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Effect of Deprenyl on Lipofuscin Accumulation in Rat Brain : A Histological Approach

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ABSTRACT

Deprenyl is a highly specific monoamine oxidase β -inhibitor, which retards the progression of Parkinson's diseases. Studies on the effect of deprenyl on lipofuscin accumulation in general as well as on the deep cerebellar nuclei of cerebellum in particular are scanty. In the context, the following experiments were conducted. Nine month old rats were treated with deprenyl for 2 weeks at a dose of 0.5mg/kg body wt/day orally. Histological and histochemical examinations of deep cerebellar nuclei of cerebellum were conducted. The lipofuscin stained in long Zeil-Neilson (ZN) test was observed under a Leica stereo microscope and quantified. Cytoplasmic area of lipofuscin was calculated and the mean value was taken. Student 't' test was done to see the level of significance. Dentatus, the lateral nuclei was with large neurons, while Interpositus was with comparatively less number of pyramid shaped nuclei and Fastigial nucleus was with flask shaped cells and found in the median position. The lipofuscin accumulation was found to decrease significantly ($P < 0.05$) in the treated rats compared to the control. Deprenyl was found effective in removing lipofuscin from the deep cerebellar neurons.

Keywords : Deprenyl, Lipofuscin, Deep cerebellar nuclei, Histological, Histochemical.

Free radical theory of aging (Harman; 1956) suggest that free radicals generated in excessive amounts from cellular reactions or from environment factors such as U.V. rays may damage cellular membrane and other components. Such damage can accelerate aging and bring about the death of the organism before its natural life span is

attained. The living body has a strong defense system involving a number of enzymes, which protects cells from the hazardous effects of the continuously produced free radicals. Superoxide radicals can attack poly unsaturated fatty acids (present in cellular membrane) to lipid peroxide which in turn, through enzymatic degradation become Malondialdehyde (Feeny-Burns *et al*., 1980; Halliwell, 1981; Zs. Nagy, 1985; Gupta, 1988).

Malondialdehyde usually cross links with free proteins, haemoglobin and nucleic acids in the cellular system and with further conjugation and polymerisation form a lysosomally indigestible yellowish autofluorescent pigment, lipofuscin that accumulates in the cell with age. The function of lipofuscin in cells, whether beneficial or harmful, is not known. However, since it accumulates with age there is a correlation with age. It is also found that the more the rate of lipid peroxidation, the greater the accumulation with lipofuscin. The accumulation of lipofuscin in non-replaceable, fixed, post mitotic cells like neurons is especially noticeable (Jayne, 1950; Hasan, 1985).

The only widely recognized method of extending maximum lifespan known till today is by calorie restriction with adequate nutrient supplementation. However, reports say that there are drugs to have potential of controlling ageing, though none is found fully effective. Deprenyl is yet another drug known to be a psychic energizer. It has some antidepressant effects too. It has been shown to protect nerve cells against a wide and growing number of neurotoxin, and has been shown to be a neurotrophic/neurorescue agent when nerve cells are exposed to damaging or stressful conditions. There are even reports that Deprenyl is a safe agent that enhance both quality and length of life (Norton *et al.*, 1990 ; Kitani *et al.*, 1992). Deprenyl is a highly specific monoamine oxidase β -inhibitor which retards the progression of Parkinson's disease by reducing the potentially damaging hydroxyl radicals by inhibiting the catalysis of catecholamine and could hence affect aging also (Lewin, 1985; Tetrad and Langston, 1989). Contrary to the above, there are studies which reveal that administration of deprenyl increases mortality in Wistar rats (Gallagher *et al.*, 1998). This feature has stimulated interest in this compound. The present study has also been done to examine the above effect with special emphasis on the deep cerebellar nuclear region.

Materials and Methods

Animals:

Ten male Wistar rats (9 months old) were procured from Kerala Agricultural University, Thrissur. The animals were acclimatized for 5 days before the experiment and maintained in room temperature as per the ethics prepared by the committee. Rats were fed with rat feed and were provided with water ad libitum mixed with vitamin B complex (Pfizer Limited).

Experimental group

The animals were divided into two groups (Group A and Group B) of 10 each. Animals of Group A were taken as control and fed with cheese balls. The other group of animals (Group B) was administered with Deprenyl orally at a dosage of 0.5mg/day/kg of body weight for two weeks in the form of tablets powdered and mixed in cheese balls. It was made sure that they consumed the whole of the cheese balls provided.

Histology and Histochemistry

After two weeks of drug administration, brain was removed from both the control and experimental rats and processed for histochemical and lipofuscin study.

Cerebellar sections were stained in Sudan Black B, Nile Blue Sulphate, Periodic acid Schiff and Long Zeil-Neelson Method for Lipofuscin (Pearse, 1962). Quantification of lipofuscin was done by observing the sections under high power using camera lucida. Camera Lucida diagrams were made on graph paper and the mean area of lipofuscin was determined. Slides were also observed both under low and high power to identify the deep cerebellar nuclei before the lipofuscin study.

Statistical analysis

Data was statistically analyzed by Students't' test to see the level of significance.

Results and Discussion

The deep cerebellar nuclei were identified from lateral to median order. The first nuclei is the dentatus nucleus (Fig: 1) and is observed to be the largest among the three and lateral in position, lying in the white matter of the cerebellum just lateral to the Interpositus nucleus.

In its whole length, the cells are distributed as an elongated narrow streak. The neurons are large, hexagonal and distally placed. The second nuclei identified was interpositus nucleus (Fig: 2). The interpositus nuclei was seen to be in interposition between dentate and fastigial nuclei. The neurons of interpositus are elongated and pyramidal shaped. The third nuclei noted in the deeper region was the fastigial nuclei (Fig: 3). Fastigial nuclei was marked at the median

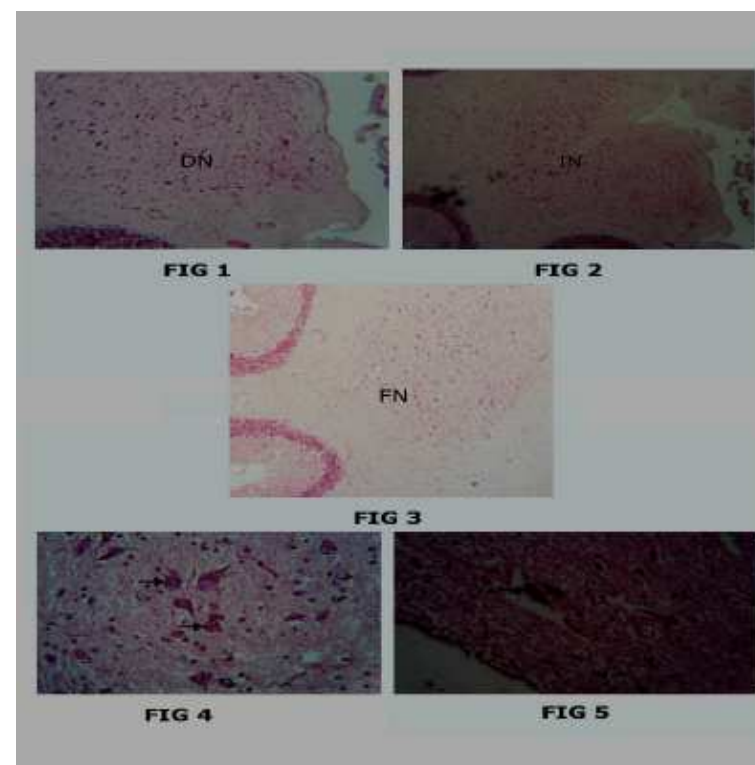


Fig 1: Sagittal section 40(x) of rat cerebellum showing Dentatus nuclei (DN).

Fig 2: Rat cerebellum section 40(x) showing Interpositus nuclei (IN).

Fig 3: Rat cerebellum section 40(x) showing Fastigial nuclei (IN).

Fig 4: Sections 40(x) treated with deprenyl showing (arrow mark) decreased lipofuscin accumulation

Fig 5: Control section 40(x) showing (arrow mark) neurons with intense lipofuscin accumulation

position of cerebellum near the midline in the roof of the fourth ventricle. It is the longest nucleus when compared to other two. Fastigial nuclei under low power shows a kidney shaped structure. The neurons were flask or oval shaped with clear lightly stained nucleus and a darkly stained nucleolus.

In the treated sections neurons were lightly stained with a clear cytoplasm. The cytoplasmic area showed few darkened pink spots of lipofuscin accumulation also though lesser than the control sections in ZN stained sections (Fig: 4). The neurons possessed a well differentiated nucleus and a nucleolus. In control sections neurons were darkly stained with increased lipofuscin accumulation (Fig: 5). Some of the neurons also showed disintegration. The control slides also showed a large number of autolysed neurons. Lipofuscin accumulation was found perinuclearly as well a juxtannuclearly (Fig: 5).

In the present investigation, the lipofuscin accumulation in the deprenyl treatment was found to be reduced when compared to the control brain. The treated animals showed 38.4% cytoplasmic area when compared to 46.4% lipofuscin in the control ones. The reduction being to a tune of 17% which is significant at $P < 0.05$ level. The drug seems to protect nerve cells against a wide and growing number of age related changes (Knoll, 1988) and hence lesser lipofuscin accumulation. The work of Carrillo (1994) also proved that deprenyl boosts the level of body's own antioxidant enzyme in the brain. The results of the work by Kaur *et al.* (2003) essentially indicated that chronic treatment of rats with L-Deprenyl significantly influenced the aging-related alterations in multiple unit action potentials. The levels of lipid peroxidation products were decreased, and lipofuscin accumulation was diminished.

Antioxidants are one of the defense mechanisms in living systems to withstand the free radical attack. The drug used in the present study must have attenuated the free radical accumulation. Lipofuscin is present virtually in every type of neurons. Like in the present study which is focussed only on the neurons of the deep cerebellar nucleus, there are evidences that lipofuscin accumulation is prominent in other areas of brain and spinal cord involved in initiating, monitoring and controlling movements including dentate nuclei of cerebellum.

Moreover, an increased accumulation of lipofuscin was noticeable in the cytoplasm of Purkinje neurons of old rats as well as an increase in MAO-B activity in the molecular layer of the cerebellar cortex (Amenta *et al.*, 1994). Protein malnourishment, enzyme alterations (Marguerite, 2005) and environmental factors like UV etc. (Sharma and James, 1994) can also lead to lipofuscin accumulation. The reduction in the lipofuscin content in the treated rats may be due to increase in the free radical scavenging enzymes thereby reducing lipid peroxidation and lipofuscin accumulation. However, Ingram *et al.* (1993) suggested that no age or deprenyl effects were observed with respect to cell counts in the substantia nigra and nigral cells containing lipofuscin increased with age, but this neurohistochemical parameter was also unaffected by deprenyl treatment.

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Gouty Arthritis Incidence in Senile Urban Population in Relation to Food Habit

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ABSTRACT

Gouty arthritis – an inflammation of the joint accompanied by pain, stiffness and movement difficulties is a chronic old age disease rendering the life of the individual highly miserable. In consideration of purine-rich dietary intake being a predominant associated factor, this study aimed at assessing relationship between disease incidence and food habit. Relevant data were raised through random sample survey of 1192 urban elderly persons of both the sexes in the 60+ age group residing within territorial jurisdiction of Municipal Corporation, Darbhanga (Bihar). where a sizeable population suffer from gouty arthritis. Results showed that non-vegetarian lot outnumbered their vegetarian counterparts in both the genders and indicated a positive correlation between non-vegetarian food habit and disease prevalence. Surprisingly enough, mean BMI values for none of the categories suggested overweight or obese conditions in the target group and hence, weight gain impact upon gout incidence in the chosen age segment could not be established.

Keywords : Elderly, Food habit, Gouty arthritis, Hyperuricemia, Joint pain, Senile

Senescence-mediated deteriorations are widely observed in sixties with relatively greater severity. These crucial years in human life witness rapid changes in physiopathology of older subjects culminating in diverse metabolic dysfunctions. Gouty arthritis, viewed as a physical discomfort induced by hyperuricemia (Wolfe, 1991),

causes inflammation of the joints with accompanying pain, stiffness and movement difficulties. This chronic disease essentially characterized by episodes of acute inflammation and pain usually occurring in one or more synovial joints (Agudelo and Wise, 2001) enhances mortality and morbidity greatly. In the given backdrop of recent emphasis on disease management (Doornum and Ryan, 2000) and purine intake supposedly a major risk factor (Li-Ching *et al.*, 2003), the present study was undertaken with a view to assess possible correlation between gout and food habit.

Materials and Methods

Relevant data pertaining food habit (vegetarian/ nonvegetarian), height, weight and gouty arthritis incidence were collected from randomly sampled 1192 urban elderly in the 60+ age group residing within territorial jurisdiction of Municipal Corporation, Darbhanga, a district headquarters of North Bihar through questionnaire/personal visit. Patients with a history of hyperuricemia reporting serum uric acid concentration above 7mg/dl for men and 6 mg/dl for women (Varley, 1976) with or without medication and with distinctive disease symptoms were identified as gouty arthritis patients. Both male and female patients were included in this study in consideration of gender bias in gout prevalence (Puig *et al.*, 1991). Mean BMI values for all categories were calculated.

Results

A sizeable urban elderly population (19%) comprising largely of men (12%) were found to suffer from gouty arthritis (Fig. 1). Non-vegetarian lot (97 % men and 88 % women) outnumbered their vegetarian counterparts (3% men and 12% women). The percentage of population comprised non-vegetarian and vegetarian to be 92.5 and 7.5 per cent respectively (Fig. 2). The overall mean BMI of the total population comprising both the genders was 23.59. However, mean BMI values for men and women categories suffering from the disease were 22.97 and 24.66, respectively. Majority of subjects reported onset of disease in earlier life between late forties and early fifties.

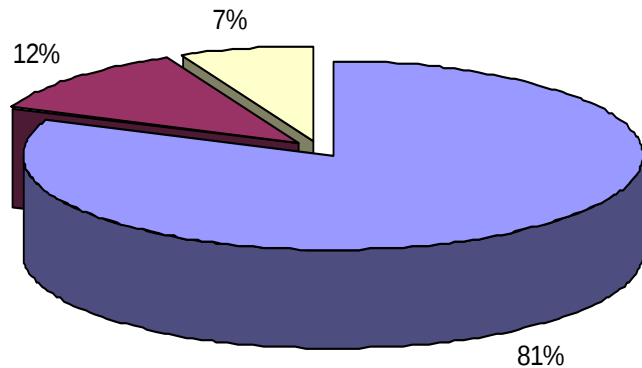


Fig. 1. Gender Difference in Gouty Arthritis Incidence in Urban Elderly Population (Men 12% and Women 7% out of a total population of 1192 surveyed)

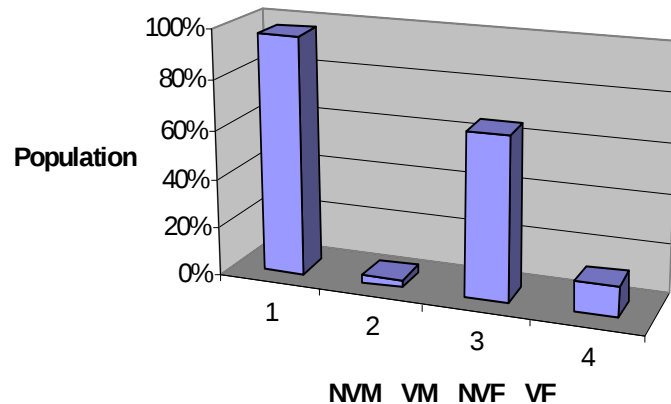


Fig.2. Gender & Food Habit Differences Among Urban Elderly With Gout

Discussion

Higher disease incidence among urban elderly men with non-vegetarian food habit might be linked to intake of high purine diet predominantly in the form of red meat (3-7 servings per week) and other edibles from plant sources. However occasional non-vegetarians did not show any significant trend of disease prevalence. Disease occurrence among vegetarian urban elderly comprising merely 7.5 per cent of the total population could have been possibly facilitated by relatively lowered purine intake and intake of gout-protective food items such as fruits and vegetables rich in dietary fiber, folate and vitamin C (Russell, 2002). Pan *et al.* (1992) also reported lower serum uric acid concentrations among the vegetarians.

Lowered solubility of uric acid in water seems to play some role in maintaining its lowered excretion rate even in normal aging. Age-associated Ca^{++} depletion lead to bone /joint degradation besides probable rise in synovial fluid density with age as a result of decrement in lean body mass and total body water (Kane *et al.*, 1994) might induce prolonged hyperuricemic conditions. Further, progressive decrease in kidney weight (Tauchi *et al.*, 1971), decline in renal blood flow (Faubert and Pourush, 1998), reduction in the number of kidney tubules (Jha and Rizvi, 2005) and rapid glomerular loss (Beck, 2000 and Silva, 2005) with advancing age may produce cumulative effect in facilitating deposition of monosodium urate crystals precipitated from supersaturated body fluids forming tophi at the vulnerable joints and, in extreme cases, deposition in the collecting tubules and lower urinary tract leading to stone formation with serious pathologic implications..

However, the present findings did not support possible link between weight gain and disease as reported by earlier workers (Choi *et al.*, 2000 and Takahashi *et al.*, 2000). This might be attributed to disease onset in majority of the cases at earlier age with expectedly higher tendency to obesity.

A food habit encouraging intake of preferably low purine vegetarian diet may be recommended for older subjects residing in stressful urban societies. This is perhaps all the more desirable in our population where regimen of calorie requirement with food intake is hardly followed. A lifestyle promoting adequate physical activity and

daily dietary intake in tune with altered nutritional requirement in senility (Singh and Lal, 2004) may be regarded helpful in drug-independent disease management.

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A Study on Health and Nutritional Status of Very Old Elderly (85+ Years) and Centenarians

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ABSTRACT

One hundred forty elderly subjects belonging to different age groups i.e. 65-74yrs(n=40), 75-84yrs(n=40), 85-92yrs(n=30) and 93-104yrs(n=30) were assessed to identify determinants of healthy aging and longevity. The information related to socio demographic profile (SES), lifestyle factors and general health profile was collected through a questionnaire, nutritional status by anthropometric measurements and clinical parameters, diet related information by 24 hr dietary recall, food frequency and general dietary profile. Mental health status of subjects was assessed using four scales i.e. Geriatric Depression Inventory (GDI), Mini Mental State Examination (MMSE), Cognitive Impairment Test (CIT) and Self Esteem Rating Scale (SERS) and Disease profile by checklist method. Data on elderly with good fitness was compared with elderly showing poor fitness. Data on SES showed that majority of male elderly were married (68%) and majority of female elderly were widows (58.4%). With respect to dietary intake a significant difference was found in the intake of beta-carotene, folic acid and vitamin C when compared between RDA and various age groups. Majority of elderly had normal CIT scores. Most prevalent minor illnesses were lethargy and pain in joints. Elderly with good fitness had a more regular meal pattern, had antioxidant rich diet, were actively involved in daily activities and had high self-esteem. Thus, healthy aging seem to be closely associated with healthy lifestyle in terms of regularity, diet and activity pattern.

Key words : healthy aging, longevity and centenarians

Aging refers to normal, progressive and irreversible biological changes that occur over an individual's life span. Aging is a constant, predictable process that involves growth and development of living organisms. Aging can also be defined as a state of mind, which does not always keep pace with our chronological age. Attitude and coping with the normal changes, challenges and opportunities of later life may best define our age.

On the other hand there are many who enjoy good health even at later stages of life. According to New England centenarian study. Perls *et al.*, (1991) centenarians have delayed or avoided age related health problems like cancer, stroke etc. In light of the existing evidences present study was planned with the central objective of assessing the health and nutritional status of elderly and comparing the healthy elderly with the younger counterparts with health problems at an early age, to look into the factors responsible for healthy aging and longevity. The study further aimed at comparing the effect of lifestyle factors on health of the elderly in later age.

