

Indian Journal of ***Gerontology***

a quarterly journal devoted to research on ageing

Vol. 23, No. 2, 2009

Editor
K.L. Sharma

EDITORIAL BOARD

<i>Biological Sciences</i>	<i>Clinical Medicine</i>	<i>Social Sciences</i>
B.K. Patnaik	S.D. Gupta	Uday Jain
P.K. Dev	Shiv Gautam	N.K. Chadha
S.P. Sharma	P.C. Ranka	Ishwar Modi

CONSULTING EDITORS

A.V. Everitt (Australia), Harold R. Massie (New York),
P.N. Srivastava (New Delhi), R.S. Sohal (Los Angeles),
A. Venkoba Rao (Madurai), Sally Newman (U.S.A.)
Udai Pareek (Jaipur), L.K. Kothari (Jaipur)
S.K. Dutta (Kolkata), Vinod Kumar (New Delhi)
V.S. Natarajan (Chennai), B.N. Pahan (Bhubaneswar),
Gireswar Mishra (New Delhi), H.S. Asthana (Lucknow),
Arun K. Bali (Delhi), R.S. Bhatnagar (Jaipur),
H.L. Dhar (Mumbai), Arup K. Benerjee (U.K.),
Indira J. Prakash (Bangalore), Yogesh Atal (Gurgaon),
V.S. Baldwa (Jaipur), P. Uma Devi (Kerala)

MANAGING EDITORS
A.K. Gautham & Vivek Sharma

Indian Journal of Gerontology
(A quarterly journal devoted to research on ageing)

ISSN : 0971-4189

SUBSCRIPTION RATES

Annual Subscription

US \$ 50.00 (Postage Extra)

UK £ 30.00 (Postage Extra)

Rs. 400.00 Libraries in India

Free for Members

Financial Assistance Received from :
ICSSR, New Delhi

Printed in India at :
Aalekh Publishers
M.I. Road, Jaipur

Typeset by :
Sharma Computers, Jaipur
Phone : 2621612

INDIAN JOURNAL OF GERONTOLOGY

Instructions to Authors

1. ORIGINAL PAPERS ONLY

Submission of a manuscript to this journal represents a certification on the part of the author(s) that it is original work, and that neither this manuscript nor a version of it has been published elsewhere nor is being considered for publication elsewhere.

PAPERS

- Since this is an international journal, it is important that authors provide a board context for their papers.
- In the context of population ageing, authors are encouraged to address implications for practice, policy, and /or research.
- To help provide content balance authors are encouraged to identify the primary emphasis of their article (research, practice or policy).

PRACTICE BASED PAPERS

- Provide a rationale for why the described gerontological program is important (describe the social issues addressed by the program).
- Describe the goals, participants, location, benefits, and lessons learned.
- Explain the cultural assumptions and values underlying the described program.
- Extend beyond a simple program description to include its relevance to other locales.
- Briefly describe the policy framework that drives the program.
- Discuss the implications for other practitioners, researchers, and policymakers.

RESEARCH BASED PAPERS

- Include relevant literature, research question(s), methodology, and results.
- Discuss implications for practice, policy and further research in an emerging multidisciplinary field of study.
- Include conceptual, theoretical and /or empirical content.

POLICY BASED PAPERS

- Describe the policy and social issues addressed.
- Provide background on cultural assumptions and values underlying the article.
- Discuss implications for inquiry and practice.

2. MANUSCRIPT LENGTH

Your manuscript maybe approximately 15-20 pages double-spaced (approximately 5000 words excluding references and abstract).Lengthier manuscripts may be considered at the discretion of the editor .Sometimes, lengthier manuscripts may be consider if they can be divided up into sections for publications in successive journal issues.

3. MANUSCRIPT STYLE

References, citations, and general style of manuscripts for this journal should follow the following style:

Zelenik, J. (2003): Normative ageing of respiratory system. *Clin Geriatr Med*, 19, 1-18.

References should be double spaced and placed in alphabetical order.

4. MANUSCRIPT PREPARATION

Margins: leave at least a one inch margin on all four sides.

Paper: use clean white 8-1/2" * 11" bond paper.

Number of copies: 2

Cover page: Important – indicating the article title, plus:

- An introductory footnote with author's academic degrees, professional titles, affiliations, mailing address and any desired acknowledgement of research support or other credit.
- Second "title page": enclose an additional title page .Include the title again, plus:
- An abstract of about 250-300 words. (Below the abstract provide 3-5 key words for bibliographic access, indexing and abstracting purposes).

FROM THE FIELD PAPERS

In addition to peer-reviewed papers, we are seeking the following contributions for review by an IJG Board committee:

Profiles: (900-1500 words) single-spaced descriptions of innovative cutting-edge programs including information on: goals, participants, activities, benefits, lessons learned, other unique features and contact information.

BOOK AND MEDIA REVIEWS : (900-1500 Words) publishers and distributors, and authors may submit books , videos,etc. for review to our editors. The subject matter must be related to gerontology.

Books and media in any language will be reviewed in English. The review should include a summary of the content and its relevance for publication in IJG.

5. **SPELLING, GRAMMER, AND PUNCTUATION.** You are responsible for preparing manuscript copy which is clearly written in acceptable English and which contains no errors of spelling, grammar or punctuation. Neither the editor nor the publisher are responsible for correcting errors. Check the accuracy of all the arithmetic calculations, statistics, numerical data, text citations and references. INCONSISTENCIES MUST BE AVOIDED.

6. **PREPARATION OF TABLES, FIGURES, AND ILLUSTRATIONS.** All tables, figures, illustrations, etc., must be "camera ready". That is, they must be clearly typed or artistically prepared so that they can be used either exactly as they are or else used after a photographic reduction in size. Figures, tables and illustrations must be prepared on separate sheets of paper. Always use black ink and professional drawing instruments. On the back of these items, write your articles and the journal title lightly in pencil, so they do not get misplaced.

7. **ALTERATIONS REQUIRED BY REFEREES AND REVIEWERS.** Many times a paper is accepted by the Editor contingent upon changes that are made by anonymous specialist referees and members of the editorial board. If the editor returns your manuscript for revisions, you are responsible for retyping any sections of the paper to incorporate these revisions (revisions should also be put on disk).

8. **ELECTRONIC MEDIA.** Please send your manuscript to the journal editor in print format ("hard copy") and electronically (on floppy diskette, or as an RTF or Word e-mail attachment) for his/her final review and approval. On the outside of the diskette page write:

1. The title of your article
2. File name
3. Please email all submission(s) to the following email address-
gerontoindia@gmail.com

For more direct information concerning your proposed submission please visit our website www.gerontologyindia.com or email Dr K.L. Sharma at gerontoindia@gmail.com

Note to authors: IGJ will have the copyright.

CONTENTS

S.No.	Page No.
1. Androgen treatment attenuates the expression of amyloid beta in the lungs of male Alzheimer's transgenic mice	113-132
<i>Sritulasi Karri, Skyler Mclaurin, Desiree Marshall, Cynthia Jumper and Gopalakrishnan Coimbatore</i>	
2. Alcohol Induced Alterations of the Antioxidant Enzymes in the Brain Tissue of Male Albino Rats with Reference to Aging	133-144
<i>N. Somasekhara Reddy, K.R. Shanmugam, K. Munikrishana Reddy, K. Mallikarjuna and K. Sathyavelu Reddy.</i>	
3. Obesity Associated Dementia Among Elderly – Role of a Plant Based Formulation	145-166
<i>A. Agrawal*, M. Rastogi, R.P. Ojha, C.S. Sahayam, L. Upadhyay, G.V. Rajamanickam and G.P. Dubey</i>	
4. An Appraisal of the Role of Pre-retirement Planning in actualization of Well-being Needs of Retirees in Southwestern Nigeria	167-182
<i>ADISA Ademola Lateef and AKANMU Olusola Esther</i>	
5. Differential Stress and Subjective well-being as Determinants of Quality of Life among Aged	183-192
<i>Jaishree Sharma and Ravi Sidhu</i>	
6. Determination of Psychological Well being Status among Older Persons in Northern Peninsular Malaysia	193-214
<i>Yadollah Abolfathi Momtaz, Nurizan Binti Yahaya and Tengku Aizan Binti Hamid</i>	
7. Study of Generation Gap in Rural West Bengal	215-234
<i>Prafulla Chakrabarti</i>	
8. The Notion of Elderly Sexuality : Views of Older People in Two Yoruba Communities in Osun State, Nigeria	235-249
<i>TITILAYO Ayotunde, AGUNBIADE Ojo Melvin, OPATOLA Mustapha and LAWANI Ajibike</i>	
9. Marginalization of Elderly : Aftermath of Tsunami in Kerala	250-261
<i>Lekshmi V. Nair and Sonny Jose</i>	
For Our Readers	262-263

Androgen Treatment Attenuates the Expression of Amyloid Beta in the Lungs of Male Alzheimer's Transgenic Mice

Sritulasi Karri, Skyler Mclaurin, Desiree Marshall, Cynthia Jumper and Gopalakrishnan Coimbatore†

Department of Internal Medicine, Texas Tech University Health Sciences Centre, Lubbock, TX 79430

† The Institute of Environmental and Human Health, Texas Tech University, Lubbock, TX, 79409 P Box-41163

ABSTRACT

In recent years, significant progress in understanding the molecular mechanisms of Alzheimer's disease (AD) in brain has been made. However, very little information exists on AD's systemic affects. Bronchopneumonia is a major cause of death in AD patients (>70%). This suggests a deeper involvement of the lungs in AD progression. This study investigates alterations in amyloid beta expression in lungs occurring in association with protracted (3 week) administration of dihydrotestosterone (DHT) treatment to male Alzheimer's transgenic mice. We found that amyloid beta expression caused lung pathology in AD transgenic mice, specifically, diffused alveolar damage, distorted appearance of lung parenchyma, decreased alveoli number succeeding in the loss of alveolar structure, resulting in lung amyloidosis. Long term DHT administration caused a significant increase in the body and organ weights in wild type and AD groups. Lung histoarchitecture improved with DHT treatment, explicitly, increase in alveoli number in AD mice. It also brought about a decrease in amyloid beta protein and gene expression levels. Overall, these results reveal for the first time that DHT attenuates amyloid beta expression in the lungs of AD male transgenic mice.

Key words: Alzheimer's disease, Dihydrotestosterone, Wild type, Amyloid precursor protein, Amyloid beta.

Defective respiratory function in patient with neuromuscular and neurological diseases is the leading cause of death in the elderly (Bach *et al.*, 1998; Finder *et al.*, 2004; Kang, 2006; Haas *et al.*, 2007). The aging process is accompanied by a decline in lung function (Janssens *et al.*, 1999; Zaugg & Lucchinetti, 2000). The ventilatory reserve is compromised during acute illness, surgery, or exercise. Lungs are responsible for the gas exchange that allows for normal body organ functions. Any deviation from normal lung function has a direct effect on system functionality (Zeleznik, 2003).

Patients suffering from hypoxic conditions are known to be more susceptible to the development of various forms of dementia including Alzheimer's disease (Peers *et al.*, 2007) In a study of 84 AD patients, bronchopneumonia was the most common cause of death in 77% of the cases (Burns *et al.*, 1990). Recently, immunohistochemical localization of A β deposits in lung tissue (Skodras *et al.*, 1993), death of AD patients due to bronchopneumonia (Attems *et al.*, 2005), and better respiratory function in midlife associated with a lower late-life risk of developing dementia and AD (Guo *et al.*, 2007) reveal a more intricate involvement of the lungs in AD progression.

Depletion of sex steroid hormones associated with normal aging is a significant risk factor for the development of AD in men and women (Paganini-Hill & Henderson, 1994; Rosario *et al.*, 2004; Fuller *et al.*, 2007). Among androgens testosterone has been attributed to control of breathing, although its role is unclear. With age, free testosterone levels in blood decreases while LH is known to increase, but the total testosterone levels remain essentially unchanged. The degree of respiratory disturbance appears to be associated with decreased overnight plasma free testosterone, but this relationship is lost after age adjustment (Schiavi *et al.*, 1992; Saaresranta & Polo, 2002). In patients (males) with chronic respiratory failure, serum testosterone depression is associated with hypoxia (Semple *et al.*, 1980). Hence, we consider it would be interesting to investigate the effect of testosterone on Alzheimer's disease lungs.

Transgenic mouse models have proven to be valuable tools to study Alzheimer's disease alterations and the effect of drug treatment. A transgenic mouse model well suited to address these questions was

introduced by Hsiao *et al.* (1996). These transgenic (Tg2576) mice express the Swedish double mutation of human APP695 under control of the hamster prion protein promoter and develop Alzheimer like β -amyloid deposits in the brain when aged. These mice also exhibit impairments in spatial reference and alternation tasks at the age of 9–13 months (Holcomb *et al.*, 1999). The β -amyloid deposits are present in brain and are accompanied by the presence of massive gliosis and dystrophic neurites, with evidence for oxidative stress in the cerebral cortex (Pappolla *et al.*, 1998; Smith *et al.*, 1998). Therefore, this animal model represents an appropriate tool with which to study the expression pattern of amyloid protein under pathological conditions.

To date in this mouse model, amyloid deposits are revealed in the regions of brain alone. Earlier studies on transgenic mice report the role of hormones viz., progestins (Frye & Walf, 2008), luteinizing hormone (Casadesus *et al.*, 2006), androgens (Rosario *et al.*, 2006) and estrogens (Green *et al.*, 2005) on amyloid beta deposition in brain. However, there is a lack of knowledge about the systemic outcome of amyloid protein in Alzheimer's disease condition. It is essential therefore to assess the role if any, of testosterone in modulating the systemic effects of AD.

We speculate that amyloid protein may be expressed in AD lungs and cause lung lesion. Testosterone treatment may attenuate lung lesion at least in part by clearing airways of amyloid protein, which, might be a cause for less oxygen supply to the AD brain. The present work was undertaken to test this hypothesis.

Materials and Methods

Chemicals

Dihydrotestosterone, antibody for beta actin were purchased from Sigma. Antibodies for amyloid beta precursor protein (APP), goat anti-rabbit, and anti mouse, were purchased from abcam.

Transgenic mice

Male wild type (WT) and Alzheimer's disease (AD) hemizygous B6;SJL-Tg(APP_{SW})2576Kha transgenic mice 12-15 wks old were purchased from Taconic Farms, New York. On arrival mice were

housed individually with controlled temperature (25° C) and 12h alternate light-dark cycles. Food and water were provided ad libitum.

Groups

Both WT and AD mice were randomly divided into 2 groups each: i) WT (n=5), ii) WT+DHT (n=6), iii) AD (n=8), iv) AD+DHT (n=8). They were treated subcutaneously (sc) with or without DHT 1mg/kg body weight for 21 days. Animal care and experiments were approved and conducted according to the Texas Tech University Health Sciences Centre Institutional Animal Care and Use Committee (IACUC) guidelines.

Control and experimental groups of the wild type (WT, WT+DHT) and AD (AD, AD+DHT) mice were sacrificed by CO₂ asphyxiation on day 22 post DHT treatment. The body weights were recorded everyday prior to DHT treatment. Lungs and seminal vesicles were dissected out and weighed individually. Relative organ weights were calculated as the ratio between organ and body weight of individual animal. Lung tissue was snap frozen in liquid nitrogen for immunoblot and RT-POR analysis. The mice were 23-27wks old when they were sacrificed.

Tissue preparation and lesion analysis

Tissues were fixed in 4% paraformaldehyde. Paraffin sections were cut 5 μ m thick and stained with hematoxylin and eosin. Microphotographs were taken using an Olympus microscope BX50 with Nikon digital camera DXm1200. Pictures were captured using ACT-1 Nikon version 2.2 software. Analysis was performed using Metamorph 7.5.4.0 2008 software from Molecular devices, Downing town, Philadelphia, Pennsylvania. Adobe Photoshop CS2 was used for final processing.

Semi quantitative analysis of Alveoli number

Hematoxylin and eosin stained paraffin lung sections were counted in a blinded fashion using light microscopy for alveoli number in all the four experimental groups. Image analysis software Metamorph 7.5.4.0 2008 from molecular devices, Downing town, Philadelphia, Pennsylvania, was used to count healthy alveoli with no infiltration independently by two investigators.

Immunohistochemistry

Staining of 5 µm thick paraffin sections was performed using antibody to APP (1:500). Sections were deparaffinized and incubated with 3% H₂O₂ to inhibit endogenous peroxidase activity. After washes in PBS and water, the sections were incubated with anti-body diluted in bovine serum albumin (BSA) overnight at 4°C. Sections were washed in PBS and probed with anti-rabbit anti-body (1:5000) for 1hr. Peroxidase substrate DAB kit (Vector Laboratories, Burlingame, CA) was used as per manufacturer's instructions. The sections were counterstained with Harris hematoxylin (Fisher). Control sections in which the primary antibody was omitted failed to show significant staining. Pictures were captured using Olympus microscope BX50 with Nikon digital camera DXm1200 and ACT-1 Nikon version 2.2 software. Finally figures were processed by using Adobe Photoshop CS2.

