation.

Table 7
Sectoral Difference in the Elderly Work Force Participation

<i>Industrial Category</i>	<i>Elderly Main Workers</i>			<i>Elderly Marginal Workers</i>		
	<i>1991</i>	<i>2001</i>	<i>2011</i>	<i>1991</i>	<i>2001</i>	<i>2011</i>
Cultivator	56.12%	50.70%	41.60%	54.13%	32.71%	25.38%
Agricultural Labourers	22.51%	21.62%	27.85%	38.84%	49.92%	52.15%
Household Industry	2.45%	3.71%	3.32%	2.20%	4.69%	4.62%
Other Workers	18.93%	23.97%	27.23%	4.83%	12.67%	17.86%
Total	100%	100%	100%	100%	100%	100%

Source: Census 1991, 2001 and 2011.

It is evident from the table that the declining trend is noted across elderly main workers and elderly marginal workers in the cultivator sector compared to other sectors. It is more pronounced in the case of the elderly marginal workers as it was almost 29 per cent decline compared to the elderly main worker which was about 15 per cent decline during 1991–2011 period. Though the elderly workforce is largely concentrated in the cultivator sector, the elderly workforce as agricultural labourers has shown a steady increase of about 5 per cent in the case of elderly main workers and 13 per cent increase for the elderly marginal workers during 1991–2011. In the household industry, elderly main workers and elderly marginal workers have shown a marginal increase. Elders working in other sectors has also shown a rise of about 8 per cent in the case of elderly main workers and about 13 per cent in case of elderly marginal workers.

Discussion

Among the elderly population in the world, India is the second-largest country with a higher elderly population next to China (Rajan, 2010). The elderly population in India, constitute about 8.58 per cent in 2011, an increase of about 2 per cent from 1991. It is evident from the data that there was a marginal increase in the female elderly population compared to their male counterpart as it may attribute to the feminization of ageing in the near future (Vera-Sanso, 2013). It is noted that the proportion of elderly population decline with higher old age and the age group of 60 to 69 years constitute a higher proportion of the elderly population than other elderly age categories. The trend of the declining mortality rate and increasing life expectancy has accelerated the growth rate of the elderly population in both developed and developing countries (Reddy, 2015). Unlike developed countries where the elderly largely rely on institutional support in most of the developing countries, joint families provide elderly support in later ages. However, structural changes in family mainly due to urbanization and migration led to the displacement of family members, reducing joining families into nuclear families. This led to declining family support for elders in many developing countries and thereby the workforce participation of elderly constitute an alternative source of support in old age (Friedman, *et al.*, 2001). In India based on census data, the elderly workforce has shown an increase

from 39.14 per cent (1991) to 41.59 per cent (2011). Though the non-workers among the elderly constitute a higher proportion of elderly population, it shows a decline in growth rate from 60.87 per cent (1991) to 58.41 per cent (2011). The declining elderly non worker growth rate and the increasing growth rate of elderly worker category implies the rising significance of elderly workforce participation and disapproves the common idea that all elders are considered as the dependent category of working population (Bhagat and Unisa, 2016). Further among elderly workers, main workers showed a positive increase in 1991–2001 and a slight decline in 2001–2011. But elderly marginal workers showed a consistent increasing trend from 1991–2011. It is evident from the data that the reduction in elderly non worker and main worker growth rate is reflected in the increased growth rate of elderly marginal workers leading to the phenomenon of “marginalization of the elderly workforce”. A similar pattern is also noted in the normal workforce of 15–59 age groups (Motkuri and Naik, 2017). Further, the increase in elderly workforce disproves the idea that the elderly are largely economically dependent populations.

To understand the workforce composition of elders in India, it is important to understand the socio-economic and political factors specific to the states. Some of the predominant macro-level factors include the new economic policy of 1991, change in GSDP, varying level of state’s poverty rate and pension policy implications. First at all India level, the introduction of neo liberal policy, the normal workforce participation pertaining to main workers was expected to increase during 1991–2001 as the policy expected to provide a vital impetus for creation of new jobs (Borbora, 2016). In contrast, main workers witnessed a declining phase at all India level and it is also reflected in the declining growth rate of elderly main worker. Followed by the new economic policy, the shift from agricultural driven economy to industrial driven economy in post 1990s has changed the composition of workforce. Rural workforce that largely relied on agriculture weredisplaced to towns and citiesto work in industries giving rise to increased rate of urbanization and migration (Subramanian, 2015). As the result, elders who were excluded from this developmental process largely remained as unskilled agricultural labourers in rural areas and could not get employed in highly skilled

and organized formal sector (Subramanian, 2015). Moreover decline in the agricultural growth can also be attributed to seasonal employment resulting in the marginalization of elderly workforce.

Second, at the state level, the varying GSDP (Gross State Domestic Product) and pension policy also impact the workforce participation of elders. In the general view, the elderly work force is expected to decrease in high income states and increase in low income states depending on health care facilities, pension system and other institutional support system. With respect to elderly main worker, it has been noted from 1991–2011 census that some of the developed and industry driven high income states like Delhi, Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu and Kerala and middle income states like Rajasthan and low income state like Manipur showed positive growth rate of elderly main workers. Contrary to the basic assumption, most of the developed states has shown increase in elderly main workers compared to low income states. However, it is necessary to note that the income status of the state has to be correlated with the implementation of old pension system of the state. Among high income states, Kerala, Delhi, Tamil Nadu and Andhra Pradesh provide old age pension of more than Rs 1000 while Gujarat, Maharashtra and Karnataka provide less than Rs. 800. With respect to coverage except Kerala shows old age pension coverage of more than 50 per cent and other high income states shows poor coverage (State of pensions in India report, 2018).

Other major finding is high income states including Kerala, Uttarakhand, Himachal Pradesh, Andhra Pradesh, Sikkim, Nagaland, Arunachal Pradesh and Tripura has showed a positive increase in the growth of marginal workers. Middle income states like West Bengal, Rajasthan, Chattisgarh, Odisha and Jammu & Kashmir and low income states like Uttar Pradesh, Assam, Jharkhand, Bihar, and Madhya Pradesh also showed positive growth rate in elderly marginal worker. Most of the states has shown positive growth of elderly marginal workers compared to elderly main and non-worker. Among high income states, though the old age pension ranges from Rs 700–2000, most of the states shows minimal coverage less than 50 per cent. In middle income and low income states, both the old age

pension amount and the coverage is minimal attributing to marginalisation of elderly workforce.

With respect to elderly non workers high income states like Haryana, Himachal Pradesh, Punjab, Goa, Sikkim and Arunachal Pradesh and UTs including Andaman & Nicobar, Puducherry and Chandigarh has shown positive growth rate. Further, Middle income states such as West Bengal, Odisha, Mizoram and Jammu & Kashmir has also shown positive growth rate. It has to be noted that none of the low income states has shown positive growth rate of elderly non worker and it can be attributed that economic condition of elders is one of the prime reason for elderly workforce participation. Only among high income states, Goa and Haryana provide better old age pension system and shows positive growth rate of elderly non workers. Other high income states like Himachal Pradesh, Tripura, Nagaland, Arunachal Pradesh, Sikkim and middle income states like West Bengal, Odisha and Jammu & Kashmir have shown positive growth rate of both elderly non worker and elderly marginal worker.

Third, with respect to sectoral difference among the elderly workforce participation, the trend that is noted in the normal working population is also reflected to the elderly work force participation (Subramanian, 2015). The reduction in the proportion of cultivator among elderly work force, especially during post 1991 period may be due to structural change in state policy from agrarian to industrial and service economy. The reduction in agricultural jobs and growth in skilled jobs in industrial sector has implications of elderly workforce composition. This findings coincide with the overall decline in cultivators in the total workforce of the country (Ibid., 2015). Some of the reasons attributed are rapid shift from farm to non-farm activity, decline in agricultural productivity due to high fragmentation of farm land, increased income disparity between farm and non-farm activity, high risk factor associated with tilling and owning farm land. On the other hand increase in the elderly agricultural labourers among elderly main workers and elderly marginal workers can be attributed to the gain of fixed remunerative wage and involvement in other income earning activity. Further elders as agricultural labourers are seasonally employed unlike cultivators who are continuously engaged in economic activity (Ibid., 2015).

Conclusion

In India the elderly population constitute close to 10 per cent of the total population and is expected to rise to 19.1 per cent in 2051, 24.5 per cent in 2071 and 30.1 per cent in 2101 (Rajan, 2010). From the census data, it is evident that elders in the age group 60 to 69 years has shown a higher share of the elderly population compared to other old age groups. Among the elderly population, elderly females outnumber the elderly male which may attribute to the feminization of ageing in future (Vera Sanso, 2013). The increasing elderly population creates the need for increased family and institutional support. The structural changes in the family due to socio-economic conditions and inadequate social security programmes has compelled elders to work in later ages (Friedman *et al.*, 2001). In India, the elderly workforce has shown an increased growth rate while elderly nonworker has shown a decreasing growth rate despite constituting a larger proportion. This negates the common idea that the elderly are largely economically dependent populations. Within the elderly workforce, the elderly marginal worker showed a positive growth rate compared to elderly main and non-worker attributing to the phenomenon of “marginalisation of the elderly workforce” indicating the significant economic role of the elderly. The neo-liberal policy of 1991, shift from the agrarian to industrial and service-based economy, the varying GSDP of state, state’s implementation of pension scheme has contributed to structural and sectoral change in the elderly labour force. It is noted that among the high-income states, an increase in elderly main worker is found in those states that have minimal implementation of pension schemes. Middle and low-income states has largely shown an increase in elderly marginal workers. Further, high-income states that has a better implementation of the pension scheme has shown increase in elderly non-workers category and none of the low-income state has shown an increase in elderly non-worker. With respect to sectoral changes of elderly workforce, there is a reduction in the growth rate of cultivators among the elderly main and marginal workers though it constitutes a larger proportion of the elderly workforce. In other sectors including agricultural labourers, household industry and other worker category elderly workforce has shown an increased growth rate. The reason can be attributed to a

rapid shift from farm to non-farm activity, decline in agricultural productivity due to the high fragmentation of farmland, increased income disparity between farm and non-farm activity, a high risk factor associated with tilling and owning farmland (Subramanian, 2015). The present paper examines the growth pattern of the elderly workforce across the States and also examines the sectoral changes in the elderly workforce using census data. Moreover, an indepth analysis using the primary data is necessary to overcome the limitation of using secondary data. The research paper also opens the scope for further investigation into the gender dimension and workforce pattern of rural and urban elderly in India.