Methodology

A total of 140 subjects were selected from various zones of Baroda city using purposive sampling and snowball technique. These elderly subjects were divided into four groups (65-74yrs, 75-84yrs, 85-92yrs, and 93-104 yrs) in section I with 40 subjects each in first two groups and 30 subjects in last two age groups. In section II, selection of 15 subjects from each group further made two groups. The groups comprised of elderly with poor fitness named as group A and elderly with good fitness named as group B. The two groups were formed on the basis of BMI, clinical parameters, disease profile, age of requiring external help and mental health status of elderly subjects.

The data was collected on socio demographic profile and lifestyle factors using questionnaire, Nutritional status by antropometric measurement and clinical assessment, dietary profile using 24 hour dietary recall, food frequency and general health profile by questionnaire, mental health status by GDI, MMSE, CIT and SERS and finally disease profile using checklist method.

Results and Discussion

Assessment of Health and Nutritional status of Elderly subjects Belonging to different Age Groups (65-93+Yrs)

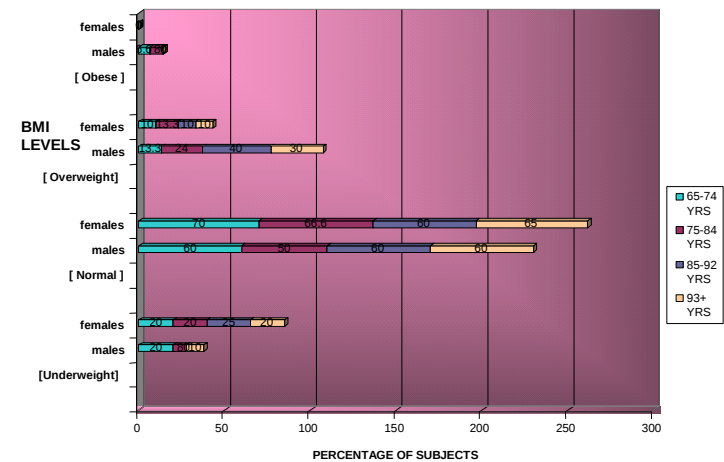
Data on socio demographic profile showed that majority of male elderly were married (68%), lived with their spouse's and majority received external help for daily activities from their spouse. On the other hand majority of female elderly were widows (58.4%), lived with their families and a 68% of them were dependent on their family members. With regard to lifestyle factors mean time spent on activity of daily living increased with advancement of age. Percentage of addiction in subjects towards cigarette and bidi was also more in age groups of 65-74 yrs and 75-84yrs as compared to their older counterparts. Bennett (2002) reported that low levels of social engagement either have a direct effect on mortality or represent hidden health outcomes.

Data on nutritional status revealed higher prevalence of overweight in 85-92yrs age group whereas that of obesity was found in 75-84yrs age group. A study on 152 elderly in an urban area of Karnataka reported that 28.3% of them had normal weight, 29.6% were underweight, 31.6% were severely underweight and 6.6% overweight and 3.9% were obese (Sarojini *et al.*, 1990). Figure 1 shows the percentage of subjects showing BMI levels belonging to different age groups.

Majority of elderly males and females belonging to different age groups had moderate degree of anemia. Equal number (50%) of total subjects had normal and abnormal glucose levels with highest prevalence (63.3%) of normal levels in 93-104yrs age group. Parnami *et al.* (2005) on 250 elderly above age of 60 years of age reported that 28.4% suffered from mild degree anemia, 2.2% from moderate anemia and 1.2% from severe anemia.

With respect to dietary intake a significant difference was found in the nutrient intake of beta carotene, folic acid and vitamin C when compared to RDA among various age groups. Majority of subjects in

FIGURE 1: PERCENTAGE OF SUBJECTS SHOWING BMI LEVELS BELONGING TO DIFFERENT AGE GROUPS



all the age groups consumed less than 50% of the RDA of beta carotene and 76-100% of the RDA of vitamin C. Data on food frequency and general dietary information showed that frequency of consumption of antioxidant rich food was irregular in age group of 65-74yrs and 75-84 yrs. Majority of subjects (75%) were vegetarian.

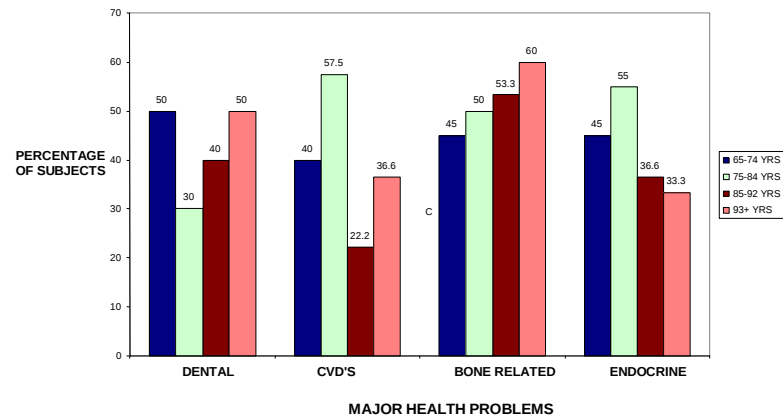
General health conditions of the subjects revealed that majority of elderly in age groups of 75-84yrs (62.5%), 85-92yrs (53.3%) and 93-104yrs (63%) wore dentures. Chhabra (2001) studied 80 edentulous elderly subjects and reported that 50% and 65% of subjects had non-frequent consumption of calcium rich foods and hard to chew foods respectively. Fifty five percent of subjects in 65-74yrs age group and 75-84yrs age group had pain in bones and 53.3% of elderly in 93-104yrs age group experienced difficulty in standing.

Data on mental health status showed that according to GDI and MMSE the prevalence of depression was found to be highest in age group of 75-84 years old elderly (55%). Around fifty six percent of total subjects were falling under normal category and about 43.3% of subjects in 93-104yrs age group were found to be abnormal according

to CIT. Shapiro *et al.* (2007) conducted a study on 10 men and 27 women aged 60 yrs and above showed that yoga appears to be a promising intervention for depression.

With respect to disease profile, data on major and minor illnesses were dental problems, endocrine problems, CVD and bone related problems, whereas lethargy, lack of appetite and pain in joints were most prevalent minor problems reported among all the age group subjects. Figure 2 depicts the percentage of subjects belonging to different age groups showing major health problems.

FIGURE 2: PERCENTAGE OF SUBJECTS BELONGING TO DIFFERENT AGE GROUPS SHOWING MAJOR HEALTH PROBLEMS



Identification of factors contributing to healthy aging and Longevity

With respect to section II, where an attempt was made to explore determinants of healthy aging and longevity by comparing the elderly having poor fitness (group A) with the elderly having good fitness (group B), a significant difference between the time spent on various activities in past and present was found (Table 1).

Table1 : Mean hours spent (at present and past) on different activities by subjects belonging to two groups.

Sr. No.	ACTIVITIES	GROUP A (n=15) PAST		GROUP B (n=15) PRESENT		t-test PRESENT
1.	DAILY ACTIVITIES	31.5±2.59	42.8±2.12	44.9±2.9	47.6±2.32	6*
2.	LEISURE ACTIVITIES	117 ±1.8	135.5±2.3	134.3±2.06	138.8±2.88	3.6*
3.	RELEGIOUS ACTIVITIES	10.8±8.71	22.1±8.12	29.7±8.31	34±8.08	4.1*
4.	EXERCISE TIME	25.2±9.64	11.3±9.79	27.6±8.28	23.8 ±9.26	3.6*
5.	YOGA & MEDITATION	2.7±7.42	41±9.8	10.2±8.83	12.5±9.32	2.3*

* Significant at p = 0.05

GROUP A: - ELDERLY WITH POOR FITNESS

GROUP B: - ELDERLY WITH GOOD FITNESS

Data on dietary intake (table 2) showed that the consumption of calcium, vitamin C, folic acid and beta carotene in elderly with poor fitness (group A) when compared with the RDA was significantly different from the subjects in group B (elderly with good fitness) who showed nutrient intake closer to the RDA. Subjects from group B (elderly with good fitness) had a more regular meal pattern.

Table 2: Mean nutrient intake of selected nutrients by subjects belonging to two groups as per the RDA.

S. No.	Nutrients	RDA n=15	Group A n=15	Group B	t-value
1	Calcium (mg)	400	287±90.69	492±101.94	5.8*
2	Vitamin C (mg)	40	21±4.44	32.2±6.52	5.5*
3	b-Carotene (mg)	2400	611±100.1	1583±363.88	9.9*
4	Folic acid (mg)	100	50.9±22.9	76.4±26.84	2.8*

* Significant at p = 0.05

GROUP A: - ELDERLY WITH POOR FITNESS

GROUP B: - ELDERLY WITH GOOD FITNESS

With regard to some of the selected food items (table 3) also subjects from group-B were found better in consuming vitamin and mineral rich foods. The figure in the table showed that elderly with good fitness increased the consumption of healthy foods whereas; elderly with poor fitness decreased the consumption of same foods reflecting on their nutritional status.

Table 3 : Percentages of subjects showing change in last 5 years related with consumption of selected food groups in subjects belonging to two groups.

FOOD GROUPS	GROUP A(n=15)		GROUP B (n=15)	
	% (n) decrease	% (n) increase	% (n) decrease	% (n) increase
MILK & MILK PRODUCTS	60(9)	26.6(4)	20(3)	80(12)
FRUITS	66.6(10)	33.3(5)	26.6(4)	73.3(11)
VEGETABLES	53.3(8)	46.6(7)	13.3(2)	86.6(13)

GROUP A: - ELDERLY WITH POOR FITNESS,

GROUP B: - ELDERLY WITH GOOD FITNESS

Hence the present study has proved fruitful in exploring the determinants for healthy aging and longevity.

Conclusion

Antioxidants rich diet, regularity in meal consumption, moderate level of physical activity and involvement in activities like meditation and yoga were some of the determinants of achieving good health in later old age.

The study clearly indicates the following :

1. Good fitness among very old elderly (85+yrs) and centenarians seem to be associated with diet rich in antioxidants, regularity of meals, high self esteem and involvement in regular physical activities, religious activities, yoga and meditation.
2. High intake of saturated fats, irregular meals and addiction towards alcohol and smoking in young age seem to be major culprit of high morbidity prevalence in old age.

3. Low intake of antioxidants, lack of family support, high morbidity profile and low self esteem appear to be the causative factors for depression in elderly.
4. Unhealthy lifestyle can deteriorate mental functioning like cognition and memory.
5. Physical independence of elderly in later life is closely linked with healthy lifestyle.

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Sustained Attention Capacity in Elderly People: A Review

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ABSTRACT

Ability to sustain attention over extended period of time is important for the quality of life in elderly people. This paper presents a review of nine studies which examined the effect of healthy aging on vigilance performance. Overall vigilance and vigilance decrement has been taken as performance measures of sustained attention. Young adults have consistently performed better than older adults on overall vigilance measures (accuracy and speed) in all the studies that have been reviewed except one in which old adults performed better than young adults. However, significant age difference was not found across time periods on vigilance performance. These studies also suggest that under the condition of high task demand (high event rate, spatial uncertainty and perceptual degradation) the age differences on sustained attention task performance can be magnified.

Key words : Sustained attention, Aging, Overall vigilance, Vigilance decrement

The “longevity” revolution has increased the focus on many aspects of healthy aging. Cognitive vitality is essential to the quality of life in old age and is affected by both ‘normal cognitive aging’ and diseases that cause dementia. Changes in cognitive functions which accompany healthy ageing include decline in functions such as episodic and working memory, attention and inhibition. Among these cognitive changes attention is considered to be the fundamental component as it is gateway to rest of the cognition. Deficiency in

attentional resource has been considered as an important factor in aging, causing inefficiencies rather than losses (Craik & Byrd, 1982).

Attention is a necessary component of everyday skills such as driving or interacting with technology and measuring attentional abilities among older adults would allow prediction of continued success or failure with vigilance tasks of everyday life. Attention is a mechanism by which certain aspects of the environment are selected for further processing while others are ignored. It can be divided into three main categories: (i) *selective attention*; ability to focus on relevant and to ignore the irrelevant information; (ii) *divided attention*; the ability to attend two or more sources of information simultaneously; and (iii) *sustained attention*; the ability to maintain the focus of attention on one or more sources of information over relatively longer period of time.

The ability to sustained attention over extended period of time is important for maintenance of quality of life in elderly people. Various activities such as reading, TV and film viewing and driving require sustained attention. Thus, the ability to attend over a period of time is not only central to enjoyment of various hobbies but also essential to safety of older people. So, before going in details of the studies which have examined age differences on sustained attention performance we will briefly discuss the factors that affect vigilance performance.

1. Sustained attention

The ability to remain vigilant over longer period of time is critical for many everyday tasks but controlled laboratory studies of sustained attention have revealed that performance declines over time when the observers’ are required to respond to infrequent signals (targets) occurring at random intervals in a sequence of standard non-signal events (non-target). Most of the tasks used in the studies of sustained attention are the variation of the Clock Test used by Mackworth (1948). In the Clock Test, observers monitored a pointer moving in single step increments across a blank clock face for 2 hours and were instructed to indicate when they detected a rare “double jump” in the movement of the pointer. Typically, performance declines over time, with the greatest decrement in correct detections occurring within the first 15-20 minutes (Davies & Tune, 1969).

The decline in the detection rate of critical targets with time on task is the fundamental problem of sustained attention and is termed as *vigilance decrement*. Several theoretical explanations have been proposed to explain the classic vigilance decrement like arousal model (Frankmann & Adams, 1962), mindlessness model (Manly, Robertson, Galloway, & Hawkins, 1999; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997) resource model (Davies & Parasuraman, 1982). Furthermore, signal detection theory explains this decrement in terms of sensitivity (d') and response criteria ($\hat{a}$). It proposes that decline in performance results either from decrement in sensitivity (d') or as the time passes the observer sets stringent criteria for detecting signals leading to decrease in detection rate. *Overall vigilance* (i.e. overall performance on correct detection rate for the target) is another indicator of sustained attention performance. In the present review, we will focus on both i.e. age differences in overall vigilance and vigilance decrement.

2. Factors affecting Vigilance Performance

Performance on sustained attention is affected by three broad classes of variables which include task parameters, extraneous environmental or situational variables, and individual subject characteristics (e.g. age, sex, etc.). Tasks manipulations such as event rate i.e. rate of presentation of stimulus events (Jerison & Pickett, 1964; Parasuraman, 1979; Warm & Jerison, 1984), stimulus quality (Nuechterlein, Parasuraman & Jiang, 1985), and memory demand (Giambra & Quilter, 1988; Parasuraman, 1979) have been shown to influence rate of decline of performance during vigilance. These manipulations have been hypothesized to influence target detection by taxing subject's limited attentional resources.

3. Age differences on Sustained attention task

As the projected graying of population continues to increase, there is a need to examine vigilance capacities in aged people. The literature contains relatively few investigations of age differences in vigilance task performance, and those that exist show little evidence for age related declines in performance across time (Giambra, 1997).

Studies of age differences in sustained attention suggests that detection efficiency tends to decline with age from around the late 50's to early 60's onwards. The magnitude of age deficit depends on the

nature of vigilance task being performed (Davies & Parasuraman, 1982). Early laboratory studies of sustained attention in older persons yielded conflicting results. Several studies found that sustained attention of young and older persons on vigilance tests did not differ (Davies & Griew, 1963; Griew & Davies, 1962; Neal & Pearson, 1966; Tune, 1966; York, 1962); other studies reported that older adults were less efficient than young adults on vigilance task (Davies, 1968; Davies & Davies, 1975; Harkins, Nowlin, Ramm, & Schroeder, 1974; Surwillo & Quilter, 1964; Talland, 1966; Thompson, Opton, & Cohen, 1963).

Davies and Parasuraman (1982) reviewed 11 studies related to age differences in vigilance performance. In six of the studies, they found lower detection rate among older adults, while in four studies, false alarm (FA) rate was higher in older adults. Out of the six studies in which the detection rate of older individuals were lower, four showed that detection efficiency declined at a faster rate with time on task.

Studies have reported inconsistent findings regarding age differences in vigilance performance. Some studies suggested age differences while others showed no significant age difference in vigilance performance. The present paper is an attempt to review some of the studies which examined the effect of normal aging on sustained attention task performance. The studies which we have reviewed had used visual (sensory or cognitive or both) vigilance tasks.

Overall vigilance and vigilance decrement have been taken as measure to look at the difference between young and old adults on vigilance task. Results obtained from nine studies of age and vigilance is shown in **Table 1** from which it can be seen that older individuals have consistently performed poorly on overall vigilance than younger individuals. While in case of vigilance decrement, no significant age difference in performance has been found. Studies also pointed out conditions under which vigilance decrement become apparent i.e. when task demands are increased under conditions of high event rate and high spatial uncertainty or high perceptual degradation level condition.

4. Age difference in Overall vigilance

Correct detection (hits) and incorrect detection (false alarms) has been taken as the performance measures of overall vigilance in the

studies reviewed in this paper. Young adults have consistently performed better than old adults on correct detection except one (Tomprowski & Tinsley, 1996) in which older adults did more hit than young adults while Berardi, Parsuraman & Haxby (2001) reported equivalent performance in all the groups on hit rates (accuracy). Also, older adults did more false alarms than young adults. Thus, on overall level of vigilance young adults performed better (more hits and less F.As.) compared to older adults (less hits and more false alarms). In some of the studies (Surwillo & Quilter, 1964; Berardi, et al., 2001; Bunce & Sisa, 2002) reaction time (RT) have also been reported which showed that older adults were slower than young adults but the difference was not significant.

Signal detection theory tries to explain this lower level of performance on overall vigilance in terms of sensitivity and response criteria. The theory proposes that decrement in sensitivity is more in older adults and they use stringent response criteria which results in lesser number of correct detection. Previous studies (Botwinick, 1984; Okun, 1976) have reported that older subjects become more conservative over time on task, i.e. as the task proceeds, older subjects may tend to say “yes” to a target only when they are absolutely sure about the exposed target.

5. Age Differences in Vigilance Decrement

Majority of studies reviewed in this paper have shown age differences in overall detection but not in the rate at which detection efficiency declines with time on task. An exception is the study of Surwillo and Quilter (1964), who found age related decrement in both overall vigilance and vigilance decrement. Later, Giambra and Quilter (1988) re-analyzed the Surwillo and Quilter (1964) data by adding a longitudinal component and they found overall reduced detection accuracy in older adults compared to younger subjects but no age difference was found in detection accuracy over time.