Immunoblotting

Lungs were homogenized using microprobe, polytron setting of "7", 30 seconds (10 sec each time) on ice in lysis buffer (10 mM Tris, 250 mM Sucrose; 0.779mM EDTA pH 7.4) containing 10mg/ml aprotinin and 1 mM phenylmethylsulfonyl fluoride (PMSF) (Sigma). Equal amounts of protein (50µg), as determined by the BCA method (Smith et al., 1985) was loaded onto a 12% polyacrylamide gels containing 0.15 M sodium dodecyl sulphate (SDS-PAGE), electro transferred to polyvinylidenedifluoride (PVDF) membrane (BioRad) and nonspecific binding was blocked with 4% nonfat milk for 3 hours at 4°C in phosphate buffered saline containing 0.05% Tween 20 (Sigma). Membranes were then incubated overnight at 4°C with APP (1:10,000) or β-actin (1:7500) primary antibodies. After washing the membranes and incubating at 4°C with anti-rabbit (1:20,000) or anti-mouse (1:2500) antibodies respectively, bands were visualized using chemiluminescence (Pierce) and exposure to X-ray film (Kodak). Band densities on X-ray films were quantified using the Alpha imager 2000, Alpha Innotech Corp., San Leandro, CA, USA. The bands of interest were designated

manually and the software then calculated the integrated density value [IDV = S (each pixel value – background)] within the designated area.

Reverse transcriptase (RT)-PCR for Amyloid beta.

Total RNA was isolated using Trizol® reagent (Invitrogen) and processed according to the directions of the manufacturer. Single stranded cDNA from total RNA was synthesized using the high-capacity cDNA reverse transcriptase kit (Applied Biosystems) according to the supplier's instructions. Target specific PCR primers for L-19 and APP harboring the amyloid beta (Aβ) common to human and murine sequences were used and the PCR products were run on a 1.2% agarose gel stained with ethidium bromide. Band densities on gel were quantified using the Alpha imager 2000, Alpha Innotech Corp., San Leandro, CA, USA. The bands of interest were designated manually and the software then calculated the integrated density value [IDV = S (each pixel value – background)] within the designated area.

Statistical Analysis

Prism software (version 4.02, GraphPad Inc., San Diego, CA, USA) was used for graphical presentation and statistical analysis. All values are represented as mean ± SEM. Analyses of variance (ANOVA) performed included one-and two-way ANOVA for matched samples followed by Bonferroni and Newman-Keuls post-hoc test of differences between all group means. P<0.05 was considered statistically significant.

Results

Figure1 depicts body weights in absolute grams ± SEM as mentioned in the graph. 5-8 mice were used in each experimental group. Body weights of mice in the four groups wild type (WT), Alzheimer's disease (AD), wild type treated with dihydrotestosterone (WT+DHT) and Alzheimer's disease treated with dihydrotestosterone (AD+DHT) were recorded every day and an average of weekly body weights represented in the graph. Two way analysis revealed

significance in the interaction ($P < 0.0001$), time ($P < 0.0001$) and treatment ($P = 0.0006$). Bonferroni post-hoc tests shows significant differences between the groups mean. At day 0 one way ANOVA revealed no significant differences in body weights. On day 7 of DHT treatment a significant increase in body weights was observed in WT+ DHT group compared to WT ($P < 0.05$), AD ($P < 0.001$) and

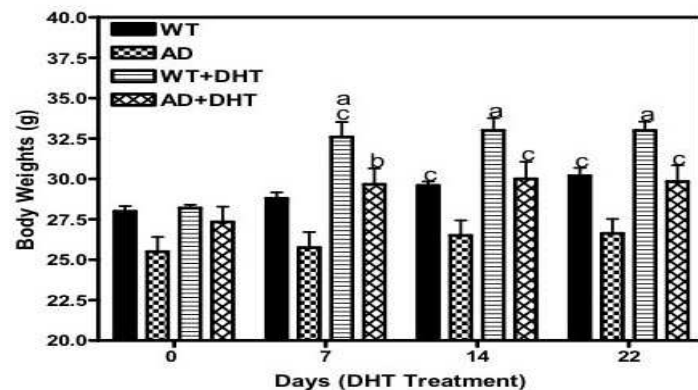


Fig.1. Effect of dihydrotestosterone (DHT) on the body weights of mice. WT= wild type, AD= Alzheimer's disease.

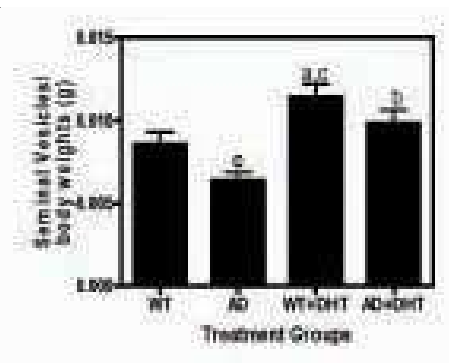


Fig.2. Effect of dihydrotestosterone on seminal vesicles weights. WT= wild type, AD= Alzheimer's disease.

AD+DHT ($P < 0.01$) groups. On days 14 and 22 a significant body weight increase in WT ($P < 0.05$), WT+DHT ($P < 0.001$), AD+DHT ($P < 0.05$) was observed compared to AD group.

Morphological appearance of lungs in AD mice looked pale pink in color compared to WT lungs which were more reddish. No significant differences in the normalized lung weights to individual body weights in AD group was observed when compared to WT. DHT treatment did not reveal any effect on lung weights in both the WT and AD groups (data not shown). To confirm if the DHT treatment was effective on mice, seminal vesicles were weighed as a marker for androgen action. DHT treatment to WT mice augmented seminal vesicle weights significantly ($P < 0.01$) compared to WT and AD groups. Such an increase $P < 0.05$ in WT+DHT group was also observed when compared to AD+DHT group (Fig. 2).

Effect of DHT on the histoarchitecture of lungs (Fig. 3)

Image analysis of hematoxylin and eosin stained lung sections revealed well developed alveolar ducts, alveolar sacs, septa, respiratory bronchiole and respiratory alveolus in WT lungs (Fig. 3. A1, B1). AD lungs revealed diffused alveolar damage, distorted appearance of lung parenchyma with loss of alveolar architecture and heavy inflammatory infiltration. There was alveolar cell hyperplasia, scattered atypical mononuclear cells within the alveolar interstitium, infiltration of small blood vessels by eosinophils, presence of interstitial neutrophils, macrophages in alveolar ducts, spaces and alveolar hemorrhage observed in AD lungs (Fig. 3. A2, B2). Exogenous DHT treatment to WT mice showed normal lung architecture (Fig. A3, B3). On the other hand, histological evaluation of AD lungs treated with DHT showed a few healthy airways compared to untreated AD lungs, although infiltration of cells was observed (Fig. A4, B4).

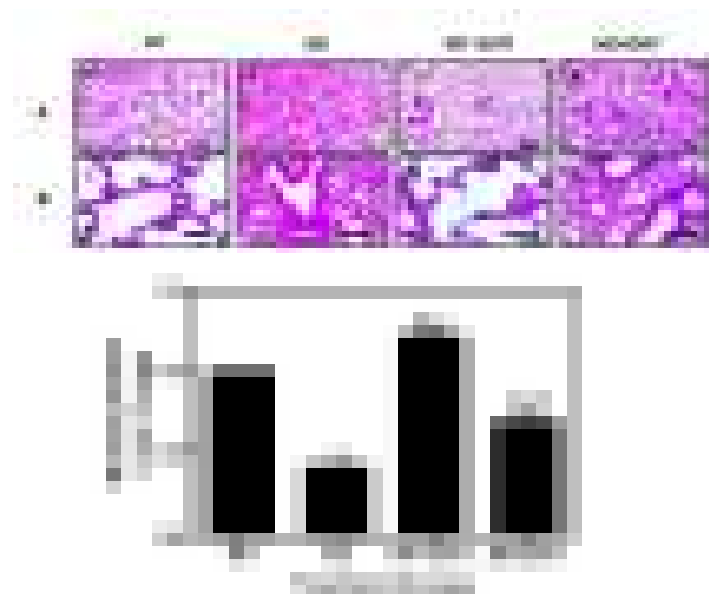


Fig.3. Representative photomicrograph showing hematoxylin and eosin stained lung sections. Bar scale, A = 50 μ m, B = 100 μ m. WT= wild type, AD= Alzheimer's disease, DHT= dihydrotestosterone. Note the well developed lung airways in WT (A1, B1) and WT+DHT (A3, B3) lungs compared to infiltrated and diffused airways in AD (A2,B2) and AD+DHT (A4,B4) lungs.

Effect of DHT on alveoli number

Bar graph (Fig.3) shows the mean healthy alveoli number. One way ANOVA revealed significant ($P < 0.0001$) differences in the group variances. Newman-Keuls multiple comparison tests revealed significant differences between the groups mean. Alveoli number increased significantly ($P < 0.05$) in WT+DHT compared to WT. While, in AD group the numbers decreased significantly ($P < 0.001$) when compared to WT and WT+DHT. On the other hand alveoli number in AD+DHT group increased significantly ($P < 0.05$) compared to AD group.

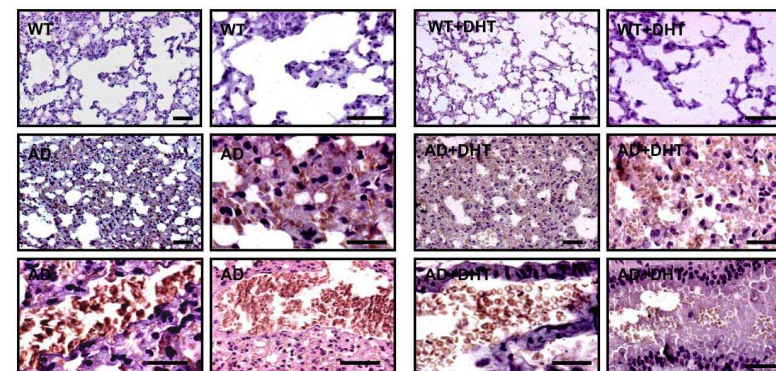


Fig.4. Representative photomicrographs showing immunohistochemistry analysis of amyloid precursor protein (APP) (brown DAB staining). WT= wild type, AD= Alzheimer's disease. Note that AD lung sections show intense staining for APP.

Effect of DHT on APP expression by immunohistochemistry

Immunohistochemistry analysis (Fig.4) revealed no APP labeling in WT and WT+DHT lung sections. On the other hand an intense APP labeling of infiltrated macrophages and type II alveoli cells and red blood cells (RBC) was observed in AD sections. DHT treatment to AD mice revealed labeling of APP was nevertheless observed in alveolar infiltrated cells. Sections were also processed for negative controls without primary antisera where labeling of APP was negative.

Effect of DHT on APP expression by immunoblotting

To examine the levels of APP quantitatively in AD lungs and the effect of DHT, immunoblot analysis was performed. One way ANOVA revealed significant ($P < 0.001$) differences in group variances. Newman-Keuls post hoc test revealed significant ($P < 0.01$) increase in APP expression in AD and AD+DHT groups when compared to WT and WT+DHT groups. The graph shown represents the mean of % integrated density value (IDV) normalized to β actin $n=3$.

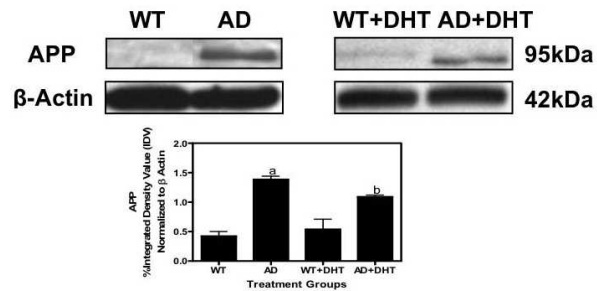


Fig.5. Immunoblot analysis of amyloid precursor protein (APP) in the lungs. WT= wild type, AD= Alzheimer's disease. The top panel is a representative of autoradiograph from lung tissue. The bottom panel shows bar graph of % integrated density values normalized to β actin. Significant mean differences. a $P < 0.001$ WT and WT+DHT vs AD group. b $P < 0.01$ WT and WT+DHT vs AD+DHT group.

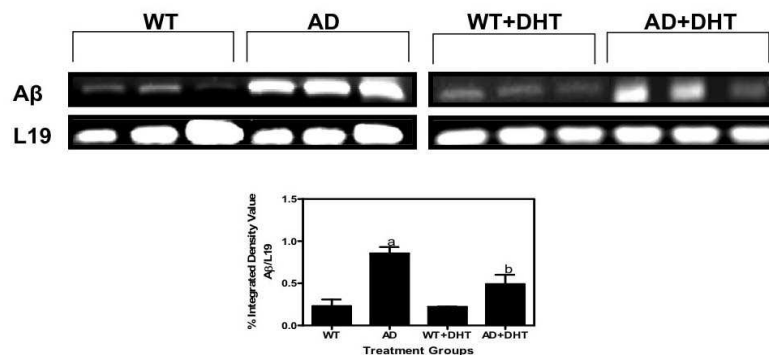


Fig.6. Reverse transcriptase PCR analysis of amyloid beta in the lungs. WT= wild type, AD= Alzheimer's disease. The top panel shows triplicate ethidium bromide stained bands of amyloid beta and L-19 in lung tissue. The bottom panel shows bar graph of amyloid beta % integrated density values normalized to L-19. One-way analysis of variance revealed a significant ($P = 0.0014$) differences.

Effect of DHT on APP gene expression by RT-PCR

To elucidate if APP gene levels alter in experimental groups, semi-quantitative PCR using APP specific primers was performed with the internal control house keeping gene L-19. One way ANOVA revealed a significant ($P < 0.01$) increase in amyloid gene levels in AD group compared to WT and WT+DHT groups. DHT treatment to AD mice caused a significant ($P < 0.05$) decrease in APP gene levels compared to APP levels in untreated AD group. Fig. 6 upper panel shows ethidium bromide stained gel of triplicate samples from each experimental group. The bar graph in Fig.6 represents % integrated density values of APP gene normalized to L-19.

Discussion

To study the effects of DHT on the lungs were assessed in AD transgenic mice it is necessary to evaluate lesion in alveoli because this is the important area for gas exchange (Askin & Kuhn, 1971). Further more, lesions in this area have been shown to correlate with hypoxia or less supply of oxygen to other organs (Bensch *et al.*, 1964; Policard, 1967a; Adamson & Bowden, 1974). It was found that DHT attenuated alveoli number, amyloid protein and gene expression in AD mice, because the lesion formation in AD mice lungs was greater than that of DHT treated mice.

Amyloidosis localized to the respiratory tract was first described in 1877 (Thompson & Citron, 1983; Utz *et al.*, 1996). Recent reports show that defective respiratory function in patients with neuromuscular and neurological diseases are the leading cause of death in the elderly (Bach *et al.*, 1998; Finder *et al.*, 2004; Kang, 2006). It is also known that the aging process is accompanied by a decline in the lung function (Janssens *et al.*, 1999; Zaugg & Lucchinetti, 2000; Rosenthal & Kavic, 2004). Most importantly bronchopneumonia was the most common cause of death in 77% of the cases of AD patients (Burns *et al.*, 1990) and recent evidence revealing pulmonary amyloid expression in older men and women (Matsutani *et al.*, 2001) leads to speculate that amyloid protein expression in lungs may be a useful marker to further uncover the mystery of Alzheimer's disease.

Towards this end we used AD transgenic mouse model in our present experiment. Immunohistochemistry revealed amyloid protein deposits in the AD lung, predominantly observed in macrophages, type II cells and red blood cells. Such an observation was not reported in earlier investigations of pulmonary amyloidosis, although strong positive staining of amyloid protein was shown in human AD lungs (Skodras *et al.*, 1993). Amyloid deposits have been identified as chronic inflammatory stimulants in AD and many studies, amply document that “senile amyloids” are common in non-neural tissues of aging individuals, humans and animal models (Lee & Johnson, 1975; Skodras *et al.*, 1993; Roertgen *et al.*, 1995; Hasleton, 1996; Matsutani *et al.*, 2001; Agca *et al.*, 2008). Positive staining of APP on Red blood cells (RBCs) in our studies is concurrent with earlier studies that RBCs bind amyloid beta fibrils (Mohanty *et al.*, 2008).

Pulmonary amyloid expression in our study was confirmed by immunoblotting analysis. In an earlier study, Rossner *et al.* (2001) had failed to detect APP in the lungs of this mouse model. This difference in observation may be attributed to the detection of APP antibody specificity. Further, increase in amyloid beta gene level confirmed by RT-PCR in our studies corroborates with the previous report of Northern blot analysis using human APP probe in transgenic rat model (Agca *et al.*, 2008).