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Indian Journal of Gerontology

2020, Vol. 34, No. 2, pp. 225–242

ISSN: 0971–4189, UGC, Care List, Science

Demographic Ageing and Social Characteristics of Elderly: A Micro Study among the Tiwas of Morigaon District of Assam

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ABSTRACT

Demographic characteristics are important indicators of population ageing and also help in having an understanding of the social and economic condition of the population. The study presents some of the aspects of demographic ageing at a micro level among the Tiwas, a marginalised scheduled tribe of Assam. The entire population of three villages, namely Manipur, Sidhabari and Buragaon were enumerated to understand the level of demographic ageing among them. Index of ageing, median age, sex ratio and dependency ratio were calculated. To find out the social characteristics and socio-economic condition of the elderly (60+ years) the data were collected with the help of a demographic survey schedule. Interview (using a structured interview schedule) and observation methods were also used. The total population of the three villages was 3,837 persons, of which 50.64 per cent were males (N=1943) and 49.36 per cent were females (1894). 7.10 per cent males (N=138) and 6.44 per cent of the females (N=122) of the study area belonged to the 60+ age group. The Tiwas (tribals) of the study area are still a young population as is indicated by their median age of 25 and an index of ageing at 23.83. They are educationally and

economically backward. The joint family is still the dominant type of family and provides economic and social support for the elderly.

Keyword: Demographic ageing, Tiwa Morigaon district, Education, Occupation, Income group, Marital status, Living arrangement.

Population ageing is defined in terms of the ratio of the aged population to the total population. Three key demographic characteristics are mainly responsible for bringing about a significant change in the age structure of the world population. They are decline in fertility, reduction in mortality and increasing survival to the older ages. Population ageing is a global phenomenon affecting every man, woman and child (Devi and Bagga, 2006). The population of older persons is gradually growing, faster than the general population, mainly because of increased longevity and declining fertility (UN 2015). The increase in life expectancy on the basis of the context under which the population ages, is important. Factors like social security, living arrangements, health care, access to occupational pension, availability of kin and other social networks, mechanisms for care and support influence quality of life among the elderly. The latest data on life expectancy, demonstrate an increase in longevity in India from 49.7 years in 1970–75 to 67.5 years in 2009–2013. Life expectancy at 60 years has increased from 13.8 years in 1970–75 to 17.9 years in 2009–2013 (Rajan and Balagopal, 2017).

The elderly population is growing faster than the total population of the world. In the 1950s, the world population aged 60 years and above was 205 million (8.2% of the population) which increased to 606 million (10% of the population) in 2000. By 2050, the proportion of the older person is projected to rise to 21.1 per cent, which will be two billion in number. Asia has the largest number of world's elderly (53%), followed by Europe (25%). This is happening at all levels of the population, be it country, state, or region. This change in age structure may become apparent even in small communities living in different parts of the globe (Baruwa, 2015).

The proportion of elderly people to the total population in India according to 2011 census is 8.6 per cent. Some of the North-Eastern states of India and some Union Territories have a high proportion of the elderly population. Tripura (7.9%), Manipur (7%) and Assam

(6.5%) have a relatively higher aged population. The proportion of elderly persons in Arunachal Pradesh (4.6%), Meghalaya (4.7%), Mizoram (6.3%) and Nagaland (5.2%) are comparatively lower (Rajan and Balagopal, 2017).

Rajan and Johnson (2010), in their research paper, 'Demographic Ageing, Nutrition and Disease Pattern in India' discusses the growing trend of elderly people in India. The proportion of elderly people in India is increasing day by day and causing serious issues in biological as well as the sociological aspects. The authors discuss the increasing trend of numbers and proportion of the elderly in the Indian population by age group from 1961 to 2001 on the basis of census data, where they have found higher life expectancy in females who were also more vulnerable toward insufficient health care practices. The challenges of population ageing create a double burden of disease and disability in developing countries. Some of the common chronic diseases found among the elderly people are heart disease, respiratory disease, renal disorders, diabetes, hypertension, neurological disorder, cancer and other tumors, and prostatic disorders. Five types of disabilities visual impairment, hearing impairment, locomotor, speech and senility are reported by the respondents. The authors also emphasised the importance of ageing studies to understand the magnitude of the issue.

Ahmed and Smith (1992) made a study on "How changes in components of Growth Affect the Population Ageing of States". They estimated the population momentum and impact of mortality, fertility, and migration on changes in the proportion of persons age 65+. Their study revealed that declining mortality rates caused the population to age in virtually every state in every decade (between 1950 and 1980), but the effects were very small. The effects of changes in fertility rates were considerably greater. Population momentum generally had a greater effect on population ageing than change in either fertility or mortality rates.

Katz (1978) in his paper "Anthropological Perspectives on Ageing" utilizes the holistic and synthetic approach of anthropology to present certain issues and problems regarding age. Such an approach integrates the process of adaptation and evolution among the biological, socio-cultural, environmental and demographic dimensions

over time. The paper also examined world-wide and national demographic trends in the ageing and the effects of these trends on cross cultural adaptations to the aged. It concluded by emphasizing the magnitude of the demographic shifts through which we are living and draws attention to the potential role of anthropology in the attendant readjustment of society to that change.

Mathu and Sreedevi (2013) studied “Socio-demographic profile of the geriatric population in the field practice area of Kurnool medical college”. The sample consisted of 490 elderly subjects aged 60 years and above. Their study revealed that the majority of subjects in urban (56.33%) and rural (55.10%) areas were in the age group 60–69 years. Illiteracy was high among elderly from both urban and rural areas. Majority of rural subjects (40.41%) were not engaged in any occupation, compared to urban areas (17.55%). 46.94 per cent of rural subjects were living with their spouse and children as compared to 38.37 per cent in urban subjects.

Sarmah (2010) undertook a study on “Socio-economic condition of the Assamese elderly of Guwahati” and dwelt on the distribution of the elderly in different ages, their marital status, living arrangement, past and present occupation, the current source of income, problems of the elderly, etc. The social factors in ageing in the urban Assamese society are found to be aggravated by the changing cultural and socio-economic conditions. The social structure is undergoing change primarily due to change in the traditional occupational pattern.

Scope of the Study

In the North-East Indian context very few studies have been done on the demographic aspects of the elderly population specially among the tribes. In Assam, there are a number of communities living in the varied ecological conditions of Assam. Most cultures have a system of integrating the aged in their socio-cultural fold. The authors attempted in this paper to understand some demographic aspects of population ageing among the Tiwas (tribals) and to understand the social characteristics of the elderly.

Objective of the Study

This cross-sectional study was planned to understand the demographic aspects of population ageing among the Tiwa people (marginalised scheduled tribe of Assam) of three villages (Sidhabari, Buragaon and Manipur) in the Morigaon district, Assam. This micro level analysis of the study villages was done to understand some of the indicators of population ageing. The socio-economic conditions of the elderly (60 years and above) living in these villages were studied. The social variables such as their educational level, marital status, occupational status, economic condition and their living arrangement were taken care in the analysis of their socio-economic status.

Material and Methodology

Sample

The sample of the study consisted of 260 elderly persons (male=138 and female=122) of *Tiwas*, (*a marginalised scheduled tribe of Assam*) of age varying from 60 years and above, belonging to three villages; Sidhabari, Buragaon and Manipur in the Morigaon district, Assam.

The Tiwas are originally known as *Lalungs*. They are believed to have migrated from Tibet and settled down in Assam. They are of Mongoloid origin. They are mainly found in the district of Nagaon in Central Assam. They are spread in Kapili, Mayang, Morigaon, Bhurbandha, Kathiatali, and Kamrup development block areas. There are a few Tiwa villages in Dhemaji, Lakhimpur district, Jorhat, Kamrup district of Assam.

The people are mainly agriculturalists. Those who do not have any agricultural land, work as agricultural wage labourers or are involved in other semi-skilled jobs like masonry, carpentry, electrical work, pulling a rickshaw, etc. Women are predominantly housewives. The educational level of the people is low.

The Tiwas of the study area are patrilineal. Their social organisation is based on twelve clan structure. In marriage, they follow clan exogamy and tribe endogamy. Rice is the staple food of the Tiwas. Their two major meals consist of rice and vegetables. Meat, fish, and

eggs are also included in their menu. Pork and fowl are their delicacies. They take locally brewed rice beer ('zu') in their day-to-day life.

Tools Used

The socio-economic data was collected with the help of a *Structured Interview Schedule* and a *Household Survey Schedule* was used to collect demographic data. Education level was classified in the four categories (illiterate, primary, middle and HSLC and above) of educational attainment.

The modified *Kuppuswamy's SES Scale* (2014) was used to find out the socio-economic status of the sample. The categorization is done on the basis of the education, monthly income and occupation of the head of the family. The Kuppuswamy's Scale classifies economic groups in five categories. However, for the present study, three instead of the normal five groups were used. Lower-income group (scored less than 5), upperlower income group (scored 5–10), lower middle income group (scored 11–15), upper middle income group (16–25) and the last is upper income group with a score between 26–29. Due to the lesser number of subjects in some groups these subjects were classified into three categories of income groups: lower income, lower middle income and upper middle-income group. For marital status the sample was categorized into three types: unmarried, married and widow / widower.

Mainly three types of families were found among the elderly population: 1) elderly who were living alone or with an only spouse, 2) nuclear families and 3) joint families. Nuclear families were those families where unmarried children were living with their parents. Joint families were those families where both married and unmarried children were living with their parents or where unmarried or even married elderly live with their children in extended families along with their brother's family. Among the Tiwas of Assam, there is also the prevalence of the tradition of having a resident son-in-law. The third type of joint family is when the family has a resident son-in-law.

Result and Discussion

Table 1
Demographic Ageing of the Study Area

<i>Demographic Ageing</i>		
1. Proportion	Total	6.78
	Male	7.10
	Female	6.44
2. Median age	Total	25
	Male	26.75
	Female	25
3. Index of ageing		23.83
4. Sex ratio (females per 1,000 males)	Overall ratio	975
	0-14	891
	15-59	1,024
	60+	884
5. Dependency ratio	Total dependency	54.34
	Young dependency	43.88

Table 2
*Distribution of elderly population
(N=260; Male=138 and Female=122) by their social characteristics*

Age group	Sex	Educational Status			
		Illiterate	Primary school	Middle school	HSLC & above
60-69	M	29(41.43)	11(15.71)	13(18.57)	17 (24.29)
	F	59(75.64)	8(10.26)	6(7.69)	5(6.41)
70+	M	26 (38.24)	23 (33.82)	6 (8.82)	13 (19.12)
	F	40 (90.91)	3 (6.82)	1 (2.27)	-
Total	M	55(39.86)	34(24.64)	19(13.77)	30 (21.74)
	F	99(81.15)	11(9.02)	7(5.74)	5(4.09)

Age group	Sex	Occupational Status				
		Agriculture	Petty trade & wage earning	No longer involved in working	Housewives	Pension holders
60 - 69	M	47(67.14)	16 (22.86)	7(10.0)	-	-
	F	9 (11.54)	7 (8.97)	-	61 (78.21)	1 (1.28)
70+	M	16 (23.53)	6 (8.82)	46 (67.65)	-	-

Cont'd...