However, Parsuraman and Giambra (1991) showed clear age differences in both absolute level of performance and time on task decrement in sustained attention. They hypothesized that reduced perceptual and information processing abilities of older adults (i.e. non-sustained attention component of the task) are responsible for the

Table 1: A summary of principle features of 9 studies of age and sustained attention

Source	Task	Task Duration	Task Type	Composition of Age Group		Overall vigilance	Vigilance decrement
				Mean Age	Age Range		
Surwillo & Quilter (1964)	Mackworth's Clock Test	60 min.	Sensory	Y(43.7) N=53 O(71.0) N=53	22-82	Hit: Y>O RT: nsd	Yes O>Y
Deaton & Parsuraman (1993)	Digit discrimination Task Sensory: Discriminate the physical size of 2 digits Cognitive: T:even:odd NT: odd:odd, even:even	32.4 min. (10.8 min each block.)	Sensory (high & low event rate) Cognitive	Y(20.3) N=20 MA(45.7) N=20 O(72.8) N=20	Y=18-29 MA=40-55 O=65-85	High event rate Hit: MA>Y>O FA: O>MA>Y Hit: Y>MA>O FA: O>Y>MA	Yes: O>Y (significant only for sensory task)
Experiment 2			Sensory Cognitive	Y(22.5) N=10 O(70.2) N=10	Y=18-29 O=67-76	Hit: sd, Y>O FA: sd, O>Y Hit: nsd, Y>O FA: sd, O>Y	No
Filley & Culhum (1994)	Numerical attention test			Y(63.9) N=20 O(74.8) N=18	Y=50-69 O=70-79	RT: Y<O	---
Mouloua & Parsuraman (1995)	Letter detection task (event rate – high, low spatial uncertainty-low, moderate, high)	30 min.	cognitive	Y(19.2) N=36 O(67.0) N=36	Y=18-24 O=60-74	Hit: sd, Y>O FA: nsd d' decrement more in O than Y	Yes, (only for high event rate & high spatial uncertainty)
Tomprowski & Tinsley (1996)* Experiment 2	Continuous digit matching vigilance test	60 min.	cognitive	Y(18.9) N=15 O(67.9) N=15	Y=18-20 O=61-79	Hit: O>Y FA: nsd	No
Giambra (1997)	Detection of rectangle target (15x17mm) and nontarget (17x19mm)	30min.	Sensory	---	Y=18-44 MA=45-59 O=60-85	FA: sd, O>Y Hit: MA>Y>O FA: Y>MA>O	No
Bunce (2001)#	Neuchterlin, et. al (1983) task (3 levels of degradation)	10 min. each condition	sensory	Y(24.04) N=24 O(68.7) N=24	Y=21-30 O=61-83	RT: O>Y	Yes O>Y
Berardi, Parsuraman & Haxby (2001)	Neuchterlin, et. al (1983) task 6 levels of degradation	8.1 min. (each level)	Sensory	Y(29) N=21 MA(51) N=21 O(67) N=20	Y=20-39 MA=40-59 O=60-73	FA: sd, O>Y	No
Bunce & Sisa (2002)^	Neuchterlin, et. al (1983) task (3 levels of degradation)	9 min. test session	sensory	Y(27.8) N=26 O(52.2) N=26	Y=16-35 O=45-65	Hit: nsd, Y>O FA: nsd, Y<O RT: nsd, Y>O	Yes, but age effect not significant

*Also investigated the effect of motivation (monetary reward) and memory demand on vigilance. # Also investigated the influence of health-related physical fitness on age differences in vigilance as complexity. ^ Also investigated the age differences in perceived workload.
Y-young adults; MA-middle age; O-old adults, RT- Reaction Time, FA- False Alarm; d'- sensitivity sd - significant difference, nsd- no significant difference, ' T - Target, NT - Non-target

age differences. However, using the same task procedure Giambra (1997) was unable to find age differences. They proposed that sampling bias, power differences, and undetected visual difficulties could be the probable reasons for the outcome.

Out of nine studies that reviewed here, four of them (Tomprowski & Tinsley, 1996; Giambra, 1997; Berardi, et al, 2001; Bunce & Sisa 2002) had failed to find age differences in vigilance decrement while other studies have pointed out the conditions under which age differences can be seen.

5.1 Task type

The effect of adult ageing on vigilance depend on the nature of vigilance task performed (Davis & Parsuraman, 1982). Most of the studies reported in this paper, had used either sensory task (having perceptual characteristics such as luminance, duration, or loudness) or cognitive tasks (target is defined symbolically, such as letters, digits or words). These studies have suggested that cognitive vigilance task is less susceptible to decrement in performance over time on task than sensory vigilance tasks.

Deaton and Parsuraman (1993) compared age differences in sensory and cognitive vigilance. They found that sensory and cognitive vigilance task produced different patterns of responses, vigilance decrement and age differences in detection efficiency being observed only in sensory but not with cognitive vigilance task. Further, Mauloua and Parsuraman (1995) studied the age related differences in cognitive vigilance and found age related difference in performance only under conditions of high event rate and high spatial uncertainty.

5.2 Event rate and stimulus quality

High event rate and high stimulus degradation affects the performance as it increases the demands on perceptual capacity of the individual. Low event rate (less than 30 events per minute) is relatively insensitive to the effect of old age (Giambra & Quilter, 1988) while age differences in vigilance performance are magnified in high event rate condition (Parsuraman & Giambra, 1991; Parsuraman, et al., 1989).

Giambra (1997) argued that factors such as stimulus exposure time and degree of signal non-signal discrimination are responsible for age differences in vigilance. And age differences are greater when the level of stimulus degradation is high (Parasuraman, et al., 1989; Bunce, 2001). However, Berardi, et al. (2001) investigated age differences in sustained attention using a high event rate digit discrimination task at six levels of stimulus degradation. A trend for lower overall vigilance in older adults was observed but there was no age related decrement in sustained attention over time.

Usually older adults are less efficient than young ones on sustained attention task when task demands are high. However, Tomporowski and Tinsley (1996) in their study reported a surprising finding in which older adult's detection efficiency was found to be superior to young adults in a 60 minute cognitive vigilance task. They attributed these somewhat surprising findings to greater intrinsic motivation of the older individuals and to participants' selection bias. But their results supported other findings that vigilance decrement was not substantially affected by ageing.

Conclusion

The studies that have been reviewed provide evidence in support of the view that overall level of sustained attention is lower in older individuals i.e. elderly people are less accurate and are slower than young adults on vigilance task. But the ability to maintain attention over relatively longer period of time is not affected by ageing. However, as the processing demands of vigilance tasks are increased by varying event rate and stimulus degradation, more pronounced age differences are seen. Further, the type of task (sensory or cognitive) also affects the performance differently. Sensory vigilance task shows more decrement in older adults compared with young adults as sensory perceptual abilities decline with age (Hoyer, Rebok & Sevd, 1979). With cognitive vigilance task age effects are seen when the complexity of the task is increased. The inconsistencies in findings may be attributed to differences in analysis method used or in the tasks type used in those studies or the sampling bias. In sum, this brief review suggests that as demands on attentional resources increases, so do the age differences in vigilance performance.

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A Prevalence Study on Physical and Cognitive Disability among Elderly in a Community Population

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ABSTRACT

The medical advancement has increased life expectancy; but science is yet to succeed in controlling the diseases and disabilities that afflict elderly persons. Disability is usually caused by disease process, injury and aging. Utilisations of health services can, to a great extent, enable the elderly to minimize, if not avoid, disability caused by disease process. Disability caused by Injury and aging are inevitable. The present study was carried out to find the level of morbidity and disability in an elderly population in few areas, selected through stratified simple random sampling, in the city of Chennai, Tamil Nadu. Interestingly, the population was quite healthy and only less than 25 per cent suffered from different types of age related medical problems like hypertension, heart ailments and diabetes. It is also quite probable that the medical conditions are yet to be diagnosed! The disability profile was higher in Locomotor and Cognitive domain followed by self care. Socialisation was the least affected domain. Disability in cognitive domain was found to significantly affect the person's ability to perform house hold task. Though different levels of cognitive disabilities that particularly affect the elderly people are recognised, it is yet to be included in the Disabilities Act in India. Recognising cognitive disability and providing cognitive rehabilitation can improve the brain functioning in reversible medical conditions and enable the person to have a better quality of life.

Key Words : Disability, Cognitive disability, Locomotor disability, Elderly, Morbidity.

The medical advancement has increased life expectancy, but has not been able to prevent diseases and disabilities in old age. Consequently, the prevalence of hearing, visual, speech, loco-motor and multiple disabilities are higher as the age increases (Verbrugge & Jette, 1994). The prevalence of disabilities in the Indian population in the age group above 60 years is 25.3 per cent in rural and 25.7 per cent in urban areas according to National Sample Survey Organisation (NSSO) 2002. (Leni 2006). The NSSO surveys state that over the years there has been a major decrease in the disabled population, among the elderly (ibid). According to NSSO 58th round, the magnitude of people with one or more than one of the five-disabilities was 18.49 million in 2002 (ibid.)

The diseases like hypertension and diabetes, if unattended, can lead to Cerebro-Vascular Accidents (CVA). CVA can lead to temporary or permanent locomotor and cognitive disabilities. Similarly, diabetes and arthritis can affect the person's extremities and lead to locomotor disabilities. Non-utilisation of health services can lead to worsening of diseases and consequently lead to debilitating disabilities which, otherwise, could have been prevented. Similarly, elderly can suffer from mild to severe cognitive impairment, which is not dementia: loss of memory, inability to concentrate, learning new tasks, calculation, comprehension, decision making, being oriented to time/ place and other brain functions. The extent of cognitive impairment have been found to be between 14.00 to 16.00 per cent in elderly population (Das *et al.*, 2007 and Graham *et al.* 1997)

The present study aims to measure the extent of physical and cognitive disabilities among the elderly population in Chennai, Tamil Nadu.

Methods

Sample: A sample of 228 elderly above the age of 60 years were chosen for the study. The city of Chennai is divided into ten zones: each zone contains 15 to 20 wards. Four wards were chosen through stratified simple random method and then in the selected wards, through survey method the elderly samples were screened for disability. The data was collected in the residence of the elderly by trained research assistants after carrying out reliability exercises.

Instruments

Measure of Disability: The 12 items brief population screening WHO Disability Assessment Schedule was utilised to measure disability. The instrument measures the individual's ability to: Understanding and Communicating, Mobility, Self Care, Socialising, Household and Work Activities and Participation in Society. The reliability of the instrument is 0.94 and validity exercises shows unidimensionality of domains average loading >0.7, among different population groups in different countries.

Results

Table 1. Demographic Details

Factor	N	(%)
Age	71.04 (Mean)	06.48 (SD)
Gender	Female	Male
	136 [59.6]	92 [40.4]
Employed	5	02.2 %
Government Pension	16	07.0 %
Occupation Pension	02	00.9 %
Salary	05	02.2 %

Table 2. Disability Assessment Profile

Factors in which elderly facing difficulty	None N %	Mild N %	Moderate N %	Severe N %	V Severe N %
Standing	132 / 57.9	54 / 23.7	21 / 9.2	14 / 6.1	07 / 3.1
House Responsibilities	163 / 71.5	35 / 15.4	11 / 4.8	09 / 3.9	10 / 4.4
Learning New Task	152 / 66.7	37 / 16.2	17 / 7.5	11 / 4.8	11 / 4.8
Community Activities	167 / 73.2	30 / 13.2	15 / 6.6	07 / 3.1	09 / 3.9
Emotionally affected	171 / 75.0	33 / 14.5	12 / 5.3	07 / 3.1	05 / 2.2
Concentration	176 / 77.2	39 / 17.1	05 / 2.2	03 / 1.3	05 / 2.2
Walking	155 / 68.0	28 / 12.3	21 / 9.2	13 / 5.7	11 / 4.8
Bathing	183 / 80.3	22 / 9.6	04 / 1.8	11 / 4.8	08 / 3.5
Getting Dressed	207 / 90.8	10 / 04.4	02 / 0.9	04 / 1.8	05 / 2.2
Dealing with people	198 / 86.8	22 / 9.6	03 / 1.3	02 / 0.9	03 / 1.3
Maintaining Friendships	204 / 89.5	18 / 7.9	01 / 0.4	00 / 0.0	05 / 2.2
Everyday Activities	189 / 82.9	18 / 7.9	05 / 2.2	05 / 2.2	11 / 4.8
Disability Interfering	166 / 72.8	38 / 16.7	10 / 4.4	10 / 4.4	04 / 1.8

Table 3. Statistical Significance of Key Variables

Variables	X ²
Gender and New Task	0.39
Gender and House Work	0.07*
Gender and Walking	0.02*
Diabetes and New Task	0.08
Diabetes and Walking	0.18
Diabetes and House Work	0.17
Diabetes and Pain	0.12
Gender and Standing	0.02*
Diabetes and Standing	0.30
New Task and House Work	0.00*
Concentration and House Work	0.00*
Fisher's Exact Test (P> 0.05)	

Table 4. Table showing Ailments and Pain suffered

Ailments	Yes	No
Diabetes	27 / 11.8	201 / 88.2
Arthritis	114 / 50.0	114 / 50.0
Eye Problems	117 / 51.3	111 / 48.7
Hearing Problems	117 / 51.3	111 / 48.7
Hypertension	58 / 25.4	170 / 74.8
Heart Ailments	18 / 7.9	210 / 92.1
Pain in the body	17 / 7.5	211 / 92.5

Demographic Details

The mean age of the sample was 71, with standard deviation of 06.48; the minimum age was 60 and maximum age was 93. The median age was 70; there were three patients above the age of 90 years. The sample consisted of 59.6 per cent females and 40.4 per cent males. Eighty five per cent of the elderly population reported no source of regular individual income; 2.2 per cent had income from rent and 1.8 per cent had contribution from the family members for their pocket money. Only 2.2 per cent of the population was engaged in gainful employment: all of them were working in the same area in non professional and non skilled jobs.

Disability Profile

43 per cent of the elderly population did not have any kind of physical or cognitive disability. Elderly seem to be predominantly having difficulty in locomotor domain and cognitive domain followed by mobility domain and self care domain. In self care, 20 per cent experienced difficulty in taking bath, but only 10 per cent experienced difficulty in getting dressed. Less than 14 per cent only reported difficulty in maintaining friendships and getting along with people.

Statistical Significance

There was significant association between gender and house work ($\chi^2 = 0.07$, $P > 0.05$); more number of females experienced difficulty than men. Similarly gender and standing were significantly associated ($\chi^2 = 0.02$, $P > 0.05$): more number of females experienced difficulty in standing than male counterparts. No significant relationship was found between gender / diabetes and other disabilities in the elderly population. Cognitive domains were found to be significantly associated with problems in performing house hold tasks. (Concentration and Ability to Learn New Tasks $\chi^2 = 0.00$, $P > 0.05$)

Morbidity Profile

Diabetes was present in 11.8 per cent of the sample and hypertension was present in 25.4 per cent of the elderly sample. Arthritis was found in 50 per cent of the sample and pain due to different ailments was found in only 7.5 per cent of the population. Sight and hearing sensory difficulties were found in 51 per cent respectively.

Discussion

The disability profile reveals that following locomotor disability, more people were affected by cognitive disability: 33.3 per cent had problems with learning new tasks and 22.8 per cent had problems with concentration. Though benign memory loss, mild cognitive impairment and dementia are well recognized conditions, cognitive difficulties are not recognised as major disabilities in the Persons with Disabilities Act 1995 and National Trust for Welfare for persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disabilities Act 1999. Consequently, rehabilitation measures and disability assistance for cognitive disabilities are not being provided. Many of the cognitive disabilities could be due to reversible cause, negligence of health or poor life style. So, taking into cognizance the cognitive

disabilities and providing rehabilitation measures can mitigate reversible cognitive impairment and improve the functional capacity and quality of life of the elderly. (Ravi Samuel, 2008).

Disability is caused either individually by a disease, injury or aging or all combined together. Disease and illness causing disability are hypertension or diabetes leading to infarct (stroke) in the brain resulting in inability to walk, talk and speak. Disabilities caused by ageing are: hearing loss, losing eyesight and cognitive difficulty due to atrophy of the brain. Ravi Samuel, in his study, found poor utilization of health services among elderly population (Ravi Samuel, 2005) Periodical utilisation of health services and physically and cognitively active life style would empower the elderly to avoid disabilities caused by diseases and illnesses and enable them to enjoy a good quality of life in the autumn years of their lives.

The cognitive aspect could be better measured by assessing memory and orientation rather than concentration and new task learning ability as found in WHODAS. The primary cognitive decline is always found in memory in most types of Mild Cognitive Impairments (MCI) and in Dementias. Pathological loss of memory (severe difficulty in remembering recent information) is primarily noticed in the elderly, rather than problems with concentration and other cognitive functions.

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Senior Athletes and Active Sport Tourism: A Case of Senior Olympic Games

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ABSTRACT

The purpose of this study was to examine the socio-demographic and serious leisure involvement of older adults who participate in the Senior Olympic Games. Respondents to the survey were 260 older adults who participated in 2008 Indiana State Senior Olympic games in the United States. Data revealed that the older adults in this study participated in leisure activities approximately one hour a day, and their history of participating in the Senior Games was over five years. Majority of the participants were Caucasians, living with a spouse or partner, and with a high education level. The results of the independent sample T-test show that the mean of male respondents' number of years participated in Senior Games was higher (= 6.45, sd = 6.41). While male participants spent more time training for the Senior Games during the week (= 6.53, sd = 4.09), the t-test revealed that this comparison was not statistically significant. The results of this study will be useful for event planners, marketers and the host hospitality community who want to better understand the demographics, psychographics and characteristics of this senior population.

Keywords : leisure, Senior Olympic Games, older adults

According to the U.S. Department of Health and Human Services (2008), the number of older adults (65 and over) in the U.S. increased by 3.4 million from 1996 to 2006. They also report that there were 37.3 million older adults in 2006, and this figure is projected to increase to 71.5 million by 2030. As life expectancy and the number of older adults are likely to increase, research on aging becomes more

important. Aging is a multidimensional phenomenon, and biological, psychological, and social aging rates are different across individuals (Patterson, 2006). Although aging causes inevitable physical changes, it is during these later years that participating in leisure activities becomes more significant (Ogles & Masters, 2000). Research has shown the beneficial aspects of leisure experiences. These benefits include improvements in physical and mental health (Russell, 1990; Yau & Packer, 2002), life satisfaction (Hawkins, Foose, & Binkley, 2004; Russell, 1987), and social bonding (Burch & Hamilton-Smith, 1991). Therefore, participating in leisure activities may be one of the central factors of the well-being of older adults.

Research has examined issues of older adults regarding their well-being and the significant role that leisure plays (Ragheb & Griffith, 1982; Russell, 1987). Riddick and Stewart (1994), for example, reported determinants of life satisfaction for older adults, and participation in leisure activities was the most significant predictor of life satisfaction. According to Palmore (1979), having a variety of meaningful activities, maintaining good health habits, securing financial plans, and living with an optimistic outlook were fundamental aspects of well-being. Similarly, Rowe and Kahn (1997) identified the three components of successful aging: (a) minimizing risk and disability, (b) maximizing physical and mental ability, and (c) engaging in vigorous activities.

Silverstein and Parker (2002) found that older adults who increased leisure activity participation were likely to maintain their quality of life. Specifically, being engaged in activities such as club meetings, watching movies and gardening was positively related to positive affect among older adults (Lawton, 1994). Among the various leisure activities, participating in physical activities may help enhancing well-being of older adults, and research has shown the benefits of physical activities. Stathi, Fox, and McKenna (2002) for example, reported that participating in physical activities contribute to well-being as well as mental health among older adults. Those physical activities are likely to buffer against negative mood state such as anxiety and depression (Blumenthal, Williams, Needels, & Wallace, 1982). Menec and Chipperfield's (1997) study supports other studies in that exercising predicts better perceived health and greater life satisfaction.

Perhaps, older adults who participate in Senior Olympic Games may exemplify a case of vigorous physical activity engagement considering their depth of involvement, commitment, and the potential benefits they obtain through participation in leisure activities. Every state in the U.S. hosts an annual series of senior athletic events dedicated to encouraging senior citizens to lead a healthy lifestyle. The history of senior games dates back to 1987 when the first national senior games were held in St. Louis, MO with 2,500 competitors. The number of participants in the national senior games has been consistently increasing, and there were 12,100 older adults competed in the national senior games held in Louisville in 2007. By 2011, it is anticipated that over 15,000 older adults will participate in senior games at the national level (National Senior Games Association, 2008).

