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Triacylglycerol Lipase Activity During Ageing of Male Moth of *Earias Vittella* (Fabricius)

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ABSTRACT

The spotted bollworm, Earias vittella (Fabricius) is most destructive pest okra. Study of triacylglycerol lipase activity during ageing of male moth of E. vittella has been attempted. The male moth ageing period was found to be 16 days. The triacylglycerol lipase activity revealed a gradual increase in triacylglycerol lipase activity from 1-day old male moth to 7-day old male moth and decreases from 7-day old male moth to 16-day old moth. The maximum triacylglycerol lipase activity was observed in 7-day old male moth of E. vittella. The triacylglycerol lipase activity of 1-day male moth was 38.06 per cent less than 7-day male moth and triacylglycerol lipase activity of 16-day male moth was 23.81 per cent less than 7-day male moth. The physiological role of triacylglycerol lipase during ageing of male moth of E. vittella has been studied.

Key words: Spotted Bollworm, Earias Vittella, Male Moth, Ageing Period, Enzyme, Triacylglycerol Lipase Okra

The spotted bollworm, *E. vittella* is very harmful pest of okra. The freshly hatched caterpillars bore into tender shoots and fruits and feed on inner tissue. They move from bud to bud and fruit to fruit thus causing damage to the number of fruiting bodies. The damaged buds and flowers

wither and fall down without bearing any fruits (Shrivastava and Butani, 1998). Lipases are enzymes that hydrolyse triacylglycerols to di and monoacylglycerol and free fatty acids (Mrdacovic *et al.*, 2008). Okra is an economically important vegetable crop grown in tropical and subtropical parts of the world (Binalfew and Alemu, 2016). Many studies have been carried out on the triacylglycerol lipase activity of various insects (Nandanani *et al.*, 1973; Arrese and Well, 1994; Smith *et al.*, 1994; Devi and Singh, 2011; Brabcova *et al.*, 2013; Oyebanji *et al.*, 2014; Gaikwad and Bhavane, 2015; Chamani *et al.*, 2016; More, 2016). The information on triacylglycerol lipase activity during ageing of male moth is rather scanty. In present study, an attempt has been made to measure triacylglycerol lipase activity during ageing of male moth of *E. vittella* which mainly concerned with liberation of energy for active life of moth.

Materials and Methods

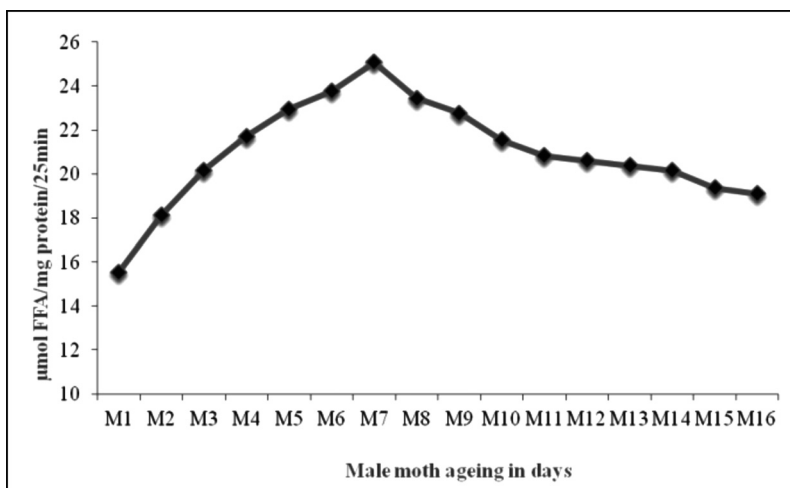
The culture of *E. vittella* was maintained in the laboratory on natural food of okra fruits (Roqaya, 2000). Male moths from 1-day to 16-day were used for study. Partial purification of triacylglycerol lipase was attempted by ammonium sulphate precipitation method (Dawson *et al.*, 1969). The desiccated ammonium sulphate was used to ensure uniform and rapid dissolution. The day before use, ammonium sulphate was placed over night in oven at 120 °C in a large beaker. Homogenate subjected to ammonium sulphate precipitation using 70 per cent fraction. Homogenate allowed precipitating for 30 minutes at 4 °C with rapid stirring. Precipitation was recovered by centrifugation for about 30 minutes and pellet was separated. The pellet was re-suspended in a volume of phosphate buffer (pH 7.8) equal to the volume of homogenate and then such partially purified enzyme (0.25 ml) was used to lipase assay. Lipase was assayed by method of Hayase and Tappel (1970) contains 0.25 ml of substrate, 0.25ml partially purified lipase enzyme and 1 ml of phosphate buffer pH 7.8 in total volume of 1.5 ml. The incubation was carried out in glass stoppered conical flask for 25 minutes at 37 °C temperature in metallic shaker. The reaction was stopped with 2 ml of Cu-TEA reagent. The flasks were shaken twenty times and after 15min 10 ml of chloroform was added and after 15 min exactly 2 ml of chloroform phase was taken in another stoppered test tube to which 1 ml of colour reagent was added. At the end liberated fatty acids were measured

calorimetrically (Itaya, 1977). The absorbance was read at 540 nm. Protein estimation (Lowry *et al.*, 1951) method included 0.5 ml partially purified enzyme, 4.5 ml of reagent I mixed well and allowed to stand for 10 minutes of incubation at room temperature. Immediately, 0.5 ml reagent II was added rapidly to a total volume of 5.5 ml. Reagent I contained 2 per cent Na_2CO_3 in 0.1N NaOH, 1 per cent sodium tartarate in distilled water and 0.5 per cent CuSO_4 in distilled water. Reagent II included 1 part of folin and ciocateu's reagent (phenol reagent) [2N] and 1 part of water. After 30 minutes of incubation, reading was taken calorimetrically at 750 nm. Reagent I and Reagent II were prepared freshly just before the experiment.

Results and Discussion

The male moth ageing period was found to be 16 days. The triacylglycerol lipase activity revealed optimum pH 7.8, incubation time 25 minutes, temperature 37°C , enzyme concentration 1 per cent, substrate concentration 5 per cent and K_m value 0.10856×10^{-2} mM. A gradual increase in triacylglycerol lipase activity noted from 1-day old male moth to 7-day old moth and decreases from 7-day old moth to 16-day old male moth. The maximum triacylglycerol lipase activity was observed in 7-day old male moth. The triacylglycerol lipase activity of 1-day male moth was

Figure 1
Triacylglycerol lipase activity during ageing of male moth of E. vittella.



38.06 per cent less than 7-day old moth but the activity of 16-day male moth was 23.81 per cent less than 7-day male moths.(Fig 1)

Lipase enzyme activity declined with age in adult beetle, *Trogoderma* (Nandan et al., 1973). Triacylglycerol lipase from fat body of insect *Manduca sexta* shows maximum activity at alkaline pH (Arrese and Well, 1994). Lipase enzyme from *Drosophila melanogaster* indicates highest activity at pH 7 and lipase activity in male was 5 fold higher than female, lipase activity present in male accessory glands of the same insect (Smith et al., 1994). Increases in lipase activity of fat body homogenate after initiation of flight have been observed in several insect species (Auerswald and Gade, 2006). Devi and Singh (2011) reported that lipase activity present in the foregut, midgut and hindgut of mango weevil, *Sternonchetus gravis* (F.). The labial gland extracts of 3rd day male of *Bombus terrestris* shows highest lipolytic activity at pH 8.3 and optimum temperature 50°C. The K_m value recorded 0.0011mM and maximum velocity V_{max} value observed 0.15U/mg (Brabcova et al., 2013). In male cockroach, *Periplaneta americana* lipase activity was observed in foregut and midgut and hind gut regions (Oyebanji et al., 2014). Digestive lipase in dung beetle, *Chironitis arrowi* reveals maximum pH 8, optimum temperature 40°C, incubation time 10 min and K_m for male adult was 3.175×10^{-4} M (Gaikwad and Bhavane, 2015). Highest lipase activity was observed at 40°C temperature and at optimum pH 9.5 in male of *Helicoverpa armigera* (Chamani et al., 2016). Triacylglycerol concentration in male moth flight muscles of *Leucopholis lepidophora* and *Oryctes rhinoceros* was 29.0 and 48.40 mg gm wet weight of tissue (More, 2016). In the present study, maximum triacylglycerol lipase activity observed at pH 7.8 which indicates that in male moth, triacylglycerol lipase is significantly active at alkaline pH. The increased triacylglycerol lipase activity from 1-day to 7-day male moth of *E. vittella* suggests more requirement of energy for active flights to the male moth in search of female. This increased triacylglycerol lipase activity may be concerned with structural components and sperms production. The decreased in triacylglycerol lipase activity from 7-day male moth to 16-day old male moth indicates less active stage of male moth and senescence. The maximum triacylglycerol lipase activity was observed in 7-day old male moth indicates most active stage of moth. The main source of energy

during male moth ageing is lipid and lipolytic activity. Our findings are in good agreement with the findings of above authors.

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Depression and Related Factors among the Elderly Chakhesang Population

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ABSTRACT

This paper seeks to determine the level of depression among the elders of the Chakhesang tribe, one of the major tribes of Nagaland, India. The study was conducted in the rural areas among community-dwelling elders. The sample size was 912 (425 males and 487 females) with age ranging from 60–101 years. For the present study, Geriatric Depression Scale (GDS–15) was used to assess the degree of depression among the Chakhesang elders. The GDS (Yesavage et al., 1983) consists of 15 questions dichotomised into a yes/no answer, with the scoring dependent on the given answer. According to the GDS, it was found that a comparatively less percentage of the elders suffered from depression (males=0.2% & females=2.1%), with depression more prevalent among elderly females. Furthermore, nutritional status was assessed by employing Mini Nutritional Assessment (MNA) scale which is a comprehensive tool specifically developed for use with elderly people in order to arrive at a relationship between depression and nutritional status. In addition, social factors such as educational status, living arrangements, marital status and socio-economic status (SES) were considered to understand their association with depression. From the present study, it was found that malnourishment, low SES, illiteracy, being unmarried and living alone were the contributing factors for depression among the Chakhesang elders

Key words: Chakhesang, Elderly, Depression, Nutrition, Social Factors

Depression is a mental illness that predominantly affects older people (Sengupta *et al.*, 2007; Mehta *et al.*, 2010; Mechanic & McAlpine, 2011; Tavitamma, 2011). It is considered to be one of the most common emotional problems among elderly individuals (Bulut, 2009; Arumugam *et al.*, 2013). Depression has been defined by WHO as 'a common mental disorder, characterised by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration' (Marcus *et al.*, 2012). Prevalence of late-life depression is consistent across countries and cultures and has a negative effect on quality of life (Beekman *et al.*, 1999). There are many reasons for older adults' depression. The major risk factors for depression include substance/alcohol abuse, spousal bereavement, financial problems, medical illness/disability and lack of social support from family and friends (Knight, 2004). WHO has stated that there is increased risk of depression in the elderly due to factors including genetic susceptibility, pain, chronic disease and disability, frustration with the limitations in activities of daily living (ADL), lack of adequate social support, adverse life events (bereavement, poverty, separation, divorce, social isolation) and personality traits (anxious or avoidant, dependent) (Rangaswamy, 2001). There is some evidence that depression is a genetic disorder; however, some have argued that a genetic disposition is accompanied by environmental interaction (Bulut, 2009). Symptoms of depression include poor appetite, insomnia or hypersomnia, loss of energy, fatigue or tiredness, psychomotor agitation or retardation, feelings of excessive guilt, lack of concentration, inability to think, and suicidal thoughts (Ryan & Shea, 1996). A depressed mental state creates a decreased level of interest in food and loss of pleasure in food. Therefore, depressed patients are at higher risk for undernourishment. Depressed patients sometimes manifest confusion and memory loss. This can make it hard for them to remember what they have eaten, or if they have, in fact, eaten anything (Bulut, 2009).

One striking pattern in the epidemiology of mental illness is that there are no differences in males and females rate of psychological disorders; however, they suffer from dramatically different types of disorders (Rosenfield, 1999). Women are found to suffer more from depression and anxiety (Sengupta *et al.*, 2007). However, Sonar (2004) in his study among

the Shahabad elderly revealed that gender difference does not have any bearing on geriatric depression because according to him, the problems for the aged irrespective of gender is mostly due to poor SES, psychological health and physical conditions.

Social factors such as living alone, being widowed and being unmarried have been found to be contributing factors for depression in successive studies among the elderly. In a univariate analysis from 24 selected articles, Barua *et al.* (2010) found that among other factors, female gender, living alone, and unmarried status were identified as risk factors for depression in geriatric population. Death of a spouse renders them vulnerable to mental stress. Circumstances which lead to divorce or separation, especially if it occurs at a late stage, can lead to adjustment problems, which may manifest as depressive symptoms. In addition, people who remain single, lack children and spousal support, for whom life-events become much more unbearable, especially at an old age. Such factors may inevitably lead to psychological stress and depression (Pracheth *et al.*, 2013). These problems can become chronic or recurrent and lead to substantial impairments in an individual's ability to take care of his or her everyday responsibilities. In this paper, attempt shall be made to discuss depression and some of the related factors among the elderly Chakhesang population.

Materials and Methods

Subjects The Chakhesangs are a tribal community inhabiting Phek district of the state of Nagaland, India. For the present study, the sample was drawn from the Chakhesang population inhabiting the rural areas. Purposive sampling was used to include those elders who were 60 years of age and above, who were mentally receptive and who were willing to participate in the study. Almost none of the aged individuals had an official record of their birth date; hence their age was estimated by matching recall of particular historical events. The total sample size was 912 (425 males and 487 females) with age ranging from 60–101 years. The mean age of the males in the sample was 73.6 years while that of the females was 71.8 years and the overall mean was 72.6 years. Data was collected from 20 Chakhesang villages viz., Enhulumi, Chizami, Kami, Khezhakeno, K. Basa, K. Bawe, Lekromi, Lasumi, Leshemi, Losami, Mesulumi, Pfutseromi,

Phusachodu, Phuyoba, Rihuba, Sakraba, Thenyizu, Thetsumi, Thipuzu, and Zapami. No statistical sampling technique was applied for the selection of villages because the criterion for inclusion was dependent upon the presence or absence of elderly participants in these respective villages.

Socio-demographic details like name, age, sex, marital status, and living arrangements were recorded by preparing a structured schedule. Data on depression, nutrition and socioeconomic status were assessed by conforming to standardised protocols. Following are brief descriptions of the protocols used in the present study.

Geriatric Depression Scale (GDS) Geriatric Depression Scale (GDS) was used to assess the level of depression among the elderly. The GDS is a self-report scale developed to measure depression particularly in the older population (Yesavage *et al.*, 1983). The scale consists of 15 questions each of which has a yes/no answer, with the scoring dependent upon the answer given. Out of the total 15 points, the following categorisations were followed to assess the various levels of depression among the elderly: =5 = No Depression; ?5 and= 10 = Suggestive of Depression and ?10 = Depression.

Mini Nutritional Assessment (MNA) A comprehensive tool specifically developed for use with elderly people is the Mini Nutritional Assessment (MNA) scale. It is a practical and reliable method and has been validated in successive studies (Vellas *et al.*, 1999). The MNA is an 18 item protocol comprising of (i) Anthropometric measurements (weight, height, mid-arm circumference, calf circumference and weight loss); (ii) Dietary assessment (number of meals consumed, food and fluid intake and feeding autonomy); (iii) General assessment (life style, mobility, medication, psychological); and, (iv) Subjective assessment (self-perception of health and nutrition). Results were trichotomised into the following three categories: ? 17 = Malnourished; 17–23.5 = at risk of Malnutrition and 24–30 = Normal Nutritional Status.

Socio-Economic Status (SES) For the present study, a household measure called the Standard of Living Index (SLI) developed by the National Health Family Survey–2 (NFHS, 2000) was used to assess the Socio-Economic Status. Altogether, 11 factors were considered such as house type, toilet facility, source of lighting, main fuel for cooking, source

of drinking water, separate room for cooking, ownership of house, ownership of agricultural land, ownership of irrigated land, ownership of livestock and ownership of durable goods. Accordingly, the scores were summed up and index scores range from 0–14 for a low SLI, 15–24 for a medium SLI and 25–67 for a high SLI.

Living Arrangement The United Nations, 2005 employed five mutually exclusive categories as the basic comparative schemes for living arrangements of older persons around the world. They are: a) Living alone; b) Living with spouse only; c) Living with a child (including adopted children), child-in-law or grandchild; d) Living with another relative (other than a spouse or child/grandchild); and, e) Living with unrelated people only apart from older person's spouse

Marital Status The marital status is divided into four categories: a) Married; b) Widowed; c) Unmarried; and, d) Separated. 'Married' included those elderly individuals who were still in wedlock and living with a spouse; individuals were considered 'Widowed' if either spouse is deceased; 'Unmarried' if an individual has never been married, while 'Separated' included those individuals whose marriage has been dissociated.

Statistical Analysis Descriptive Statistics was used to report gender-wise distribution of depression. Independent-Samples *t*-Test and ANOVA were performed for GDS and social factors. Chi-square test was performed to look at the levels of association between groups, while, correlation analysis was conducted for GDS with MNA and SLI to quantify the degree to which the variables vary together.

Results

Table 1
Geriatric Depression Scale (GDS) in the Present Study

<i>GDS</i>	<i>Male</i> (<i>N</i> =425)	<i>Female</i> (<i>N</i> =487)	<i>Total</i> (<i>N</i> =912)
No Depression (= 5)	360 84.7%	395 81.1%	755 82.8%
Suggestive of Depression (? 5 and = 10)	64 15.1%	82 16.8%	146 16.0%
Depression (? 10)	1 0.2%	10 2.1%	11 1.2%

Table 1 shows that majority of the elders, i.e., 84.7 per cent elderly males and 81.1 per cent elderly females showed no signs of depression as assessed by the Geriatric Depression Scale (GDS). While, it was found that a comparatively less percentage of the elders, i.e., 0.2 per cent of the males and 2.1 per cent of the elderly females were experiencing depression.

Table 2
Correlation Coefficients for Geriatric Depression Scale (GDS)

<i>Variables</i>	<i>Chakhesang elders (r' value)</i>	
	<i>Males</i>	<i>Females</i>
Age	-0.056	0.015
MNA	-0.323**	-0.339**
SLI	-0.255**	-0.132**

**₁. Correlation is significant at the 0.01 level (2-tailed)

*₂. Correlation is significant at the 0.05 level (2-tailed)

From Table 2, GDS was seen to negatively, but not significantly, correlate with age among the males but no correlation was found between GDS scores and age among the females. However, bivariate analysis shows significant negative correlations between GDS and MNA, both among the elderly males ($r = -0.323$, $p > 0.001$) and the females ($r = -0.339$, $p > 0.001$). A negative and significant correlation was also observed between GDS scores and SLI scores, among both the elderly males ($r = -0.255$, $p > 0.001$) and females ($r = -0.132$, $p > 0.001$). The results indicate that with increase in nutritional status and socioeconomic status, a decrease in the levels of depression was observed among the Chakhesang elders.

Table 3
Mean GDS and socio-demographic variables

<i>Variables</i>	<i>N (%)</i>	<i>Mean $\pm$ SD GDS Scores</i>	<i>p' value</i>
Sex*			
Male	425 (46.6)	2.90 $\pm$ 2.4	p > 0.05
Female	487 (53.4)	3.31 $\pm$ 2.7	
Educational Status†			

Cont'd...

Cont'd...

