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Kerala

Fifteen Dimensions of Health and their Associations with Quality of Life among Elderly in Rural Villages in Maharashtra, (India)

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ABSTRACT

Elderly health is a growing priority given growing older-adult populations worldwide. The present study aimed to identify factors that influence health and quality of life (QoL) specifically in rural-dwelling elderly Indians. A cross-sectional survey of 352 elders (=60y) from 10 villages near Pune, Maharashtra, India was conducted to measure the prevalence of 15 dimensions of health: vision, hearing, cognition, mental, social (generativity), physical activity, substance-use, physical-strength, independence in activities of daily living (ADL) and instrumental ADL (IADL), dental, nutrition, chronic-pain, sleep and safety (falls). The researchers then examined the associations between these health dimensions and QoL using linear regression. It was found that in general, these elders were physically active (70%), independent and cognitively-intact (55%), however only a minority were free from

problems relating to vision (33%), dental (45%), nutrition (30%), mental health (34%) and chronic pain (40%). Adjusted analysis revealed that higher QoL scores were associated with healthy status in seven dimensions: vision ($\beta=4.9$, $p<0.001$), hearing ($\beta=3.5$, $p=0.003$), sleep ($\beta=4.1$, $p<0.001$), dental ($\beta=2.6$, $p=0.017$), mental ($\beta=2.1$, $p=0.048$), independence in ADL ($\beta=4.6$, $p=0.016$) and social health ($\beta=0.3$, $p<0.001$). On the basis of these findings it may be concluded that to achieve comprehensive health and QoL in Elderlies, a proactive and diverse approach to optimizing all significant dimensions of health should be adopted. This is particularly important in rural areas where available medical resources may be limited when it comes to addressing elderly health decline.

Key words: Rural Elderly, 15 Dimensions of Health , Health status, Quality of life, Disability, Ageing

The World Health Organization (WHO) projects the number of elderly individuals, aged ≥ 60 , to account for 22 per cent of the world's population by 2050 – an increase of 1.25 billion people from today – and the largest growth is expected primarily in lower and middle income countries (WHO, 2015)). Therefore, the health of the elderly is and will be of central importance. With individuals living longer, chronic diseases and related disabilities will require greater attention and resources. However, there is more to health than just the absence of disease and disability, as expressed in WHO's definition of health, "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (Grad, 2002). Thus, health is multidimensional, which calls for evaluation of its many dimensions for a comprehensive picture of the health of both individuals and populations.

The WHO's definition of health also highlights the importance of quality of life (QoL) in healthy ageing (WHO, 1997). QoL can serve to estimate the burden and impact of diseases, injury and disability in a community, as well as measure "health" more broadly (CDC, 2000); it can also help predict levels of health-care utilization, since people with lower reported QoL are more likely to use health services (Dominic, *et al.*, 2002). One tool to measure QoL and health status in the elderly is

the community health needs assessment (CHNA), as it can measure health outcomes and their determinants (WHO, 2001).

India has the world's second largest population of elderly, 104 million (GOI, 2011), which by 2050 is expected to near triple (WHO, 2011). Importantly, two-thirds of elderly Indians reside in rural areas where access to primary or advanced medical care is limited (Ragan *et al.*, 2011). While the WHO Study of Global Aging and Adult Health (SAGE) (Kowal *et al.*, 2012), the Longitudinal Aging Study in India (Arokiasamy *et al.*, 2012) (LASI) and smaller studies have added to our knowledge about elderly health in Asia (Østbye *et al.*, 2009 and Malhotra *et al.*, 2011), few have exclusively targeted rural India to evaluate elderly health using the combination of variables below. To gain a comprehensive understanding of elderly health in rural India, we collaborated with a local NGO, the Janaseva Foundation, to conduct a community health-needs assessment of 352 elderly aged 60+ years from 10 rural villages near Pune, Maharashtra. Maharashtra is one of states with the highest population of elders and disabled elders ages ≥60 years (GOI, 2011). Our primary aim was to assess the prevalence of 15 distinct, potentially disabling, dimensions of health by age and gender, and to investigate their relationship with QoL.

Material and Methods

This cross-sectional study was conducted between 09/2014 and 12/2014. Socio-demographic and health related information was collected using a combination of a verbal interview, brief physical and dental examination. Villages were selected among those within a 35km radius of the Janaseva Rural Hospital in the Ambi-Panshet village region, Taluka Haveli, Pune, Maharashtra. Elders were randomly selected using stratified (by village and gender) random sampling from an updated registry of elderly living in this area.

Each elderly person was approached at their home and enrolled after giving informed consent. Given the possibility of cognitive impairment, elders' capacity to provide informed consent was first assessed using the full mini-mental state exam (MMSE) (Folstein *et al.*, 1995). Those who scored above the cutoff =21 were consented and completed the survey independently while those who scored <21 or

had sensory deficits preventing communication were consented through a legal representative family member. A proxy, defined as an adult family member (age 18+) with the greatest knowledge about the elder and who is routinely involved in their daily care was then chosen to assist the elder in completing the survey. Elders who could not communicate at all were interviewed using a proxy-only interview. Participants were compensated for their time through provision of a Tata Swach Smart-Water Filter, worth approximately Rs. 1,200 (\$18).

Ethics approval for this project was attained from the Indian Institute of Public Health Bhubaneswar and the Duke University School of Medicine, and funding was provided by the Doris Duke Charitable Foundation through a grant supporting the Doris Duke International Clinical Research Fellows Program at the Duke University School of Medicine.

The Tool Used

The survey questionnaire was administered in the local language (Marathi). With permission, a shortened version of the LASI and SAGE survey tools were adapted to collect data on self-reported vision, hearing, chronic pain, sleep, physical activity, oral and physical health; The Loyola Generativity Scale (score 0–60) for measurement of elderly's perceived social contributions was our proxy for social health (Mc Adams and de St Aubin, 1992); The MMSE for measurement of cognitive status (Falstein *et al.*, 1975); The Kessler-10 scale for assessment of level of psychological distress and likelihood of diagnosis of a mental disorder including depression or anxiety was our proxy for mental health (Kessler *et al.*, 2002); The Simplified Nutritional Assessment Questionnaire (SNAQ) for screening for the risk of significant weight-loss of at least 5–10 per cent of bodyweight in next 6 months (Wilson *et al.*, 2005), and the Older American Resource and Services (OARS) Multidimensional Functional Assessment Questionnaire for the measurement of independent status in activities of daily living (ADL) and instrumental ADL (IADL) (Fillenbaum and Smyer, 1981). Physical strength was evaluated using a Tata hand-grip dynamometer and an objective dental exam was conducted by a trained dentist who recorded the number of decayed, missing and

filled teeth (DMFT) by simple visualization and counting with a small mirror and probe (WHO, 2013). The WHO Quality of Life scale (WHOQOL-AGE) was used to measure our main outcome, QoL, (range 0–100), with higher scores indicating greater elderly satisfaction and wellbeing (Caballero *et al.*, 2013).

Statistical Analysis

Simple descriptive tabulations were generated for all demographic and health variables according to gender and age. Pearson correlation coefficients were used to study associations of demographics and the 15 dimensions of health. For categorical data, we used the χ^2 – test. Simple and multiple linear regressions were then used to investigate adjusted and unadjusted relationships between each health dimension and QoL. Analyses were carried out using STATA SE (version 13.0).

Results

Characteristics of Study Participants

Table 1 shows overall sample characteristics. There were 49 per cent males and 51 per cent females with an average age of 71 years. Most were married (61%), Hindu (96%) and belonged to the general caste (84%). More than half had no formal education (57%), were either retired or not working for pay (66%) and with a median household monthly income of 2,000 INR (\$30). Approximately two-thirds were interviewed independently, while another third required some assistance from a proxy. Less than 1 per cent required a proxy-only interview.

Table 1
Characteristics of Study Participants Overall and by Gender¹.

<i>Variables</i>	<i>Overall</i>	<i>Male</i>	<i>Female</i>
	<i>(N= 352)</i>	<i>(n= 174)</i>	<i>(n=178)</i>
Age			
60–69	47.4	47.1	47.8
70–79	34.9	32.2	37.6

Cont'd...

Cont'd...

80+	17.6	20.7	14.6
Marital Status			
Married	61.1	81.6	41
Separated	0.3	0.6	0.0
Widowed	38.6	17.8	59
Religion			
Hindu	95.5	96	94.9
Caste			
General	84.4	87.4	81.5
Others	15.6	12.6	18.5
Education Level			
No Formal Education	57.1	32.2	81.5
Primary/Upper-Primary (Standards 1–8)	37.8	58.1	18
Secondary (Standards 9–12)	5.1	9.8	0.6
Employment Status			
Working for Pay	34.1	40.8	27.5
Not working for Pay/Retired	65.9	59.2	72.5
Household Income			
Median Income in 1,000 Rupees	2	3	2
Proxy-Level of Assistance with Interview			
Elder Only (Not Needed)	68.8	83.3	54.5
Elder + Proxy (Some Assistance)	30.4	15.5	44.9
Proxy Only (Complete Assistance)	0.9	1.2	0.6

1 Values are percentages unless otherwise noted.

Fifteen Dimensions of Health

Table 2 displays the prevalence and averages of the 15 dimensions of health by gender and age. For the purpose of organizing our findings, we have chosen to highlight the *positive*-health states and group these in three main dimensions: physical health, psychosocial health, and daily activity.

Physical Health Dimensions

Healthy vision (very good/good far sightedness) was self-reported by 33 per cent with no differences by gender or age. Most could hear unassisted (74%), however this declined with age ($p < 0.001$). Lack of

Table 2
Prevalence and Means of Fifteen Dimensions of Health, Overall and by Gender and Age.

Dimension Of Health	Overall	Male			Female			Gender χ^2 or p -value	Age p -trend or p -value
		60-69	70-79	80+	60-69	70-79	80+		
		$N = 348-352$ $n = 81-82$ $n = 56$			$n = 34-36$ $n = 84-85$ $n = 65-67$ $n = 26$				
Physical Health Dimensions	Per cent (unless noted otherwise)								
Vision Health									
Very Good/Good Far sightedness	33.0	37.8	28.6	22.2	34.1	38.8	23.1	0.595	0.085
Hearing Health									
Yes, Ability to hear normal voice	74.2	79.3	71.4	55.6	85.9	70.2	61.5	0.328	<0.001 (?as age?)
Chronic Pain									
None/Mild, Daily difficulty due to body pain/aches in past 30 days	40.1	42.7	50.0	32.4	40.0	34.9	34.6	0.274	0.374
Sleep Health									
None/Mild, Difficulty sleeping in past 30 days	54.7	57.3	50.0	61.8	54.1	53.0	53.9	0.688	0.936
Physical Activity									
Yes, Participation in moderate-to-vigorous activity for 10 min. continuously	70.2	87.8	67.9	38.2	87.1	63.6	30.8	0.765	<0.001 (?as age?)
Physical Strength									

Cont'd...

Cont'd...

Hand-grip strength Mean (SD); range 6.3–30.5	16.8(4.7)	21.4(3.9)	18.4(4.1)	17.1(3.1)	15.1(3.1)	13.8(3.2)	11.1(2.2)	<0.001 (M>F)	<0.001 (?as age?)
Nutritional Health									
Absent, Risk of 5–10% of weight loss over next 6 month	29.5	41.5	32.1	32.4	24.7	22.7	15.4	0.004 (M>F)	0.186
Dental: Oral Health									
Excellent/Very Good/Good Oral Health	44.6	47.6	37.5	25.0	49.4	55.2	34.6	0.065	0.021
(?as age?)									
Dental: DMFT Score									
Mean (SD); range 0–32	14.2(9.3)	10.6(8)	15.9(9.5)	19.6(9.6)	11.9(8.3)	15.1(8.7)	20.3(9.7)	0.850	<0.001 (?as age?)
Substance Use									
No, Current Tobacco and/or Alcohol use	42.1	23.2	27.3	26.5	66.7	56.1	38.5	<0.001 (M>F)	0.097
Safety									
No, fall in past 12 month	71.8	69.5	78.6	75.0	70.2	70.2	69.2	0.465	0.562
Psychosocial Health Dimensions									
Mental Health									
Likely to be Well (score <20)	33.6	39.5	37.5	20.6	32.9	28.8	38.5	0.569	0.264
Cognitive Health									
Normal Cognition (adjusted for education) ¹	54.8	87.8	67.9	50.0	55.3	23.9	7.7	<0.001 (M>F)	<0.001 (?as age?)

Cont'd...

Social Health										
Loyola generativity Score	Mean (SD); range 19–58	37.9(6.2)	39.7(6.6)	37.9(5.6)	37.9(6.3)	36.8(6.1)	37.3(6)	37.4(6.2)	0.0117 (M>F)	0.676
Daily Activities Dimensions										
Activities of Daily Living (ADL)										
Independent in all seven ADL		91.2	91.5	91.1	83.3	98.8	91.0	76.9	0.314	0.001
(?as age?)										
Instrumental Activities of Daily Living										
(IADL)										
Independent in all seven IADL		17.9	34.2	21.4	5.6	18.8	7.5	0.0	0.003 (M>F)	<0.001 (?as age?)

1 Using the education adjusted cutoffs – abnormal cognition determined if scores were =21 if education level 8th grade or less, <23 if high school level (>8th–12thgrade) and <24 if college level (>12thgrade) education.

chronic pain (none/mild over 30 days) was reported by 40 per cent, while good sleep (none/mild difficulty sleeping) was reported by 55 per cent with no differences across gender or age. Most endorsed daily moderate/vigorous activity (70%) but this decreased with age ($p < 0.001$). The average physical grip-strength was 17 kg (SD + 4.7) with males performing better ($p < 0.001$), however this declined significantly with age ($p < 0.001$). The risk of significant weight loss in the following 6 months was absent only in 30 per cent, and males were more likely to fare better than females in this measure ($p = 0.004$). The prevalence of positive self-rated oral health was 45 per cent, which also declined with increasing age ($p = 0.021$). Mean DMFT score was 14 (SD + 9.3) and this score increased with age ($p < 0.001$) indicating worsened dental status. No tobacco and/or alcohol use was reported by 42 per cent of the sample, with greater use in males ($p < 0.001$). No falls in the past 12 months were reported by 72 per cent of the sample

Psychosocial Health Dimensions

Thirty-four per cent of the sample was classified as likely to be free of mental health disorders, with no differences by age or gender. The proportion who were cognitively intact was 55 per cent; this declined with increasing age ($p < 0.001$), and men were more likely to be cognitively intact ($p < 0.001$). The average social health score was 38 (SD + 6.2), with males being more likely to have higher generative scores ($p = 0.0117$).

Daily Activity Dimensions

Most could independently complete all seven activities of daily living (91%), but this also decreased with age ($p < 0.001$). A small number was independent on all seven IADLs (18%); while many were independent in most of the individual IADL tasks (71–94%), only 22 per cent could independently use a telephone, lowering the prevalence of being independent in *all* seven IADL. IADL independence declined with increasing age ($p < 0.001$) and males were more likely to be independent in IADLs ($p = 0.003$).

Table 3
*Univariate and Multivariate Associations of Demographic Factors and
 Fifteen Dimensions of Health with Quality of Life*

<i>Fifteen Dimensions of Health</i>	<i>Unadjusted Model</i>		<i>Adjusted model1</i>	
	<i>Beta</i>	<i>p</i>	<i>Beta</i>	<i>p</i>
Vision Health				
Very Good/Good Far sightedness	7.4	<0.001	4.9	<0.001
Fair/Poor/Very Far sightedness	55.1	< reference >		< reference >
Hearing Health				
Yes, Ability to hear normal voice	5.4	<0.001	3.5	0.003
No, Ability to hear normal voice	53.5	< reference >		< reference >
Chronic Pain				
None/Mild, Daily difficulty due to body pain/aches in past 30 days	5.1	<0.001	-0.6	0.603
Moderate/Severe/Extreme, Daily difficulty in past 30 days	55.5	< reference >		< reference >
Sleep Health				
None/Mild, Difficulty sleeping in past 30 days	6.1	<0.001	4.13	<0.001
Moderate/Severe/Extreme, Difficulty in past 30 days	54.2	< reference >		< reference >
Physical Activity				
Yes, Participation in vigorous and/or moderate activity for 10 min. continuously	3.5	0.004	-0.1	0.955
No, Participation in vigorous and/or moderate activity for 10 min. continuously	55.0	< reference >		< reference >
Physical Strength				
Hand-grip strength Mean (SD); range 6.25 –30.5	0.3	0.019	0.1	0.472
Nutritional Health				
Absent, Risk of 5–10% of weight loss over next 6 month	4.0	0.001	1.9	0.087
Present, Risk of 5–10% of weight loss over next 6 month	56.4	< reference >		< reference >
Dental: Oral Health				
Excellent/Very Good/Good Oral Health	5.1	<0.001	2.6	0.017
Average/Poor/Very Poor Oral Health	55.2	< reference >		< reference >
Dental: DMFT Score				
DMFT Score Mean (SD); range 0–32	-0.1	0.294		
Substance Use				

Cont'd...

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No, Current Tobacco and/or Alcohol use	0.5	0.685	0.8	0.449
Yes, Current Tobacco and/or Alcohol use	57.4	< reference >		< reference >
Safety				
No, fall in past 12 month	2.4	0.053	0.9	0.424
Yes, fall in past 12 month	55.7	< reference >		< reference >
Mental Health				
Likely to be Well	3.9	0.001	2.1	0.048
Likely to have Mild/Moderate/Severe Mental Disorder	56.2	< reference >		< reference >
Cognitive Health				
Normal Cognition	3.5	0.002	2.9	0.087
Abnormal Cognition	55.6	< reference >		< reference >
Social Health				
Loyola generativity Score Mean (SD); range 19–58	0.4	0.001	0.3	< 0.001
Activities of Daily Living (ADL)				
Independent in all seven IADL	8.0	< 0.001	4.6	0.016
Dependent in one/more ADL	50.2	< reference >		< reference >
Instrumental Activities of Daily Living (IADL)				
Independent in all seven IADL	2.5	0.084	1.1	0.416
Dependent in one/more IADL	57.1	< reference >		< reference >
Gender				
Female	0.7	0.543	2.1	0.158
Male	57.2	< reference >		< reference >
Age				
80+	–2.1	0.176	2.1	0.207
70–79	–2.7	0.032	0.0	0.995
60–69	58.9	< reference >		< reference >
Marital Status				
Married/Separated	1.2	0.289		
Widowed	56.8	< reference >		
Religion				
Buddhist/Other	1.6	0.558		
Hindu	57.5	< reference >		
Caste				
Non-General	–2.7	0.081		
General/Open	58	< reference >		
Education Level				
Some Formal Education (Primary/Secondary)	2.2	0.050	0.1	0.918

Cont'd...

Cont'd...

No Formal Education	56.6	< reference >		< reference >
Employment Status				
Working for Pay	2.8	0.018	1.3	0.300
Not working for Pay/Retired	56.6	< reference >		< reference >
Household Income (Per 1000 Rupees)				
Range 0–20. [Major outliers excluded] ²	0.4	0.003	0.2	0.083
Proxy Level of Assistance with Interview				
Elder Only (Not Needed)	1.0	0.433	–2.4	0.129
Elder + Proxy (Some Assistance)	56.9	< reference >		< reference >

¹ Model adjusted for gender, age, education, work-status, household-income and proxy level of assistance with interview.

² The two highest outliers for household income (40,000 and 50,000 rupees) were excluded to meet assumptions.

Relationship Between Demographics, Dimensions of Health, and QoL

Table 3 displays the results of the unadjusted and adjusted relationships between each variable and QoL. The mean QoL score was 57 (SD +11) and tended to decline with increasing age but was significantly higher among those with more education, who were working for pay status and with increasing income.

The unadjusted standardized beta scores reveal that elderlies who were defined as healthy in the following 12 health dimensions had significantly higher QoL compared to those in unhealthier states: vision ($\beta=7.4$, $p < 0.001$), hearing ($\beta=5.4$, $p < 0.001$), chronic pain ($\beta=5.1$, $p < 0.001$), sleep ($\beta=6.1$, $p < 0.001$), physical activity ($\beta=3.5$, $p = 0.004$), nutrition ($\beta=4.0$, $p = 0.001$), oral health ($\beta=5.1$, $p < 0.001$), mental health ($\beta=3.9$, $p = 0.001$), cognition ($\beta=3.5$, $p = 0.002$), independence in ADL ($\beta=8.0$, $p < 0.001$), physical strength ($\beta=0.3$, $p = 0.019$; range 6.3–30.5) and social health ($\beta=0.4$, $p = 0.001$; range 19–58).

After adjustment for gender, age, education, work-status, income and proxy-level of assistance with interview, healthy status in seven of the 15 dimensions remained significantly associated with increased QoL: vision ($\beta=4.9$, $p < 0.001$), hearing ($\beta=3.5$, $p = 0.003$), sleep ($\beta=4.1$, $p < 0.001$), oral ($\beta=2.6$, $p = 0.017$) mental health ($\beta=2.1$, $p =$

0.048) independence in ADL ($\beta=4.6$, $p=0.016$) and social health ($\beta=0.3$, $p<0.001$).

Discussion

The present study was successful in completing a comprehensive CHNA in rural India and contribute to current knowledge on elderly health and QoL, an important factor in healthy ageing.

Socio-demographically, our sample of rural-dwelling elders was notably vulnerable given their low-education and household income status. In general, the majority were physically active, cognitively intact, independent and socially generative within their communities, however only a minority were free from health problems relating to daily difficulty with poor vision, chronic pain, poor dental health and significant weight-loss risk. The majority also had high psychological distress scores suggesting an increased likelihood of diagnosis of a mental health disorder and many, particularly males, endorsed ongoing tobacco or alcohol use. About one in four also reported having fallen in the past year, a concerning risk factor for disability in this group. Females and the oldest old were identified as especially disadvantaged as both scored poorer on many of the health dimension measured.

The findings of this study are similar to those from the older-adults INDEPTH study in Pune India which reported poorer functional ability and health scores with increasing age, lower education and widowed/single status (Hirve *et al.*, 2010). Greater burden of disability in women and rural dwellers in India was also noted in the SAGE study (Basu and King, 2013). The women in our rural sample scored significantly lower in five of the measured dimensions and were more likely to be widowed, have no formal education and be unemployed. This supports ongoing gender differences in positive health states in Elderlies residing in rural India. However, our study did not find significant differences in QOL scores by gender.

With the exception of four health dimensions (status of tobacco/alcohol use, DMFT dental score, independence in IADL and falls in past 12 months), healthy status in each of the 15 health dimensions measured were individually associated with higher QoL. After adjusting for potential confounders, seven of these health dimensions

remained significantly associated with higher QOL supporting the important influence of 'healthy' vision, hearing, sleep, dental, mental, independence in daily ADLs and social health states on rural-elderly satisfaction and well-being.

These QoL findings are also corroborated by other elderly studies that have found better self-rated health to be associated with a lack of sensory impairments (Sun *et al.*, 2007 and Wang *et al.*, 2000), better oral health (Sun *et al.*, 2007), and sleep (Ancoli-Israel *et al.*, 2008). The similarities between the findings of the current and other studies conducted in other elderly populations suggest that the findings can be extrapolated to the elderly in other rural regions in India.

Our study has identified significant health trends and opportunities for addressing modifiable factors, especially within the seven health dimensions highlighted above. To optimize elderly health in rural India, a concerted effort by government and non-governmental sectors is necessary, and both individuals and community interventions should be tailored to the local/regional culture to maximize elderly community access, acceptance and programme effectiveness. Such interventions may include investment in early prevention, education, nutrition, social and primary healthcare programmes before health decline occurs with ageing, and the creation of programmes that are female-friendly to counter some of gender disparities noted in this study. Rural elderly may also benefit from greater tobacco/alcohol cessation programs and psychiatric support services given the high level of psychological distress noted in this group. In 2015, the Maharashtra Government initiated the Prerana Project-Farmers' Mental Health Service Programme in response to increasing rates of mental health problems including suicides in rural Maharashtrian agricultural workers (Travasso, 2015).