Research shows that participating in athletic events provides both personal and social benefits among senior citizens (e.g., Siegenthaler & O'Dell, 2003; Smith & Storandt, 1997). Considering the ever-increasing number of senior citizens, providing adequate guidance for healthy living becomes important. It can be assumed that those who participate in competitive sporting events - such as Senior Olympic Games - would demonstrate a healthy lifestyle. Furthermore, understanding lifestyle patterns would provide broader views of older consumers for marketers in the sport and tourism industry and investigating how those senior citizens live will contribute to expanding the body of knowledge in sport and tourism literature.

While there has been a significant number of increase in number of participants in Senior Games (National Senior Games Association, 2008), previous research has given limited attention to this population. It is timely to explore the characteristics of this group, their marketability, and level of involvement. Therefore the purpose of this study is to create a demographic and psychographic profile of the senior active athletes.

Specifically, this study seeks to answer the following questions about senior athletes and their participation in the Senior Games event:

1. What is the profile of a Senior Games participant?
2. What is the typical travel and spending profile to attend a Senior Games competition?

3. Are there differences between the travel patterns of those traveling with a spouse or partner?
4. Are there differences between the training commitment and duration of participation in the Games based on gender?
5. Do retirees have different travel and spending patterns than those athletes employed?

Methodology

The methods used to address the research problem are described in the following sections: (a) selection of subjects, (b) procedures for data collection, (c) design of the instrument, and (d) method of analysis.

Selection of the Subjects

The sample for this study was athletes participating in the 2008 Indiana Senior Games hosted by the Hamilton County Convention and Visitors Bureau in Carmel, Indiana. To qualify as a senior games participant, individuals must be over 50 years of age. Approximately, 600 seniors participated in the 2008 Indiana Senior Games and participated in twenty categories of events. This year's games consisted of a four-day event that gave seniors the opportunity to compete in archery, badminton, basketball, bowling, cycling, golf, horseshoes, mountain biking, pickleball, race walk, racquetball, road races, shuffleboard, swimming, table tennis, tennis, and a variety of track and field events.

Data collection procedures

The researchers partnered with the Hamilton County Convention and Visitors Bureau, the host organization of the games, and mailed a letter and the survey instrument to over 600 potential participants of the 2008 Indiana Senior Games. The letter detailed the study's purpose and asked for the athlete's participation. The subjects received the letter and survey with their 2008 Senior Games registration packet. The packet was mailed in March 2008 for the June 2008 Indiana Games and approximately 125 surveys were returned by mail.

Additionally, the researchers intercepted subjects at the event's registration area to increase the sample size. Only those individuals that were participating in the games were approached and asked to

complete a survey. Appropriately 135 surveys were collected during the registration days (first two days of the Senior Games). The researches collected a total of 260 usable surveys and the data were entered into SPSS for analysis.

Instrumentation

The survey was designed to gather information on Senior Games participants' demographic characteristics, economic impact, and involvement in serious leisure. In order to measure economic impact, respondents were asked how many miles they traveled to participate in the event, and how much they spent during the event. Their involvement in serious leisure was measured using two items: number of years participated in Senior Games and number of hours per week training for Senior Games.

Data analysis

The analysis of the data was conducted using Statistical Package for Social Sciences (SPSS). Frequencies, mean scores, and standard deviations were initially computed and a variety of descriptive statistics was utilized to determine the sample characteristics. The independent t-test was used to test for a difference between the means of number of years participated in Senior Games and training hours per week between males and females.

Results

The demographics of the participants are reported in Table 1. It shows the frequencies of the athletes categorized by age, gender, race, education, employment, and marital status. The largest group of the respondents was between the ages of 60 and 69 (36.1%); while those 70-79 made up the second largest group (31.6%) and those 50-59 represented the third largest group (24.8%). A small percentage, 6.9%, represented those over the age of 80.

A majority of the participants were men (72.1%) with women representing 27.9% of the group. Athletes in the Senior Games tend to be Caucasian (94.7%); less than 5% were minority participants. A total of 89.7% of the participants had beyond college education. Sixty percent of the respondents were retired, while 39.4% of the group was still working full or part-time. A large percentage, 81.7%, of the group

was married/partnered and 17.3% indicated they were divorced, widowed or single.

Table 1. Frequencies of Participant Characteristics

Characteristics	<i>n</i>	%
Age		
50-59	64	24.8
60-69	96	36.7
70-79	83	31.6
80-89	17	6.5
90-	1	.4
Gender		
Male	189	72.1
Female	73	27.9
Race		
Caucasian	248	94.7
African American	6	2.3
Asian	4	1.5
Hispanic	2	.8
Education		
High School	18	6.9
College	141	54.0
Graduate School	93	35.6
Employment		
Retired	158	60.5
Other	103	39.4
Marital Status		
Married/Partnered	214	81.7
Other (single/divorced/widowed)	48	

Table 2 reports the descriptive statistics of several variables related to involvement in the Senior Games, including number of years the athlete has participated, number of training hours per week, miles traveled to the completion site, and the amount of money spent during the games. The largest percentage of respondents reported they have participated in the games 1-5 years (51.8%), and 21.5% participating 6-10 years. Notably, 26.7 % of participants have been actively involved in the senior games for 11 or more years.

Survey respondents reported that they average 6.51 hours per week training for the games. Most dedicated 1-10 hours preparing for the competition, 46.6% dedicate 1-5 hours per week, and 42.2% dedicating 6-10 hours of training. Additionally, 11.6% indicated 10 or more hours of training per week in their respective sport.

Participants indicated they travel an average of 116.1 miles to the event and spend an average of \$137.27 while at the games. Most participants travel under 150 miles (69.2%) to participate, while another 31% make the trip from 150 miles or more. Additionally, a majority of the participants (59.9%) spend less than \$100 while at the games.

Table 2. Descriptive statistics of the variables related to the Senior Games involvement

Variables	%	<i>M</i>	<i>SD</i>
Number of years participated in Senior Games		5.84	6.20
1-5	51.8		
6-10	21.5		
11-15	10.3		
16-25	16.4		
Number of hours per week training for Senior Games		6.51	4.19
1-5	46.6		
6-10	42.2		
10-	11.2		
Miles traveled to participate in Senior Games		116.10	137.79
1-50	39.2		
51-150	30.4		
151-300	25.6		
300-	4.8		
Amount spent during the Senior Games		137.27	147.66
1-50	40.1		
51-100	19.8		
101-250	23.3		
251-	16.8		

Note. *M* = Mean; *SD* = Standard deviation

Table 3 describes the differences of involvement in Senior Games between the participants who are married/partnered and unmarried (single/divorced/widowed). The results show that married participants had more number of years participated in Senior Games, spend more time training for Senior Games, traveled more to participate in the event, and spent more money during the event. Table 4 is exploring if there is a difference in the number of years of participation of male participants compared to the female athletes. A significant mean difference was found for male and female older adults regarding the number of years participated in Senior Games ($t = -260, p < .01$). The mean of male respondents' number of years participated in Senior Games was higher ($= 6.45, sd = 6.41$).

Table 3. Mean comparison of variables related to the Senior Games involvement between married/partnered participants and unmarried

	Married/ Partnered	Others (single/ divorced / widowed)
Number of years participated in Senior Games	$\bar{x} = 6.03,$ $sd = 6.38$	$\bar{x} = 4.96,$ $sd = 5.29$
Number of hours per week training for Senior Games	$\bar{x} = 6.61,$ $sd = 4.13$	$\bar{x} = 6.04,$ $sd = 4.49$
Miles traveled to participate in Senior Games	$\bar{x} = 117.43,$ $sd = 141.54$	$\bar{x} = 109.86,$ $sd = 119.96$
Amount spent during the Senior Games	$\bar{x} = 139.02,$ $sd = 141.19$	$\bar{x} = 128.88,$ $sd = 177.28$

Table 4. Results of the T-test: Gender and number of years participating

	Gender	N	Mean	SD	t-value	df	p
Number of years in Senior Games	Male	189	6.45	6.41	-2.60	260	<.01
	Female	73	4.25	5.33			

Table 5 is looking at significant differences between the number of training hours of male and female athletes. While male participants spent more time training for the Senior Games during the week ($= 6.53, sd = 4.09$), t-test revealed that this comparison was not statistically significant. More T-Tests were performed to address differences of miles traveled to participate in senior games as well as money spent during the senior games between retirees and the older adults who are employed. Relative to the employed older adults, retirees were more likely to travel further to participate in the senior games ($= 132.62, sd = 161.29$). Additional difference between these two groups was emerged. Retirees were significantly more likely to spend money while participating in the senior games than the ones who were employed ($= 139.38, sd = 160.37$).

Table 5. Results of the T-test: Gender and training hours per week

	Gender	N	Mean	SD	t-value	df	p
Training hours per week	Male	189	6.53	4.09	-1.67	260	.096
	Female	73	5.54	4.36			

Table 6. Results of the T-test: Employment status vs. miles traveled to participate and money spent during the Senior Games

	Employment status	N	Mean	SD	t-value	df	p
Miles traveled	Retired	152	132.62	161.29	2.38	248	<.05
	Employed	98	90.47	84.57			
Money spent	Retired	153	139.38	160.37	2.01	254	<.05
	Employed	103	102.15	119.31			

Discussion and conclusions

The purpose of this study is to create a demographic and psychographic profile of senior athletes to understand the tendencies of this segment, and differences between participant types. The findings of this study show that participants in the Senior Games are mostly male, married/partnered, Caucasians with high education level. As noted in Table 3, married/partnered participants were more likely to be involved in the Senior Games because they tend to travel further, spend more money, and training harder for the Senior Games. The results of the T-test indicate that male older adults have been participating in the Senior Games longer than female counterparts. Interestingly, miles traveled and money spent during Senior Games differed significantly between retirees and employed older adults. Retirees seemed to be more involved in the Senior Games than employed participants. This was consistent with Heo and Lee's (2005) prior study of Senior Games that the value and importance of leisure activity would increase after the retirement, and therefore their commitment and involvement in leisure activity might also increase. Given that participating in Senior Games may be understood as pursuit of well-being of older adults, the findings of this study also supports previous study in that perception of well-being tends to be higher as people get older (Horley & Lavery, 1995).

The demographic information provided in this study will give the event organizer a better understanding of economic impact of the event and allow for targeting marketing and services for older adults. By exploring the differences between years of participation and training, issues of event loyalty and interest can also be investigated and tracked. Often, marketers view the senior travel market as a homogenous segment, when this market is really diverse in term of socioeconomic, interest, lifestyles, attitudes and consumption patterns (Horneman, L.R., Carter, W., Wei, S. & Ruys, H., 2000). Therefore, this study can help event organizers and marketers to better reach and meet the needs of the participants, leading to increased participation and satisfaction in their involvement. The host destination can use this information to predict future athletes' connection with the Senior Games events, logistically plan for the athletes' arrival and stay in the community, and create unique marketing efforts for specific groups of senior athletes. Lastly, as multiple studies examining senior travelers

emerge, tourism marketers and travel professionals may want to compare the travel behaviors of senior athletes to those traveling for other leisure purposes, such as gaming, cultural travel, or other forms of serious or hobby leisure. Future market study comparison may lead to new discoveries in senior travel motivations and behaviors.

By replicating this study using different senior athlete populations or another state's Senior Games population, additional insight on the demographic and psychographic make-up and travel behaviors of this population may be revealed. Additionally, by adding a qualitative element to the study or applying additional quantitative measures, other significant findings may surface, adding to the body of knowledge in this field of study.

Several issues should be considered when interpreting the result of the study. First this study was based on a convenience sampling. Additionally, most participants in this study were Caucasian (94.7%), and their education level was relatively high. Further studies may expand the geographic coverage in data collection because senior games participants in other states may have different opinions as well as different levels of involvement. Perhaps, comparison with participants from other states will provide important benchmarks to facilitate the understanding of the findings.

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General and Central Adiposity among Elderly

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ABSTRACT

This study explores the general and central adiposity among 100 elderly of lower income group residing in Jodhpur city. Both elderly men and women show a decline in the mean values of anthropometric measurement with only increase in WHR. The average prevalence of central adiposity among elderly was 68.3% in females which was nearly 3½ times higher than the males (20%). In both males and females, the fat accumulation at the abdomen increases with age. The study also describes their nutritional status through BMI. The study revealed that central adiposity did not always go hand in hand with overweight/obesity, each of these could occur in the absence of the other.

Key words: BMI, Central adiposity, Elderly, Nutritional status

The prevalence of obesity is increasing in the developed as well as developing countries. Central obesity in the elderly population of India is a major public health problem as obesity is associated with significant increase in morbidity and mortality.

Increase in life expectancy has resulted in growing of population of aged throughout the world and it has raised a number of issues concerning the developing world as well. Projection indicate that by the year 2020 there will be 470 million people aged 65 and above in developing countries which will be more than double the number of developed world. India is also gradually observing a phenomenon of graying of her population. Thus, with more people surviving in later life, more obese will be living and having certain morbidities as the

effect of obesity. Since obesity is a significant risk factor for coronary artery disease, hypertension, cholelithiasis, diabetes and osteoarthritis.

More recently, regional distribution of fat within the body has been the focus of attention. Excess abdominal fat or 'android' or 'central obesity' appears to be far more deleterious than 'gynoid' obesity or general obesity where fat is distributed peripherally around the body. Further, the 'X' syndrome of hyperglycaemia, hyperlipidaemia, dense LDL, hyuperinsulinaemia and hypertension, is more often which is believed to be more common in South Asians (Krishnaswamy, 1999).

India is passing through a transitional phase of socio-economic development while acute infectious diseases are on the decline, chronic non-communicable diseases like cardiovascular diseases, diabetes and cancer are becoming major contributors to the disease burden. While the country has still to overcome problems arising from underdevelopment and poverty, it is also likely to increasingly face problems related to affluence, generally seen in developed countries, in the year ahead.

The per capita income is on the rise and the technological development has brought changes in the life style pattern of not only the affluent section but has affected the lower segment too. Little work has been done in this field especially in Western Rajasthan, where living conditions are comparatively different from other areas, thus, in view of the above considerations the present study was designed to assess nutritional status in terms of body mass index (BMI) and central adiposity in elderly people from low income group residing in Jodhpur.

Material and Methods

Both elderly male and female subjects were selected from different residential areas of Jodhpur. In all 100 elderly, 50 males and 50 females enrolled for the study were in the age group of 60 years and above and belonged to lower income group. Information regarding socio-demographic variable such as age, sex, marital status, religion, education, income, living arrangements, duration of stay in Rajasthan were obtained. Nutritional status was assessed using anthropometric measurements like weight, height, waist and hip circumferences. These measurements were recorded following standard techniques

recommended by Gibson (1990). Body weight was taken to the nearest 0.1 kg and height was measured to the nearest 0.1 cm using a tape measure. Maximum waist circumference was measured at the smallest circumference of the torso, which is the level of natural waist. Maximum hip circumference measurement was made horizontally at the level of maximum extension of the buttocks posterior. BMI and WHR were calculated. All data were compiled and analyzed.

Results and Discussion

The subjects were in the age of 60 to 90 years. The socio-demographic data of elderly subjects showed that the majority (92.4%) of the subjects were living in joint family followed by nuclear family (7.6%). Out of the total 100 subjects 67 (67%) were nonworking. Female formed the major part of non-working elderly. Even the working people were not having the regular employment but earned on daily wages. The people surveyed were all vegetarian. All subjects were living in Rajasthan for more than 25 years. Most of them were Hindu and a small fraction of total subjects were non Hindu. The changes made in the dietary pattern by the elderly males and females in lower income group showed a reduction in the consumption of spices, pickles and salt due to gastrointestinal problems, hypertension and cardiovascular diseases. Most of the reduction was seen in the hard to chew foods due to dental problems.

The mean of all the anthropometric measurements are presented in Table 1. The mean body weight (58.2 kg) of the elderly males of 60-69 years gradually declined to 56.2 kg and 54.2 kg by the age of 70-79 years and 80 years and above. A similar trend was seen among the elderly females. Except in the age group of 60-69 years where females weighted slightly more (1 kg) than males, but in the other two age groups, males weighted 4 and 9.2 kg more than females (in 70-79 and 80 years and above age groups, respectively). They weighed 59.2 kg and 52.1 kg in the age group of 60-69 and 70-79 years. However, in the age group of 80 years and above, their mean body weight was recorded only 45.0 kg. Females in this age group were much lighter than the females of other age groups. A marked decline in body weight of 14.2 kg among females was observed as compared to their male counterparts.

Table 1: Mean Anthropometric Data for Elderly in LIG Based on Age Specific Group

Measurements	Age 60 to 69 years (n = 58)			Age 70 to 79 years (n = 26)			Age 80 years and above (n = 16)		
	M (n = 19)	F (n = 39)	Total Mean (n = 58)	M (n = 14)	F (n = 12)	Total Mean (n = 26)	M (n = 7)	F (n = 9)	Total Mean (n = 16)
Body weight (kg)	58.2	59.2	58.3	56.2	52.1	55.1	54.2	45.0	48.0
Body height (cm)	162.7	148.5	155.6	160.7	147.3	154.0	158.1	143.1	150.0
Body mass index (kg/m ²)	21.7	25.7	24.4	21.2	21.7	21.4	19.9	19.9	19.9
Waist circumference (cm)	79.8	87.0	84.9	81.2	88.7	84.6	83.0	84.4	88.7
Hip circumference (cm)	86.7	101.6	97.3	86.5	96.0	91.3	87.5	90.0	88.8
Waist hip ratio	0.92	0.86	0.87	0.93	0.92	0.93	0.94	0.93	0.94

Table 2: Percent Prevalence of Under Nutrition /Over Nutrition in three Age Groups

BMI	60-69		70-79		80 & above	
	M	F	M	F	M	F
Under weight (< 18.5)	36.8	12.8	14.3	25.0	57.1	22.2
Normal (18.5-24.9)	31.5	23.1	28.6	58.3	14.3	77.8
Over weight (25.0-29.9)	31.6	33.3	57.1	-	28.5	-
Obese (≥ 30)	-	30.8	-	16.7	-	-

Table 3: Central Adiposity among Elderly (%)

Gender	60-69 year	70-79 year	80 years	Total
Male	14.2	21.1	28.5	20.0
Female	58.3	69.2	77.7	68.3

The mean body weight of all the elderly males was noted to be 56.1 kg and in females 52.1 kg which is 4 kg less, irrespective of their age. According to Noppa *et al.* (1980) body weight of women increases with age till the age of 45 to 50 years after which it decreases with the aging process.

Males were taller than females by 19.6 cm with a mean height of 162.7 cm (males) against 143.1 cm (females). The mean height of the males in the respecting age groups was recorded to be 162.7 cm, 160.7 cm and 158.1 cm. The height decreased by approximately 2 cm per decade. The overall decline in height with age was 4.6 cm. Among females a marked decline in their height was seen at the age of 80 years and above. The difference was much higher (5.4 cm) when compared with height at 60 to 69 years. Females of 80 years and above measured 4.2 cm less than the females of 70 to 79 years and 5.4 cm less than that of 60-69 years. It shows that the over all reduction in the

height of females is much greater than the height of males. The reduction in height for men was noticed to be 4.6 cm while in females it was 5.4 cm. The mean height for both males and females decreased by 4 to 5.4 cm. Part of this effect is related to loss of stature within individuals and effect that has been attributed to weakening or imbalance of muscle groups, postural changes, osteoporosis, disk deterioration and spinal deformities such as Kyphosis and Scoliosis (Trotter and Gleser, 1951; Dequeker *et al.*, 1969; Rossmen, 1986). An over all decrease in height was apparent among the very elderly. This is consistent with what was reported by Rossmen (1986), that is loss of height becomes progressively more severe in the eight and ninth decades.