Advancing age, depletion of testosterone as a normal consequence of aging are related risk-factors for Alzheimer’s disease in men (Rosario *et al.*, 2004). Aging also increases respiratory disturbance associated with lower levels of testosterone (Schiavi *et al.*, 1992; Saareanta & Polo, 2002). Serum testosterone depression is also associated with hypoxia (Semple *et al.*, 1980) in male patients with chronic respiratory failure. The impact of sex hormones on lung physiology and disease in animal studies has been reported recently (Carey *et al.*, 2007). On the other hand, it has also been reported that, in both rodent and human, androgens can exert beneficial cognitive effects (Cherrier, 2005; Janowsky, 2006). However, a clear correlation between testosterone and its effect on the lungs in AD condition needs attention.

The exogenous testosterone increased body and seminal vesicle weights in both wild type and AD groups compared to untreated control groups. Increase in the body and seminal vesicle weights of mice in our study are concurrent with the previous studies (Hooker, 1943; Allen, 1958). A number of recent studies have highlighted the myriad of ways in which sex hormones can modulate lung development, physiology, and pathology (Carey *et al.*, 2007). Sex hormones have been demonstrated to play important roles in models of allergic airway disease, immune response, and lung injury, and the influence of sex hormones is often dependent upon the model studied. DHT treatment did not completely restore the pathology of AD lungs. The reason could be attributed to the continued presence of amyloid protein in the lungs even with DHT treatment as confirmed by immunohistochemistry, immunoblotting and RT-PCR analysis. Although, a marked improvement in the airways, an increase in alveoli number and a relative decrease in amyloid protein and gene levels were observed after DHT treatment in AD lungs. These levels were never back to normalcy when compared to the wild type lungs.

In this study, we did not assess the mechanism(s) by which testosterone attenuated APP expression in lungs. Our observations taken together with those of others may help explain some of the reports with regard to the role of hormonal therapy in Alzheimer’s disease. Histology and cytology of lung reveals that the alveoli bring RBCs into close proximity with inspired air. Type I pneumocytes are the squamous cells that form a component of the air-blood barrier. The Type II pneumocytes secrete surfactant that reduces surface tension and prevents atelectasis and macrophages reuptake surfactant, debris, etc (Askin & Kuhn, 1971). Type II pneumocytes are progenitors of Type I pneumocytes, developmentally (Adamson & Bowden, 1974). Type I pneumocytes wrap around the endothelial cells and their primary function is gas exchange which takes place in the alveolar septum (Bensch *et al.*, 1964; Policard, 1967b, a). Our findings localize APP expression in Type II pneumocytes and macrophages.

This would explain that Type II pneumocytes with amyloid toxicity are unable to act as progenitor cells to produce Type I cells, which in turn impairs the function of Type I cells of gas exchange in lungs. On the other hand, APP expression in Type II pneumocytes would have adverse effects on the collapse of AD lung alveolar septum inhibiting surfactant secretion and macrophages unable to clear the debris with APP toxicity. Furthermore, APP bound RBCs in AD lungs might be deprived of oxygen transport and delivery.

In summary, the effects of dihydrotestosterone on lung lesion and amyloid expression were assessed in Alzheimer's disease transgenic mice by immunohistochemistry, immunoblotting and RT-PCR analysis. Our results unambiguously show that Alzheimer's mice lungs express significant levels of amyloid deposits. Further, our studies also indicate that dihydrotestosterone attenuates amyloid levels in AD mice lungs.

Our findings if confirmed in humans may have important clinical implications, because they would suggest the cause of death in AD patients due to respiratory complications. Further, experiments using AD animal models are needed to reveal the involvement of systemic affects in Alzheimer's disease progression for therapies that prevent, slow down the progression or defer the onset, or in anyway improve the symptoms of Alzheimer's disease.

Acknowledgements

We gratefully acknowledge the financial support provided by: the South Plains Foundation, Lubbock to SK; Medical Student Summer Research Program to DM; and TTU HHMI Undergraduate Scholarship to SM.

References

- Adamson IY & Bowden DH (1974). The type 2 cell as progenitor of alveolar epithelial regeneration. A cytodynamic study in mice after exposure to oxygen. *Lab Invest* 30, 35-42.
- Agca C, Fritz JJ, Walker LC, Levey AI, Chan AW, Lah JJ & Agca Y (2008). Development of transgenic rats producing human beta-amyloid precursor protein as a model for Alzheimer's disease:

- transgene and endogenous APP genes are regulated tissue-specifically. *BMC Neurosci* 9, 28.
- Allen JM (1958). The influence of hormones on cell division. II. Time response of ear, seminal vesicle, coagulating gland and ventra, prostate of castrate male mice to a single injection of testosterone propionate. *Exp Cell Res* 14, 142-148.
- Askin FB & Kuhn C (1971). The cellular origin of pulmonary surfactant. *Lab Invest* 25, 260-268. *Lab Invest* 25, 260-268.
- Attems J, König C, Huber M, Lintner F & Jellinger KA (2005). Cause of death in demented and non-demented elderly inpatients; an autopsy study of 308 cases. *J Alzheimers Dis* 8, 57-62.
- Bach JR, Rajaraman R, Ballanger F, Tzeng AC, Ishikawa Y, Kulesa R & Bansal T (1998). Neuromuscular ventilatory insufficiency: effect of home mechanical ventilator use v oxygen therapy on pneumonia and hospitalization rates. *Am J Phys Med Rehabil* 77, 8-19.
- Bensch K, Schaefer K & Avery ME (1964). Granular Pneumocytes: Electron Microscopic Evidence of Their Exocrine Function. *Science* 145, 1318-1319.
- Burns A, Jacoby R, Luthert P & Levy R (1990). Cause of death in Alzheimer's disease. *Age Ageing* 19, 341-344.
- Carey MA, Card JW, Voltz JW, Germolec DR, Korach KS & Zeldin DC (2007). The impact of sex and sex hormones on lung physiology and disease: lessons from animal studies. *Am J Physiol Lung Cell Mol Physiol* 293, L272-278.
- Casadesus G, Webber KM, Atwood CS, Pappolla MA, Perry G, Bowen RL & Smith MA (2006). Luteinizing hormone modulates cognition and amyloid-beta deposition in Alzheimer APP transgenic mice. *Biochim Biophys Acta* 1762, 447-452.
- Cherrier MM (2005). Androgens and cognitive function. *J Endocrinol Invest* 28, 65-75.
- Finder JD, Birnkrant D, Carl J, Farber HJ, Gozal D, Iannaccone ST, Kovesi T, Kravitz RM, Panitch H, Schramm C, Schroth M,

- Sharma G, Sievers L, Silvestri JM & Sterni L (2004). Respiratory care of the patient with Duchenne muscular dystrophy: ATS consensus statement. *Am J Respir Crit Care Med* 170, 456-465.
- Frye CA & Walf AA (2008). Effects of progesterone administration and APP^{swe}+PSEN1^{Deltae9} mutation for cognitive performance of mid-aged mice. *Neurobiol Learn Mem* 89, 17-26.
- Fuller SJ, Tan RS & Martins RN (2007). Androgens in the etiology of Alzheimer's disease in aging men and possible therapeutic interventions. *J Alzheimers Dis* 12, 129-142.
- Green PS, Bales K, Paul S & Bu G (2005). Estrogen therapy fails to alter amyloid deposition in the PDAPP model of Alzheimer's disease. *Endocrinology* 146, 2774-2781.
- Guo X, Waern M, Sjogren K, Lissner L, Bengtsson C, Bjorkelund C, Ostling S, Gustafson D & Skoog I (2007). Midlife respiratory function and Incidence of Alzheimer's disease: a 29-year longitudinal study in women. *Neurobiol Aging* 28, 343-350.
- Haas CF, Loik PS & Gay SE (2007). Airway clearance applications in the elderly and in patients with neurologic or neuromuscular compromise. *Respir Care* 52, 1362-1381.
- Hasleton P (1996). Spencer's Pathology of the Lung. McGraw-Hill, New York.
- Holcomb LA, Gordon MN, Jantzen P, Hsiao K, Duff K & Morgan D (1999). Behavioral changes in transgenic mice expressing both amyloid precursor protein and presenilin-1 mutations: lack of association with amyloid deposits. *Behav Genet* 29, 177-185.
- Morgan D (1999). Behavioral changes in transgenic mice expressing both amyloid precursor protein and presenilin-1 mutations: lack of association with amyloid deposits. *Behav Genet* 29, 177-185.
- Hooker CaP, CA (1943). Effects of sex hormones upon body growth, skin, hair and sebaceous glands in the rat. *Endocrinology* 32, 69.

- Hsiao K, Chapman P, Nilsen S, Eckman C, Harigaya Y, Younkin S, Yang F & Cole G (1996). Correlative memory deficits, Abeta elevation, and amyloid plaques in transgenic mice. *Science* 274, 99-102.
- Janowsky JS (2006). The role of androgens in cognition and brain aging in men. *Neuroscience* 138, 1015-1020.
- Janssens JP, Pache JC & Nicod LP (1999). Physiological changes in respiratory function associated with ageing. *Eur Respir J* 13, 197-205.
- Kang SW (2006). Pulmonary rehabilitation in patients with neuromuscular disease. *Yonsei Med J* 47, 307, 314.
- Lee SC & Johnson H (1975). Multiple nodular pulmonary amyloidosis. A case report and comparison with diffuse alveolar-septal pulmonary amyloidosis. *Thorax* 30, 178-185.
- Matsutani H, Hoshii Y, Setoguchi M, Kawano H, Gondo T, Takahashi M, Yokota T & Ishihara T (2001). Vascular amyloid of unknown origin and senile transthyretin amyloid in the lung and gastrointestinal tract of old age: histological and immunohistochemical studies. *Pathol Int* 51, 326.
- Mohanty JG, Eckley DM, Williamson JD, Launer LJ & Rifkind JM (2008). Do red blood cell-betaamyloid interactions alter oxygen delivery in Alzheimer's disease? *Adv Exp Med Biol* 614, 29-35.
- Paganini-Hill A & Henderson VW (1994). Estrogen deficiency and risk of Alzheimer's disease in women. *Am J Epidemiol* 140, 256-261.
- Pappolla MA, Chyan YJ, Omar RA, Hsiao K, Perry G, Smith MA & Bozner P (1998). Evidence of oxidative stress and in vivo neurotoxicity of beta-amyloid in a transgenic mouse model of Alzheimer's disease: a chronic oxidative paradigm for testing antioxidant therapies in vivo. *Am J Pathol* 152, 871-877.
- Peers C, Pearson HA & Boyle JP (2007). Hypoxia and Alzheimer's disease. *Essays Biochem* 43, 153-164.

- Policard A (1967a). The pneumocytes and their roles in pulmonary function. *Pathol Biol* 15, 973-981.
- Policard A (1967b). Study of the microphysiological mechanisms of clearance of the air passages of the lung. *Presse Med* 75, 2389-2394.
- Roertgen KE, Lund EM, O'Brien TD, Westermarck P, Hayden DW & Johnson KH (1995). Apolipoprotein AI-derived pulmonary vascular amyloid in aged dogs. *Am J Pathol* 147, 1311-1317.
- Rosario ER, Carroll JC, Oddo S, LaFerla FM & Pike CJ (2006). Androgens regulate the development of neuropathology in a triple transgenic mouse model of Alzheimer's disease. *J Neurosci* 26, 13384-13389.
- Rosario ER, Chang L, Stanczyk FZ & Pike CJ (2004). Age-related testosterone depletion and the development of Alzheimer disease. *JAMA* 292, 1431-1432.
- Rosenthal RA & Kavic SM (2004). Assessment and management of the geriatric patient. *Crit Care Med* 32, S92-105.
- Rossner S, Apelt J, Schliebs R, Perez-Polo JR & Bigl V (2001). Neuronal and glial beta-secretase (BACE) protein expression in transgenic Tg2576 mice with amyloid plaque pathology. *J Neurosci Res* 64, 437-446.
- Saareanta T & Polo O (2002). Hormones and breathing. *Chest* 122, 2165-2182.
- Schiavi RC, White D & Mandeli J (1992). Pituitary-gonadal function during sleep in healthy aging men. *Psychoneuroendocrinology* 17, 599-609.
- Seiple PD, Beastall GH, Watson WS & Hume R (1980). Serum testosterone depression associated with hypoxia in respiratory failure. *Clin Sci (Lond)* 58, 105-106.
- Skodras G, Peng JH, Parker JC, Jr. & Kragel PJ (1993). Immunohistochemical localization of amyloid beta-protein deposits

- in extracerebral tissues of patients with Alzheimer's disease. *Ann Clin Lab Sci* 23, 275-280.
- Smith MA, Hirai K, Hsiao K, Pappolla MA, Harris PL, Siedlak SL, Tabaton M & Perry G (1998). Amyloid-beta deposition in Alzheimer transgenic mice is associated with oxidative stress. *J Neurochem* 70, 2212-2215.
- Smith PK, Krohn RI, Hermanson GT, Mallia AK, Gartner FH, Provenzano MD, Fujimoto EK, Goeke NM, Olson BJ & Klenk DC (1985). Measurement of protein using bicinchoninic acid. *Anal Biochem* 150, 76-85.
- Thompson PJ & Citron KM (1983). Amyloid and the lower respiratory tract. *Thorax* 38, 84-87.
- Utz JP, Swensen SJ & Gertz MA (1996). Pulmonary amyloidosis. The Mayo Clinic experience from 1980 to 1993. *Ann Intern Med* 124, 407-413.
- Zaugg M & Lucchinetti E (2000). Respiratory function in the elderly. *Anesthesiol Clin North America* 18, 47-58, vi.
- Zelevnik J (2003). Normative aging of the respiratory system. *Clin Geriatr Med* 19, 1-18.

Alcohol Induced Alterations of the Antioxidant Enzymes in the Brain Tissue of Male Albino Rats with Reference to Aging

N. Somasekhara Reddy, K.R. Shanmugam, K. Munikrishana Reddy, K. Mallikarjuna* and K. Sathyavelu Reddy

Division of Molecular Biology and Exercise Physiology, Department of Zoology, Sri Venkateswara University, Tirupati – 517502, A.P.

*Exercise Biochemistry Lab, Taipei Physical Education College, Taipei City, Taiwan

ABSTRACT

Aging though inevitable, is an unwanted biological phenomenon. During the life span, metabolic machinery of the body deteriorates at an increasing rate after the organism reaches its maturity. This process is thought to be related to increase in free radicals generation and oxidative stress. Today, alcohol use and its consequences are issues undergoing extensive debate. So in the present study we made an attempt to investigate the impact of alcohol treatment during aging by selecting two age groups (3 months as “young” and 18 months as “old”). The parameters like superoxide dismutase (SOD), catalase (CAT), glutathione reductase (GR), glutathione peroxidase (GPx) and glutathione (GSH) were assayed in the brain tissue. These antioxidant enzymes were decreased with the advancement of age and also with alcohol treatment. The decline in antioxidant enzymes with age and alcohol ingestion could be due to the production of reactive oxygen species and the action of these antioxidant enzymes on these species. However, the activities of SOD, CAT, GR and GPx and GSH levels were lesser with alcohol treatment in old rats. We conclude that 2 months alcohol treatment was unsafe to the old rats. It may be concluded that the consumption of alcohol during old age should not be preferable.

Key words : Aging, alcohol, antioxidant enzymes, rats.

Alcohol use is related to wide range of physical, mental and social harms (Abel, 1997). Most health Professionals agrees that alcohol affects practically every organ in the human body. Alcohol consumption was linked to more than 60 disease conditions in a series of recent meta-analyses (Single *et al.*, 1999; Ridolfo and Stevenson, 2001). Alcoholism is a serious problem for any age group that can have pathological effect on several important systems of the body, eg: Central vascular system, central nervous system, liver, kidney function and cognitive function. It is generally accepted that excessive alcohol consumption can induce dramatic changes in the physiological and biochemical processes of the whole organism and in the cells (Oba *et al.*, 2005). Ethanol exposure to brain can be associated with oxidative perturbation of cellular oxidant/antioxidant balance (Calabrese *et al.*, 2000). Chronic ethanol exposure leads to brain damage and production of free radicals which ultimately leads to neuro degenerative changes, such as aging (Benzi and Moreti, 1995).

An increasing evidence points to oxidative stress as an important mechanism of alcohol toxicity (Sergent *et al.*, 2001) in as much as alcohol induces peroxidation of membranes lipids and oxidation of proteins and nucleic acids (Davis *et al.*, 2001). These effects lead to changes in cellular markers of oxidative stress such as intraerythrocyte glutathione (GSH) in alcohol consumers (Rigamonti *et al.*, 2003).

Aging has been defined as the sum of all changes produced with the passing of time, determining a decline in the morphological integrity and functional capacity of the endocrine, nervous and immune systems, together with a decrease in their ability to maintain homeostasis (Meites *et al.*, 1987). Aging associated decline in mitochondrial respiratory function can lead to lower ATP production and higher oxidative stress and leads to gradual decline in their physiological functions (Bakala *et al.*, 2003; Lee and Wei, 2007). Aging is characterized by a general decline of physiological functions. The free radical theory purports that oxidative stress develops when the well-regulated balance between pro- and anti-oxidants gets out of control in favor of the pro-oxidants. As age advances, several enzymes increase, while some decrease and some do not show any changes in their activities. (Husain and Mitra, 2004; Kakarla *et al.*, 2005). The specific alterations in the enzymes must have inflicted a great impact on the process of aging.