Cont'd...

Total	F	-	2 (4.55)	-	41 (93.18)	1 (2.27)
	M	63 (45.65)	22 (15.94)	53 (38.41)	-	-
	F	9 (7.38)	9 (7.38)	-	102 (83.61)	2 (1.64)
<i>Age group</i>	<i>Sex</i>	<i>Income</i>				
		<i>Lower</i>	<i>Lower Middle</i>	<i>Upper middle</i>		
60-69	M	31(44.29)	22 (31.43)	17 (24.29)		
	F	45 (57.69)	23 (29.49)	10 (12.82)		
70+	M	28 (41.18)	25 (36.76)	15 (22.06)		
	F	23 (52.27)	16 (36.36)	5 (11.36)		
Total	M	59 (42.75)	47 (34.06)	32 (23.19)		
	F	68 (55.74)	39 (31.97)	15 (12.30)		
<i>Age group</i>	<i>Sex</i>	<i>Marital Status</i>				
		<i>Unmarried</i>	<i>Currently married</i>	<i>Widow/Widower</i>		
60-69	M	-	58 (82.86)	12 (17.14)		
	F	3 (3.85)	40 (51.28)	35 (44.87)		
70+	M	-	44 (64.71)	24 (35.29)		
	F	2 (4.55)	13 (29.55)	29 (65.91)		
Total	M	-	102 (73.91)	36 (26.09)		
	F	5(4.10)	53 (43.44)	64 (52.46)		
<i>Age group</i>	<i>Sex</i>	<i>Living Arrangement</i>				
		<i>Living alone/with only spouse</i>	<i>Nuclear family</i>	<i>Joint Family</i>		
				<i>Married/Unmarried Children</i>	<i>Sibling's Family</i>	<i>With son-in-law</i>
60-69	M	7 (10.0)	11 (15.71)	47 (67.14)	3 (4.29)	2 (2.86)
	F	4 (5.13)	3 (3.85)	66 (84.62)	4 (5.13)	1 (1.28)
70-79	M	1 (2.04)	4 (5.88)	58 (85.29)	1 (1.47)	4 (5.88)
	F	-	2 (5.88)	36 (81.82)	3 (6.82)	3 (6.82)
Total	M	8 (5.80)	15 (10.87)	105 (76.09)	4 (2.90)	6 (4.35)
	F	4 (3.28)	5 (4.10)	102 (83.61)	7 (5.74)	4 (3.28)

(Figures in parentheses indicate percentage)

Table 3
Level of significance between the socio-economic variables and age, sex

<i>Socio-economic variables</i>	<i>Sex</i>	<i>Chi square</i>	<i>Degree of freedom</i>	<i>Probability</i>	<i>Results</i>
Education	Male	7.48	3	0.058	Not significant
	Female	5.44	3	0.142	Not significant
	Male + Female	46.9	3	0.000	Significant
Occupational pattern	Male	7.48	3	0.058	Not significant
	Female	6.75	3	0.080	Not significant
	Male + Female	203.	4	0.000	Significant
Income group	Male	0.440	2	0.802	Not significant
	Female	0.613	2	0.736	Not significant
	Male + Female	6.57	2	0.037	Not significant
Marital status	Male	5.89	2	0.015	Not significant
	Female	5.47	2	0.065	Not significant
	Male + Female	27.4	2	0.000	Significant
Living arrangement	Male	10.6	4	0.032	Not significant
	Female	5.09	4	0.279	Not significant
	Male + Female	6.64	4	0.156	Not significant

Significant at 0.05 level

Indicators of Population Ageing: To understand the phenomenon of demographic ageing among the Tiwas at a micro level, the following aspects were considered the proportion of elderly to the total population, median age, index of ageing, dependency ratio and sex ratio of the elderly.

Proportion of Elderly

Among the three villages of Morigaon district of Assam, the proportion of elderly (60+) is 6.77 per cent of the total population (N=3837; male=1943, and female=1894). There is some amount of gender difference in the proportion of the elderly in the three villages. The proportion of elderly males (7.10% of total male=1943) is slightly higher than females (6.44% of total female=1894). The total population (N=3837) was looked at from three broad age structures: 1) 0-14 years age category (28.43% or N=1091); 2) 15-59 years age

group (64.79%, N=2486) and 3) 60 years and above age group (6.78%; N=260).

Median Age

Median age was calculated from the total population of the three villages among the Tiwas of Morigaon district is 25 years. The median age calculated separately for males and females shown some difference. It is 26.75 in males and 25 years in females.

The median age of a population is the age that divides a population into two groups of the same size, such that half the total population is younger than this age, and the other half older. A manifestation of population ageing is the shift in the median age, the age that divides the younger from the older half of the population. Globally, the median age moved from 24 years in 1950 to 29 years in 2010, and will continue to increase to 2050. The faster ageing in the less developed regions is reflected in the big shift in the median age from 26 years in 2010 to 35 years in 2050, which represents an eight-year increase during a period of 40 years. The median age in the more developed regions increased rapidly between 1950 and 2010, from 28 years to 40 years, from 2010 on word the pace is expected to slow down and the median age is projected to reach 44 years in 2050 (World Population Ageing 2015).

Index of Ageing

The index of ageing is the ratio of the elderly population (60 years and above) to the child population (0–14 years) and is a measure of the level of population ageing. It takes into consideration both ends of the age distribution and captures the effect of fertility decline on population ageing (Rajan and Balagopal, 2017). Index of ageing among the ageing Tiwas of Morigaon district is 23.83. It indicates that among 100, 0–14 years of children, there is 23.83 or 24 elderly people.

Dependency Ratio

The dependency ratio is considered as one of the important measures of the population. It is a simple indicator of the relationship between the population independent ages and the population in the main working ages. It is generally used as an indicator of the burden of

demographic dependency in a population; that is how many ‘dependent’ needs to be supported by each person of working age. This ratio assumes that 15–59 years age groups is the ‘productive’ segment of the population. Population below 14 years of age and 60 years and above are the ‘dependent’ segment.

The dependency ratio indicates the effects of changes in population age structure for social and economic development and trends in social support needs.

$$\text{Dependency Ratio: } \frac{\text{Population (0 - 14)} + \text{Population (60 years and above)}}{\text{Population (15 - 59 Years)}} \times 100$$

The total dependency ratio among the Tiwas is 54.34 per cent per working-age group population. It indicates that in every 100 individuals of the productive age group there are 54 individuals who depend on them. Dependency may again be calculated separately for old age and as well as young dependents.

Old age dependency: In demography, the old-age dependency ratio measures how many persons in the main working ages are there to support each older person. In the present study, the old age dependency ratio is calculated as the number of persons aged 60 years or over divided by the number of persons aged 15 to 59 years. The old age dependency ratio is 10.46. It indicates that for every 100 persons in the 15–59 years age category, there are 10 elderly dependents.

Young dependency: The young dependency measures how many children in the population the working-age group person need to support. This ratio is measured the number of persons 0–14 years per one hundred persons aged 15–59 years. The dependency ratio among the study population is 43.88. This is also an indirect indicator of the rate of fertility in the population.

A high dependency ratio indicates that the economically active population and the overall economy face a greater burden to support and provide the social services needed by children and by older persons who are often economically dependent. A high young dependency ratio, for instance, implies that higher investments need to

be made in schooling and child care. And in the case of elderly, the investment should be in the areas of health care and support services.

As fertility levels decline, the dependency ratio falls initially because the proportion of children decreases while the proportion of the population of working age increases. As fertility levels continue to decline, dependency ratios eventually increase because of the proportion of working-age starts declining and the proportion of older persons continues to increase. Among the Tiwas of the present study, the young dependency is higher than the old dependency indicating continuing higher fertility.

Sex Ratio

The sex ratio is defined as the number of females per thousand or a hundred males. It is an important and useful indicator to assess the relative excess/ deficit of men or women in a given population at a point of time. Sex differentials can be due to differences in mortality rate, migration, the sex ratio at birth, and at times, the undercounting of women at the time of population enumeration. The sex ratio of populations in villages and towns helps to know the composition of population distribution at lower levels and is also useful in micro-level planning (Das, 2011).

The overall sex ratio of Tiwa population of the study area is 975 females per 1,000 males. The sex ratio in the age group of 0–14 years is 891, i.e. the number of females is lower than males. In the 15–59 years, age group the sex ratio increases to 1,024 due to various social factors. However in 60 years and above age group the sex ratio decline to 884. This may be an indicator of less number of females surviving to older ages in comparison to males. In the 0–14 years age groups, the sex ratio favours males. But in the 15–59 years age group, the number of females is higher and in the 60+ years, the ratio is again towards more males.

Social Characteristics of the elderly Tiwas: To have an understanding of the social characteristics of the elderly Tiwas, the following aspects have been taken into consideration. They are their education, occupation, income, marital status, and living arrangement.

Education

Educational level and literacy rate is one of the important indicators of the level of development achieved by a society. The level of education plays a very important role in providing economic stability and better adaptive capacity to an individual to the changes taking place in society (Sarmah, 2006).

The educational level of the elderly Tiwas is low. Illiteracy (59.23%) is high and especially among females elderly. 40.77 per cent of the elderly Tiwas are literate. Literacy level among the males (60.14%) is higher than the females (18.85%). Among the literates, 21.74 per cent male elderly have studied to the level of HSLC or above. The relative figure for the female elderly is much less (4.09%).

The chi square test was used to examine whether the difference in educational level is statically significant among males and females. Educational status does not show any statistically significant difference in both males and females according to age group. But there is a statistically significant difference is found in educational attainment between the sexes.

Occupation

The occupation of a population is a direct indicator of their economic condition. Agriculture is the primary occupation among the Tiwas of Morigaon district in Assam. Those who do not have agricultural land of their own, work as agricultural labourers or are involved in semi-skilled jobs like masonry, carpentry, electrical works or were rickshaw pullers. Some of them are involved in a petty businesses like running grocery shops, animal husbandry, or selling country liquor. Women are predominantly housewives and do not have an independent sources of income. For the purpose of the study, occupation has been divided into three categories. They are agriculture which includes all individuals who work in their own agricultural land. The second category is where the individuals are involved in wage-earning or in some petty trade. The third category is where the elderly individual is no longer able to be involved in economic activity.

45.65 per cent of elderly males continue to be involved in agriculture. The people, who are farmers, continue to work in fields as

long it is physically possible for them to work. It is only from the seventh decade that they stop being actively involved and gradually reduce their work in the fields.