Illiterate	712(78.1)	3.28±2.6	p≥0.01
Primary	93(10.2)	2.48±2.1	
Middle	61(6.7)	2.33±2.0	
High School	38(4.2)	3.13±3.0	
Higher Secondary	5(0.5)	2.40±1.5	
Graduate	3(0.3)	1.33±2.3	
Living Arrangements†			
Living Alone	163 (17.9)	3.83±3.0	p≥0.01
Living with Spouse	157 (17.2)	2.89±2.4	
Living with Child	577 (63.3)	2.97±2.5	
Living with Relatives	15 (1.6)	3.67±2.2	
Marital Status†			
Unmarried	39 (4.3)	3.97±2.1	p≥0.01
Widowed	282 (30.9)	3.47±2.9	
Married	585 (64.1)	2.89±2.4	
Separated	6 (0.7)	3.00±2.0	

* Independent-Samples *t*-Test

† ANOVA

Table 3 presents the mean GDS score for the elderly Chakhesang elders. Mean GDS score for the males and females were 2.90 ± 2.44 and 3.31 ± 2.68 respectively and the difference between the means was found to be significant ($t = -2.373$, $p > 0.05$). Women seem to have higher mean score and the difference in mean score was statistically significant between males and females. Regarding the educational levels, the mean GDS was highest 3.28 ± 2.6 among the illiterates, while the mean was lowest among the graduates (1.33 ± 2.3), which implies that the illiterates are most depressed. With regard to the living arrangements, the fifth category of living arrangement as classified by UN (2005) i.e., “living with unrelated people only, apart from the older person’s spouse” was not reported among the subjects, hence the category has not been included in the analysis. It was found that those elders who were living alone had the highest mean GDS score (3.83 ± 3.0), followed by elders who were living with their relatives (3.67 ± 2.2), and then living with a children/grandchildren (at least one child or in case of skipped-generation, at least one grandchild), who may/may not have a spouse in the house (2.97 ± 2.5). While, those elders who were living with a spouse showed the lowest GDS score (2.89 ± 2.4), implying that

those elders who live with a spouse are least depressed as compared to the other types of living arrangements and the difference in the means was found to be statistically significant ($F=5.540$; $p>0.01$). With regard to marital status, the present study showed that unmarried elders were most depressed with the highest mean GDS score (3.97 ± 2.1) among other types of marital statuses. That was followed by those individuals who were widowed (3.47 ± 2.9), then by those who were separated (3.00 ± 2.0), while the married individuals had the lowest mean GDS score (2.89 ± 2.4), indicating that still-married elders were least depressed. The differences between the means was found to be statistically significant ($F=4.790$; $p>0.01$).

Table 4
Comparison of the present study with other reported studies on the GDS

<i>Area of Research</i>	<i>No depression (%)</i>	<i>Suggestive of depression (%)</i>	<i>Depression (%)</i>	<i>Reference</i>
Present Study	82.8	16.0	1.2	Chakhesang
Urban	57.6	28.3	14.1	Payahoo et al., 2013
	47.3	31.5	21.9	Sengupta et al., 2007
	57.3	27.4	15.3	Gautam & Houde, 2011
	20	38.9	41.1	Arumugam et al., 2013
Urban Slum	70.64	22.48	6.88	Pracheth et al., 2013
Rural	20.4	33.8	45.8	Arumugam et al., 2013
	41.2	37.8	21.0	Radhakrishnan & Nayeem, 2013

While the present study showed no significant association between age and GDS, a similar finding was also reported by Arumugam *et al.*, (2013) and Sinha *et al.*, (2013). However, Gautam & Houde (2011) found that increasing age significantly correlated with increased levels of depressive symptoms. In another study conducted by Sengupta & Benjamin (2015), increasing age was found to be a significant factor for depression in both rural and urban setting in Ludhiana.

Discussion

In comparison to other studies, the present population shows a comparatively lesser percentage of elders who were experiencing depression (1.2%) (please refer Table 4). Whoever gave negative responses

reportedly underwent loss of near or dear ones sometime before the study. Kennedy *et al.* (1989) and Barua *et al.* (2007) had also reported a significantly high prevalence of depression among those who had a history of death in their family within the last 6–12 months. In the present study, it was found that elderly females were experiencing more depression in comparison to their male counterparts. Similar studies were also reported by Payahoo *et al.* (2013) where they found that female participants had about five-time high level of severe depression as compared to the males. Sengupta *et al.* (2007) also reported that women suffered more with 30.3 per cent as compared to 10.5 per cent in men. Other studies also found that more women suffer from depression (Jain & Aras, 2007; Rajkumar *et al.*, 2009; Gautam & Houde, 2011; Arumugam *et al.*, 2013; Pracheth *et al.*, 2013; Sinha *et al.*, 2013; Dawane *et al.*, 2014). Throughout their lifetime, women face many stressful events and have a greater sensitivity towards them. Hence, they tend to get depressed in response to stressful life events (Pracheth *et al.*, 2013). On the contrary, a study done by Sandhya (2010) in a rural community in South Kerala found that the prevalence of depression was lower among women (22.9%) when compared to men (29.1%). The following table shows a comparison of the present study with other reported studies on GDS.

The present study also revealed that with increase in nutritional status, a decrease in the levels of depression was observed among the Chakhesang elders. Earlier studies have also reported that depressed patients are at higher risk for undernourishment. Simply, sad and depressive feelings cause big changes in appetite, digestion, energy level, weight, and sense of well being. Hence, older adults experiencing depression may also indirectly suffer nutritional deprivation or vice-versa (Bulut, 2009). Also, in the present study, a decrease in the level of depression was observed among elders with better SES. Similar results were also reported from other studies (Barua *et al.*, 2010; Pracheth *et al.*, 2013).

Educational status is also another factor which relates to depression. Being illiterate was found to be a contributing factor towards depression in the present study. Similar findings were also reported in studies carried out by Arumugam *et al.*, (2013); Pracheth *et al.*, (2013) and Sanjay *et al.*, (2014). In contrary, Dawane *et al.* (2014) however, found a positive correlation of

depression with education and financial status, that those who were better educated and financially independent appeared to be more depressed.

Further, the present study shows that those elders who live with a spouse ($F=5.540$; $p\leq 0.01$) and the still married elders ($F=4.790$; $p\leq 0.01$) were found to be least depressed. Similar studies were also reported by Saha & Saha (2013) and Sinha *et al.* (2013), that married people were less likely to suffer from depression compared to those who did not marry or who were separated or widowed, while, studies conducted by Liu *et al.* (1997) and Chong *et al.* (2001) had documented a significantly high prevalence of depression among singles who were either unmarried or widowed. Depression was most prevalent in widowed older adults (Chen *et al.*, 2005; Gautam & Houde, 2011). Liu *et al.* (1997) and Chen *et al.* (2005) had observed a significantly high prevalence of depression among those living alone. Padda *et al.* (1998) observed that the problems due to socio-psychological causes were minimal, probably because majority (73.74%) of them were residing with their families.

Conclusion

The present study was conducted among the Chakhesang elders in a rural set up. It has been revealed that malnourishment, low SES, illiteracy, being unmarried and living alone are the contributing factors for depression among the Chakhesang elders. In comparison to other studies, the results indicate a comparatively low percentage of depression as determined by GDS. The World Health Organization estimated that the overall prevalence rate of depressive disorders among the elderly varies between 10 per cent and 20 per cent, depending on the cultural situations. In a rural tribal community, it is observed that social ties, family support, kinship and filial bonds are strong; traditional values are held with utmost reverence; there is also a lower risk of old-age dependency as agriculture heeds no retirement, they have a close connection with their land way into late-life. Therefore, it can be derived that social security and economic security are the likely contributors to low levels of depression in the present study. Mental health such as depression is not often attended with the same degree of promptness as physical health and is often overlooked and ignored. It is important to have reliable instruments to screen for depression, as early diagnosis and treatment of depression reduces medical costs and institutionalisation. Depression is evitable with timely intervention and can

be prevented by addressing the risk factors. It is crucial to promote mental health and prevent depression among the elders in an endeavour towards successful and active ageing.

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Differential in Living Standard of Inmates in Old Age Homes of Chennai (Tamilnadu)

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ABSTRACT

This study focuses on inmates aged 60 years and above in old age homes. Data for this study was collected from three types of old age homes. 129 inmates from free old age homes, 122 inmates from paid old age homes and 99 inmates from free-cum-paid old age homes were selected based on inclusion criteria. The institutionalized elderly were interviewed individually. The inmates were asked to give required information about the organization, nature of accommodation, medical facilities, management staffs, entertainment facilities, food menu, room features and special features. WHOQOL-Bref was also used to compare the quality of life of inmates with various old age homes. On the basis of this study it may be concluded that the paid home inmates secured high quality of life than free home and free-cum-paid home inmates. The findings also revealed that there was a strong relation between types of old age homes and quality of life of inmates.

Key words: Old age home, Paid homes, Free-cum-paid inmates, Associated factors, Quality of life

The Indian family, like most families in oriental culture, is considered to be strong, well knit, resilient and enduring. Old age homes (OAHs) have become a credible alternative accommodation for elders in India due to several factors. Changing family structure, fewer numbers of children in urban, upper and middle class families, migration, desire to live

independently and abusive situation in some families have led to older people seeking a long stay in institutions, old age homes and senior citizens' accommodation during the last phase of their life. Due to the increased physical and economic dependence, more and more elders are compelled to stay in old age homes (Nekar, 2011). The western countries have a fairly well organized network of institutions for the care of the elderly.

Experts feel that the requirements of institutionalization cannot be denied for aged people who are neither able to manage their own affairs nor do they have any person to look after them. Usually living in an old age home evokes a picture of apathy, dependence and sadness. The inmates often confront problems due to highly institutionalized, depersonalized and bureaucratic atmosphere in old age homes. They face problems of adjustment with tight and rigid schedule, total or near total separation from the family/social milieu, anxiety over entrusting oneself to a new environment, diminished physical capacity and very close and frequent encounters with death and ailments in the institution. State of health has a profound effect on the quality of life of the older persons (Hall, *et al.*, 2011).

Old Age Homes

According to statistical data 52 per cent of old age homes are located in south India (Kerala, Tamilnadu, Andhra Pradesh and Karnataka). In India highest number of old age homes are found in Kerala followed by Tamilnadu. As per 2014 Directory of help age India, 231 old age homes were established in Tamilnadu. Among them, 147 old age homes were situated in and around Chennai. In Tamilnadu, highest numbers of old age homes are in Chennai. Particularly, 130 old age homes are in Chennai. As like any other institutions, there are separate old age homes for males, females as well as mixed exist in India. Some of the old age homes are meant for only aged persons. Some of the old age homes take only poor, aged and destitute. Some are aiming to help the sick and handicapped (Irudaya Rajan, 2008). Old age homes are of three types. They are (a) Free old age homes (b) Paid old age homes (c) Free-cum-Paid old age homes. Totally there are seven sub-categories of old age homes in Chennai city.

In free homes the inmates need not pay any fees. Generally such homes are run by religious organizations belonging to Christian or Hindu organizations or secular trusts. Their chief motive is service. Normally the age of admission is 60 and above in free homes. 130 old age homes have

been established in Chennai city. Among them 51 are free old age homes, 66 are paid old age homes, and 13 are free-cum-paid homes. The institutional living for the aged to a certain extent provided scope for sharing of the bottled up emotional securities. This is a tension releasing mechanisms for the aged. Institutional care offers a place for recreation and a platform for overcoming, bouts of depression and a source for sharing feelings, thoughts and companionship. For many elderly who are in similar situations, the home becomes a place for supports, encouragement and a chance for finding friends (Barua, 2007).

Life in old age home revolves around three kinds of relationships. They are (a) Inmate-Inmate relationship, (b) Inmate-Staff relationship and (c) Inmate-Family/Friend relationship. The intra-relationship is the most difficult issue in the process of adapting to institutional life. Whether or not inmate was able to lead a happy home life largely depends on their capability in dealing with their relationship with others (Khan, 2007). Some people interacted actively to make friends while others refrain from interpersonal interaction to save trouble. If notions such as age, hierarchy, harmony, cooperation, consideration and endurances function well, interpersonal relationship among inmates would be maintained smoothly and a supportive network would form when these norms get violated, conflict arises (Kashyap, 2010).

Objective

The specific objective of the study was to analyse living condition of inmates in free homes, paid homes and free-cum-paid homes with respect to home condition, nature of accommodation, medical facilities, management staffs, entertainment facilities, food menu, room features and special features.

Methodology

In this study, descriptive research design was adopted. It was described and compared the quality of life of inmates with different types of old age homes. It aimed at gaining new insights in to the needs and problems of the institutionalized elderly. The study was conducted in Chennai. There were 130 old age homes categorized in to three types. They are free homes (51), paid homes (66) and free cum paid homes (13). Among these three types, some homes are run exclusively for women, some for

men and some for men and women (Anitha, *et al.*, 2009). Table-1 reveals that there are seven sub-categories of old age homes in Chennai city. One old age home was selected from each category and totally seven old age homes were randomly selected.

Table 1
Subcategories of old age homes in Chennai

	<i>Sub-categories of old age homes</i>	<i>Old age homes</i>
Free homes	Free homes for Men and Women	36
	Free homes for only Women	13
	Free homes for only Men	2
Paid homes	Paid homes for Men and Women	60
	Paid homes for only Women	6
Free-cum-Paid homes	Free-cum-Paid homes for Men and Women	11
	Free-cum-Paid homes for only Women	2
Total number of old age homes		130

In these seven homes, there were 436 inmates. Persons aged less than 60 years, mentally retarded and bed ridden was excluded from the sample selection. 350 inmates were interviewed based on inclusion and exclusion criteria. 129 inmates from free old age homes, 122 inmates from paid old age homes, and 99 inmates from free cum paid old age homes were selected for the study.

A structured interview schedule was used to collect data from the selected inmates. A good amount of time was spent with each inmate for collecting the required information, about the organization, nature of accommodation, medical facilities, management staffs, entertainment facilities, food menu, room features and special features (applicable for paid home inmates). WHOQOL-Bref (1996) was used to compare the mean score of quality of life of inmates with different types of old age homes. Facets were rated on a 5 point scale with a high score indicating a higher quality of life. Secondary data were collected from Chennai district office, directory of help age India, list of homes in and around Chennai and from many websites.

Findings and Discussion

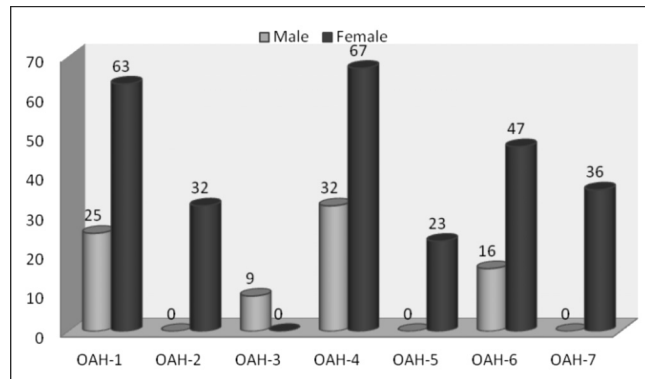
Table 2
Distribution of inmates by their types of old age home

Type of old age homes		Male		Female		Total	
		F	%	F	%	F	%
Free home	OAH-1 (men and women)	25	30	63	24	88	25
	OAH-2 (only women)	0	0	32	12	32	9
	OAH-3 (only men)	9	11	0	0	9	3
Paid home	OAH-4 (men and women)	32	39	67	25	99	28
	OAH-5 (only women)	0	0	23	9	23	7
Free cum paid home	OAH-6 (men and women)	16	20	47	18	63	18
	OAH-7 (only women)	0	0	36	13	36	10
Total		82	100	268	100	350	100

The above table shows the distribution of inmates by their old age homes. It is found that majority of the inmates (28%) were interviewed from OAH-4. Out of 7 old age homes, four institutions are for single sex inmates, three homes are exclusively for women and one for men only. Almost all the old age institutions have the provision to accommodate both men and women. Highest number of men (39%) and women (25%) were interviewed from OAH-4. On the whole 50 per cent of inmates were staying in paid homes. Regarding the criterion for admitting an elderly person in the old age home, 3 of the 7 homes studied admit persons who are atleast 60 years old (Free homes) whereas 55 years is the minimum age criterion in the remaining (Paid homes, Free-cum-paid homes) 4 institutions.

Economic consideration is the other criterion considered before admitting an elderly inmate. In this regard, paid homes only admit those who are able to pay the required institutional charges whereas (4 institutes) free homes are especially for those who are destitute, have no one to care for and, have no means of economic support. What is surprised to note from the paid home is that the person must be able to take care of self and that the person must be free from any diseases and must be in good physical and mental health.

Chart 1
Distribution of Inmates by their Old Age Homes



In Chennai majority of the old age homes maintain the waiting list format to give admission to the elderly people in their old age homes. Many elderly people are waiting more than six months to join in a specific old age homes. Table 3 stated that free old age homes are also maintaining the waiting list of elderly people in Chennai. OAH-4 provides more medical facilities to the inmates based on their needs and they charge separately for each facility. They have intensive care unit for bed ridden inmates inside the old age home.

Table 3 reveals that television is available in all the homes but radio is not available in their homes. At the time of interview, inmates stated that they are really interested to listen music, news and, etc. The management staffs in homes are less in number in free homes compared with paid homes. Every day evening snacks are provided to the inmates in paid homes but not in free homes.

In some free old age homes relatives are not allowed to visit the inmates but in paid homes they are allowed to interact with them. Some paid homes provide special facilities like call button in bedroom/bathroom, night time nurses, allow the inmate to cook in their room, telephone service, fire extinguisher and, etc. But these facilities are not available in free old age homes.

Table 3
Profile of old age homes

Facilities/Services	Free old age homes		Paid old age homes		Free cum paid old age homes		
Sub-categories	OAH-1	OAH-2	OAH-3	OAH-4	OAH-5	OAH-6	OAH-7
	For men and women	For only women	For only men	For men and women	For only women	For men and women	For only women
Nature of Accommodation							
Total capacity	100	34	30	180	25	65	40
Persons accepted	Men and women	Women	Men	Men and women	Women	Men and women	Women
Total number of floors	2	1	2	3	2	2	2
Present occupancy	92	33	27	157	24	65	38
Number of males	25	NA	27	32	NA	16	NA
Number of females	63	32	NA	67	23	47	36
Waiting list	7	6	3	4	2	12	2
Mentally retarded	0	0	18	42	0	0	0
Bed ridden	4	1	0	16	1	2	2
Medical facilities							
Hospital	Nearby	Nearby	Nearby	Available	Nearby	Nearby	Nearby
Visiting doctors	Available	Not available	Available	Available	Available	Available	Available
Nurses	Not available	Not available	Not available	Available	Available	Not available	Not available
Cont'd...							

Cont'd...

<i>Cont'd...</i>									
Monthly check up	Not available	Not available	Not available	Available	Available	Available	Not available	Not available	Not available
Ambulance	Not available	Not available	Not available	Not available	Available	Not available	Not available	Not available	Not available
Intensive care unit	Not available	Not available	Not available	Not available	Available	Not available	Not available	Not available	Not available
Medicines	Available	Available	Available	Available	Available	Available	Available	Available	Available
Walker/wheel chair	3 walker 1 wheel								
chair	1 walker 1 wheel chair	1 walker 1 wheel chair	8walker 6 wheel chair	1walker 1 wheel chair	3walker 1 wheel chair	2walker 1wheel chair			
<i>Entertainment facilities</i>									
Television	Available	Available	Available	Available	Available	Available	Available	Available	Available
Radio	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available
Newspaper	Available	Available	Available	Available	Available	Available	Available	Available	Available
Social activity	Available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available
Recreation activity	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available
<i>Management staffs</i>									
Office staffs	5(Sisters)	2	3(Brothers)	4	3	3	3	3	3
Attender	5	1	2	7	4	2	4	4	4
Household workers	4	1	3	6	3	3	3	3	3
Security	1	0	1	2	1	1	1	1	1

Cont'd...

Note: OAH – Old age home. Table compiled from parent thesis.

Table 4
Comparison between different types of old age homes and four domains of quality of life

<i>Types of old age homes</i>	<i>Mean value of four domains</i>			
	<i>Physical</i>	<i>Psychological</i>	<i>Social</i>	<i>Environmental</i>
OAH 1 Free home For men and women	3.2	3.2	2.9	2.9
OAH 2 Free home For only women	3.0	3.1	3.0	3.3
OAH 3 Free home For only men	3.0	2.9	2.4	3.0
OAH 4 Paid home For men and women	3.1	3.4	3.2	3.1
OAH 5 Paid home For only women	3.1	3.3	3.3	3.4
OAH 6 Free/Paid For men and women	3.2	3.3	2.8	2.9
OAH 7 Free/Paid For only women	3.2	3.3	3.1	2.9
P value	0.828	0.000	0.000	0.000

Note: Maximum score of WHOQOL-Bref scale 26 facets are 130. The score is converted in to mean value to do comparison. OAH-old age home

This table shows the mean value of seven old age homes. The mean value of physical domain was (3.2) in OAH 1. OAH 3 had gained 3.0 mean value (59.42) in physical domain. But no significant difference was found between seven old age homes and physical domain of quality of life since the p value was >0.05 level of significance.