Elderly people may be more susceptible to oxidative stress induced by alcohol consumption than young. At present the role of the antioxidant enzymes during alcohol use has not been thoroughly investigated so far in old age. Taking into account the above, the purpose of the present study was to analyze the impact of alcohol in two different age groups of male albino rats.

Materials and Methods

Animal care and treatment:

Pathogen free, Wistar strain male albino rats ($n = 24$) of two different age groups i.e., young (3 months old) weighing 170 ± 10 gm and old (18 months old) weighing 240 ± 10 gm were used in the current investigation. [Approved by the Institutional Animal Ethics Committee [(Regd.No. 438/01/a/CPCSEA/dt 17.7.2001) in its resolution number 9/IAEC/ SVU/ Zool, dated 4.3.2002]. We assumed such a division of the age groups according to the studies of Cao and Cutler (1995). The rats were housed in clean polypropylene cages, 6 rats per cage and maintained under temperature controlled room ($27 \pm 2^\circ\text{C}$) with a photoperiod of 12 hrs light and 12hrs dark cycle. The rats were fed with a standard rat pellet diet and water *ad libitum*.

Chemicals

All the chemicals used in the present study were Analar Grade (AR) and obtained from the following scientific companies: Sigma (St. Louis, MO, USA), Fischer (Pittsburg, PA, USA), Merck (Mumbai, India), Ranbaxy (New Delhi, India), Qualigens (Mumbai, India).

The animals of both the age groups i.e., young ($n = 12$) and moderately aged/old ($n = 12$) were divided in to two groups of six each.

Group I – Normal Control (SC) : Six rats were put on a six-channel, motor driven treadmill for 5 days / week for a period of 2 months and given 23 m / min exercise for 5 mm for equivalent handling, and also the rats received normal (0.9%) saline orally via orogastric tube.

Group II – Alcohol Treatment (At) : Six rats received 20% of alcohol with a dose of 2.0 grams / kg bodyweight via orogastric tube for a period of two months.

After completion of 2 months treatment, the animals were sacrificed by cervical dislocation and the brain tissue was excised at 4°C . The tissue was washed with ice-cold saline, immersed in liquid nitrogen and immediately stored in deep freezer at -80°C for further biochemical analysis. The selected antioxidant enzymes such as Superoxide dismutase (SOD), Catalase (CAT), Glutathione peroxidase (GPx), Glutathione reductase (GR) and Glutathione (GSH) levels were monitored by the methods of Misra and Fridovich (1972), Aebi (1984), Flohe and Gunzler, (1984), Carlberg and Mannervik (1985), Theodoros *et al.* (1981), respectively. Total proteins were estimated by the method of Lowry *et al.*, (1951).).

Table 1 : Changes in SOD, CAT, GPx, and GR, activities and GSH level in the brain tissue of rats.

Parameter	Normal Control (NC)		Alcohol Treatment (At)	
	Young	Old	Young	Old
SOD ^a	6.293 $\pm$ 0.090	3.879 $\pm$ 0.143*	5.036 $\pm$ 0.128* (-19.974)	2.990 $\pm$ 0.081* (-22.918)
CAT ^b	0.083 $\pm$ 0.004	0.045 $\pm$ 0.004*	0.041 $\pm$ 0.006* (-50.602)	0.019 $\pm$ 0.001* (-57.777)
GPx ^c	0.393 $\pm$ 0.056	0.182 $\pm$ 0.027*	0.289 $\pm$ 0.008* (-26.463)	0.108 $\pm$ 0.005* (-40.659)
GR ^d	0.114 $\pm$ 0.006	0.050 $\pm$ 0.004*	0.077 $\pm$ 0.005* (-32.456)	0.026 $\pm$ 0.004* (-48.000)
GSH ^e	25.291 $\pm$ 0.898	12.478 $\pm$ 0.322*	21.223 $\pm$ 0.741* (-16.084)	11.263 $\pm$ 0.483* (-9.737)

All the values are mean, $\pm$ SD of six individual observations,

^a values are expressed in units of superoxide anion reduced/mg protein/minute,

^b values are expressed in μ moles of H_2O_2 degraded/mg protein/minute,

^{c,d} values are expressed in μ moles of NADPH oxidized/mg protein/minute,

^e values are expressed in μ moles of glutathione/gram wet weight of the tissue values in the parenthesis denote percent change over normal control,

*significant at $p < 0.001$ with normal control.

Statistical analysis

The data has been analyzed by using SPSS (Version 13.5; SPSS Inc., Chicago, IL, USA) and M.S. Office, Excel Software for the significance of the main effects (factors), and treatments along with their interactions. The data has been compared using one way ANOVA

with Dunnett's multiple comparison test and differences were considered significant at 0.001.

Results

In the present study, the SOD activity in the brain tissue was decreased in old age rats compared to young rats. With alcohol treatment, SOD activity was significantly ($p < 0.001$) depleted in the brain tissue of both young and old rats. In the present study, down regulation of SOD activity in brain (20%) of young rats, and (23%) in old rats was observed with alcohol treatment when compared to their respective normal controls.

The activity of CAT was decreased in brain tissue of young and old rats. But with alcohol treatment a significant depletion of CAT activity was noticed in old rats when compared to young rats. CAT activity was decreased in brain of young rats (51%) and in old aged rats (58%) when compared to their respective normal controls.

We noted a significant reduction ($p < 0.001$) in GPx activity in both age groups of rats. However with alcohol treatment in old rats. However with alcohol treatment in old rats GPx activity was further decreased. It was 41 per cent vs 26 per cent when compared to their respective normal controls.

A significant reduction ($p < 0.001$) in GR activity in both age groups of rats was observed. The depletion was 32% in young rats, and 48% in old rats when compared to their respective normal controls.

The concentrations of GSH observed as a foot marker of oxidative stress, dropped with advancement of age and further decreased with alcohol treatment. In old rats alcohol treatment reduced GSH level by 10 per cent, whereas in young rats it was 16 per cent when compared to their respective normal controls.

Discussion

Among various antioxidative mechanisms in the body SOD is thought to be one of the major enzyme, which protects the cells against tissue damage caused by the potentially cytotoxic relativities of free radicals. (Carrillo *et al.*, 1992). In this study, age related decrease in SOD activity was observed in brain tissue indicate either reduced synthesis of enzyme or elevated degradation or inactivation of enzyme

with the advancement of age. It is, therefore, possible that the decreased in SOD activity with age might be closely related to the aging of the organism. Sawada and Carlson (1987) reported that superoxide radical formation increases with age, therefore a decreased protection against toxic radical may have serious consequences for aging tissues. We found that with alcohol treatment, SOD activity was decreased in both age groups. However, in old rats more reduction of SOD was observed than young rats. Somani *et al.*, (1996) reported that brain SOD activity was decreased with 20 per cent of alcohol treatment. Evidences exist that alcohol intake increases the oxidative stress in the brain (Montoliu, 1994; Chen and Cohen, 1995) and its toxicity is associated with elevated generation of reactive oxygen species like superoxide anion, hydrogen peroxide and other free radicals (Reinke *et al.*, 1994). SOD acts on the superoxide radical hence, its activity was decreased. In old rats, the over production of superoxide radicals due to alcohol intoxication implies the over utilization of SOD, hence SOD activity was much decreased in old age rats.

In the present investigation decrease in the activity of CAT was observed in the brain of old rats than young rats. The decreased CAT activity in the present study may be because of high reactive oxygen metabolites production especially $O_2^{\cdot -}$ and H_2O_2 during aging process and cause oxidative stress to the tissue. Evidences suggest that $O_2^{\cdot -}$ itself affect directly the CAT activity (Kono and Fridovich, 1982). Bindu *et al.* (2002) reported that CAT activity was decreased with alcohol treatment. The decreased CAT activity with alcohol treatment indicate inefficient scavenging of hydrogen peroxide due to oxidative inactivation of enzyme. However with alcohol treatment in old rats we, observed more decrease in CAT activity than young rats (Mallikarjuna *et al.*, 2008).

A decrease in the specific activity of GPx was observed in old rats when compared to young rats. The production of free radicals and other ROS are believed to increase with age in most cells (Lee and Wei, 2007). Age induced increases in the production of free radicals, especially hydrogen peroxide was responsible for the lowered activity of GPx in older rats. Vohra *et al.* (2001) reported decreased SOD and GPx activities in aged guinea pigs. The decreased GPx activity might have disturbed the glutathione (GSH) homeostasis in brain cell and

ultimately lead to the damage of brain. Ostrowska *et al.* (2004) reported decreased GPx activity at a significant level in rat brain for a period of 4 weeks alcohol intoxication. Decreased GPx activity might be due to either free radical inactivation of enzyme or depletion of its co-substrate i.e., GSH and NADPH in the alcohol treatment (Chandra *et al.*, 2000). GPx catalyses the reduction of lipid peroxides or hydrogen peroxides using reduced glutathione as a substrate, thus providing a line of metabolism against alcohol induced oxidative stress (Albert II and Ren, 2003).

GR activity was dropped in the brain tissue of older rats. Recently Mallikarjuna *et al.* (2007) and Pushphalatha *et al.* (2008) reported that the decreased activity GR in hepatic and cardiac tissues with advancement of age. The decrease in enzyme activity also suggests the possible free radical mediated oxidative stress and consequent damage to the brain tissue. Age induced oxygen derived free radicals, which cause disturbance of pro-oxidants and antioxidant homeostasis in the tissues and leads to decrease all the antioxidant enzymes including GR. Glutathione reductase is involved in the detoxification of peroxides. The activity of brain glutathione reductase was significantly decreased with alcohol treatment in both age groups of rats. Somani *et al.* (1996) also reported decreased GR activity with ethanol treatment in brain tissue of rat. Das and Vasudevan (2005a) found a significant decrease in GR activity in the hepatic tissue of rat. A significant decrease in brain GR activity after alcohol treatment is indicative of impaired reduction of GSSH to GSH due to depletion of reducing equivalent (NADPH) which is a co-substrate for GR activity. The decrease in GR activity and GSH levels after ethanol treatment reflected the impaired glutathione of oxidized form to reduced form (Dinu and Zamfir, 1991). The increase in GSH / GSSG ratio in the brain of alcohol fed rats and inhibition of GR activity are indicative of alcohol induced oxidative stress in brain (Somani *et al.*, 1996). In old rats with alcohol treatment we observed very low activity of GR than young rats.

Glutathione is the most abundant intracellular thiol based antioxidant present in milli molar concentration, and plays an important role in maintaining the integrity of cells (Powers *et al.*, 2004). In the present study, we reported that with alcohol treatment, GSH level was decreased in both age groups. Several studies reported that chronic alcohol

consumption significantly depleted the GSH concentration in the hepatic tissue of different mammals like, rats (Kim *et al.*, 2003) mice (Zhou *et al.*, 2002) and man (Kannan *et al.*, 2004; Das and Vasudevan, 2005b). Alcohol interferes with the transport of GSH through membranes, leading to its depletion from mitochondria. The resulting GSH deficiency may permit mitochondrial damage and cell death by means of unimpeded lipid peroxidation (Zhou *et al.*, 2002). Hence, the level of GSH was decreased with alcohol intoxication.

From the above results, it is concluded that the antioxidant enzymes help in countering the free radicals generated during aging process. With alcohol treatment these antioxidant enzymes SOD, CAT, GPx, and GR activities and GSH levels were very much depleted in old rats, which shows that these antioxidant enzymes acts on the excess free radicals produced during old age.

References

- Abel, E.L. (1997). Maternal alcohol consumption and spontaneous abortion. *Alcohol and Alcoholism*, 32(3): 211-219.
- Aebi, H., (1984). Catalase. *Methods in Enzymology* 105, 125-126.
- Albert II, N. S. and Ren, J. (2003). Experimental assessment of the role of acetaldehyde in alcoholic cardiomyopathy. *Biol. Proced. Online* 25 (1): 1-12.
- Bakala, H., Delaval, E.M. Hamelin, M., Bismuth, J., Borot-Laloi, C., Cormann, B., and Friguet, B. (2003). Changes in rat liver mitochondria with aging, Lon-protease like activity and N^E-carboxymethyllysine accumulation in the matrix. *Eur. J. Biochem* 270: 2295-2302.
- Benzi, G. and Moretti, A. (1995). Age-and peroxidative stress –related modifications of the cerebral enzymatic activities linked to mitochondria and the glutathione system. *Free Rad Biol Med* 19: 77-101.
- Bindu, M. P., Sreekant, K. S., Annamali, P.T. and Augusti, K. T. (2002). Effect of S-allile cysteine sulfoxide on lipid metabolism and free radical scavenges in alcohol fed rats. *Curr. Sci* 82(6): 628-631.

- Calabrese, V., Testa, G., Ravagna, A., Bates, T.E., Stella, A.M. (2000). HSP70 induction in the brain following ethanol administration in the rat: regulation by glutathione redox state. *Biochem. Biophys. Res. Commun* 269: 397-400.
- Cao, G. and Cutler, R.G. (1995). Protein oxidation and aging: II. Difficulties in measuring alkaline protease activity in tissues using the Fluorescamine procedure. *Arch. Biochem. Biophys* 320 (1): 195-201.
- Carillo, M.C., Canai, S., Sato, Y. and Kitani, K.(1992). Age related changes in antioxidant enzyme activities are region organ as well as sex, selective in the rat. *Mech. Age. Dev.* **65**: 187-198.
- Carlberg, I., Mannervik, B. (1985). Glutathione reductase . *Methods in Enzymology* 113, 484-490.
- Chandra, R. Aneja, R., Rewal, C., Konduri, R., Das, S. K. and Agarwal, S. (2000). An opium alkaloid *Papaverine* ameliorates ethanol induced hepatotoxicity diminution of oxidative stress. *Ind. J. Clin. Biochem* 15(2): 155-160.
- Chen, L.H., Xi, S. and Cohen, D.A. (1995). Liver antioxidant defense in mice fed ethanol and the AIN-76A diet. *Alcohol* 12: 453-457.
- Clemens, D.L., Jerrells, T.R. (2004). Ethanol consumption potentials viral pancreatitis and may inhibit pancreas regeneration. Preliminary findings. *Alcohol* 33:183-189.
- Das, S. K. and Vasudevan, D. M. (2005a). Effect of ethanol on liver antioxidant defense system: A dose dependent study. *Indi. J. Clin. Biochem* 20(1): 80-84.
- Das, S. K. and Vasudeva, D. M. (2005b). Biochemical diagnosis of alcoholism. *Ind. J. Clin Biochem* 20(1): 35-42.
- Davis, K.L., and Martin, E., Turko, I.V., Murad, F. (2001). Novel effects of nitric oxide. *Annu Rev Pharmacol Toxicol* 41:203-236.

- Dinu, V. and Zamfir, D. (1991). Oxidative stress in ethanol intoxicated rats. *Rev. Roum. Physiol* 28: 63-67.
- Flohe, L., Gunzler, W.A. (1984). Glutathione Peroxidase. *Methods in Enzymology* 105, 115-121.
- Husain, A.M and Mitra, A.K. (2004). Effect of reactive oxygen species on the metabolism of tryptophan in rat brain : Influence of age. *Mol. Cell. Biochem* 258(1):145-153.
- Kakarla, P. Vadluri, G. and Reddy. K.S. (2005). Response of hepatic antioxidant system to exercise training in aging female rats. *J. Exp. Zoology* 303A(3):203-208.
- Kannan, M. Wang, L. and Kang, Y. J. (2004). Myocardial oxidative stress and toxicity induced by acute ethanol exposure in mice. *Exp. Biol. Med* 229: 553-559.
- Kim, Y.C. Kim, Y.S. and Sohn, Y.R. (2003). Effect of age increase on metabolism and toxicity of ethanol in female rats. *Life Sci* 74: 509-519.
- Kono, Y. and Fridovich, I. (1982). Superoxide radical inhibits catalase. *J. Biol. Chem* 257: 5751.
- Lee, H.C. and Wei, Y.H. (2007). Oxidative stress, mitochondrial DNA mutation and apoptosis in aging. *Exp, Biol. Med* 232: 592-606.
- Lowry, O.H., N. C. Rosebrough, A. L. Farr., R.J. Randall. (1951). Protein measurements with folin-phenol reagent. *Journal of Biological Chemistry* 193: 265-275.
- Mallikarjuna K., Nishanth K. and Sathyavelu Reddy K. (2007). Hepatic glutathione mediated antioxidant system in ethanol treated rats: Decline with age; *Pathophysiol* 14, 17-21.
- Mallikarjuna K, Sahitya Chetan P, Sathyavelu Reddy K, Rajendra W (2008). Ethanol toxicity: Rehabilitation of hepatic antioxidant defense system with dietary ginger. *Fitoterapia* 79: 174-178.
- Meites J, Goya RG, Takahashi S. (1987). Why the neuroendocrine system is important in aging process. *Exp Gerontol* 22: 1-5.