Strengths of this study include its comprehensive nature and the partnership with the local community leaders in planning and conducting the study. Its limitation includes the relatively small sample size and elder's low literacy that may reduce self-report reliability. In addition, our sample had relatively more males than females in the 80+ age subgroup than the national census. Finally, because we selected villages within a 35km radius of a rural hospital, our health report of elderly in the participating villages may have been

healthier, given their proximity to this hospital relative to those farther away that were not sampled. Some of the logistical challenges faced included the remoteness of some of the villages, difficulty in locating elders' houses due to lack of street names and house numbers, and the need to rely on face to face contacts to schedule interviews as many of the elderly did not have access to telephones.

Conclusion

Good health is more than the absence of disease and disability, but rather a multifaceted state of overall wellbeing including QoL. With increasing longevity, a rapidly growing elderly population, optimizing modifiable health states that influence healthy ageing and QoL is important. This is particularly so in rural areas where available medical and financial resources to address elderly health decline may be limited. The elderly themselves, their families, healthcare providers and communities should adopt a proactive and diverse approach to optimizing all significant dimensions of health.

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Age Identity and Psychosocial Disability in Older Persons of Kerala

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ABSTRACT

The researchers examined the determining effect of age identity, stigma and discrimination on psychosocial disability in older persons. 573 older persons aged 65 years and more, living in families and in elder care facilities were selected by using multi-stage cluster sampling procedure. The interviews were conducted by using standardized rating scales and hierarchical regression analysis was used to test guiding hypotheses. Negative age identity ranges from 20 to 64 with a mean of 42.2 (± 6.6). Stigma ranged from 16 to 48 with a mean of 32.9 (± 5.7). Discrimination ranged from 17 to 64 (range=47) with a mean of 40.6 (± 7.7). The significant correlations were found between age identity and stigma ($r=.587$; $p<.01$), discrimination ($r=.673$; $p<.01$) and psychosocial disability ($r=.713$; $p<.01$). Age identity ($\beta=.364$; $p=.001$), stigma ($\beta=.102$; $p<.01$) and discrimination ($\beta=.447$; $p=.001$) have significantly determined psychosocial disability and explained 64.3 per cent ($R^2=0.643$) of variance. The study concludes that age identity associated stigma and discrimination have significantly increased psychosocial disability, disposing older persons vulnerable to social exclusion.

Key words: Age identity, Stigma, Discrimination, Psychosocial disability

Identity is a conception and expression of self in alignment with others individually or collectively. It is a label people place on self and is relational as well as contextual (Weinreich, 1986; Rummens, 1993). Identity is a pivotal focus of social psychological research and theorization (Major & O' Brien, 2005). Identity carries full weight for a sense of who we are, along with an overwhelming pace of change in surrounding social contexts where our identities are embedded (Howard, 2000). Age identity refers to the inner most experience of a person's age and ageing process. This is an outcome of a process, by which one identifies himself or herself with, or distances self from different aspects of the ageing process. The older people are considered as a peculiar social category; therefore, the social identity arising out of the categorical label of 'old age' might appear natural and obvious. However, it is contingent, unstable and product of historical circumstances (Hall cited in Ainsworth & Hardy, 2007: 269).

The social construction of age identity is associated with discursive practices of particular age group in question. In older persons, age identity is often with reference to health and social services utilization, which gives rise to an identity of dependency (Ibid.). Age identity is not separable from other social dimensions in which identities are constructed or attributed such as gender, sexuality, class, culture, religion, nationality and profession (Coupland, 2009). Self-perceived age identification is a major component of one's self-concept over the life-course. Age identity is a personal assessment of one's relative position in an age-graded system. It is composed of a number of sub-features such as biological, physiological, psychological, demographic, socio-economic and social psychological (Kastenbaum *et al.*, 1972; Barak & Stern, 1986). However, little is known systematically about age identity although age identity is found to significantly influence older persons' health and wellbeing (Demo, 1992; Howard, 2000; Mariaym & Jose, 2015) and psychosocial disability (Jose & Meena, 2015; Mariyam & Jose, 2015). Hence, present study is designed to examine the determining role of age identity on psychosocial disability of older persons.

Non-dominant social identities including age identity are often discredited and devalued in society therefore its perceptions and internalization has multiple disabling effects on it targets (Jose *et al.*, 2011).

The discrediting identity perceptions induce and maintain self-perceived stigma in the form of personalized stigma and negative self-image. Social ascriptions of non-dominant identity (e.g., age identity) subjects and victimizes individuals with discredited identities to enacted stigma (Scamblar, 1998). Both perceived and enacted stigmatization found to produce discrimination in basic social institutions (Scamblar, 1998; Khan *et al.*, 2009; Varghese, 2011; Jose, 2014). Discrimination leads to psychosocial disability, which critically incapacitates individual human agency of older persons to favorably influence resourceful out-groups for self and collective self-expansions (Aron & Aron, 1986).

Self-expansion model postulates the desire for self-expansion as a basic motive inherent in humans (Aron & Aron, 1986; Aron *et al.*, 2001). Individuals have innate desire for enhancing their potential self and communal efficacy through increasing access and control over material and social resources, perspectives and identities (Aron & McLaughlin-Volpe, 2001). It expands one's behavioural efficacy and self-concept (Leary, 2007). It posits self as a primary desire to enhance potential efficacy, which helps to gain access to and control over material and social resources that make achievements of goals possible. Goal achievement is a fundamental human motive (Aron & McLaughlin-Volpe, 2001), especially when individuals are deprived of material and social resources. Formation and maintenance of relations with individuals was found to be satisfying and efficient way of achieving self-expansion (Aron, *et al.*, 1995).

Self-expansion theory was useful in studying people's motivation to join and identifying self with groups (Aron & McLaughlin-Volpe, 2001). Group membership help in expanding self by giving access to group resources, perspectives and identities (Wright, *et al.*, 2002). Group becomes an important source of collective perspective such as identity, worldviews and norms. It provides a framework for understanding and negotiating with one's world (McLaughlin-Volpe *et al.*, 2005). The extent of self-inclusion in-group and acceptance of inclusion by others are likely to potentially increase desired self-efficacy. The experience of inclusion can give privileged access to group resources. It is expected to provide pleasurable affect (Ibid.).

Initial desire to possess high level of potential self-efficacy is the motivation to form new relationships and joining new groups (Ibid.).

The term psychosocial disability is defined from self-expansion perspective (Aron & Aron, 1986; *et al.*, 2001) as “individual or/and collective sense of psychosocial incompetence that restricts optimal use of individual and collective human agency to influence out-groups favorably to achieve self-expansion and/or collective self expansion most fulfilling to individuals and groups” (Jose, 2014). As the term suggests, the psychosocial disability contained both psychological and social aspects of reduced and compromised competence, abilities and functioning at individual and collective life.

Individuals tend to develop poor self-concept and (collective) self-esteem (Phinney, 1992; Verkuyten and Lay 1999) therefore non-dominant identity internalization (Sidanius & Pratto, 1993; 1994; 1997; Jose & Sabu, 2013). Such individuals and groups significantly lack the sense of control, autonomy and agency to favorably influence out-groups to expand themselves and acquire resources needed to self-expansion for wellbeing (Aron & Aron, 1986; and Aron *et al.*, 2001) through individual and communal efforts. This psychosocial incompetence and/or inadequate agency to favorably influence out-groups is viewed as compromised functionality both individually and collectively that significantly disable individuals and groups to mobilize and acquire important resources and responses to favorably influence out-groups.

Precisely, the marginalized social groups such as elderly persons are divided across intersecting identities such as social and gender, were likely to have poor psychological and social resources to organize collectively to influence dominant out-groups in favor of them; and thereby achieve collective self expansions most difficult to fulfil. Further, the process of stereotyping, negative cultural images and discrimination against ageing persons have significantly influenced health (including mental health) and psychological wellbeing, which further restricted their agency to influence resourceful out-groups. Besides, social image of old age was significantly associated with fastening ageing. It represents deficits and decline in old age and limited range of opportunities for elderly persons. Elderly persons learned dependency during old age even in the absence of biological

decline, which lead to deficits in performing activities of daily life. It was neither determined by primary biological decline nor these were irreversible but socially prescribed support received by caregivers often reflects the scripts of support that neglect independency and reinforce dependence in activities of daily living.

In the latter, the social dimension of psychosocial disability has an ad-on effect through compromised social competence and functioning. This is because, such individuals and social groups significantly lack sophisticated repertoire of social skills and an interpersonal problem solving abilities. It disables persons to develop psychosocial competence and abilities (McFall, 1982; Spence, 1995) both personally and collectively (Jose, 2014). As a result, social disabilities were reflected in the important social domains of life. Such persons were likely to experience increased conflicts in social relations and interactions, weak social ties, poor social support and poor social integration outside one's social groups or categories (Varghese, 2011; Jose & Sultana, 2012; Jose & Maheshwari, 2012) resulting social exclusion.

Individuals and groups with discredited and devalued identities experience increased conflicts in social relations (Jose & Sabu, 2013; Cherayi, 2015), reduced social support and network (Jose, *et al.*, 2011) and reduced social integration (Jose, 2013). Further, such groups face restricted autonomy over economic and social resources and perspectives. It induced and sustained persistent structural disabilities that restrict them to effectively advocating for due social rights (Jose, 2014). Situating within this conceptual premises, the present study examined the determining roles of age identity, stigma and discrimination on psychosocial disability of older persons.

Method

Using a cross sectional research design, the purpose of this study was to examine how age identity alongside with stigma and discrimination influence psychosocial disability in older persons. The universe formed older persons aged 65 years and more who resided in the southern state of Kerala, India. The sample was defined as 'a person aged 65 years and more, presently living either with family of procreation or in an institutional care facility in the selected districts of Kerala, namely Kannur, Ernakulam and Pathanamthitta'. The study

choose 65 years as the minimum age to participate, because older persons at their 60s were likely to be still economically active and engage in familial and social roles (Cornwell and Waite, 2009). Evidence suggests that as the age increases, the levels of functioning decline including cognitive functioning (Sebastian, 2013), which restricted older persons' life choices (Bowling and Iliffe, 2011). The eligibility criteria to recruit older persons in the study were: aged 65 years and more, who were currently not suffering from any severe forms of mental illness or cognitive deficits and provide informed oral consent.

Sample Selection Procedure

Multi-stage cluster sampling procedure was used in this study (Bryman, 2008; Bordens & Abbott, 2011). This sampling procedure involves multiple stages of sampling since in this sampling; primary unit (first stage of the sampling procedure) is not the unit of the population to be studied but grouping of those units that are known as clusters. A probability sampling procedure needs to be employed (e.g., simple random or systematic random sampling) at each stage of sample selection in cluster sampling (Bryman, 2008). Using this sampling procedure, the authors selected two to three administrative blocks from each selected district randomly as clusters. These clusters were divided into different village panchayats. About 50 per cent of the village panchayats were randomly selected using lottery technique. Selected 573 elderly persons were randomly chosen from village panchayats.

Table 1
Shows the Sampling Procedure in Detail

<i>Districts</i>	<i>Block Panchayats</i>	<i>Village Panchayats</i>	<i>Selected Block Panchayats</i>	<i>Total VPs in Selected Block Panchayats</i>	<i>Selected Panchayats [50%]</i>	<i>Selected Sample Size</i>
Ernakulam	14	84	03	21	10	200
Kannur	11	81	02	15	08	200
Pathanamthitta	08	54	02	14	08	173
Total	33	219	07	50	26	573

NB: Source: Ministry of Panchayat Raj Affairs, Government of India.

The selected wards of Panchayats was treated as primary sampling unit (PSUs) where our field researchers conducted a mapping exercise to identify the older persons with the help of local voluntary organization and local panchayat representatives. Through this exercise, we developed a sampling frame from where we randomly selected about 30 older persons who met the eligibility criteria.

The authors decided to choose this sampling strategy based on two important considerations. First, the study population was too large that pose difficulties for cost effective random sampling; therefore, we choose multi-stage cluster sampling technique (Kish, 1965; Bordens & Abbott, 2011; David de Vaus, 2001). Second, this sampling strategy helped the field researchers to be geographically well concentrated. Third, this sampling strategy saved time and it is an acceptable and cost effective method of acquiring a sample for survey design (Bordens & Abbott, 2011; Polit & Hungler, 1995).

Measurements

The authors developed a structured interview schedule based on the critical variables considered for the study. The instrument included age identity, internationalized and enacted stigma and discrimination. The present study adapted standardized measurement scales that covered the key variables considered for examination. We developed a draft interview schedule. In order to face validate it, we shared the schedule among three experts. Among them, one person was an expert on instrument development through statistical validation procedure (e.g., factor analysis), another person was a subject matter expert on issues and third person was an expert on social exclusion of older persons. These experts reviewed the schedule against the set objectives of the study. The research team further reviewed reviewers' comments and suggestions and incorporated appropriate changes that resulted in refined version of the interview schedule.

Two independent translators with excellent command over both English and Malayalam (to read, write and speak) were engaged in translation of the structured interview schedule. Both translators were postgraduate in social work with research experience and were

currently working in research institutions, though they were not directly involved in the present study. The Principal Investigator and the Research Associate have independently reviewed the accuracy of the translation through back translation from Malayalam to English.

A three-day a fieldwork training was organized to train interviewers. The interview schedule was presented to the selected group. The group was brainstormed and discussed in detail the context of the research study as well as the measurement objectives. The trained interviewers conducted the pre-test for the translated version of the interview scheduled among 10 actual study participants. A separate observation and comments section was attached with pre-testing interview schedule to document interviewers' observations and participants' suggestions. After each pre-test, the principal investigator conducted a discussion about interview process with each interviewer. As a result, the investigators further refined and contextualized interview schedule before actual data collection.

Socio-demographic Profile

Socio-demographic data: The researchers developed a socio-demographic schedule. It contained the variables such as age, gender, years of education, family income, occupation, social group and religion.

Age Identity Measurement Scale (Jose & Meena, 2015): It is a 17-items instrument with 4-point rating scale. The responses range from strongly agree (1) to strongly disagree (4). It has three subscales, viz., personalized self-image (2-items), personalized social image (12-items) and importance to age identity (3-items). The scale yielded an overall internal consistency reliability of 0.85. The personalized self-image yielded a Cronbach's alpha of 0.59; second subscale, i.e., personalized social image yielded a Cronbach's alpha of 0.90, and the third subscale, i.e., yielded an internal consistency reliability of 0.72. In a sample of 100 older persons aged 65 years and more in rural areas of Kozhikode district, Mariyam and Jose (2015) studied the test-retest reliability over four weeks interval, using inter-class correlation coefficient. Personalized social image yielded an ICC of 0.666 with a Cronbach's alpha of 0.663, which was within an acceptable limit. The

subscale identity importance yielded an ICC of .711 with the Cronbach's alpha of .709, which indicates that this subscale has a high temporal reliability over 4-week period. Finally, the personalized self-image yielded an ICC of 0.120 with a Cronbach's alpha of 0.21, which indicates that this subscale has not yield to acceptable level of temporal reliability. However, the overall scale yielded an ICC of 0.70 with a Cronbach's alpha of 0.70. Besides that, AIMS yielded excellent criterion validity with Rosenberg Self-esteem scale (1965), Negative self-image subscale of the AIDS stigma scale (Berger *et al.*, 2001).

Stigma and Discrimination Scale: The authors used a modified version of AIDS Stigma and Discrimination Scale (Genberg *et al.*, 2009) to measure aspects of stigma and discrimination. It is a 22-item Likert type rating scale based on three-component model of stigmatization and discrimination (viz., shame, blame and social isolation, perceived discrimination and equity) with a high internal consistency reliability and good divergent validity. The first factor consisted of 10-items with factor loadings above 0.40, ranging from 0.45 to 0.73. This factor collectively represented the first three components of stigma proposed (Link & Phelan, 2006). This factor yielded high internal consistency (Cronbach's alpha=0.86). The second component was the perceived discrimination. It consisted of eight items with high factor loadings, which ranged from 0.60 to 0.71. This factor addresses the manifestations of stigma and the discrimination that community members perceived that the PLWHA face in their communities. This factor corresponds to Link and Phelan's (2006) fourth component. This factor also had high internal consistency ($\alpha=0.82$).

Perceived Discrimination Scale: The authors modified the third factor, i.e., *perceived discrimination* was modified to capture the study context and subsequently used. It consisted of five items with factor loadings ranging from 0.46 to 0.73 (Genberg *et al.*, 2009). We modified these items to contextualize and measure the endorsement of views that older persons should be considered equal members of society as those who are in mainstream society. The questions focused on study participants' attitude about restrictive policies, freedoms, need for equal and fair treatments in society. This factor had an internal consistency reliability (Cronbach's $\alpha=0.71$). Item-to-total correlations and

alpha coefficients with each item deleted showed good reliability for perceived discrimination was somewhat lower ($\alpha=0.050$ to 0.70) with item deletions (Genberg, 2009). In the current sample, we found a reliability coefficient of 0.78 ($\alpha=0.784$). The correlation coefficient shows a strong positive correlation between the scales' scores on perceived and enacted discrimination ($r=.676$; $p<.001$). Correlation coefficient conceptually supported the direction and degree of relationship, which in turn implies a strong construct validity of the perceived discrimination scale (Berger *et al.*, 2001; Nunnally & Bernstein, 1994).

Everyday Life Discrimination: We used a 9-item scale (Williams *et al.*, 1997) to measure the frequency of disrespects faced by older persons in everyday life. This scale included statements such as "you are treated with less courtesy than other people," "you are treated with less respect than other people," and "people act as if they think you are dishonest." Older persons will be asked to indicate their response with a 4-point scale ranging from 1 (strongly disagree) to 4 (Strongly agree). Total scores needs to be computed, with higher scores indicating severity of discrimination. Internal consistency of the scale was 0.93 (Jang, Chiriboga, & Small, 2008). Reliability examination of this instrument in the current sample yielded a Cronbach's alpha of 0.88 . We examined the construct validity of this scale by using the perceived discrimination subscale of the AID Stigma & Discrimination Scale (Genberg *et al.*, 2009). The correlation coefficient showed a strong positive correlation between the scales' scores on perceived and frequency of enacted discrimination ($r=.676$; $p<.001$). The correlation coefficients conceptually supported the direction and degree of relationships, which in turn implied strong criterion validity of the enacted discrimination scale (Berger *et al.*, 2001; Nunnally & Bernstein, 1994).

Perceived Stigma Scale: We modified Berger HIV stigma scale (Berger *et al.*, 2001) to measure negative self-image of older persons. The original scale is a 40-item Likert-type rating scale intended to measure generalized perceived stigma with response categories of 4=strongly agree, 3=agree, 2=disagree, 1=strongly disagree. It consisted of 4 subscales with a total score ranging from 40 to 160, with

a coefficient alpha of .96 and high score obtained showed high stigma perceived. In the present study, we modified 13-item negative self-image subscale selected from Berger Stigma Scale. The subscale scores ranged from 13 to 52 with a reported alpha coefficient of .91. Jose (2014) reported that the alpha coefficient on negative self image of 0.81 ($\alpha=0.812$) when he examined the negative self-image of on account of lower caste identity of dalit women in rural India. The present study showed a Cronbach's alpha of 0.81 in the current study sample of older persons in Kerala. In the present sample, we established the criterion validity to the subscale of 'the negative self-image,' examining the relationships between negative self-image and self-esteem of older persons. In addition, we examined the construct validity through examining the relationship 'negative self-image' on other measures of related construct (Nunnally & Bernstein, 1994). Berger *et al.* (2001) reported that the negative self-image was inversely correlated with the scores on Rosenberg's Self-esteem scale scores ($r=-.68$; $p<.001$) (Rosenberg, 1965). In order to examine the construct validity, the present study examined the relationship between negative self-image and self-esteem. Result yield significant inverse correlation ($r=-.711$; $p<.001$) consistent with the report of Berger and colleagues (2001).

Psychosocial Disability Scale (Jose & Meena, 2015): A 37-item 4-point rating scale measured psychosocial disability on five sub-domains, viz., psychological disability, autonomy, social support, social integration and spouse support. Responses range from 'strongly disagree=01 to strongly agree=04'. First subscale was psychological disability with 19 items that measured a range of concerns such as feel shame, public attitude, feeling less good, feel isolated, feel bad, feel useless and less important due to ageing, loss of self-respect, feel failure, less effective and lack understanding. This subscale showed an internal consistency reliability alpha of 0.92 and Gutman Split Half $r=0.89$. The second subscale on 6-items measured freedom in terms of physical mobility, keeping aside and spending money for self, and health for enjoying independence. The internal consistency reliability alpha was 0.86 with Guttman Split Half r was 0.76. Third subscale on 5-items measured social support in terms of 'feel loved and wanted at homes,

availability of persons upon whom older person could depend on for personal matters, help, availability of family members to freely talk and its frequency. This subscale showed an internal consistency reliability of 0.79 and Guttman Split Half r of 0.63. The fourth factor measured the concept social integration on five items. The items tap the aspects such as feel proud of being an older person, level of satisfaction with life, positive attitude towards life, felt loved and wanted, being part of a larger group and feel respected. Internal consistency reliability was inadequate with a Cronbach's coefficient alpha of 0.57. The final subscale consists of two items that measures older persons' sense of opening up self to spouse and the level of reliability on spouse in time of needs. This subscale showed a significant internal consistency reliability coefficient of 0.94 while Guttman Split Half r was 0.941.

Data Analyses

Prior to the analysis, we edited the data, processed and transformed based on the factors of the standardized scales. The scores obtained on the perceived discrimination subscale of the stigma and discrimination scale and the scores obtained on everyday life discrimination scale were computed together in order to form a composite scores on discrimination, which integrates two dimensions of discrimination, viz., perceived and actual discrimination in everyday life. Similarly, we have computed the obtained scores on stigma and discrimination scale (exclusion perceived discrimination subscale) and the scores obtained on negative self-image of the perceived stigma scale (Berger *et al.*, 2001) were computed in order to get a composite score that integrates perceived and enacted stigma. Missing responses were dealt either with deletion of interviews (more than 5% responses in an interview) or mean substitution (if 5% or less). We examined normality of data on important variables studied using QQ Plots and found normal distribution. Preliminary analysis was performed using frequency, percentile, mean, mode, range and SD. Apart from descriptive statistics, we performed Pearson's correlation (one-tailed) and hierarchical regression analyses to test the critical hypotheses.

Ethical Considerations

Informed oral consent was obtained from each study participant with a view to protect their rights either to participate or to decline the participation after informing the study purpose, nature of participation and the type of information sought.

Results

Socio-demographic Characteristics

Older persons' age ranged from 65 years to 102 years with a mean age of 75.5 years and mode was 75 years (± 7.6 years). Most of the older persons were women (61.2%; $n=382$) and men were 38.3% ($n=242$). The years of education substantially ranged from no formal education (Mode=0 yr) to 18 years with a mean of 4.2 years (± 3.2 yrs). Further, 73.9 per cent reported that they completed up to 5 years at schools, while 24.2 per cent of them reported that they completed 6 to 10 years at schools. Evidently, older persons were relatively less educated especially up to primary and secondary levels. Older persons were married (43.4%; $n=271$) and unmarried constituted merely 12 persons (1.9%). About 8.3 per cent ($n=52$) men were widowers and 46.3 per cent ($n=289$) women were widows. The religious composition reveals that 57.4 per cent ($n=358$) were Hindus, Muslims were 7.9 per cent ($n=49$) and Christians were 34.8 per cent ($n=217$). Evidently, there is a significant under-reporting of family income under the pretext of perceived probable exclusion from welfare benefits. As a result, income showed skewed trends while most of the older persons have reported that they do not have a sizable family income (Mode=0). Income ranged from no income to Rs. 50,000 per year with a mean of 3,607.1 (± 6294.6).

Age Identity, Stigma and Discrimination

Table 1 shows the descriptive analyses of age identity, stigma and discrimination. The scores on negative age identity ranged from 20 to 64 with a mean of 42.2 (± 6.6). The scores on stigma ranged from 16 to 48 with a mean of 32.9 (± 5.7). The scores on discrimination ranged from 17 to 64 (range=47) with a mean of 40.6 (± 7.7). The older persons reported substantial level of negative age identity, stigma and discrimination.