The psychological domain scores were more in paid homes. OAH 4 had secured the highest mean value (3.4) in psychological domain as compared to the other OAHs. OAH 5 had secured the mean value of 3.3. There was a direct association between psychological domain and old age homes since the p value was <0.001 level of significance. The social domain scores were more in paid homes compared with free homes and free-cum-paid homes. OAH 5 had gained the highest mean value of 3.3 among other OAHs. However, statistically significant difference was found in social domain between institutions (p<0.001).

The score of environmental domain was more in paid home OAH 5. In OAH 5 women were living separately in one room with attached restroom. They were comfortable with their environmental condition. But in OAH 4 (paid home) more than 10 inmates were living in one room and their mean value was 3.1. The association between environmental domain and old age home was found to be statistically significant at 1 per cent level (p<0.001). Hence, we can conclude that psychological, social and environmental domains of quality of life were dependent on the types of old age

homes. According to the statistics, inmates who were residing in free old age homes have less quality of life as compared with paid old age homes. The domain scores also differ according to the types of old age homes.

Chart 2

Comparison between different types of old age homes and four domains of quality of life

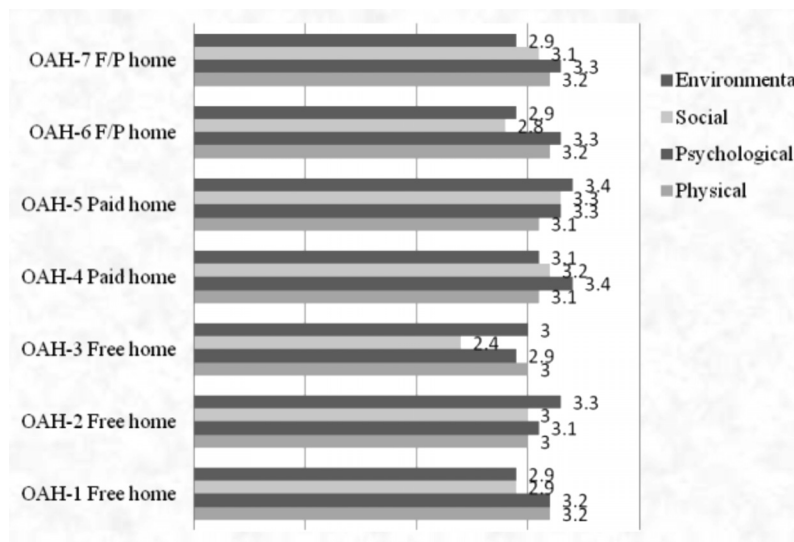


Table 5

Comparison between Free homes, Paid homes and Free-cum-paid homes with regard to the quality of life of inmates

Types of OAHs	OAH	N	Mean score of QOL		F value	P value
			Separate	Total		
Free homes	1	88	3.0	3.06	4.197	0.000
	2	32	3.2			
	3	9	2.9			
Paid homes	4	99	3.1	3.17		
	5	23	3.3			
Free-cum-paid homes	6	63	3.1	3.08		
	7	36	3.1			
Total	7	350	3.1			

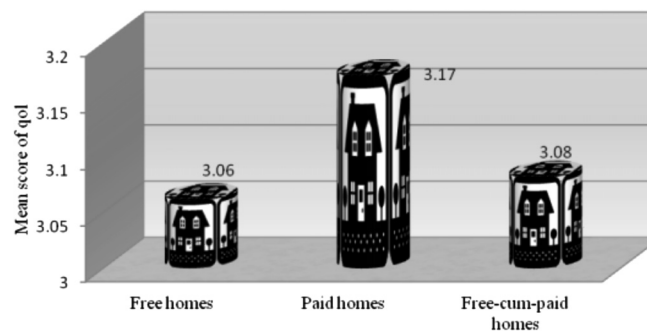
Note: Maximum score of (WHOQOL-Bref scale) 26 facets are 130. Mean has calculated for 130 scores.

This table shows the relationship between types of old age homes and their quality of life. Out of 350 inmates, 129 inmates were staying in free old age homes. OAH 1, OAH 2, and OAH 3 were free old age homes. In OAH 1, male inmates and female inmates were residing. The mean score of OAH 1 was 3.0. Only female inmates were residing in OAH 2 and their mean score was 3.2. Only male inmates were residing in OAH 3 and their mean score was 2.9. On the whole, OAH 2 had gained high mean score. Out of 350 inmates, 122 inmates were residing in paid old age homes. OAH 4 and OAH 5 were paid homes. Male inmates and female inmates were residing in OAH 4. The mean score of OAH 4 was 3.1. Only female inmates were residing in OAH 5 and their mean score was 3.3. OAH 5 had gained the highest mean score in seven OAHs. Out of 350 inmates, 99 were residing in free-cum-paid old age homes. Male inmates and female inmates were residing in OAH 6. The mean score of OAH 6 was 3.1. Only female inmates were residing in OAH 7 and their mean score was 3.1.

On the whole, total mean score of free homes was 3.06. Two paid homes had gained the mean score of 3.17 and two free-cum-paid homes had gained the mean score of 3.08. According to the statistics, paid homes had gained high mean scores. It is clearly assumed that paid home inmates had high quality of life as compared with free home or free-cum-paid home inmates. The results revealed that there was a strong significant difference between types of old age homes and quality of life of inmates since the p value was <0.001 level of significance. The quality of life of inmates in paid homes was better. This may be because of socio-demographic factors, social resources and financial resources.

Chart 3

Comparison between free homes, paid homes and Free-cum-Paid homes and Quality of life of inmates



Conclusion

The number of institutionalized elderly may be increasing for a variety of reasons, first it has become more culturally acceptable to have elderly parents admitted to an institution, rather than caring for them in the home. In order to provide housing services and treatment for those who are partially or totally unable to care for themselves, a variety of institutions settings have evolved. Relocation from independent, private living to a form of institutionalization in the later years represents a complete change in lifestyle. While preparation for the first move to an institution can lessen the shock, most people have difficulty in adjusting to the lack of privacy and personal space.

Institutions operated by voluntary organizations or religious groups tend to be more person-oriented and less bureaucratic. When an individual is institutionalized, he or she may experience great stress, especially if the relocation is an involuntary move. The loss of one's home or apartment entails a loss of privacy and personal possessions, disrupts well-established lifestyles and symbolizes rejection, deterioration and the imminence of death.

Recommendations

a) Counsellors, physiotherapists, and yoga instructors can make differences to quality of life in old age homes b) Healthy food should be provided to the inmates. A dietician is essential to provide wholesome, balanced, nutritional diet to the inmates c) As per dormitory system, a minimum area of 120 square feet is essential for an individual. Individual toilet is essential to reduce inmates' conflicts d) Media should play an important role in bringing out the condition of old age homes and their needs e) Adults should be aware of savings so that they need not depend on their children f) Government may give economic support to the free old age homes g) Government may publish a list of old age homes with all particulars to make easy for elderly people to select the homes.

In fact, being institutionalized is often perceived as the penultimate stage in life. Unless the move is voluntary, or the individual is well prepared for the move, the social, emotional and psychological needs of the individual are seldom satisfied in the bureaucratic and depersonalized environment. It is important to improve the quality of life and make the lives of the inmates more delightful. Inmates need care with humanitarian

approach to ensure a better life. Extra care and support are required to the inmates to lead a peaceful life.

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Cognitive Behaviour Therapy as a Tool to Enhance Mental Health of Institutionalized Elderly

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ABSTRACT

Mental Health and Emotional Well Being are important in old age as in any other stage of life. Cognitive Behaviour Therapy as an intervention is done in collaboration with the clients teaching them skills for questioning and re-evaluating negative automatic thoughts. The objective of this study was to examine the use of Cognitive Behaviour Therapy to reduce Stress and Depression and Enhance the General Well Being of the Institutionalized Elderly. A total of 201 elderly (151 females and 50 males) living in three different Institutions in Chennai were selected through Purposive Sampling Method. The participants of the study were assessed for their levels of Stress, Depression and General Well Being using Stress Inventory, Geriatric Depression Scale – Short form (15) and WHO General Well Being Index (1998) respectively. Participants who were interpreted to have “Very High Stress”, “High Stress”, “Mild”, “Moderate” and “Severe” Depression, and “Low General Well Being” were identified and in each Institution these elderly were randomly assigned to Experimental (N=68) and Wait List

Control Group (N=67). Cognitive Behaviour Therapy was given for 15 sessions for the Experimental Group. Both the groups were reassessed using Case Study Reassessment Schedule and Psychological Tests used earlier. Results showed that after Cognitive Behaviour Therapy the elderly participants in the experimental group were free of depressive symptoms, had good well being and their stress level was found to be reduced considerably. No significant changes were recorded in the Pre, Post and Follow-up phases of the Wait List Control Group participants.

Key words: Cognitive behaviour therapy, Mental health, Institutionalized elderly, Well-being, Depression

The World Health Organization's vision statement for active ageing, states, 'Active Ageing is the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age' (WHO, 2002). Mental Health and Emotional Well Being is as important in older age as in any other stage of life. It is not just the absence of mental disorder; but is also a sense of well being and satisfaction which enables stresses that occur as a result of ageing to be dealt with.

Old Age brings special pressures, unique upsets, and profound biological changes. People become more prone to illness and injury as they age, and they are likely to experience the stress of loss – the loss of spouses, friends and adult children, and the loss of former activities and roles (Inselmann, 2004). Disability in Activities of Daily Living (ADL) also creates considerable amount of stress in old age. Loss of ability to care for personal needs leads to loss of Self Esteem, and a deep sense of dependence. Social exclusion and economic deprivation are also sources of stress (Agrawal and Jaiswal, 2013). False labels, myths and stereotypes associated with elderly sometimes act as stressors and become self fulfilling prophecies. It is believed widely that fear of death causes stress in elderly. In reality, however, elderly wish for a peaceful death and are anxious about and fear the risk of being dependent on others or becoming a burden to their children or care givers. However, the stresses of elderly people need not necessarily result in psychological problems (Nordhus and Nielsen, 2005). Some older persons use the changes that come with ageing as opportunities for learning and growth. For others, however, the stresses of old age do lead to psychological difficulties (Aldwin, *etal.*, 2006).

High Baseline Depression Score, Increase in Disability, Poor General Health, Dissatisfaction with Support and Loneliness are predictors of depression in older people (Harris, *etal.*, 2006). Elderly persons are also more likely to commit suicide than younger ones, and often their suicides are related to depression (Preville, *etal.*, 2005). However, it is observed that depressed elderly adults often do not seek treatment.

Living environment of the elderly can have a deeper impact in their well being. Deep Attachment to Home usually begins in childhood and can serve as a place of self expression, a vessel of memories and a place of refuge from the outside world (Marcus, 1997). Social changes have led elderly people resorting to institutionalized living arrangement which might have an impact on their well being.

Cognitive Behaviour Therapy is collaboration with the client, teaching them skills for questioning and re-evaluating negative automatic thoughts. A client with depression, whose depression is related to feelings of low self esteem, would be taught to avoid certain mental traps that lead to convictions of worthlessness and failure. Behavioural methods are used to challenge negative thoughts through the provision of compensatory positive experiences. Core beliefs are then challenged in the light of these new ways of thinking about and experiencing the world. The focus is on the 'here and now' and future behavioural change rather than a direct interrogation of difficulties in the past.

In Indian setting, elderly people seldom seek help for their mental health for various reasons. Teaching elderly people the skills to question and re-evaluate their thoughts especially in a cohort which is deprived of educational resource is considered a challenge. It is also widely misperceived that long held behaviour patterns might be an obstacle for acquisition of new adaptive behaviours.

The objective of this study was therefore to test the usefulness of cognitive behaviour therapy to enhance mental health of institutionalized elderly.

Method

Sample

Three Old Age Homes in Chennai were selected for the study using purposive sampling method. The inmates were contacted as small groups

and were informed about the research in general, and the time frame of the study; if they qualify to become a candidate of study, their oral consent was obtained. Those unwilling to participate, those who were reported by the caretakers to be suffering from some psychotic conditions, dementia, and those who had disability in basic personal care tasks like bathing, dressing, toileting, transferring, continence and feeding were excluded from the present study. A total of 201 elderly (151 females and 50 males) were selected for this study. Only very few had graduate level education, there were many illiterates and few who had just high school level of education.

Tools used

To assess the levels of Stress, Depression and General Well Being of these subjects Stress Inventory (SI Revised, Hemalatha and Nandhini, 2005), Geriatric Depression Scale – Short Form (15) (Sheikh and Yesavage, 1986) and WHO General Well Being Index (1998 version) were used respectively.

Design of research

‘Before, After and Follow-up with Wait List Control Group’ was the experimental design used in this study.

Participants who were interpreted to have “Very High Stress”, “High Stress”, “Mild”, “Moderate” and “Severe” Depression, and “Low General Well Being” were identified and in each institution these elderly were randomly assigned to Experimental (N=68) and Wait List Control Group (n=67). Cognitive Behaviour Therapy was given for 15 sessions for the experimental group which was extended over a period of 3 weeks. Each session lasted for forty five minutes to one hour. The study was conducted in 4 phases – Descriptive, Experimental, Post Experimental and Follow-up phase. Again reassessment was done after 3 weeks and follow-up was carried out after 3 months and the data was analysed. The randomly assigned 67 subjects in the Wait List Control group did not undergo any interventions. They were assessed Pre, Post and Follow-up without administering Cognitive Behaviour Therapy. After the entire study was completed they were given Cognitive Behaviour Therapy.

Cognitive Behaviour Therapy–15 Sessions

I. Conceptual Phase

In the conceptual phase, the researcher made the participants in the experimental group to understand the nature of stress, depression and how it takes its toll on the well being of them through oral presentations highlighting the role of cognition and by a process of guided self discovery. Beck (1976) postulated, “Cognitive Therapy consists of all of the approaches that alleviate psychological distress through the medium of correcting faulty conceptions and self signals”. According to him the most direct way to change dysfunctional thinking. Participants were therefore taught to recognize, observe, and monitor their own thoughts and assumptions, especially their negative automatic thoughts. The subjects were instructed to keep track of their pleasant and unpleasant events, they were helped to understand the relationship between their mood and these behaviours, look for changes that could be made in daily life, increase their social skills and be alert and try to change their negative thoughts about self.

II. Skills Acquisition Phase

In the skills acquisition phase, the elderly in the experimental group were asked to focus on situations when they were sad and depressed, identify the negative thoughts and beliefs and emotions associated to it, generate alternative thought, and reassess the emotions and beliefs. The participants of the present study were unable to keep a diary of their homework assignments, however they were asked to engage mentally with disputing their dysfunctional thinking pattern. Some of their dysfunctional thinking pattern were: “catastrophizing” that they will become “functionally disabled”, when the caretaker insists on healthy eating thinking that “I am helpless therefore they are infringing on my rights”, “Being healthy is not a big gift when I am not happy”, “I failed to bring up my son/daughter properly”, “My family didn’t want me so I will not be of any use for anybody”, “I should be in perfect health, otherwise I should rather die”.

A list of possible ‘cognitive errors’ was explained and put up as charts in the halls where they meet regularly so that it can be a prod for them to question them and generate alternatives with the help of caregivers and paramedics stationed in the old age homes. They were asked to generate a

gratitude list and include it in their daily prayer or recall it mentally when they retire into bed. Peterson and Seligman (2004) find that throughout life exercising human strengths and virtues such as generosity, humour, gratitude and zest are related to happiness. In a cultural milieu such as India elderly verbalize their feelings less frequently and tend to report of physical tiredness, sickness more frequently which is accepted as an expected course of occurrence in old age.

As they were not so comfortable with role plays and role reversal techniques, the elderly participants of this study were made to interact in small groups and in the larger group, express the feelings they went through at times of loss/difficulties, how they coped with and learned new behaviours which facilitated new learning for others in the group. They were also taught assertive skills such as use of 'I' messages, offering an alternative and Broken Record Technique.

They were made to take part in group exercises to enhance their self esteem such as forming small groups and asking each member to give as many positive comments about other members in the group, recall and narrate the most prestigious moment in their life, etc. They were given behavioural assignments such as reciting positive assertions as auto suggestions, complimenting fellow inmates, talking to others and focus on their conversation rather than withdrawing within themselves and focusing on their problems. Having close personal relationships contributes to a positive quality of life, improved health, and emotional well being – even more so than winning the lottery (Seligman and Csikszentmihalyi, 2000). They were also asked to walk for at least 10 minutes two times a day, take part as much possible in day to day chores of the Institution.

The subjects were asked to identify episodes of well being and locate them in their situational context, no matter how short lived they were. They were encouraged to identify the thoughts and beliefs that lead to the premature interruption of well being, but with the trigger for self observation being based on well being, rather than distress (Ruini and Fava, 2004). Mindfulness is also associated with a host of well being indicators (Brown and Ryan, 2003). Participants were also trained in being mindful of their thoughts and feelings.

They were also helped to focus on their self instructions through the process of self observation, monitor their negative self statements and imagery and make them increasingly sensitive to their thoughts, feelings,

actions, physiological reactions and ways of reacting with others. They were encouraged to start new internal dialogue one that is incompatible with their maladaptive behaviours (Meichenbaum, 1986). They were taught visual imagery technique. As a part of Stress Inoculation Programme the participants were given opportunities to deal with relatively mild stress stimuli in successful ways, so that they gradually develop a tolerance for stronger stimuli. They were posed with questions such as “How can I prepare for a stressor (e. g. falling sick)?”, “How can I confront and deal with what is stressing me?”, (“What are some ways I can handle a stressor?, How can I meet this challenge?”), “How can I cope with feeling overwhelmed?” (“What can I do right now?), How can I keep my fears in check?”, How can I make reinforcing self statements?” (“How can I give myself credit?”) (Meichenbaum, 1985). They were also encouraged to generate alternative thoughts which would help them to perceive the situation more in their control.

Relaxation Therapy

The elderly participants were taught relaxation skills to help them to relax and promote a positive attitude. As the focus is on breathing, unwanted thoughts are eliminated, helping them to relax. Relaxation Therapy involves 3 steps –Deep Breathing Practice, Relaxation Training and Auto Suggestions.

Greater happiness and emotional well being derive from positive attitudes such as “courage, future mindedness, optimism, interpersonal skill, faith, a work ethic, hope, honesty, perseverance and the capacity for flow and insight” in daily life. “People high in optimism tend to have better moods, to be more persevering and successful, and to experience better physical health” (Seligman and Csikszentmihalyi, 2000). Elderly participants were therefore asked to tell to themselves statements such as “I still have control over my situation”, “I love everyone and everyone loves me”, etc. when they were in the relaxed state and between sessions.

III Application and Follow-through Phase

In this phase the participants were monitored and encouraged to practice the skills learned during the sessions to be practised between sessions also.

Table 1
Mean and S.D.'S of Depression, General Well Being and Stress among the Experimental Group in the Before, After and Follow-up Sessions

N = 68

<i>Experimental Group</i>		<i>Mean</i>	<i>S. D.</i>
Depression	Before	7.62	3.67
	After	4.13	1.73
	Follow-up	3.32	1.48
General Well-being	Before	15.72	6.46
	After	20.38	3.54
	Follow-up	21.59	3.09
Stress	Before	13.54	4.78
	After	6.40	3.03
	Follow-up	5.56	2.51

Table.1 shows the Mean and S. D. scores of the variables Depression, General Well Being and Stress among the total sample of the experimental group in the Before, After and Follow-up sessions of Cognitive Behaviour Therapy. The scores indicate that the mean scores of Depression before therapy is 7.62, which is interpreted to be 'Mild Depression' had reduced considerably to 4.13 after therapy and further to 3.32 in the follow-up session which means that the subjects were free of depressive symptoms in the post intervention and in the follow-up session.

Mean and S.D. scores of General Well being shows that the experimental group subjects had a mean score of 15.72 before therapy which indicates their average level of General Well Being. This had increased to 20.38 in the after therapy and subsequently to 21.59 in the follow-up phase.