- Misra, H. P., Fridovich, I. (1972). The role of superoxide anion in the autooxidation of epinephrine and a simple assay for superoxide dismutase. *Journal of Biological Chemistry* 247, 3170-3175.
- Montoliu, C., Valles, S., Renau-Piqueras, J., Gurri, C. (1994). Ethanol-induced oxygen radical formation and lipid peroxidation in rat brain: effect of chronic alcohol consumption. *N. Neurochem* 63, 1855-1862.
- Oba, T., Maeno, Y., Ishida, K. (2005). Differential contribution of clinical amounts of acetaldehyde to skeletal and cardiac muscle dysfunction in alcoholic myopathy. *Curr Pharm Des* 11: 791-800.
- Ostrowska, J., Luczaj, W., Kasacka, I., Rozanski, A. and Skrydlewska, E. (2004). Green tea protects against ethanol – induced lipid peroxidation in rat organs. *Alcohol* 32: 25-32.
- Powers, S.K., DeRuisseau, K.C., Quindary, J. and Hamilton, K.L. (2004). Dietary antioxidants and exercise. *J. Sports Sci* 22: 81-94.
- Pushpalatha Kakarla, Sathyavelu Reddy Kesireddy and Leeuwenburgh Christiana (2008). Exercise training with ageing protects against ethanol induced myocardial glutathione homeostasis. *Free Radical Research* 42(5): 428-434.
- Reinke, L.A., Moore, D.R. Hague, C.M. and McCoy, P.B. (1994). Metabolisms of ethanol to 1hydroxyethyle radicals in rat liver microsomes – comparative studies with three spin trapping agents. *Free. Rad. Res* 21: 213-222.
- Ridolfo B., Stevenson CE. (2001). *The Quantification of Drug-Caused Mortality and Morbidity in Australia 1998*. Canberra, Australian Institute of Health and Welfare.
- Rigamonti, C., Mottaran, E., Reale, E., Rolla, R., Cipriani, V., Capelli, F., Boldorini, R., Vidali, M., Sartori, M., Albano, E. (2003). Moderate alcohol consumption increases oxidative stress in patients with chronic hepatitis C. *Hepatology* 38: 42-49.

- Sawada M. and Carlson J.C. (1987). Changes in superoxide radical and lipid peroxide formation in the brain, heart and liver during the life time of the rat; *Mech. Ageing Dev* 41, 125-137.
- Sergent, O., Griffon, B., Cillard, P., Cillard, J. (2001). Alcohol and oxidative stress. *Pathol Biol* 49: 689-695.
- Single, E., *et al.*, (1999). Morbidity and mortality attributable to alcohol, tobacco, and illicit drug use in Canada. *American Journal of Public Health* 89(3): 385-390.
- Somani, S.M. and Husain, K. (1996). Exercise training alters kinetics of antioxidant enzymes in rat tissues. *Biochem. Mole. Bilo. Inter* 38(3): 587-595.
- Theodorus, P. M., Akerboom, Helmut Sies. (1981). Assay of Gluthathione, Glutathione disulfide and Gluthathione mixed disulfide in biological samples. *Methods in Enzymology* 77, 373-382.
- Vohra, B.P.S., Sharma, S.P. and Kansal, V.K. (2001). Age dependent variations in mitochondrial and cytosolic antioxidant enzymes and lipid peroxidation in different regions of central nervous system of guinea pigs. *Ind. J. Biochem. Biophy* 38: 321-326.
- Zhou, Z., Sun, X. and Kang, Y.J. (2002). Metallothionein protection against alcoholic liver injury through inhibition of oxidative stress. *Exp. Biol. Med* 227(3): 214-222.

Obesity Associated Dementia Among Elderly – Role of a Plant Based Formulation

**A. Agrawal*, M. Rastogi, R.P. Ojha, C.S. Sahayam,
L. Upadhyay, G.V. Rajamanickam and G.P. Dubey**

Centre for Advanced Research in Indian System of Medicine
SASTRA University, Thanjavur

*Faculty of Ayurveda, Institute of Medical Sciences
Banaras Hindu University, Varanasi

ABSTRACT

*The main object of the present study was to evaluate association between obesity and dementia in elderly people, and its prevention and management by an herbal formulation. Under this clinical trial, 80 men and women, aged 61 to 79 years who underwent a detailed health evaluation, showing high BMI with a major complaint of loss of memory and deterioration of other cognitive functions were treated with a novel herbal formulation containing hydro-alcoholic extract of **Dioscorea bulbifera**, **Salacia oblonga** and **Hippophae rhamnoides** in effective doses. Normal 58 aged (31 male and 27 female, BMI 18-25) with normal cognitive functions, and 57 (33 male and 24 female) underweight aged (BMI <18 with poor mental abilities) were also treated with test formulation. The test formulation exerted beneficial effects on BMI, mental functions particularly on memory and attention span, inflammatory marker CRP including homocysteine, plasma leptin and adiponectin levels during six months of study period. It is concluded that test formulation enhanced the satiety, decreased appetite and fat absorption through regulation of 5-HT, leptin and adiponectin receptors involved in the onset of obesity. Thus by regulating adipokines, memory, attention span and other cognitive impairments significantly improved among obese elderly demented subjects. Pre-clinical toxicity studies revealed that the formulation was safe and could be administered for longer time.*

Key words: Obesity, Dementia, Herbal formulation, Leptin, Adiponectin, Homocysteine, CRP, Memory.

Obesity in adults is associated with cognitive impairment and dementia and it is speculated to be a consequence of obesity or obesity related processes like secretion of bio-active hormonal compounds, altered insulin signaling diabetes, hypertension and other cardiovascular disease processes (Graf *et al.*, 2004; Rosengren *et al.*, 2005; Whitmer *et al.*, 2005; Gustafson, 2006). Though some of the other mechanisms are also involved in earlier life.

Obese adults particularly individuals with type-2 diabetes mellitus may already have poor cognitive functions in childhood consistent with a subtle developmental impairment (Chandola *et al.*, 1958; Olsson *et al.*, 2008). Thus impairment in cognitive function in such cases may begin much earlier in life showing early biological processes relevant to neurological function and cognition. One of the views is that the neurological mechanism and social influences also increase future risk of obesity (Jefferis *et al.*, 2002, Tong *et al.*, 2007), and there is association of childhood cognitive impairment with obesity in later life.

Dementia affects 4-10 percent of persons over 65 years or older. In one of the studies (Beydoun *et al.*, 2008) the workers observed significant association between BMI and dementia i.e. the risk of dementia increases with obesity and under weight. In a long term follow up studies these workers noticed marked effect of over weight or obesity with the onset of Alzheimer's disease (AD) and vascular dementia. Weight gain, and high waist circumference or more skin fold thickness increased the risk of dementia. The meta-analysis showed a moderate association between obesity and risk of dementia including Alzheimer's disease.

Several vascular risk factors have now been identified that are associated with dementia (Kivipelto *et al.*, 2006). Age, low education, hypertension, hypercholesterolemia and obesity are the factors responsible for future onset of dementia. Hyperhomocystenemia appears to be an independent risk factor for various vascular linked pathologies, including dementia, stroke and peripheral vascular disease

(Braak and Braak, 1991). US National Institute of Health team found that in middle age overweight increase the risk of developing dementia. Obese people in their 40s are 74 percent likely to develop dementia in comparison to the normal weight of same age group. The authors warned that the percent epidemic of obesity might lead to a boom of dementia.

BMI is an acceptable measure of body fat or adiposity in the general population. Among old individuals, BMI may underestimate adiposity because lean body mass is replaced by fat on aging (Baumgartner *et al.*, 1995). The association of increased adiposity to dementia may be weaker among the older participants who may have more body fat in spite of their low body weight. Thus association of BMI to dementia may be more accurately assessed at mid life than in the older years (Whitmer *et al.*, 2005).

Adiposity is one component of metabolic syndrome, which has also been shown to cause cognitive decline particularly in those with high levels of inflammation (Yaffe *et al.*, 2004). C-reactive protein an important inflammatory marker is increased in those with greater adiposity and is associated with dementia and cognitive decline (Das, 2001, Schmidt *et al.*, 2002). In one of the recent studies obesity in elderly women was shown to be associated with greater cerebral atrophy and white matter hyperintensity (Gustafson, 2004).

It is reported (Brookmeyer and Gray, 2000) that in the next 20 years the incidence of dementia will increase 400 percent in aged population. In one of the recent studies it was observed that obesity in elderly women increase the risk of dementia (Wang, 2002, Gustafson *et al.*, 2003). It is evident that the ratio of lean to fat mass changes with aging (Baumgartner *et al.*, 1995) resulting in a decreased body mass index (BMI). Later on dementia affects the appetite and causes reduction in BMI and weight loss is responsible for dementia in elderly population.

Sibutramin and Orlistat are the drugs approved by FDA for the management of obesity (Rolls *et al.*, 1998, Hill *et al.*, 1999). Their application is restricted due to risk profile, as these agents cause mood

enhancement, cardiovascular excitation etc. (Graddoc 1978, Bowen *et al.*, 1997).

As pointed out, obesity is a major risk factor for cardiovascular and neurodegenerative disorders and a plant based tribal formulation has been validated in the management of obesity associated with dementia in elderly people. The Tribal plants *Dioscorea bulbifera*, *Salacia oblonga* and *Hippophae rhamnoides* were selected, as pharmacologically these plants have shown strong rationale for their anti-obesity, anti-oxidant, anti-inflammatory and memory enhancing property.

Materials and Methods

In the present study a prospective analysis of obese elderly was carried out and subjects with age range of 61 to 74 years were selected from urban population. All the selected obese cases had a major complaint of dementia (memory loss with poor mental performance).

The study was divided into 3 groups –

Group-I: 58 elderly with normal body weight (31 male and 27 female, BMI 18-25), were treated with test formulation.

Group-II: 80 elderly obese subjects (34 male & 46 female, BMI - >30) were treated with test formulation.

Group-III: 57 elderly with under weight i.e. (BMI <18) (33 male and 24 female) were selected for validation of test formulation.

In all the three groups, the subjects were assessed for their mental performance particularly for their memory status. Both Short Term (Peterson and Peterson, 1969), and Long Term Memory (Chaudhary, 1978) were measured, Mini Mental State examination was conducted using Folstein *et al.* (1975) method. Attention span was determined by electronic device, Attention Span Apparatus (Medicaid System).

Biochemical Assessment

Leptin and Homocysteine levels were measured by ELISA Kit method. Adiponectin estimation was conducting using Radioimmunoassay kit method. Inflammatory marker C-reactive protein

was done by Kit for quantitative nephelometric determination of CRP in human serum or Plasma, Turbox/Turbox analyzer.

The follow up studies were made at the interval of 3 and 6 months. A written informed consent were taken from all the subjects to participate in this clinical trial programme. The cases who showed any serious metabolic, endocrine, neurologic, allergic or hemopoetic reactions or did not follow the treatment schedule were discarded from the series.

Diagnosis of Dementia

A deterioration of memory along with complaints such as poor orientation, poor judgment, problem solving difficulties, trouble in the functioning of community affairs, inability to function independently in home, during hobbies and personal care were noticed to be present. The aged subjects who exhibited at least three of above mentioned complaints were categorised in dementia group. Dementia rating scale-2 (Jurica *et al.*, 2001) has been used in the present study. Based on this scale the score obtained for diagnosis of dementia is as follows :

Complaints	Normal control	Dementia
Attention	79.55	32.22
Initiation/Preservation	23.55	10.04
Construction	21.37	8.93
Conceptualization	2.55	1.45
Memory	21.18	9.79
Total Score	10.91	5.87

Preparation of test formulation:

Hydro-alcoholic extract of *Dioscorea bulbifera* (400 mg), *Salacia oblonga* (250mg) and *Hippophae rhamnoides* (300mg) were mixed with additional additive (50 mg) to make one gram (1000 mg). The mixture was then divided into 2 capsules of 500 mg so that each capsule contained 475 mg extract of three plants. One capsule was given in the morning and one in the evening, continuously for six months. The values of parameters obtained at initial level were compared with the values

obtained at the end of six months of treatment. Students paired T test is applied to obtain significance level.

Results & Observations

Results indicated that incidence of obesity is more common in female than the male sex. A high BMI at first visit was calculated in obese demented elderly people. Similarly, triceps and sub-scapular skin fold thickness was also recorded significantly high in obese subjects. On the contrary, underweight elderly subjects exhibited low BMI with poor skin fold thickness. A group of elderly showing normal BMI with normal skin fold thickness without dementia served as the control group. The obese subjects of group-II when treated with herbal formulation for six months revealed a significant reduction in obesity index as BMI and skin fold thickness reduced significantly (Table-1).

As discussed obesity is significantly associated with dementia particularly in reference to elderly population. The present study also indicated poor memory and deteriorated cognitive functions of elderly people. On Mini-Mental State examination, memory and attention span of obese individuals showed a very poor scores at baseline study which improved significantly following six months of treatment (Table 2 - 5).

The novel herbal formulation has also shown beneficial role on various bio-markers responsible for obesity like leptin and adiponectin. A high value of leptin and significant low value of adiponectin was the main laboratory findings of obese subjects at base line study. A marked decrease in leptin level and significant increase in adiponectin was noticed following treatment indicating anti-obesity property of the drug. On comparison i.e. initial values vs six months values of the parameters the changes were significant (Fig. 1 & 2).

An elevated level of homocysteine and inflammatory marker CRP was associated with obese elderly cases. Following six months of treatment, a reduction in the levels suggested improvement in vascular inflammation and atherosclerotic process among obese subjects (Figs. 3 & 4), which exerted improvement in mental performance.

Table-1: BMI and skin fold thickness among different elderly groups (dementia) treated with herbal formulation.

Elderly Groups	Sex	No. of Case	Average Age	BMI		Skin fold thickness (mm)			
				Initial	After 6 months	Triceps (mm)		Sub-scapular (mm)	
						Initial	After 6 months	Initial	After 6 months
Normal weight	M	31	68.72 ±4.08	22.14 ±2.75	22.17±3.04 P>0.05	9.31 ±2.20	9.45±2.30 P>0.05	14.25 ±2.06	14.38±2.14 P>0.05
	F	27	65.82 ±3.81	21.32 ±2.14	21.93±2.72 P>0.05	10.75 ±1.82	10.86±1.75 P>0.05	15.38 ±2.61	15.51±2.63 P>0.05
With obesity	M	34	67.49 ±3.90	34.71 ±3.24	31.65±2.91 P<0.001	14.82 ±2.72	12.64±2.28 P<0.001	18.54 ±1.97	17.49±2.01 P<0.05
	F	46	63.81 ±2.43	37.40 ±3.11	34.11±3.04 P<0.001	16.75 ±3.08	13.93±2.34 P<0.001	19.84 ±2.71	16.72±2.54 P<0.001
Under weight	M	33	69.78 ±4.31	15.06 ±2.04	15.86±2.02 P<0.01	8.21 ±1.26	8.83±1.30 P>0.05	12.09 ±2.01	12.29±1.85 P>0.05
	F	24	64.82 ±2.94	16.16 ±2.13	19.91±2.41 P>0.05	7.85 ±1.04	8.36±0.98 P>0.05	10.75 ±2.23	10.91±2.13 P>0.05

Table-2 : Mini mental score among different elderly groups (dementia) treated with herbal formulation.