Table 1
Shows the Descriptive Scores of Age Identity and Its Subscales

<i>Variables</i>	<i>N</i>	<i>Min-Max</i>	<i>Mean</i>	<i>SD</i>
Negative age identity	573	20–64	42.2	6.6
Stigma	573	16–48	32	5.7
Discrimination	573	17–64	47	7.7

Table 2
Shows the Bivariate Relationship between Key Variables, viz., Age Identity, Stigma, Discrimination and Psychosocial Disability

<i>Name of Variables</i>	1	2	3	4
1. Age identity	1			
2. Stigma	.587**	1		
3. Discrimination	.673**	.684**	1	
4. Psychosocial disability	.713**	.613**	.749**	1

** Significant at 0.01 level (one tailed).

Table 2 shows the results of the Pearson's one tailed correlation analysis, which examined the correlation between age identity, stigma, discrimination and psychosocial disability. The analysis reveals that age identity significantly correlated with stigma ($r = .587$; $p < .01$) with a direction that as the negative age identity increases, stigma also increases. Age identity was significantly correlated with discrimination ($r = .673$; $p < .01$) which implies that as the age identity increases, discrimination also increases. Age identity was significantly correlated with psychosocial disability in older persons ($r = .713$; $p < .01$) which indicates that as the age identity increases, psychosocial disability also increases. Stigma was significantly correlated with discrimination ($r = .684$; $p < .01$) which implies that as stigma increases, discrimination also increases. Stigma further increases psychosocial disability ($r = .613$; $p < .01$) which implies that as the stigma increases, psychosocial disability also increases. Finally, discrimination was significantly correlated with psychosocial disability in older persons, which implies that as the discrimination increases, psychosocial disability also increases.

Predictors of Psychosocial Disability in Older Persons

Table 3
Shows the Hierarchical Regression Model on Psychosocial Disability in Older Persons

<i>Variables</i>	<i>Unstandardized</i>	<i>Standardized</i>	<i>t</i>	<i>F</i>	<i>R2</i>
<i>Model: 3</i>	<i>Coefficients</i>	<i>Coefficients</i>	–	–	–
–	<i>B</i>	<i>Std. error Beta</i>	–	–	–
(Constant)	1.007	1.822		.555	337.624***
Age identity	.590	.057	.364	10.375***	.643
Stigma	.401	.139	.102	2.884**	
Discrimination	.610	.055	.431	11.118***	

Adjusted R² = .641

DV: Psychosocial disability: 1.007 = age identity = 0.364 + stigma = .102 + discrimination = .431

NB: ***Significant at .000 level; **significant at 0.01 level

Table 3 shows the hierarchical regression model on psychosocial disability in older persons. Since, all variables entered into the correlation analyses showed statistically significant one-tailed correlations, we considered hierarchical linear regression model to examine the effect of age identity, stigma and discrimination on psychosocial disability. The theoretical consideration has guided ordering the variables into the regression model (see psychosocial model of social exclusion). In the analysis, we fixed confidence interval as 95 per cent and case-wise deletion was performed, where cases with more than an SD of 2.5 were excluded from the analysis. In the stepping method criteria, we used a probability of F at 0.05 while removal was performed if probability was at 0.10 and above. The test was run using enter method in SPSS version 21.

First, we ruled out the possible role of collinearity among the independent variables through examining the tolerance and VIF. Multi-collinearity exists when tolerance is below 0.1 and VIF is greater than 10. In this analysis, tolerance level of each predictor variable was within the acceptance level of 0.1 (tolerance ranged from 0.516 to 0.422) and less than the VIF of 10 for exact values (VIF ranged from 1.936 to 2.367). Hence, it was ruled out that collinearity was not a

significant problem among predictor variables. Secondly, we examined the overall significance of the model using F statistic and found that the predictor model of psychosocial disability was significant at 0.000 level ($F(566)=337.624$; $p<.000$). This result indicates that each contributing variable to psychosocial disability (viz., age identity, stigma and discrimination) has significant linear relationship with the predicted variable (i.e., psychosocial disability). Overall variance explained by three predictors were 64.3 per cent ($R^2=0.643$). Age identity ($\beta=.364$; $p=.001$), stigma ($\beta=.102$; $p<.01$) and discrimination ($\beta=.447$; $p=.001$) have significantly contributed to the outcome variable positively. This regression model suggests that age identity, stigma and discrimination significantly determine psychosocial disability in older persons.

Discussion

We found that older persons highly negatively personalized age identity that induced and sustained intense stigma, discrimination, psychosocial disability and global wellbeing. Age identity significantly and positively correlated with stigma, discrimination, psychosocial disability and global wellbeing. Age identity, stigma and discrimination significantly contributed to psychosocial disability in older persons. Age identity, stigma and discriminated together accounted for about 64.3 per cent of variance on psychosocial disability.

We conceptualized and measured age identity in three sub-dimensions such as self-image, social image and value attached to ageing self as older persons. The social image refers to older persons' idea about how society perceives ageing persons, especially societal attitudes, social stereotypes and cultural images (Sijuwade, 2009) which are inherently negative and disabling older persons (Jose and Meena, 2015). This study found that older persons highly personalized the social image as older persons. Ageing self-image refers to an ageing person's knowledge of chronological and subjective ageing (i.e., how person feel about the broad age group he/she belongs to) (Sijuwade, 2009). Older persons have heavily personalized negative image of ageing self, hence they were likely attach less importance to ageing self-identity as ageing persons. Mariyam and Jose (2015) found that older person who personalizes high level of personalized social and

self-images of self are likely to give less importance to the age identity. Negative age identity is likely to have significant bearing on successful ageing of older persons, including health and mental health outcomes. Therefore, it is critical to develop inclusive social policy practices that would address issues related to the social construction of age identity alongside with guided public discourses to scale up inclusive social images of older adults with mainstream society.

Age based identities are formed within social structures that shape their wellbeing and satisfaction with life. Age identity has a significant influence on cognitive age adaptation and influence on health and wellbeing in older persons (Schafer & Shippee, 2009). Howard (2000) argued that evolving positive conceptions of ageing should lead more older persons to identify and accept themselves as old and have more positive self evaluations. In contrary, negative age identity results in negative self evaluations, which results in attaching stigma and discriminations (Jose and Meena, 2015). We found that negative age identity significantly and positively correlated with stigma, discrimination and psychosocial disability while inversely influenced global wellbeing of older persons. The result was consistent with Logan *et al.* (1992) that found life satisfaction was lower while stress was higher among older persons who perceived themselves as aged. The negative age identity significantly increased social exclusion in older persons, increased material deprivation, restricted access to social rights, reduced social participation and poor normative social integration (Mariyam & Jose, 2014). Negative age identity was significantly associated with reduced self-esteem, poor self-concept, intensified conflicts in interpersonal and social relations and poor social integration (Jose and Meena, 2015). The results suggest the need for evolving positive self-conceptions of ageing self, assisting older persons to develop congruence between subjective age and chronological age (Montepare & Lacuman, 1989), improve acceptance of self as ageing persons, thereby improve satisfaction with self and reduces stress (Logan *et al.*, 1992), and older persons' quality of life.

Stigma positively and significantly correlated with discrimination and psychosocial disability while it inversely correlated with global wellbeing. The stigmatized persons anticipate and experience discrimination. They were aware of how they violate social norms by

possessing stigmatizing attribute to negative evaluation of self, loss of self, a loss of self-esteem, anxiety and social withdrawal (Goffman, 1963). Discrimination is viewed as a mechanism by which stigmatization is induced and sustained (Major & O' Bren, 2005). Hence, stigma and discrimination are likely to be in same directions as when stigma increases, discrimination also increases (Jose, 2014; Varghese, 2011; Cherayi, 2015). Furthermore, discrimination significantly and positively correlated with psychosocial disability, which signifies that as the discrimination persists, psychosocial disability worsens. This relationship is consistent with the theoretical postulation proposed in the psychosocial model of social exclusion (Varghese, 2011; Jose, *et al.*, 2011; Jose & Sabu, 2013). These results further reiterate the need for positive portrayal of older adults in public places as well as in public discourses.

Consistent with theoretical postulation of the psychosocial model of social exclusion (Varghese, 2011; Jose, *et al.*, 2011), the hierarchical regression analysis revealed that age identity alongside with stigma and discrimination significantly determined psychosocial disability while these variables explained 64.3 per cent variance on psychosocial disability. Jose (2014) tested this theoretical model in 601 dalit and tribal women in south India using structural equation modelling. The result showed that social identity together with stigma and discrimination significantly induced and sustained psychological and social disability experience in women, which finally resulted in compromised quality of social life. Among the school-going dalit children, Jose (2013) found significant level of social stigma and discrimination attached dalit social identity, which lead to psychosocial disability and social exclusion. Further, illegitimate origin of children significantly induced stigma and discrimination in children of unwedded tribal mothers, which has contributed to the psychosocial disability in children (Cherayi, 2014).

Conclusion

Older persons heavily personalized negative social-and-self images and attached less importance to ageing self. Negatively personalized age identity and associated stigma and discrimination significantly increased psychosocial disability and reduced global

wellbeing in older persons. Older persons' increased psychosocial disability significantly increasing susceptibility to social exclusion of older persons since their agency to influence others positively and favourably is compromised due to stigma and discrimination of older persons and ageing identity.

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Situating Elderly Role in Family Decision-Making: Indian Scenario

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ABSTRACT

Intergenerational relations make an important part of our social identity. Healthier relationships between generations may ensure a healthy ageing. Improved relationships between generations can be reinforced in better way when we understand the role of elderly and importance of inter-generational relationships. This study was carried out in Gujarat to explore the role of elderly, in household domain with an intergenerational perspective. 69 elderly from the family setting (Women = 32; Men = 37) and 11 elderly from the old age homes (Women = 04; Men = 07) were interviewed individually. It was found that the various factors influence the relationships between elderly and their family members. The paper concludes with the relevance of healthy interaction for better intergenerational bonding in family.

Key words: Family, Support, Decision-Making, Elderly, Relationships,

The demographic and economic transition put numerous challenges to the family structure and intergenerational relationship. The relationships between generations are observed as the mutual help among people where both younger and older generations support and influence each other (Tabuchi & Miura, 2015). Declining traditional

values and institutions are resulting in the weakening of intergenerational relationships and thereby an increasing number of nuclear families are emerging (Bhat & Dhruvarajan, 2009). The intergenerational relations are created by a complex range of factors at individual, family, community and societal levels (Pain, 2005). As one gets older, home and family life become more central to ones lives. Whether elderly live with their families or separate, they have an important place and role in the family. They create important bonds, relationships and have important understandings with their loved ones during their entire life. These bonding influence the quality of life of older and young people.

There are several advantages of strong and positive intergenerational relations including an exchange of human capital and life-skills; the transmission of values and culture; the preservation of intergenerational solidarity; and reduction of age-based prejudice, etc. However, there has been relatively little research available in this field particularly in Indian context. Intergenerational relations are produced by a complex range of factors. The nature of these relations varies widely in different places and cultural settings. Research in the field of Intergenerational relationships within family and kinship is gaining importance due to intense demographic changes particularly increasing life expectancy, declining fertility, and its implications for institutions like family. In view of increasing proportion of elderly population and inadequate social security programmes for them, there is need to reinforce the importance of different role and activities, performed by the elderly members in family.

Family and Inter-Generational Relations

Intergenerational relationships refer to relationships between two or more generations of people. In both traditional and modern cultures, intergenerational learning includes systematic transfer of knowledge, skills, competencies, norms and values between generations (Hoff, 2007). Typically the elders or grandparents of the family share their wisdom and are valued for their role in perpetuating the values and culture in younger generation. Such dissemination keeps new generations grounded to the history of their culture and to provide a link to the past (Hanks, 2007). During different life events

like marriage, work, parenthood, the younger generation develop more respect for family elders. The younger generations takes the responsibility for the well-being of elderly parents. However, this responsibility may differ depending on the need. Most of the younger generation views elderly as a socio-economic burden however, advantages of having an elderly person at home for care in times of sickness, advice in family matters and education are also recognised by younger generation (Khan & Raikwar, 2011). The intergenerational theory, based on the linkage between two generations, helps in investigating intergenerational relationships in the changing world. It focuses on understanding of the combination of two people at different phases of development in various situations and contexts (Vandervan, 2011).

Family, the basic and universal social structure of human society, has been identified as the socio-economic backbone of the country (Shah, 1998; Patel, 2005). In Asian countries including India, strong family values are maintained; with many people living in extended family households either together or close by for their psychological, social and physical needs (ILC, 2012; Paltasingh & Tyagi, 2012). In times of disease or emergency, members of the family have pooled in resources to help each other. It is the family through which inter-generational relationships are cherished and continued. The modernization involving urbanization, industrialization and increased women's work participation, etc. have been reported to be affecting the traditional familial supports to the elderly (Gupta, *et al.*, 2009). Individual freedom has become the distinguishing feature of today's modern family system and people are moving faster to modernity due to associated limitations of living in the joint family. This has an impact on marriage system, age at marriage, division of labour in the family, competitiveness and relations in the family (Manocha, 2003). Today, multiple health issues, unequal employment opportunities; inadequate income; lack of suitable health services; changing family structures, inter-generational relations and stereotyped negative attitude (Spence & Radunovich, 2007; Paltasingh & Tyagi, 2015) are the major challenges for the elderly population. However, developing constructive relationships at an early age helps to reduce such adverse perceptions (Khan, 2015). The quality of family relationships is established in the early years of marriage and parenthood which continues into the later years (Kumar, 2015). Increasing knowledge gap between

generations, particularly in urban areas shapes the intergeneration interactions to a great extent. Younger generation is gaining easily available and accessible information & knowledge due to advancement of technologies especially the digital world. However, elderly do not have easy access to such information. In the present day context youths and children have become more enthusiastic on learning new, fast and practical ways of leading their lives. This has resulted in creating knowledge or information gap between the generations besides creating a matter of worry for the parent of the teenagers (Sorbring, 2014).

Involvement in Family Issues

Intergenerational support may not be assumed to be one sided always with a belief that once a person grows old, he or she becomes only a recipient of care and support from the younger generation. The intergenerational transfers, either material or non-material, flow either way. In modern Indian society, with both the parents in jobs, grandparents play an important role in caring for the grandchildren. The attention given to older persons informs them that they are important to the younger generation. The close linkages between grandparents and grandchildren, promote well-being and mental health, i.e., greater self-esteem and lesser susceptibility of developing depression among grandparents and grandchildren (Reitzesn & Mutran, 2004; Silverstein *et al.*, 2010). The intergenerational relationships are more about continuity than change. The changes are structured by circumstances that elevate the social dependency of older parents and the economic dependency of adult children, initiating both positive and negative changes in their relationships (Hogerbrugge & Silverstein, 2014). There are various socio-economic and psychological aspects which have an important bearing on the intergenerational relations. Some of the determinant variables for change and disappointment in intergenerational relations have been identified as the class, gender, values, change in beliefs and socio-economic transformations (Lane, 2003). The quality of interaction between young and old is gradually changing. Non acceptance of changing requirement and challenges adversely influence the relationships between generations (Khan, 2015).

The present paper was planned to study various roles performed by the elderly and intergenerational relationships in family context. It addresses intergenerational relations in terms of interactions between

individuals and role of elderly in decision-making in important family issues.

Objectives

Broad objective of the study is to explore the nature and extent of engagement of elderly men and women in various family issues particularly matters like property, grandchildren's education, their career and participation in family rituals. The specific objectives of the present study are as follows:

1. To examine the relevance of interrelationships between different generations.
2. To study the role of elderly in family issues.
3. To examine the factors influencing the involvement of elderly in family.

Methodology

Sampling

Total 80 elderly (69 elderly from the family setting (Women = 32; Men = 37) and 11 elderly from the old age homes (Women = 04; Men = 07) 60 years and above of both the sexes, were selected by purposive sampling technique from those families living in Ahmedabad in which at least one of the grand parents were alive and the family had adolescent children and different generations were residing together and from two Old Age Homes (viz Suvarna Vridhrashram, Ambli and Shri Maganlal Trikamlal Trust Vridhrashram, Ashram Road).

Table 1
Demographic and Socio-economic Characteristics of the Sample Elderly

Variables	Women		Men		Total	
	N	%	N	%	N	%
Age (in Years)						
60-70	27	33.7	29	36.2	56	70
71-80	5	6.2	13	16.2	18	22.5
81 & above	4	5	2	2.5	6	7.5
Total	36	45	44	55	80	100
Marital Status						

Cont'd...

Cont'd...

Unmarried	0	–	1	1.2	1	1.25
Married	16	20	36	45	52	65
Widow/Widower	19	23.7	7	8.7	26	32.5
Divorced	1	1.2		–	1	1.2
Education						
Illiterate	9	11.2	2	2.5	11	13.7
Literate	9	11.2	4	5	13	16.2
Primary	8	10	4	5	12	15
Higher Secondary	5	6.2	2	2.5	7	8.7
Senior Secondary	3	3.7	7	8.7	10	12.5
Graduate & above	2	2.5	25	31.2	27	33.7
Type of Family						
Nuclear	8	10	17	21.2	25	31.2
Joint	28	35	27	33.7	55	68.7
Living Arrangement						
Alone	6	7.5	6	7.5	12	15
With Spouse	2	2.5	10	12.5	12	15
With Married Children	18	22.5	3	3.8	21	26.2
With Spouse & Married Children	10	12.5	24	30	34	42.5

Tools of Study

Tools used for the data collection were the Interview schedule and questionnaire. Closed and open-ended questions were included in the interview schedules. All the elderly from both the settings were personally interviewed. Prior permission was obtained from concerned authorities. The purpose of the study was explained and consent of each subject was taken before data collection.

Quantitative technique included frequency distribution, percentages and chi square test. The tabulation and data analysis was carried out using Statistical Package for Social Sciences (SPSS).

Findings and Discussion

Reciprocation of help and support among the family members is very important (Shankar *et al.*, 2003). The elderly with their vast experience and wisdom may play an important role in various family issues. However, with changing family structure and intergenerational relationship, the involvement of elderly in different family issues is also changing. There are many factors responsible for elderly involvement in different family issues. The factors considered in the

present study are educational level and income of elderly, support extended by the elderly to family members and the type of family set up to which the elderly member belong. Role of the elderly members in the decision-making in family matters is studied by cross tabulation of these factors with four parameters viz consulting elderly for Property sale or purchase in the family, consulting them for their grandchildren education and career decision and consulting elderly to participate in family rituals of relatives. Table 3 & Table 4 present the result for factors influencing the involvement of elderly in family issues.

Factors Influencing Role of Elderly

Grandparents play different significant roles and contribute towards cognitive, moral and socio-affective development of their grandchildren which creates close relationship between generations. In Indian culture it is generally found that the guidance, education, affectionate relationships and care are taught by the grandparents.

Influence of Education and Financial Status

It is reported that the elderly, who are educated and have some source of income, are found to have good relations with the younger generation (Sonar *et al.*, 2007). There are number of aged people who are economically independent and support a number of dependents. Earlier studies have evidenced that elderly use their asset or income to finance substantial proportion of the expenditure for adults and children at the aggregate level (Singh & Narayana, 2011).

In present study, the educational level of the elderly is found to influence the involvement of the elderly in various decisions pertaining to socio-cultural and financial issues at home. Their involvement is found to be significant particularly regarding any decision-making pertaining to education choice making ($\chi^2 = 22.36$, $p < 0.001$) and career selection ($\chi^2 = 22.09$, $p < 0.001$) of their grandchildren (Table 3). Good education among elderly, have direct association with intergenerational relationships (Thang & Mehta, 2012) and good quality of life (Mudey *et al.*, 2011). Education provides a developing role for older people as mentors to transmit knowledge and help improve achievement and self-esteem of the younger

generation. In a study conducted at Gulbarga district of Karnataka, significant proportion of elderly was found to have good intergenerational relationship with their children and grandchildren.

Table 2
Influence of Educational Level and Economic Status on Decision-Making

<i>Factors</i>	<i>Property Issues</i>		<i>Career of Grandchildren</i>		<i>Education of Grandchildren</i>		<i>Participation in Family Rituals</i>	
<i>Education</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>
Illiterate	09(11.2)	02(2.5)	01(1.2)	10(12.5)	01(1.2)	10(12.5)	09(11.2)	02(2.5)
Literate	07(8.8)	06(7.5)	03(3.8)	10(12.5)	04(5.0)	09(11.2)	07(8.8)	06(7.5)
Primary	07(8.8)	05(6.2)	03(3.8)	09(11.2)	03(3.8)	09(11.2)	08(10.0)	04(5.0)
High Secondary	06(7.5)	01(1.2)	05(6.2)	02(2.5)	05(6.2)	02(2.5)	06(7.5)	01(1.2)
Senior Secondary	08(10.0)	02(2.5)	03(3.8)	07(8.8)	02(2.5)	08(10.0)	07(8.8)	03(3.8)
Graduate & above	24(30.0)	03(3.8)	17(21.3)	10(12.5)	16(20.0)	11(13.7)	22(27.5)	05(6.2)
χ^2 (5 Df)	10.54 (NS)		22.09 ***		22.36 ***		9.28 (NS)	
<i>Income Range</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
<i>(Per Month)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>
< Rs. 10,000	16(20.0)	05(6.2)	05 (6.2)	16(20.0)	05(6.2)	16(20.0)	17(21.2)	04 (5.0)
Rs. 10,001–20,000	17 (21.2)	03(3.8)	11(13.8)	09(11.2)	11(13.8)	09(11.2)	16(20.0)	04(5.0)
Rs. 20,001–30,000	11(13.8)	04(5.0)	05(6.2)	10(12.5)	02(2.5)	13(16.2)	11(13.8)	04(5.0)
Rs. 30,001–40,000	05(6.2)	00(0.0)	04(5.0)	01(1.2)	05(6.2)	00(0)	05(6.2)	00(0)
Rs. 40,001–50,000	07(8.8)	01(1.2)	05(6.2)	03(3.8)	05(6.2)	03(3.8)	06(7.5)	02(2.5)
> Rs. 50,001	05(6.2)	00(0.0)	02(2.5)	03(3.8)	03(3.8)	02(2.5)	04(5.0)	01(1.2)
Nil	0(0)	06(7.5)	00(0)	06(0)	00(0)	06(7.5)	00(0)	06(7.5)
χ^2 (6 Df)	23.85 ***		12.47 *		22.83 ***		19.71 **	

Significance Level * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; NS-Non significant.

In the present study, the income range of the elderly is found to have a significant influence on involvement of the elderly in all types of decision-making (i.e., property issues, $\chi^2 = 23.85$, $p < 0.001$; grandchildren career $\chi^2 = 12.47$, $p < 0.05$; grandchildren education $\chi^2 = 22.83$, $p < 0.001$ and participation in family rituals $\chi^2 = 19.71$, $p < 0.01$) at home (Table 4). It has pointed that the elderly with adequate financial resources get respect by the young and these elderly members are actively involved with various family issues. Economic independent status of elderly might reduce the financial burden on the

family with respect to their care. The contributory role of elderly in financial terms also conveys their importance to the family. Their monetary contribution enhances their chance of participation in household decision matters and their financial independence was found to be associated with good quality of life in old age (Geetha *et al.*, 2003; Kumar & Majumdar, 2014). Poor quality of life among older people is found to be linked with the living alone status, poor family income, presence of chronic diseases and poor self-rated health (Rathnayake & Siop, 2015). In some instances where the elderly do not have any financial provisions, the younger generations neglect them and fail to provide them care (Yadav, 2004).

Influence of Support Extended by Elderly and Family Type

The elderly men and women have different roles to play. Developing connections with a younger generation helps older adults to feel a greater sense of fulfillment and it becomes advantageous for both the generations. It helps the elderly transfer whatever they have achieved emotionally and socially in their entire life. This way their children gets multiple perspectives on reality which makes them socially adjusted in better way. While the grandchild is young, the grandparents' main roles are helping with his or her care, developing play behaviors, and encouraging them emotionally, thus contributing to their overall development. Old age is the time to give other the richness of life and share their worldly wisdom especially with their children and grandchildren.

In present study, the type of support extended by the elderly to family members is found to have an influence on involvement of the elderly in all types of decision-making in the family. The support extended by them at home includes providing 'cash', 'Things', 'gifts', all three (i.e., 'Things', 'gift' & 'education') or both (i.e., 'Things' & 'cash') or all these including assistance in household chores to children or grandchildren. In present study, the support extended by elderly to family members is found to have a significant influence on all types of decision-making (i.e., property issues, $\chi^2 = 27.49$, $p < 0.001$; grandchildren career $\chi^2 = 16.34$, $p < 0.01$; grandchildren education $\chi^2 = 16.68$, $p < 0.01$ and participation in family rituals $\chi^2 = 17.51$, $p < 0.01$) at home. The intergenerational relationships are found to be

influenced by social resources (Becker & Steinbach, 2012) and financial assistance by the elderly (Kumar & Majumdar, 2014). Family relationship and social support helps to achieve good quality of life among elderly.