It further reveals that the 'High' Stress score (13.54) before therapy had drastically reduced to 6.40 after therapy and further to 5.56 in the follow-up phase. Cognitive Behaviour Therapy is proved to be efficacious in managing stress and depression and enhancing well being of elderly living in Institutions. The participants of the present study also exhibited commitment in carrying out between session assignments, which aided the progress, in spite of them not being able to maintain diary/journal. Some participants even acted as facilitators by motivating their friends' between sessions in helping them monitor their thought processes and behaviours.

Table 2
'F' value of Depression, General Well Being and Stress among the Total Sample of the Experimental Group

N = 68

<i>Experimental Group</i>		<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>
Depression	Between Groups	708.13	2	354.06	57.08**
	Within Groups	1,246.75	201	6.20	
General Well Being	Between Groups	1,305.95	2	652.98	30.66**
	Within Groups	4,280.22	201	21.30	
Stress	Between Groups	2,619.09	2	1,309.54	102.58**
	Within Groups	2,565.91	201	12.77	

** = Significant at 0.01 level

Table 2 shows 'F' values for the variables Depression, General Well Being and Stress among the total sample of the experimental group in the Before, After and Follow-up sessions of Cognitive Behaviour Therapy. It is found that there is significant difference between Before, After and Follow-up sessions for all the three variables studied – Depression, General Well Being and Stress proving the therapy to be very effective.

Table 3
Post-hoc Analysis for Before, After and Follow-up of Depression, General Well Being and Stress among the Total Sample of the Experimental Group

N = 68

<i>Variables</i>	<i>Group</i>	<i>Mean</i>	<i>S.D.</i>	<i>Before</i>	<i>After</i>	<i>Follow-up</i>
Depression	Before	7.62	3.67	-	**	**
	After	4.13	1.73	**	-	NS
	Follow-up	3.32	1.48	**	NS	-
General Well Being	Before	15.72	6.46	-	**	**
	After	20.38	3.54	**	-	NS
	Follow-up	21.59	3.09	**	NS	-
Stress	Before	13.54	4.78	-	**	**
	After	6.40	3.03	**	-	NS
	Follow-up	5.56	2.51	**	NS	-

** = Significant at 0.01 level

Table 3 indicates Duncan's Post-hoc test results which show significant difference among the total sample of the experimental group in the Before, After and Follow-up sessions of Cognitive Behaviour Therapy in all the three variables studied – Depression, General Well Being and Stress. Depression level had considerably decreased, General Well Being had markedly increased and Stress level had significantly come down proving the therapy to be efficacious. This corroborates with the evidence provided by an earlier study (Gallagher-Thompson, 1982, Gallagher, *et al.*, 1990) that cognitive therapy, suitably fitted to individual's abilities and needs, is a viable and potentially effective treatment for depressed older people.

Table 4
Mean and S. D.'S of the Depression, General Well Being and Stress in the Pre, Post and Follow-up Sessions among the Total Sample of the Wait List Control Group

<i>Wait List Control Group Total Sample</i>		<i>N</i>	<i>Mean</i>	<i>S. D.</i>
Depression	Pre	67	8.51	3.07
	Post	67	8.52	2.73
	Follow-up	67	8.75	2.55
General Well Being	Pre	67	14.66	5.04
	Post	67	14.52	4.16
	Follow-up	67	14.34	4.03
Stress	Pre	67	12.72	4.14
	Post	67	13.69	3.53
	Follow-up	67	14.46	3.39

Table 4 shows the Mean and SD scores of the variables Depression, General Well Being and Stress among the total sample of the Wait List Control Group in the Pre, Post and Follow-up sessions. The scores indicate that the mean score of Depression in the Pre test phase is 8.51, which almost remains the same in the Post and Follow-up sessions. The reduction in symptoms of depression reported by the experimental group may therefore be attributed to the effects of therapy.

Gallagher and Thompson's (1982) provide support for the efficacy of Cognitive Behaviour Therapy in elderly. They found no differences at the end of treatment between cognitive therapy, behaviour therapy, and insight oriented dynamic psychotherapy in a sample of elderly depressed outpatients,

although differences at a one year follow-up favoured the two cognitive behavioural interventions. In a subsequent study, Thompson, *et al.*, (1987) again found no differences among cognitive, behavioural and dynamic interventions in an elderly population and all three of these treatments were superior to a waiting list control.

The Mean and SD scores of General Well Being shows that the wait list control group subjects had a mean score of 14.66 in the Pre-test which did not undergo significant changes in the post-test and follow-up sessions. It is also seen from the Table 4, that the Stress score of 12.72 interpreted to be High in the Pre test slightly increased in the Post test and further increased slightly in the follow-up phase.

Since the Wait List Control Group did not show any significant reduction of Depression and Stress symptoms and significant increase in their level of well being it may be concluded that these effects observed in the experimental group which was due to the therapy.

Table 5
'F' Value of Depression, General Well Being and Stress among the Total Sample of the Wait List Control Group

N= 67

Wait List Control Group		Sum of Squares	df	Mean Square	F
Depression	Between Groups	2.40	2	1.20	0.15 NS
	Within Groups	1,544.15	198	7.80	
General Well Being	Between Groups	3.31	2	1.66	0.08 NS
	Within Groups	3,890.93	198	19.65	
Stress	Between Groups	102.58	2	51.29	3.74*
	Within Groups	2,712.69	198	13.70	

NS = Not significant

* = Significant at 0.05 level

Table 5 shows the 'F' value of Depression, General Well being and Stress among the total sample of the Wait-list Control group in the Pre, Post and Follow-up sessions. It is found that the 'F' values do not differ significantly for the variables Depression and General Well-being. There is a significant difference in the variable Stress between the Pre, Post and Follow-up sessions of the wait-list control group. However, the mean scores reveal that there is an increase in the level of stress in the Post and Follow-up sessions which indicate that without therapy stress level may

escalate. Individuals who are faced with stressors that threaten their emotional well being will engage in cognitive appraisal of the threats and challenges and adopt coping strategies to manage specific external and/or internal demands (Lazarus, 1999; Lazarus and Folkman, 1984). The inmates in the wait list control group did not benefit as their counterparts in the experimental group by learning to appraise the resources available to them and their actual ability to cope in their present situation which might have led to the increase their level of stress. It has been documented that stressors can be responsible for increasing the risk of developing depression in the elderly population (Ahn, 2006).

Table 6
Post Hoc Analysis for Pre, Post and Follow-up of Depression, General Well Being and Stress among the Total Sample of the Wait List Control Group

N = 201

<i>Variables</i>	<i>Group</i>	<i>Mean</i>	<i>S.D.</i>	<i>Pre</i>	<i>Post</i>	<i>Follow-up</i>
Depression	Pre	8.51	3.07	-	NS	NS
	Post	8.52	2.73	NS	-	NS
	Follow-up	8.75	2.55	NS	NS	-
General Well Being	Pre	14.66	5.04	-	NS	NS
	Post	14.52	4.16	NS	-	NS
	Follow-up	14.34	4.03	NS	NS	-
Stress	Pre	12.72	4.14	-	NS	*
	Post	13.69	3.53	NS	-	NS
	Follow-up	14.46	3.39	*	NS	-

NS = Not Significant

* = Significant at 0.05 level

Table 6 indicates Duncan's Post-hoc test results among the total sample of the wait list control group in the Pre, Post and Follow-up sessions. There is no significant difference in the variables – Depression, General Well Being. In the level of Stress there is an increase and it is found to be significant.

Conclusion

Thus in conclusion, it is found that cognitive behaviour therapy is a useful tool for enhancing the mental health of elderly living in institutions. In spite of the challenge of not being able to keep a written record of their thoughts the participants were able to actively access and dispute their

dysfunctional thinking pattern, they learned to express their feelings and learned new behaviours. Relaxation Techniques helped them to get better sleep and reduce their physical symptoms. Positive Self Talk and including gratitude list in their daily prayer had a positive effect on their General Well Being.

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Influence of Stress on Psychological Well-Being Among Old Age

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ABSTRACT

The aim of this study was to identify stress and psychological wellbeing of adult and old age people. To find out the relationship between stress and psychological well-being of adult and old age people. The sample of this study consisted of 120 persons—60 adults (Male and Female) were selected randomly from office sector and 60 elderly persons (Male and Female) were also selected randomly from old age homes. To measure the stress a stress scale-DASS-21(Depression Anxiety Stress Scale) by Lovibond and Lovibond, (1995) was used. And for measuring Psychological well-being, Psychological well-being questionnaire by Sudha Bhogale, (1995) was used. 't'-test was applied to analyze the differences in the scores of the adult and old age people. To check the correlation between the scores of Stress and Psychological well-being the Karl-Pearson 'r' method was used. The findings of the study revealed that there was a significant difference in stress and psychological wellbeing among adult and old age persons. The negative correlation between stress and psychological wellbeing indicates, that higher the stress lower the psychological wellbeing and lower the stress higher the psychological wellbeing.

Key words: Stress, Psychological well-being, Adult, Old age.

Health and psychological wellbeing are closely related to old age people Stress is one of the most important factor to influence the

psychological wellbeing. Stress is the emotional and physical response you experience when you perceive an imbalance between demands placed on you and your resources at a time when coping is important. If you perceive the situation or event as threatening or overwhelming your coping abilities, you will probably feel a lot of stress.

According to Mirowsky and Rose (1989), the higher level of stress is due to poverty, lack of education, minority status, being female, being unmarried and other social factors leading to fewer opportunities in life.

In many research explained about older persons, who perceived undesirable events or chronic strains, such as reduced income, illness, loneliness, loss of spouse, loss of driving license, significant frustration. So very difficult to maintain normal adult life style, desired activities, dissatisfaction one particular life domains, difficult to reach gratification in social relationship. Importantly, your perception of how negative an outcome could be will significantly determine what degree of stress you experience. The difference between the demands of the situation and your perception of how well you can cope with that situation is what determines how much stress you will feel.

Signs and Symptoms of Stress

The signs and symptoms of stress of old age can range from a major physical crisis like a heart attack, to more minor symptoms like tiredness and disrupted sleep patterns. The more serious stress-related problems usually emerge in the context of prolonged periods of exposure to intense stress.

Physiological Symptoms

- Increased pulse rate and blood pressure
- Shallow, rapid respirations
- Excessive perspiration, clamminess

Subjective Symptoms

- Tiredness, fatigue, Disrupted sleep patterns
- Constipation, diarrhea
- Muscular tension
- Dry mouth

- Decreased libido

Behavioral Symptoms

- Increased use of alcohol or other drugs
- Loss of appetite, overeating, indigestion
- Irritability and impatience
- Frequent worry and anxiety
- Moodiness, feeling sad or upset
- Poor concentration, memory lapses
- Ambivalence

The Stress Process According to the Transactional Model of Stress

The wider contents of the stress process in context of the interactional/transactional approach has been defined as including the following five stages: Demands the person have to comply with; the individual's perception of these demands; psycho physiological changes; outcome of coping action or response by individual; and feedback and feed forward response.

Stage 1

This stage is recognized by the origin of the demand with direct relation to the person, integrated with his/her environment. In this case the demand can be perceived as part of the external environment, the fulfillment of these needs constitute a person's behavior.

Stage 2

The person's perception of the demand, as well as the individual ability to cope, forms part of Stage 2. It is believed that stress can be the result of an imbalance between the perceived demand and the person's perception of his capability to meet the demand. Therefore, the emphasis is placed on a person's cognitive appraisal of the stressful situation at hand and his ability to cope. The person will thus experience stress, or an imbalance, when he perceives that his limitations have been reached, In other words the direct result of psycho physiological changes.

Stage 3

The psycho physiological changes, as mentioned above, is considered as the next stage and characterized by the person's response to stress. Although this stage is often seen as the result of a demand or stressful situation. It should in fact be regarded as the individual's coping skills, either positive or negative. The noted response of an individual to stress and means of coping with the demands enforced by the stressors are discussed in more detail in two separate sections to follow.

Stage 4

The outcome of the coping action or response displayed by the individual is also an easily forgotten, but most essential part of the stress process. It is here that the actual, as well as perceived, outcome should be considered. The concern is therefore mainly focused on the consequences of coping.

Stage 5

The fifth and final stage of the model is considered as the feedback and feed forward response, not only as a final result after the consequences have occurred, but in fact at the level of all preceding stages. The outcome of each stage can thus be shaped accordingly if this fifth stage is implemented in the correct manner.

Cannon's Fight-or-Flight Response

Cannon, Walter (1932) theorized the existence of this response during the earlier stages of stress research. His work documented the release of hormones in an animal subjected to shock or a perceived threat (Taylor, 1999). This same response applied to humans throughout the ages. Something as simple as an unexpected encounter can elicit the fight-or-flight response. People may also experience this response when frustrated or interrupted, or posed with an unfamiliar or challenging situation.

Selye's General Adaptation Syndrome

Hans Selye (1952) however, took a different approach to that of Cannon. He observed that various illnesses and injuries to the body appeared to cause similar symptoms in patients. He identified a general

response known as the General Adaptation Syndrome. According to this response, the body reacts to a major stimulus. While the fight-or-flight response is more focused on the short term, this second response occurs as a result of long-term exposure to stress.

Psychological well being

The Disengagement theory by Cumming and Henry (1961) states that ageing is a mutual withdrawal, inevitable or disengagement; resulting in decreased interaction between the ageing person and others in the social system he belongs to'. Disengagement theory assumes that social involvement decreases with ageing and that successful ageing is best achieved through abandoning social roles and relationships and by the individual reducing both activities and involvement. Diener *et al.*, (1999) states the elderly population need for social connections. Decline of social connection is considered one of the various interrelated factors which compose well-being among the elderly.

Berkman and Cohen (2004) claim that social isolation is a phenomenon with serious health consequences. Hence, Tamra (2008) point out that the elderly are affected by social isolation in a qualitatively similar way to younger adults, with typical isolation effects.

Nicholson (2008) also mentioned, the socially isolated elderly are among the risk group for myriad other negative health consequences, such as poor nutrition, rehospitalization, cognitive decline and heavy alcohol consumption. Therefore, social isolation has a not ignorable influence on elderly well-being. Much research has explained about old age care. Such as Nayar (1992) states that, most of the countries family is the major source of care giver for the elderly people. So the family is the major role for economic, psychological, social and physical support for the elderly people.

Effect of Stress on Psychological well being

Well-being is related with numerous health conditions like job, family, and economically related benefits. For example, higher levels of well-being are associated with decreased risk of disease, illness, and injury and better immune functioning, immediate recovery and increased longevity.

Soldo and Agree (1988) state the ability of the old age people to cope with the changes in health, income and social activities, etc. The old age people great extent and expect support from his her family members. In

India the cultural values emphasize that the elderly members of the family be treated with honor and respect. At any age, the family provides the individual, the emotional, social and economic support.

There is clean and clear evidence and connection presents between stressful event and psychological well being of mental health outcomes to varying degrees (Avison and Gotlib, 1994; Gatz, 1992). According to Pelletier 2004 well being of elderly is related to health status and personality. Psychological well-being is plays as a vital dimension of the elderly quality of life (Perry amd Felce, 1995). Psychological well-being is generated by two dimensions which are absence of depression and emotional loneliness; and presence of happiness, life satisfaction, feeling of security, and plans for the future (Savikko, 2008).

The physical activities also can reflect on well-being (Van Boxtel, *et al.*, 1996; Gauvin and Spence, 1996). Many studies have explained, not only physical activity which contributes to wellbeing, but that activities of a social, productive or intellectual nature also have significant role to get better wellbeing. Meanwhile, recent research also showed that listening to music is a common leisure activity encountered in everyday situations, and that listening to music through a variety of strategies are a frequent source of positive emotions for the elderly. Consequently, music is also considered an effective means for decreasing stress-related arousal reactions and maintaining well-being (Pelletier, 2004).

The Objectives of the Study

1. To study about stress and psychological well-being among adult and old age.
2. To assess the stress and psychological well-being among adult and old age.

Hypotheses

1. There is no significance difference in stress among adult and old age.
2. There is no significance difference in psychological well-being among adult and old age.
3. There is no significance correlation between stress and psychological well-being among adult and old age.

Methodology

Sample

Sample in this study consisted of 120 subjects (60 adults – age 20 yrs. to 57 yrs. and 60 elderly age varying from 60 yrs. and above from Trichy city, Tamilnadu.

Research Tools

(a) Personal Data Sheet

A personal data sheet developed by the investigator was used to collect the information about adult and old age.

(b) DASS-21 (Depression Anxiety Stress Scale)

The DASS-21 scale was made by Lovibond and Lovibond (1995). This was designed to measure the common symptoms of Depression, Anxiety and Stress. The short form version scale consists of 21 item (the long form has 42 items). Each item is scored from 0 to 3 (Never, Sometimes, Often, Almost always) the final score of each item groups need to multiply by two. The Cronbach's α of stress in DASS-21 is .82 (92% CI .80–.83).

(c) Psychological well-being scale

Psychological well-being scale was made by Bhogle (1995). It consists of 28 items and 12 dimensions. In this scale, positive and negative types of items are included. In positive questions '1' score awarded for every 'yes' response and '0' score awarded every 'no' response. In negative questions '0' score awarded for every 'yes' response and '1' score awarded every 'no' response. Reliability of this scale is 0.85. This is very high validity of this scale seen high.

Statistical Analysis

SPSS was used to analyse the data.

Sample Size.

The total sample consists of 120 equally drawn from adult and old age. It was taken at Trichirappalli.

Research Design

The aim of the research was to study on stress and psychological well-being among adult and old age. For these 120 samples were taken out of which 60 were adult and 60 were aged. Here to measure stress, DASS-21 Scale (Lovibond and Lovibond, 1995) was used. For psychological well-being, Psychological Well-being Scale (Bhogle, 1995) was used. To check the difference between groups 't' test and karl-pearson 'r' method was used to check the correlation.

Results

Table No.1
To measure the significance difference on stress among adult and old age

<i>Group</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>Sig. level</i>
Adult (20 to 59yrs)	60	12.43	6.95	26.39**	0.01
Old age (60) and above)	60	38.20	2.96		

** at the significant 0.01 level

To see the table no.1 explained the old age people received high mean score of stress 38.20 as compared to the adult 12.43 with the standard deviation 6.95 and 2.96. The t-value 26.39 is significant at 0.01 levels. Old age people have more stress as compared adult. So we can say 1st hypothesis was not accepted.

Table 2
To measure the significance difference on psychological well-being Among adult and old age

<i>Group</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>Sig. level</i>
Adult (20 to 59yrs)	60	19.63	3.849	11.89**	0.01
Old age and above (60	60	12.60	2.485		

** at the significant 0.01 level

To see the table no.2 explained the adult received high mean score of psychological wellbeing 19.63 as compared to the old age people 12.60 with the standard deviation 2.48 and 3.84. The t-value 11.89 is significant at 0.01

levels. Adult is more psychological wellbeing as compared old age people. So we can say 2nd hypothesis was not accepted. So we can say 2nd hypothesis was not accepted.

Table 3

To measure correlation between stress and psychological well-being Among adult and old age

<i>Variables</i>	<i>N</i>	<i>M</i>	<i>r</i>	<i>Sig. level</i>
Stress	120	25.76	-0.77**	0.01
Psychological well-being	120	7.03		

** Correlation is significant at the 0.01 level

According to table No.3 the results obtain the negative correlation between stress and psychological wellbeing. That is -0.77 negative correlation between stress and psychological wellbeing among adult and old age people. That indicates stress increases psychological wellbeing decreases and stress decreases psychological wellbeing increases. So we can say 3rd hypothesis was not accepted.

Discussion

In this study the old age people has high stress and low psychological wellbeing. Basically the elderly people are became neglected. Because they are facing different types of problems. Like stress from outside, frail health condition, improper care by the family members, also negligence by the care givers, due to urbanization, As a result they, become more vulnerable in physically and mentally. So the elderly people getting more perceived stress than the younger. The old age people expecting hospice care to follow the activities of daily living and run through the life peacefully. For instance engaging people with stress in social, creative, or other activities they find interesting also can be helpful. Also the government, non government organisation should communicate with older people and help them for health issues, financial support, and concerns about being a burden to others. In addition, many of them are experience with spiritual activities, It can be benefits for many older people who believe in God or some transcendental reality. Some elders find that meditations of their stress. Many therapies include problem solving, cognitive behavioral, and interpersonal, all of which require specialized training. In addition to the verbal aspects of these therapies, they often involve education and support

in managing anxiety in structured ways, also some relaxation training such as autogenic relaxation, sleep hygiene, and deep breathing exercises, which gives stress free life and can run through the life very fruitfully.