Elderly Groups	Sex	No. of Cases	Mini Mental State Examination (Score)		
			Initial	After 3 months	After 6 months
Normal weight	M	31	19.81 ±3.01	19.98 ±2.16	20.28±2.35 P>0.05
	F	27	18.23 ±2.94	18.86 ±3.41	19.14±2.88 P>0.05
With obesity	M	34	14.51 ±2.11	15.39 ±1.87	15.83±1.91 P<0.02
	F	46	13.42 ±1.98	13.88 ±2.01	15.24±1.87 P<0.001
Under weight	M	33	15.77 ±1.85	15.91 ±1.35	16.54±2.16 P>0.05
	F	24	15.21 ±2.04	15.54 ±1.84	16.12±2.08 P>0.05

p value : Initial vs 6 months after treatment

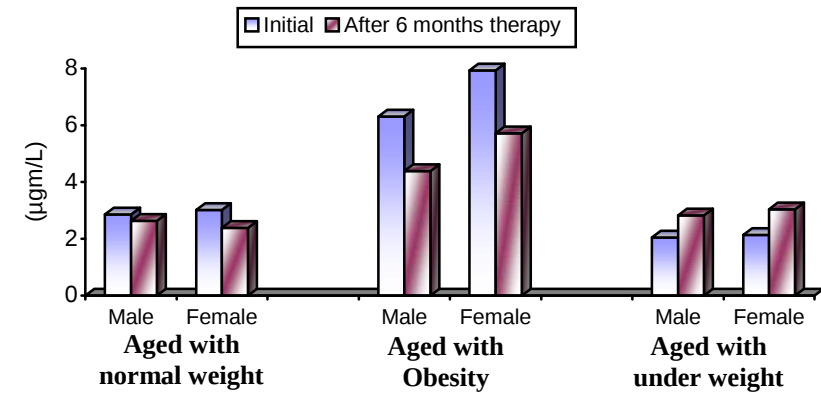


Fig. 1 : Decreased Leptin level in aged demented treated with herbal formulation

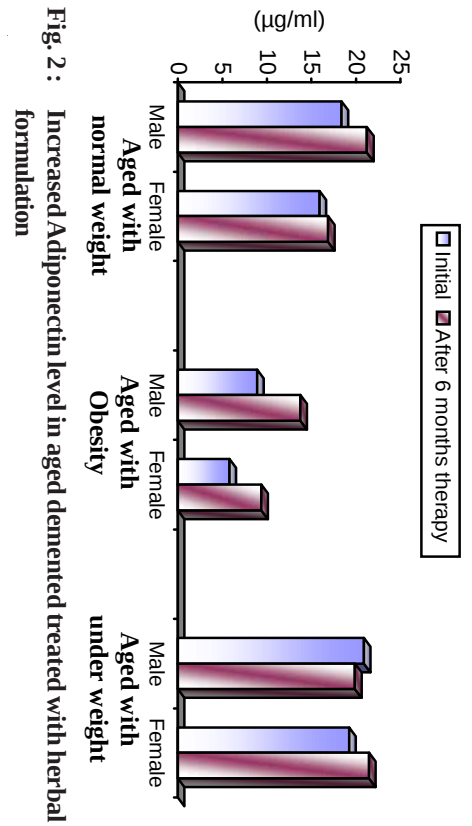


Fig. 2 : Increased Adiponectin level in aged demented treated with herbal formulation

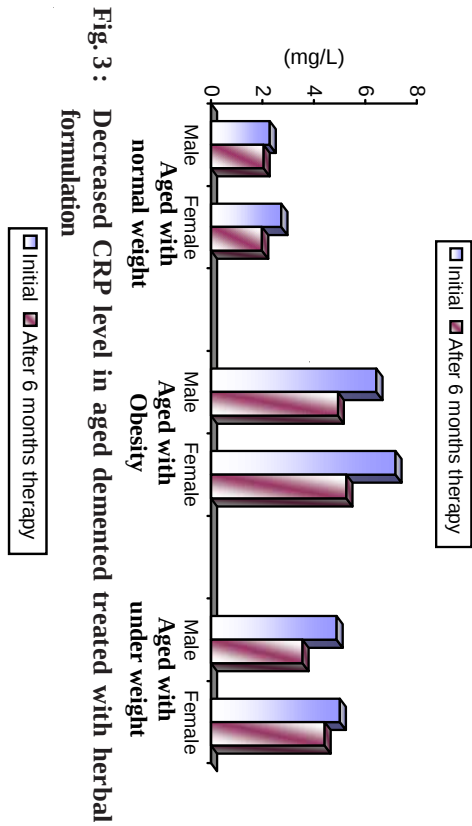


Fig. 3 : Decreased CRP level in aged demented treated with herbal formulation

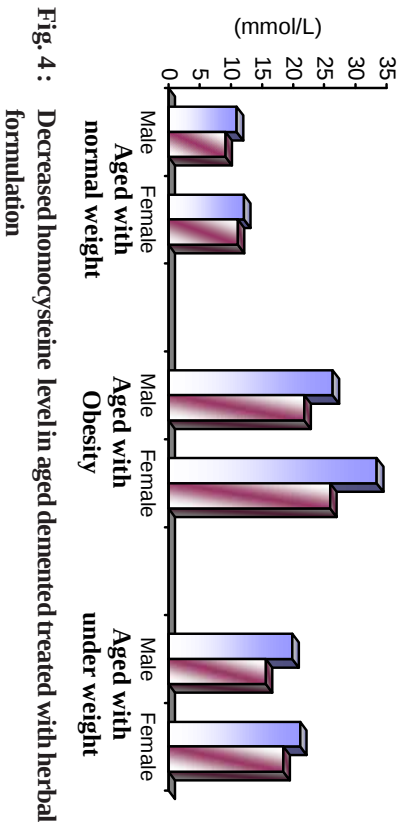


Fig. 4 : Decreased homocysteine level in aged demented treated with herbal formulation

Table-3: Short term memory score among different elderly groups (dementia) treated with herbal formulation

Elderly Groups	Sex	No. of cases	Short term memory span (Score)								
			Initial			After 3 months			After 6 months		
			3 sec.	9 sec.	18 sec.	3 sec.	9 sec.	18 sec.	3 sec.	9 sec.	18 sec.
Normal weight	M	31	5.54 ±1.01	5.14 ±0.92	4.87 ±0.54	5.71 ±1.12	5.63 ±1.16	5.21 ±0.98	5.83±1.01 P>0.05	5.77±0.87 P>0.05	5.35±0.93 P>0.05
	F	27	5.16 ±1.02	4.86 ±0.66	4.68 ±0.71	5.43 ±0.64	5.10 ±0.55	4.96 ±0.82	5.71±0.84 P>0.05	5.53±0.49 P<0.001	5.48±0.86 P<0.001
With obesity	M	34	3.94 ±0.38	3.71 ±0.41	3.57 ±0.52	4.64 ±0.62	4.42 ±0.52	4.12 ±0.38	4.97±0.52 P<0.001	4.85±0.35 P<0.001	4.73±0.48 P<0.001
	F	46	3.81 ±0.54	3.64 ±0.43	3.41 ±0.28	4.33 ±0.39	4.29 ±0.64	4.10 ±0.48	4.82±0.81 P<0.001	4.53±0.61 P<0.001	4.50±0.48 P<0.001
Under weight	M	33	3.94 ±0.38	3.86 ±0.57	3.71 ±0.61	4.22 ±0.82	4.16 ±0.71	4.12 ±0.64	4.80±0.48 P<0.001	4.63±0.91 P<0.001	4.55±0.73 P<0.001
	F	24	3.69 ±0.61	3.53 ±0.91	3.38 ±0.29	3.99 ±0.71	3.86 ±0.81	3.45 ±0.49	4.27±0.67 P<0.001	4.16±0.68 P<0.001	4.08±0.91 P<0.001

p value : Initial vs 6 months after treatment

Table-4 Beneficial role of test formulation on long term memory among obese dementia cases

Elderly Groups	Sex	No. of Cases	Long Term Memory Span (Score)					
			Initial		After 3 months		After 6 months	
			1 time	4 time	1 time	4 time	1 time	4 time
Normal weight	M	31	3.09 ±0.75	2.68 ±0.62	3.35 ±0.77	2.83 ±0.91	3.74±1.02 P < 0.02	3.62±0.54 P < 0.001
	F	27	2.89 ±0.46	2.70 ±0.51	3.64 ±0.48	3.52 ±0.65	3.88±0.84 P < 0.001	3.67±0.71 P < 0.001
With obesity	M	34	1.93 ±0.43	1.59 ±0.71	2.32 ±0.35	2.19 ±0.69	2.73±0.48 P < 0.001	2.61±0.82 P < 0.001
	F	46	1.79 ±0.53	1.53 ±0.61	1.86 ±0.93	1.73 ±0.59	2.10±0.71 P < 0.05	1.93±0.45 P < 0.001
Under weight	M	33	2.11 ±0.91	1.97 ±0.84	2.64 ±0.73	2.33 ±0.94	2.89±0.82 P < 0.001	2.76±0.65 P < 0.001
	F	24	1.98 ±0.44	1.84 ±0.73	2.28 ±0.61	2.19 ±0.58	2.68±0.73 P < 0.001	2.55±0.91 P < 0.001

P value : Initial vs 6 months after treatment.

Table-5: Attention span among different elderly groups (Dementia) treated with herbal formulation

Elderly Groups	Sex	No. of Cases	Attention span (Score)		
			Initial	After 3 months therapy	After 6 months therapy
Normal weight	M	31	11.45 ±2.02	11.56 ±2.35	11.92±1.84 P>0.05
	F	27	10.72 ±1.96	10.81 ±2.11	11.04±2.04 P>0.05
With obesity	M	34	7.22 ±0.85	8.16 ±0.85	8.82±1.11 P<0.001
	F	46	6.82 ±0.75	7.91 ±1.10	8.25±1.25 P<0.001
Under weight	M	33	8.38 ±1.73	8.94 ±2.02	9.54±2.16 P<0.05
	F	24	8.04 ±1.81	8.65 ±1.04	8.96±0.89 P<0.05

p-value : Initial vs 6 months after treatment

Discussion:

The prevention of dementia through identification and management of risk factors is of public health importance due to advancing elderly population. Dementia affects 6-10 percent of persons over 65 years of age (Hendrie, 1998). Currently available therapies for dementia are inadequate and having risk profile.

The risk of developing late life dementia is predicted among middle aged persons with low education, hypertension hypercholesterolemia and obesity. An healthy life style has shown beneficial effect in the management of dementia. Sex wise distribution has shown BMI was associated with dementia than normal weight women where as men were comparatively at less risk.

In one of the studies conducted by Johns Hopkins Bloombers-School of Public Health reported a consistent relationship between obesity and dementia. The results of this study were published by the International Association for the Study of Obesity, May 2008. It was reported that subjects with a healthy body mass index and waist circumference showed a decreased risk of dementia than the subjects

with high BMI or waist circumference. He emphasized that preventing or treating obesity at a younger age could play a major role in reducing the number of dementia patients and those with other commonly associated illnesses such as Alzheimer's disease. It is reported that the risk of Alzheimer's disease increased 80 percent due to obesity as compared to normal weight.

Obesity might increase dementia risk either through a direct effect on brain or by its association with medical conditions that are also known to increase dementia risk like hyperhomocysteinemia, hypercholesterolemia, hypertension, diabetes mellitus etc. (Rosengren *et al.*, 2005). Thus, the proper management of obesity may reduce the risk of dementia. Weight loss could even precede diagnosis of dementia by several years (Barrett-Connor *et al.*, 1996).

On the basis of present investigation, it is speculated that the possibility for increased risk of dementia with adiposity is through cardiovascular disease or glucose intolerance as both condition increases the risk of dementia. Adiposity is also one of the components of metabolic syndrome which also causes cognitive decline particularly among such cases showing high levels of inflammatory markers.

Adiposity has a direct effect on neuronal degradation. It is reported that genetically obese leptin receptor deficient animals had impaired performance on memory task (Funahashi *et al.*, 2003) and long term potentiation of neurons in the hippocampus. C-reactive protein, an inflammatory marker is increased in those cases who have greater adiposity and is associated with dementia and cognitive decline (Schmidt *et al.*, 2002, Gustafson *et al.*, 2004). In present study, obese elderly showed significant low scores on memory task with high CRP levels before starting the therapy. After 6 months of treatment, improvement in cognitive function and reduction in inflammatory cytokines were observed. It is speculated that the present formulation may have potentiality in the distribution of adiposity and effect on adipocytokines. Thus, the management of obesity reduced the risk of dementia and improved the cognitive deficits among elderly. Such effect occurred due to the anti-obesity and anti-inflammatory properties of the test combination.

Recently, attention has been paid to the possible role of leptin in the regulation of food intake and satiety, as well as in the control of fat accumulation (Friedman, 2000). Leptin depresses appetite and inhibits fat deposition particularly in visceral depots which is mediated through sympathetic nervous system activation (Haynes *et al.*, 1997). Several workers have reported that high levels of leptin are ineffective in reducing fat accumulation (Narkiewicz *et al.*, 1999).

Inflammation has been recognized as an important pathological part in the development of atherosclerosis. Several studies have demonstrated that adiponectin exhibits anti-inflammatory properties in atherogenesis (Engeli *et al.*, 2003, Kern *et al.*, 2003, Motoshima, 2004, Shibata *et al.*, 2004). Adiponectin suppressed TNF- α and reversed the increased levels of adipose expression of TNF- α and plasma TNF- α (Maeda *et al.*, 2002). Adiponectin also inhibits oxidised LDL-induced cell proliferation and suppresses cellular superoxide generation (Motoshima *et al.*, 2004). Adiponectin alters inflammatory reactions in various pathogenesis. It blocks fat cell formation in bone marrow cultures by the induction of COX-2 and prostaglandins in pre-adipocytes (Yokota *et al.*, 2002).

Data collected among different population indicated strong positive correlation between leptin and insulin concentrations (Kolaczynski *et al.*, 1996). Higher leptin level predicts development of obesity or type-2 diabetes mellitus (Chessler *et al.*, 1998, McNeely *et al.*, 1999). In the light of these observations, it is speculated that elevated leptin levels might signal an increased risk of cerebro-vascular events. Such a link is independent of BMI and other classic risk factors such as age, lipids, blood pressure, CRP etc. It is observed that hyperleptinemia correlate with insulin resistance and bring changes in body weight. Leptin concentration is correlated with CRP because both leptin and cytokines such as IL-6, (which promotes CRP secretion) are produced by adipocytes (Mohamed-Ali *et al.*, 1998). Hyperleptinemia is also a sequel to low-grade chronic inflammation. In this regard, recent evidence suggests that like leptin, CRP also correlates with insulin resistance independently of BMI and the level of inflammatory markers predicts risk of diabetes.

In our study, obese elderly patients had high plasma leptin concentrations in comparison to normal weight elderly. There was a correlation between leptin concentration and obesity index among the subjects. Similarly, plasma levels of adiponectin have a negative correlation with total body fat and with visceral body fat mass. Thus, the regulation of adiponectin secretion is very important in the distribution of visceral adipose tissues. The test formulation checked the accumulation of body fat mass followed by the regulation of leptin and adiponectin secretion by adipose cells. The test formulation included organic extract of *Hippophae rhamnoides*. The ripe fruits of *Hippophae rhamnoides* contain malic acid, oxalic acid, phospholipid, vitamin C, A, B complex, E and K. Other nutrients like fat, protein, organic acids, and flavonoides are also found. The peel of stem and fruit contains 5-HT which is rare occurrence in plant kingdom and responsible for dietary regulation. Several recent studies indicated that *Hippophae rhamnoides* contains biologically active substance, which enhances immunity and reduces the cardiovascular over reactivity (Gupta *et al.*, 1990; Agrawal *et al.*, 2001; Dubey *et al.*, 2005). The therapeutic efficacy of this plant exerted beneficial effect in age related deterioration of cognitive functions (Dubey *et al.*, 2003, Agrawal *et al.*, 2001, 2002). Several studies have shown the anti-inflammatory, anti-anxiety properties and it has capacity to improve overall mental performance particularly memory and attention span (Zhang *et al.*, 1989, Dubey *et al.*, 1990; Chai *et al.*, 1999, Agrawal *et al.*, 2004). The compound extraction of this plant strengthens non-specific immunity (Zhang *et al.*, 1989). The oil has unique anti-aging properties and stimulates tissue regulation (Yu Let *et al.*, 1993; Cheng *et al.*, 2003). It also protected the functional integrity of mitochondria from radiation – induced oxidative stress (Goel *et al.*, 2005; Narayanan *et al.*, 2004).

The plant *Salacia oblonga* has a potent alpha glucosidase inhibiting property and helps in the regulation of body weight. Studies indicated that dietary disogenin found in the plant *Dioscorea bulbifera* have shown lipid lowering, anti-inflammatory and hypoglycemic effects (Sauvaire *et al.*, 1991). In the present study, the test formulation exerted anti-obesity and anti-inflammatory role. As synergistic effect it has shown anti-oxidant and immunomodulatory properties as proven in various studies (Dubey *et al.*, 2008).

It is concluded that test formulation alters the body energy balance through its effects on glucose and fat metabolism. It also suppresses the deposition of visceral fat and improves vascular inflammation and atherosclerosis. The test formulation has potentiality in long term weight control, healthy cardiovascular functions with a better behavior adjustment and cognitive abilities particularly memory performance through regulation of leptin and adiponectin biomarkers of obesity. Such types of beneficial effects are due to presence of one or more bio-active compound. It is proposed that the test formulation is effective in the management of obesity, with the associated dementia and other mental ability improved significantly following the treatment.

Acknowledgement:

The authors are grateful to Prof. R. Sethuraman, Vice Chancellor, SASTRA University, Thanjavur for providing necessary support to conduct present study. The authors are thankful to Drugs & Pharmaceutical Division, Department Science & Technology, Govt. of India, New Delhi for providing financial support in conducting the present study.

The authors also extend thanks to Mr. Ravi Patodia, Director, Tulshi Ayurvedic Products & Research Pvt. Ltd., Bhadohi, for providing standard drug for clinical trial under DST sponsored joint collaborative project.

References

- Agrawal A., Khuntia BB, Dubey GP, Seabuckthorn modulates the mental health status and its effect on immunosenescence among the elderly- A double blind placebo control study. In. *Proceeding of International Workshop on Seabuckthorn*, Eds. Singh, V, Khosla PK, pp-214-220, 18-21, 2001
- Agrawal A., S.P.Dixit, Dubey GP. Medhya Rasayana Property of *Hippophae rhamnoides* (*Hippophae rhamnoides*) in age related cognitive deficits, Âyurvedic conference on Rasayana, Rashtriya Âyurveda Vidyapeeth (National Academy of Ayurveda), Ministry of Health and Family Welfare, Govt. of India, Dhanwantari Bhawan , Road No. 66, Punjabi Bagh (West), New Delhi, 2002.