Table 3
Influence of Support Extended and Family Type on Elderly Decision-Making

<i>Type of Support</i>	<i>Property Issues</i>		<i>Career of Grandchildren</i>		<i>Education of Grandchildren</i>		<i>Participation in Family Rituals</i>	
	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>
Cash	05(6.2)	0(0)	02(2.5)	03(3.8)	01(1.2)	04(5.0)	05(6.2)	00(0)
Things	03(3.8)	0(0)	0(0)	03(3.8)	00(0)	03(3.8)	03(3.8)	00(0)
Gifts	06(7.5)	02(2.5)	03(3.8)	05(6.2)	03(3.8)	05(6.2)	06(7.5)	02(2.5)
Things, Gift & Edn.	09(11.2)	01(1.2)	05(6.2)	05(6.2)	06(7.5)	04(5.0)	08(10.0)	02(2.5)
Cash & 'Things'	02(2.5)	01(1.2)	01(1.2)	02(2.5)	01(1.2)	02(2.5)	02(2.5)	01(1.2)
All the above	27(33.8)	01(1.2)	18(22.5)	10(12.5)	17(21.2)	11(13.8)	25(31.2)	03(3.8)
Nil	09(11.2)	14(17.5)	03(3.8)	20(25.0)	03(3.8)	20(25.0)	10(12.5)	13(16.2)
χ^2 (6 Df)	27.49***		16.34**		16.68**		17.51**	
<i>Type of family</i>	<i>Yes</i>		<i>Yes</i>		<i>Yes</i>		<i>Yes</i>	
	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>
Nuclear	14(17.5)	11(13.2)	5(6.2)	20(25.0)	04(5.0)	21(26.2)	12(15.0)	13(16.3)
Joint	47(58.8)	08(10)	27(33.8)	28(35.0)	27(33.8)	28(35.0)	47(58.8)	08(10.0)
χ^2 (1 Df)	21.90***		7.38**		8.78**		21.85***	

Significance Level ** p < 0.01; *** p < 0.001

Indian society promotes interdependence and co-operation. Indian joint families are considered to be strong, stable, close, resilient and enduring with focus on family integrity, family loyalty, and family unity at expense of individuality, freedom of choice, privacy and personal space (Mulatti, 1995). One of the impacts of changing family structure is creation of more and more nuclear families. With limited income, a tendency to support a nuclear family is gaining momentum. This trend adversely influences the old practice of caring and sharing among grandparents and grandchildren (Manocha, 2003). In present study, type of family set up is found to have a significant influence on involvement of elderly in decision-making at home (i.e.,

property issues, $\chi^2 = 21.90$; grandchildren career $\chi^2 = 7.38$; grand-children education $\chi^2 = 8.78$ and participation in family rituals $\chi^2 = 21.85$). Relatively higher percentage of elderly from nuclear family is not being involved in decision-making in family issues than their joint families counterparts. It is revealed that intergenerational relationships are significantly associated with kind of family set up.

Present study has shown that the educational level and financial status of elderly, help extended to younger generation by the elderly family members and type of family set up significantly influence the involvement of the elderly in important family issues as also reported in earlier studies (Yadav, 2004; Kumar & Majumdar, 2014; Datta, 2015). In present study, a significant proportion of elderly people used to spend their time watching television, reading newspaper, religious books, interacting with grand-children, worshipping, chatting with friends and helping in various household works, etc. Majority of the elderly reported that they are respected as seniors in the family. Most of the elderly participants reported that they are dependent on their family members for their physical, emotional and financial needs. Most of the elderly told that they are satisfied with the kind of support they receive from their family members. However, some of them conveyed their dissatisfaction with the support received from their family members.

Conclusion

Planning for the elderly especially in terms of living arrangements assumes increasingly greater importance due to changing household structures and feeble social security systems. The Senior Citizen Draft Policy 2011 and National Education Policy may be expanded to include family and family supports. Revision of existing policies should be supported in terms of developing intergenerational social unity. It is necessary to have a better understanding of the dynamics of such complex aspects of inter-generational relations which is a vigorous area of research for social-gerontology. Extensive research in the field of intergenerational relationships may help in tackling a wide range of emerging socio-cultural issues. It may act as a means of building social capital showing a path to build a responsive society for all ages.

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The Impairments of Verbal Fluency in Dementia of the Alzheimer's Type

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ABSTRACT

In the present study the nature of the semantic memory impairments in dementia of the Alzheimer's type (DAT) was investigated in a verbal fluency task. Fifteen mildly demented and ten moderately demented patients were screened on the basis of HMMS, HWMS, HMDS and NINCDS-ADRDA criteria (McKhann et al., 1984) and fifteen matched controls (category naming task) were performed. Subjects were tested in this study for verbal fluency in producing exemplars of the eight semantic categories. Moderately demented patients were found to have suffered an extensive reduction in producing the exemplars than either mildly demented or control group. Category fluency scores were analysed separately for each of the eight categories, which revealed a gradient for the two groups of demented patients and the matched controls with "body part" giving the highest mean scores and the "tools" showing the lowest mean scores. These data were subjected to 3(groups) X 8(categories) factorial ANOVA with repeated measure on the last factor.

Key words: Alzheimer, Dementia, Semantic memory, Category fluency

The nature of the memory deficit in dementia of the Alzheimer's type (DAT) has been a topic of intensive scrutiny over the past decade.

It is now well established that the vast majority of cases show impairment in semantic memory from very early in the course of the disease. Tests of the verbal fluency or generative meaning are very sensitive measures of the semantic memory deficit in DAT and tend to show a steady decline as the disease progresses. Word-finding difficulties, such as retrieving names of familiar persons, have been a well documented language deficit that manifests itself in the early stages of dementia (Braaten *et al.*, 2006). Verbal fluency tasks, which assess the speed of access to lexical and semantic information (processes involved in word finding) have often been used in clinical settings to aid in the diagnosis of dementia. These tasks consequently also serve as helpful tools in distinguishing normal age-related cognitive decline from degenerative dementia (Haugrud, *et al.*, 2011). Additionally, verbal fluency tasks lend insight into vocabulary size, speed of response, mental organization, search strategies, and long-term memory (Ruff *et al.*, 1997).

Martin and Fedio (1983) used different types of fluency task. Subjects were asked to name items found in the supermarket. The normal subjects typically named three or four items from each of a number of different sub-categories such as fruits or meats. DAT patients, by contrast not only named fewer items overall but also tended to produce only a single item from each sub-category. Based on Martin and Fedio's and their own findings Ober *et al.* (1986), argued that if DAT patients' decreased fluency was due merely to a slowing in the rate at which they searched their memory, then they should have got through fewer sub-categories than normal controls in the time period, but they should have the same number of items per sub-category. This, however, was not seen instead, DAT patients' search appeared more random than that of normal. Diesfeldt (1985) delineated several factors which might influence Verbal fluency search procedures. Impaired initiative and spontaneity, impaired ability to generate imagery, impaired working memory, attention deficit and a high arousal level could adversely affect semantic memory search. Impaired ability to breakdown categories into sub-categories and to search them systematically would also impair verbal fluency, as would a general slowing of the search procedures. The existence of these multiple possibilities makes it difficult to interpret the impaired verbal

fluency in dementia directly in terms of a straightforward breakdown of semantic memory.

Miller and Hugue (1975) noted that DAT patients with a marked reduction in verbal fluency on formal testing continued to use comparatively 'rare' words in free speech. This suggested that the problem was generally one of word retrieval rather than a loss of the words' representation in the lexicon. Monsch, *et al.*, (1992) compare the performance of patients with DAT and elderly normal control subjects on four commonly used measures of verbal fluency (Category, letter, first name and supermarket fluency) to determine whether differential performance exists across the tasks and to identify the fluency measure that best discriminates between these two groups. ROC curves were plotted to determine early fluency tasks sensitivity (true positive rate) and specificity (true negative rate). Category fluency demonstrated the greatest degree of discrimination between patients with DAT and normal control subjects (Sensitivity, 100%, specificity, 92.5%), letter fluency was the least accurate (sensitivity, 89%, specificity 85%).

Hodges and Patterson (1995) tested the category fluency in DAT and control groups. Findings suggested that minimal subgroups were clearly impaired when contrasted with matched controls. For the DAT subgroups the intergroup comparison for both the combined living and man-made categories as well as for several more specific categories, showed the pattern minimal > mild > moderate, though some other specific categories (Birds, water creatures, dogs, household items, vehicle, musical instrument) revealed only minimal = mild > moderate. Results indicated that category fluency may be the most sensitive measure of semantic memory impairment: 70 per cent of minimal, 76 per cent of the mild and 100 per cent of the moderate patients showed reduced total correct responses for living or man-made categories. Tippet, *et al.*, (1995) suggested that the distinction between knowledge of specific exemplars and knowledge for their general categories was central to much theorizing on the nature of semantic memory. The dissociation between exemplar and category knowledge observed in Alzheimer's disease would appear to support this distinction, and to suggest that different neural systems are involved in the representation of exemplar and category

knowledge. They suggested that category and exemplar knowledge were both represented in the same distributed neural substrate. The relative preservation of category knowledge was a consequence of the greater frequency, and hence greater robustness, of the representation of attributes shared by all or most members of a category, compared to exemplar-unique attributes. Miller K.J. *et al.*, (2005) examined the object naming and semantic fluency of individuals who are at risk for developing Alzheimer's disease. A total of 108 participants completed Boston naming and animal naming task, at initial assessment semantic fluency was reduced among Alzheimer's patients.

Several studies, however, raised doubts about the claim that defective search and retrieval mechanisms were primarily responsible for impaired fluency on list generation tasks. Butters *et al.*, (1987) found that in their series of patients with mild DAT, there was impairment in producing animal names but not on letter fluency tasks. They suggested that this reflected the presence of early linguistic deterioration at the level of semantic memory causing a reduction in the number of category exemplars available to the patients. Such a deficit would appear most prominently in testing a limited abstract category such as animal. In contrast additional impairments (i.e., in search procedure) would only occur with more severe form of the illness. There appears to be disagreement, therefore as to whether decreased verbal fluency alone can be taken as a measure of semantic memory impairment in dementia of the Alzheimer's type.

The present study addressed the issue of verbal fluency search in DAT patients from the perspective of whether the deterioration in search was due to storage deficit or due to access deficit. Accordingly, the subject told to produce as many items belonging to the category asked for from the picture displayed earlier. It was expected that in such event there would be differences in search of items belonging to a particular category and this would be different from natural and man-made categories.

Following hypotheses were framed for being tested in experiments of the present study.

There would be more pronounced category fluency retrieval deficit in the moderately demented group than would be in the mildly demented and controls groups.

Method

Subject

200 elderly subjects above 60 years of age were individually tested in the first phase of the study on the Hindi version of Folstein, Folstein and McHugh's Mini-mental Status Examination (HMMS), Mattis Dementia Scale (HMDS) and Wechsler Memory Scale (HWMS). Fifteen mildly demented (aged 62 to 72 years, $M = 68.40$ years, $SD = 3.68$ years) and ten moderately demented patients (aged 65 to 80 years, $M = 69.50$, $SD = 4.28$ years), screened on the basis of HMMS, HMDS, HWMS and on the NINCDS – ADRDA criteria (McKhan *et al.*, 1984) and fifteen matched control subjects (age 60 to 72 years, $M = 64.00$ years, $SD = 3.11$ years) performed verbal fluency task.

Tools

The following three screening tools were adapted and standardized for the first phase of this study. The standard psychometric adaptation and standardization procedure was followed for each tool.

(1) *Hindi version of Mini-Mental Status Examination (HMMS)*: Folstein, Folstein & Mc Hugh's (1975) MMSE was translated into Hindi. The experimental format of the HMMS (Dwivedi, *et al.*, 1996) was used for ascertaining its psychometric properties. This test has 11 contextual areas with time orientation (5 items, scores range from 0 to 5), place orientation (5 items, scores range from 0 to 5), registration (3 items, scores range from 0 to 3), attention and calculation (backward counting to 5 digits or repetition of 5 alphabets, scores range from 0 to 5), recall of previously registered 3 items (scores range from 0 to 3), naming of two objects (scores range from 0 to 2), repetition of 5 words in a row (score 0 to 1), following the 3 stage command (scores range from 0 to 3), reading and writing of a sentence (score 0 to 1 for each of them), and copying of a figure showing 2 pentagons crossing each other (score 0 to 1). Thus, the total score range from 0 to 30. The lower scores denote greater degree of cognitive impairment and possibility of presence of dementia in an aged person.

(2) *Hindi version of modified Wechsler Memory Scale (HWMS)*: The HWMS (Dwivedi, *et al.*, 1997) comprises logical memory and Visual reproduction subtests of the original WMS (Wechsler, 1945). The logical memory subtest comprises 2 new Hindi stories having 12 logical components on the pattern of the original WMS. Each of the 2 stories is presented for 5 minutes after which immediate recall is separately taken. This is followed by the presentation of visual reproduction component in which 3 cards are singly displayed. The first 2 cards comprise a geometrical pattern while the third card consists of two geometrical patterns. The subject is required to reproduce for memory the displayed geometrical patterns. The delayed reproductions as well as recognition of geometrical patterns are taken. The scores range from 0 to 14 for reproduction, 0 to 4 for recognition, and 0 to 24 for recall component of HWMS. Higher score on this scale denote normal memory.

(3) *The Hindi version of Mattis Dementia Rating Scale (HMDS)*: The HMDS (Dwivedi, *et al.*, 2000) consists of 5 components which are attention (scores range from 0 to 37), initiation and perseveration (scores range from 0 to 37), construction (scores range from 0 to 6), conceptualization (scores range from 0 to 39), and memory (scores range from 0 to 35). Lower scores denote more pronounced dementia (Mattis, 1976, 1989, 1992).

Procedure

The design of this experiment was 3 (group) x 8 (categories) mixed factorial in which first factor was between subject factor and the last factor was treated as within subject factor. After ensuring a workable rapport of the Ss the following instruction were imparted in informal manner

Subjects were tested in this study for verbal fluency in producing exemplars of the eight semantic categories that were presented as single stimulus drawn on 3 X 5 inch card. Subjects were asked to list verbally all items in each category which they could think of in one minute period.

Results

In the present experiment the subjects were required to initiate a search from their semantic memory. So that there verbal fluency could be adequately studied the subject were asked to produced within a minute exemplars of eight semantic categories stimuli that were vegetable, body part, animal, fruit, vehicle, tools furniture and clothing (Snodgrass & Vanderwart, 1980). The means and SDs for verbal fluency on eight categories were calculated which are presented in Table 1.

Table 1
Mean and SDs for Category Fluency by Mild and Moderate DAT Patients and Matched Control Subjects

<i>Task</i> \ <i>Group</i>	<i>Normal (n = 15)</i>	<i>Mild (n = 15)</i>	<i>Moderate (n = 10)</i>
Mean	67.53	38.67	35.50
SD	3.20	1.76	1.51
Range	62–72	37–42	33–37

Table 2
Summary of One Way Analysis of Variance for Category Fluency Task

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F-ratio</i>
Between groups	8,572.83	2	4,286.42	764.08*
Within groups (error)	207.57	37	5.61	

* $p < 0.01$

The mean category fluency score presented in Table 1 makes it explicit that the moderately demented patients have suffered an extensive reduction in producing exemplars. The mildly demented subjects have also shown and almost equal impairment in category search, although the deficit was more pronounced in the moderately demented patients. The matched controls faced no difficulty in searching the exemplars and there mean score is almost double the value of mildly and moderately demented patients. The standard deviation of moderately and mildly demented patients showed that their cognitive store was quite limited. The range of scores for moderately demented patients it was form 33 to 37 and for mildly demented patients was for 37 to 42. On the other hand, the matched controls

(SD=3.20) suggested that these subject had a little higher degree of categorization. One way ANOVA for category x subject, (summary of which is presented in Table 2) has yielded highly significant F value ($F_{2, 37} = 764.08$, $p < 0.001$) for between groups. Tukey's HSD test was applied for studying the post-hoc differences between groups. These values are presented in Table 3.

Table 3
Pair wise Mean Differences for Category Fluency Test Following Tukey's HSD Test

<i>Group</i>	<i>Mild</i>	<i>Moderate</i>
Normal	28.87*	32.03*
Mild	—	3.17*

* $p < 0.05$

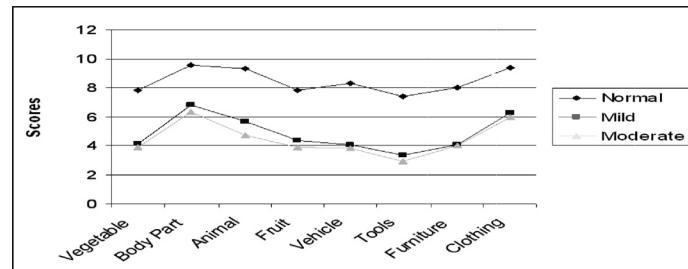
The Tukey's HSD values bring out that moderately demented subjects have scored significantly lesser on category fluency task than have been scored by mildly demented and matched controls, while both the demented groups have performed significantly lower than that of normal controls.

With a view to analyse the retrieval failure by the demented patients their obtained category fluency scores were analysed separately for each of the eight categories. The obtained means and S.D. for these categories are presented in Table 4. The mean values are also displayed pictorially in Fig. 1.

Table 4
Mean Category Fluency Scores and SDs for Three Subject Subgroups Across Eight Categories

<i>Group Categories</i>	<i>Normal</i>		<i>Mild</i>		<i>Moderate</i>	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Vegetable	7.80	0.68	4.13	0.74	3.90	0.88
Body Part	9.53	0.74	6.80	1.01	6.30	0.82
Animal	9.33	0.82	5.67	0.90	4.70	0.82
Fruit	7.80	0.68	4.33	0.62	3.90	0.74
Vehicle	8.27	1.03	4.07	0.70	3.80	0.79
Tools	7.40	0.91	3.33	0.82	2.90	0.74
Furniture	8.00	0.85	4.07	1.03	4.00	0.94
Clothing	9.40	0.63	6.27	0.96	6.00	1.25

Figure 1
Mean Category Fluency Scores for Mildly Demented, Moderately Demented and Matched Control Subjects Across Eight Categories



A perusal of Table 4 makes it apparent that the performances of demented and matched controls are governed by similar patterns of processing of categories. The category fluency scores extend a gradient for the two groups of demented patients and the matched controls with body parts occupying the highest mean scores (Mean = 9.53, SD = 0.74 for matched control, Mean = 6.80, SD 1.01 for mildly demented patients and Mean = 6.30, SD 0.82 for moderately demented patients) and Tools showing the lowest mean scores in all the group (Mean = 7.40, SD = 0.91 for matched control, Mean 3.33, SD = 0.82 for mildly demented patients and Mean 2.90, SD = 0.74 for moderately demented patients). It appears that the self concept as evidence in body parts is not amenable to memory impairment. The two demented subjects group show that categories related to the self (Body part and clothing) are most retrieved in category search. The categories that are not even distantly related with the self as tools or vehicles have not been least retrieved in category search. These mean values extend the theory that semantic memory for the phenomenological self remains unimpaired while the peripheral items suffered more impairment. These data were subjected to 3 (group) X 8 (category) factorial ANOVA with repeated measure on last factor. The summary of this ANOVA is presented in Table 5 along with within subject contrast. Table 5 showed the main effect of category was highly significant revealing that the three groups of subject process differential level of familiarity with the categories which served as a potent factor in a category search. The items of those categories which were more familiar were retrieved in greater frequency than were those categories which were less familiar. The verbal fluency task thus appears

have established itself as a reliable criterion for distinguishing between the subject belonging to different groups. This observation is corroborated by statistically significant group x category. The within subject contrast effects revealed highly significant F value for all categories excepting the category vegetables which would mean that all but one category (vegetable) differentiate among the three groups of subject. However this expectation is not corroborated by category x group contrast effect where only body part contrast-effect as extended a significant difference.

Table 5

Summary of Analysis of Variance for 3 (groups) x 8 (categories) Factorial Repeated Measure on the Last Factor for Verbal Fluency Task along with within Subject Contrast Effects

Source of Variation		SS	df	MS	F-ratio
Between groups		133.95	2	66.97	764.07***
Error		3.24	37	0.09	
Category		308.54	7	44.08	61.55***
Error		185.48	259	0.72	
<i>Transformed Variable</i>			<i>Within subject contrast effect</i>		
Category	1	0.38	1	0.38	0.24
	2	36.88	1	36.88	25.97***
	3	57.62	1	57.62	45.68***
	4	136.01	1	136.01	142.02***
	5	26.79	1	26.79	20.84***
	6	25.38	1	25.38	22.66***
	7	184.81	1	184.81	99.43***
Category x group	1	2.80	2	1.40	0.87
	2	13.07	2	6.53	4.60**
	3	3.31	2	1.65	1.31
	4	1.67	2	0.83	0.87
	5	0.20	2	0.10	0.08
	6	1.54	2	0.77	0.69
	7	11.01	2	5.50	2.96
Error	1	59.57	37	1.61	
	2	52.53	37	1.42	
	3	46.67	37	1.26	
	4	35.43	37	0.96	
	5	47.51	37	1.29	
	6	41.43	37	1.12	
	7	68.77	37	1.86	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Discussion

The present results highlight the importance of search mechanism in the semantic memory which is more impaired in the

early stage of dementia and thereafter an asymptote is observed. It is pertinent to note that in verbal fluency a subject is required to search of relevant exemplar for a particular category and given that a demented patient with impaired semantic memory functions is likely to find greater difficulty inactivating the search and retrieval processes.

Given that the neurofibrillary tangles are prominently spreading as the dementia progresses, it is quite likely that the search process would be degraded in the same subject after a temporal interval. Both the mildly and moderately demented patients have found difficulty in generating the exemplars which attests most of the studies of category fluency. The results are clearly demonstrated that one minutes time of not quite sufficient for demented patients because for them generating of category exemplars in such a limited time frame becomes quite demanding inasmuch, as this types of complex task not only depends on the integrity of his semantic system but also requires affective search and retrieval strategies. The present studies extend the theory that the search procedure of demented patients show an impaired initiative and spontaneity impaired ability to generate imagery, impaired working memory, attention deficit and a high arousal level. A category fluency task requires that categories were broken down to subcategory so as to facilitate the search process and subsequent retrieval phenomenon, which are apparently impaired in a demented patient. The present results are consistent with the findings of Chertkow and Bub (1990), Diesfeld (1985), Hodges and Patterson (1995), Hodges, *et al.*, (1996), Ober *et al.*, (1986) and Weingartner *et al.* (1981).

It appears that picture naming and category fluency tasks require separate operational mechanism in semantic memory for the picture naming; it is likely that perceptual and functional factor play pre-dominant role because the picture is present before the subject on the other hand for the category fluency task a more regress role of central executive function is called for. These results extend the theory that impairment in category fluency by the mildly and moderately demented patients is attributable to a deficit in the central executive functioning namely initiation, formation and verification, etc. Such types of executive function are imperative for category fluency task which are impaired disproportionately in the demented patients and which remain diffused along the progression of dementia, somewhat

more pronounced impairment in moderately demented patients was observed in the present study. This impairment was more centered on functional attributes as a result of which search and retrieval of man-made category was adversely affected.

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Gait Evaluation of Institutionalized Elders – A Feasibility Study

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ABSTRACT

This study evaluates the feasibility of kinematic gait parameters in institutionalized 40 geriatric population using easily available software and associated objects of evaluation. The findings of this study revealed that recording and analysis of gait, using kinovea software and web cams is a feasible and objective method of gait analysis to detect abnormalities that may predispose to falls in elderly. This will help the rehabilitation practitioner to plan and implement gait strategies and interventions, thus reducing the risk and incidence of fall in elderly population.