Table 4. Distribution of Elderly (%) According to Body Mass Index (BMI) and Waist to Hip Ratio (WHR)

WHR	BMI			
	< 18.5	18.5 – 24.9	25 – 29.90	≥ 30
Male				
> 1.0	100	81.8	62.5	-
≥ 1.0	-	18.2	37.5	-
Total	100	100	100	-
Female				
> 0.8	60	12.5	8.4	35.7
≥ 0.8	40	87.5	91.6	64.3
Total	100	100	100	100

The body mass index (BMI) is now widely used as an indicator of body fatness. WHO (2000) reported a cut off value for classification of obesity as BMI ≥ 18.5 kg/m² for normal, ≥ 25 kg/m² overweight and ≥ 30 kg/m² for obesity. The average BMI of elderly males and females irrespective of age was 20.9 and 22.4 kg/m² respectively. On an average both fell within the normal range of BMI. The mean BMI of elderly males ranged between 19.9 kg/m² to 21.7 kg/m², being lowest in the age group of 80 years and above. Body mass index of women

aged 60-69 years was 25.7 kg/m² and thus, classified as overweight (higher than the males of same age group, BMI- 21.7 kg/m²). Whereas females of the other two age groups had normal BMI values (21.7 kg/m² and 19.9 kg/m²). In both males and females a gradual reduction in the BMI values was seen with increase in age. This may be due to degenerative changes and aging factors in the later years of life. Frisancho (1981) and Burr and Phillips (1984) reported that with advancing age lean body mass decreases and the amount of body fat generally increases until age 70 years after which it decreases again.

The findings of the present study are comparable with that of Sarojini *et al.* (1990), which also reveals similar results, the mean weight and height of elderly males were significantly more than females and mean weight of elderly subjects in older age group was significantly lower than 60 to 69 years. A significant overall decrease in weight and height was apparent among the elderly, while non significant, reduction in the BMI with increase in age was also found by Suriah *et al.* (1998).

Waist circumference is an indicator of abdominal distribution of fat as well as of total body fat. In the present study the mean waist circumference of females (86.7 cm) was more than males (81.3 cm). At the same time females had higher waist circumference than males in all the age groups. Waist circumference among elderly males tend to increase with advancing age, the increment was 1.4 to 3.2 cm. Whereas, among females no such trend could be noted. It was 87.0 cm between the age 60-69 years and rose to 88.7 cm during the age of 70-79 years and then declined to 84.4 cm (80 years and above).

The hip circumference of elderly females was higher than males. The mean hip circumference of all the elderly males and females being 86.7 cm and 95.8 cm respectively. In females the hip circumference decreased with age with a difference of more than 10 cm in the age group of 60-69 and 80 years and above. Whereas almost no change was found in hip circumference among the elderly males. It remained 86.7 cm, 86.5 cm and 87.5 cm in the three age groups, respectively.

The waist to hip ratio (WHR) is a simple technique by which the distribution of both subcutaneous and intra abdominal adipose tissue can be described and also be related to risk of cardiovascular diseases. Subject having greater than normal threshold of WHR (Central

obesity) are prone to cardiovascular diseases. From the waist and hip circumference waist-hip ratio (WHR) is calculated. A WHR of 1.0 or greater in males and 0.8 or greater in females is indicative of android obesity (Mahan and Escott-Stamp, 1996).

In the present study the WHR of all the elderly males and females was found to be 0.93 and 0.90 respectively. Which indicates that on the whole males had normal (< 1) WHR and females crossed the limit, WHR being > 0.8. Considering the age it was observed that the WHR in both males and females tend to rise with age. Though the rise in males was slight and remained < 1.0. On the other hand among females of various age groups the WHR was always beyond the threshold level, being > 0.8. The WHR was 0.86, 0.92 and 0.93 in the respective three age groups (these value of WHR are indicative of central obesity). Jones *et al.* (1986) also found that waist to hip ratio increases with age.

The present study observed a general anthropometric decrement with only increase in WHR mainly due to the decrease in the hip circumference, which has also been reported by other workers (de Groot *et al.*, 1996). Greater centralization of body fat especially among elderly women was also found by Santos and Sicheri (2005).

Prevalence of under nutrition /over nutrition in different age groups are presented in Table 2. Maximum number of male subjects had normal nutritional status in the age group of 60-69 years (31.5%) while minimum (14.3%) in 80 years and above age group. Majority of under weight (57.1%) male subjects belonged to 80 years and above while in age group of 60-69 years and 70-79 years, the number of underweight males was found to be 36.8% and 14.3%, respectively. Higher number (57.1%) of over weight male subjects were in 70-79 years age group. The age group of 60-69 years and 80 years and above had an almost equal number of overweight individuals (31.6% and 28.5%, respectively). None of the male subject had obesity in this lower income group. Greater percent of females enjoyed normal nutritional status in the age groups of 80 years and above (77.8%) and 70-79 years (58.3%), while nearly ¼ of females (31.6%) in the age group of 60-69 years. Almost same number of females were found underweight in the age group of 70-79 years and 80 years and above i.e. 25% and 22.2%, respectively while only 12.8% were in 60-69 years age group. Overweight females (33.3%) were found only in the

age group of 60-69 years. None of the overweight female was observed after the age of 70 years. Majority of the obese females were in the age group of 60-69 years (30.8%) followed by 16.7% in the age group of 70-79 years while none of the obese female subject was found in oldest age group (> 80 years). Higher number of females (38.3%) had normal nutritional status than males (27.5%) while prevalence of under weight was two folds in male (32.5%) as compared to females. Where as, overweight was more prevalent among males (40.0%) than the females (21.1%). However obesity was present only in females (23.3%) and none of the male was found be obese.

Prevalence of central adiposity among the elderly in different age groups is presented in Table 3. The average prevalence of central adiposity among elderly was found to be 68.3% in females which was nearly 3½ times greater than the males (20%). In each age group females had much greater central adiposity than males.

The prevalence of central adiposity increased with age in both genders. In the case of males the prevalence was double in the age group of 80 years and above in comparison to 60-69 year (14.2%). In the age group of 70-79 years, 21.1% elderly males had abdominal adiposity. Elderly females aged 80 years and above (77.7%) had higher central adiposity than those of 70-79 years (69.2%) which it self was 10.9% greater than those aged 60-69 years (58.3%). The above results indicate that in both males and females the fat accumulation at the abdomen increase with age.

General adiposity v/s Central adiposity

The BMI and WHR levels in male and female elderly are discussed here with Table 4. Of underweight male (BMI < 18.5) none of the subject had central adiposity (WHR ³ 1.0), while in the category of normal BMI (BMI 18.5 – 24.9), 18.2% males had abdominal adiposity and 81.8% had WHR < 1.0. Of the overweight males (BMI 25 – 29.9), 37.5% had an abdominal adiposity. Where as none of the male subject was observed having both categories of obesities i.e. general and central adiposity.

Out of the total 10 underweight females 40% had central adiposity (WHR ³ 0.8) while 60% had WHR < 0.8. In the category of normal BMI, 87.5% of females showed central adipose tissue

distribution while only 12.5% had normal WHR. Of overweight elderly females a greater percentage (91.6%) of females had central adiposity whereas 8.4% females had normal WHR (< 0.8). Similarly 64.3% females had abdominal adiposity in the category of general obesity (BMI ³ 30) and only 35.7% females had WHR < 0.8.

In case of both sexes, in all categories of BMI, higher percentage of elderly females, had abdominal adiposity compared to elderly males. Central adiposity, thus, did not always go hand in hand with overweight/obesity. Thus, central adiposity and general obesity would appear to distinct; and that while general obesity could aggravate abdominal obesity, each of these could occur in the absence of other. Similar observations have been made by Krishnaswamy (1999) in Delhi. To find the relation between body mass index and waist to hip ratio, test of linear correlation was employed which revealed significant correlation between BMI and WHR among males ($r = 0.38$, $P < 0.01$) and females ($r = 0.26$, $P < 0.01$).

Abdominal fat and visceral fat appear to vary widely within a narrow range of total body fat. The risks associated with abdominal obesity also vary depending on its severity. Abdominal adiposity is more often associated with medical morbidity than the generalized obesity. In the present study it was noted that, in both sexes, central adiposity increased as age increases. A higher prevalence of central adiposity was seen in the age group of 80 years and above than the 60-69 years age group.

Changes related to gains in visceral or subcutaneous fat associated with aging may be affected by both the initial amount of fat and by increase in body mass. Despite abdominal skin folds becoming thinner with age, waist circumference does not vary, suggesting an increase in visceral fat (Perissinotto *et al.*, 2002). Central adiposity in females (68.3%) was observed to be 3½ times higher as compared to males (20%). The transformation of visceral fat occur differently in males and females, and genetic characteristics are pre-disposition factor for fat centralization. These findings are consistent with the hypothesis of an increase in visceral adiposity in post menopausal women highlighted by many studies, most of which are based on computed tomography scans (Kotani *et al.*, 1999; Zombani *et al.*, 1997). Lean *et al.* (1995) reported 38% of the males and 48% of the females had abdominal adiposity and males had higher WHR than

females. Where as an Italian study showed a significant age related reduction with regard to WHR; only in males; while in females this rate slightly but significantly increased with age (Perissinotto *et al.*, 2002). Santos and Sicheri (2005), reported that the prevalence of inadequate WHR among females was approximately twice that of men. The prevalence of inadequate WHR among females was as high as three times that of men in 80 + years age group and this prevalence among females increased with age. These findings are similar to the present study. The findings of the present investigation are generally in line with observations made by Sanchez-Garcia *et al.* (2007). They demonstrated that 73.7% of females and 19.1% of males showed central adipose tissue distribution. Further for every age group, males had a lower frequency of central adiposity than females.

Conclusion

In the present study, abdominal adiposity was observed in a considerable proportion of subjects with normal BMI especially in females. These results suggest that, at least in elderly females the cut off value of less than 0.8 for females (less than 1.0 for males), should be re-evaluated with special consideration for Asian subjects. Using BMI and WHR in combination could assist health professionals in assessing the nutritional status of the elderly, and assist in implementing the necessary measures to control obesity in the elderly with high tissue distribution. Overweight/obesity may not be considered a specific “disease” but it is certainly the “mother” of important degenerative diseases. Prevention and control of this problem must, therefore, claim priority attention as even the elderly of LIG are not spared to be affected by general and central adiposity a problem which was considered to be of the affluent group only.

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The South Asian Older Adult Immigrant's Barriers to Accessing Health Services in Canada: What Do We Know? What Can We do?

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ABSTRACT

The number of South Asian older adult immigrant is increasing rapidly. For older adult immigrants, the stresses of a recent migration may interact with other life-cycle changes, such as the inevitable decline in health due to aging. The older adult South Asian immigrants are acknowledged as a high-risk population, with increased physical and mental health needs and limited resources to draw on when confronting major life stresses. Many of these newcomers are unfamiliar with Canadian health care and/or are unable to communicate effectively in either official language, thereby making access to care more difficult. Moreover, cultural differences and various beliefs about health and medicine, along with the potential lack of knowledge or sensitivity by health care providers, can raise cultural barriers that interfere with the delivery of adequate medical services. In terms of physical and mental health, there is an increasing body of research on South Asian immigrants that highlights the risk of increased mortality and morbidity among this immigrant group as compared with other immigrants but they receive fewer health care services. The purpose of this paper is to explore the health status of older adult immigrant coming from South Asia and to understand what is known about barriers to health care that are experienced by South Asian older adults who have migrated to Canada.

Keywords: Older Adult immigrants, South Asian, Health status, Use of health services, Barriers.

The number of older adult immigrants has been increasing markedly in recent years (Newbold, 2004). Seniors represent 12% of the present population of Canada and by the year 2041, it is estimated that 23% of the population will be aged 65 and over (Durst, 2005). In 2001, 12% of the Canadian population was older adults, who were aged 65 and over, and 28% of these older adults were immigrants. Of the older immigrant adults, 68% were of European background and 19% were from Asia (Statistics Canada, 2003). Most older immigrant adults have been in Canada for many years and are aging here. In contrast, only a small number immigrated to Canada when they were already older. For example, about 3% of immigrants who arrived in 1997 (less than 6000) were older adults. About half of these older immigrant adults (43%) were from Asia and 4% were of South Asian descent (Chappell, Gee, McDonald, & Stones, 2003). According to the 2001 census, the total number of South Asian immigrants in Canada are 917,000 (Tran, Kaddatz & Allard, 2005). However, it is difficult to say how many South Asian older adult are presently living in Canada. If we assume that among these South Asian immigrants only 3% are older adult, then the number would be more than 27,000 and expected to be increasing because of increased immigration.

Despite the dramatic changes to the Canadian cultural composition, little research has been done in this area. Published research findings on the health of visible minority older adults are found mainly in the United States; very little research in this area is available in Canada (Lai et al., 2003). So it is imperative that culturally relevant community-based research is required to shape policy, professional education and ultimately, service delivery. Without it, there can be no knowledge base about the diverse health needs of racialized minorities.

The purpose of this paper is twofold: 1) to review the literature on health status of older adult South Asian immigrants to Canada; 2) to identify what is known about barriers to seeking help and health care pattern by older South Asian immigrants; In order to address the above purposes, this paper will critically examine the following questions 1) is there more illness within the older adult South Asian immigrant groups than native born Canadians and other older immigrant s?; 2) if so, how often this older adult seeking help from professionals?; 3) what are the barriers to the use of health services including structural and cultural factors?; 4) does the lower level of

utilization reflect lowered help-seeking, lack of access, inappropriate services, or something else?; 5) and how should the problem be addressed?

The Health Status of South Asian Immigrants

Research on South Asian immigrants in several Western countries, such as the United Kingdom and Canada, has found them to be at greater risk for morbidity and mortality from coronary health disease and diabetes as compared to the Canadian born population and other immigrant groups (Pais, Pogue, Gerstein, Zachariah, Savitha, & Jayprakash, 1996). Among the various chronic diseases prevalent in the Western world, cardiovascular disease (CVD) is the leading cause of death among older adult people. South Asian immigrants in Canada had higher rates of type 2 diabetes than Canadian born people (Sheth *et al.*, 1999). In the United Kingdom, the ratio of disorder among South Asian immigrants and the indigenous British population was 5 to 1 (Greenhalgh, 1997). Current data regarding the incidence of breast cancer among South Asian women living in Canada is limited because the breast cancer registries do not collect information regarding ethnicity (Bottoreff *et al.*, 1998). After breast cancer, South Asian women, however, are more likely to be diagnosed with ovarian and uterine cancer (American Cancer Society, 1999). There are few studies on mental health and depression among South Asians in the United States. A household survey of 10,000 randomly selected adults commissioned by the Department of Health revealed that depression appeared to be twice as prevalent among 'Asian and Oriental' women compared to White women (OPCS, 1995). Suicide rates within the South Asian community however, are found to be higher than among other populations (Health Briefs, 2003). Female South Asian immigrants report higher rates of depression and dysphoria than Canadian born women (Beliappa, 1991).

Domestic violence has been a major problem in the South Asian community; therefore, many community-based organizations have been created around the United States to address domestic violence among this population. While no national studies have been conducted to document the prevalence of domestic violence among the South Asian community, one study in the Greater Boston area found that 40% of South Asian women surveyed had been subjected to intimate partner violence (Raj, 2001).

So it is pertinent to discuss how these older adults cope with their health status and how they utilize the Canadian health services. In the next section I will discuss the barriers in a length.

Barriers to Health Care Utilization

A number of national (Canadian Task Force on Mental Issues Affecting Immigrants and refugees, 1988), provincial (British Columbia's Provincial Ministry of Health policy framework on Designated Populations, 1995), and regional (Abbotsford Local Working Group, 1996) studies indicate that for immigrants and their families, identifying and accessing services for physical and mental health is a process full of obstacles. Additionally, recent research on health care disparities by the Institute of Medicine reports that members of ethnic/racial minorities face special barriers in both access and utilization of health care services in the U.S. (Smedley, Stith, & Nelson, 2002). Local studies in Canada (Popatia, 1994; Sangha, 1987) that highlighted South Asian community's access to communitywide health services also had similar conclusions. Lee (1986) has postulated four reasons for this: culturally inappropriate services, preference for traditional healing, historical discrimination, organizational barriers and lack of female physicians and interpreter services. In order to understand these barriers and their impact on older adult immigrants' mental well-being, I would like to discuss some of this in detail.

Culturally Inappropriate Services

One reason consistently cited for the differences in utilization rates between South Asians and Anglos is the existing conflict between traditional South Asian values and Western values inherent in the therapeutic process. Modern therapy places an emphasis on such things as individualism, insight, self-disclosure, and verbal, emotional, and behavioral expressiveness. Such goals may not fit with a South Asian value system that often espouses such ideals as collectivism and emotional restraint.

Immigrant access to formal health services is often influenced by language and culture (Popita, 1994). Popita finds that over half of the respondents in her study of 200 people have difficulty using services

due to language barriers. Sometimes, a translator is used when services are provided. However, many older adults feel uncomfortable in the treatment process because they cannot communicate directly and effectively with the counselors (Doyle & Visano, 1987).

Cultural insensitivity or bias is sometimes manifested by providers failing to acknowledge the importance of religion/spirituality and familial influence in the treatment compliance decision-making process (Martinez, 1999). This may lead to a greater likelihood of inaccurate disease diagnoses or providers not employing aggressive treatment procedures.

Preference for Traditional Healing

The utilization of Eastern approaches to promote health and prevent illness may act as a barrier to accessing physical or mental health services. Data reveal that length of time spent in the immigrant country neither diminishes the older adult immigrant's attachment to their traditions and religious belief nor weakens their ties to their homeland (Elliot, 1999). Culturally rooted attitudes and behaviors are difficult to change.

Fernando (1991) argues that many South Asian groups do not differentiate between culture, religion, medicine, and ethics in the same way as Western cultures do. Furthermore, there is no sharp distinction made between 'illnesses of the mind and of the body'. It is therefore, quite acceptable for a South Asian to visit a traditional healer whose spiritual or religious approach is considered appropriate for resolving their physical and emotional problems.

Desai and Coelho (1980) note that because of the stigma associated with professional help seeking, South Asians may turn to resources such as the extended family, friends, elders, indigenous healers, religious rituals, meditation, or yoga to alleviate psychological distress (Gardner, 2002). There exists a traditional belief among South Asians that mental health problems cannot be cured by medicine. "Seeking help for psychiatric problems usually occurs only in severe cases and may start with the pursuit of indigenous treatment modalities in the community" (Ahmed & Lekmau, 2000, p.95). Some families may first attempt to use herbal remedies and prayers prior to seeking

professional help. Research by Gardner (2002, p.185) provides a powerful example of how his Bangladeshi older adult participant living in Shoreditch (London) describes the importance of traditional healing:

We have a Kabiraj here. We have everything here. I went to one just the other day, because my head was aching....He's Bengali, otherwise he wouldn't understand. You go to your own Kabiraj, don't you? They give Tapij (amulets) and pura pani [water that has been blessed]...some illness doctor can cure and others the kabiraj can cure.

Historical Discrimination

Despite improvements over the past three decades, research continues to document the existence of racism and discrimination in the administration of medical care. They are manifest, for example, in fewer diagnostic and treatment procedures for South Asians versus whites (Giles, Anda, Casper, Escobedo & Taylor, 1995). For many years, researchers and practitioners have found that minority clients who seek psychotherapeutic services receive discriminatory treatment from white therapists (Sue, 1977). In their study with South Asian women, Browne, Johnson, Bottorff, Grewal and Hilton (2002) found that some women they interviewed were conscious of being treated as "different" when compared to their counterparts from "white" backgrounds. This could take the form of nurses refusing a minority women's request for basic courtesies in the context of the health care encounter, or the women's perception of receiving lesser care from nurses because of their racial background.