- Agrawal A, Vasanthi HR, Attrey DP, Dubey GP, An Âyurvedic Drug Therapeutic Strategy in the Prevention and Management of Neuropsychiatric Problems among Elderly. In : Seminar on Hippophae rhamnoides , A resource for Environment, Health and Economy. Organised by : Directorate of Life Sciences, Defence Research and Development Organisation, Chanakya Bhawan New Delhi, 2004.
- Barrett-Connor E, Edelstein SL, Corey-Bloom J, *et al.* (1996). Weight loss precedes dementia in community-dwelling older adults. *J Am Geriatr Soc* 44, 1147-52.
- Baumgartner RN, Heymsfield SB, Roche AF (1995). Human body composition and the epidemiology of chronic disease. *Obes Res*, 3, 73-95.
- Beydoun M.A., H.A. Beydoun and Wang Y. (2008). Obesity and central obesity as risk factors for incident dementia and its subtypes: a systematic review and meta-analysis, Obesity review. *Journal Compilation, International Association for the Study of Obesity*, 9 (3) : 204-218.
- Bowen R, Glicklich A, Kahn M, *et al.* (1997). Cardiac valulopathy associated with exposure to fenfluramine or dexfenfluramine: U.S. Department of Health and human Services Interim Public Health Recommendations. *Morbidity Mortality Weekly report* 46 :1061-6.
- Braak H, Braak E. (1991). Neuropathological staging of Alzheimer-related changes. *Acta Neuropathol Berl*, 82:239-59.
- Brookmeyer R, Gray S. (2000). Methods for projecting the incidence and prevalence of chronic disease in aging populations: application to Alzheimer's disease. *Stat Med*, 19 :1481-93.
- Chai Quiyan *et al.*, The experimental studies on the cardiovascular pharmacology of Seabuckthorn extract form Hippophae rhamnoides In: proceeding of International workshop on Seabuckthorn, Beijing, China, 1999.
- Chandola T, Deary IJ, Blane D, Batty GD. (1958) Childhood IQ in relation to obesity and weight gain in adult life: the national child development study. *Int J Obes* 30:1422-32, 1958.

- Chaudhary OP. (1978). Manual for long term memory. Published by Manovigyanic Parikchhan Sansthan, U.H.B., 28 Sanjay Nagar colony, Chowkaghat, Varanasi.
- Cheng J *et al.* (2003). Inhibitory effects of total flavones of Hippophae rhamnoides on thrombosis in mouse femoral artery and in vitro platelet aggregation, *Life Sciences* 72(20): 2263-2271.
- Chessler SD, Fujimoto WY, Shofer JB, *et al.* (1998). Increase plasma leptin levels are associated with fat accumulation in Japanese Americans. *Diabetes* 47 : 239-243.
- Das UN (2001). Is obesity an inflammatory condition? *Nutrition* 17 : 953-66.
- Dubey G.P., Agrawal A., Rajamanickam G.V., Lavekar G.S. (2008). Brain ageing and Ayurveda, published by Central Council for Reseach in Ayurveda & Siddha, Deptt. Of AYUSH, Ministry of health & family welfare) Government of India.
- Dubey GP, Agrawal A, Gupta BS and Udupa KN (1990). Neurophysiological adaptation following cold stress under the influence of Badriphal (*Hippophae rhamnoides* L.) *Pharmacophytoecologia* 3 : 59-63.
- Dubey GP, Agrawal A, Wilson E, Vyas N, Rajamanickam GV. Novel markers of atherothrombotic risk– Therapeutic benefits. In Second International Conference of The International Society for Âyurveda & Health and International seminar on Chronic Diseases and its Management by Complementary and Alternative Medicine (CAM), organized by Dept. of Medicinal Chemistry, IMS, BHU & University of Connecticut, School of Medicine, USA, 2005.
- Dubey GP, Agrawal A. Memory enhancing potentials of Hippophae rhamnoides (Hippophae rhamnoides)–A placebo controlled study. In: Congress of the International Hippophae rhamnoides Association–ISA. Organized by: International Hippophae rhamnoides Association–ISA German Hippophae rhamnoides Society–Sanddorn e.V. Humboldt- university, Berlin, Technical University, Berlin, 2003.

- Engeli S, Feldpausch M, Gorzelniak K, Hartwig F, Heintze U, Janke J, Mohlig M, Pfeiffer AF, Luft FC, Sharma AM. (2003). Association between adiponectin and mediators of inflammation on obese women. *Diabetes* 52 : 942-947.
- Folstein MF, Folstein SE, McHugh PR. (1975). "Mini-Mental State": a practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 12(3) : 189-98.
- Friedman JM (2000). Obesity in the new millennium. *Nature* 404 : 632-634.
- Funahashi H, Yada T, Suzuki R, Shioda S. (2003). Distribution, function, and properties of leptin receptors in the brain. *Int Rev Cytol*, 224 : 1-27.
- Goel, H.C., Gupta, S., Garg, A.P. and Bala, M. (2005). Protection of mitochondrial system by Hippophae rhamnoides L. Against radiation-induced oxidative damage in mice. *Journal of Pharmacy and Pharmacology* 57 : 135-43.
- Graddock D. (1978). Obesity and its management. 3rd ed. Edinburgh: Churchill Livingstone, 92-109.
- Graf C, Koch B, Kretschmann-Kandel E, Falkowski G, Christ H, Coburger S, et. al. (2004). Correlation between BMI, leisure habits and motor abilities in childhood (CHILT-project). *Int J Obes Relat Metab Disord*, 28 : 22-6.
- Gupta BS, Agrawal A, Dubey GP, Udupa KN (1990). Anti-ageing effect of Badrifal (*Hippophae rhamnoides*) pharmacopschoecologia 3,53-57.
- Gustafson D, Lissner L, Bengtsson C, Bjorkelund C, Skoog I. (2004). A 24-year follow-up of body mass index and cerebral atrophy. *Neurology*, 63 : 1876-81.
- Gustafson D, Rothenberg E, Blennow K, Steen B, Skoog I. (2003). An 18 year follow-up of overweight and risk of Alzheimer disease. *Arch Intern Med*, 163 : 1524-8.
- Gustafson D. (2006). Adiposity indices and dementia. *Lancet Neurol*, 5 : 713-20.

- Gustafson DR, Steen B, Skoog I. (2004). Body mass index and white matter lesion in elderly women. An 18-year longitudinal study. *Int Psychogeriatr*, 16 : 327-36.
- Haynes, WG, Sivitz, WI, Morgan, DA, et al. (1997). Sympathetic and cardiorenal actions of leptin. *Hypertension* 30 : 619-623.
- Hendrie HC. (1998). Epidemiology of dementia and Alzheimer's disease. *Am J Geriatr Psychiatry* 6 S3-18 Suppl.1.
- Hill JO, Hauptman J, Anderson JW, et al. (1999). Orlistat, a lipase inhibitor, for weight maintenance after conventional dieting: a 1-y study. *Am J clin Nutr*. 69 :1108-1116.
- Jefferis BJ, Power C, Hertzman C. (2002). Birth weight, childhood socioeconomic environment, and cognitive development in the 1958 British birth cohort study. *BMJ*, 325 : 305.
- Jurica PJ, Leittern CL, Mattis S. Dementia Rating Scale-2, Professional Manual; Psychological Assessment Resources, Inc, Florida, 2001.
- Kern PA, Di Gregorio GB, Lu T, Rassouli N, Ranganathan G.(2003). Adiponectin expression from human adipose tissue : relation to obesity, insulin resistance, and tumor necrosis factor-alpha expression. *Diabetes* 52 : 1779-1785.
- Kivipelto M, Ngandu T, Laatikainen T, Winblad B, Soininen H, Tuomilehto J. (2006). Risk score for the prediction of dementia risk in 20 years among middle aged people: a longitudinal, population-based study, *Lancet Neurol*, 5 : 735-41.
- Kolaczynski JW, Nyce MR, Considine RV, et al. (1996). Acute and chronic effects of insulin on leptin production in humans: Studies in vivo and in vitro. *Diabetes* 45 : 699-701.
- Maeda N, Shimomura I, Kishida K, Nishizawa H, Matsuda M, Nagaretani H, Furuyama N, Kondo H, Takahashi M, Arita Y, Komuro R, Ouchi N, Kihara S, Tochino Y, Okutomi K, Horie M, Takeda S, Aoyama T, Funahashi T, Matsuzawa Y. (2002). Diet-induced insulin resistance in mice lacking adiponectin/ACRP30. *Nat Med* 8 : 731-737.

- McNeely MJ, Boyko EJ, Weigle DS, *et al.* (1999). Association between baseline plasma leptin levels and subsequent development of diabetes in Japanese Americans. *Diabetes Care* 22 : 65-70.
- Mohamed-Ali V, Pinkney JH, Coppack SW. (1998). Adipose tissue as an endocrine and paracrine organ. *Int J Obes.* 22 : 1145-1158.
- Motoshima H, Wu X, Mahadev K, Goldstein BJ. (2004). Adiponectin suppresses proliferation and superoxide generation and enhances eNOS activity in endothelial cells treated with oxidized LDL. *Biochem Biophys Res Commun* 315 : 264-271.
- Narayanan S, Ruma D, Gitika B, Sharma SK, Pauline T, Sai Ram M, Llavazhagan G, Sawhney RC, Kumar D, Banerjee PK. (2004). Antioxidant activities of seabuckthorn (*Hippophae rhamnoides*) during hypoxia induced oxidative stress in glial cells; 278, No. 1-2 : 9-14.
- Narkiewicz K, Somers, VK, Mos L *et al.* (1999). An independent relationship between plasma leptin and heart rate in untreated patients with essential hypertension. *J Hypertens* 17 : 245-249.
- Olsson GM, Hulting AL, Montgomery SM. (2008). Cognitive function in children and subsequent type-2 diabetes mellitus. *Diabetes Care*, 31:514-6.
- Peterson LRS, Peterson MJ. (1969) Short-term retention of individual verbal items. *J. Exp. Psycho.* 58 : 193-198 .
- Rolls BJ, Shide DJ, Thorwart ML, Ulbrecht JS. (1998). Sibutramine reduces food intake in non-dieting women with obesity. *Obes Res.* 6 :1-11.
- Rosengren A, Skoog I, Gustafson D, *et al.* (2005). Body mass index, other cardiovascular risk factors, and hospitalization for dementia. *Arch Intern Med* 165 : 321-26.
- Rosengren A, Skoog I, Gustafson D, Wilhelmsen L. (2005). Body Mass Index, other cardiovascular risk factors, and hospitalization for dementia. *Arch Intern Med.* 165 : 321-6.
- Sauvaire Y, Ribes G, Baccou JC, *et al.* (1991). Implication of steroid saponins and sapogenins in the hypocholesterolemic effect of fenugreek. *Lipids* 26(3) : 191-197.

- Schmidt R, Schmidt H, Curb JD, Masaki K, White LR, Launer LJ. (2002) Early inflammation and dementia: a 25 year follow-up of the Honolulu-Asia aging study. *Ann Neurol*, 52 : 168-74.
- Shibata R, Ouchi N, Ito M, Kihara S, Shiojima I, Pimentel DR, Kumada M, Sato K, Schiekofer S, Ohashi K, Funahashi T, Colucci WS, Walsh K. (2004). Adiponectin-mediated modulation of hypertrophic signals in the heart. *Nat Med* 10 : 1384-1389.
- Tong S, Baghurst P, Vimpani G, McMichael A, (2007). Socioeconomic position, maternal IQ, home environment, and cognitive development. *J Pediatr* 151 : 284-8.
- Wang SY, (2002). Weight loss and metabolic changes in dementia. *J Nutr Health Aging* 6 : 201-5.
- Whitmer RA, Gunderson EP, Barrett-Connor E, Quesenberry CP Jr, Yaffe K. (2005). Obesity in middle age and future risk of dementia: a 27 year longitudinal population based study, *BMJ*, 330 : 1360.
- Yaffe K. Kanaya A, Lindquist K, Simonsick EM, Harris T, Shorr RI, *et al.* (2004). The metabolic syndrome, inflammation, and risk of cognitive decline. *JAMA* 292 : 2237-42.
- Yokota T, Meka CS, Medina KL, Igarashi H, Comp PC, Takahashi M, Nishida M, Oritani K, Miyagawa J, Funahashi T, Tomiyama Y, Matsuzawa Y, Kincade PW. (2002). Paracrine regulation of fat cell formation in bone marrow cultures via adiponectin and prostaglandins. *J Clin Invest* 109 : 1303-1310.
- Yu Let *et al.* (1993). Effects of Hippophae rhamnoides juice on immunologic and antitumor functions. *Acta Nutrimenta Sinica* 15(3): 280-283.
- Zhang, P.X. Ding, L. Mao, D. Li and L. Li (1989). Anti-tumor effects of fruit juice and seed oil of Hippophae rhamnoides and their influence on immune function. Proc. Int. Symp. Seabuckthorn (*Hippophae rhamnoides* L.), Xian, China. p. 373-381.

An Appraisal of the Role of Pre-retirement Planning in actualization of Well-being Needs of Retirees in Southwestern Nigeria

ADISA Ademola Lateef and AKANMU Olusola Esther

Department of Sociology and Anthropology
Obafemi Awolowo University
Ile-Ife, Osun State, Nigeria

ABSTRACT

The objectives of this paper were three-fold; one, to identify well-being needs that were paramount in the pre-retirement plans of the retirees; two, to examine the methods that the retirees adopted in the attempts to achieve the needs and finally, to evaluate the role of planning in achieving their well-being plans. The study relied on primary data generated from questionnaire survey, Focus Group Discussions (FGDs) and in-depth interviews. In all, the study covered 988 retirees drawn across some retirees' paying centres in Osun State. The data generated by questionnaire were analysed using both descriptive and inferential statistics, while ZY index table was used for the analysis of data obtained through FGDs and in-depth interviews. The study found direct relationships in the plans for desired needs and achievement of eighty percent of the needs; thereby presenting pre-retirement plans as important in facilitating retirement well-being needs.

Key words : Well-being needs, pre-retirement plans.

Many studies, dated and current, have emphasized the importance of planning in guaranteeing, at least, minimum comfort in retirement. For instance, Barfield and Morgan (1969), in a national study and a study of some automobile workers respectively, stressed the overwhelming importance of financial considerations in planning early

retirement. Ogunbameru and Akinyemi (2006) also reported on the financial attitude of some civil servants in Nigeria towards retirement that, generally, some Nigerians believed that they were too young to begin planning, or it was too late, while others viewed financial planning as being expensive. However, as important as planning is to retirement well-being, pre-retirement counseling organized by employers, was for a long time not a part of the culture of work-life in Nigeria. It could then be said that this accounted for Ogunbameru and Akinyemi's findings. In the more recent times, the frequency of retirement has, however, sensitized Nigerians to the need to plan ahead of retirement; especially now that forced/premature retirement has become prevalent in Nigeria.

The explanations for forced/premature retirement can be found in the analysis of Yesufu (1984) that, where employers of labour (mostly government in Nigerian case) have to contend with fluctuating market conditions, labour costs often seem to be the most amenable to control in the short run. That, when faced with declining receipts of profits, an enterprise can do very little in the short run to alter its fixed capital structure and costs or recurrent industrial costs such as fuel, electricity or raw materials. Labour costs, on the other hand, can often be significantly reduced through a judicious application of the principles of redundancy, retirement, reduction in fringe benefits, among others. Additionally, since wages issues have impact upon national economy, they are always of concern to the government.

Modes of disengaging workers across the globe show that mass retirement of workers cannot be said to be a reflection of under-development. Quadagno (1999) for instance, cited that American companies cast off thousands of workers in a frenzy of mergers, acquisitions and downsizing in the 1990s. This recent phenomenon of mass retirement makes pre-retirement planning important both in the developing and the developed countries; even as there are differences in the experiences of Nigerian retirees in relation to their counterparts in the developed world. For instance, Nigerian employers are always complacent toward retirees' problems while the developed economies have provisions for alleviating retirees' problems. Sheehy (1995) pointed

out that in the United States of America, workers can be retired, if prematurely, on the promise of double pensions. If not, social securities and assistance from Non-Governmental Organizations (NGOs), which serve as receptacles for the retired workers, cushion the impact of changes occurring in retirement.

More so, there are jobs called bridge jobs, in which willing, able-bodied retirees are re-employed. In Nigeria, retirement constitutes a big problem, impacting negatively on retirees' sense of well-being, especially as retirement benefits are not paid when due. There are media reports on retirees who collapsed and died while queuing for pensions (Edemodu, 1997; Akinloye, 1998; and Gbenoba, 2003). Poor pay makes savings difficult in Nigeria and assistance from kith and kin seems not forthcoming, thereby necessitating planning. This study attempted to investigate whether planning could facilitate achievement of a number of indices, considered important in the well-being plans of retirees in various locations of study. The indices were derived from the World Bank definition of well-being (2000) and a review of other literatures.