Key words: Gait, Kinematics, Kinovea, Video analysis, Geriatric Fall,

Falls in elderly adults represent a major health care problem. About 30 per cent of people over 65 years of age, living in the community, fall at least once a year (Guccione A, 2013). Fall rate has been reported to increase with age. This increase from 47 per cent in people aged 70–74 years to 94 per cent among 80 to 84 year-olds is a significant cause of morbidity and mortality (Ibid.). Most of these falls are associated with one or more identifiable risk factors (e.g., weakness, unsteady gait, confusion and certain medications), and research has shown that attention to these risk factors can significantly reduce rates of falling (Rubenstein, 2006).

Gait variability is an early indicator of fall risk. It is associated with factors which increase the fear of fall, in elderly population. Early identification of this characteristic, particularly in spatiotemporal and kinematic variables can act as a precursor to implementing interventions strategies.

Although new technologies exist with sophisticated gait analysis methods, these specialized instruments are expensive and require gait laboratory as well as experts who can operate the systems. A low level clinical set up or rehabilitation center cannot afford the expenses for repeated evaluation of gait with these methods. Hence they have little applicability in a geriatric institution.

In this paper, we discuss the possibility of using Kinovea, a video based software tool, on videos taken with easily available recording devices for gait analysis of institutionalized elders. The detection and analysis using Kinovea with position markers to measure angular positions of gait is simple (Valdivia & Salazar, 2013). Spatiotemporal parameters can also be appraised using the software. The software is easy to understand and apply, and is freely available. The recorded video can be calibrated to international standards using a simple grid with known measurements (Gupta & Raja, 2012).

Objective

The objective of this study was to evaluate the feasibility of gait analysis in elder individuals living in an institution, and to identify fall risk in reference to known parameters of gait

Materials and Methods

Study Design

This was an observational study conducted in a geriatric home, Mysuru. This study was approved by the college ethical committee and geriatric home administration.

Sampling strategy

All the residents of the institution were screened and forty individuals who used gait as the primary mode of ambulation with or without assistive devices were identified.

After the consideration of the above criteria a written informed consent from all the participants was obtained. In case, the participant had difficulty reading, the consent was read out and the participants thumb impression with the signature was obtained. Thereafter, a stringent procedure of gait recording was performed as described below.

Procedure for Gait Evaluation

The protocols were strictly followed to keep the recording and measurement parameters consistent. The required parts of the body were exposed and markers were attached on the relevant bony landmarks. The individual was instructed to walk bare foot. A care giver accompanied the participant for safety but did not make contact with the patient.

Patient Preparation

The bony landmarks for the video graphic reference were marked using colored tape. The landmarks are given in Table 1.

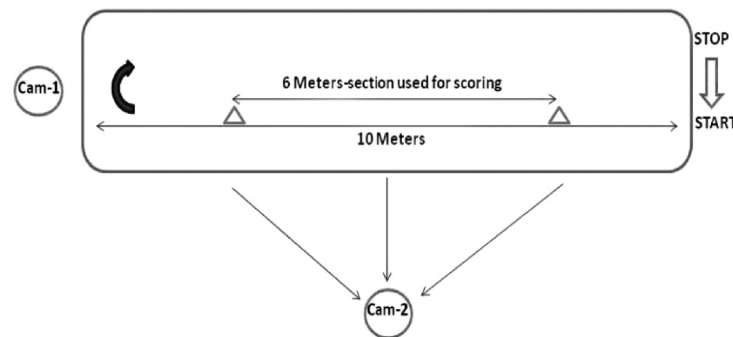
Table 1
List of Bony Landmarks Identified

<i>Segment</i>	<i>Bony prominence</i>
Foot	-Head of 1st Metatarsal (Dorsal) -Head of 3rd Metatarsal (Dorsal) -Head of 5th Metatarsal (Lateral)
Ankle	-Medial and Lateral Malleolus -Calcaneal Tuberosity -Achilles Tendon
Knee	-Lower 1/3rd of Tibia (Anterior) -Lateral Condyle of Femur -Midpoint of Patella
Hip and Pelvis	-Greater Trochanter -Anterior Superior Iliac Spine -Posterior Superior Iliac Spine -Iliac Tubercle
Upper limbs	-Radial and Ulnar Styloid Process -Medial and Lateral Condyles of Humerus - Acromion Process

The area selected for the recording was a spacious platform of the study institution (14m × 18m). Two web cameras of 'logistics 720 HD' (Patricoski & Ferguson, 2009), connected to two laptops were used for the recording. Both the cameras were mounted on stationary tripods. One tripod with camera was placed at a distance of 3m from the midportion of the walkway to record anterior and posterior views of ambulation (Gupta & Raja, 2012).

The second camera was placed at a distance of 3m from the midportion of the walkway laterally to record the lateral view. The placements of cameras are shown in Figure 1.

Figure 1
Diagrammatic Representation of the Walkway with Relevant Markings



This placement ensured a clear visualization of at least 3m of the mid portion of the walkway consisting of about three to six cycles of gait, which were taken for analysis. Videography was done at a frame rate of 30 fps (frames per second). The cameras had a frame width and height of 1,280 × 720 pixels. The total data bit ranges from 12 megabytes to 40 megabytes. The optical axis of the camera was aligned with the knee so as to give optimum visualization of all relevant joints (Nielsen, 2008).

Video Recording

Each participant was instructed to walk without foot wear at his/her self selected pace on the platform. Both the cameras were set to start recording simultaneously, once the individual started walking. Anterior and posterior views were recorded by 'camera 1' and sagittal

plane movements are captured by ‘camera 2’ as demonstrated in Figure 1. Videos were immediately transferred to desired folder with appropriate file names to minimize the data loss. The participants walked from start to start (2 laps) so as to ensure lateral visualization of both sides.

Video Analysis

The videos of each participant comprising of different views were imported to Kinovea 0.2.5 version video analysing software. The starting point, turning point, midportion, initial and final two meters were marked using ‘line tool’. Slow motion analysis of the gait was done. The initial three cycles and final three cycles were excluded from the analysis so as to control for initiation and fatigue. Thus, the cycles covered in the middle 6m (3–6 cycles) were analysed.

The kinematics of each event, of each joint was analysed using cross marker tool, line tool and angle tool of the software. The bony landmarks were highlighted using the cross marker tool with bright contrast color for better visualization of the points in the video. Each event was paused and the measurements of angles of all the joints were taken. To increase the accuracy in measurement, joint angles at the same event was taken from at least three cycles.

Videos were excluded if;

- they were not clear and could not be assessed
- participants showed gross gait deviations. Eg; ataxia
- participants tripped and had to be assisted by a caregiver during the recording session

Data Analysis

Descriptive statistics of the data was done by compiling the ranges of motion at joint during the stance events of the gait cycle.

Results

The investigators screened 20 men and 34 women, out of the video recording of 19 men and 21 women were included for the analysis. The demographic data are summarized in Table 2.

Table 2
Demographic Characteristics of Study Participants

	<i>Men</i>	<i>Women</i>
Assessed	19	21
Using walking devices	5	2
Age (M $\pm$ SD)	82.4 $\pm$ 8	78 $\pm$ 8.5

The kinematics of each joint at different events of stance phase are given in Table 3.

Table 3
Angle Measurement of Ankle, Knee and Hip at Different Events of STANCE phase

<i>Range of motion in degrees (M$\pm$SD)</i>		
<i>Events</i>	<i>Men (n=19)</i>	<i>Women (n=21)</i>
Ankle Joint		
IC	7.8 $\pm$ 5.83 deg. PF	7.9 $\pm$ 6 deg. PF
LR	8 $\pm$ 5.4 deg. PF	7 $\pm$ 3.8 deg. PF
MS	5 $\pm$ 3.1 deg. PF	8.4 $\pm$ 3.3 deg. PF
TS	5.3 $\pm$ 3.9 deg. PF	8.3 $\pm$ 7 deg. PF
PS	11.9 $\pm$ 5.14 deg. PF	14.5 $\pm$ 5.6 deg. PF
Knee Joint		
IC	9.4 $\pm$ 7.15 deg. F	5.4 $\pm$ 6.3 deg. F
LR	17 $\pm$ 5.42 deg. F	11 $\pm$ 9.8 deg. F
MS	16.6 $\pm$ 4.9 deg. F	10 $\pm$ 6.5 deg. F
TS	16.75 $\pm$ 12.8 deg. F	21 $\pm$ 15.9 deg. F
PS	33.75 $\pm$ 6.64 deg. F	36 $\pm$ 5.3 deg. F
Hip Joint		
IC	16.7 $\pm$ 4.2 deg. F	12 $\pm$ 6.9 deg. F
LR	16.4 $\pm$ 4.5 deg. F	12.3 $\pm$ 6.8 deg. F
MS	13.6 $\pm$ 5.7 deg. F	6.4 $\pm$ 6.4 deg. F
TS	13.8 $\pm$ 6.45 deg. F	9.3 $\pm$ 7.65 deg. F
PS	18.5 $\pm$ 9.2 deg. F	10 $\pm$ 1.4 deg. F

Note: IC; Initial contact. LR; Loading response. MS; Mid stance. TS; Terminal stance PS; Pre Swing.

PF; Plantar flexion, F; Flexion.

The table above demonstrates the mean ROM in degrees at different events of the stance with SD for both men and women. All movements occurred in flexion direction.

The reference values that have been considered to perform this classification are given below in table 4.

Table 4
Reference Values of Joint Angles that are Considered Necessary for Normal Gait (Perry, 1992)

<i>Event</i>	<i>Joint Movement</i>	<i>Angles (degrees)</i>
Ankle joint		
IC	Neutral	0
LR	Plantar flexion	5
MS	Dorsiflexion	5
TS	Dorsiflexion	10
PS	Plantar flexion	15
Knee Joint		
IC	Flexion	5
LR	Flexion	15
MS	Flexion	5
TS	Flexion	5
PS	Flexion	40
Hip Joint		
IC	Flexion	20
LR	Flexion	20
MS	Neutral	0
TS	Hyperextension	20
PS	Hyperextension	10

The table above gives the normative values of kinematics during a normal gait cycle. Taking this table as reference, all the videos of gait were analysed and interpreted.

Tables 5, 6 and 7 below show the percentage of participants with range of motion which is outside the normal range or potentially at risk for fall. They also depict the characteristics of movement or abnormality noticed in both sexes.

Table 5
Distribution of Participants based on Kinematic Variables of Ankle Joint

Event	Men (% of population)		Women (% of population)		Abnormality Observed		
	Normal (%)	Deviated (%)	Normal (%)	Deviated (%)	Deviation (%)	Movement (%)	ROM (Range in degree)
IC	42.1	57.9	42.8	57.2	Increased	Plantar Flexion	7.8–7.9
LR	52.6	47.4	47.6	52.4	Increased	Plantar Flexion	7–8
MS	73.7	26.3	71.4	28.6	Increased	Plantar Flexion	5–8.5
TS	47.4	52.6	38.1	61.9	Increased	Plantar Flexion	5.3–8.3
PS	52.7	47.3	14.3	85.7	Reduced	Plantar Flexion	11.9–14.5

Note: IC; Initial contact. LR; Loading response. MS; Mid stance. TS; Terminal stance PS; Pre Swing.

As the table above shows, there was an increase in plantar flexion in all the phases of gait for both the sexes.

Table 6
Distribution of Participants based on Kinematic Variables of Knee Joint

Event	Men (% of population)		Women (% of population)		Abnormality Observed		
	Normal (%)	Deviated (%)	Normal (%)	Deviated (%)	Deviation (%)	Movement (%)	ROM (Range in degree)
IC	57.9	42.1	66.7	33.3	Increased	Flexion	5.4–9.4
LR	36.9	63.1	61.9	38.1	Reduced	Flexion	11–17
MS	47.4	52.6	33.3	66.7	Increased	Flexion	10–16.6
TS	47.4	52.6	38.1	61.9	Increased	Flexion	16.75–21
PS	52.6	47.4	76.2	23.8	Increased	Flexion	33.75–36

Note: IC; Initial contact. LR; Loading response. MS; Mid stance. TS; Terminal stance PS; Pre Swing

As the table above shows, during IC, 57.9 per cent men and 66.7 per cent women had knee mobility within normal ranges.

Table 7
Distribution of Participants based on Kinematic Variables of Hip Joint

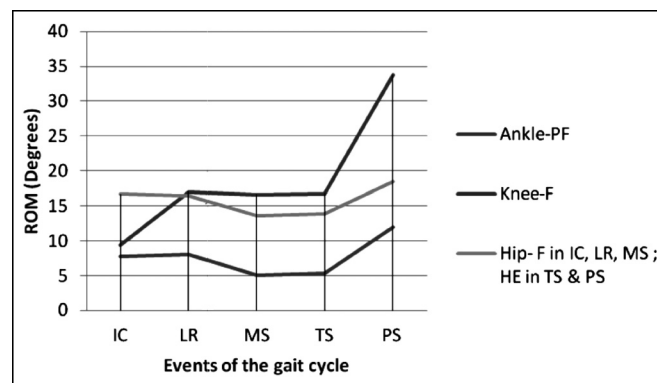
Event	Men (% of population)		Women (% of population)		Abnormality Observed		
	Normal (%)	Deviated (%)	Normal (%)	Deviated (%)	Deviation (%)	Movement (%)	ROM (Range in degree)
IC	78.9	21.1	23.8	76.2	Reduced	Flexion	12–16.7
LR	73.9	26.1	28.6	71.4	Reduced	Flexion	12.3–16.4
MS	73.7	26.3	66.7	33.3	Increased	Flexion	6.4–13.4
TS	26.3	73.7	61.9	38.1	Reduced	Hyper Extension	5.3–8.3
PS	73.7	26.1	57.1	42.8	Reduced	Hyper Extension	10–18.5

Note: IC; Initial contact. LR; Loading response. MS; Mid stance. TS; Terminal stance PS; Pre Swing.

As the table above shows that there is a marked reduction of hip hyperextension in both TS and PS events of the gait cycles. Studies have shown that reduction of hip hyperextension can predispose to risk of fall.

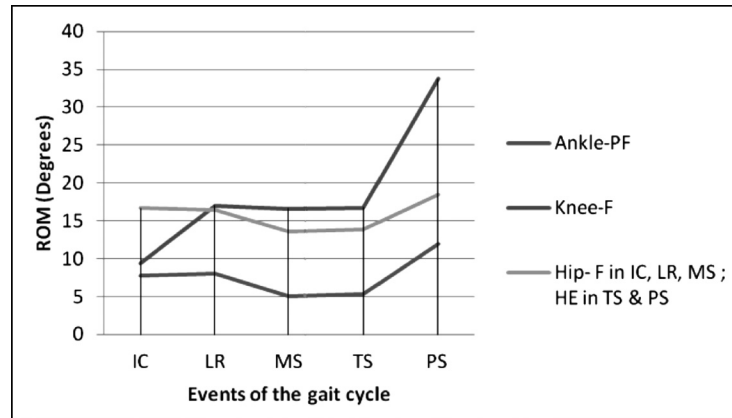
The figures below are graphical representation of maximum angles at different events of the gait cycles.

Figure 2
Range of Motion in Men At Different Events of Gait Cycles with the Movement Observed



Note: IC; Initial contact. LR; Loading response. MS; Mid stance. TS; Terminal stance PS; Pre Swing. PF; Plantar flexion. F; Flexion. HE; Hyperextension

Figure 3
Range of Motion Men at Different Events of Gait Cycles



Note: IC; Initial contact. LR; Loading response. MS; Mid stance. TS; Terminal stance PS; Pre Swing. PF; Plantar flexion. F; Flexion. HE; Hyperextension.

As seen from Fig 2 and 3 women tend to have greater degree of plantar flexion than men. Women had lesser hip hyperextension as well.

Spatiotemporal parameters

The step length (meters) of both the lower extremities and the gait velocities (distance/time) of the study population were also calculated and analysed which is shown in Table 8.

Table 8
Step Lengths and Gait Velocities of the Participants.

	<i>Left step length (M±SD) Meters</i>	<i>Right step length (M±SD) Meters</i>	<i>Velocity (M±SD) Meters/seconds</i>
Men	1.5±0.33	1.5±0.4	0.5±0.12
Women	1.2±0.3	1.1±0.3	0.4±0.1

While analysing the mean step length of the extremities, the values fall into normal category (1.46 m for men and 1.28 m for women) (Sullivan, 2014). While observing individual values, there are individuals whose values falls below the norms stated. This variation is given in Table 9.

Table 9
Percentage of Participants with Deviation in Step Length

<i>Participants with abnormal step length. No. (%)</i>	
<i>Men</i>	<i>Women</i>
7 (36.8%)	10 (47.6)%

The result demonstrates that, 36.8 per cent men and 47.6 per cent women have shown a reduction in step length on both the extremities. The gait velocity of all these individuals can be considered as pathological gait velocity ($PGV < 0.8\text{m/s}$) (Montero-Odasso *et al.*, 2009).

Discussion

Our result demonstrated that 40–70 per cent of geriatric population showed deviation in ankle range of motion, compared with hip and knee joint (Ankle > Hip > Knee). There were significant deviations of ranges in all the joints irrespective of gender. Men have showed more deviations compared with women. Any deviation in the distal joint will affect the nearby joints in terms of compensatory movements, as gait is considered a kinematic chain of movements of all the peripheral joints of the lower limb. Thus, the excessive knee flexion during the gait events could be a compensatory movement for the increased plantar flexion at ankle. This phenomenon of kinematic compensation and deviations can be observed in almost all the events in all the joints of the study.

These kinematic deviations can predispose to fall or can increase the risk and fear of fall in elderly population. For example, the study shows that in hip during the TS and PS events, there was reduction in hip hyperextension. When there is a noticeable deterioration of hip hyperextension in one limb (ipsilateral) the other limb (contralateral) cannot produce a good stepping strategy to overcome the sudden perturbation, as the contralateral step length is directly proportional to ipsilateral hip hyper extension (Guccione, 2013).

Most of the men (73.7%) and 38.1 per cent of women have shown reduced hip hyper extension in TS and PS events of the gait cycle. At the same time, the data showed that 36.8% men and 47.6 per cent women have reduced step length in both the lower extremities. Reduced hip hyperextension would be a possible explanation for reduced step length in the elderly population. As discussed above, a

contralateral step length is directly proportionate to ipsilateral hip hyper extension. A good step length is important to maintain balance within a large base of support (BOS). Any reduction in this can increase the risk of fall. The individual may not be able to produce a good stepping strategy to counter a sudden change in position or perturbations in order to prevent him/her self from an unintentional fall.

Gait velocity indicates a patient's level of physical mobility. A velocity $<0.8\text{m/s}$ is considered to be a pathological gait velocity. All the participants included in this study fall below the norms with a mean value for men as 0.5m/s and women with 0.4m/s . This can affect their physical performances and adverse events of mobility in daily living. Early identification and implementation of interventions of gait deviations in elderly people can improve their quality of life and physical performance in daily living. This is important to reduce economical and emotional costs associated with falls.

The kinovea software is a good tool and makes the analysis easy. The software is easily available on the internet and is user free. This increases the feasibility of using the software in a clinical set up. The timing can be assessed in milliseconds, thus making temporal analysis robust. The measurements can be derived by giving pounds of reference as input in measurement calibration. Screenshots or snaps of each event or any measurements can be captured by using the camera snap shot option in the software. The use of the software for analysis requires about 45 minute to one hour for a novice. Other requirements are consistency and accuracy in using the tools. Hence we recommend that repeated measurements must be done by the same researcher or clinician. One of the limitations of this study was that, all gait recording was done on a single session. This was done as the primary purpose of this study was to ascertain the feasibility of gait evaluation in this population. We recommend that future studies must attempt to evaluate gait cycles taken from different times and days, so as to better capture the individual's performance.

Conclusion

Recording and analysis of gait, using kinovea software and web cams is a feasible and objective method of gait analysis to detect abnormalities that may predispose to falls in this elderly. The results of this study show a high risk of falls among institutionalized elder women greater than men.

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Rural-Urban Differential in Living Standard of Elderly in Bihar

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ABSTRACT

The present paper aims at exploring the status of elderly people, living in urban and rural area of Patna with respect to their living conditions such as housing, water and toilet facilities which are their basic necessities. The paper is based on study of 300 elderly persons (172 males and 128 females) of 60 years and above, married, educated males belonging to low and middle income groups, drawn equally from urban (male=80, and female=70) and rural ((male=92 and female=58) areas of Patna district in Bihar. The respondents were interviewed at their residence individually. The elderly persons living in urban areas appear to be better placed than their rural counterparts with respect to their age, education and income levels. The findings of this study revealed that the elderly persons of low and middle income groups both in urban and rural areas possess moderate level of basic facilities like housing, drinking water, toilets, and modern equipments like television, fridge, mobile, etc. The elderly in urban area seem to have better standard of living and access to these facilities than those living in rural areas of Patna.

Key words: Living conditions, Staying alone, Standard of living.

The boundary of old age cannot be defined exactly because it does not have the same meaning in all societies. People can be considered old because of certain changes in their activities or social roles. Also old people have limited regenerative abilities and are more prone to disease, syndromes, and sickness as compared to other adults. "The ageing process is of course a biological reality which has its own dynamic, largely beyond human control. The age of 60 or 65, roughly equivalent to retirement ages in most developed countries is said to be the beginning of old age. In many parts of the developing world, chronological time has little or no importance in the meaning of old age. Other socially constructed meanings of age are more significant such as the roles assigned to older people; in some cases it is the loss of roles accompanying physical decline which is significant in defining old age. Thus, in contrast to the chronological milestones which mark life stages in the developed world, old age in many developing countries is seen to begin at the point when active contribution is no longer possible." (Gorman, 2000). However the Indians believe 60 years is starting for old age.

Throughout Asia, the family has traditionally been the primary source of care and material support for the elderly, who in many cases live with or near their adult children. Most governments of countries and territories in Asia are interested in preserving this family-oriented support system in some form (Chen *et. al*, 1989; Chan, 1999). The Indian family system is often held high for its qualities like support and care of elderly. The responsibility of adult children for their parents' well being is not only morally, socially recognized in India but it is a part of the legal code in many states in India. The urbanization, modernization and globalization have brought about major structural and functional transformation in the family, the primary care agency (Jamuna, 1991; Ramamurthi, 1992; Vijaykumar, 1995; Chakraborty, 1997; Gokhlae *et al.*, 1998). Therefore, all over, a rapidly ageing population continues to stretch the ability of families to provide support for the elderly (Jiang, 1995; Kaplan). Considerable attention is being paid to both formal and informal systems of social and economic support and care of the elderly and their interaction with demographic change (World Bank 1994).

Objectives of the Study

To examine living conditions of elderly with respect to housing conditions, water and toilet facility, and standard of living, as well as provide comparative picture on the listed aspects of elderly residing in rural and urban areas.

Methodology

The present study was undertaken in the urban and rural areas of Patna. A sample of 300 aged (60+ years) people 172 males and 128 females were selected from urban and rural area of Patna. Five villages from one Block of Patna and five wards from Municipal area of Patna were randomly selected. The subjects were randomly selected from the list of older people prepared from each selected village and ward. The list was prepared with the help of voter's lists and ration cards of the villagers.

The information on living conditions of elderly with respect to housing conditions, water and toilet facility, and standard of living were collected with the help of an interview schedule prepared for the study. The respondents were interviewed at their residence. Some aspects of personal and family life such as family relations, personal satisfaction and general awareness of the aged were judged by observation, group discussion and informal interview and discussion with the subjects, their spouse or friends.

Table 1
Socio-Demographic Characteristics of the Elderly

<i>Age in Years</i>	<i>Urban</i>		<i>Rural</i>		<i>Total</i>	
	<i>No.</i>	<i>Percentage</i>	<i>No.</i>	<i>Percentage</i>	<i>No.</i>	<i>Percentage</i>
60-65	69	46.0	96	64.0	165	55.0
66-75	58	38.7	32	21.3	90	30.0
76-80	20	13.3	17	11.3	37	12.3
80 & above	3	2.0	5	3.3	8	2.7
Gender						
Male	80	53.3	92	61.3	172	57.3
Female	70	46.7	58	38.7	128	42.7
Marital status						
Married	108	72.0	121	80.7	229	76.3

Cont'd...