15.94 per cent of the elderly males are involved in other occupations. Those who are involved in petty trade continue with their business with some assistance from family members. Wage earning requires a more rigorous routine than working in one's own fields. Therefore, those who are wage earners have to give up working relatively earlier. They are found to be no longer able to earn beyond the seventh decade. After the elderly individuals give up work, they are generally looked after by their son.

38.41 per cent are no longer economically active. 10 per cent of the male elderly of the 60–69 years age group are no longer economically active and the proportion of such persons rises to 67.65 per cent in the 70+ age group.

Only 16.39 per cent of 60+ females are engaged in earning. Among them 7.38 per cent are engaged in agriculture, 7.38 per cent are involved in petty trade (selling of country liquor, weaving) and wage earning.

The chi square test was used to examine the statically significant difference in occupational pattern among males and females. Occupational status do not show any statistically significant difference by age in both males and females. There is a statistically significant difference between the sexes.

Income Group

From the Kuppuswamy's classification followed in the study it is seen that 42.75 per cent of the elderly males belong to the lower income group, 34.06 per cent to the lower middle-income group, 23.19 per cent to the upper middle income group. In case of elderly females, the majority (55.74%) belong to the lower income group, 31.97 per cent to the lower middle-income group, 12.30 per cent to the upper middle-income group. Elderly of both sexes and age group belong predominantly to the lower income group. Thus it can be said that elderly Tiwas belong to a lower income bracket. Not many differences are seen in income group be age and sex.

The chi square test was used to examine statically significant differences by their income group among males and females. The difference by age group do not show any statistically significant difference in both males and females. Statistically significant difference is not found in occupational status between the sexes.

Marital Status

Marital status is another important demographic characteristic of any population and is especially significant in the study of the elderly. Having another person to share and take care of makes a significant difference to both the mental and physical health of a person. 4.10 per cent of the elderly females have remained unmarried. Most of the elderly Tiwas are currently married (59.62%). But if we look into the gender difference, the number of males (73.91%) who have a surviving spouse is higher than females (43.44%). 52.46 per cent of the women and 26.09 per cent of men, no longer have a surviving spouse. Both male and female individuals, who no longer have a surviving spouse increases with an increase in age, but the proportion of such women is relatively higher than men.

The chi square test was used to examine between age group and sexes statistically significant difference by their marital status. Marital status by age do not show any statistically significant difference in both males and females. There is however the statistically significant difference is found in sex.

Living Arrangement

Living arrangement means with whom the elderly person resides. In the study of ageing, understanding living arrangement is important because it is a reflection of the social support and care available for elderly persons. For the elderly people living arrangement is also related to the life satisfaction level. The living arrangements are influenced by a variety of factors like marital status, financial well-being, health status, family size and structure, as well as cultural traditions like kinship patterns and the social supports available to the aged.

Among the Tiwas, joint or extended family is the most prevalent type of family. Mainly three types of families are found among the elderly population. These are individuals living alone or with the only

spouse, nuclear family and joint family structure. Only one lady (0.82%) from the 60–69 years age category is living alone. 4.62 per cent of the elderly people are living with only their spouse. These couples do not have children or their children are living elsewhere outside the village. Nuclear families occur when children are young and have not yet married. 7.69 per cent of the elderly population living in the nuclear families. Among them 10.87 per cent are males and 4.10 per cent are females.

Joint families among the Tiwas may be broadly divided into three categories. The first is when an elderly person's household comprises of both married and unmarried children. In such families, married adult sons continue to live with their parents. 79.62 per cent of elderly Tiwas are living in households where both their married and unmarried children, are living with them. The highest numbers of elderly females (83.61%) and males (76.09%) are living in such families. The second type of joint family is where unmarried or even married elderly live with their brother's family and their children in extended families. If a couple has more than one son, then after all the sons get married, the cultivable land or residential land is divided equally among the sons. In case there is an unmarried daughter in the family, an equal share is given to her. She will continue to live with her parents or her brothers. Whoever takes care of her will inherit her share of the land. Individuals who do not have children or are not living with their spouses are taken care of by their brother and his family. 4.23 per cent of ageing males and females in the study are found to be living with their sibling's family. The numbers of females (5.74%) who are living with their brother's family are found in higher than males (2.90%).

Among the Tiwas of Assam, there is also the prevalence of the tradition of having a resident son-in-law. This is followed mainly when the family have a large amount of land or does not have a son. In the case of transmission of property, the resident son-in-law is given an equal share as the sons. If there is no son, then the property is inherited by the son-in-law. 3.85 per cent of the elderly males and females are living with their resident son-in-law.

Examination of the living arrangement indicate that the family is the dominant source of support. Most of the elderly are living in a

joint family system which is the source of economic as well as emotional support. When an elderly person lives in the family, his/her day-to-day functioning remains integrated into the family. Moreover, the elderly are generally not excluded from the family division of labour and this means that they continue participation within the family. The elderly are excluded from the division of labour only when they become physically unable. Under such circumstances, they become dependent for care which is provided by the younger members of the family.

The chi square test has been done to examine between age groups and sexes statistically significant difference in their living arrangement. Living arrangement does not show any statistically significant difference by age and sex.

Conclusion

The Tiwas of the study area, in spite of living close to the district headquarters, follow a traditional rural way of life. From the above discussion, the proportion of the elderly population, the median age, index of ageing and dependency ratio the community can be said to be a young population. They practice agriculture as their primary means of living, though a shift towards other means of subsistence is also observed. The educational level of the elderly population is low. In this village, most of the families are found to belong to the lower-income group. The elderly individuals continue to occupy a significant place in society and family, maybe because of their following a traditional way of life which arises, mainly from their following their traditional occupation. The elderly population prefers to live in a joint family. The elderly continue to be socially integrated. Family is the main source of support and their continued physical activity allows them to remain integrated in to their society.

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Indian Journal of Gerontology

2020, Vol. 34, No. 2, pp. 243–254

ISSN: 0971–4189, UGC, Care List, Science

Unlocking The Potentials of an Older Workforce: The Singapore Case

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ABSTRACT

Singapore has the highest life expectancy in the world, standing at 84.8 years as reported by The Burden of Disease Report 2017. Arising from the ageing of its population, Singapore has formulated policies to cope with the reality of an ageing workforce, which in turn would impact its economy. The article provides a review of the recent policies and strategies adopted by the Singapore government to address these challenges. Technology is likely to displace older workers and to grapple with this Skills. The future framework was launched to reskill and upgrade employees. Lifelong learning is a philosophy that has been adopted by employers and educational institutions to help the workforce stay nimble and flexible. Singapore's example may be of relevance to Asian nations as ideas may be developed to customise the strategies to suit the local context. Recommendations for future research and policies conclude the article.

Keywords: Older workers, Asia, Lifelong learning, Barriers, Technology, Workforce

Singapore's only main resource is its people and at every stage of its socioeconomic development, the government has banked on the resilience and confidence of its people to tackle the challenges ahead with courage. In comparison with large nations, Singapore is a

minuscule city-state, with no natural resources; it has, however, a reputation of good governance, nimble response to global crises, and political stability. Its leaders have believed in keeping good ties with its neighbours and an open economy that injects dynamism, competition and diversity, which, in the long-run has helped the nation to retain its place in a volatile world.

The Singapore Context

Singapore's median age of population in 2018 was 40 years, double what it was in 1950. In 2050 it will be 52.8 years (<https://www.statista.com/statistics/378424/average-age-of-the-population-in-singapore/>). Its population size is almost 5.8 million and the fertility rate is below replacement level at around 1.24. The land area is small, i.e. approximately 720 square kilometres including the smaller islands. The percentage of persons above 65 years is currently 12 Per cent of the total population but it is projected to increase to 25 per cent in the year 2030. In actual numbers, in 2030 about 9,00,000 residents will be above 65 years.

The cultural diversity and economic disparity are probably the two main distinguishing features of Singapore's social and economic landscape. Singapore can be considered a social researcher's natural cultural laboratory as the country consists of Chinese, Malays, Indians, Eurasians, Japanese, British, Americans, and many others. The transient permanent resident population makes up about 1 million or one-fifth of the total population. These consist of people from countries such as Turkey, Australia, Philippines, Japan, Thailand and Taiwan. Labour migration and globalisation are forces that have accelerated the cultural diversity of residents. With the increase in affluence, the inflation rate has also increased, thus contributing to economic disparities. The demographic ageing of the society has also contributed towards the prevalent economic inequalities. In recent months, income inequality has been highlighted as a major challenge for Singaporeans (Lim, 2018); academics and policymakers have offered a recommendation on ways to reduce it. Singapore's (after taxes and transfers) Gini coefficient is 0.37, after social policies such as Workfare Income Supplement, a scheme to help low wage workers financially, and the Special Employment Credits scheme, which

provides wage offsets up to 11 per cent to employers hiring older workers aged 55 years and above and paid a salary up to S\$4,000 (for more details see Singapore Yearbook of Statistics 2018).

Despite the rapid speed of the demographic shift from a youthful to an ageing population, the economy has not suffered negatively. Gradually, due to policies such as the Re-employment and Retirement Act 2002, which encouraged employers to continue hiring older workers beyond the mandatory retirement age of 62, and incentives to employers to extend the employment contracts of mature employees e.g. Job Credits scheme, the labour participation rate of persons above 60 years increased to 25.8 per cent in 2017 (http://stats.mom.gov.sg/iMAS_PdfLibrary/mrsd-Labour-Force-in-Singapore-Advance-Release-2017.pdf#page=6). The government has made serious efforts to encourage older workers (above 65 years) to continue working, resulting in an increase in the labour force participation rate (LFPR) of males from 22.8 per cent in 2007 to 35.6 per cent in 2017. Female LFPR rose 7.8 per cent to 17.8 per cent in the same 10 year period (Labor Force in Singapore, 2017). The gender gap in labour participation rate of males and females is not unique to Singapore. However, ageism and family expectations create barriers for older women, particularly in Asia, to continue working (for more discussion see Teo *et al.*, 2006; Devasahayam, 2014). The National Survey of Senior Citizens (2011) reported that monthly income from all sources for the male respondents above 55 years was mostly in the range of S\$1,000 – 1,999; for female respondents majority received between S\$500–999. It is to be noted that both groups had income that fell below the national median income.

In recent years, more steps have been taken by the government, the National Wages Council and the National Trade Unions Congress to work in a united way to improve the work opportunities for older workers. In April 2018, the Tripartite Standard in Age-Friendly Practices was released, following recommendations by the National Wages Council. (Singapore Yearbook of Statistics 2018: 46). This policy encourages age-friendly jobs and practices, urges employers to train older employees to perform the jobs more effectively and cautions companies from using age as selection criteria when hiring personnel. While there is no Age Discrimination Act in Singapore,

this kind of positive ‘disruption’ works a deterrent to Human Resource practices that stereotype older applicants and does not even give them a chance to try for jobs.