Zhan (1998), studying the health practice of older adult women in the United States, found that because of cultural conflicts concerning the power relationship between the health provider and patient, language incompetence, perceived discrimination, and financial difficulty, a majority of older adult female clients hesitated to ask questions regarding prescribed medication or to verbalize their concerns for fear of public conflict.

Organizational Barriers

Organizational factors including staffing patterns, location and office hours of service facilities, providers' attitudes, and staff-client

relationships have also been found to influence service use (Thornton & Carter, 1975). Holmes, Holmes, Steinbach, Hausner and Rocheleau (1979) stated in their study that in addition to the attitudes and behaviors of professionals, the location of service facilities, staffing patterns that reflected the ethnic populations and the positive attitudes of agency administrators toward the importance of ethnic staff to organizational functioning were positively related to service use. McKinlay (1972) notes that the system's bureaucratic orientation towards potential clients may serve as a barrier to use (e.g., eligibility tests, application forms and procedures, impersonal treatment and so on).

Additional Difficulties for South Asian Women

The gender differential in English language skills also affects access to health and social care services (Askham, Henshaw, & Tarpey, 1995). One United Kingdom study showed that communication is still a challenge because interpreters are scarce: only 3% of Indians and 7% of Bangladeshis said their general practitioner provided interpreting services when required (Rehman, 1999).

Lack of access to female practitioners can be a deterrent to South Asian women taking up an invitation for cervical cancer screening (Naish, Brown & Denton, 1994). Jesmin's study (2001) reveals that South Asian, Pakistani and Bangladeshi women in particular, prefer a female doctor. She also notes that women generally prefer a female doctor for check ups and delivery and they feel uncomfortable discussing female sickness with a male physician. In evaluating the effect of a breast awareness program among South Asian women living in England, researchers found that the majority of women did not perceive themselves as at risk for cancer, believed that breast self-examination was not necessary, and were often shy about having male physicians examine their breasts (Bhakta, Donnell, & Mayberry, 1995). Some even reported that if they were assigned a male doctor for their scheduled appointment they would try to reschedule it for another date in the hopes of being reassigned to a female doctor.

Implications for Policy

Studies of health and community services in Toronto have revealed that serious incongruencies exist between the needs of ethnic older adults and the services they are offered (Doyle & Visano, 1987). A search of Canadian research identified 13 more recent publications on the subject (Mulvihill, Mailloux, & Atkin, 2001). The overriding message of this research is that culturally appropriate health care practices and health promotion initiatives can enhance both the accessibility of health services and the status and behaviors of immigrants (Mulvihill *et al.*, 2001).

The preceding sections have provided an overview of the life experiences of older adult South Asian Canadians, some features of their unique culture and health needs. In this section I would like to provide some ideas about how to address the problem of their access to health care.

Combine Traditional Healing Systems with Western Medicine

Older adult immigrants frequently prefer traditional, familiar health care practices over modern and, therefore, unknown Western medicine (Gozdziak, 1989). Popita's (1995) findings illustrate that in most of South Asia, the bio-medical model of health care co-exists within the matrix of a pluralistic system which consists of a variety of practitioners, schools of thought, disciplines and ways of accessing services. She concludes that the health care system in South Asia is pluralistic and access to the professional (bio-medical, *ayurvedic*), folk (astrologers, herbalists, temples, shrines, and others) and popular (lay public) sectors allows clients to control the process of seeking and receiving treatment.

Some institutions have attempted to follow this South Asian model to better serve their patients. For example, there is evidence that the Community University Health Care Centre in St. Paul, Minnesota, which tries to combine traditional medical practices with Western health care seem to be very successful in gaining its older adult patients' trust (Gozdziak, 1989). In modern India, folk healers continue to be sought out along with medical doctors and it is not uncommon for multiple healers to be consulted and treatment from different kinds of health followed simultaneously (Bhattacharyya,

1983; Kapur, 1979). According to Smith (1990) many Hmong herbalists have begun blending Western medicines with their herbs (e.g. mixing antibiotics and herbal creams for treating wounds). This suggestion for mixing and matching the two systems requires the existence of a desire to understand and accommodate the patient's belief system on the part of physicians and other care providers (Gozdziak, 1989).

Develop Coordination and Collaboration among Providers

Collaboration between health care providers, particularly the use of a collaborative practice model between psychologists and physicians, is a growing area designed to meet the multiple needs of patients (Sargent, 1985). Collaboration allows for more comprehensive care by giving patients access to intensive treatment for difficult emotional and psychosomatic problems (McDaniel, 1995). Such collaborations can reduce service gaps while sensitizing mainstream agency providers to the unique needs of the immigrant older adult populations (Domanski & Mui, 1999). Collaborations between medical and mental health providers can help break down social barriers, unify fractionalized care, identify creative solutions, and prevent frustrations, burnout, and compassion fatigue among care providers (Bray & Rogers, 1995, 1997).

Provide Culturally Sensitive Services

A review of the literature shows that culture plays an important role in a client's understanding about health problems, so it is significant to realize cultural variations in the understanding of health and disease. Biomedical health professionals' failure to recognize alternative visions of health and illness result in confusion, mistrust, and poor communication. Given the centrality of talking as a major form of mental health treatment, issues of language and culture appear particularly central in thinking about developing culturally competent mental health services (Guarnaccia, Rivera, Franco & Neighbors, 1996). Commissioner Roy Romanow, (2002) in his recommendations regarding health care in Canada, acknowledges the need for immigrant and racialized Canadians to have equal access to health care services, and that racialized people need programs that complement their ethnic and cultural traditions. The CEC (2003) proposed a Best Practice

model in a training program that focused on ethnocultural and Aboriginal older adults.

Conclusions

The stress older adult immigrants face as a result of late in life immigration clearly points to a need for health services. However, there is a myriad of reasons why these immigrants do not utilize services as much as their Canadian born counterparts. Meeting the physical and mental health needs of older adult immigrants is challenging due to cultural differences. South Asians often somatize their emotional problems, and thus seek emotional support from primary care providers instead of mental health professionals. This is particularly true for older adult women.

Supportive health services for these populations will need to be tailored to the particular cultural preferences and values of these older adults in order to successfully deliver the services. Targeted services could be especially important for these older adult immigrants because services designed for the general population may not serve the needs of those with limited English proficiency, different cultural backgrounds and socio-economic conditions. Providers need to go into the community, gain the trust of the people they are trying to serve, and slowly begin reducing stigma around mental health, and mental illness. Research has also suggested a need for better planning, organizing, and delivery of health services to meet the special needs of women (Rhodes & Goering, 1994).

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Gender Differences in Economic Support, Well-being and Satisfaction of the Rural Elderly in Naogaon District, Bangladesh

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ABSTRACT

This study provides a comprehensive analysis of gender differences in economic support and well-being based on findings of interviews conducted with 743 elderly from rural area under Naogaon district, Bangladesh. We examine multiple economic indicators, including sources of income, receipt of financial support, income levels, ownership of dwelling and satisfaction with adequacy of income. Results show substantial variation in gender differences across indicators and provide an important qualification to widely held views concerning the globally disadvantaged position of older women. Whereas men tend to report higher levels of income than women, there is also a quite gender difference in housing characteristics, dwelling ownership or reports of satisfaction with the adequacy of income. Findings need to be significantly utilized in developing suitable programs addressing the case of elderly of the developing countries as well as Bangladesh.

Keywords : Gender difference, Economic support, Economic well-being, Logistic regression analysis and Bangladesh.

Interest in gender as a theme in ageing in part from the recognition that women predominate among the elderly. Lower mortality among women has resulted in an imbalance in the sex ratio among older persons in almost all countries, with women out

numbering men particularly among the oldest-old (Gist and Velkoff, 1997). Beyond these demographic dimensions, the growing concern over gender and ageing is motivated by a presumed greater social and economic vulnerability of older women compared to men, arising from the fact that, more than for men, women's productive activities are carried out outside the formal economic sector and from pervasive gender inequality in family and community life that is through to characterize many societies.

Virtually all societies have a set of norms and practices that define the roles, rights and obligations of men and women: this is typically referred to as a "gender system" (Mason, 2001). Gender systems differ substantially across societies and the conditions. Gender systems, in turn, are both influenced and reinforced by social and economic institutions. Gender systems also influence the relative access of older men and women to family assets both before and after the death of a spouse.

At any age, the family provides the individual the emotional, social and economic support (Soldo and Agree, 1988). Karen Mason (1992) found two major types of family system that contains such support in Asia: the patriarchal/patrilineal systems found in East Asia and the northern tier of South Asia, and the bilateral systems found in southeast Asia and the southern tier of South Asia. The former stress the responsibility of sons (and their wives) for caring for and supporting parents, whereas under the later daughters occupy equally or more important roles in contributing to their parent's well-being. Focusing on the providers of support, both sons and daughters are actively engaged in support exchange with their older parents in the patriarchal societies of Taiwan and Singapore, as well as the more bilateral societies of Thailand and the Philippines (Ofstedal *et al.*, 1999).

Economic well-being is a complex and multi-dimensional concept (Chayovan, 1999; Hermalin *et al.*, 2002). Economic well-being depends not only just on monetary resources, such as earnings or interest income, but also on non-monetary resources, such as the presence of other family members and one's own ability to perform tasks that generate earnings (Arber and Ginn, 1991; Danigelis and McIntosh, 2001). In addition, economic satisfactions also vary by gender. Higher economic satisfaction generally leads to higher life

satisfaction particularly in a country where most of the people are living below poverty line. In terms of financial satisfaction males experience more economic satisfaction than females. Generally, males enjoy more independence and financial security than females.

Much recent concern over population ageing has focused on the assumed social and economic vulnerability of older women (INSTRAW, 1999; UN, 2002). And little systematic research on this issue is available for developing countries. Thus the present study tries to a comprehensive and systematic analysis of gender differences in economic support, well-being and satisfaction of the elderly of the rural Naogaon district in Bangladesh.

Objectives

In order to represent the complex and multidimensional nature of economic well-being and support, we draw on a number of indicators. And this study tries to carry out with the following objectives:

- to observe the socio-economic status of the study respondents;
- to explore household characteristics and the direct & indirect economic support of the study respondents; and
- to isolate more influential factors that are responsible for economic satisfaction of elderly population.

Materials and Methods

This study uses the data collected from 7 villages of rural areas under Naogaon district, about 36 km away from Rajshahi divisional town of Bangladesh. One Thana named, Manda, was randomly selected from this district. From all the unions of the Thana, a Union (9 Number Tintulia Union Parishad) was randomly selected and from this union 7 villages were selected by using Probability Proportional to size (PPS) sampling. In order to perform the above task, first the authors made a pilot survey and collect voter list from Union Parishad and then identify seven villages out of 34 villages and collect the information of 743 elderly persons using Lahiri's method of PPS sampling. All the elderly (743 elderly) persons aged 60+ years were interviewed during 6th September to 16th September 2007. The data were edited, compiled, computerized and processed by using SPSS 10.5 program.

In any situation where a multivariate problem is encountered, the method of analysis should proceed from simple to complex in an orderly manner (Srinivasan, 1979). We have performed univariate classification analysis i.e. percentage distribution in order to observe the socio-demographic characteristics, household characteristics, economic characteristics and direct and indirect economic support of the study population. Finally, a multivariate technique named as logistic regression analysis is used to assess the effect of several variables on economic satisfaction of the elderly population.

Results and Discussions

Socio-Demographic Conditions

We begin with a brief overview of the older men and women with respect to several key socio-demographic characteristics (see Table 1). Highest percentage of the older male (41.2%) are in the age group 70 years and above whereas most of the older female (43.1%) are in the age group 60-64 years. Marital status varies strongly by gender. Majority of the older male (91.5%) are married whereas most of the older females (63.9%) are widowed.

There are strong cross-gender variations in education, although these variations do not necessarily correspond with level of social and economic development. For example, the largest percent with no education is in older female (91.0%) whereas this percent for older male is 44.5%. We also observed that men have a definite advantage with respect to education, with much higher proportions receiving education for 1-5 years and 6 years and above.

For both men and women the percent of currently not working is quite similar by gender. Highest percent male elderly are engaged in agricultural work whereas largest percent of women elderly are worked as housewife. This variation likely reflects societal differences in gender roles and cultural definition of work, as well as the level of industrialization and development. In the less-well off and/or predominantly agricultural societies, women's labour may be needed to contribute to the household economy or assist with the farming. Lastly, most of the elderly reside with a child, most often a married child. Women (57.6%) are more likely than men (27.9%) to live with a married child.

Table1. Selected socio-demographic characteristics of the study respondents**Table1. Selected socio-demographic characteristics of the study respondents**

Variables	Male N= 330		Female N= 413		Both N= 743	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Age Composition						
60-64 years	95	28.8	178	43.1	273	36.7
65-69 years	99	30.0	101	24.5	200	26.9
70+ years	136	41.2	134	32.4	270	36.3
Marital Status						
Married	302	91.5	146	35.4	448	60.3
Widowed	24	7.3	264	63.9	288	38.8
Others	4	1.2	3	0.7	7	0.9
Level of Education (in actual year of schooling)						
No Education	147	44.5	367	91.0	523	70.4
1-5 years	121	36.7	35	8.5	156	21.0
6+ years	62	18.8	2	0.5	64	8.6
Work Status						
Not Working	113	34.2	141	34.1	254	34.2
Agriculture	147	44.5	9	2.2	156	21.0
Service	15	4.5	-	-	15	2.0
Business	30	9.1	8	1.9	38	5.1
Housewife	-	-	226	54.7	226	30.4
Others	25	7.6	29	7.0	54	7.3
Living Arrangement						
Living alone	6	1.8	51	12.3	57	7.7
With spouse	180	54.5	77	18.6	257	34.6
With unmarried children	49	14.8	37	9.0	86	11.6
With married children	92	27.9	238	57.6	330	44.4
Others	3	0.9	10	2.4	13	1.7

Household Characteristics

Table 2 addresses household characteristics in order to provide another indication of whether women are more disadvantaged than men at the household level. Majority of the elderly male (79.7%) are the head of their family whereas 52.1% female elderly said that their

family is headed by their children. This indicates the picture of male headed Bangladeshi society. Also majority of the male elderly are the owner of their dwelling but in case of female elderly it is 34.6 percent. Household characteristics also correspond to economic development levels of a country. From table 2 it is observed that the house condition of both male and female elderly is quite similar and also there is no strong variation by gender in case of latrine. The sources of drinking water (i.e. tube well) in case of both men and women are also quite similar.

Table 2. Household characteristics of the study population

Variables	Male N= 330		Female N= 413		Both N= 743	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Family Head						
Self	263	79.7	99	24.0	362	48.7
Spouse	8	2.4	85	20.6	93	12.5
Children	55	16.7	215	52.1	270	36.3
Others	4	1.2	14	3.4	18	2.4
Owner of Dwelling						
Self	305	92.4	143	34.6	448	60.3
Children	20	6.1	162	39.2	182	24.5
Others	5	1.5	108	26.2	113	15.2
Condition of House						
Pacca	21	6.4	23	5.6	44	5.9
Kaccha	277	83.9	359	86.9	636	85.6
Half pacca	31	9.4	27	6.5	58	7.8
Others	1	0.3	4	1.0	5	0.7
Condition of Latrine						
Sanitary	44	13.3	32	7.7	76	10.2
Pacca	75	22.7	85	20.6	160	21.5
Kaccha	179	54.2	231	55.9	410	55.2
Open	32	9.7	65	15.7	97	13.0
Sources of Drinking Water						
Tube well	323	97.9	406	98.3	729	98.1
Tap	3	0.9	2	0.5	5	0.7
Others	4	1.2	5	1.2	9	1.2

Economic Characteristics

Table 3 presents data on economic characteristics by focusing on the percentage of respondent's monthly income, family's monthly income, economic status and economic satisfaction of the elderly population. With requisite data, women are more likely than men to have low personal incomes. More than half of the female elderly have no income. The percentage of older women at various level of income varies significantly with men. These gender differences in personal income likely reflect, at least to some extent, differences in main sources of economic support for men and women. Whereas men are more likely to be working and thus generating income, women are more likely to receive support from children and other family members, which may be in kind and services rather than cash and thus not be reported as income.

Interestingly, the gender differentials with respect to family's monthly income are far less consistent. For women are substantially more likely than men to fall in the low income category. One possible explanation is that women are more likely than men to live with married children and have no income, who may command a lower wage in poor setting rural Bangladesh.

There is a strong cross-gender variation in economic status. Table 3 also shows that highest percent of the male elderly (69.7%) were economically independent and more than three-fourth of the older female were economically dependent. This may be the same previous reasons that in Bangladesh women are more likely than men to live with married children and to receive support from children and other family members. Generally, there is a strong difference by gender in satisfaction with perceived adequacy of income. Gender difference is considerably more pronounced, where more than three-fourth of the women and more than half of the men are not satisfied with their current economic condition and are more likely to report having inadequate income to meet their expenses.

Table 3. Economic characteristics of the study respondents

Variable	Male N= 330		Female N= 413		Both N= 743	
	Frequen- ncy	Percen- tage	Frequen- ncy	Percent -age	Frequen- ncy	Percent -age
Respondent's Monthly Income (in Tk.)						
No Income	45	13.6	231	55.9	276	37.1
Up to 2999	200	60.6	174	42.1	374	50.3
3000-5999	55	16.7	5	1.2	60	8.1
6000+	30	9.1	3	.7	33	4.4
Family's Monthly Income (in Tk.)						
Up to 2999	163	49.4	235	56.9	398	53.6
3000-5999	84	25.5	103	24.9	187	25.2
6000+	83	25.2	75	18.2	158	21.3
Economic Status						
Independent	230	69.7	101	24.5	331	44.5
Dependent	100	30.3	312	75.5	412	55.5
Economic Satisfaction (with their income/economic support)?						
Yes	157	47.6	99	24.0	256	34.5
No	173	52.4	314	76.0	487	65.5

Notes: Bangladesh Currency- Taka i.e. Tk.

Direct and Indirect Economic Support

As a starting point for examine the direct and indirect economic support of older men and women, we focus on current sources of income and household expense. Table 4 presents the percent that report receiving income (source of income) from each source by gender. Since respondents were allowed to report multiple sources, the percentages do not add to 100.

Gender differentials are also pronounced in the sources of income. More men elderly (20.3%) than female elderly (9.9%) earn from work. Since men are more likely than women to be currently

working, it follows that they are also more likely to earn income from work. Again the gender differential favours men across the broad and is even more pronounced than that for current land property income. Land property is the main source of income for male elderly whereas for female elderly children is the main income source. It is also observed that about one-fifth of the female elderly received income from others sources (like begging, financial help from others etc.) than men (13.3%). Consistent with the pattern noted above, the ratios indicate that men's income is more dispersed across a number of sources compared to women's income.

To know the indirect support, the respondents were asked to indicate who paid for household expenses. Highest percent men respondents reported that the household expenses were mostly paid by themselves but in case of female elderly the household expenses are mostly paid by their children.

In some respects the finding pertaining to direct and indirect transfer of support are counter to the concern that the position of elderly women in patrilineal/patriarchal societies are less secure than that of elderly men. On the other hand, the high level support from family members (usually children) may be indicate of a more tenuous position of women in society (if not in the family) in that women are forced to rely on support from kin in the absence of more formal support mechanisms provided through work or through private or public pensions. In addition, closer emotional ties between mothers and children lead to more filial support for women.

Logistic Regression Analysis

To conclude our analysis we present results of logistic regression model to assess the impact of several variables on economic well-being by gender in Table 5 which shows results for the logistic regression model predicting the subjective measure of economic well-being: satisfied with income (coded 1 = satisfied; 0 = not satisfied).