Cont'd...

widow/widower	41	27.3	29	19.3	70	23.3
Separated/Divorced	1	0.7	0	0	1	0.3
Education						
Illiterate	21	14.0	50	33.3	71	23.7
Primary School	17	11.3	22	14.7	39	13.0
Secondary School	15	10.0	18	12.0	33	11.0
High School	28	18.7	35	23.3	63	21.0
College	50	33.3	24	16.0	74	24.7
Professionally qualified	19	12.7	1	0.7	20	6.7
monthly income						
Low Income Group (Below 17,000)	46	30.7	73	48.7	119	39.7
Middle Income Group (17,001–34,000)	46	30.7	43	28.7	89	29.7
High Income Group (34,000 & above)	58	38.7	34	22.7	92	30.7

The socio-demographic characteristics of the sampled elderly are shown in Table 1. Maximum percentage, i.e., 55 per cent respondents (46.0% in urban and 64.0% in rural) belong to age group of 60–65 years, 30 per cent (38.7% in urban and 21.3% in rural) were in the age group of 66–75 years, 12.3 per cent (13.3% in urban and 11.3% in rural) were in the age group of 76–80 years and lowest only 2.5 per cent were 80 years and above.

Sex distribution of elderly population indicates that in urban area 53.3 per cent were males and 46.7 per cent were females, while in rural area, male aged people constituted 61.3 per cent the females constituted 38.7 per cent. 57.3 per cent were males and 42.7 per cent females respectively. Thus, male aged people constituted higher proportion in urban as well as in rural area under the study.

Marital status has profound impact on social position and overall welfare of elderly. In the current survey found that majority of the aged people were found to be currently married (72% in urban and 80.7% in rural). 27.3 per cent were widow/widower in urban area while in rural area 19.3 per cent of the aged people were widow/widower. Only one male elderly person was separated/divorced in urban. Thus, there are minor urban-rural differentials by marital status of elderly. The proportion of widows among

elderly was much higher in the urban (27.3%) as compared to (19.3%) among those living in rural area.

Education can make significant difference in the quality of life of elderly though indirectly. Better education leads to better employment opportunity and better standard of living, which would ultimately make life easier in old age. Current survey revealed that 23.7 per cent elderly were illiterate; 13 per cent have education upto primary level, 11 per cent upto secondary level, 21 per cent high school level and 31.4 per cent up to college and professional degrees. Thus, three fourths of them for literates and educated up to school and college levels. Elderly living in urban areas were more educated and qualified than their rural counterparts.

In urban area 38.7 per cent of elderly belonged to High Income Group followed by middle Income Group (30.7%) and low Income Group (30.7%) respectively. In case of rural, 48.7 per cent of elderly belonged to low Income Group, 28.7 per cent to middle Income Group and 22.7 per cent to high Income Group respectively. Out of the total sample, 30.7 per cent elder by constituted high Income Group, 29.7 per cent Middle Income Group and about 40 per cent of the sample size belonged to low Income Group.

Thus the elderly in urban area seemed to be better-off than those living in rural area.

Housing Conditions and Household Amenities

Table 2
Per cent Distribution of Elderly Population by House and Household Facilities House and Household

<i>Household Ownership</i>	<i>Urban</i>		<i>Rural</i>		<i>Total</i>	
	<i>No.</i>	<i>Percentage</i>	<i>No.</i>	<i>Percentage</i>	<i>No.</i>	<i>Percentage</i>
owned by self	120	80.0	127	84.7	247	82.3
belongs to a family	14	9.3	11	7.3	25	8.3
Rented	16	10.7	12	8.0	28	9.3
Type of House						
Independent house	64	42.7	25	16.7	89	29.7

Cont'd...

Cont'd...

Apartment	26	17.3	5	3.3	31	10.3
pucca	42	28.0	63	42.0	105	35.0
Semi pucca	9	6.0	36	24.0	45	15.0
Kachha	9	6.0	21	14.0	30	10.0
No. of living room						
1 Room	3	2.0	14	9.3	17	5.7
2 Rooms	29	19.3	35	23.3	64	21.3
3 rooms	45	30.0	19	12.7	64	21.3
4 Rooms	35	23.3	29	19.3	64	21.3
5 & more than 5	38	25.3	53	35.3	91	30.3
household facilities						
Electricity	150	100	146	97.3	296	98.7
Television	128	85.3	80	53.3	208	69.3
Refrigerator	121	80.7	53	35.3	174	58.0
Telephon/Mobile	137	91.3	96	64.0	233	77.7
Source of drinking water						
Tap water	35	23.3	34	22.7	69	23.0
Boring	73	48.7	10	6.7	83	27.7
Hand pump	16	10.7	69	46.0	85	28.3
Aquaguard	37	24.7	26	17.3	63	21.0
Toilet facility						
Own	136	90.7	105	70.0	241	80.3
Public	1	0.7	3	2.0	4	1.3
No facility	9	6.0	29	19.3	38	12.7
Shared	4	2.7	13	8.7	17	5.7

Any assumption about welfare of the elderly is basically routed in the family environment where elderly spent majority of their time and a lot depends on the housing conditions, living arrangement and household facilities, availability of care taker, etc. In the present study majority (82.3%) of the elderly were staying in their own houses. As shows in Table 2, proportion of rural elderly likely to stay in own house was more (84.7%) as against urban (80.0%). Large number (42.7%) of the aged people in urban area live in independent houses followed by pucca type house (28%), 17.3 per cent in apartment and 6 per cent of the urban aged people live in semi pucca and kachha type

houses. Further, in rural area 42 per cent of the aged people live in pucca type house followed by 24.0 per cent in semi pucca, 16.7 per cent in independent house, 14 per cent in kachha type house and only 3.3 per cent of the aged people live in apartment.

Majority (70%) of urban elderly reported to have 3 rooms, 25.3 per cent have 5 or more rooms in the house. 23.3 per cent elderly people have 4 rooms and only 2 per cent have 1 room in each house respectively. While, 35.3 per cent of rural elderly reported to have 5 or more rooms followed by 23.3 per cent with 2 rooms. 19.3 per cent have 4 rooms and only 9.3 per cent elderly have one room in the house. It is evident that most of the elderly live in houses with three and more rooms, more so in urban areas.

In all 98.7 per cent households have electricity connection in which proportion of urban households is more compared to rural. Similar trend is observed with regard to ownership of television (85.3% in urban, 53.3% in rural), refrigerator (80.7% in urban, 35.5% in rural) and telephone/mobile (91.3% in urban, 64% in rural). Television has become a major source of entertainment for urban elderly. Access to telephone/mobile is considered important in case of emergency situation while refrigerator plays an important role of providing more comforts in day-to-day life. Though television, telephone, mobile and refrigerator may be less popular in rural area, all these gadgets have pivotal role in making life easier and comfortable in urban families. Electricity can be considered as basic need of today and almost equal households have electricity connection in urban and rural households.

Almost half of urban elderly households reported that boring water is the main source of drinking water, 23.3 per cent in urban and 22.7 per cent in rural area depend on public tap water. 24.7 per cent elderly used aquaguard and only about 11 per cent depended on hand pump in urban area. In rural area much higher proportion (46%) of households have hand pump water as compared to urban areas. 17.3 per cent elderly used aquaguard and only 6.7 per cent elderly depend on boring water in rural area.

Thus, about half of the aged people used boring water in urban area and 46 per cent elderly used hand pump water in rural area. About 25 per cent used aquaguard water in urban area and about 17.3 per cent of elderly from rural area did not use aquaguard. Thus elderly in urban area has better access to safe drinking water than their rural counterparts.

Sanitation is considered most important from health point of view. 90.7 per cent of the aged people in urban households have own toilet facility in the house and 6 per cent elderly have no such arrangement. In rural area 70 per cent of the aged people have own toilet facility in the house and 19.3 per cent elderly have no toilet facility in their house. Thus, Urban elderly have better toilet facilities than the rural ones.

Conclusion

The resent study has been carried out to explore the socio-economic status of the elderly as well as their living conditions. The demographic characteristics of the elderly showed that more than half of them were between 60–65 years (55 %) and remaining were above 65 years of age. 57.3 per cent were males, 76.3 per cent were married and 23.7 per cent had no formal education. Large population of the elderly belonged to high Income Group in urban area, while in rural area less than half of elderly belong to low Income Group families. 42.7 per cent of the aged people in urban area live in independent houses. More than one third of the aged people residing in rural area have more than 5 rooms in their houses. In all 98.7 per cent households have electricity connection in which proportion of urban households is more compared to rural. Similar trend is observed with regard to ownership of houses and possession of refrigerator and telephone/mobile and television.

48.7 per cent of the aged people used boring water in urban area and 46 per cent used hand pump water in rural area. Every fourth urban household used aquaguard water in urban area and every fifth household consumed drinking water of aquaguard in rural area. Toilet facilities are not available to about 6 per cent of the households in urban areas and 19.3 per cent in rural areas. Though rural elderly are

used to such life style without toilets, they would certainly find comfort if they have these facilities within reach.

Recommendations

The only way to increase the dignity, respect and authority of elderly in the families and society is to associate them with gainful income generation sources. At the same time, current and future social, health and psychological needs of older people should be urgently addressed through the promotion of social awareness and health education programmes.

The issue of old age social security needs more and deeper discussion and the wider implementation of existing welfare programmes to cover wider elderly population. Concerns and care for vulnerable elderly population is an issue of national importance, The issues related to the rights of elderly need priority action.

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Psychological and Health Problems of Conflict-displaced Ilaje Adolescents and Elderly in Nigeria

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ABSTRACT

In Nigeria, less research attention has been paid to the psychological and health problems of conflict-displaced individuals. This study, therefore, compared some psychological (e.g., hopelessness and troubled sleep) and health (e.g., diarrhea and fever) problems of a group of conflict-displaced adolescents and elderly. It also tested the extent to which such problems and the victims' willingness to return to their place of habitual residence were associated with perceived adequacy of the socio-economic support they received from the host community. Preliminary results indicated that the victims perceived that the displaced persons' camps in Igbokoda had inadequate supply of basic facilities (e.g., water, electricity, health services, psychological services, and functional toilets). A significant numbers of the adolescents reported psychological and health problems than elderly. Less number of conflict-displaced persons, who received adequate socio-economic support, reported psychological and health problems compared with those who received either inadequate or no socio-economic support from the host

community. Socio-economic support was significantly associated with victims' willingness to return to their habitual place of residence. Specifically, most of the victims who received no socio-economic support were willing to return compared with those who had either adequate or inadequate socio-economic support. In order to reduce psychological and health problems, especially among victims of conflict-forced displacement who are adolescents and aged, adequate socio-economic support should be provided in displaced persons' camps.

Key words: Displacement, Elderly, Adolescents, Conflict reaction, Socio-economic support, Ilaje, Okoritak

Forced displacement, a condition in which persons are compelled to leave or flee their home and place of habitual residence due to natural or man-made disasters and developmental projects, has received research attention in recent time (Christensen & Harild, 2009; Fritze, *et al.*, 2008; Maldonado, 2009; Sarvimaki, *et al.*, 2009). This is because studies have shown that displaced persons are more vulnerable to psychological and health disorders than non-displaced persons (Ergun, *et al.*, 2008; Mels, *et al.*, 2010). There are two broad categories of forced displacement: refugees and internally displaced persons. When the displaced persons cross internationally recognized state borders, they are regarded as refugees. In the case of internally displaced persons (IDP), the displaced persons are confined within the borders of a country (UNDP, 2009).

This study focuses on the internally displaced category of forced displacement, as IDPs constitute over 66% of the world's population undergoing forced displacement (Ergun *et al.*, 2008). Internal displacement can be development-forced (Maldonado, 2009), conflict-, economic-, or disaster-forced depending on what makes the individuals in focus to flee or lose the place of their habitual residence against their wish (Cernea, 2006).

Internal-Displacement Monitoring Centre (2008) reported that the number of conflict-forced displaced persons in Nigeria might be around 12,10,000. This might be because Nigeria is home to over 370 ethnic groups (Otite, 1990). Each ethnic group in Nigeria has its own language, values, belief system; and seeks political and economic

dominance (Omoluabi, 2001). Such polarized interests and values, which may threaten collective identity and collective survival of other groups (Coleman & Lowe, 2007), could serve as a potential source of conflict, especially between indigenes and non-indigenes in a particular locality (Omoluabi, 2008; Soyombo, 2008) across difference age groups (Adolescents and Elderly) (Soyombo, 2008).

The focus of most studies on conflict-forced internal displacement in Nigeria has been more on rate of conflict (Global IDP, 2005; Internal-Displacement Monitoring Centre, 2008), causes and patterns of reprisal attacks (Okafor, 2007). Less research attention has been devoted to the extent to which adolescents and elderly undergoing internal displacement experience psychological problems (e.g., hopelessness, troubled sleep, aggressive thoughts and feelings, perceived insecurity as well as perceived loss of personal space) and health-related challenges (e.g., aches and pains, skin diseases, cold and catarrh, fever, and diarrhea), making it necessary to investigate the matter. This is because such psychological and health challenges may have serious implications for the functionality of the individuals, especially the displaced adolescents and elderly (Franco, *et al.*, 2006). The level of socio-economic support received by victims could enhance their ability to cope with conflict and re-settlement challenges (Kaniasty & Norris, 1992). It is, therefore, important to investigate the extent to which perceived adequacy of socio-economic support influence the number of victims who experience psychological and health problems and those willing to return to their former place of residence.

Psychological and Health Problems Associated with Conflict-forced Displacement

The economic costs of conflict-forced displacement on the individuals and the society are enormous, and sometimes, long-lasting (Fiala, 2009; Kondylis, 2007).

In a study that compared internally displaced and non-displaced Turkish Cypriot, Ergun *et al.* (2008) reported that the internally displaced persons experienced higher level of posttraumatic stress disorder than non-displaced persons. Their results also indicated that displaced persons showed higher levels of somatization and depression

than non-displaced persons. In a related study, Mels *et al.* (2010) found that conflict-displaced Eastern Congolese adolescents reported the highest level of psychological distress compared with returnees and non-displaced counterparts. Apart from that, conflict-displaced persons showed the highest tendency of posttraumatic stress and internalizing behaviours compared with returnees and non-displaced persons.

Robert, *et al.*, (2009) reported that socio-economic conditions such as overcrowding, poverty, and loss of land affected the physical and psychological health of the conflict-forced displaced persons in Northern Uganda. The reduced health conditions resulted from emotional sense of loss of freedom and personal space; and lack of food and income. This condition could be exacerbated by more difficult access to health services, family disintegration, and deterioration in the condition of the camp (Franco *et al.*, 2006). The deterioration in the condition of the displaced persons' camps makes displaced children, adolescents and aged more vulnerable to malnutrition, skin diseases, and infecto-contagious disease (Ibid.). We, therefore, hypothesized that:

- 1a More numbers of the displaced adolescents would report more psychological problems (such as hopelessness, troubled sleep, aggressive thoughts and feelings, perceived insecurity, and perceived loss of personal space) than elderly.
- 1b More numbers of the displaced adolescents would report more health problems (such as aches and pains, skin diseases, general weakness in the body, cold, catarrh and cough, diarrhea, cholera, and fever) than elderly.

Socio-economic Support and Victims of Conflict-forced Displacement

The immediate and prolonged effects of conflict-forced displacement on the victims could be ameliorated by the level of socio-economic support they received from others (Kaniasty & Norris, 1992). The social capital theory posits that individuals benefit from social relations through the social structure that links actors and their resources (Agneessens, 2006; Burt, 2003; Putnam, 2000; Amiri, *et al.*, 2010). The Ilaje sub-group of the Yoruba ethnic group in

Southwestern Nigeria is a reflection of network relations and intimate family ties (Ehinmore, 2002). The social structure of inter-dependence and familial connections among the Ilaje creates a norm of mutual trust and mutual felt obligation for each other's success and survival. This social norm is summarized in this popular Ilaje proverb: *Bi ebi ne ba ku tan a ren iwo riwo yu oron*. This means that "as long as one's family lives, one does not go hungry or uncared for." Therefore, members of every Ilaje community see themselves as one big family that must care for and protect one another.

This does not indicate that social capital always has positive outcomes. Social capital can also create social liabilities. The norm of social felt obligation can "provide strong pressure on individuals to contribute a large part of their individual resources to the well-being of the community they are part of" (Agneessens, 2006, p. 4). The liability and the excess claim by other members of the community reduce the individual's drive for success and wealth creation. Sometimes, these behavioural restrictions and excessive demand for conformity imposed by the community may hamper individual freedom and discourage productivity (Ibid.).

In spite of the problems associated with social liabilities, social capital provides opportunity for individuals in need, especially during crises and economic downturn, to cope with the challenges of life and living. The social capital theory provided the best framework for explaining the behaviour of community members toward the victims of the 2007 Okoritak conflict-forced displacement who were camped in Igbokoda. Though, the displaced persons have left their ancestral communities in Ondo State for over thirty years, re-integration with their families was easier because of town- or village-specificity in family names. It was, therefore, easier to trace the town or village of victims using their family names. This might have enhanced family re-integration.

Ehinmore (2007) submitted that Ilaje are noted for cultural preservation and communal settlement system than other groups of migratory fishermen in West Africa. Soyombo (2008) theorized that when a non-indigene or minority group engages in cultural preservation practice, it is usually more vulnerable to xenophobic attack from the indigenes because they are easily identifiable. However,

cultural preservation and communal settlement system might enhance the survival of a group during conflict and stressful life events (Ehinmore, 2007). The activities of the community members might enhance the coping abilities of the victims and reduce their psychological and health challenges. Against this background, we hypothesized as follows:

- 2a Less number of the displaced persons who had adequate socio-economic support from members of the host community would experience psychological problems than those who report inadequate or none socio-economic support.
- 2b Less number of the displaced persons who had adequate socio-economic support from members of the host community would experience health problems than those who report inadequate or none socio-economic support.

Apart from health and psychological problems that are associated with conflict-forced displacement, the displaced persons often experience post-displacement challenges. These challenges include post-displacement safety, re-settlement, willingness to return, family re-integration, attitudes of the host community, adaptation to new geographic conditions, and cultural dissimilarity. An analysis of the victims' re-settlement bid and their willingness to return to their place of habitual residence is important because the decision of the displaced persons to either stay and start a new life in the new environment or return to their former place of residence could be implicated their ability to cope with the post-displacement challenges. It may also spell the direction of intervention programmes for the displaced persons.

Most studies on post-displacement challenges of displaced persons focused on psychological health of the victims. In a meta-analysis involving over 50 studies, Porter and Haslam (2005) found that individuals who were internally displaced and whose initiating conflict had not been resolved had worse psychological conditions (depression, post-traumatic stress disorder, and dissociation) compared with non-displaced persons. The results also showed that the situation in the camp exerted a strong influence on the relationship between the pre-displacement experiences and post-displacement conditions of the displaced persons among the adolescents and the elderly.

These could have implications for re-settlement intentions of the displaced persons. Re-settlement has been linked to mental health conditions of the victims (Murray, *et al.*, 2008). This might be because conflict-forced displacement results in loss of meaningful social roles, increased economic hardship, social isolation, and loss of important life projects (Colic-Peisker *et al.*, 2002; Simich, *et al.*, 2006).

The host community and family can play important roles in helping displaced children and traumatized elderly adapt to a new environment. For example, when parents are mentally healthy, the family and children are better able to adapt to a new environment (Birman, *et al.*, 2005; Hjern & Angel, 2000). Cultural compatibility between the host community and the displaced persons can also enhance post-displacement adjustment thereby increasing the likelihood of the conflict-displaced persons to re-settle in the new environment (Murray *et al.*, 2008; Silove, 1999). Since the conflict-displaced Ilaje and their host community shared cultural and family ties, we hypothesized as follow:

3. Less number of the displaced persons who had adequate socio-economic support from members of the host community would be willing to return to Okoritak than those who reported inadequate or none socio-economic support.

Methods

Study Setting

The study was conducted in Igbokoda, the headquarters of Ilaje Local Government Area of Ondo State, Southwestern Nigeria. Igbokoda is about 950 kilometers from Okoritak (the place of displacement).

Igbokoda is in the tropical region of Africa with two basic seasons (dry and rainy seasons). In the rainy season, which was the time of this study, most towns and villages (including Igbokoda) in Ilaje Local Government Area had an average temperature of 27°C Celsius with a range of 21°C to 29°C Celsius. The area had an average rainfall of 2,000 mm with a range of 1,000 mm to 3,500 mm. Apart from the vast Atlantic Ocean, which lined the entire southern part of the area; Ilaje Local Government Area was home to a number of rivers, lagoons, and

creeks. That could explain why the people were predominantly fishermen. In fact the Ilaje were regarded as one of the most skillful fishermen in West Africa (Ehinmore, 2002). Some of them were traders, artisans, farmers, civil servants, water transporters, and fish processors.

Since the population of study was displaced from Okoritak in Akwa-Ibom State, Southeastern Nigeria, it is important that a brief description of the place of displacement be provided. Ibeno Local Government Area of Akwa-Ibom State, which housed Okoritak, shared a lot of features such as temperature, vegetation, and rainfall with Ilaje Local Government Area of Ondo State. It had a vast coast line and a number of rivers and canals, hence the people engaged mostly in fishing and fish processing. A few numbers of the people of Okoritak were farmers, traders, and artisans.

In Okoritak, and other traditional Ibibio communities, the *Esenowo* (non-indigenes) must respect and obey the laws, custom, tradition of the *Enyene Otun* (landlords or indigenes) and pay *Okuk Nfaka Ikot* (rent) to the *Edidem* (the king) for a continued stay in the community (Alagoa, 1980). Particularly, the non-indigenes must abide by the dictates of the traditional belief system, which ascribed great powers and influence to the ancestral spirits.

Among the Ibibio, animals, fishes, birds, and trees that could harbour ancestral spirits were accorded high totemic values (Ekong, 1983). According to Ekong (1983) it was a taboo to kill or eat animals such as crocodile (*Utaï*) and cat (*Anwa*). On the contrary, the Ilaje traditional and contemporary belief systems did not forbid individuals from killing or eating a crocodile or cat. Such conflicting belief system was a potential source of conflict between the Ilaje (non-indigenes) and the Ibibio (indigenes) resident in Okoritak.

Design and Participants

The study was a cross-sectional survey. The population of study comprised individuals who were displaced from Okoritak, Nigeria as a result of the conflict between Ilaje and Ibibio in 2007. There were two major categories of respondents: adolescents and elderly, which represented each of the displaced persons' camps in Igbokoda.

The participants were 450 (280 males; 170 females) conflict-displaced persons in Igbokoda. They were selected from the displaced persons' camps in Igbokoda, the headquarters of Ilaje Local Government Area of Ondo State, Southwestern Nigeria. Their ages ranged between 12 and 74 years (mean = 36.4 years; SD = 8.42). Majority of them (344 or 76.4%) were Christians and the rest (106 or 33.6%) practiced traditional religion. The respondents were asked to indicate their level of education. Twenty of the respondents (4.4%) had primary school education, 242 (53.8%) had secondary school education, and 21 (4.7%) had tertiary school education.

Reports on marital status showed that 297 (67% elderly; 33% adolescents) were married, 102 (1% elderly; 99% adolescents) were single, 16 (75% elderly; 25% adolescents) were divorced, and 35 (88.6% elderly; 11.4% adolescents) were widowed. The respondents also indicated their occupation before they were displaced. Their responses showed that 199 (66.3% elderly; 33.7% adolescents) of them were fishermen, 100 (36% elderly; 64% adolescents) were fish processors, 40 (27.5% elderly; 72.5% adolescents) were petty traders, and 20 (90% elderly; 10% adolescents) were tailors, and 20 (70% elderly; 30% adolescents) were boat builders. Sixteen of them (37.5% elderly; 62.5% adolescents) engaged in white collar jobs, 15 (73.3% elderly; 26.7% adolescents) were into carpentry, and 10 (90% elderly; 10% adolescents) engaged in water transportation business.

The respondents were asked to indicate the adequacy of socio-economic support they received from members of the host community since the camp opened. Two hundred and eleven of them (46.9%) indicated that they received adequate socio-economic support, 138 (30.7%) reported that they received inadequate socio-economic support, 101 (22.4%) indicated that they received no socio-economic support. We also asked the respondents to express their willingness to return to Okoritak. One hundred and seventy one (38%) of the respondents were willing to return to Okoritak, 102 (22.7%) were not sure, and 177 (39.3%) indicated that they were not willing to return to Okoritak.