In keeping with the global trend, Singapore has also shifted its emphasis from adult education to lifelong learning which is a broader concept. Education tends to be associated with formal and systematic knowledge dissemination while learning is associated with knowledge acquisition in a variety of ways e.g. informal, experiential.

At 2019 National Day Rally, Prime Minister Lee HsienLoong announced the government’s intention to increase the retirement age to 63 in 2022, and eventually to 65 by 2030. The re-employment age would be increased from 67 to 68 in 2022, and eventually to 70 by 2030. The extension of the working life of Singaporeans is associated with the need to relook at our lifelong learning strategies and the reskilling of the adult workforce.

Social Policies that Promote Lifelong Learning

The philosophical and conceptual thrust in the direction towards promoting lifelong learning by the state is to build the intellectual as well as the social capital of the current and future cohorts of older persons. Such an approach would increase social inclusion of older people, and offer them opportunities to gain skills and knowledge that would help them adjust to societal advances.

The definition of lifelong learning applied in this article is similar to the Faure report (1972) published by UNESCO, which highlighted the concepts of “vertical integration”, “horizontal integration”, and “democratization.” (see Findsen and Formosa, 2011). Lifelong learning is viewed as extending across the lifespan, as well as life-wide. The move towards expanding opportunities for lifelong learning is in tandem with the ‘active ageing’ framework adopted by the Singapore government. The aim is to keep the ageing population active and engaged, with the hope that they maintain a good quality of life in old age. Social policies shape the choices made by the people as well as their behaviour hence, the importance of the appropriate social policies to be designed and implemented in a timely manner.

In an earlier publication the history of Singapore’s policies for encouraging adults to continue their learning journey was described

and discussed (Mehta, 2016: 379–388). The field of adult education has evolved to embrace the concept of lifelong learning, which is in sync with the idea of a learning economy. The state plays a catalyst role by developing Continuous Education and Training (or CET) Masterplan. Mehta (2016) expressed concern about whether the advent of online courses and virtual learning opportunities would meet the aspirations of fourth age learners.

In October 2016, there was another major shift in policies. The Skills Future Singapore (SSG) framework was created and it was housed under the Ministry of Education. It took over some of the functions of the Workforce Development Agency (WDA) which had been the main body planning and delivering adult education to the populace. SSG also absorbed the Council of Private Education, which had an overseeing role of private educational institutions (for more information on SSG, please visit: www.skillsfuture.sg).

To promote the lifelong learning accessibility, every Singaporean has been given S\$500 that he/she can use over the lifetime (no expiry date) to attend courses that appeal to him/her. This scheme is called the Skills Future Credits scheme. There are a large variety of courses available, and seniors they may also apply for courses tailored to their pace and interest which are organised by the National Silver Academy. However, research has shown that those who are less educated are less likely to tap the scheme. From a gender lens, research has shown that females in the current cohorts of “older adults”, i.e. those in the 70s and 80s, have lower educational levels than their male counterparts (Mehta and Kang, in press). More research is required to establish whether the skills future framework increases the employment and employability of seniors. There are also academic courses offered by Universities that the baby-boomers may select to attend. For example, the author is managing a course in her University titled “Technology in an Ageing Society” which is subsidised up to 90 per cent for adults 40 years and above as it has been approved under the Skills Future Series.

The government, together with major stakeholders and industry players, has designed a national credentialing system called Workforce Skills Qualification (WSQ) that covers major industries such as health, social, human resources, aerospace, finance and so on. The WSQ lays

the career progression pathways in each of the industries using Industry Transformation Maps (ITMs) (for more details see www.mti.gov.sg).

This national system trains, develops, assesses and certifies skills and competencies for the workforce using a flexible competency-based adult learning schema. The main point to note is that the knowledge and skills transferred to the course participant is linked to the WSQ framework, thus improving his/her chances of securing a job or promotion (if they so desire).

Disruption Due to Technology

Lifelong learning and adult learning have been promoted by the government for a few decades but the advent of e-learning and disruption in the way businesses and other organisations operate due to technology have caused the pre-seniors (50 – 64 years) and seniors (65 years and above) to have lowered psychological well-being.

In a Quality of Life-study conducted by the National Council of Social Service (2017), and nationwide on 666 pre-seniors and 334 seniors using the WHOQOL-BREF and WHOQOL-OLD instruments, some light was shed on what areas they felt contributed most to their well-being and what they wished could be improved upon. One of the key findings was that both groups wanted a higher level of physical and psychological well-being, which was linked to their inclusion in the workforce and opportunities for greater social participation e.g. in the community space as volunteers, or in the workspace as consultants (NCSS, 2017). The findings summarise the results of a survey and focus group discussions with the two groups of pre-seniors and seniors. By focussing on the holistic approach towards quality of life, the research team advocated a gerontological perspective, i.e. multidisciplinary examination, of what mattered to the seniors in Singapore. The voices of the seniors should guide policies and services that are aimed at improving their lives. The findings from the two groups were compared with a separate representative sample of 942 survey participants. It was found that both groups experienced a lower quality of life than the general population (Ibid.). This was in terms of the overall score as well as all six domains identified by the WHO, i.e.

physical, level of independence, social relationships, environment, psychological and personal beliefs.

Computers and smart devices, robots and sensors are replacing jobs in many sectors, and this is a worldwide phenomenon. While it constitutes a solution to one type of problem, i.e. shortage in manpower in some specialised professions such as nursing, it is also responsible for causing problems such as rising unemployment among the older workers who tend to be first to go when a company downsizes or restructures its processes. Reskilling and upgrading of the skills of this segment of the workforce is imperative if we want them to continue to retain their self-dignity, as well as their ability to support their families.

“There is a meta-narrative to lifelong learning, one that is only beginning to unravel. Lifelong learning is central to social development at the macro-level (national), meso (industries), and micro-level (individual). It is as important to economic transformation as it is to social development and personal growth.” (Teng, 2017)

Enablers and Barriers to Lifelong Learning

This section draws from two studies that were conducted in Singapore. The first was commissioned by the Council for Third Age (C3A) to FeiYue Family Services Centre in 2012 and the second was mixed design research conducted by a team of academic researchers from SIM University (which has been renamed Singapore University of Social Sciences in 2017).

The first study narrowed down the barriers for older adults towards lifelong learning into three categories, i.e. Attitudinal, situational and institutional barriers. The total sample size was 64 respondents between the ages of 50 – 64 years; 32 were learners and 32 were non-learners. The aim was to find out the motivations for learning, barriers to learning and how learning impacted their lives, using a purposive sampling method. A learner was a person who had participated in at least one course in the past five years, and a non-learner was a person who had no history of enrolling in a course in the past five years.

The barriers elaborated in the FeiYue report (Thang, *et al.*, 2012) are summarised below:

Attitudinal

Psychological emotions such as fear and lack of confidence inhibited older adults from enrolling in courses. Other reasons were resistance to learning due to lack of time, work overload and personal duties. Self-perceived notions of being “too old to learn” also persisted in the mindset of some seniors. This could be viewed as a self-fulfilling prophecy as ageism in society may be imbibed by the seniors themselves.

Situational

These were factors that were beyond the control of the older adults such as language barriers – the senior may be unable to read and write English but the common mode of instruction at such courses is English; poor health, and lack of support from family or friends were other influences.

Institutional

The high cost of fees, lack of accommodation to older adults' needs, lack of lifelong learning awareness and opportunities amongst seniors were the main institutional barriers (see Fraser, *et al.*, 2009, for more discussion on barriers and adaptations). Inaccessible venues and a pace of teaching that was too fast for the seniors were factors that posed as obstacles and discouraged seniors from participating (Mehta, 2016).

The second study suggested the enablers or factors that made it more conducive for seniors to adapt to technology and the changing work landscape. Intrinsic motivation, positive disposition and past experience of handling computers or other smart devices were enablers to learning, in this case learning to adapt to a fast-moving, technologically driven ecosystem. The study attempted to find out how the seniors in Singapore felt about the push for technology to be adopted by the government especially the ‘e-services.’ Factors that made it more conducive to adapt and factors that impeded their progress in adapting were focussed on. One of the barriers that the seniors mentioned was the predominant use of the English language on government websites, a practice that prevented those who were of low educational levels (such as the current cohort of seniors) from

accessing the relevant information. Lack of accessibility ultimately resulted in a lack of social inclusion (Mehta, 2017). Social capital was viewed as an enabler by a majority of the respondents in the focus groups as well as the case studies. Those seniors who had friends, family members, or formal organisations (which they frequently visited) to support them in the adaptation journey to technology and its challenges, had a better disposition and motivation to learn how to use it effectively.

The above discussion should be viewed in the context of Singapore's SMART Nation initiative, which was launched by Prime Minister Lee HsienLoong in 2014. He described the aim of the initiative to create: "A nation where people live meaningful and fulfilled lives, enabled seamlessly by technology, offering exciting opportunities for all." (http://mddb.apec.org/Documents/2016/MM/SMEMM/16_smemm_011.pdf). Four main areas of focus were outlined by the PM, i.e. enhanced mobility, better homes and environment, improved public services, better health, and ageing well, competitive economy.

As Singapore witnesses the phasing out of the cohorts of elderly who had received less education and enters the era of baby boomer elderly cohorts, it is anticipated that better-educated seniors would be poised to take advantage of the digital revolution. Data analytics, artificial intelligence and test-bedding of novel solutions would be more acceptable for the baby boomers. However, ethical concerns such as face recognition devices being abused or hacked will persist. Would such concerns hold back the embracing of certain digital solutions for societal problems?

The Skills Future Movement

Amongst the 2,85,000 Singaporeans who have utilised Skills Future Credits in 2017, there is a good spread in age, with those above 40 years being the majority (www.skillsfuture.sg).

Apart from the Skills Future Credits, there are other categories of subsidies available for Singaporeans for upgrading their skills. The Skills Future Fellowships are aimed at senior managers and professionals; the Mid-career enhanced subsidy, which was tapped by about 1,20,000 Singaporeans in 2017, is aimed at career switchers. In a

volatile global economy, employees who are multitalented, adaptable and fast learners are sought after by employers.

The Training and Adult Education Sector Transformation Plan (TAESP) (see <http://www.skillsfuture.sg/taesp>) was succeeded by the Training and Education Industry Transformation Map which was released in 2018 (see [http://www.ssg-wsg.gov.sg/content/dam/ssg-wsg/ssgwsg/news/media-release/20180201/Education%20\(TAE\)%20ITM%20Infographic_FINAL.PDF](http://www.ssg-wsg.gov.sg/content/dam/ssg-wsg/ssgwsg/news/media-release/20180201/Education%20(TAE)%20ITM%20Infographic_FINAL.PDF)). In both of these initiatives, the individuals and the employers are targeted.