Table 5 exerts the impact of marital status on economic satisfaction by gender. Male elderly who are widower are less likely to satisfy with their income than the reference category. But female elderly who are widow are 0.57 times significantly and less likely to be satisfied with their income than the reference category.

Table 4. Direct and indirect economic support of the study respondents

Variable	Male N= 330		Female N= 413		Both N= 743	
	Freque -ncy	Percen -tage	Freque -ncy	Percen -tage	Freque -ncy	Percen -tage
Sources of Income						
Work	67	20.3	41	9.9	108	14.4
Business	26	7.9	16	3.9	42	5.7
Pension	11	3.3	7	1.7	18	2.4
Land	176	53.3	65	15.7	241	32.4
Children	80	24.2	195	47.2	275	37.0
Others	44	13.3	87	21.1	131	17.6
Who Paid Household Expenses						
Max. by own self	213	64.5	82	19.9	295	39.7
Max. by Spouse	16	4.8	71	17.2	87	11.7
Max. by Children	97	29.4	245	59.3	342	46.0
Max. by Others	4	1.2	15	3.6	19	2.6

Regarding family type, male elderly living in a nuclear family are less likely to be satisfied with their income than those are living in joint family but incase of female elderly we have got the significant value and the female elderly living in nuclear family are 0.36 times less likely be satisfied with their income than the reference category. Considering elderly (both male and female) living with married children as reference category, we have not got any significant category, separately for male and female.

From Table 5 it is also observed that not working male elderly are 2.57 times more likely to be satisfied with their income which is highly statistically significant than the reference category. Also for female not working elderly are 1.26 times not significant but more likely to satisfy with income than their reference category. One possible reason responsible for that is not working elderly (both male and female) have received financial support and others material support from their family member and also from some other relatives.

Family's monthly income exerts the significant effect on economic satisfaction by gender. Generally, more income means more economic satisfaction. And our study shows the as usual and statistically significant results that mean those, whose family's monthly income are higher, are more satisfied. Male elderly, whose family's monthly income is 6000+ Tk. are 12.05 times more likely to report that they are satisfied with their economic condition, also whose family's monthly income in between Tk. 3000- 5999 are 3.37 times highly significant and more likely than the reference income group. Incase of female elderly whose family's monthly income is 6000+ Tk. are 3.31 times more likely to report that they are satisfied with their economic condition, also whose family's monthly income in between Tk. 3000- 5999 are 1.97 times highly significant and more likely than the reference income group

This finding may be related to the findings that, although women tend to be disadvantaged relative to men on individual/couple financial measures (e.g. income sources and amounts), there is less discrepancy on household level measures. Given that elderly persons live within households and thus share much of the common fate of the household, the modest differences in economic well-being between the households in which elderly men and women live may account for the lack of gender differences in perceived well-being. It is possible that women in the study population are less apt to report negative feelings about their financial situation, particularly if they are dependent on others for financial support.

Table 5. Results of logistic regression analysis on economic well-being of elderly population

Variables	Elderly Population								
	Male			Female			Total		
	ERC	S.E.	OR	ERC	S.E.	OR	ERC	S.E.	OR
Marital status									
Married (ref.)	-	-	1.00	-	-	1.00	-	-	1.00
Widow	-0.93	0.55	0.40	-0.57**	0.27	0.57	-0.96***	.206	0.38
Others	-0.13	1.19	0.88	-5.53	12.83	0.04	-1.02	1.10	0.36
Family type									
Nuclear	-0.21	0.33	0.81	-1.02***	0.37	0.36	-0.49**	0.24	0.62
Joint (ref.)	-	-	1.00	-	-	1.00	-	-	1.00
Living with married children									
Yes (ref.)	-	-	1.00	-	-	1.00	-	-	1.00
No	-0.41	0.39	0.67	-0.49	0.34	0.61	-0.495**	0.248	0.610
Work status									
Working (ref.)	-	-	1.00	-	-	1.00	-	-	1.00
Not working	0.94***	0.29	2.57	0.23	0.28	1.26	0.46**	0.19	1.58
Family's monthly income (in Tk.)									
Up to 2999 (ref.)	-	-	1.00	-	-	1.00	-	-	1.00
3000 – 5999	1.22**	0.31	3.37	0.68**	0.30	1.97	0.97***	0.21	2.64
6000+	2.49***	0.36	12.05	1.20***	0.32	3.31	1.87***	0.23	6.47
Constant	-1.37***	0.38	0.26	-0.81**	0.41	0.44	-0.91***	0.26	0.40

Notes: ERC = Estimated Regression Coefficient; S.E. = Standard Error of ERC; OR = Odds Ratio; Tk. = Bangladesh Currency - Taka i.e. Tk.; Coefficient significant at least 5 percent level are shown in bold type; Level of significance: ***p < 0.01; **p < 0.05

Summary and Conclusion

Concern over the vulnerability of the older population in general and older women in particular, has been a major impetus of much of the research and the focus of considerable attention relating to population ageing. The present study examines numerous different indicators, including both individual and household level measures and formal and informal sources of support. The findings indicate that women (particularly widows) are more likely to rely on family members for financial and material support, whereas men are more likely to have their own sources of income, mainly through work. Despite gender differentials in actual income levels, which tend to favour men, there is much less difference between men and women with respect to some housing characteristics and reports of economic satisfaction or income sufficiency.

This study tries to provide an important benchmark on gender and economic well-being of the study population. Gender discrimination and inequality are carried into old age, making widows among the most vulnerable in the society (Help Age Int., 2000). Likewise, statements by international agencies dealing with population, ageing and development typically emphasize the disadvantaged situation of older women, particularly widows (Knodel & Ofstedal, 2003). Most notably, the Plan of Action emanating from the 2nd World Assembly on Ageing held in April 2002 argues repeatedly throughout the documents that older women are more vulnerable than their male counterparts in virtually every dimension including being economically disadvantaged (United Nations, 2002).

If the international agencies are to provide informed guidance for policies and programs to assist elderly population and to help target these programs more effectively comparative research such as the present study is essential for Bangladesh as well as for developing countries. In formulating national policies and programs to address future rapid population ageing, the relevant government agencies will benefit by taking into account systematic assessments of the current situation, such as our findings provide, rather than uncritically accepting commonly held assumptions that fail to acknowledge the extent of diversity across settings and the specifics of their own national and regional contexts.

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Gender Differences in Coping Ways and Mental Health among the Institutionalized Aged

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ABSTRACT

Data were collected from 200 institutionalized aged (100 Males and 100 Females) in the age range of 60 to 85 years on Ways of Coping Questionnaire (Folkman & Lazarus, 1985) and General Health Questionnaire-28 (Goldberg & Hillier, 1979). The obtained data were subjected to t-test and Pearson product-moment correlation. Result showed that males scored higher on positive reappraisal ($t = 6.54, p < .01$), self-controlling ($t = 7.73, p < .01$), planful-problem solving ($t = 7.62, p < .01$), confronting coping ($t = 4.73, p < .01$), seeking-social support ($t = 3.8, p < .01$), accepting responsibility ($t = 7.32, p < .01$). And females scores higher on distancing and escape-avoidance respectively. In mental health, results shown that females scores higher on depression ($t = 4.19, d = .60, p < .01$), somatic symptoms ($t = 4.00, p < .01$), anxiety ($t = 3.60, p < .01$), and social dysfunction ($t = 2.95, p < .05$ level). The results of product-moment correlations showed that escape-avoidance found significantly positively correlated with total mental health (males: $r = .65, p < .01$, and females: $r = .79, p < .01$), and its four sub-scales, i.e., somatic symptoms, anxiety and insomnia, social dysfunctions, and depression among both male and female groups. Distancing was also found positively but not significantly correlated with total mental health, and its sub-scales i.e., depression in both male and female groups, and found negatively but not significantly correlated with somatic symptoms, social dysfunction, and anxiety. All other sub-scales of coping, such as confronting coping, self-control, seeking-social support, accepting responsibility, planful-problem solving and positive reappraisal found significantly negatively correlated with somatic symptoms, anxiety and insomnia, social dysfunction, and

depression among both male and female groups. Results were discussed in the light of previous studies.

Key words : Gender differences, Coping ways, Mental health, Institutionalized aged

Pune is the most developed city in Maharashtra after Mumbai. Earlier Pune was known as 'pensioner's paradise,' but since the last decade or so, this city has been developing rapidly and is known as 'IT and educational hub' in the country. Due to this high industrialization and globalization the younger generation is working in different cities as well as countries and their parents have had to stay away from their children. Due to these changing socio-economic and demographic conditions most of the family members are not able to provide support and care to the older parents and more and more number of the aged have moved into the homes for the aged. Earlier research also explained that due to the displacement or migration of the children most of the older persons either live alone or in homes for the aged (Shaha, 1999). There are about 12.75 million elderly in India who are without family and they comprise about 30 per cent of the total population of the elderly (Ara, 1995). With this growing incidence are the problems of the aged, and increasing number of the aged in India will progressively be found in old-age homes in future.

Living in old-age homes is not accepted in the Indian culture (Dandekar, 1996), but because of migration of younger generation, lack of care within family, insufficient housing, economic hardship, and break-up of the joint family, the elderly people have to move into the old-age homes or institutions (Prakash, 2000; Rajan *et al.*, 1994, cited in Vijaya Kumar, 2001).

The purpose of this study was to find out if any gender differences existed in the ways of coping among the institutionalized aged and if there was any correlation between ways of coping and mental health among institutionalized aged.

Institutional Living: Old-age homes have been characterized as "an essential private place which is the center of domesticity, a place of intimacy and sometimes a place of solitude" (Peace, 1988, 1993;

Sixsmith, 1986; 1990). It is often linked to the idea of family (Peace, 1988, 1993; Willcocks *et al.*, 1987). This may not be applicable to the Indian society. Another term we use for old age home is 'institution' where the aged live, such as homes for the elderly, non-private institution, care-centers for the aged, and government aided welfare homes.

The older people living in homes for the aged have to adjust with the atmosphere there. Stress does not reduce or vanish in this stage. Due to this coping with old age is becoming increasingly difficult. According to Folkman *et al.* (1987) and McCrae (1982) elderly people use a wide range of coping strategies with negative life events.

Some elderly use more cognitive or behavioral problem-solving strategies (e.g., come up with several solutions, gather information, and make plans of action) while others prefer emotion-focused coping strategies (seeking emotional support, distancing, avoiding, and self-blame) in stressful situations (Folkman, 1984).

Cox and Hammonds' study (1988) showed that elderly people do not use only problem-focused and emotion-focused coping in stressful situation, although, they also use religious and spiritual coping to a large extent. Many elderly people use active, adoptive, and passive ways of coping to manage and maintain their everyday problems (Duner and Norstrom, 2005).

In gender differences studies on coping ways, females showed more social support, emotion-focused, and avoidant coping compared to males (e.g. Billings & Moos, 1981; Pearlin & Schooler, 1978; Ptacek *et al.*, 1992; Stein & Nyamathi, 1999; Stone & Neal, 1984), whereas males showed more stress release through other activities and more often turned to drugs or alcohol as compared to females (Bird & Harris, 1990; Carver *et al.*, 1989; Patterson & McCubbin, 1987, Stein & Nyamathi, 1999). In another study researchers (Brems & Johnson, 1989; Stone & Neal, 1984) found that males use more problem-focused coping strategies than females, but Billing and Moos (1991) and Ptacek *et al.* (1994) reported that women use more often problem-focused coping strategies than men.

Some studies compared the problems of institutionalized and non-institutionalized living in which Chaddha (1994) found that non-institutionalized elderly were better on psychological well-being with low depression level as compared to institutionalized elderly people. Arora and Chaddha (1995) found insignificant social support network and lower life satisfaction in institutionalized aged compared to non-institutionalized aged. In another study (Ron, 2004) institutionalized aged reported high feeling of hopelessness, helplessness, and depression compared to community living elderly.

Hypotheses

The following hypotheses were formulated keeping in mind previous studies and the objectives of the study.

1. Males and females differ on coping ways.
2. Males and females differ on mental health.
3. Escape-avoidance and distancing is positively correlated with mental health among male and female groups.
4. Confronting coping, self-control, seeking-social support, accepting responsibility, painful-problem solving, and positive reappraisal are negatively correlated with mental health among male and female groups.

Method

This section deals with the sample, tools, procedure, and statistical analysis.

Sample

The sample of present study consisted of 200 elderly (100 males and 100 females) age varying from 65 to 85 years, belonging to middle class families, semi educated and having no major health problems (both mental and physical). These subjects were selected from 28 old age homes of Pune City (Maharashtra) where they were staying for the last two years prior to the study.

Tools

The following scales were used in the present study to measure ways of coping, and mental health.

Ways of Coping Questionnaire (WOC)

WOC was designed by Folkman and Lazarus (1985) to identify the thoughts and actions an individual uses to cope with stress of everyday living. In the present study, the Marathi translation was used. The WOC consists of 66 items and has eight sub-scales, and measures eight ways of coping, namely, Confrontive Coping, Distancing, Self-Controlling, Seeking Social Support, Accepting Responsibility, Escape-Avoidance, Planful-Problem Solving, and Positive Reappraisal. There is no time limit, and most respondents take 10 to 15 minutes to complete it but older respondents may take longer time. The individuals respond to each item on a 4-point Likert-type scale, indicating frequency with which each strategy is used: 0 indicates "Does not apply and/or not used," 1 indicates "Used somewhat," 2 indicates "Used quite a bit," and 3 indicates "Used a great deal."

This test has a satisfactory test-retest reliability, and alpha coefficients for the original scales range from .61 to .79: Confrontive Coping .70, Distancing .61, Self-Controlling .70, Seeking Social Support .76, Accepting Responsibility .66, Escape-Avoidance .72, Planful Problem Solving .68, and Positive Reappraisal .79. For the present study Marathi translation of the WOC was used. The translation was done by forward-backward method. The alpha coefficients for the Marathi scale range from .53 to .89, and total reliability was .92.

General Health Questionnaire-28 (GHQ-28)

The original General Health Questionnaire consists of 60 items from which a shorter version of GHQ-28 as developed by Goldberg and Hillier (1979). It assesses the individual's ability to carry out his/her healthy activities and the recent development of subjective symptoms of psychological distress (Goldberg & William, 1988). The

GHQ-28(1998) consists of 28 items and has four subscales: Somatic Symptoms, Anxiety and Insomnia, Social Dysfunction and Severe Depression.

In this questionnaire the respondent responds to each item on a 4-point scale: 1-Not at all, 2-No more than usual, 3-Rather more than usual, 4-Much more than usual. The respondent was asked to compare his/her recent psychological state with his/her usual state. This questionnaire has satisfactory reliability and validity. The Cronbach's alpha coefficient of reliability of the subscale ranges from .83 to .92. Split-half reliability is .97. In the present study Marathi translation used, The Cronbach's alpha coefficient of reliability of the sub-scales ranges from .74 to .89, and total reliability is .94. The higher scores indicate poorer psychological well-being and low scores indicate good well-being.

Procedure

The permission for data collection was taken from the concerned authorities of the homes/ institutions for the aged. The homes/ institution personnel were requested to help the investigator to have smooth interaction with the elderly for research purpose. All the tools were pinned together with the separate answer sheet/s and distributed among the aged in small groups of 3 or 4. While completing the tests some help was provided to the respondents by researcher as per the need. The age of each respondent was verified later with concerned authorities. Queries and concerns raised by the participants were attended to individually during the testing.

Results

The data collected from the 200 participants were analyzed through the SPSS version11.0.

Coping

A t-test was carried out to see if males and females differ significantly on the ways of coping.

Table-IV-1: Shows means, standard deviation and t-test result for males and females on eight ways of coping (Males N = 100, Females N = 100).

Ways of coping	Gender	Mean	SD	t	Level of Sig.
Confronting coping	M	8.51	2.97	4.73	.00
	F	6.52	2.97		
Distancing	M	7.83	3.09	.12	.06(NS)
	F	8.55	2.37		
Self-Control	M	12.01	3.68	7.73	.00
	F	8.39	2.89		
S-Social Support	M	8.04	3.10	3.86	.00
	F	6.48	2.60		
Accepting Responsibility	M	6.90	2.40	7.32	.00
	F	4.54	2.14		
Escape-Avoidance	M	6.33	5.51	-5.05	.00
	F	9.91	4.15		
P-P Solving	M	10.66	3.67	7.62	.00
	F	6.75	3.59		
Positive Reappraisal	M	12.55	4.73	6.54	.00
	F	8.47	4.06		
Emotion-focused	M	26.17	6.97	-.67	.51(NS)
	F	26.75	5.18		
Problem-focused	M	46.66	14.37	7.16	.00
	F	32.76	13.05		

NS = Not Significant

The above table (IV-1) shows the mean, standard deviation, and t-test results for males and females on eight ways of coping, total score of emotion-focused coping and total score of problem-focused coping. The mean for males on confronting coping were 8.51, $\sigma = 2.97$, and for females 6.52, $\sigma = 2.97$, and t value was 4.73, with $d = .67$, ($p < .01$). The means for males on distancing were 7.83, $\sigma = 3.09$, and for females 8.55, and $\sigma = 2.37$, and t value was .12, which was not significant. The means for males on self-controlling were 12.01, $\sigma = 3.68$, and for females 8.39, $\sigma = 2.89$, and t value was 7.73, with 1.10, ($p < .00$). The means for males on seeking-social support were 8.04, σ

= 3.10, and for females 6.48, $\sigma = 2.60$, and t value was 3.86, with $d = .55$, ($p < .00$). The means for males on accepting responsibility were 6.90, $\sigma = 2.40$, and for females 4.54, $\sigma = 2.14$, and t value was 7.32, with $d = 1.04$, ($p < .00$). The means for males on escape-avoidance were 6.33, $\sigma = 5.51$, and for females 9.91, $\sigma = 4.15$, and t value was 5.05, with $d = .72$, ($p < .00$).

The means for males on planful-problem solving were 10.66, $\sigma = 3.67$, and for females 6.75, $\sigma = 3.59$, and t value was 7.62, with 1.08, ($p < .00$). The means for males on positive-reappraisal were 12.55, $\sigma = 4.73$, and for females 8.47, $\sigma = 4.06$, and t value was 6.54, with $d = .93$, ($p < .00$).

The means for males on total scores of emotion-focused coping were 26.17, $\sigma = 6.97$, and for females 26.75, $\sigma = 5.18$, and t value was .67, with $d = .10$ which was not significant. The means for males on total scores of problem-focused coping were 46.66, and $\sigma = 14.37$, and for females 32.76, $\sigma = 13.05$, and t value was 7.16, with $d = 1.16$, ($p < .00$).

Results show that excluding distancing and escape-avoidance ways of coping, males scored higher on confronting coping, self-controlling, seeking-social support, accepting responsibility, planful-problem solving and positive reappraisal, than do the females. Thus, there are significant gender differences. On escape-avoidance and distancing ways of coping, females' scored higher than males, that is, females used more escape-avoidance and distancing than did males. In problem-focused coping, males scored higher than females, and no gender differences found in use of emotion-focused coping. Thus, males used more problem-focused coping than females in stressful situation.

Mental health

This section present the result obtained when t - test carried out to test gender differences in mental health.

Table IV-2: Shows mean and standard deviation of mental health for males and females and the results of the t-test for gender differences in mental health (Males N = 100, Females N = 100).