Instrument

We designed a questionnaire to assess some of the psychological and health problems of the respondents (adolescents and elderly) as well as the perceived adequacy of socio-economic support and facilities in the camps. In designing the questionnaire, we based our items on reports and findings of previous studies (e.g., Franco *et al.*, 2006; Mels *et al.*, 2010) on conflict and displacement.

Apart from socio-demographic variables, the respondents indicated their perceived adequacy and availability of basic facilities in the camps such as functional toilets, water, school, furniture, electricity, health and psychological services. Response categories were “Available and adequate” “Available but inadequate” and “Not available”. This was based on the fact that Franco *et al.* (2006) posited that the condition in the camp could make the displaced persons more vulnerable to psychological and health problems.

Other items in the questionnaire, especially those on psychological and health problems, were derived from previous studies. For example, Franco *et al.* (2006) and Robert *et al.* (2009) listed some of the psychological and health problems of conflict-displaced persons to include perceived insecurity, loss of personal space, hopelessness, troubled sleep, aggressive feelings, skin diseases, aches and pains, general weakness in the body, and infecto-contagious diseases (e.g., diarrhea). We added cold and catarrh, cholera, and fever to the list because the study area was in the temperate region where people might be more exposed to fever, cold, water borne diseases (due to lack of safe and portable water). Since our focus was to determine the number of respondents who experienced such psychological and health problems, the response categories were “Yes” and “No”.

Two other items (victims’ perceived adequacy of socio-economic support and the willingness to return to the Okoritak – their place of habitual residence) were included in the questionnaire because Mels *et al.* (2010) submitted that support from important others could enhance the coping ability and re-settlement intentions of individuals who are undergoing displacement. The response categories of the item on the perceived adequacy socio-economic support were “Adequate” “Inadequate” and “None”. The item on the willingness of the victim to

return to Okoritak had “Willing”, “Not Sure”, and “Unwilling” response categories

In order to ascertain the face and adequacy of the questionnaire, four subject matter experts (2 psychologist; 2 health workers) assessed it. Based on their assessments, 3 items were removed because they overlapped with other items.

Procedure

Three camps housed the conflict-displaced persons in Igbokoda (Ilaje City Hall, Ilaje Local Government Secretariat, and Ilaje Grammar School). Each camp had an average of four hundred occupants.

We obtained the Camp Register, which contained information such as age, gender, marital status, educational qualification, and pre-displacement occupation of the displaced persons in each camp. Based on the information on the Register, we streamed out those who completed at least primary school education. An average of two hundred and seventy individuals from each camp fell into this category. We used this inclusion criterion because the questionnaire was prepared in English Language; so we wanted some assurance that respondents could read and understand English language.

Using a combination of stratified and simple random sampling techniques, we selected 504 individuals (252 adolescents; 252 elderly) with an average of 84 individuals per camp. With the help of the Camp Managers, these individuals were identified. The selected individuals were provided moderate information on the research, which could enable them to decide whether to participate in the study or not. Apart from the consent of the adolescents, we also obtained the consent of their parents or guardians. The participants were assured that their responses could not be traced to them and that they were free to discontinue with the study whenever they felt uncomfortable with it. Out of the 504 individuals, 31 individuals declined participation in the study. According to some of them, they were not in the mood for such thing.

Out of the 473 questionnaires distributed, 450 (207 from adolescents; 243 from elderly) were duly completed and found usable. Each participant spent an average of 15 minutes to complete the

questionnaire. This research was conducted 12 days after the camps were opened.

Data Analysis

This study was designed to determine percentage of individuals who experienced each psychological and health problem, rather than to ascertain the level of psychological and health problems experienced by conflict-displaced persons. We, therefore, used cross tabulation to determine the number and percentage of respondents in each response category. In addition to that, we used Pearson's Chi-square test to assess the extent to which the respondents were different with reference to the psychological and health problems as well as other important variables.

Results

We asked respondents to assess the availability and perceived adequacy of some basic facilities in the camps. This was necessary because most camps set up to house victims of natural and artificial disasters are usually designed in a hurry without making adequate provision for the occupants in terms of number and peculiar needs. The availability and adequacy of such facilities at the camps in Igbokoda might affect the health and psychological states of the victims. The results are presented in Table 1.

Table 1
Availability and Perceived Adequacy of Some Basic Facilities at the Camps

<i>Basic Facilities</i>	<i>Availability and Perceived Adequacy</i>					
	<i>Available and Adequate</i>		<i>Available but Not Adequate</i>		<i>Not Available</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Functional toilet/bathroom	6	1.3	294	65.3	148	32.9
Water supply	2	0.4	36	8.0	412	91.6
Health services	3	0.7	24	5.3	423	94.0
Waste disposal services	1	0.2	17	3.8	432	96.0
Psychological services	0	0	0	0	450	100

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Security services	10	2.2	420	93.3	20	4.4
School, especially for the children	3	0.7	129	28.7	318	70.7
Furniture	5	1.1	310	68.9	135	30.0
Electricity supply	1	0.2	209	46.4	240	53.3

The results in Table 1 show that majority of the conflict-displaced persons reported that security services and functional toilets/bathrooms were available but inadequate. They reported that the camps were without psychological, educational, and health-related services.

In order to determine whether age category influenced the number of respondents who reported psychological problems, we categorized the respondents into two broad groups: adolescents and elderly. The adolescent group ($n = 207$) comprised individuals whose ages ranged between 12 and 18 years. Elderly ($n = 243$) were individuals who were above 60 years. We tested hypothesis 1a, which expected that a higher number of adolescents would report psychological problems than elderly, with five sets of 2 (Age category: Adolescent versus elderly) $\times$ 2 (Response category: Yes versus No) Chi-square tests. The results are presented in Table 2.

Table 2
Summary of 2x2 Pearson χ^2 Showing the Association between Age Category and Psychological Problems

Psychological Problems	Response Category	Age Category		df	χ^2	p
		Adolescent	Elderly			
Hopeless about the future	Yes	190	173	1	30.37	< .0001
	No	17	70			
Troubled sleep	Yes	200	160	1	66.17	< .0001
	No	7	83			
Aggressive thoughts/feelings	Yes	187	201	1	5.48	< .05
	No	20	42			
Perceived insecurity	Yes	175	150	1	65.89	< .0001
	No	12	93			
Perceived loss of personal space	Yes	140	228	1	51.46	< .0001
	No	67	15			

As shown in Table 2, higher percentage of the conflict displaced adolescents, compared with elderly, reported a range of psychological problems such as hopelessness [$\chi^2 (1) = 30.37, p < .001$], troubled sleep [$\chi^2 (1) = 66.17, p < .001$], aggressive thought and feelings [$\chi^2 (1) = 5.48, p < .05$], and perceived insecurity [$\chi^2 (1) = 65.89, p < .001$]. In the case of perceived loss of personal space, more elderly than adolescents were affected [$\chi^2 (1) = 51.64, p < .001$]. This implies that more conflict-displaced adolescents were affected by psychological problems than elderly.

To test hypothesis 1b, we conducted another set of Pearson's Chi-square test. Specifically, we conducted seven sets of 2 (Age category: Adolescent versus elderly) x 2 (Response category: Yes versus No) Person's Chi Square Test to determine whether more number of conflict-displaced adolescents than elderly would report health problems. The results are presented in Table 3.

Table 3
Summary of 2x2 Pearson χ^2 Showing the Association Between Age Category and Health Problems

Health Problems	Response Category	Age Category		df	χ^2	p
		Adolescents	Elderly			
Aches and pains (e.g., headache and stomach ache)	Yes	174	145			
	No	33	98	1	32.2	< .001
Skin rashes/itching	Yes	198	152			
	No	9	91	1	70.85	< .001
General weakness in the body	Yes	142	135			
	No	65	108	1	8.04	< .01
Cold, Catarrh and Cough	Yes	181	127			
	No	26	116	1	58.49	< .001
Diarrhea	Yes	163	124			
	No	44	119	1	37.16	< .001
Cholera	Yes	117	129			
	No	90	114	1	0.53	> .05
Fever (e.g., Malaria and Typhoid)	Yes	110	126			
	No	97	117	1	0.08	> .05

As shown in Table 3, higher number of the adolescents reported some health problems compared with elderly. Specifically, the results in Table 3 show that significantly higher number of the conflict-displaced adolescents, compare with elderly reported aches and pains [$\chi^2 (1) = 32.20, p < .001$]; skin rashes [$\chi^2 (1) = 70.85, p < .001$]; general weakness in the body [$\chi^2 (1) = 8.04, p < .01$]; cold, catarrh, and cough [$\chi^2 (1) = 58.49, p < .001$]; and diarrhea [$\chi^2 (1) = 37.16, p < .001$]. This implies that more conflict-displaced adolescents are more vulnerable to health problems than elderly.

In the case of cholera and fever, the results were different. Table 3 indicates that there was no significant difference in the number of conflict-displaced adolescents and elderly who suffered from cholera [$\chi^2 (1) = .53, p > .05$] and fever [$\chi^2 (1) = .08, p > .05$]. This implies that cholera and fever were not restricted to a specific age category. In addition to that, there was no significant difference in the number of those who suffered from cholera and fever and those who did not experience the diseases. On the whole, the results in Table 3 provided a partial support to hypothesis 1b.

Hypothesis 2a was tested with five sets of 3 (socio-economic support: adequate, inadequate, and none) x 2 (Response category: Yes, No) Pearson's Chi Square Test. The results are presented in Table 4.

Table 4
Summary of 3x2 Pearson χ^2 Showing the Association between Socio-economic Support and Psychological Problems

Psychological Problems	Response Category	Socio-economic Support			df	χ^2	p
		Adequate	Inadequate	None			
Hopeless about the future	Yes	58	81	90	2	106.27	< .0001
	No	153	57	12			
Troubled sleep	Yes	47	75	76	2	67.51	< .001
	No	164	63	26			
Aggressive thoughts/feelings	Yes	50	78	82	2	96.38	< .001
	No	161	60	20			
Perceived insecurity	Yes	43	84	93	2	149.07	< .001
	No	168	54	9			
Perceived loss of personal space	Yes	98	72	65	2	8.22	< .01
	No	113	66	37			

As indicated in Table 4, some psychological problems were associated with perceived adequacy of the socio-economic support victims received from the host community. The results show that most of the conflict-displaced persons, who reported that they had not received socio-economic support the host community since the camps were opened, had psychological problems compared with those who enjoyed either adequate or inadequate socio-economic support. Most of such group of people were hopeless [$\chi^2(2) = 106.27, p < .0001$] and they experienced troubled sleep [$\chi^2(2) = 67.51, p < .001$]. Majority of those who did not enjoy socio-economic support were also aggressive in thoughts and feelings [$\chi^2(2) = 96.38, p < .001$], perceived insecurity [$\chi^2(2) = 149.07, p < .0001$] and loss of personal space [$\chi^2(2) = 8.22, p < .01$] compared with those who reported that they enjoyed either an adequate or inadequate socio-economic support.

These results indicate that majority of the conflict-displaced persons who did not enjoy social and economic support from important others also tended to record psychological problems compared with those who were catered for by important others. These results confirmed hypothesis 2a.

To test hypothesis 2b, we conducted seven sets of 3 (socio-economic support: Adequate, inadequate, and none) x 2 (Response category: Yes and No) Pearson's Chi Square Test. The results are shown in Table 5.

Table 5
Summary of 3x2 Pearson χ^2 showing the Association between Socio-economic Support and Health Problems

Health Problems	Response Category	Socio-economic Support			df	χ^2	p
		Adequate	Inadequate	None			
Aches and pains (e.g., headache and stomach ache)	Yes	79	55	67	2	25.01	< .001
	No	132	83	35			
Skin rashes/itching	Yes	100	75	60	2	3.99	> .05
	No	111	63	42			
General weakness in the body	Yes	84	78	57	2	12.14	< .01
	No						

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	No	127	60	45			
Cold, Catarrh, and Cough	Yes	101	76	70	2	11.96	< .01
	No	111	62	32			
Diarrhea	Yes	98	80	76	2	11.96	< .01
	No	113	58	26			
Cholera	Yes	72	74	82	2	59.51	< .0001
	No	139	64	20			
Fever (e.g., Malaria and Typhoid)	Yes	93	72	68	2	13.88	< .01
	No	118	66	34			

As shown in Table 5, socio-economic support was significantly associated with some health problems among the conflict-displaced persons. Except for skin rashes/itching, Table 5 shows that majority of the conflict-displaced persons who had no socio-economic support reported that they had had health problems such as aches and pains [$\chi^2(2) = 25.01, p < .001$], general weakness of the body [$\chi^2(2) = 12.14, p < .01$], and cold, catarrh, and cough [$\chi^2(2) = 11.96, p < .01$] since the camp opened. In addition to that, most individuals in this category also reported that they had had diarrhea [$\chi^2(2) = 21.69, p < .001$], cholera [$\chi^2(2) = 59.56, p < .001$], and fever [$\chi^2(2) = 13.88, p < .01$] since the camps opened compared with those who enjoyed either adequate or inadequate socio-economic support.

These imply that victims of conflict-forced displacement, who did not receive socio-economic support, had the highest tendency of experiencing health problems such as aches and pains, feverish conditions, and cholera. The level of occurrence of such health problems among victims who received adequate socio-economic support was low. These results partly supported hypothesis 2b.

We tested hypothesis 3 using a 3 (socio-economic support: Adequate, inadequate, and none) x 3 (Willingness to return to Okoritak: Willing, not sure, and unwilling) Pearson's Chi Square Test. The results are presented in Table 6.

Table 6
Summary of 3x3 Pearson χ^2 showing the Association between Socio-economic Support and Willingness to Return to Okoritak

<i>Willingness to Return to Okoritak</i>	<i>Socio-economic support</i>			<i>df</i>	χ^2	<i>p</i>
	<i>Adequate</i>	<i>Inadequate</i>	<i>None</i>			
Willing	37	64	70	4	84.82	< .0001
Not sure	62	27	13			
Unwilling	112	47	18			

As Table 6 indicates, victims' willingness to return to their place of habitual residence was significantly associated with the perceived adequacy the socio-economic support they received [$\chi^2 (4) = 84.82$, $p < .001$]. For example, a comparison of the percentages of the victims across the three categories of socio-economic support indicated that 69.6 per cent of conflict-displaced persons who did not enjoy socio-economic support, compared to those who enjoyed either adequate (17.5%) or inadequate (46.4%) socio-economic support, were willing to return. This implies that when victims of conflict-forced displacement do not receive socio-economic support, they are more willing to return to their habitual home despite the risks involved. Results in Table 6, therefore, provide evidence in support of hypothesis 3.

Discussion

In this study, we investigated the extent to which conflict-displaced adolescents and elderly were different with respect to psychological and health problems. We also tested the extent to which socio-economic support influenced number of displaced persons who reported psychological and health problems as well as those who were willingness to return to their place of habitual residence in Okoritak.

Results indicated more number of adolescents than elderly reported psychological and health problems such as hopelessness, troubled sleep, aggressive thoughts and feelings, perceived insecurity. These results partly supported hypothesis 1a. However, most of the conflict-displaced elderly perceived a loss in their personal space than adolescents. This might be because younger individuals (children and

adolescents) were able to make new friends more easily; and were better adapted to new social conditions than elderly. To a large extent, these results confirmed the findings of Franco *et al.* (2006) and Save the Children (2009). They reported that victims of forced displaced who were adolescents and children had more incidence of psychological and post-traumatic disorders than the aged.

In the case of health, results indicated that significant number of adolescents compared with elderly reported problems such as skin rashes, cold, catarrh and cough, diarrhea, cholera, and fever. These health-related problems might be associated with emotional sense of loss of freedom, lack of food, safe water, inadequate health facilities, and lack of functional toilets. These results confirmed the findings of Mels *et al.* (2010) and Roberts *et al.* (2009) that poor physical and social conditions in and around the camp have the tendency of aggravating the physical and psychological health conditions of the victims of conflict-forced displacement. Contagious disease such as cough, skin rashes, and diarrhea could be more widespread among adolescents than elderly probably because younger people tend to interact more freely with one another than elderly do. Such less restricted interaction might have increased the rate of spread of the diseases.

Furthermore, we found that most of the victims, who did not receive socio-economic support, reported incidences of psychological and health problems than those who received either adequate or inadequate socio-economic support. These results supported the findings of Kaniasty and Norris (1992) that social support helps reduce the effects of negative life events. The theory of social capital (Burt, 2005; Putnam, 2000) was supported by the results of the present study. The socio-economic support received from the host community, which might include medication, health-related advice, money and food, could have prevented diseases or aided the victims' road to recovery. The fact that majority of individuals who did not receive socio-economic support had psychological problems might be because such people had no one to share their pains with, turn to for advice on possible solutions to their problems.

The hypothesis that linked reduced health challenges with perceived adequacy of socio-economic support received by the victims was confirmed. We found that most victims of conflict-forced

displacement who received no socio-economic support were willing to return to their place of habitual residence in Okoritak than those who received some degree of socio-economic support (adequate socio-economic support or inadequate socio-economic support). This might be because such victims felt rejected and consequently the “new” place of residence offered them less hope of survival (Louis *et al.* 2007). Such people may be angry at the host community and the perpetrators of the conflict-forced displacement. They are also likely to be vengeful towards those linked with their problems. This might indirectly, explain the reasons for post-conflict reprisal attacks in Nigeria.

Nursing and Psychological Implications

The economic costs of conflict-forced displacement on the individuals and the society are enormous, and sometimes, long-lasting (Fiala, 2009; Kondylis, 2007). Conflict-forced displacement also has psychological and health consequences, especially on the displaced persons (International Free Women’s Foundation, 2007). For example, conflict-forced displacement has been associated with psychological distress among displaced children and adults (Save the Children, 2009). However, posttraumatic stress and internalizing behaviours were associated with traumatic exposure and daily stressors and not with whether the individual was displaced or not. This implies that conflict-forced displacement may not automatically culminate in psychological and health disorders. The socio-economic conditions of the displaced persons as well as the actions of important others during and after the traumatic experience could help enhance the coping ability, psychological state, and health conditions of conflict-forced displaced persons (Mels *et al.*, 2010).

Conclusion

This study has shown that adolescents, who were victims of conflict-forced displacement, tended to be more vulnerable to psychological and health problems than elderly. Irrespective of age group, these problems appears to be more common among those who felt that the host community did not provide socio-economic support to them.

The results of this study have implications for theory and practice. Since perceived socio-economic support was associated with a reduced number of displaced individuals who reported psychological and health problems, it might be beneficial to have psychological and health service centers in displaced persons' camps (Franco *et al.*, 2006). Host communities and other stakeholders should be encouraged to provide adequate socio-economic support to the victims of conflict-forced displacement (Kaniasty & Norris, 1992). Special attention should be paid to children and adolescents, as they appear to be more vulnerable to such problems than adults (Mels *et al.*, 2010).

In spite of the theoretical and practical implications of this study, there are short-comings. One, this study did not compare the psychological and health problems of the displaced persons with those of non-displaced persons, which could have implications for the internal validity of the study. Two, the results of the study should be generalized with caution. This is because the study focused on a specific group of displaced individuals (adolescents and elderly). Three, the questionnaire was prepared in English Language. The inclusion criterion (ability to understand English Language) did not provide the displaced persons with equal opportunities of participating in the study.

Against this background, future researches on conflict-forced displacement in Nigeria should not only compared larger national samples of displaced persons and relevant groups of individuals on those psychological and health problems but should also include other important variables such as personality characteristics. The methodological inadequacies should also be addressed.

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Gender Perspectives of Multi-morbidity among Elderly and It's Determinants in an Urban Setting of Tamil Nadu

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ABSTRACT

As elderly women live longer than men, they are likely to suffer more from multi-morbidity during old age. Hence, an attempt was made in this study to examine the prevalence and determinants of multi-morbidity among elderly across their gender background, making use of the data drawn from 778 elderly persons (60+ years) residing in 4 randomly selected wards in Coimbatore city, Tamil Nadu. The findings revealed that 61 per cent of the total elderly persons were suffering from multi-morbidity (2+ chronic morbidities); such prevalence was significantly higher among females (70%) than males (51%). Differentials in the prevalence of multi-morbidity of the elderly were mostly on the expected lines across their background characteristics, irrespective of their gender, and also found to be significant (Chi-square values significant at different levels). Results based on logistic regression analysis highlighted that, among the total elderly, the odds ratio of multi-morbidity is 2.2 times higher for females as compared to males ($p < 0.001$). While such odds were found to be significantly (at different levels) higher among those who were old-old, habitual to one or more adverse lifestyles and living with married sons and

others, similar odds were lower among those who were engaged in non-agricultural work and other services and belonging to the households of moderate and high SLI than their respective counterparts. Though, more or less, similar findings were also observed among elderly males and females; slightly more number of factors had showed significant net effects on multi-morbidity in the case of females than in the case of males.

Key words: Multi-morbidity, Elderly, Gender, Binary Logistic Regression, Coimbatore

In fact, in the recent past, elderly suffering from multiple chronic morbidities has become a common phenomenon as there would be biological deterioration in the functioning of human organs with an increasing age, in addition to the inter-connections between different organs of the human body. Of course, one can't deny the fact that without much understanding about the morbid conditions from which they exactly suffer, aged persons may likely to report one or more such problems at the time of contact. Multi-morbidity is defined as simultaneous occurrence of several adverse medical conditions in the same person (van den Akker *et al.*, 1996). The prevalence of multi-morbidities has often been investigated in several more developed countries, but to a little extent in less developed nations including India (Fortin *et al.*, 2004; Marengoni *et al.*, 2011; Afshar *et al.*, 2015). In India, though few studies have examined the prevalence of several chronic morbidity conditions among the elderly and its differentials across gender and age (Joshi *et al.*, 2003; Audinarayana, 2005; 2012a; Purty *et al.*, 2006), scanty attempts have been made to examine the multi-morbidity conditions and its determinants (Banjare & Pradhan, 2014; Arokiasamy *et al.*, 2015). Keeping this in mind, this paper aims at examining the prevalence of multi-morbidity among elderly residing in an urban setting of Tamil Nadu state and it also intends to identify the principal factors that have significant net effects on multi-morbidity.

Theoretical Propositions and Earlier Research

Earlier research has documented a number of social, demographic, economic, familial and household characteristics that

are likely to be associated with the prevalence of chronic multi-morbidity among the elderly persons. Among all the factors, gender seems to be playing a vital role in the occurrence and burden of multi-morbidity among elderly. A number of reasons have been enumerated for the same: females have less access to social and economic resources (education, lower positions and lesser earnings/incomes), lower autonomy and decision-making power in the household and community. Moreover, gender differentials do exist in treatment-seeking behaviour, nature of treatment and care & support received from family members, besides purchasing power of healthcare. Next to gender, age obviously influences the chronic multi-morbidity in a significantly positive direction mainly due to longer period of exposure to diseases due to longer expectation of life especially in the case of females, in addition to the deterioration of working capabilities of the several human organs in the body and to some extent utilization of health care facilities. Widowhood noted to be conducive to increase the occurrence of illnesses during old age, mainly because of lower social status attached to it, depression due to loss of spouse and less support from close/distant relatives, besides living in economically poor conditions. In Indian context, caste background serves as a social status (to some extent this is also good indicator for socio-economic status till the recent period) and generally, it is noted that elderly belonging to Scheduled Castes/Tribes (SC/ST; lower status in social strata) tend to be afflicted from higher multi-morbidity than their non-SC/ST counterparts.

It has been widely argued and empirically supported that higher socio-economic status of the elderly persons, by and large, is likely to affect the multi-morbidity conditions in negative direction. The possible reasons behind such contention is that better knowledge (due to education) about the occurrence of diseases and thereby, on the one side, take steps for preventive care and on the other side, avail curative services at the earliest, which would be conducive due to better income (generally possible for those who served or service in better positions – jobs). Living arrangements and habitual to lifestyle habits do affect the prevalence of multi-morbidity. While the situation for elderly to live with son and others mostly arise when they are not working and

earning/not having money/savings and thereby, such elderly are likely to suffer more from multi-morbidity than those living alone. Of course, those living alone largely would be self-sufficient and economically independent due to savings or earning some income by participating in one or the other income generating activities, which obviously need them to keep up good health and thereby, they will tend to utilise both preventive and curative healthcare services promptly. It is also expected and obvious to note that elderly who are habitual to adverse lifestyle habits like smoking, drinking alcohol, etc. tend to suffer with multi-morbidity to a large extent than those who are not habitual to such habits. With a few exceptions, several studies conducted around the World and in India have empirically confirmed most of these associations/relationships in different settings (Khokhar & Mehra, 2001; Joshi *et al.*, 2003; Audinarayana, 2005; 2012a; 2012b; Purty *et al.*, 2006; Walker, 2007; Britt *et al.*, 2008; Marengoni *et al.*, 2008; Wong *et al.*, 2008; Khanam *et al.*, 2011; Barnett *et al.*, 2012; Schafer *et al.*, 2012; Shraddha *et al.*, 2012; Banjare & Pradhan, 2014; Afshar *et al.*, 2015; Arokiasamy *et al.*, 2015; Ha *et al.*, 2015).