Workplace learning initiatives and blended learning methods are also encouraged to assist the employees to learn on the job. The Institute for Adult Learning (IAL) has been charged by the government to develop teaching methods for older adults, and to this end, some courses have been offered to train adult educators. The methods of teaching and learning that suit older people are often called “Geragogy” (Findsen and Formosa, 2011)

The longevity dividend has been a term coined to refer to the benefits to society of having longer lives. It presumes that longer living individuals are also having good health and mobility. However, if longer lives are associated mostly with frailty, reduced levels of mobility and increase in healthcare costs the term longevity liability may be more appropriate!

Conclusion

From the perspective of human capital, the ageing workforce can be perceived as an experienced group that can contribute towards the training and education of the next successive generation through sharing and role modelling their strengths. The labour laws of a country need to be synchronised with education and training opportunities so that when older people reach retirement, they are able to occupy themselves with their experiential wisdom, as well as work if they wish to. In this way there is a higher level of social protection that older people are likely to gain.

This paper has looked to the role of disruption in the guise of technology in the workplace. Technology is a dual-faced dragon – it can help companies reap profits whilst sailing through a difficult period, but it can also destroy the morale of the work environment as

a result of less social interaction between colleagues and older mature employees' fear of being retrenched.

Additionally, mature employees are loyal, creative and have the interpersonal skills that count for a good collegial work environment. However, this workforce also wishes to have a fair deal and equitable wage/salary and work conditions akin to their younger counterparts working in the same department at the same level.

The ageing workforce has potentials waiting to be tapped by visionary leaders. Amy Khor, Senior Minister of State, Ministry of Health has rightfully commented that Singapore should zoom in on the strengths of the older employees and offer opportunities for them to remain abreast with the changes at the workplace (Straits Times, 28/1/16). Finally, it is recommended that more research be undertaken by academics and scholars on this topic from a multidisciplinary perspective to deepen our insights into the seniors' experiences of the various disruptions that occur in their lives e.g. the digital revolution, as they travel their life journeys.

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Indian Journal of Gerontology

2020, Vol. 34, No. 2, pp. 255–263

ISSN: 0971–4189, UGC, Care List, Science

The Role of Social Workers in the Care of Elderly

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ABSTRACT

The number of older people is increasing throughout the world. As individuals grow older, they are faced with numerous physical, psychological and social role changes that challenge their sense of self and capacity to live happily. There are several problems that are likely to make these golden sections of the population depressed and lonely leading to impaired quality of life among elderly persons especially if there seems to be a withdrawal of conventional sources of love, care and respect from the family and near ones. But with the right and timely Professional help of the Geriatric social workers the same phase can be altered for the dignified life, of the old people; to change into an opportunity for making new friends, developing new interests, discovering fresh ways of services, spending more time in fellowship with God to cheer up the golden age, to say that 'the life that ends well is the best end.

Keywords: Problems of elderly, Changing family structure, Care giver, Social Worker.

Even though ageing is a universal phenomenon and considered as a natural and evolutionary process. Till the very recent time the problems of these golden sections of the population were not known and therefore they were not attended. But due to some structural, functional and even psychological changes in the family system and

the development of multi-cultural, global communication system, and the byproducts of globalization made it mandatory for the countries around the world to open avenues for a need to take care of elderly persons. This demographic category is increasing year by year due to the availability and the advancement of many favorable services needed by these vigorously growing sections of our population.

As people start growing older there are lots of physical and psychological changes and there is a lot of probability of experiencing age-related losses as well. Such inexperienced transition and losses may impede the maintenance or acquisition of desired relationships and quality of life, resulting in a higher incidence of loneliness either as a result of the death of spouse and friends, social disengagement after retirement, after leaving a familiar neighborhood, living alone, a lack of close family ties reduced connections with their culture of origin or an inability to actively participate in the family and local community activities are some of the common life-changing events. More so, if all these problems occur in combination with physical disablement the damaging feeling of demoralization and depression are common accompaniments.

Till very recent times, the cultural values and traditional practices had been ensuring the highest respect and honor gave to this golden population. But due to the reckless unthoughtful and rash drive towards globalization, urbanization and consumerism, and its ill effects of mass-migration and resultant preference to the nuclear family system and the ever-new wave of anew definition of 'empowered women' in much to showcasing way, has led to each woman search for her individual identity outside of her traditional role of a home maker /loyal caretaker for the whole family and consequent seeking of the Independence, even from their close ones in the family system, has made the older population get lost in a perplexed situation of not being attended to, taken care of and unheard by the younger women in the family (may it be daughter in law or sister in law) as that was the age-old practices. Now, the older members are treated as a burden and a big liability

Therefore, the love, care and older age call for counseling and advocacy for their rights, dignity and awareness generation services are beginning to be provided by outside of the family system, i.e. by the

professionals who undertake professional training in highly systematically developed academic curriculum and fieldwork practices in the various agencies or open communities. These are the skillful and knowledge-based Professional Social Workers known as geriatric social workers.

This paper highlights the pivotal and growing role of professional social workers working with older people in many and varied agencies and the open communities like in an acute hospital or rehabilitation services, public residential facilities, Local Authorities, community units, primary care settings or psychiatry care, adult learning disability services and a small number in community Care Centers where there are defined teams and supervision structures. These professional brings a range of specialised skills and methods of intervention in affecting positive change and problem resolution for the most loveable n honored senior citizens. A Social Worker has very good networking with the communities and services available that can be a great help in the restoration, protection and rehabilitation of our senior citizens for problem solving.

Objectives of the Research

1. To know as what are the roles of social worker in the care of aged.
2. To analyze the perspective of the Social Work profession on the golden population.
3. To know as what are the roles of a social worker in the care of aged.
4. To analyze the perspective of the Social Work profession on the golden population

Methodology

In this study, the researcher made use of secondary source data and the relevant and comprehensive literature on the subject.

Analysis of Some Issues of Elderly

Older people have a right to independence despite any disabilities they may have. They are entitled to respect for their particular social, emotional, religious, cultural, and political views and needs. They have a right to privacy, control over their own lives and environment

and a right to choice, involvement in decision making and to the consultation on decisions affecting their lives. This applies to all older adults, whether at home, with support from carers or in Institutional care. (HSE/Department of Health and Children,2005)

In old aged depression is a problem that often accompanies loneliness. In many cases, depressive symptoms such as withdrawal, anxiety, lack of motivation and sadness mimic mask the symptoms of loneliness (Max *et al.* 2005).

The health and well-being of older adults is affected by the level of social activity and the mood states. Researchers have reported the negative effects of loneliness on health in old age (Heikkinen *et al.*, 1995).

Despite being sociable, they experienced increased feelings of loneliness. A possible explanation for this may be that feeling lonely not only depends on the number of connections one has with others but also whether or not one is satisfied with his lifestyle. An expressed dissatisfaction with available relationships is a more powerful indicator of loneliness (Revenson, 1982).

Sociability plays an important role in protecting people from the experience of psychological distress and in enhancing well-being. The increasing age, minority, racial or ethnic status, lower socio-economic status and reduced quantity or quality of social relations are all associated with increased depressive symptom levels (George,1996) .

Social isolation is a major risk factor for functional difficulties in older persons. Loss of important relationships can lead to feelings of emptiness and depression. "Persons involved with a positive relationship tend to be less affected by everyday problems and to have a greater sense of control and independence. Those caught in poor relationships tend to develop and maintain negative perceptions of self, find life less satisfying and often lack the motivation to change" (Hanson & Carpenter, 1994).

The older people tend to make friendships predominantly with those within the same age group. Thus with advancing age, it is inevitable that people lose their friendship networks and that they find it more difficult to initiate new friendships and to belong to new networks. However, those with more physical, material and

intellectual resources also have more social capital which allows them to continue to seek out new relationships and forms of social involvement”(Posner 1995).

Older abuse in society at all level is increasing. The elder abuse is “a single or repeated act or lack of appropriate action occurring within any relationship where there is an expectation of trust which causes harm or distress to an older person or violates their human and civil rights”(Report of the Working Group on Elder Abuse, 2002).

Social Work and Elder Abuse: Professional social workers have a special responsibility and unique task and contributions in relation to the prevention of, investigation and intervention into cases of physical, emotional and sexual abuse and neglect of older people.

Problems of Elderly and Social Work

“The primary focus of social Work is working with individuals, families and groups within their social context, through training, knowledge and skills which support a high standard of professionalism, the social work task is to facilitate and enable clients to identify options and make decisions for themselves so that they may develop strategies to affect improvement in the quality of their lives. Social work also focuses on issues of public policy, social administration, social justice and the betterment of society as a whole.” (IASW, 1995)

“The social work profession promotes social change, problem-solving in human relationships and the empowerment and liberation of people to enhance well-being. Utilizing theories of human behavior and social systems, social work intervenes at points where people interact with their environments. Principles of human rights and social justice are fundamental to social work.” (IFSW 2012)

The geriatric social workers work in the three dimensional systems that are grouped in a following way to provide care and support for the elderly:

- A. *Informal systems*, even known as a natural system such as family, care-takers for elderly, friends and neighbours.
- B. *Formal systems* are the most systematic and specialized systems such as community supports or structures which provide more help than that available in informal systems;

- C. *Societal systems*, such as hospitals, health professionals, Day Care Centers, etc. Problems can be caused not only by some issue internal to the person but by a breakdown in the interactions between the older person and any of these systems. The role of the Social Worker is to assess where the cause of the conflict arises and to mediate between the client and the resource system in question.

The Professional Social Workers work broadly in three dimensions of the elderly people's life system that includes the *social work care and support system*, *social-psychological assessment system* and the final part is *treatment or identification of the need* for the material, psychological and other services for the elderly people to lead a normal dignified and respectful life. These professionals, work in different set-ups who performs a number of functions, including helping older adults adjust to life in their new setups are grouped under some sub-headings

Social Work Care and Support System

The professional social workers help to develop the coping and adjusting skills of these honourable sections of the population by boosting their morals, advocating for the clients' needs and rights, providing supportive counseling and making psychosocial assessments.

Social Work Assistance

Psychosocial Assessments

According to the 'National Association of Social Workers', the purpose of a psycho-social assessment is to evaluate the person's biological, psychological, and social needs. The social worker performs a psycho-social assessment to determine the level of care required and to assess whether specific services, such as counseling or psychiatric intervention, are needed. After an assessment is completed, the social worker discusses her findings with an interdisciplinary team, which usually consists of medical staff, occupational therapists, physical therapists, and other professionals, to collaborate on formulating a treatment plan to address the needs. Social Worker undertakes

a 'career assessment' in situations, where there are complex emotional, financial issues or difficulties within the family.