Conclusion

There were significant difference in stress and psychological well being among adult and old age people. There were -0.77 negative correlations are seen between stress and psychological well being.

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Dietary Practice of Elderly Women and its Association with their Nutritional Status

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ABSTRACT

The aim of this study was to check the dietary practices of elderly women and to find out the relationship of it with their nutritional status. A cross sectional study was carried out among 365 elderly (=60 years) women of Kolkata, India, who were either inmates of old-age homes or who were living otherwise. Nutritional status was assessed by Mini Nutritional Assessment (MNA) questionnaire and the dietary practices were recorded using pre-tested self-structured Food Frequency Questionnaire (FFQ). According to MNA scores 96 (26.3%) participants had normal nutritional status, 197 (54%) participants were at risk of malnutrition and 72 (19.7%) participants were malnourished. A significant association ($p < 0.05$) was found among MNA and protein rich food intakes as well as energy rich food intakes for both old-age homes and free living participants. The data was analysed statistically and it was found that there is no significant difference ($p > 0.05$) between protein rich food intakes and energy rich food intakes of both old-age homes and free living participants. On the basis of present findings it may be

concluded that dietary practices of the elderly participants were significantly associated with their nutritional status and practice of protein and energy rich food consumption was not significantly associated with their living environment.

Key words: Elderly women, Dietary practice, Nutritional status, MNA, India

Loss of skeletal muscle is often seen in ageing. It is also associated with increased risk of falls, low quality of life and increasing mortality in advanced age (WHO, 2002; Mori H and Tokuda Y., 2017; Morley J.E. *et al.*, 2010). A healthy diet is often seen to be beneficial in old age. It is found that consumption of fruits, vegetables and protein rich foods helps to reduce disabilities and mortality among the older adults (Neville CE *et al.*, 2013; Alves Valle, *et al.*, 2016). Healthy diet is also beneficial for their cognition and overall mental health (Alves Valle, *et al.*, 2016; Amarya S *et al.*, 2015). It is also found that consumption of protein rich foods along with physical and exercise prevents loss of muscular strength and increases physical function (Mori H and Tokuda, Y., 2017; Morley, J.E., *et al.*, 2010; Montero-Fernandez Serr-Rexach, *et al.*, 2013). Researchers have found that intake of adequate amount of protein rich food stimulates the secretion of insulin-like growth factor 1 (IGF-1) which is found lower among the elderly. This factor is believed to be associated with the rate of protein synthesis (Gille, D, 2010). In advanced age protein energy malnutrition is often seen widely which essentially results from decreasing food intake and increasing catabolism (Torres M J, *et al.*, 2014; Nazemi, L *et al.*, 2015; Mathew, *et al.*, 2016). Plasma concentrations of both essential and non-essential amino acids are found to decrease with protein energy malnutrition in old age (Caballero, B. *et al.*, 1991; Polge A *et al.*, 1997). Decrease in food intake is associated with neoglucogenesis and hypermetabolism and these have adverse effect on muscle protein (Polge, A *et al.*, 1997). Loss of muscle protein along with weight loss also seen in under-nutrition (Amarya, S, *et al.*, 2015; Gille, D, 2010). It is also associated with infectious diseases and decreased immunity (Basu, I. *et al.*, 2011; Lu J. *et al.*, 2016).

The study was conducted to find out the dietary practice of elderly women in Kolkata and to assess its relationship with their nutritional status, if any.

Methods

Sample and Data Collection

Total 365 elderly (= 60 years) women (196 from old age homes and 169 free living) participated in the study. Apparently healthy elderly women not suffering from any kind of serious illness or cognitive impairment were randomly selected in this study.

The purpose and objectives of the study were carefully and clearly explained to them. All of them signed consent form before data collection. Thus their participation was strictly voluntary. The study was conducted between March, 2011 to December, 2014

Ethical clearance: The study was approved by Bioethics committee for Animal and Human Research Studies, University of Calcutta (No. BEHR/1099/2304).

Assessment of nutritional status: Nutritional status of the participants was assessed by revised long version of Mini Nutritional Assessment (MNA[®]) questionnaire. This tool can assess nutritional status of elderly people. According to Murphy, *et al.*, 2000 and Vellas *et al.*, the scores of MNA show normal nutritional status (24–30 points), at risk of malnutrition (17–23.5 points) and malnourished (< 17 points).

Dietary assessment: To obtain diet related information like their weekly intake of foods from different food groups a self-structured and pre tested Food Frequency Questionnaire (FFQ) was used. The questionnaire has total 21 questions based on seven day food intake practice. All participants were asked to answer the questions according to their food intake. Foods were ranked according to their protein content 100 g edible portion and calorific value/100 g edible portion as per the Indian Council of Medical Research expert body (Gopalan C, 2012) in order to obtain their protein score and energy score. Protein scores and energy scores of different foods are therefore indicative of their protein and energy contents, respectively. Frequencies of intake (recalled by the participants) of all the foods were multiplied with the rank scores as shown in the following equations:

Total score of protein

$$= \Sigma(\text{PS}_a \times f_a) + (\text{PS}_b \times f_b) + (\text{PS}_c \times f_c) + \dots \dots \dots (\text{PS}_n \times f_n)$$

Where, PS = Protein Score

a, b, c n = Different foods

f = Frequency of consumption in a week

Total score of calorie

$$= \Sigma(ES_a \times f_a) + (ES_b \times f_b) + (ES_c \times f_c) + \dots (ES_n \times f_n)$$

Where, ES = Energy Score

a, b, c n = Different foods

f = Frequency of consumption in a week

For frequency coding, daily/4–6 days was coded as 2, 1–3 days was coded as 1 and occasional/never was coded as 0.

Statistical analysis: At first all data were entered in to Microsoft excel worksheet. Data were checked for the presence of any kind of possible errors or missing values in the work sheet. Data were transferred into SPSS version 19.0 (Statistical Package for Social Sciences) and Epi Info version 3.2 for further analysis. Normality of the data was checked by Kolmogorov Smirnov test and skewed distribution was found (p value became significant). Data were expressed as median and IQR (Inter Quartile Range). Correlations between protein score/energy score and nutritional status were assessed by Spearman's rho. Kruskal Wallis test was done to check the relation between three sets of independent data. Chi-square test was done to assess the significant relationship between the categorical variables. Mann-Whitney U test was performed to compare the differences between two mean/median values of two independent variables. For statistical significance p value = 0.05 was considered.

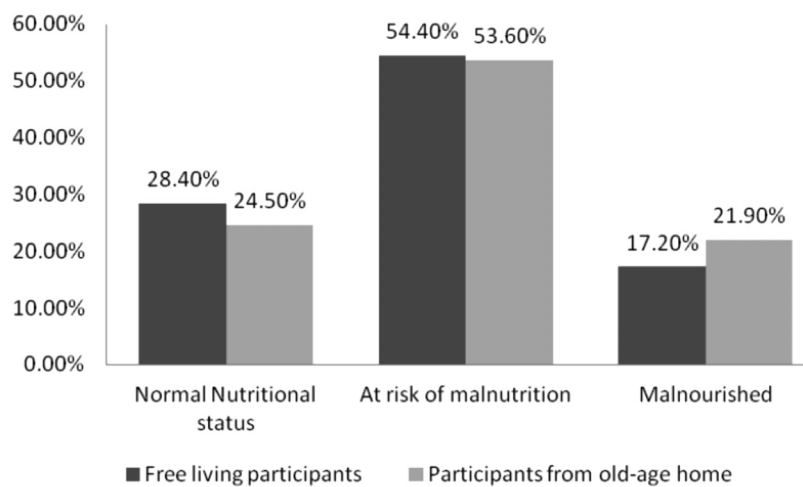
Result

The median age of the elderly participants was 70 (IQR $\pm$ 12) years. According to MNA score, out of 365 elderly women 96 (26.3%) participants had normal nutritional status, 197 (54%) were at risk of malnutrition and 72 (19.7%) were malnourished.

Distribution of elderly women according to their nutritional status has been shown in Fig.1. 28.4 per cent of the free living participants and 24.5 per cent of the participants from the old-age homes had normal nutritional status. In the 'at risk of malnutrition' 54.4 per cent of the free living participants and 53.6 per cent of the participants from the old-age homes were fallen in this group. In the malnourished group 17.2 per cent free living participants were malnourished and 21.9 per cent participants from the old-age homes were malnourished. From Pearson's Chi-square test no

significant association ($p > 0.05$) was found between the nutritional status of the free living and old-age home participants.

Figure 1
Distribution of the elderly women according to their nutritional status (N=365)



Pearson's Chi-square (χ^2) = 7.66, df= 4, $p = 0.105$

Food consumption practice of the participants from both old-age homes and free living has been shown in Table 1.

Table 1
Distribution of the elderly participants according to their food consumption practice (N=365)

<i>Food consumption practice</i>	<i>Old-age home (N= 196) No (%)</i>	<i>Free living (N=169) No (%)</i>	<i>p value</i>
Vegetarian and Non-vegetarian classification			
Vegetarian	33 (16.8)	19 (11.2)	0.12
Non-vegetarian	163 (83.2)	150 (88.8)	
Frequency of rice consumption			
Daily/4–6 days in a week	196(100)	167(98.8)	NA

Cont'd...

Cont'd...

1–3 days in a week	0(0)	1(0.6)	
Occasional/Never	0(0)	1(0.6)	
Frequency of chapatti (hand-made bread) consumption			
Daily/4–6 days in a week	13(6.6)	128(75.7)	0.000*
1–3 days in a week	166(84.7)	18(10.7)	
Occasional/Never	17(8.6%)	23(13.6%)	
Frequency of paratha (fried hand-made bread) consumption			
Daily/4–6 days in a week	2(1)	6(3.5)	0.02*
1–3 days in a week	58(29.6)	67(39.6)	
Occasional/Never	136(69.4)	96(56.8)	
Frequency of puffed rice/semolina/other cereal products consumption	122(62.2)	102(60.4)	0.07
Daily/4–6 days in a week	37(18.9)	46(27.2)	
1–3 days in a week	37(18.9)	21(12.4)	
Occasional/Never			
Frequency of pulses consumption			
Daily/4–6 days in a week	181(92.2)	114(67.5)	0.000*
1–3 days in a week	6(3)	44(26)	
Occasional/Never	9(4.6)	11(6.5)	
Frequency of green leafy vegetable consumption			
Daily/4–6 days in a week	5(2.5)	45(26.6)	0.000*
1–3 days in a week	127(64.8)	87(51.5)	
Occasional/Never	64(32.7)	37(21.9)	
Frequency of vegetables other than green leafy vegetable consumption			
Daily/4–6 days in a week	194(99)	161(95.3)	0.31
1–3 days in a week	1(0.5)	5(2.9)	
Occasional/Never	1(0.5)	3(1.8)	
Frequency of potato consumption			
Daily/4–6 days in a week	175(89.3)	135(80)	0.000*
1–3 days in a week	2(1)	17(10)	
Occasional/Never	19(9.7)	17(10)	
Frequency of fruit consumption			
Daily/4–6 days in a week	53(27)	56(33.1)	0.04*
1–3 days in a week	47(28)	52(30.8)	
Occasional/Never	96(49)	61(36)	
Frequency of nut consumption	10(5.9)	14(8.2)	0.000*

Cont'd...

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Daily/4–6 days in a week	21(10.7)	39(23.1)	
1–3 days in a week	165(84.2)	116(68.6)	
Occasional/Never			
Frequency of milk consumption			
Daily/4–6 days in a week	72(36.7)	44(26)	0.02*
1–3 days in a week	35(17.8)	24(14.2)	
Occasional/Never	89(45.4)	101(59.7)	
Frequency of curd/yogurt consumption			
Daily/4–6 days in a week	37(18.9)	22(13)	0.28
1–3 days in a week	46(23.5)	46(27.2)	
Occasional/Never	113(57.6)	101(59.7)	
Frequency of chaana/paneer/cottage cheese consumption			
Daily/4–6 days in a week	6(3)	1(0.6)	0.2
1–3 days in a week	40(20.4)	39(23)	
Occasional/Never	150(76.5)	129(76)	
Frequency of sweet/dessert consumption			
Daily/4–6 days in a week	24(12.2)	24(14.2)	0.21
1–3 days in a week	38(19.4)	44(26)	
Occasional/Never	134(68.4)	101(59.8)	
Frequency of butter/ghee consumption			
Daily/4–6 days in a week	8(4)	12(7.1)	0.04*
1–3 days in a week	27(13.8)	37(21.9)	
Occasional/Never	161(82.1)	120(71)	
Frequency of egg consumption			
Daily/4–6 days in a week	4(2.4)	10(6.7)	0.17
1–3 days in a week	87(53.4)	73(48.7)	
Occasional/Never	72(44.2)	67(44.6)	
Frequency of fish consumption			
Daily/4–6 days in a week	100(61.3)	68(45.3)	0.000*
1–3 days in a week	37(22.7)	67(44.7)	
Occasional/Never	26(16)	15(10)	
Frequency of chicken/mutton consumption			
Daily/4–6 days in a week	0(0)	1(0.6)	0.61
1–3 days in a week	50(30.7)	49(32.6)	
Occasional/Never	113(69.3)	100(66.75)	

Cont'd...

Cont'd...

Frequency of tea/coffee consumption	187(95.4)	154(91.1)	0.09
Daily/4–6 days in a week	0(0)	0(0)	
1–3 days in a week	9(4.6)	15(8.9)	
Occasional/Never			
Consumption of water			
< 1.5 lit day	54(27.5)	53(31.4)	
= 1.5 lit day	142(72.5)	116(68.6)	0.42

* Statistically significant.

83.2 per cent and 88.8 per cent participants were non-vegetarian from old-age homes and free living, respectively.

Daily or 4–6 days/week rice consumption was 100 per cent and 98.8 per cent for elderly of the old-age homes and free living, respectively. Daily or 4–6 days/week puffed rice consumption was 62.2 per cent and 60.4 per cent for the elderly of old-age homes and free living participants, respectively ($p > 0.05$), while fried handmade chapatti or paratha consumption was 1–3 days/week was 29.6 per cent and 39.6% ($P < 0.05$), respectively for these two groups. 75.7 per cent free living and 6.6 per cent old-age home elderly women consumed chapati daily or 4–6 days/week, respectively ($P < 0.05$).

92.2 per cent participants in old-age homes consumed pulses daily or 4–6 days in a week, for free living participants same was 67.5% ($p < 0.05$).

64.8 per cent old-age home participants and 51.5 per cent free living participants consumed green leafy vegetables for 1–3 days/week ($p < 0.05$). 99 per cent old-age home participants and 95.3 per cent free living participants consumed vegetables other than green leafy vegetables ($p > 0.05$). 89.3 per cent old-age homes participants and 80.0 per cent free living participants consumed potato either daily or 4–6 days/week ($p < 0.05$).

Daily or 4–6 days/week fruit consumption was 27 per cent and 33.1 per cent for old-age home and free living participants, respectively ($p < 0.05$).

45.4 per cent and 59.7 per cent old-age home and free living participants consumed milk occasionally or never ($p > 0.05$). Consumption of curd or yogurt occasionally or never was 57.6 per cent and 59.7 per cent for old-age home and free living participants, respectively ($p > 0.05$). Channa or

paneer was occasionally or never consumed by 76.5 per cent and 76 per cent old-age homes and free living elderly women, respectively ($p > 0.05$).

For old-age home and free living participants occasional or never consumption of sweet was found to be 68.4 per cent and 59.8 per cent, respectively ($p > 0.05$).

Occasional or never consumption of ghee or butter was 82.1 per cent and 71 per cent for old-age home and free living participants, respectively ($p > 0.05$).

44.2 per cent of the old-age home residents and 44.6 per cent of the free living participants consumed egg occasionally or never ($p > 0.05$), while 69.3 per cent old-age home residents and 66.7 per cent free living participants consumed chicken or mutton occasionally or never ($p > 0.05$). However, 61.3 per cent old-age home participants and 45.3 per cent of free living participants consumed fishes daily or 4–6 days/week ($p < 0.05$).

72.5 per cent old-age home participants and 68.6 per cent free living participants drank =1.5 liters water daily ($p > 0.05$).

In table 2 results from association of the nutritional status with protein scores and energy scores of the old-age homes participants have been described. Significant correlation has been found to exist between nutritional status protein scores and energy scores ($p < 0.05$). Significant difference was also found between the median values among the three nutritional status (Kruskal Wallis test) for both protein and energy scores.

Table 2
Association of nutritional status with protein score and energy score of old-age home participants (N= 196)

<i>Nutritional status</i>	<i>Protein score Median $\pm$ IQR</i>	<i>Energy score Median $\pm$ IQR</i>
Normal nutritional status (n= 48)	49.0 $\pm$ 18.2	52.0 $\pm$ 19.3
At risk of malnutrition (n= 105)	43.0 $\pm$ 13.0	44.0 $\pm$ 12.0
Malnourished (n= 43)	46.0 $\pm$ 26.5	46.0 $\pm$ 16.5
Correlation co-efficient (Spearman's rho)	rho= 0.191 (p = 0.000*)	rho = 0.161 (p= 0.024*)
Kruskal Wallis	8.777	6.659
Chi-square test	(p= 0.012*)	(p= 0.036*)

* Statistically significant

In table 3 results from association of nutritional status, protein scores and calorie scores of free living participants have been described. Here protein scores and energy scores were found to significant with their nutritional status ($p < 0.05$). A significant difference was found between median values among the three nutritional status (Kruskal Wallis test) for energy scores ($p < 0.05$), whereas no significant difference was found among median values for protein scores across the three nutritional status.

Table 3
Association of nutritional status with protein score and energy score of free living participants (N= 169)

<i>Nutritional status</i>	<i>Protein score Median $\pm$ IQR</i>	<i>Energy score Median $\pm$ IQR</i>
Normal nutritional status (n= 48)	45.0 $\pm$ 19.5	52.5 $\pm$ 21.2
At risk of malnutrition (n= 92)	49.0 $\pm$ 17.0	49.0 $\pm$ 18.2
Malnourished (n= 29)	43.0 $\pm$ 18.0	45.0 $\pm$ 16.0
Correlation co-efficient (Spearman's rho)	rho = 0.191 (p = 0.007*)	rho = 0.161 (p = 0.024*)
Kruskal Wallis	2.504	8.284
Chi-square test	(p= 0.286)	(p=0.036*)

* Statistically significant

Mann-Whitney U test was done between protein and energy scores and no significant association was found between the median values of protein and energy scores of both the groups (i.e. old-age homes and free living) (Table 4)

Table 4
Comparison between old-age home and free living participants according to protein and energy consumption

<i>Protein Score</i>	<i>Median $\pm$ IQR</i>	<i>Mann-Whitney U test</i>	<i>p value</i>
Old-age home	45.0 $\pm$ 14.0	Z = - 0.977	0.329
Free living	47.0 $\pm$ 17.0		
Energy score			
Old-age home	46.0 $\pm$ 15.0	Z = - 1.914	0.056
Free living	49.0 $\pm$ 20.0		

Discussion

The study intended to find out the nutritional status and the impact of diet on it among the elderly women residing in the old-age homes and those living freely. Of the total 365 participants only 26.3 per cent (Free living, 28.4%; Old age home, 24.5%) were found to have normal nutritional status. 54 per cent (Free living, 54.4%; Old age home, 53.6%) and 19.7 per cent (Free living, 17.2%; Old age home, 21.9%) of them were at risk of malnutrition and malnourished, respectively. No significant difference was found between the nutritional status of the free living participants and participants from the old-age homes (see Figure 1).

From food frequency questionnaire dietary practices of the participants has been revealed (see Table 1). Protein and energy scores of different foods consumed were determined to estimate the extent of daily protein and energy rich food intake by the participants (see Table 2 and Table 3).