Data and Methods

Data for the present study was collected from 778 elderly persons (60 years or more) from Coimbatore city, Tamil Nadu during 2009–11 as part of a major research project entitled “*Care of the Elderly across their Living Arrangements in an Urban Setting of Tamil Nadu*”. The elderly were selected (on census basis) from 8 clusters (streets or parts of streets), which were selected on the basis of simple random sampling technique, belonging to 4 Wards (out of 72 Wards) in Coimbatore Municipal Corporation. At the cluster level, all the aged persons (60+ years) were enumerated – about 82 to 94 from each of the cluster – and interviewed & collected the required information (one person only from each household). For more details one can see Audinarayana (2012b).

Dependent Variable: Studies have adopted various ways of defining multi-morbidity, which has yielded prevalence rates that vary according to the definition. However, one of the approaches that used mostly is the quantitative approach through which one would count

the number of medical conditions (multi-morbidity) from which the elderly are affected by/suffering from at the time of survey. A chief advantage of this procedure is simplicity, especially when a large number of diseases are evaluated through self-reporting method. In the present context, such method is used for measuring the 'multi-morbidity among the elderly persons', which is considered here as the dependent variable. For the purpose of analysis, this variable is used as dichotomous, which is defined as all those elderly who are suffering from 2 or more chronic morbid conditions treated as those suffering from multi-morbidities (assigned a score of '1') and the rest as 'others' (suffering from 1 chronic morbidity as well as not from any morbidity condition; allotted a score of '0').

Explanatory Variables: Though a number of background characteristics of the elderly as well as households have been collected in the present study, selected variables only considered here for analysis depending upon the theoretical perspectives and their magnitude of association (based on Chi-square test) with the dependent variable (Table 2). Most of these variables are self-explanatory, except the Standard of Living Index (SLI) of Households, for which details are provided in Appendix.

Data Analysis: The analysis has been carried out in the following manner. Firstly, the prevalence of chronic morbid conditions of the elderly, besides the magnitude of multi-morbid conditions from which the elderly are suffering or not by their gender have been analysed. Then, the differentials in the magnitude of elderly suffering from multi-morbidity or not by their selected background characteristics have been analysed with the help of cross-tabular analysis and Chi-square test of significance. Finally, the principal determinants of the multi-morbidity of the elderly have been examined adopting the logistic regression analysis. All these analyses have been carried out for total elderly as well as males and females separately making use of SPSS software (version 22.0).

Results and Discussion

Table 1
*Distribution of the Elderly by Type of Chronic Morbidity
Conditions from which they are suffering across their Gender*

Chronic Morbidity Conditions	Male (N=364)		Female (N=414)		Total (N=778)	
	%	No.	%	No.	%	No.
1. Type of Chronic Morbidity						
Vision/Cataract Problems***	36	131	49.3	204	43.1	335
Rheumatism/Arthritis***	31	113	50.5	209	41.4	322
Blood Pressure*	25.3	92	31.6	131	28.7	223
DiabetesNS	15.9	58	17.4	72	16.7	130
Back Pain/Slipped Disc***	9.1	33	19.8	82	14.8	115
Asthma/Lung Problems**	9.9	36	15.5	64	12.9	100
Ulcer/Gas Problems*	11.3	41	7.5	31	9.3	72
Heart ProblemsNS	8	29	9.2	38	8.6	67
Dental Problems**	3	11	7	29	5.1	40
TuberculosisNS	4.9	18	3.4	14	4.1	32
Nervous ProblemsNS	2.7	10	4.6	19	3.7	29
Kidney Problems+	2.7	10	1.2	5	1.9	15
2. Suffering from Multi-Morbidity						
Conditions	49.2	179	30	124	38.9	303
No	50.8	185	70	290	61.1	475
Yes						
Total	100	364	100	414	100	778
χ^2 - Value; Significant Level				30.105; 0.001		

Note: Percentages in Columns 2, 4 & 6 in Panel 1 would exceed more than 100 because of multiple responses among the respective respondents (364, 414 and 778, respectively).
+, *, **, and *** = χ^2 -Values for each Chronic morbidity condition across their gender are Significant at 0.10, 0.05, 0.01, and 0.001 levels, respectively. NS = Not Significant.

Prevalence of Chronic Morbidity Conditions among the Elderly by Gender

In the present study, all the respondents (elderly persons) have been asked to state 'whether they are suffering from any morbid conditions for three months or more preceding the date of survey'. In all, responses from the elderly have been elicited for 12 chronic morbid conditions, which have been analysed and presented in Table 1. Among the total sample elderly, slightly more than two-fifths of them are suffering from poor vision/cataract problems (43%) followed by rheumatism/arthritis (41%). While a substantial percentage of them stated that they are suffering from blood pressure (29%), a sizeable per cent of them reported to be suffering from diabetes (17%), back

pain/slipped disc (15%) and asthma/lung problems (13%). Few elderly are afflicted from chronic morbidities like ulcer/gas problems and heart problems (around 9% each), whereas negligible proportions of the elderly are suffering from different other chronic morbidities.

While scrutinizing the same across their gender background, it is striking to note that the percentages of those suffering from majority of the morbid conditions are higher among females than their male counterparts. Such gender differentials in morbid conditions have also turned out as statistically highly significant ($p < 0.001$ or $p < 0.01$) in the case of problems related to poor vision/cataract, rheumatism/arthritis, back pain/slipped disc, asthma/lung problems and dental problems, and to a moderate extent in the case of blood pressure ($p < 0.05$). Conversely, though the percentage of those suffering from chronic morbidities like ulcer/gas problems, kidney problems and Tuberculosis is higher among males than females, the Chi-square test results turned out as significant at a moderate ($p < 0.05$) and lesser extent ($p < 0.10$) for ulcer/gas problems and kidney problems, respectively. The data provided in panel 2 of Table 1 further highlights the fact that as high as 61 per cent of the sample elderly are suffering from multi-morbidity conditions (2 or more morbidities). However, it is striking to note that the prevalence of elderly suffering from multi-morbidity is significantly ($p < 0.001$) higher among females (70%) than their male counterparts (51%). With minor exceptions, the prevalence of multi-morbidity as well as its higher magnitude among female elderly than males noticed in this research work are also corroborate with some of the studies cited earlier.

Differentials in Multi-morbidity Conditions of the Elderly Persons

Table 2

Percentage Distribution of Elderly who are suffering from Multi-morbidity Conditions by Background Characteristics across their Gender

<i>Background Characteristics of the Elderly</i>	<i>Male</i>		<i>Female</i>		<i>Total</i>	
	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>
1. Age (in Years)						
60–64	42.3	104	67.8	118	55.9	222
65–69	55	80	59.5	111	57.6	191

Cont'd...

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70-74	54	87	73.3	75	63	162
75 +	53.8	93	80.9	110	68.5	203
χ^2 – Value; Sig. Level	4.254; NS		12.987; $p < 0.001$		8.433; $p < 0.05$	
2. Marital Status						
Married	50.2	309	64.6	48	52.1	357
Si./Wi./Se./Di.	54.5	55	70.8	366	68.6	421
χ^2 – Value; Sig. Level	0.359; NS		0.773; NS		22.240; $p < 0.001$	
3. Caste						
Scheduled Castes/Tribes	60.9	39	76.9	104	70.8	69
Others than SCs/STs	48.7	146	67.7	310	58.4	168
χ^2 – Value; Sig. Level	3.178; $p < 0.05$		3.129; $p < 0.05$		8.648; $p < 0.001$	
4. Education						
Illiterate	60	95	70.3	256	67.5	351
Up to High School	49.1	110	76.9	104	62.6	214
Higher Sec. School & above	46.5	159	55.6	54	48.8	213
χ^2 – Value; Sig. Level	4.600; $p < 0.10$		7.757; $p < 0.05$		19.788; $p < 0.001$	
5. Occupation						
Not-Working/Retired	54.9	235	70.6	320	64	335
Non-Agricultural Labourers	45.9	74	55.2	29	48.5	220
Business/Employees	40	55	73.8	65	58.3	120
χ^2 – Value; Sig. Level	4.840; $p < 0.10$		3.556; NS		9.130; $p < 0.01$	
6. Monthly Family Income (in)						
	58.5	94	76.3	173	70	267
= 4,999	51.6	93	67	106	59.8	199
5,000 –9,999	46.3	177	64.4	135	54.2	312
10,000 +						
χ^2 – Value; Sig. Level	3.677; NS		5.919; $p < 0.05$		15.418; $p < 0.001$	
7. SLI of Households						
Low	59.3	86	76.6	175	70.9	261
Moderate	48.9	137	67.2	137	58	274
High	47.5	141	62.7	102	53.9	243
χ^2 – Value; Sig. Level	3.292; NS		6.690; $p < 0.05$		16.871; $p < 0.001$	
8. Living Arrangements						

Cont'd...

Cont'd...

Alone	41.7	12	60.8	66	57.7	78
With Spouse only	45.8	155	75.6	41	52	196
With Married Son	52.8	108	72.6	157	64.5	265
With Others	58.4	89	70	150	65.7	239
χ^2 – Value; Sig. Level	4.187; NS		3.901; NS		10.873; $p < 0.01$	
9. Lifestyle (Personal) Habits						
Not Habitual to Any One	42.8	208	69	258	57.3	466
Habitual to One or More Habits	61.5	156	71.8	156	66.7	312
χ^2 – Value; Sig. Level	12.539; $p < 0.001$		0.364; NS		6.901; $p < 0.01$	

Note: Chi-square test values Significant at various levels have been presented as Bold and *Italics*.
NS = Not Significant.

Information about the differentials in multi-morbidity of the elderly by their background characteristics across gender background is provided in Table 2. In the case of *total sample elderly* (Columns 6–7), one can see that the percentage of those ever suffered from multi-morbidity is noted at a moderate level among those who are in the age group of 60–64 years, which has consistently increased with an increase in their age categories, and reached to a level of 69 per cent among those who are in 75 years and above (panel 1). The prevalence of multi-morbidity is noted to be higher among those elderly who are single/widowed/separated/divorced as well as among those who belonged to SC/STs (69% and 71%, respectively) than their respective counterparts (panel 2 & 3). With a few exceptions, one can notice that the magnitude of multi-morbidity appears to be negatively associated with their socio-economic conditions. For instance, from panels 4–7 of Table 2, one can observe that elderly who are somewhat and better educated, engaged in income generating activities (non-agricultural labourers and business/employees), earning moderate and higher incomes per month, and belonged to households of moderate and high SLI reported to be ever suffering from multi-morbidity conditions significantly to a lower extent than their respective counterparts. It is also conspicuous to note that the prevalence of multi-morbidity appears to be fairly lower among those elderly who are living with spouse (52%) and alone (58%) than those who are living with married

son(s) and with others (unmarried daughters/children/relatives), whereas such magnitude is higher among those elderly who are habitual to one or more lifestyle habits such as smoking cigarettes/beedis, drinking alcohol, chewing tobacco, etc. than those who are not habitual to such habits (panel 8 & 9). The Chi-square test results between each of the background characteristics under consideration and the prevalence of multi-morbidity are turned out as highly significant ($p < 0.001$ or $p < 0.01$), except in the case of current age ($p < 0.05$).

Almost similar differentials in the prevalence of multi-morbidity (as noted in the case of total sample elderly) of the elderly across their background characteristics under consideration are noticed among male and female elderly also with the following minor exceptions. Among *male elderly* (Columns 2–3 of Table 2), the differentials in the magnitude of multi-morbidity mostly didn't turn out as significant across their current age, marital status, monthly family income, SLI of households and living arrangements, whereas such differentials are observed to be moderately significant ($p < 0.05$) in the case of caste background and somewhat less across their educational attainment and occupational status ($p < 0.10$ in each case). However, it is conspicuous to note that the association between lifestyle habits and prevalence of multi-morbidity has turned out as much stronger ($p < 0.001$). In the case *female elderly* (Columns 5–6 of Table 2), while the association between current age and multi-morbidity turned out as highly significant ($p < 0.001$), such relationship pertaining to caste, educational status, monthly family income and SLI of households, and multi-morbidity has turned out as moderately significant ($p < 0.05$). On the other hand, differentials in the burden of multi-morbidity across the other background characteristics such as marital status, occupational status, monthly family income, living arrangements and habitual to lifestyle habits are not found to be statistically significant.

Determinants of Multi-morbidity Conditions among the Elderly

Table 3
Results of Logistic Regression Analysis on Elderly'
Multi-morbidity across their Gender

Explanatory Variables	Total		Males		Females	
	Beta	Exp(β)	Beta	Exp(β)	Beta	Exp(β)
Gender (Ref: Males)	–	1	–	–	–	–
Females	0.808	2.243***				
Current Age (Ref: 60–64 years)	–	1	–	1	–	1
65–69	0.029	1.029	0.531	1.700+	–0.382	0.682
70–74	0.448	1.560*	0.575	1.777+	0.292	1.34
75 +	0.57	1.765**	0.499	1.648	0.684	1.982*
Marital Status (Ref: Married)	–	1	–	1	–	1
Widowed/Divorced/Separated	–0.003	0.997	–0.165	0.848	0.31	1.364
Caste (Ref: Non-SC/ST)	–	1	–	1	–	1
Scheduled Castes/Tribes	0.212	1.236	0.049	1.05	0.613	1.845+
Educational Status (Ref: Illiterates)	–	1	–	1	–	1
Up to High School	0.309	1.362	–0.367	0.929	0.678	1.970*
Higher Secondary School +	–0.06	0.942		0.746	–0.045	0.995
Occupational Status						
(Ref: Not Working/Retired)	–	1	–	1	–	1
Non-Agricultural Labourers	–0.524	0.592*	–0.322	0.724	–1.03	0.357*
Skilled Work/Business/Employees	–0.556	0.579*	–0.89	0.410*	–0.459	0.708
Monthly Family Income (in Rs.)						
(Ref: < 4,999)	–	1	–	1	–	1
5,000–9,999	0.6	1.823*	–0.479	0.619	0.761	2.140+
10,000 +	0.206	1.229	–1.849	0.132***	0.444	1.558
SLI of Households (Ref: Low)	–	1	–	1	–	1
Moderate	–0.442	0.643*	0.398	1.489	–0.597	0.551*
High	–0.491	0.612+	–0.025	0.976	–0.998	0.360**
Living Arrangements (Ref: Alone)	–	1	–	1	–	1
With Spouse only	0.576	1.778+	0.08	1.083	1.271	3.563*
With Married Son	0.813	2.243**	0.283	1.327	1.07	2.915**
With Others	0.743	2.103*	0.424	1.527	0.786	2.194*
Lifestyle Habits (Ref: Not Habitual)	–	1	–	1	–	1
Habitual to Any Lifestyle Habits	0.368	1.445*	0.808	2.243***	–0.221	0.802
– 2 Log likelihood	964.41	473.898	462.022			
Chi-square (df),	75.785	30.615	43.434			
	(18)	(17)	(17)			
Significance Level	0	0	0			
N	778	364	414			
Cox & Snell R-Square	9.3	8.1	10			
Nagelkerke R-Square	12.6	10.8	14.1			

Note: +, *, ** and *** = Beta co-efficients are significant at 0.10, 0.05, 0.01 and 0.001 levels, respectively.

Results based on binary logistic regression analyses on multi-morbidity among elderly are provided in Table 3. Among the *total sample elderly* (Column 2 & 3), it is visibly noticed that, controlling for all the variables used in the model, the odds of multi-morbidity are strikingly higher among female elderly than their male counterparts (OR=2.24; $p < 0.001$). Likewise, the odds of multi-morbidity are 2.34, 2.10 and 1.78 times higher among those elderly who are living with married son, others and with spouse, respectively than those who live alone ($p < 0.01$, $p < 0.05$ and $p < 0.10$, respectively). Similarly, the odds of multi-morbidity are 1.77 and 1.56 times higher among those elderly who are in the age groups of 75+ years and 70–74 years, respectively as compared to those who are little young-old ($p < 0.01$ and $p < 0.05$, respectively). Next to these, the probability of suffering from multi-morbidity noted to be higher among those who belonged to middle and higher monthly family income brackets (Rs. 5,000–9,999 and Rs. 10,000+) than those who belonged to lower monthly family income bracket (Rs. <5,000), but the t-test results turned out as moderately significant ($p < 0.05$) only in the case of middle income bracket. Another pertinent point noted here is that the likelihood of multi-morbidity among elderly is fairly higher among those who are addicted to one or more lifestyle habits than those who are not habitual to such habits (OR=1.44; $p < 0.05$). As expected, the likelihood of reporting multi-morbidity among elderly is fairly lower among those who are working as non-agricultural labourers and engaged in other works (skilled work, business and employment) (OR=0.59 and 0.58; $p < 0.05$ in each case) and also among those who are residing in households of moderate and high SLI (OR=0.64 and 0.61; $p < 0.05$ and 0.10, respectively) than those who belonged to respective reference categories. The net effects of other three factors, viz., marital status, caste and educational status, on multi-morbidity appears to be neither consistent nor significant.

In the case of *male elderly* (Columns 4 & 5 of Table 3), the results of logistic regression analysis on multi-morbidity are almost on the same lines as noted among the total elderly, with minor variations. The probability of male elderly suffering from multi-morbidity noted to be pertinently lower among those who belonged to high family monthly income bracket than those who are from low family income

bracket ($OR=0.13$; $p<0.001$); though middle family income bracket also exhibited such direction of net effect, the t-test results didn't turn out as significant. On the other hand, while elderly habitual to lifestyle habits is independently and significantly associated with increased likelihood of multi-morbidity ($OR=2.24$; $p<0.001$), elderly belonged to 65–69 and 70–74 years have exhibited comparatively high multi-morbidity than those who are in 60–64 years, but to a lesser extent of significance ($OR=1.70$ and 1.78 ; $p<0.10$ in each case). Further, while those working as skilled workers, engaged in business and employment decreases the likelihood of multi-morbidity to a moderately significant level ($OR=0.41$; $p<0.05$), the role of living arrangements on multi-morbidity didn't turn out as significant. Rest of the variables included in the model mostly exhibited net effects on multi-morbidity on expected lines, but the t-test results didn't turn out as significant.

Among the *female elderly* too (Columns 6 & 7 of Table 6.5), few of the following exceptions are noticed than the ones observed in the case of total elderly. While reporting of multi-morbidity is almost intact across their living arrangements, the negative net effect of SLI of households on multi-morbidity has become much stronger. The probability of suffering from multi-morbidity among female elderly is noted to be somewhat higher among SC/STs than their counterparts ($OR=1.84$; $p<0.10$), such likelihood is also observed to be higher in the case of those who are old-old in age (75+ years) as against very young-old, but at a moderate significant extent. Further, it is conspicuous to note that the odds of multi-morbidity are fairly higher among those who are educated up to high school level as well as among those who belonged to middle level family income bracket than their respective counterparts ($OR=1.97$ and 2.14); however, the t-test results turned out as moderately significant ($p<0.05$) in the case of former one and little significant ($p<0.10$) in the case of latter one ($p<0.10$). Noticeably, the net effects of working in better positions and habitual to one or more lifestyle habits have observed to be in negative direction on multi-morbidity, but lacks the statistical support.

Discussion and Conclusions

Data of the present study reveals that the overall multi-morbidity among elderly who are residing in Coimbatore city, Tamil Nadu, is as high as 61 per cent, which appears in line with that of many studies conducted in the developed countries wherein such prevalence ranges between 55 per cent and 98 per cent (Marengoni *et al.*, 2011). However, these figures fairly much higher compared to those figures observed in the low income countries (Schafer *et al.*, 2012; Afshar *et al.*, 2015) as well as in India (Arokiasamy *et al.*, 2015). The number and type of chronic morbidities included in the measurement of multi-morbidity, besides cut-off age (60+ or 65+ years) taken for defining aged or elderly can be said as the major reasons for such discrepancies in the prevalence of multi-morbidity.

This study also supported that the prevalence of multi-morbidity among elderly is significantly higher among females as against males and also exhibited an increasing trend with an increase in their age. Another notable finding is that the burden of the multi-morbidity is higher among those who are habitual to adverse lifestyle habits and such result is more significant in the case of males. With a few exceptions, these findings are mostly agreeing with the results observed in several studies carried out around the World and India. Elderly living with spouse, married son and others have demonstrated higher multi-morbidity than among those who are living alone and such pattern is more conspicuous in the case of females. A study carried out among rural elderly in India (Banjare & Pradhan, 2014) also noted more or less similar result. The reasons for such pattern could be on the one side, elderly living alone tend to be mostly engaged in economic/working activities and thereby, economically independent; on the other side, most of the elderly co-residing may be little older, females in large and economically poor.

The present study demonstrated that the role of socio-economic related factors, viz., marital status, caste, education, occupational status, monthly family income and SLI of households, on multi-morbidity of elderly is mostly negative, but at times inconsistent too. For instance, there is a clear support for those who are engaged in better occupational avenues and part of well placed SLI of households tend to suffer from multi-morbid conditions as compared to their

respective counterparts, whereas elderly from Scheduled Castes/Tribes (belonged to lower strata) have shown significantly higher prevalence of multi-morbidity than their non-SC/ST counterparts. Further, all these findings are more consistent in the case of females than males. On the other hand, elderly, especially those who are educated up to high school level and belonged to middle family income bracket have shown moderately higher multi-morbidity than their counterparts, but the reverse patterns are noticed in the case of males. Majority of the studies around the world and in India cited earlier have exhibited such type of negative associations between the SES factors and multi-morbidity among elderly, whereas the positive role of education on multi-morbidity is noted in the two recent studies carried in India (Banjare & Pradhan, 2014; Arokiasamy *et al.*, 2015). Contrary to the expectation, the prevalence of multi-morbidity appears to be little lower higher among the total elderly, but somewhat higher among the females; however the multivariate results in all these regard didn't turn as significant in any of the sub-groups of elderly, viz., total, males and females.

On the whole, the findings of this study indicate that the prevalence of multi-morbidity is high among elderly persons and given the context of ageing of population, such prevalence is going to be much higher in near future, especially in the case of females. Keeping this scenario in mind, it is suggested that there is an urgent need to plan intervention strategies and community based health promotion programmes so as to reduce the burden of chronic morbid conditions among the elderly; especially such programmes should be directed to women and those belonged to lower socio-economic strata. The present existing geriatric healthcare has to be expanded to a large extent so that elderly persons from all walks of life make use of such services, which in turn may decrease the occurrence of chronic diseases and/or reduce their prevalence to a significant extent.

Appendix

Standard of Living Index (SLI): This is the mostly used proxy measure of economic conditions of households. For this measure, selected housing conditions and amenities as well as consumer goods available in the households have been considered and assigned the

scores in the following lines: Type of House (Hut=0, Kutcha=2, Pucca=3); Source of Drinking Water (Well=0, Street Tap=2, and Own Tap=3); Availability of Bathroom Facility (No=0, Others=1, Outside House=2 and Within House=3); Availability of Toilet Facility (No=0, Others=1, Outside House=3, and within House=3); Type of Cooking Fuel (Firewood=0, Kerosene=2 and LPG=3); Electrification of House (No=1, Yes=2); Availability of Radio, Bicycle, Fan, and Sofa/Dining Table (No=0, Yes=2); Availability of LPG connection, TV, Scooter/Motor Cycle, Refrigerator, and Telephone (No=0, Yes = 3) and Availability of Motor Car (No=0, Yes=4). Based on the cumulative scores of each household, all the households are categorized into three SLI groups, viz., *Low* = (Scores =12), *Medium* = (Scores 13–19) and *High* (Scores 20–42).

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