Mental health (sub-scales)	Gender	Mean	SD	t	Sig. level
Somatic Symptoms	M	1.55	1.86	-4.00	.000
	F	2.66	2.06		
Anxiety	M	2.44	2.41	-3.60	.000
	F	3.81	2.96		
Social Dysfunction	M	2.48	2.36	-2.95	.004
	F	3.45	2.29		
Depression	M	2.52	2.82	-4.19	.000
	F	4.41	3.53		
Mental health	M	9.00	7.73	-4.21	.000
	F	14.23	9.74		

The above table IV-2 shows means and standard deviation for males and females on mental health. The mean for males on total mental health were 9.00, $\sigma = 7.73$, and for females 14.23, $\sigma = 9.74$, and obtained t value was 4.21, with $d = .60$ ($p < .000$). This results indicates that males and females differ in mental health, and females scored higher than males, indicating females' mental health is poorer than males'.

Results also show the means and SDs for males and females on four sub-scales of mental health. The mean for males on somatic symptoms was 1.55, and $\sigma = 1.86$, and for females 2.66, and $\sigma = 2.06$. The mean for males on anxiety and insomnia was 2.44, $\sigma = 2.41$, and for females 3.81, and $\sigma = 2.96$. The means for males on social dysfunction was 2.48, $\sigma = 2.36$, and for females 3.45, $\sigma = 2.29$. The means for males on depression was 2.52, $\sigma = 2.82$, and for females 4.41, $\sigma = 3.53$.

In all the four sub-scales of mental health, there are significant sex differences on depression ($t = 4.19$, with $d = .60$, $p < 0.01$), somatic symptoms, ($t = 4.00$, with $d = .57$, $p < 0.01$), anxiety and insomnia ($t = 3.60$, with $d = .51$, $p < 0.01$), and social dysfunction ($t = 2.95$, with $d = .42$, $p < .05$ level). The results show that females' scores are higher on

all four sub-scales than the males' scores, which means females are higher on depression, somatic symptoms, anxiety and insomnia, and social dysfunction than males.

Correlation

This section presents the obtained correlations between ways of coping and mental health among male and female groups.

Ways of coping and mental health

This section presents the correlations among the ways of coping (eight sub-scales) and general mental health in males (N = 100), and females (N = 100).

Table-IV-3 shows the obtain results of the Pearson's product-moment correlation coefficient between ways of coping and mental health sub-scales. Results show that emotion-focused coping was found significantly positively correlated with total mental health (males: $r = .23$, $p < .05$, and females: $r = .31$, $p < .01$), and significantly negatively correlated with problem-focused coping with total mental health (males: $r = -.56$, $p < .01$, and females: $r = -.74$, $p < .01$) among both males and females groups. The correlation between emotion-focused coping and mental health was low but significant in males groups, and problem-focused coping was found significantly negatively associated with total mental health among both males and females groups indicating good mental health.

Results also show the significant correlation between eight sub-scales of coping and total mental health with four sub-scales. Escape-avoidance was found significantly positively correlated with total mental health (males: $r = .65$, $p < .01$, and females: $r = .79$, $p < .01$), and its four sub-scales, i.e., somatic symptoms (males: $r = .44$, $p < .01$, and females: $r = .68$, $p < .01$), anxiety and insomnia (males: $r = .62$, $p < .01$, and females: $r = .73$, $p < .01$), somatic dysfunctions (males: $r = .36$, $p < .01$, and females: $r = .65$, $p < .01$), and depression (males: $r = .67$, $p < .01$, and females: $r = .79$, $p < .01$) among both males and females, meaning high escape-avoidance scores are associated with high scores of all four sub-scales of mental health which shows poor mental health. Distancing was found positively but not significantly correlated with total mental health (males: $r = .02$, and females: $r = .03$, NS), and depression (males: $r = .16$, and females: $r = .09$, NS) in both males and

Table IV-3 Shows Pearson's product-moment correlation matrix of ways of coping and general mental health among males and females (Males, N = 100, Females, N = 100)

Sub-Scales	Sex	CC	D	SC	SSS	AR	E-A	PPS	PR	EFC	PFC
Somatic Symptoms	M	-.189	-.04 (NS)	-.44**	-.36**	-.32**	.44**	-.52**	-.45**	.09	-.45**
	F	-.42**	-.06 (NS)	-.60**	-.60**	-.46**	.68**	-.67**	-.68**	.18	-.69**
Anxiety & Insomnia	M	-.22*	-.01 (NS)	-.55**	-.41**	-.30**	.62**	-.48**	-.52**	.19	-.49**
	F	-.48**	.04 (NS)	-.58**	-.64**	-.41**	.73**	-.67**	-.69**	.28**	-.70**
Social Dysfunctions	M	-.31**	-.07 (NS)	-.47**	-.40**	-.35**	.36**	-.45**	-.46**	.00	-.48**
	F	-.43**	-.07 (NS)	-.50**	-.59**	-.35**	.65**	-.61**	-.61**	.21*	-.63**
Depression	M	-.188	.16 (NS)	-.39**	-.35**	-.23*	.67**	-.44**	-.53**	.39**	-.44**
	F	-.47**	.09 (NS)	-.52**	-.64**	-.36**	.80**	-.70**	-.70**	.37**	-.70**
Total Mental Health	M	-.27**	.02 (NS)	-.56**	-.47**	-.36**	.65**	-.57**	-.60**	.23*	-.56**
	F	-.49**	.03 (NS)	-.60**	-.68**	-.42**	.79**	-.73**	-.73**	.31**	-.74**

CC - Confronting Coping, D- Distancing, SC- Self-control, SSS- Seeking-Social Support, AR- Accepting Responsibility, EA- Escape-Avoidance, PPS- Planful-Problem Solving, PR- Positive Reappraisal.

females groups, and found negatively but not significantly correlated with somatic symptoms, social dysfunctions, and anxiety, (males: $r = -.038$, and females: $r = -.061$, NS), (males: $r = -.066$, and females: $r = -.07$, NS), and (males: $r = -.01$, and females: $r = .04$, NS), which shows that high distancing scores are associated with high scores of total mental health and depression, but compared to escape-avoidance coping distancing is not significantly correlated with total mental health.

Confronting coping (males: $r = -.27$, $p < .01$, and females: $r = -.49$, $p < .01$), self-controlling (males: $r = -.56$, $p < .01$, and females: $r = -.60$, $p < .01$), seeking-social support (males: $r = -.47$, $p < .01$, and females: $r = -.68$, $p < .01$), accepting responsibility (males: $r = -.36$, $p < .01$, and females: $r = -.42$, $p < .01$), planful problem-solving (males: $r = -.57$, $p < .01$, and females: $r = -.73$, $p < .01$), and positive reappraisal (males: $r = -.60$, $p < .01$, and females: $r = -.73$, $p < .01$) were found significantly negatively correlated with total mental health, which shows that high scores on confronting coping, self-controlling, seeking-social support, accepting responsibility, planful-problem solving, and positive reappraisal are associated with low scores on mental health which indicating better mental health.

All other sub-scales that is, confronting coping, self-control, seeking-social support, accepting responsibility, planful problem-solving, and positive reappraisal show significant negative correlation with four sub-scales of mental health. Confronting coping was negatively correlated with somatic symptoms, anxiety and insomnia, social dysfunctions, and depression (males: $r = -.19$, NS, and females: $r = -.42$, $p < .01$), (males: $r = -.22$, $p < .05$, and females: $r = -.48$, $p < .01$), (males: $r = -.31$, $p < .01$, and females: $r = -.43$, $p < .01$), and (males: $r = -.19$, NS, and females: $r = -.47$, $p < .01$), respectively, in both groups, though results indicate that the correlation coefficients between confronting coping and somatic symptoms, and depression were negative but not significant in the male group, and significantly negative in female group on all four sub-scales.

Self-control coping sub-scale found significant negative correlation with somatic symptoms (males: $r = -.44$, $p < .01$, and females: $r = -.60$, $p < .01$), anxiety and insomnia (males: $r = -.55$, $p < .01$, and females: $r = -.58$, $p < .01$), social dysfunctions (males: $r = -.47$,

$p < .01$, and females: $r = -.50$, $p < .01$), and depression (males: $r = -.39$, $p < .01$, and females: $r = -.52$, $p < .01$) among both males and females.

Seeking-social support also found significantly negatively correlation with all four sub-scales of mental health, namely, somatic symptoms (males: $r = -.36$, $p < .01$, and females: $r = -.60$, $p < .01$), anxiety and insomnia (males: $r = -.41$, $p < .01$, and females: $r = -.64$, $p < .01$), social dysfunctions (males: $r = -.40$, $p < .01$, and females: $r = -.59$, $p < .01$), and depression (males: $r = -.35$, $p < .01$, and females: $r = -.64$, $p < .01$) in both male and female groups.

Next sub-scale, accepting responsibility was significantly negatively correlated with somatic symptoms (males: $r = -.32$, $p < .01$, and females: $r = -.46$, $p < .01$), anxiety and insomnia (males: $r = -.30$, $p < .01$, and females: $r = -.41$, $p < .01$), social dysfunctions (males: $r = -.35$, $p < .01$, and females: $r = -.35$, $p < .01$) and depression (males: $r = -.23$, $p < .05$, and females: $r = -.36$, $p < .01$) among both groups, though correlation between accepting responsibility and depression were significant but lower in males than females.

Another sub-scale, planful-problem solving was significantly negatively correlated with all four sub-scales of mental health: somatic symptoms (males: $r = -.52$, $p < .01$, and females: $r = -.67$, $p < .01$), anxiety and insomnia (males: $r = -.48$, $p < .01$, and females: $r = -.67$, $p < .01$), social dysfunctions (males: $r = -.45$, $p < .01$, and females: $r = -.61$, $p < .01$), and depression (males: $r = -.53$, $p < .01$, and females: $r = -.70$, $p < .01$) in both groups.

The last sub-scale of coping, positive reappraisal, was significantly negatively correlated with somatic symptoms (males: $r = -.45$, $p < .01$, and females: $r = -.68$, $p < .01$), anxiety and insomnia (males: $r = -.52$, $p < .01$, and females: $r = -.69$, $p < .01$), social dysfunctions (males: $r = -.46$, $p < .01$, and females: $r = -.61$, $p < .01$), and depression (males: $r = -.53$, $p < .01$, and females: $r = -.70$, $p < .01$) among both males and females.

As results stated that escape-avoidance coping found significantly positively correlation with total mental health and its four sub-scales, and problem-focused coping was negatively correlated with total mental health and its four sub-scales, e.g. somatic symptoms, anxiety and insomnia, social dysfunctions, and depression.

Discussion

Gender Differences in Coping

As Table- (IV-1) indicated that males scored significantly higher on confronting coping, self-control, seeking-social support, accepting responsibility planful-problem solving, and positive reappraisal than females and females scored higher on escape-avoidance coping than males, the first hypothesis 'males and females differ on coping ways' was accepted. Earlier research also supported the present findings to some extent, where Stone and Neal (1984) and Brems and Johnson (1989) found that males used more confronting coping, accepting responsibility, seeking-social support, planful-problem solving, and positive reappraisal than females. Other researchers (Billings & Moos, 1981; Pearlin & Schooler, 1978; Ptacek *et al.*, 1992; Stein & Nyamathi, 1999; Stone & Neal, 1984) found that female used more social support, emotion-focused and avoidant coping than males. Folkman and Moskowitz (2000, cited in, Rokach *et al.*, 2004) pointed out that individual and social resources affect coping with any stressful stimuli and this may be applicable in old-age home coping.

Some earlier findings also reported that old age people do not use only problem-focused and emotion-focused coping, but also turn to religious and spiritual coping to a large extent (Cox & Hammonds, 1988), and elderly people use a wide range of coping strategies in negative life events (Folkman, 1987; McCrae, 1982). Earlier and present findings show that elderly do not adopt completely any specific coping strategy as they change these depending on the situation.

Gender Differences in Mental Health

The second hypothesis stated that, 'males and females differ on mental health' was accepted, since the present study indicated that females are higher on depression, somatic symptoms, anxiety and insomnia, and social dysfunction than males. That is females showed poorer mental health than did males.

In some Indian studies, Bharadwaj *et al.* (1991) and Agarwal *et al.* (1994) explored the association between institutional living and mental health and found that depression, dementia, suicidal tendencies, and other psycho-geriatric problems were common in institutional

living. In recent study, Punia *et al.* (2007) explored psychosocial status of institutionalized senior citizens in Haryana, and found that 38% elderly fell into moderate to severe depression category, and 35% elderly were found in the normal depression category, which indicated that the aged have high mental health problems in institutional living.

A number of western studies reported gender differences in mental health. The findings of study by Lai and Conita (2005) showed that being a female predicted a poorer status of mental health, and Blazer (1990) also found higher prevalence of depression in older women compared to older men. Fisher *et al.* (2001) also found higher depression in older women compared to older men, and overall elderly showed higher psychotic symptoms than younger people. Petterson's (1998) study indicated high co-morbidity anxiety problems in women than men, while high anxiety was found to be related to higher incidence of anxiety and depressive disorders in women, and the latter showed more phobias and somatic symptoms than men, and men tended to have more personality disorders and problems related to abuse than women.

Correlation between ways of coping and mental health

The third hypothesis, 'escape-avoidance coping and distancing is positively correlated with mental health among male and female groups' was partially accepted because present results showed that escape-avoidance was significantly positively correlated with total mental health and its four sub-scales, i.e., somatic symptoms, anxiety and insomnia, somatic dysfunctions, and depression among both male and female groups, which shows that high escape-avoidance coping scores are associated with high scores of all four sub-scales of mental health which means poor mental health, but distancing was found positively though not significantly correlated with total mental health and depression in both male and female groups, and found negatively but not significantly correlated with somatic symptoms, social dysfunctions, and anxiety and insomnia, which means high distancing scores are associated with high scores of total mental health and depression, but compared to escape-avoidance coping, distancing is not significantly correlated with total mental health.

Confronting coping, self-control, seeking-social support, accepting responsibility, planful problem-solving, and positive

reappraisal coping sub-scales were negatively correlated with mental health among male and female groups, therefore, the last hypothesis, 'confronting coping, self-control, seeking-social support, accepting responsibility, painful problem-solving, and positive reappraisal are negatively correlated with mental health among male and female groups' was accepted.

The findings of present study are supported by various past researches; many studies have explored relationship between ways of coping and mental health. McCrae and Costa, (1986) found that individuals who used more effective ways of coping reported higher subsequent happiness and life satisfaction. Holahan *et al.* (2005) found an association between avoidance coping strategy and depression. Higgins and Endler's (1995) found that problem-focused coping was associated with lower level of distress, and avoidant coping was highly associated with higher distress (cited in, Terluin *et al.*, 2004). Ruth *et al.* (1992) reported negative correlation between depression symptoms, task- and avoidance-oriented coping styles, but emotion-oriented coping style was found to be positively correlated with depression symptoms. Escapism coping was associated with poorer mental health and greater stress (Aldwin & Revenson, 1987).

Conclusion

After studying the obtain results, based on the acceptance and rejection of the framed hypotheses the following conclusions may be drawn:

1. Females are higher on escape-avoidance coping and distancing than males.
2. Males are higher on confronting coping, self-control, seeking-social support, accepting responsibility, planful problem-solving and positive reappraisal than females.
3. Females are higher on somatic symptoms, anxiety and insomnia, social dysfunction and depression than males.
4. Confronting coping, self-control, seeking-social support, accepting responsibility, planful problem-solving, and positive reappraisal are positively associated with good mental health among both males and females.

5. Escape-avoidance coping and distancing are positively associated with somatic symptoms, anxiety and insomnia, social dysfunction and depression among both males and females.

LIMITATION OF THE PRESENT STUDY

The following are limitations of the present study:

1. The sample was restricted to only institutionalized aged, hence, no comparison or generalization regarding non-institutionalized aged is available from this study.
2. It was limited to aged population between 60 to 85 years only.
3. This study did not compare samples of the aged who paid to live in institution with those who stayed there free of cost.

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FOR OUR READERS

ATTENTION PLEASE

Members of **Indian Gerontological Association** (IAG) are requested to send their Life Membership fee is Rs. 1500/- (Rs. One thousand and Five hundred only). Membership fee accepted only by D.D. in favour of Secretary, Indian Gerontological Association or Editor, Indian Journal of Gerontology. Only Life members have right to vote for Association's executive committee. They will get the journal free of cost.

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Readers are invited to express their views about the content of the Journal and other problems of Senior citizens. Their views will be published in the Readers Column. Senior citizens can send any problem to us through our web site : www.gerontologyindia.com Their identity will not be disclosed. We have well qualified counsellors on our panel. Take the services of our counselling centre - RAHAT.

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NEW LIFE MEMBERS

560. Ms. Richa Singh, Research Scholar, Cognitive Science Laboratory, Department of Psychology, Banaras Hindu University, Varanasi-5
561. Dr. Mona Srivastava, M.D., Lecturer, Institute of Medical Sciences, Banaras Hindu University, Varanasi-5

WORLD ELDER ABUSE AWARENESS DAY

June 15, 2009

Indian Gerontological Association in collaboration with NICE, Institute for Life course and Aging, University of Canada and Department of Social Justice and Empowerment, Government of Rajasthan, Jaipur organized various activities at this occasion. At four busy places of Jaipur city nukkad nataaks (street plays) were enacted by the professional artists. In the Jawahar Kala Kendra, Jaipur a painting competition was organized in which 60 artists took part. Six best paintings were selected by the jury. The artists of these paintings were given prizes and certificates by the chief guest. In the evening a seminar on " The role of Civil Society and Government in the elimination of elder abuse" was also organized. Shri Ramkishore Saini, State Minister for Social Justice and Empowerment, Government of Rajasthan was the chief guest and Justice N.K.Jain, Chairman, Human Right Commission, Rajasthan presided the function. Approximately 200 persons from different walks of life were present in the seminar. For detailed information visit our site: www.gerontologyindia.com

Dr. K.L.Sharma, Secretary, Indian Gerontological Association attended 19th Conference of Internal Association of Gerontology and Geriatrics held in Paris from 5-9 July, 2009.

YOU ARE INVITED TO JOIN US

We are Working to Protect the Rights and Social Welfare of the Elderly

Indian Gerontological Association (Registration No 212/ 1968) is an independent grassroots non-profit organization based in Jaipur (Rajasthan). Our efforts **empower** and **support** the underprivileged elderly in rural and urban communities.

We strive to **ensure social justice and welfare for people over 60**, focusing on those elders who are the most disadvantaged such as elderly women. We protect the civil liberties of elderly citizens as a part of the **struggle for individual rights and social progress** in India.

Currently, the elderly community comprises approximately 10% of the total population of India. This number will increase to nearly 25% within the next twenty years. **Neglected and abandoned by society and sometimes their own families, elders are increasingly subject to conditions of disease and poverty.** They lack access to health care, and often face serious discrimination as well as physical and emotional abuse.

As a public interest group, **we work for and with the elderly to protect their rights and access to a better quality of life.** We seek to both empower and serve by working directly with rural communities. By facilitating the growth of citizen's groups, raising public awareness on aging, promoting public action and participation, and advocating public policy changes, Indian Gerontological Association hopes to alter the current trends in elder relations for the better.

Our work includes :

- ✧ **Community Centers for the Elderly** that Offer Communal Support and Interaction
- ✧ **Training on Legal Rights** by Offering the Elderly Practical Knowledge on Their Rights
- ✧ **Public Hotline for the Elderly** that Offers Legal Referrals and Assistance (proposed)
- ✧ **Public Accessibility for the Elderly** Advocating More Available Access to the Public Sphere
- ✧ **Use of various forms of media** to Raise Public Awareness on Elder Rights
- ✧ **Counselling** and Helping elderly to Relieve Psychological Stress and Depression
- ✧ **Elder Women's Cooperatives** that Provide Grants and Assistance to Elderly Women
- ✧ **Public Awareness Raising** to Promote Public Action for Helping Disadvantaged Elderly
- ✧ **Field Study of Rural Areas** to Analyze Challenges Faced by Aging Rural Population

Our plan of action includes:-

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

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