Counseling

A social worker provides individual and group counseling as needed to help her clients overcome potential emotional, psychological, and social obstacles to adjustment and cope up with new changes and challenges of life. If the facility does not provide certain services, such as psychiatric care, the social worker will refer her client to the appropriate resources and professionals. The Social Worker takes up the task of protection, planning, and counseling. In case of a serious level of abuse to these senior citizens, Social Workers provide a referral to give needed supportive therapeutic care.

In therapeutic intervention the Social work support may be offered to those clients and their carers for Psychiatric Assessment or the case can be referred to a specialist worker.

Social Work support may be offered in the following complex situations:

1. *Family Conflict* may have risen from domestic violence, alcohol or substance abuse or where there is a history of the family being dysfunctional. It has been noted that there are a number of clients who require support other than practical services at times of crisis.
2. *Significant Life Changes*, i.e. change in health, loss of independence, loss of spouse/close family member, grief, adjusting to new changes increased responsibilities within the home environment.
3. *Risk Situation*: Here the assessment and management of risk is the focus. Individual care plan, based on needs (felt and perceived).
4. *Advocacy*: Social workers advocate for their clients to ensure that their needs are met and that their rights are protected. Social workers who work in elderly homes should stay up-to-date with legislative changes and policies that can affect their clients. They are responsible for ensuring that residents are protected from abuse and neglect, and should report any suspicion of abuse or

neglect to the appropriate regulatory and law enforcement officials.

5. *Education*: In addition to educating her/his clients and their families about their rights and responsibilities, social workers also educate staff about the psycho-social needs of residents and provide training on multi-cultural and diversity issues. Social workers may take tasks of generating awareness among the staff through different activities such as training programme, seminars, etc. Social workers even liaison and network to provide consultation to the service providing agencies to discuss relevantly issues, such as the delivery of psycho-social care, as needed by their clients.
6. *Administrative and Other Tasks*: The social workers are involved in the administrative tasks for these golden populations in their elderly homes such as maintaining case files, writing case notes, reviewing treatment plans, participating in staff meetings and seminars and contributing to quality assurance meetings.

In conclusion, it may be said that the social workers have to develop the broad theoretical and methodological Perspectives for, Social Work with Older People to guide them for Social Work intervention and professional practice.

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Indian Journal of Gerontology

2020, Vol. 34, No. 2, pp. 264–278

ISSN: 0971–4189, UGC, Care List, Science

Science of Ageing: Causes, Effects and Treatments

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ABSTRACT

Ageing, as per the current understanding, may be considered as the accumulation of various molecules as well as cellular damage over time which results in a very complicated physiological process is poorly understood. Ageing leads to a gradual decrease in the physical and mental capacity with an increased risk of disease and death. Researchers have proposed various hypotheses like free radical theory, telomerase theory, wear-and-tear theory, etc. in order to explain these inexplicable phenomena which are also influenced by environmental factors, radiation and lifestyle. The human yearning for longevity has led to the development of various treatment methods including manipulation of a metabolic pathway, the use of antioxidant drugs to prevent oxidation due to free radicals, telomere-based therapy, hormonal therapy using peptide hormone, usage of Anti-ageing compounds, vitamins (e.g. ALT 711), and change in lifestyle, etc. Presently, research on ageing includes investigations into novel methods to reverse ageing and genetic approaches to increase the lifespan as a longer lifespan

contribute to not only the wellness of an individual, but also that of the society as a whole.

Keywords: Ageing, Free radicals, Antioxidants, Telomere, Longevity, Reverse ageing

Biologically, ageing is described as an accumulation of a wide variety of molecular and cellular damage, in an organism over time. This involves a very complicated physiological process which is poorly understood. Scientific research has brought up many different theories that try to comprehensively explain ageing, but none of these explain all the aspects of this biological process. Ageing may lead to a gradual decrease in physical and mental capacity, an increased risk of diseases, and ultimately, death. But these changes are neither linear nor consistent and are only vaguely associated with a person's age in years while also depending on various factors such as lifestyle and environment. As a result, individuals in their advanced years may exhibit good health while those who are younger and expected to be healthier owing to their age may become frail (WHO 2015). Among the different theories formulated to explain the phenomena that constitute ageing, one of the most known and widely studied is the free radical theory of ageing (Harman D. 1956). There is evidence that suggests that ageing may also be associated with epigenetic changes (López-Otín C., *et al.*, 2013). In the last few years, widespread efforts are being made to catalogue the cellular and molecular hallmarks of ageing as well as the interconnection between them. Herein, we are attempting to give a comprehensive overview on how the combination of different epigenetic alterations and oxidative stress affects the process of ageing and the advanced therapies that have been developed in order to be used to delay ageing (Guillaumet-Adkins, A., *et al.*, 2017).

Causes of Ageing

Free Radicals and Ageing

Free radicals are reactive chemical species that have a single unpaired electron on the external orbital (Riley P.A., 1994). The theory of free radicals (Sohal and Weindruch 1996), originally described by Denham Harman in the 1950s proposes that organisms

age because of the accumulation of free radicals (Harman D. 1956), that end up causing cellular toxicity and damage to the nuclear DNA, cellular membrane structures and mitochondrial DNA (mt DNA). This theory also suggests Reactive Oxygen Species (ROS) as the major cause of this oxidative damage, but not the only cause. ROS is a by-product in the cells of most aerobes that is generated either exogenously or endogenously. Exogenously it is produced during UV light irradiation by X-rays and gamma rays or produced during metal-catalysed reactions or may be present in the atmosphere as pollutants. Endogenously these are produced by neutrophils and macrophages during inflammation, and are by-products of different mitochondrial reactions (Inoue M., *et al.*, 2003) or various other mechanisms (Cadenas E., 1989). But several other reports contradict this idea by saying that many forms of damage serve as causal factors in the ageing process. Also, it fails to explain why cells are unable to maintain a balance between damage generation and their removal. Oxidative stress produced by free radicals increases with age which eventually weakens the natural repair systems in older individuals (Kowald and Kirkwood, 2000) and is a major contributor to many cardiovascular and neuro degenerative diseases (Ames BN., *et al.*, 1993).

Telomerase

Chromosomes have a specific repetitive sequence at their ends, known as telomeres which are shortened after each cell division cycle. This shortening eventually leads the chromosomes to stop dividing and die. But in some specific cells like the stem-cells, the enzyme telomerase prevents this decline by lengthening the telomere. Variations in a gene known as TERC (Telomerase RNA component) have been associated with reduced telomere length (Arvind, and Grace, 2018). According to a study, individuals with TERC variations are believed to look several years older when compared to a non-carrier of the same age. (Jae-Hong Kim, *et al.*, 2011) After engineering mice which lack telomerase, researchers have managed to prove that short telomeres and mutation of the telomerase enzyme may lead to premature ageing as the transgenic mice suffered from infertility and other age-related conditions such as osteoporosis, diabetes and neuro degeneration (Ibid.).

Environmental Factors

Ageing is also known to be affected by environmental factors apart from genetic and/or epigenetic mechanisms (Robert, and Fulop, 2014).

1. *Radiation:* In many species like mice, rats, hamsters, guinea pigs, and dogs, ionizing radiation like X-rays can cause a significant shortening of lifespan. In a study, it was found that small daily doses of continuous irradiation throughout life helps in speeding up the process of mortality. Recent cell-culture studies also show that ionizing radiation leads to more chromosomal aberration which ultimately fastens the mortality process. Natural radioactive potassium, radium and natural background radiation from Earth can cause a small percentage of cancer but are not major contributors of ageing.
2. *Temperature:* Flour beetles, fruit flies, fishes and other poikilotherms live longer because of lower environmental temperature. According to the rate of living hypothesis, an organism's lifespan is dependent on some critical substance that is exhausted more rapidly in high temperature but this was found to be inadequate when a study was done using *Drosophila* spp. by rearing at one temperature for one part of their life and another temperature for the rest of their life. It was also observed that the number of calories expended by fruit flies per lifetime was maximum at an intermediate temperature, so the rate of ageing per calorie was minimal at that temperature. Researchers say that the lowering of core body temperature may make humans live longer. In short-lived species, high metabolism increases core temperature which shortens their lifespan. This was tested in engineered mice and the results found that even a 0.5% reduction in temperature can increase the life span by almost 20 per cent.
3. *Environment, infectious disease and nutrition:* Those who live in a poor environment have higher susceptibility rates for infectious diseases and also may suffer from poor nutrition which can speed up the process of ageing. Experiments with rats have shown that

rats on restrictive diets lived longer than those allowed to consume unrestrictedly.

Besides these, many theories regarding the cause and effect of those particular causes have been proposed. Some of them are discussed in the table below:

Table 1
Theories on Ageing

<i>Theory on Ageing</i>	What it Says?
<i>Genetic Theory</i>	Genes of the organism contains factors that specifically determine its lifespan; i.e. the number of repeats in a telomere determines the maximum life span of a cell.
Non-genetic Theories	
1. Wear-and-tear Theory	Accumulation of waste products within cells wear them out by interfering with the function. E.g.-age pigment accumulation in heart, nerve and muscle cells
2. Cross-linking theory	Cross-linking between molecules alter the structure and shape of the molecules making them unable to carry out the function of the cell. E.g. - cross-linking of collagen leads to loss of elasticity.
3. Autoimmune theory	Immune reactions cannot distinguish between self and foreign and start attacking own cells.
4. Glycation theory	Simple sugars like glucose bind to molecules such as proteins and lipids showing a cumulative effect which may lead to shorter life span.
5. Oxidative damage theory	Gradual accumulation of oxidative damage to macromolecules reduces the physiologic functions and is associated with the life expectancy. E.g. - electrons leaking from ETC produce ROS and damage protein.
6. Psych sociological theory	As people grow older, their behaviour, social interactions and the activities in which they engage change.

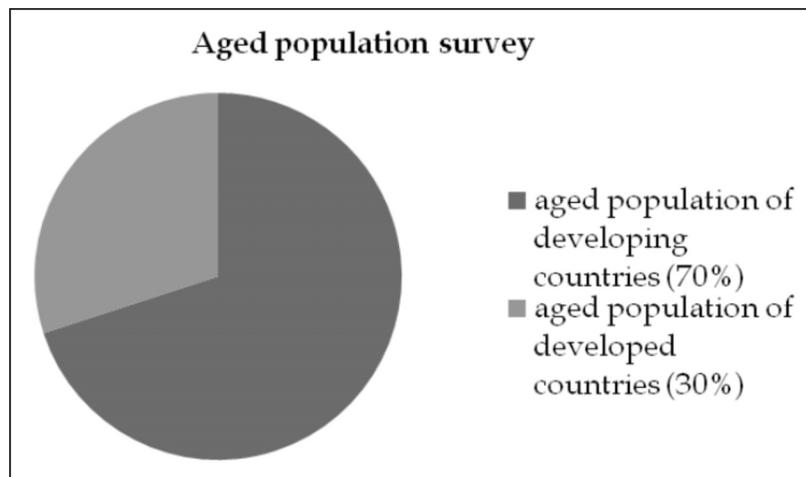
Effect

Ageing comes with several physiological and anatomical changes like nervous dysfunction, decreased cognitive function and memory loss. The function of sense organs like vision, smell, taste and hearing capacity also decreases with some changes. The limb muscles in older people are shorter by at least 25–35 per cent from young adults. After the forties, humans start losing some of the cells in their internal organs. Surveys conducted across age groups also indicate a loss of

height of 1.5 inches per ten years can occur after the forties which become more prevalent past the seventies. Men start losing weight after the age of 55 while women start losing their weight after 67–69 years. Lean muscle tissues are replaced by fat cells in older people. While ageing, the post genetic mechanisms produce a slow-down of most vital functions, of which nervous conductivity declines the slowest and elastic recoil declines the fastest (Shilpa, *et al.*, 2018). One of the most known consequences of ageing is a decrease in the immune response and higher susceptibility to disease.