In case of chapatti (handmade bread) and paratha (handmade fried bread) consumption, significant difference ($p < 0.05$) was found between old-age homes and free living elderly women contrary to rice and puffed rice/semolina/other cereal product intake (see Table 1). Practice of daily or 4–6 days/week chapatti consumption was more (75.7%) among free living participants than old age home participants (6.6%) and a significant difference was found ($p < 0.05$). The practice will enable the most of the free living participants to obtain more fibers beside, carbohydrates and proteins in comparison to most participants of old-age homes.

Both groups have a good practice of pulse consumption, however significant difference has been observed between their practices ($p < 0.05$) (see Table 1). Interestingly practice of daily or 4–6 days/week pulse consumption was more (92.2%) among old-age home participants than free living participants (67.5%). Therefore, most of the old-age home participants were consuming a food group rich in protein and that may to some extent compensate the limitation of chapatti (made of wheat) consumption.

Practice of daily or 4–6 days/week green leafy vegetable consumption was higher (26.6%) among free living participants in comparison to old-age participants (2.5%). A significant difference has also been found between the practices ($p < 0.05$) of two groups (see Table 1). Green leafy vegetables being rich in dietary fibres, minerals, vitamins and antioxidants, participants

of old age homes are at greater risk of these important nutrients and bioactive substances.

Most of the participants of both the groups have been found to consume vegetables other than green leafy vegetables daily or 4–6 days/week and no significant difference has been found in this regard ($p > 0.05$) (see Table 1). This practice may compensate to some extent the dietary fibre, mineral, vitamin and antioxidant consumption. Most of the participants of both the groups consumed potato daily or 4–6 days/week (see Table 1) which will supply high carbohydrate and some vitamins. However, significant difference has been found between the practices of the two groups ($p < 0.05$).

Practice fruit was not satisfactory (Table 1) in case of both groups. Therefore, they have a chance of low consumption of vitamins and minerals from their diet.

Nut consumption for both the groups was low (Table 1). The practice may deprive them from the availability of some important health promoters.

Practice of consumption of milk and milk products was inadequate for many in both the groups and no significant difference was found in this regard (see Table 1). This practice may deprive them from high quality protein as well as important vitamins, particularly B₁₂.

Participants from both the groups, generally, have limited consumption of sweets, ghee and butter (see Table 1). Therefore, the intake of sugar and saturated fats was restricted in most of them.

In case of animal food consumption, participants were found to be 83.2 per cent and 88.8 per cent non-vegetarian from old-age homes and free living, respectively. It has been revealed that most preferred animal food was fish for both the groups; 61.3 per cent old-age home participants and 45.3 per cent of free living participants consumed fishes daily or 4–6 days/week (see Table 1). However, significant difference has been found between practices of the two groups in this regard ($p < 0.05$). Comparatively less consumption of eggs and chicken/mutton for most of the participants helped them to low intake of saturated fats and cholesterol.

Most of the participants have good practice of fluid intake. 72.5 per cent old-age home participants and 68.6 per cent free living participants drank = 1.5 liters water daily or 4–6 days/week. 95.4 per cent old-age

homes participants and 91.1 per cent of free living participants drank tea or coffee daily or 4–6 days/week. Therefore they may have a lower risk of dehydration. In both the cases no significant difference has been observed between two groups.

In old age chances for becoming malnourished is higher than younger population. Some researchers stated that a section of community dwelling elderly persons were found to be deficient in protein and calories (Amarya, S. *et al.*, 2015). In this stage malnutrition can occur mainly due to decreased food intake, malabsorption or increased metabolism (Morley, J.E., 1998). Food intake among the elderly was found to decline with age and it found even in very healthy persons. Some changes occur in the gastrointestinal tract in this age and this can affect food intake by increasing satiety (Morley, J.E., 1998; Gille, D., 2010; Amarya, S., *et al.*, 2015).

In old age, there is no consensus about the definition of protein energy malnutrition. Some suggests that this is due to an inadequate intake of protein and calorie rich food. Another group suggested that protein energy malnutrition occurs from a response to biological stress, i.e low albumin malnutrition (Amarya, S. *et al.*, 2015). However, in case of under nutrition an involuntary weight loss can be seen among the older adults. This weight loss usually occurs due to starvation, sarcopenia or cachexia. Starvation results from consumption of less or inadequate protein rich and energy rich foods. In case of sarcopenia muscle wasting occurs and sometimes body weight may not change in obese individuals. In cachexia muscle wasting and weight loss both occurs together (marasmus type) (Thomas, D, R, 2007).

A study conducted by Sharkey *et al.*, (2007) among homebound elderly participants revealed that women and elderly who usually skip breakfast found to have low intake of some nutrients. Likewise in Nigeria, Afolabi *et al.*, (2015) reported the coexistence of overweight and underweight among elderly and also reported that inadequate intake of protein and other micronutrients existed among the elderly men and women. Sharar *et al.*, found that people aged over 75 years consumed less carbohydrate, protein, fat and some vitamins than people aged 65–75. They also found that who usually took less snacks consumed lower energy (Sharar, D. *et al.*, 2003). In our study significant association was found between nutritional status (according to MNA) with protein rich food consumption and

energy rich food consumption of the participants from both old-age homes ($p < 0.05$) (see Table 2) and free living participants ($p < 0.05$) (see Table 3).

For old-age home participants a significant difference was observed in protein rich ($p < 0.05$) and energy rich ($p < 0.05$) food consumption among different levels of nutritional status (see Table 2), indicating women who consumed more protein and energy rich foods had better nutritional status. For free living participants no such observation was found for protein rich foods but a significant difference was observed for energy rich food consumption across the three nutritional status (see Table 3).

No significant association was found between the protein rich foods and energy rich foods of both the groups (old age home and free living) from Mann-Whitney U test (see Table 4). That indicates that women living in their houses or in the old-age homes have same type of protein and energy intake status. Therefore, it can be stated that only living environment may not have great influence on their nutritional status.

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Does Short Duration of Hospitalization for Acute Illnesses Affect Functional Outcome in Older Adults?

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ABSTRACT

Hospital-related functional decline of older adults admitted due to acute illness is indirectly associated to preventable effects of in-hospital procedures. To determine the short-term functional outcome of hospitalized older adults and to identify the personal and immediate environmental factors associated with an increased risk of functional decline. A Prospective Cohort study (n=154) of patients aged 60 years and above admitted to general medical wards across 4 hospitals selected from Pune and Ahmednagar for acute medical illnesses. Number of ADL disabilities at pre-admission baseline, at 48 hours of hospitalization and at 2 weeks post hospitalization. Outcomes were sustained decline in ADL function and recovery to baseline ADL function at 2 weeks post hospitalization. Data on personal and immediate environmental factors affecting functional decline was also collected by Pune-FAAT. Decline in ADL function ($P < 0.05$) showed by 55 per cent of respondents, 45 per cent recovered to baseline; 16 per cent developed limitation in 1–2 activities and 39 per cent developed limitation in 3 or more activities. Age > 70 years ($P=0.003$), duration of hospitalization for > 6 days ($P=0.002$), untreated hearing problem ($P=0.009$) predicted failure to recover. Having friends and moderate amount of television watching in everyday

routine were found to be effective in recovery of ADL post hospitalization (p value 0.018 and 0.05 respectively). Increasing age, repeated hospitalization, longer duration of inactivity due to hospitalization, untreated hearing problem may be associated with the functional decline two week post hospitalization. Early intervention to regain Activities of Daily Living in older hospitalized patients is recommended.

Key words: Older adults, Hospitalization, Functional decline, Activities of daily living (ADL)

Functional ability is a prime indicator of health-related quality of life (Farquhar 1995). The risk of functional limitation increases with advancing age which renders an individual dependent. Acute illness followed by subsequent hospitalization is a sentinel event in life of older adults, the way that disease impacts the functional state of older adults is a basic characteristic differentiating them from patients in other age groups (Keeler *et al.*, 2010). Traditional wisdom dictates that bedrest promotes healing and recovery. Studies indicate that, hospitalized elderly patients are more likely to be discharged to long-term care facilities, or even to die, as a result of the deleterious effects of prolonged bed rest, including “hospitalization associated disability,” i.e. the loss of ability to complete one or more of the basic activities needed to live independently, such as bathing, dressing and using the toilet. Changes in activities of daily living (ADL) are used to predict functional decline.

Traditionally, elderly in India have come to accept failing health and dependency as a part of their old age, disengage from material life, practice spirituality and live in joint family. With increasing life span, greater social and household involvement of elderly is happening (Branch *et al.*, 1984) but it is a challenge to change their mindset so that they begin adopting healthy lifestyles and environment to eliminate risk factors and remain active and independent.

As estimated almost 64 per 1000 of adults who are hospitalized are 60 years of age or older (NSSO 60th round), although those older than 65 years represent only 9 per cent of the population. The proportion of hospitalized adults who are elderly is only expected to increase as the population ages in India. The average length of stay in hospital for patients aged 60 and older was 6.1(2.9) days (Fisher *et al.*, 2010).

Studies have shown that about one-third of older persons develop functional decline following hospitalization (Wu *et al.*, 2006). The effects of medical or surgical therapies initiated and the deconditioning associated with bed rest are the major reasons for functional decline (Gillis and MacDonald 2005).

Older adults are vulnerable to many diseases and a significant proportion of their life is spent with disability and reduced functional ability. They are substantial users of hospital care. However, a disagreement exists between the hospital environment and therapeutic goals for the hospitalized elderly. The hospital environment, has traditionally focused on medically managing illness states, not on improving patient functioning. The environment is designed for the rapid and effective delivery of care – not for enhancing patient function (Kleinpell, *et al.*, 2008). Functional decline is common and costly in both economic and human terms which makes the prevention of functional problems an important public health issue. Therefore, this study was planned to understand functional decline in hospitalized elderly, as to know whether activities are affected when admitted for acute illness and which activities are affected mostly. Therefore study objective were;

1. To determine the short-term functional outcome of hospitalized older adults and
2. To identify the personal and immediate environmental factors associated with an increased risk of functional decline.

Materials and Methods

Study Population

This prospective study was conducted in 4 hospitals selected from Pune and Ahmednagar. The study included patients aged 60 years and above admitted for acute medical illnesses. Patients admitted for severe illnesses, ICU patients and patients with chronic conditions and orthopedic illness were excluded. The sample size was 154 obtained by multiple visits to selected hospitals in the data collection period.

Measures and Tools

The parameter to measure outcome variable of functional decline was Activities of Daily Living ADL score. ADL score from 1–4 was given

separately for each activity at 3 points in time. These were before hospitalization, at 48 hours of hospitalization and at 2 weeks of hospitalization. Mean ADL for each study participant was then calculated. Each study participant had 3 mean ADL scores, i.e. ADL-1 (mean of scores for all activities before hospitalization), ADL-2 (mean of scores for all activities during hospitalization), ADL-3 (mean of scores for all activities at 2 weeks of follow-up). Outcomes were sustained decline in ADL function and recovery to baseline ADL function at 2 weeks post hospitalization. Pune-FAAT tool was used to assess the performance of Activities of Daily Living. The outcome was measured in terms of change in the ADL score after 2 weeks of hospitalization as compared to the baseline score. The study also collected data on individual and immediate environmental factors affecting functional decline.

Statistical Analysis

The characteristics of the study group were described with appropriate descriptive statistics. The characteristics were grouped in categories of demographic characteristics of the study participants, health related information of the study participants and characteristics of current hospitalization. To determine the change in the overall ADL score cumulative of all the 10 activities, mean were calculated and noted as ADL1 for baseline mean score, ADL2 for score during hospitalization and ADL3 for the mean of scores at 2 weeks follow-up. Paired sample T-Test was performed to compare the mean scores for each activity separately. This comparison was made between the mean score at baseline and at 48 hours of hospitalization and at 2 weeks of follow up. The test was performed by taking all 3 combinations of the means, i.e. comparison of mean of one activity at baseline with the mean of one activity at 48 hours, then comparison of mean of same activity at 48 hours with that at 2 weeks, comparison of mean of activity at baseline with the mean at 2 weeks. This test was performed to assess which activities are affected negatively at 2 weeks after hospitalization.

The prevalence of the increased ADL score at follow up was determined by a positive difference of greater than 0. A new variable was thus generated based on this and was coded as "ADL change". The variable was of dichotomous nature which described whether a positive increase occurred (Yes/No). To determine the association between the

characteristics and the outcome variable of change in the ADL score, a chi square test was performed for each. Further the outcome was categorized based on the ADL limitation. 3 categories were generated which were the participants who had limitation of 1–2 activities, participants who had limitation in 3 or more activities and those who recovered. Chi square test was performed and graphs were generated from the same. The data was entered and analyzed in SPSS (Statistical Package for Social Science ver. 19th). A P value of 0.05 was considered to indicate statistical significance.

Results

Baseline characteristics of 154 study participants are shown in Table 1. This population consisted of 88 males and 66 females and had a mean age 70 years with standard deviation of ± 6.6 . Of the total 154 study participants, 56 per cent belonged to urban areas and remaining 44 per cent belonged to rural areas. Among the total study participants, 58 per cent were married and had their partners alive whereas, 38 per cent of them were widows/widower. 51% (n=78) of the study participants did not receive any kind of formal schooling, 27% (n=42) received primary education. 91 per cent were currently not employed. Due to unemployment in older age and lack of pensions or saved money; 82 per cent of the study participants depended completely on their partners, children, relatives or neighbors for their expenditure. 60% (n=91) had more than 4 members in the household. The 154 study participants were admitted to the hospitals for acute illnesses or for acute exacerbations of chronic diseases. The most common causes for admission were cataract (n=48) followed by hyperglycemia (n=20), Anemia (n=15), weakness (n=14). The duration of hospitalization ranged from minimum of 3 days to more than 2 weeks.

Table 1
Demographic characteristics of the study participants

1	Demographic Characteristics	(n)	Percentage
1.1	Place of residence		
	Urban	87	56.5
	Rural	67	43.5
1.2	Age		
	<70	93	60.4

Cont'd...

Cont'd...

	>70	61	40
1.3	Sex		
	Male	88	57
	Female	66	43
1.4	Marital Status		
	Married	90	58
	Other	64	42
1.5	Financial Dependency		
	Self-support/Partial dependency	27	18
	Full dependency	127	82
1.6	Living companion		
	Alone	6	4
	With Husband/wife	16	10
	With Husband/wife and children	125	81.2
	Other	7	4.5

The 154 study participants were admitted to the hospitals for acute illnesses or for acute exacerbations of chronic diseases. The most common causes for admission were cataract (n=48) followed by hyperglycemia (n=20), Anemia (n=15), weakness (n=14). The duration of hospitalization ranged from minimum of 3 days to more than 2 weeks. Further follow up for discharge day was not done beyond the pre decided 2 weeks follow-up. The median length of stay at the hospital was 6 days. (Table 2)

Table 2
Description of hospital related characteristics of the study participants

2	Hospital related characteristics	(n)	Percentage
2.1	Reason for hospitalization		
	Anemia	15	9.7
	Breathlessness	14	9.1
	Cataract	48	31.2
	Diarrhea, vomiting	9	5.8
	Fever and Cold	10	6.5
	Hyperacidity	3	1.9
	Hyperglycemia	20	13.0

Cont'd...

Cont'd...

Hypertension	11	7.1
Hypoglycemia	3	1.9
Low Blood Pressure	3	1.9
Pneumonia	1	0.6
Stomach ache	3	1.9
Total	154	100
2.2 Duration of hospitalization		
<6 days	85	68
>6 days	39	32

The Presence of at least 1 type of co-morbidity was seen in 48 per cent of the study participants. Poly-pharmacy, i.e. Daily medication of 2 or more drugs was seen in 18% (n=28). Current medication status was found to be as high as 8–9 tablets per day. 27% (n=42) were hospitalized in the past 3 years for the reasons similar to the current illnesses, associated with their chronic morbidities or other.

Self-reported weight loss was observed to be positive among 32% (n=50) of the study participants. 61% (n=94) watched television for leisure for duration ranging from half hour to more than 2–3 hours. 70% (n=104) had friends to share talks with. 44 per cent of the study participants had problem with eyesight, 26 per cent had problem with hearing and 25 per cent stated self-reported memory loss. (Table 3)

Table 3
Description of health related characteristics of the study participants

3	Health related Characteristics	(n)	Percentage
3.1	Presence of co-morbidity		
	No	82	53.2
	Yes	72	46.8
3.2	Poly-pharmacy		
	No	126	81.8
	Yes	28	18.2
3.3	Hospitalization history (past 3 years)		
	1st time	112	72.7

Cont'd...

Cont'd...

	More than 1 time	42	27.3
3.4	Self reported weight loss		
	No	104	67.5
	Yes	50	32.5
3.5	Eyesight problem		
	No	85	55.2
	Yes	69	44.8
3.6	Hearing problem		
	No	114	74.0
	Yes	40	26.0
3.7	Self reported memory loss		
	No	115	74.7
	Yes	39	25.3

Table 4
Comparison of Mean ADL scores at baseline and follow up

S. No.	Activity	Mean ADL score at baseline	Mean ADL score at 48 hours after hospitalization	Mean ADL score at after 2 weeks of hospitalization	Comparison of mean baseline and 2 weeks hospitalization score (p value)
1	Lifting	1.34	1.77	1.76	<0.05
2	Bending	1.19	1.54	1.25	0.189
3	Squatting	1.16	1.61	1.61	<0.05
4	Walking	1.18	1.68	1.69	<0.05
5	Climbing	1.61	2.15	2.05	<0.05
6	Getting Up	1.14	1.56	1.53	<0.05
7	Bathing	1.17	1.71	1.68	0.373
8	Toilet use	1.08	1.72	1.70	<0.05
9	Clothing	1.13	1.61	1.52	<0.05
10	Eating	1.07	1.51	1.46	<0.05

Prevalence of functional limitations in daily tasks is estimated from the 154 hospitalized elderly cohort members. Overall, limitations in functional tasks are reported by 55 per cent of the cohort, 45 per cent recovered to

baseline; 16 per cent developed limitation in 1–2 activities and 39 per cent developed limitation in 3 or more activities.

Mean of ADL scores was calculated for each of the 10 activities separately. These means were calculated for the 118 study participants whose follow up data was available. Comparison of the mean ADL scores was done using the paired sample T-test. The results of the paired T-test showed that there was significant difference in the mean scores for all the activities from baseline to that at hospitalization. This states that all the activities of the study participants were significantly affected when they were hospitalized. Further comparison of the mean ADL scores of each activity at baseline and at 2 weeks follow-up was done.

The results of the paired sample T-test suggested that all the activities except bathing and bending showed significant change in performance ($p=0.05$). This result indicated that the activities of lifting, squatting, walking, climbing, getting up from the bed, using toilet, clothing and eating remain significantly affected when assessed 2 weeks after hospitalization.

Further analysis to assess the number of activities affected at 2 weeks was performed. 65 study participants showed an increase in ADL suggesting that at least 1 of the 10 activities was affected. Of these 65 older adults 29% ($n=19$) had limitation of 1–2 activities whereas, 71% ($n=46$) could not perform more than 3 activities when assessed after 2 weeks.

Discussion

Functional decline in the hospitalized older adults is a complex process with a cumulative effect of several factors. Functional decline occurs in every older adult because of this with physiological changes. There is decrease in the muscle strength, bone density reduces, and reduction in appetite, urinary incontinence, etc. These are considered to predispose the older adults to decline. Hospitalization is a stressful event for the older persons. Studies have shown that nearly one third of the individuals develop functional decline at discharge after hospitalization (Connolly, *et al.*, 2016).

The current study was conducted to assess the functional outcome among hospitalized older adults aged 60 years and above. The study further attempted to observe the significant change in the activities of daily living and the probable factors contributing to this change.

The present study results show an increased dependency or increased difficulty to the older adult patients to perform activities of daily living 2 weeks after hospitalization. The study results demonstrate that 55 per cent (n=65) of the study participants did not recover to their baseline levels of functional ability when assessed at 2 weeks post hospitalization. Thus, this study confirms the findings from similar studies done on hospitalized older adults admitted for acute geriatric illnesses outside India. The current study considered a follow up of 2 weeks and could assess a decline among 55 per cent of the participants. From the 10 ADL considered in the study 8 of them remained significantly affected after 2 weeks of hospitalization.

Another key finding of this study was duration of hospitalization. It was found to be a key factor causing an escalating difference in the ADL scores at follow up as compared to the baseline. Thus, more days in the hospital contributed to a higher difference in the scores. The decline in the functional status is not permanent and gradual recovery has been observed in multiple studies (Hirsch *et al.*, 1990, Sager *et al.*, 1996). This study indicates that the older patients who were hospitalized for duration for more than 6 days developed difficulty performing the activities of daily living at discharge. The prolonged bed rest during hospitalization and consistent immobility that is induced, results in decline. This immobility was found to be similar irrespective of the reason for which the patient was hospitalized. This study observed that participants who were admitted for cataract operations were admitted for 2 days without any medication in the hospital. They were operated on the 2nd day and discharged on day 4. Thus, an unnecessary bed rest was involved that contributed to a decline.

Studies have described hospitalization to be related to functional decline post hospital discharge. In the hospital itself there are several factors that can cause a decline while several other act as confounders. A study conducted in Italy demonstrated that the severity of the illness determined the magnitude of decline (Fimognari *et al.*, 2017). In this study the patients with severe illnesses were not included. All the participants suffered from an acute medical condition which did not predispose them to be in the Intensive care unit. Thus the decline that was due to the predisposing illness was minimized.

This study has used the Pune-FAAT tool that has been validated in the Indian setting. This tool has the capability of identifying minor changes in the performance of the ADL activities. This is due to a critical scoring

method that is involved in using this tool. For an activity to range from independency of performance to dependency, there are stages of difficulty in performance of the activity. These could be identified by the tool.

An association was found with untreated hearing loss and increase in the ADL scores. Hearing loss is independently associated with accelerated cognitive decline and incident cognitive impairment in community-dwelling older adults (Lin *et al.*, 2013). Vision impairment is also considered to contribute towards functional decline (Laforge, *et al.*, 1992). Another factor to be considered here was that those individuals who had problem with vision were cataract patients to be treated for their vision. Thus, there was improvement in the vision at the time of follow up that probably acted as a beneficial factor in the recovery of the patients.

Limitations

Limited number of study participants could be enrolled and interviewed due to time constraints. All approached hospitals did not give permission for data collection for a longer duration due to which, study participants were enrolled majorly from one hospital and even distribution of study population could not be achieved which may have resulted in selection bias.

Conclusion

It can be concluded that increasing age, repeated hospitalization, longer duration of inactivity due to hospitalization, untreated hearing problem associated with the functional decline two weeks post hospitalization. Functional decline is coupled with higher levels of dependency. The imperative finding of this study was that decline was associated with a hospitalization of as low as 6 days and amplified further with the duration of hospitalization. The severity of the condition necessitate for a change in the care of the older adults during hospitalization in India. Certain factors attributing to functional decline remain unavoidable; in such instances focus must be on the factors causing early recovery from the decline to enhance the quality of life.

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Role, Relevance and Issues of Age-Friendly Environment in Older Age

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ABSTRACT

This paper reflects upon the current discussions on age friendly environment with respect to home, community and society and critically examines its role and relevance in determining physical and mental capacity of a person across the life course and into older age.

Key words: Age-friendly environment, Old age, Age activity, Social environment

The shift in the perspective to look at health in a broader way has received much impetus and acknowledgement in the recent time. The horizon of 'being healthy' encompasses several aspects such as physical, psychological, social, emotional, and financial including environmental health. It is important to note that these factors are key to the ageing process. In a nutshell, focus is on improving quality of life or rather wellbeing of a person.

Quality of life, as is said includes both, subjective as well as objective dimensions of life. Objective and subjective dimensions includes a variety of factors such as behavioral, environmental, socio-economic and services available for them.

Ageing of the population as one of the most significant demographic trends in recent years is a well-known fact to all. Never before in the history of human evolution have we lived for longer and in better health and it is

predicted that this trend will continue. This, together with the increasing number of people who are living in urban areas, led to the WHO developing its Active Ageing framework to promote the principles of healthy and active ageing (Hehir, 2014).

Acknowledgement of age friendly environment is as necessary and important as income and health security for older persons. It is important to question oneself if the environment in which we live is conducive to people of all ages; particularly the old, impaired or disabled.

Age-friendly environment is something that fosters health, well-being and participation of people as they age. They are accessible, equitable, inclusive, safe and secure, and supportive. The policy for older people mentions about this supportive environment. However it is interesting to see how it actually manifests in reality. Acknowledgement of age friendly environment is as important as of income and health security for older persons.

They promote health and prevent onset of diseases. They also delay the onset of functional decline.

Without age-friendly environments, health and wellbeing for all cannot be achieved. Everyone should have the opportunity to achieve the highest possible level of health and well-being, regardless of age, sex or gender, cultural or ethnic background, wealth or health status. Older people may experience negative attitudes and discrimination based on their age. Creating age-friendly environments acknowledges diversity, fights ageism and ensures that everyone has the opportunity to fully participate. According to the report on Age friendly cities, Delhi by Helpage India, Ageing-in-place policies should also include social integration as a fundamental and necessary element. It is crucial that older people be supported and encouraged to continue their participation in the social and economic life of their communities. For active ageing and its healthful consequences to be achieved, social integration should be given equal importance as surroundings that are safe and easy to navigate.

WHO (2007) raises awareness on the importance of environments in determining Healthy Ageing and encourages the creation of age-friendly environments by:

- compiling evidence based guidance on age-friendly environments;

- providing an information platform for sharing of information and experience; and
- nurturing and developing the WHO Global network on age friendly cities and communities.

This paper is broadly divided into two parts. One part highlights the discussion around *social environment*, *social participation*, *social support* and *home environment* and the other part will try to examine issues around this theme.

Creating environments that are truly age-friendly requires action in many sectors: health, long-term care, transport, housing, labour, social protection, information and communication, and by many actors – government, service providers, civil society, older people and their organizations, families and friends. It also requires action at multiple levels of government.

The six areas recommended by the WHO (2007) for developing age-friendly living environments are as below;

Outdoor Space and Buildings: Adaptive models and integrated buildings, Study of wandering and elopement behaviours of older adults with cognitive impairment, Study of older adults living on their own in public housing. Transportation: Public transport for persons with special needs (including older adults)

Inclusive Housing: Design guidelines for living environments for older adults, Housing environments (indoor and outdoor) for older adults, Fire safety in residential care homes for elderly persons, Everyday products/objects for older adults, Access guide for people with special needs, Fall prevention and home safety for community-dwelling older adults

Respect and Social Inclusion: Ageing in the community, Design of integrated service centres, 'Inclusive design' research, Study on activity preferences and patterns of individuals with dementia in long-term care settings, an intergenerational reminiscence programme for older adults with cognitive impairment

Social Participation (Lifestyle): Community participation in urban living environments design, Study of participation of community-dwelling

stroke survivors, Influence of ageing on participation and lifestyles of older adults

Community Support and Health Services: Spatial programme design strategy for recreational space, Accessibility and disability, Future development of rehabs services, Informational needs of health care professionals on dementia care, Care-needs assessment of older adults with cognitive impairment. (http://iaa.fhss.polyu.edu.hk/Age_Friendly.html)

Well-being in later life is often taken to emerge independently of the environment in which older adults find themselves. This is clearly not the case and, as the Age-friendly Cities project demonstrates, urban environments are an important factor mediating the experiences and opportunities open to older citizens. In an age-friendly community there is a culture of inclusion shared by persons of all ages and ability levels. Policies, services and structures related to the physical and social environment are designed to support and enable older people to 'age actively', that is, to live in security, enjoy good health and continue to participate fully in society. (Biggs S, and Tinker A, 2007)

Key elements in Age friendly Environment

An age-friendly community promotes healthy ageing through the existence of appropriate housing, transportation options and neighbourhoods where older people can maintain an active and healthy lifestyle (Ball and Lawler, 2014).

There have been attempts made to examine the perceptions of older adults about active ageing or successful ageing and the way they see it impacting their lives. By and large, a positive relationship has been reported between 'being active' and quality of life.

Home Environment

It is one major arena for ageing research which looks at the subjective needs of older adults in home environment. This refers to family support, family interaction, taking care of their interest, their needs, caring and nurturing of elderly people. As people grow older, they spend relatively more time in their homes; on average, very old people tend to spend 80 per cent of their time at home (Baltes, *et al.*, 1999). Strong cognitive and affective ties to the home environment are formed as people age, and, as a consequence, ageing in place and preventing relocation are among the

strongest needs of older adults as well as their families (Gitlin, 2003). Thus, an important goal in health promotion is to create home environments that support healthy ageing.

A positive impact of active ageing on the elderly was reported in a study by Marhankova (2011), where productivity was viewed as an opportunity to transform adverse connotations of ageing and elevate self-esteem. In this context, a study by Bowling (2008) found that, active ageing was frequently described in terms physical well-being, engagement in leisure activities and maintaining social connectivity. In another study, that aimed to examine the experiences of older persons in terms of their everyday life, it was found that, the choices for staying active (mentally and physically) played a critical role in defining daily life experiences among the elderly respondents. The activities that emerged as relevant in this context included, self-maintenance and housework, social activities (talking to people, telephone calls and visiting others, caring or voluntary work, playing cards or travelling with others, being members of religious organizations and sports clubs, leisure activities (reading newspapers and books, walking, watching television and resting), participation in social and cultural activities which included both physical and intellectual pursuits, including study circles, cultural and organizational activities, and restaurant visits. In a study conducted by Clarke and Warren (2007), also found a high desire among older persons to stay active in old age, and concluded that, the aspirations of the present are achievable by enabling older persons to find avenues to continue with activities from their past.

Social Environment

According to the WHO, an age-friendly community has the following features:

- Recognizes the great diversity among older adults
- Promotes older adults' inclusion (engagement) and contribution in all areas of community life
- Respects older adults' decisions and lifestyle choices
- Anticipates and responds flexibly to ageing-related needs and preferences (http://iaa.fhss.polyu.edu.hk/Age_Friendly.html)

The social life of the people is affected by the kind of community in which they live. With the advancement of science and our life has become

complex. Social Institutions like family, joint family, caste system; village panchayats, education, etc. have undergone changes.

The communities of today are facing lot of challenges. The ancient social relations, emotional bonds and sentimental ties are no more significant and visible. This is especially visible in cities where the joint family system has been taken over by nuclear family system and the individualistic approach has replaced the community and the community feeling.

The concept of community is used in three senses in the Indian context-sectarian, territorial and functional. In the sectarian sense, the word community is synonymous with the words 'caste' and 'religious group'. In this context, an individual has responsibilities and obligations not only to anyone who can establish relationship, actual or fictional, with the clan or lineage. However, a "community" based on the criteria of caste and religion, tends to be very exclusive and parochial. The individual or elderly person outside the community is looked as a stranger. The services and provisions are limited to its own members.

The territorial and functional point of view of Community with its flaws and weaknesses has in its favour one big strength which cannot be overlooked – a great sense of community. It is in these less developed villages/neighbourhoods that the elderly of our community continue to play valued roles. However, today, in our industrialized and urbanized societies much of these sense of community with its deep rooted tradition and support for the elderly has declined. The modern world needs to reawaken the human bonds of community.

They are not treated with kindness or with respect. They are often demeaned and find themselves ill-equipped to cope with such behaviour of others towards them. In view of the growing numbers of elderly in communities, a host of problems specific to them have emerged, thus, becoming increasingly necessary to meet these special needs, whether physical, psychological, emotional, financial, health or social.

It is important to work with elderly in groups, engage or involve them in group activities. The aim is to help them to deal with their problems in such a way that will restore in them, the best possible ways of coping with their changing circumstances.

Elderly support group can be formed within a large group, those of who are more dynamic and they are able to organize themselves to take care

of other elderly members who are ill or dying. They can be helpful in referring cases of elderly abuse as well as of conflict in homes. Thus, appropriate interventions could be made in a few cases through counselling, home visits and in trying to involve the family in the care of their elderly members. Nutritional and medical aid can be started in cases of neglect of the elderly by the family members.

Social Support

WHO refers social determinants of health (SDH) as the conditions, in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life. These forces and systems include economic policies and systems, development agendas, social norms, social policies and political systems.

Social support is one of the most important predictors of satisfaction and emotional wellbeing among older adults, a finding confirmed by the MacArthur Study (Quoted from *Successful Aging* by Rowe and Kahn, 1997). Rowe and Kahn found that social support plays an important role in buffering the deleterious effects of ageing. Those who survived and thrived because they remained deeply engaged with family, friends, and productive activity (Ibid.). Having the support of family and friends can help a widowed older adult face the array of new challenges that accompany a new life without his or her spouse or partner.

Villiant (2002) added an important concept to the understanding of the importance of social support to older adults – generativity. Older adults who nurture their relationships with grandchildren, nieces and nephews, or other young people had something to do and someone who cared about them. These older adults were able to identify what was important to them in their lives, which cared about them, and what activities helped them to maintain a positive self-image.

Social isolation is found to be one of the powerful risk factors not only for the development of cognitive and intellectual decline but also for physical illness as well (Rowe and Kahn, 1998). It is somewhat difficult, however, to determine whether individuals with better health have better social support systems or whether better social support systems actually determine better health (Valiant, 2002). Older adults with concerned family or friends are more likely to attend to physical health issues as others encourage them to see a health care provider regularly and help facilitate

these medical visits. Knowing that others are concerned about an older adult's health and are paying attention may actually encourage older adults to be more diligent about maintaining medication schedules or following treatment plans.

Key Issues and Challenges around Age friendly environment

It is believed that loneliness can weaken willpower and perseverance over time and can hamper self-regulation leading to low self-esteem and self-destructive habits. This has been reported from various studies. Not just the elderly but even the middle-aged people who are lonely report more exposure to stress. Loneliness and depressive symptoms are strongly related to each other in older adults since lonely people are more likely to withdraw from engaging with others and less likely to seek emotional support.

Personal restrictions to Social Participation in Old Age

Older adult's relationships have specific characteristics that make them more prone to social isolation. It is generally observed that older person's social life tends to be more restricted to close relatives and close friends. Very old people also have a decreased ability to compensate for "lost contacts" due to alienation within their own age group. Caregivers for older adults are themselves alienated from the social network because of the care giving work that they are engaged with. Sometime even they feel disassociated with the younger age groups because of the gaps in the thinking process, difference in the perspectives, difference in looking at life and issues, etc.

Furthermore, there are functional limitations associated with ageing which may hamper the maintenance of existing relationships. These can also lead to difficulties in performing activities of daily living and ultimately discourages them from actively engaging in activities at home as well as at community level. In addition, decreased strength and endurance can make journeys to places of social gathering too tiring and stressful. Finally, some older persons may find that social participation is not a priority for them.

Social environment determinants of Social participation

Societal made norms and values that regulate and govern the role of older persons in society can hinder social participation in old age. Older persons are generally vulnerable and are marginalized by the people and

State. They are such excluded from their basic right of proper health services, credit schemes, income-generating activities, etc. The negative stereotypes that associate old age with retirement, illness, dependency and poverty; deformities, reduces the opportunities for social participation. Furthermore, age discrimination induces older adults to adopt age appropriate behaviour. Sometimes they feel alienated to the changing society and really can't connect to the changing culture, events, values, etc. With the advancement in the technology and services, every individual is expected to be updating their skills and knowledge. This expectation for older adults becomes a real challenge and is one of the main reasons for marginalization in the current world.

The sociological determinants are known to have direct bearing on the psychological well-being of elderly women. Owing to less engagement in decision making process at home, less participation in the family functions and community events or even regular household work causes them to feel low, nervous, anxious, unwanted and lonely most of the time. These factors further make them more vulnerable to disability and illness proving to be more difficult in accessing health services despite of India having 'access to quality health care utilization' as one of the developmental agenda.

Concerns of home environment for older people

Modernization has brought about changes in the traditional values, perceptions, attitudes and expectations with regard to relationships with older relatives. Educational advancement, wider contacts and employment outside households/communities have resulted in the younger generation having less time and space to develop to the care of older people. It has also brought about changes in the power structure in the family. It was perceived that older people traditionally had unquestioned authority over the younger family members, but this seems to be undergoing a shift.

The process of modernization gives rise to power sharing between the two generations. Older people in India seem to be losing power over their children and finding it difficult to adjust to the rapidly changing socio-economic environment. Studies which focussed on the effects of forces associated with modernization or development upon the well-being of older people have tended to posit a negative relationship between the two. The general outcome has been that across a range of social settings the ability and/or willingness of families to support older people has suffered a

setback following the loss of status in the course of economic and social change. (Bali, 1996)

One of findings, in a study conducted by the author on "Issues of Elderly Women: A study of M-ward, Mumbai, was strong association/relation between the social status of elderly women in the society with them attending family ceremonies, weddings, parties, birthdays, festivals, etc. It was reported that the status in the household, role in the community had direct influence on the decision making for self and also affected their decision of attending social functions.

Factors such as dependency brings in various challenges for older adults especially for elderly women. It significantly influences their socialization process and engagement with, not just the society at large, but also within their own community. Their daily life too gets affected to a great extent in this context. The study further reported that elderly women remain at home mostly engaged in doing household work and looking after their grandchildren. They are completely weaned away from their social life also are robbed off their family and societal status. They no longer participate in the community events, family events and other social functions. Moreover, hardly do they go to visit temples or do something which interests them.

Conclusion

An age friendly environment especially in relation to *Home* and *Social* engagement appears to be particularly beneficial to the health, wellbeing and empowerment of older adults. However, personal restrictions and physical and geographical barriers associated with ageing and determinants related to the social and physical environment can hinder the social participation of older persons.

Availability of proper commuting options allows older persons to reach places of social gathering, accessibility to key resources increases opportunities for social participation while performing activities of daily living, and a safe neighbourhood encourages older people to have confidence in and use the neighbourhood facilities.

Building more public facilities like library, meditation centers, yoga, etc. around the community that makes these elderly people engaged in community thereby utilizing their leisure time. There is great necessity to

keep them busy both physically and mentally. They should be made to utilize their energy in recreational activities and should be encouraged to pursue their hobbies. This will protect them from negative thoughts and in beating loneliness. Recreation Centers started by some NGOs should be established within communities so that elderly women can participate in all kinds of activities to their fullest as commuting won't be a hassle for them.

Although several researches and gerontologists have stated the necessity, role and relevance of age friendly environment for older adults, there is a great need to work in a systemic approach along with various stakeholders like communities, local government, state, civil organizations, etc. This also highlights the need of greater awareness amongst people and action necessary in providing quality life to older people.

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Factors Affecting Health Status of Urban Aged Population: Evidence from Sylhet, Bangladesh

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ABSTRACT

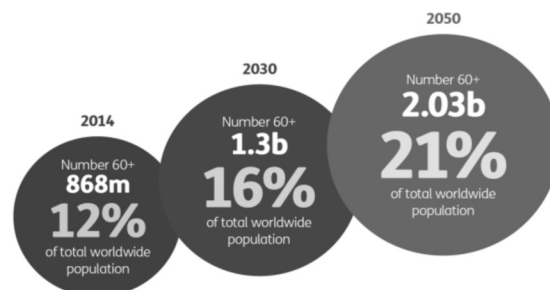
Population ageing emerged on a world wide scale within the last century and Bangladesh is also facing frightening problems with ageing population. Demographic transition influences health of elderly population in a variety of ways particularly in developing countries. The aims of this study is to identify the determinants of health status of urban ageing people in Sylhet District of Bangladesh. For this, a total number of 390 urban aged populations have been interviewed. Different statistical tools including logistic regression model have been applied to analyze the data. The analysis shows that 68.4 per cent of the elderly belonging to the age group 80 and above are suffering from various types of diseases. From the analysis is found that Age of the respondents, Mobility, Food Intake declination, Weight loss during 3 months, Psychological stress, Neuropsychological Problem, Educational Status, Current Working Status, Family type, income, Religion, Marital Status, Diabetes, BP, Hypertensions, Suffering diseases, Have Sound Sleep, Living arrangement, Physical exercise and Take care have significant effects on health status of the elderly. It is also found from the logistic regression analysis that Age of respondents, Food Intake decrease, Diabetes, BP and Income have significant impact on Taking treatment of the elderly.