Figure 1

Chart showing the distribution of aged population across the Globe



Longevity

Most of the research on anti-ageing treatment concentrates on the possibilities involved in the manipulation of the metabolic pathways that are implicated in the progressive decline of biological functions associated with senescence.

Life expectancy cannot be exclusively genetically determined which could be understood from the study of identical twins raised apart. In spite of having identical genomes, they passed away at different ages due to various factors (Segal NL., 2012).

Some of the therapies that may come to the rescue to delay ageing are discussed further.

Free Radicals and Antioxidants

A healthy body requires a balance between free radicals, antioxidants and cofactors. Free radicals induce oxidative stress, which is balanced by the body's endogenous antioxidant systems with the help of co-factors; if the level of free radicals increased and can't be managed by endogenous antioxidant and co-factors, then it can result in rapid ageing and subsequent progression of age-dependent diseases such as cardiovascular disease, cancer, neurodegenerative disorders, and other chronic disorders. To accelerate the function of endogenous antioxidants, antioxidant drugs could be supplied. Most commonly used antioxidants are retinols (Vitamin A) that stimulate the growth of new collagen and combat skin ageing. Selenium and Resveratrol (found in grape skin) are also used to treat cancer and obesity (Rahman, K. 2007). It is also seen that when the mitochondria were removed, mitochondrial ROS molecules that cause inflammation were reduced to some extent. Interventions like Calorie restrictions, exercise and drugs, such as polyphenols, antioxidants, metformin, ω -3 fatty acids, aspirin, and senolytics specifically target mitochondria and thereby successfully act towards the reversal of age-related damages to an extent.

Telomere-Based Therapies

The telomeres will gradually shorten with time and cell division unless there is sufficient telomerase activity to maintain telomere length. The length of the telomere is maintained by the enzyme telomerase which succeeds in dealing with cellular senescence by lengthening the telomeres. Many companies are developing telomerase-based therapies to fight against ageing. One of the products available is a telomerase activator named TA-65. There has been observational and research studies in animal models and humans that paved way for the development of biomarkers of ageing such as immune, metabolic, bone, cardiovascular, and inflammatory markers, in the absence of remarkable signs of toxicity. The TA-65 can extend telomeres and potentially enhance health outcomes in humans, without any observation or safety concerns (Harley, *et al.*, 2011).

Researchers from Stanford University School of Medicine in California have discovered a way to increase the length of human telomeres by around 1,000 nucleotides – around 10 per cent – in a matter of days which can be proper solution hence proceeding to slow and successful ageing. According to some other research, telomere length can be extended by taking Mediterranean diet which is typically high in vegetables, fruits, nuts and olive oil, but low in saturated fats, dairy, meat and poultry and by reducing the amount of sitting time.

Calorie Restriction

Calorie restriction (CR) holds the greatest potential to delay human ageing. Many studies have found that atherosclerosis can be reduced by the protective effect of CR (7). CR has a protective effect on cardiac function (Meyer, *et al.*, 2006), and even has benefits in adiposity to help reducing weight (Racette, *et al.*, 2006). Improved memory in elder people is seen due to CR (Witte, *et al.*, 2009). In overweight people, some biomarkers of longevity are present where CR appears to have beneficial effects (Heilbronn, *et al.*, 2006). Calorie restriction can also activate sirtuins gene in different organism, i.e. Sir 2 in yeast, SIRT 1 in humans. In nematodes and fruit fly sirtuins function as anti-ageing genes. In yeast, it regulates a large segment of the chromosome. It suppresses the activity of the genes whose mutation can cause ageing which are also observed in mammals. So the development of drugs that mimic the effect of calorie restriction on the sirtuin gene in humans can help in treating different age-related diseases.

Stem Cell-based Therapy

The stem cells with its self-renewal property have a major role in tissue-life prolongation such that a decrease in stem cell is often associated with ageing. The intravenous or local administration of adult adipose-derived stem cell can be used as an efficient tool in anti-ageing treatment. This is either due to its subsequent ability to differentiate into various cell lines (variable differentiation) by paracrine activity or immune privilege. The in vitro modification and subsequent introduction of stem cells is a novel strategy for rejuvenation of older or deceased cells. The use of induced pluripotent cells to replace cells of organs lacking stem cells is also a novel method of

anti-ageing therapy as it can retain the ability of embryonic stem cells to play a key role in organogenesis and mitigating ageing effect (Jae-Hong Kim, *et al.*, 2011; Yeh, and Chan, 2018; Godic, A., 2019).

Hormonal Therapies

Human growth hormone (HGH) injection is an anti-ageing treatment which is helpful for certain aged group due to its beneficial effects (Besson *et al.*, 2003). Another hormone named Insulin-like growth factor 1 (IGF-1) is helpful in ageing as low levels of this hormone seem to correlate with longevity. (Krzisnik, *et al.*, 1999). Melatonin hormone that is usually involved in circadian rhythms and sleep, is also associated with ageing and life-extension (Froy, and Miskin, 2007; Kondratov, R.V. 2007). Even Dehydroepiandrosterone (DHEA) makes progress in the health of the elderly by various ways such as enhanced memory, muscle mass, sexual appetite, immune system, and benefits to the skin (Nair, *et al.*, 2006) Oestrogen is also used as a therapeutic agent that helps in anti-ageing . (Dominguez, *et al.*, 2009).

Hyperbaric Oxygen Therapy

All the tissues need an adequate supply of oxygen to function. In aged condition, when a tissue is injured, it requires even more oxygen to survive. Hyperbaric oxygen therapy involves breathing pure oxygen in a pressurized form that is three times more than the normal air pressure. It increases the amount of oxygen taken by the blood. An increase in blood oxygen somewhat restores normal levels of blood gases and tissue function to promote healing and fight infection (Carney, AY., 2013).

Vitamin Supplements and Anti-ageing Drugs

Many products that are promoted commercially as having anti-ageing properties include diets, drugs and supplements. E.g.-Vitamin B3 regulates apoptosis and proliferation in the testis of D-Galactose induced aged rat model. A compound called Rapamycin (sirolimus) can increase the lifespan of adult mice by 14 per cent and young mice by 28 per cent. It is an immunosuppressing agent which is also helpful in tissue transplant rejection and also used as an anticancer agent as it can inhibit the proliferation of particular types of cancer

cells. Another anti-ageing compound ALT-711 appears to be helpful against cardiac diseases and can treat ageing as a whole. There are some other genes responsible for ageing which can also be useful for further pharmaceutical intervention and the attempts have been already started, to analyse these genes and could help extend lifespan (Yeh, and Chan, 2018). It also shows that ageing can be slowed down naturally through regular exercise.

Successful Ageing

It has been pointed out that successful ageing refers to key ideas such as life satisfaction, longevity, freedom from disability, mastery and growth, active engagement with life and independence (Moody, 2005) in a study that has been reported regarding the association between the inflammatory potential of nutrition and successful ageing in a sample of older adults living in the Mediterranean basin (Sohal, and Weindruch, 1996). Data analysis revealed that the diet high in anti-inflammatory agents (fruits, vegetables, whole grains, etc.) lead to successful ageing. The role of a healthy diet in ageing and longevity has been well clarified in the past (Keys A *et al.*, 1984; Mathers JC., 2013). According to meta-data analysis, participants with high NAI score with pro-inflammatory nutrition had a higher chance of hypercholesterolemia and lower successful ageing (Sohal, and Weindruch, 1996).

Reversible Ageing

De-Pinho's team engineered a mouse where they found telomerase could be switched back on by feeding the mice with a chemical 4-OHT. After a month they were surprised by seeing the result that shrivelled testes grew back to normal and the animals regained their fertility and also other organs, such as the spleen, liver and intestines, recuperated from their degenerated state. Even ageing of the brain was also reversed. Mice with restored telomerase activity had noticeably larger brains and neural-progenitor cells started working again. But there exists a contradictory report regarding this idea when David Harrison said that telomere rejuvenation is potentially dangerous as it can also stimulate cancer. Hence, ethical questions on how to safely use this strategy to reverse ageing remain unanswered (Jaskelioff M., *et al.*, 2011).

Reversible Brain Ageing

The progressive loss of dendritic arbours and impairments to synaptic plasticity causes brain ageing. This brain ageing can mostly be reversed by long-term, oral administration of a positive allosteric modulator of AMPA-type glutamate receptors which is experimented in rat brain. In order to illuminate on how brain softness and stiffness may influence cell behaviour, a group of researchers from the University of Cambridge investigated a cell surface protein, Piezo1—which informs the cell whether the surrounding environment is soft or stiff. When they grew young, functioning rat brain stem cells on the stiff material, the cells became dysfunctional and lost their ability to regenerate and started functioning like aged cells. But when the old brain cells were grown on the soft material, they began to function like young cells which mean they were rejuvenated. Upon removing Piezo1 from the surface of aged brain stem cells, they managed to trick the cells into perceiving a soft surrounding environment, even when they were growing on the stiff material. This led to the conclusion that deleting Piezo1 in the oligodendrocyte progenitor cells (OPCs) within the aged rat brains could lead the cells to become rejuvenated and get back their normal regenerative function (Segel M., *et al.*, 2018).

Conclusion

According to the survey result of world population prospects (1950–2050), the number of aged people is increasing more in developing countries than the developed countries. If this continues then, within a few years the aged population count will be 70 per cent from only developing countries which will merely exceed 470 million which is double of the aged population in developed countries (Amarya, S., *et al.*, 2018) (Figure 1).

A longer life brings with it opportunities, not only for themselves and their families but also for society. An extended healthy lifespan means individuals can contribute more to society in socioeconomic as well as cultural aspects thus helping in the cultivation of a better society. Older people also can contribute in many ways to their families and communities by utilising their lived experience. Health is

the major factor on which these opportunities and contributions can depend on (WHO 2015).

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