Key words: Urban Ageing, suffering diseases, socio-demographic characteristics.

The unprecedented increase in human longevity in 21st century has resulted in the phenomenon of population ageing all over the world (Mishra and Gupta, 2012). Virtually every country in the world, the proportion of older people is increasing in their population. Population ageing is poised to become one of the most significant social transformations of the twenty-first century, with implications for nearly all sectors of society, including labor and financial markets, the demand for goods and services, such as housing, transportation and social protection, as well as family structures and intergenerational ties. Preparing for the economic and social shifts associated with an ageing population is thus essential to ensure progress in development, including towards the achievement of the goals outlined in the 2030 Agenda for Sustainable Development (U.N., 2015).

Global community is now experiencing faster increase in geriatric people than their counter parts. Over the last half century, life expectancy at birth has increased by almost 20 years. According to data from World Population Prospects, 2015, the number of older persons those aged 60 years or over has increased substantially in recent years in most countries and regions, and that growth is projected to accelerate in the coming decades (Ibid., 2015). In 1980, 8.6 per cent of the global population was aged 60 years or over; with a 3 per cent increase in aged population in 2014 the world experienced 868 million older people in the global community,

Figure 1



Source: UNDESA Population Division, Population Ageing and Development 2012, Wall Chart, 2012; UNDESA Population Division, World Population Prospects: the 2012 Revision, 2013.

i.e. this had risen to 12 per cent; it will near to double about 16 per cent by 2030 and it is predicted that human history is first time going to see more older people (aged 60 and over) than children (aged under 16).⁵ By 2047. It is predicated that by 2050 this number will have reached more than 2 billion—21 per cent of the world's population. And most will live in developing countries.

It is commonly believed that the majority of the elderly population resides in developed countries. About 60 per cent (279 million) of the world older people (580 million) live in developing countries, and this value will increase to 70 per cent of the total older population by 2030 (Hajjar RR *et al.*,—2004, World Health Organization, 2001). Population ageing progressing fastest in developing countries, including in those that also have a large population of young people. Of the current 15 countries with more than 10 million older persons, seven of these are developing countries (Flora—2011). Population trends in Bangladesh also show that Bangladesh is well into third phase of demographic transition, having shifted from a high mortality-high fertility regime to a low mortality-low fertility one (Nurun Nabi 2017). In Bangladesh due to improved quality of life the number of people over 60 years is increasing rapidly.

A population is said to be ageing, in demographic terms, which the proportion of the older people increases and the proportion of youth and children decreases (Balamurugan and Ramathirtham, 2012). It is an ongoing natural inevitable psychological process of human life. Although, there is no internationally accepted age bracket for defining the elderly population, people aged 60 years or above are considered as elderly in most gerontological literature. Aged population is defined as the group of population who belong to the age group of 60 years and more (Islam *et al.*, 2010).

Population ageing and its social and economic consequences are drawing increased has drawn the attention of policy makers worldwide. For Bangladesh too, ageing is one of the emerging issues that has been gradually accumulating with its far reaching consequences. The statistical data of Bangladesh represent the number of aged population has increased from 1.38 million to 7.59 million from the year of 1974–2001 (Barikdar *et al.*, 2016). In 2011 this percentage was 7.7 per cent of the total population and roughly about 10 million (Khan 2014, BBS–2003, BBS-www.bbs.gov.bd). The UNO projection suggests that by 2025 elderly population of

Bangladesh will be 16.2 million and by 2050 it will raise to 42.2 million which account for 20 per cent of the total population – a four-fold increase from the present time.

With the number and proportion of older persons growing faster than any other age group, and in an increasing range of countries, there are concerns about the capacities of societies to address the challenges associated with this demographic shift. Population ageing and its social and economic consequences are drawing increased has drawn the attention of policy makers worldwide. At the primary or at other levels, the needs of older person's healthcare are rarely addressed (Kabir 2001). There are no separate healthcare facilities for older adults, and so far no comprehensive health policy exists for this group of people (Banu 2003).

Ketshukietuo Dzuvichu (2005), in the paper "*Health problems of aged among the Angaminagas*" mentioned that health is not only a biological or medical concern but also a significant personal and social concern. In general with declining health, individuals can lose their independence, lose social roles, become isolated, experience economic hardship, be labelled or stigmatized, change their self-perception and some of them may even be institutionalized (Balamurugan, J. *et al.*, 2012). Haque M.M. *et al.*, (2014), in the Paper "*Health and Nutritional Status of Aged People*" found that overall nutritional status as well as health status was not good and satisfactory. Nesa M.N. *et al.*, (2013), in the paper "*Social Status of Elderly People in Health Perspective: A Comparison of Rural and Urban Area*" found that the health status of elderly population is poor and they lack access to basic health care. They also found that almost every one suffered from at least one disease during three months prior to the survey and age, sex, access to treatment and income are associated with the health problems of the older population.

Bangladesh is a developing country with a poor health status (Roy J. 1997). The health of elderly population has become an important social concern because, like many other developing countries, there is no social security system. In view of the size of the population, scarcity of resources, existing poverty, insufficient health facilities and absence of social security, ageing is going to be a major problem in Bangladesh (Khan 2014). Hence the aim of this study is to understand the health status of the aged people

and determine the factors associated with the health status of urban ageing of North –eastern part (Sylhet District) of Bangladesh.

Materials and Methods

A total number of 390 urban aged populations have been interviewed through a structured questionnaire from urban area of Sylhet district during March to October in 2017. The data were analyzed using Statistical Package for Social Science (SPSS). Frequency distribution, χ^2 test and a Binary logistic regression model were used to analyze the data. In logistic regression analysis the following variables were considered.

Dependent variable: Taking treatment (coded '0' for No and '1' for Yes).

The exploratory variables were:

X₁ = Age of the respondents ('1' for 60–69, '2' for 70–79 and '3' for 80 and above).

X₂ = Sex of the respondents (coded '1' for Male and '2' for Female).

X₃ = Food intake declination (coded '0' for severe, '1' for moderate and '2' for no decrease).

X₄ = Neuropsychological stress (coded '1' for Yes and '0' for No).

X₅ = Education of the respondents (coded '1' for illiterate and '2' for literate).

X₆ = Current working status (coded '1' for Yes and '0' for No)

X₇ = Family Type (coded '1' for Nuclear, '2' for joint and '3' for extended).

X₈ = Diabetes (coded '1' for Yes and '0' for No).

X₉ = BP (coded '1' for high, '2' for low and '3' for normal).

X₁₀ = Smoking habit (coded '1' for Yes and '2' for No).

X₁₁ = Physical exercise (coded '1' for Yes and '2' for No).

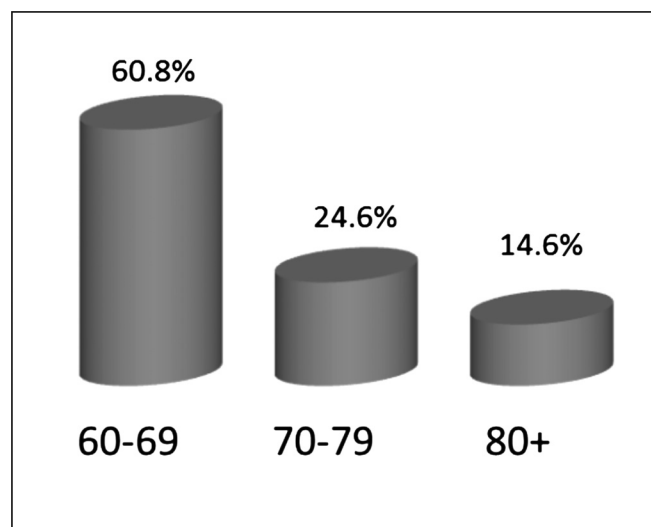
X₁₂ = Income Recoding (coded '1' for 0–9500, '2' for 10000–19500 and '3' for 20000 and above).

The results of logistic model are demonstrated in Table 4 (Appendix).

Result and Discussions

Figure 2 shows that a major fraction of the respondent (60.8%) were in the age group 60–69 and the values were 24.6 per cent and 14.6 per cent for the age group 70–79 per cent and 80+ respectively. A study conducted by Samad A and Abedin S (1998) found that majority of older people in Bangladesh are belong to the age group 60–69years and same findings was also found Uddin *et al.*, (2010) which has a similarity with the findings of this study (Figure 2).

Figure 2
Distribution of respondents by age (n=390)



In this study about 72.6 per cent respondents were male and 27.4 per cent were female. Most of the respondents came from income <9500(Tk.) group and married. About 56.7 per cent were illiterate, 82.1 per cent were Muslim and 62.1 per cent were from joint family. Only 21 per cent were currently working and most of them were self-employed (35.1), 72.8 per cent were suffering various diseases, 43.1 per cent were Hypertensive, 27.2 per cent were Diabetic patients and 58.2 per cent were suffering Psychological Stress or Acute diseases (Table 1).

Table 1
Percentage Distribution of population according to socio demographic factors.

<i>Characteristic</i>		<i>Observed</i>	<i>Percentage</i>
Age groups	60=69	237	60.8
	70–79	96	24.6
	80+	57	14.6
Sex	Male	283	72.6
	Female	107	27.4
Education	Illiterate	221	56.7
	Literate	169	43.3
Currently working	Yes	82	21
	No	308	79
Family Type	Nuclear	148	37.9
	Joint	242	62.1
Income	0–9,500	289	74.1
	10,000–19,500	70	17.9
	20,000 and above	31	7.9
Religion	Muslim	320	82.1
	Others	70	17.9
Marital Status	Married	367	94.1
	Unmarried/Widow/Divorce	23	5.9
Psychological Stress	Yes	227	58.2
	No	163	41.8
Health Status	Good	90	23.1
	Not Good	140	35.9
	Average	160	41
Diabetes	Yes	106	27.2
	No	284	72.8
BP	High	145	37.2
	Low	125	32.1
	Normal	120	30.8
Hypertension	Yes	168	43.8
	NO	222	56.9
Suffering from diseases	Yes	284	72.8
	No	106	27.2
Smoking habit	Yes	125	32.1
	No	265	67.9

Health Conditions of the Respondents

Health status of the present study subject represents surprising results and respondents Health status in different age groups are depicts in Table 2. It is found that about half of the respondent's health status are not good in the age group 70–79. And the value is 24.4 per cent for the age group 60–69 year. It is also found that with the increase of age of the elderly people, this value is also increase and this percentage is very high (68.4%) in the age group 80 and above. The major health problems faced by the elderly from age 80 and above in the urban area and same findings was found in the study “Social Status of Elderly People in Health Perspective: A Comparison of Rural and Urban Area” which was conducted by Mirza Amirun Nesa, Haque, Siddiqua and Imdadul Haque (Nesa, M.N. *et al.*, 2013) (Table 2).

Table 2
Health conditions according to their age group.

<i>Age Group</i>	<i>Good</i>	<i>Not good</i>	<i>Average</i>	<i>Total</i>
60–69	39.9%	24.4%	43%	100%
70–79	9.40%	45.8%	44.8%	100%
80 and Above	5.30%	68.4%	26.3%	100%

Factors Related to Health Status

Respondents Health status is observe according to their socio-demographic characteristics in Table 3(Appendix). In this table, it was found that almost all the socio-economic and health indicators are has significant ($P < 0.05$) relationship with the Health status of elderly people except gender, marital status, Smoking habit. Hossain *et al.*, (2006) has found in their study that elderly people suffer from various complicated physical diseases and the number is increasing day by day and this result is similar with findings of this study (Table 3, Appendix).

Logistic Regression Analysis

This study also makes an attempt to fit a logistic regression model of the treatment taking behavior of elderly in Sylhet. In logistic regression model it was found that Diabetes, BP and Income of the family has significant ($P < 0.05$) effects on Treatment taking behavior of elderly in Sylhet (Table 4, Appendix). This study also found that female respondents have

taken 1.675 times more treatment than the male respondents. Similar findings was found in the study “Health status and modeling of rural aged population of Kushtia District in Bangladesh” which was conducted by Islam, R. *et al.*, (2010). They found that female respondent takes more treatment than male respondent. Respondents who were suffering Diabetes and low BP have taken two times more treatment than those don’t have the disease. Respondents have severe decrease in food intake declination have taken 7.4 times more treatment than those not facing problems of Food intake declination (Table 4, Appendix).

Conclusion

The study indicate that most of the elderly are suffering from various types of diseases like Food intake declination, Hypertension, Psychological problem, Diabetes, BP, etc. It is concluded that health status of urban elderly people of Sylhet District in Bangladesh is not at satisfactory level and hence considering the significant correlated factors affecting it is important to take focused intervention for improving their health status. As the size of the elderly people increasing rapidly and there is no proper health security for the elderly people in Bangladesh hence health problem of elderly people may be a big future threat for Bangladesh if proper attention and policy of better health treat is not taken from now. Although Bangladesh has achieved a lot in health sector but has a lot to be achieved also in future. A national human resources policy and action plan, a national health insurance system and an interoperable electronic health information system are among the necessities in future.

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Appendix

Table 3
Distribution of health status of study subjects according to socio demographic factors.

Characteristics	Good		Not Good		Average		Total		Test of significance
	No.	%	No.	%	No.	%	No.	%	
Age of the respondent									
60–69	78	32.9	57	24.4	102	43	237	100	$\chi^2=57.85$, DF=4, P=0.0
70–79	9	9.4	44	45.8	43	44.8	96	100	
80+	3	5.3	39	68.4	15	26.3	57	100	
Sex									
Male	70	24.7	97	34.3	116	41	283	100	$\chi^2=2.0$, DF=2, P=0.3
Female	20	18.7	43	40.2	44	41.1	107	100	
Mobility									
Bed or Chair bound	0	0	17	94.4	1	5.7	18	100	$\chi^2=54.4$, DF=4, P=0.00
Able to get out of bed/chair	1	2.4	26	66.7	13	31	42	100	
Go out	89	27	95	28.8	146	44.2	330	100	
Food intake declination									
Severe decrease	16	11	75	51.7	54	37.2	145	100	$\chi^2=79.9$, DF=4, P=0.00
Moderate decrease	11	9.8	39	34.8	62	55.4	112	100	
No decrease	63	47.4	26	19.5	44	33.1	133	100	
Weight loss (Last 3-months)									
Loss (>3 kg)	22	11.6	101	53.2	67	35.3	190	100	$\chi^2=64.95$, DF=4, P=0.00
does not know	22	24.2	19	20.9	50	54.9	91	100	
No weight loss	46	42.2	20	18.3	43	39.4	109	100	
Psychological stress or Acute disease									
Yes	46	20.3	100	44.1	81	35.7	227	100	$\chi^2=15.70$, DF=2, P=0.00
No	44	27	40	24.5	79	48.5	163	100	
Neuropsychological Problem									
Yes	10	6.7	66	44	74	49.3	150	100	$\chi^2=37.0$, DF=2, P=0.00
No	80	33.3	74	30.8	86	35.8	240	100	

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Educational Status									
Illiterate	35	15.8	97	43.9	89	40.3	221	100	$\chi^2=20.73$, DF=2, P=0.00
Literate	55	32.5	43	24.5	71	42	169	100	
Current working status									
Yes	27	32.9	26	31.7	29	35.7	82	100	$\chi^2=5.7$, DF=2, P=0.058
No	63	20.5	114	37	131	42.5	308	100	
Family Type									
Nuclear	47	31.8	37	25	64	43.2	148	100	$\chi^2=15.9$, DF=2, P=0.00
Joint	43	17.8	103	42.6	96	39.7	242	100	
Income									
0–9,500	52	18	125	43.3	112	38.8	289	100	$\chi^2=32.18$, DF=4, P=0.00
10,000–19,500	25	35.7	9	12.9	36	51.4	70	100	
20,000 +	13	41.9	6	19.4	12	38.7	31	100	
Religion									
Muslim	65	20.3	122	38.1	133	41.6	320	100	$\chi^2=8.49$, DF=2, P=0.01
Others	25	35.7	18	25.7	27	38.7	70	100	
Marital Status									
Married	88	24	126	34.3	153	41.7	367	100	$\chi^2=7.105$, DF=2, P=0.02
Unmarried/Widow/Divorce	2	8.7	14	60.9	7	30.4	23	100	
Diabetes									
Yes	35	33	33	31.1	38	35.8	106	100	$\chi^2=8.12$, DF=2, P=0.02
No	55	19.4	107	37.7	122	43	284	100	
BP									
High	28	19.3	60	41.4	57	39.3	145	100	$\chi^2=15.44$, DF=4, P=0.00
Low	21	16.8	50	40	54	43.2	125	100	
Normal	41	34.2	30	25	49	40.8	120	100	
Hypertension									
Yes	34	20.2	73	43.5	61	36.3	168	100	$\chi^2=7.32$, DF=2, P=0.02
No	56	25.2	67	30.2	99	46.4	222	100	
Suffering diseases									
Yes	41	14.4	120	42.3	123	43.3	284	100	$\chi^2=46.9$, DF=2, P=0.00
No	49	46.2	20	18.9	37	34.9	106	100	
Smoking Habit									
Yes	31	24.8	35	28	59	47.2	125	100	$\chi^2=5.14$, DF=2, P=0.07
No	59	22.3	105	39.6	101	38.1	265	100	

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Treatment seeking Behavior								
Traditional	14	29.2	21	43.8	13	27.1	48	100
Allopathic	72	23.8	101	33.4	129	42.7	302	100
Homeopathic	2	13.3	5	33.3	8	53.3	15	100
All	2	8	13	52	10	40	25	100
Have sound sleep								
Yes	54	50	19	17.6	35	32.4	108	100
No	36	12.8	121	42.9	125	44.3	282	100
Living arrangement								
Single	14	16.3	46	53.5	26	30.2	86	100
Double	73	24.6	91	30.6	133	44.8	297	100
Others	2	33.3	3	50	1	16.7	6	100
Physical exercise								
Yes	61	59.8	20	19.6	21	20.6	102	100
No	29	10.1	120	41.7	139	48.3	288	100
Take Care								
Son	17	12.3	70	50.7	51	37	138	100
Daughter	1	7.7	8	61.5	4	30.8	13	100
Spouse	0	0	12	34.3	23	65.7	35	100
Self	64	34.6	44	23.8	77	41.6	185	100
Others	7	38.9	6	33.3	5	27.8	18	100

Table 4
Logistic regression of the estimates of the effects of different selected characteristics on taking treatment.

Characteristic	Coefficient (β)	Std. Error	Sig.	Exp (β)	95% Confidence Interval for Exp (β)	
					Lower Bound	Upper Bound
Intercept	6.748	2.039	0.001	0.936		
Age of Respondents	-0.066	0.021	0.002	0.936	0.898	0.975
Sex						
Female	0.516	0.454	0.025	1.675	0.689	4.075
Male						

Cont'd...

Cont'd...

Food intake declination						
Severe decrease	2.007	0.513	0.0001	7.442	2.723	20.337
Moderate decrease	0.537	0.422	0.203	1.711	0.748	3.917
No decrease r						
Neuropsychological stress						
Yes	0.006	0.375	0.988	1.006	0.482	2.097
Nor						
Education						
Illiterate	0.177	0.379	0.64	1.194	0.568	2.508
Literate r						
Current working status						
No	0.612	0.446	0.17	1.843	0.769	4.42
Yes r						
Family Type						
Nuclear	0.697	0.873	0.425	2.007	0.363	11.112
Joint	1.313	0.845	0.120	3.719	0.71	19.482
Extended r						
Diabetes						
Yes	0.957	0.292	0.001	2.605	1.47	4.615
Nor						
BP						
High	-1.119	0.39	0.004	0.327	0.152	0.701
Low	0.694	0.505	0.17	2.001	0.744	5.385
Normal r						
Smoking habit						
No	-0.544	0.428	0.204	0.58	0.251	1.343
Yes r						
Physical exercise						
Yes	-0.200	0.425	0.595	0.818	0.387	1.731
No r						

Cont'd...

Cont'd...

Income of the Respondents						
0-9,500	-3.121	1.099	0.005	0.044	0.005	0.38
10,000-19,500	-1.669	1.18	0.157	0.188	0.019	1.904
20,000 and above ^r						

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