Definitions of Well-being

Just like health, well-being can be a vague concept without a provision for its measuring indices. In the available literatures, many definitions of wellbeing have been given. For instance, well-being can be viewed as command over commodities, or the ability to obtain a specific type of consumption good, such as food and housing. People who lack the capacity to function in society might be said to have lower well-being (Sen, 1987); or, be more vulnerable to income and weather shocks. It can also be a specific type of consumption, for instance, too little food, energy intake, deemed essential to constitute a reasonable standard of living, or lack of inability to function in a society.

Webster's Third New International Dictionary (1961), defined it as a condition characterized by happiness, health or prosperity. According to the World Bank (2000), well-being is "a measure of individual's possession of income, health, nutrition, education, assets, housing and certain rights such as freedom of speech". Building on

this, the following indices were considered to be paramount in the plans for retirement well-being of the retirees:

- (i) How to ensure adequate income for self sufficiency
- (ii) Remaining in good health within the period of retirement
- (iii) Having a good and comfortable home
- (iv) Being able to enjoy adequate rest period or leisure
- (v) Economic independence of children

The adoption of these indices of well-being is also justified in the gerontological literatures; a short review of which is done here.

Income and Retirement Well-being

Streib and Schneider (1971) described income and health as 'the massive situational factors' affecting life satisfaction of older persons. However, Tugbobo (1998) observed that, pensions are not usually paid when due in Nigeria; and in the days of high cost of living, the consequences of the delayed or irregular payments of pensions cannot but be hardship and sometimes, death of pensioners. Furthermore, some empirical studies have reported the influential relationship between income and satisfaction in retirement. For instance, some findings revealed that older adults want financial independence in later years; and that the elderly persons who were better off financially reported higher life satisfaction than those who were not financially strong (Jaslow, 1976; Holahan, 1981; Beck, 1982; Richardson and Kilty, 1989). Other findings affirmed the importance of financial security in retirement (Glamser, 1976; Karp, 1989; Seccombe and Lee, 1986; Ogunbameru, 1988). Richardson and Kilty (1989) even stressed that "retirement is not possible, however favourably one looks at it, without an adequate financial basis". However, this might lead to a situation where one would exchange the concept of retirement planning for financial planning.

Health and Retirement Well-being

The world health Organisation (WHO) (1946) defines health as 'a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity. As the definition has generated so many criticisms so are the effects of retirement on health.

The prevailing opinion among professionals and lay people alike has been that retirement frequently leads to physical deterioration (Donahue, Orbach and Pollak, 1960), but research findings have tended to support the opposing view that retirement might actually improve physical health. These opposing views spurred Ogunbameru (1993) to report his findings on the relationship between retirement and health of 52 retired civil servants in Akure (Ondo State capital) in 1985. He found out that poor health among the retirees was attributed, not to loss of work, but to personal and situational factors such as old age, poor financial state during retirement, involuntary nature of retirement and lack of regular activity. He added that failure to distinguish between voluntary and compulsory retirement in early studies might account for the contradiction in popular belief and actual findings.

A few other research findings, spanning thirty years, supported the hypothesis that poor health only prompts the desire to retire. Shanas (1970) and Atchley (1976a) found a strong relationship between retirement and mental health, were also inconclusive. For instance, in a study of 1,200 old people conducted by Langley Porter Neuro-Psychiatric Institute in San Francisco, evidence was not found to support the assumption that retirement precipitates mental illness in the elderly (Spence, 1966).

Retirement and Housing Problem

Where to live in retirement usually dominates the plans of the individual workers who live in official and rented quarters (Yee and Van Arsdol, 1971; Egbuta, 1991; Ogunbameru, 1996). Quadagno (1999) also described housing as a core component of independent living; an ideal housing policy should provide a continuum of services ranging from programmes for people who are largely independent to institutional care to those fully disabled.

In Denmark, it is a matter of public support 'the old people's possibility of staying in independent homes as long as possible and to maintain the elderly in an active daily life to prevent them from being placed in nursing homes or other institutions' (Plovsing, 1992). Denmark

provides highly coordinated medical, social and community care services for elderly people, retirees inclusive (Plovsing, *ibid*).

The UN-HABITAT II Conference held at Istanbul, Turkey in June 1996 heralded in a renewed advocacy of a new initiative in housing delivery in Nigeria. People began to subscribe to National Housing Fund (NHF), which was established by Decree 3 of 1982. However, the subscribers were disappointed by the upward review on the agreed amounts. Since then, many Nigerians have been suffering from the problems of housing and they are forced to pay high rents in spite of the existence of the State Rent Control and Recovery of Residential Premises.

In 1988, the then Head of State, General Babangida promised that there would be housing for all Nigerians in the year 2000 but according to Sobowale (2008) the deadline has expired and Nigerians are not better housed than in 1988. He blamed failure on non accountability of Nigerian leaders. He expressed that "yet none of the proponents of the scam has the gut to apologise to Nigerians".

Economic Independence of Children and Retirement Well-being

The culture of old age support by the young was very prevalent in the Southwestern region. This was sustained by certain beliefs and practices which, though might not be directed towards caring, but ensured elders' support and well-being. Beliefs and practices such as the extended living arrangement (Buckland and Hardy, 1987); cooperated efforts and familism (Otite and Ogionwo, 1981); ancestral worship (Bussia, 1965), could be said to guarantee elder's well-being. It was obligatory for children to support the old parents; and in spite of the challenges of unemployment, low salaries, among others, children are still obliged to care for their elders. Since caring is built on reciprocal relationships (Buckland and Hardy, *ibid.*), parents make sure they nurture and equip the young for the role through education or other form(s) of empowerment. Shahrani (1981) also found a semblance of culture among some non-Western cultures such as the Kirghiz people of Afghanistan and among the traditional Chinese.

Leisure Enjoyment and Retirement Well-being

A review of Nigerian retirees' perception or enjoyment of leisure shows that, many, especially professionals, still engage in money-yielding ventures in retirement. Akinade (1991) conducted an exploratory study among some retired Nigerian lawyers and found that, many of his respondents were still practicing law to generate income. However, Atchley (1976a) submits that the nature of pre-retirement occupation regulates the opportunity to participate in social activities, especially lecturers whose part of work activities is participation in community development.

Methodology

The study relied on primary data generated from questionnaire survey, Focus Group Discussions (FGDs) and in-depth interviews. The target groups were Federal and Osun State Civil Pensioners. The selection of the respondents was by convenience, but purposive sampling based membership of pensioners' associations. A total sample of 954 respondents was drawn from Association of Pensioners of Obafemi Awolowo University, Ile-Ife (250), and 3 main paying centres of Osun State Civil Pensioners located in Gbongan (210), Osogbo (230) and Ilesha (264). Five sessions of FGDs was by sex (3 sessions for males and 2 for females); and, by literacy (4 sessions for literate group and 1 session for the illiterates). Four in-depth interviews were conducted with 2 members each of the executives of OAU and Osun State Civil Pensioners, Gbongan paying centre. The data were analysed using descriptive and inferential statistics. Data from the FGDs and in-depth interviews were analysed by means of ZY index tables.

Findings and Discussion

Findings will be discussed under three sub-headings, namely: Socio-demographic and economic characteristics of the respondents; hierarchy of the retirees' preferences for well-being indices; and relationship between their preferences, which influenced their plans and met needs.

Table 1: Socio-demographic and Economic Characteristics of Respondents

Sex		
Males	765	80.2
Females	189	19.8
Total	954	100.0
Age		
Young Retirees (49 years and below)	278	29.4
Middle-Aged Retirees (50-59 years)	189	19.7
Old retirees (60 years and above)	485	50.9
Total	952	100.0
Religion		
Christianity	753	81.2
Islam	174	18.8
Total	927	100.0
Marital Status		
Single	27	2.8
Married	876	92.1
Divorced	03	0.3
Separated	15	1.6
Widowed	30	3.2
Total	951	100
Marriage Types		
Monogamy	573	75.5
Polygyny	186	24.5
Total	759	100.0
Number of wives living with male retirees		
One wife	582	79.5
Two wives and above	150	20.5
Total	732	100.0
Number of children of the retirees		
Moderate family size (1-4 children)	483	51.9
Fairly large family size (5-6 children)	258	27.8

Large family size (7-9 children)	114	15.4
Extremely large family size (10children & above)	45	4.9
Total	930	100.0

Number of children living with the retirees

None	03	0.4
1-4	642	84.6
5 and above	114	15.1
Total	759	100.0

Number of the retirees' children working

01	93	19.6
2-4	327	69.0
5-10	54	11.3
Total	474	100.0

Number of the retirees' children seeking employment

01	210	55.1
02	114	29.9
03	36	9.5
04	12	3.2
05	06	1.6
06	03	0.7
Total	381	100.0

Levels of educational attainments of the retirees

No formal education	63	7.0
Primary school and equivalent	57	6.3
Teachers' Grade II and equivalent	87	9.6
Tertiary Institutions	699	77.2
Total	906	100.0

Salary grade levels of the retirees

Grade levels 1-6	57	7.2
Grade levels 7-12	375	47.3
Grade Levels 13 and above	360	45.5
Total	792	100.0

Source: Author's Fieldwork, October, 2005-March, 2006

Hierarchy of the Preferences

This study took a cue from Abraham Maslow's Hierarchy of needs theory (1954) in which Maslow hypothesized that within every human being, there exists a hierarchy of five needs. The need for security and protection from harm makes the safety needs and are the second in the hierarchy. This is followed by social needs, comprising affection, belongingness, acceptance and friendship. Needs for self-esteem include: internal esteem factors such as need for self-respect, autonomy and achievement; and external esteem factors, status and recognition. Lastly, self-actualisation involves the drive to become what one is capable of becoming and this includes achieving one's potential and self-fulfillment.

The retirees were asked how the five indices of well-being were preferred in their plans and this was obtained with the use of Friedman test; which was later converted to percentages for ease of understanding.

Table 2: The Hierarchy of needs in the Plans of the Retirees

Well-being Needs	Allotted Points	Percentage	Distributions
Good health	3,145	28.2	1 st
House ownership	2,328	20.9	2 nd
Adequate leisure	2,274	20.4	3 rd
Economic independence of children	1,785	16.0	4 th
Adequate income	1,623	14.5	5 th

Source: Author's Fieldwork, October, 2005-March, 2006

Table 2 revealed the needs preferences of the retirees in the study areas. Using the Friedman test, the order of preferences was good health with mean rank of 3.69, followed by house ownership (3.12) and adequate rest (3.10). Other needs were economic independence of children (2.66) and sufficient income (2.43). Overall, the Friedman test showed significant difference in the mean ranks ($\chi^2=508.25$, $p<0.05$).

The findings presented health and income at two extreme positions and this is in contrary to equal degree of importance accorded the two by Streib and Schneider (1971). But, a closer examination of the indices will justify Streib and Schneider because money will still be needed in the attainment of the other indices of well-being. An illustration of this is that, if a retiree has insufficient money, feeding and housing will be poor, and poor feeding and poor housing will affect health.

The study relied on self-appraisal of the state of health by the retirees because in the illness behaviour of the people of the region, hospital patronage cannot be used to appraise health. Their belief in multiple causes of ailment, natural, preter-natural and supernatural, makes them to seek health in many care-giving centers, which are not necessarily hospitals.

Culturally among the Yoruba people of Southwestern Nigeria it is a disgraceful act if a man is living in his wife's house or in the house of the wife's relation; patrilocal residence is preferred. It was then not a surprise to find a significant difference between male retirees' preference for personal house and females' ($t=-4.09$, $p<0.05$).

The FGD results, however, indicated a slight variation in the ranking of needs. House ownership ranked highest, followed by good health, sufficiency of income, economic independence of children and food. The topmost ranking accorded good health and house ownership could just be a reflection of their old-age status. In all, the retirees' preferences were influenced by their socio-demographic characteristics. On preference for good health, there was no significant difference by age ($t=-4.09$, $p>0.05$), but significant by sex ($t=2.36$, $p<0.05$). Women retirees were found to be much more concerned about good health in their well-being plans than men. With respect to preference for house ownership, there was a significant variation by age ($t=-7.03$, $p<0.05$) and by sex ($t=-2.77$, $p<0.05$). The much older retirees (65 years and above) and women retirees were more interested in house ownership than those below 65 years and men. Furthermore, the study showed significant variations in the choice of good health by marital status ($F=3.63$, $p<0.05$) and house ownership ($F=3.33$, $p<0.05$). However, no significant difference was found in the desire for economic independence of children by marital status ($F=1.45$, $p>0.05$).

Virtually all the retirees (94.5%) relied on personal, individual level planning as their work organisation did not organize pre-retirement counseling for them. A few other things which became manifest on pre-retirement planning among the retirees are: Low education turned out to have positive effects; those categorized as retirees with low education (Level of education terminating before tertiary education) specified that the fear they had over low salary made them to be very conscious of the need to plan ahead of retirement and they have all along being closer to land (farming) than the highly educated (Retirees with tertiary education). The fairly and relatively higher salary gave them confidence which made to procrastinate and eventually miss out on achievement of some well-being needs. Higher percentage of those with high education, 62%, had greater number of un-met needs than those with low education (48%).

Table 3: Well-being Needs Preferences of FGD Participants and Interviewees

Well-being Needs	OAU Male Retirees	OAU Female Retirees	Osun Male Retirees	Osun Female Retirees	Illiterate Osun Male Retirees
Money	++	+	+	+	+
Food	-	+	-	+	++
Good health	++	++	++	++	++
Personal house	++	++	++	++	++
Economic independence of children	+	+	-	++	++

Source: *Field Survey, October, 2005-March, 2006*

Note: + indicates well-being was identified
 ++ emphasis was placed on an index
 - indicates an index was not identified.

Met and Unmet Needs of the Retirees

Efforts were made here to examine whether the preference table will reflect what the retirees were able to achieve as in tables 2 and 3.

Table 4: Met Needs of the Retirees

Met Needs	Percentage Distributions
Good health	71.2
House ownership	56.0
Adequate leisure/rest	45.4
Economic independence of children	49.7
Adequate income	26.2

Source: Author's Fieldwork, October, 2005-March, 2006

Table 4 presents direct relationship between the desires and achievement of all the indices, except enjoyment of rest/leisure. The findings affirmed the popular slogan, "Who cares wins". It can be concluded that setting goals assisted the retirees too to achieve their well-being goals just as it works for work organisations. Their love and desire for the well-being goals could be said to account for the corresponding percentages between desire for and actual attainment/enjoyment of the needs. As companies adopt some principles, it is deemed important to examine what the retirees adopted as efforts to achieve well-being in retirement.

In all, 61.9% of the retirees claimed to have pleasant retirement, and this was supported by the following: 92.1% still had their marriages intact; 71.2% claimed to be in good health. This could also be a derivative of the findings that 91.7% were not alcohol; 49.7% had children who were already working, and 28.0% had multiple sources of income.

The seeming inability to enjoy adequate rest/leisure might be explained by probable commitment to former work; as Bell (1975) stressed that the greater the pre-retirement commitment of any person to the work role the greater the desire to re-engage in work activity. Miller (1965) pointed out that there is yet to be an ethic, which makes full-time leisure acceptable; hence their avoidance of idleness. Additionally, state of well-being is relative; even as majority claimed to

have pleasant retirement experiences, 61.9%, many might still be striving to attain higher level of well-being. Finally, the age distribution of the retirees in which 49.1% were yet to attain age of 60 years and could still engage in economic activities could explain non-enjoyment of leisure, especially not only to avoid idleness but to make ends meet.

Conclusion and Recommendation

The corresponding percentages in the desire and plans and actual achievement of majority of the well-being indices justifies the slogan: "He who cares wins"; and this suggests that planning, whether externally or induced by oneself, should be encouraged among retirees in the region.

References

- Akinade, E. A. (1991), "Retirement and Civil Servants: A Monograph". Lagos: Lagos State University.
- Akinloye, M. (1998), "Retirement: A Blessing or a Curse?" *Nigerian Tribune*, July 2, p. 7.
- Atchley, R. (1976) *The Sociology of Retirement*. New York: Schenkan.
- Barfield, R. E. and Morgan, J. N. (1969), *Early Retirement*. Ann Arbor: University of Michigan Press.
- Beck, S. H. (1982), "Adjustment to and Satisfaction with Retirement", *Journal of Gerontology*, 327, pp. 616- 624.
- Buckland, S. and Hardy, M. (1987), *Extended Household: New income Households in Affluent Villages*. Mimeo: University of Surrey.
- Bussia, K. A. (1965), *The Ashanti in African Worlds*. Daryll Forde.
- Donahue, E., Orback, H. L. and Pollak, O. (1960), "Retirement: The Emerging Social Pattern". In C. Tibbits (ed.) *Handbook of Social Gerontology*. Chicago, University of Chicago Press.
- Edemodu, A. (1997), "Society's Elderly Burden" *The Guardian on Sunday Magazine*, p. 13

- Egbuta, I. (1991), *Thinking of Your Retirement: A Guidance in Retirement Planning*. Lagos: Ages Nigeria Ltd.
- Gbenoba, A. (2003), "Nigerian Pensioners: Suffering and Dying" *Sunday Tribune*, December 28, p. 9.
- Glamser, F. D. and De-Jong, G. F. (1975), "The Efficiency of Pre-retirement Preparation Programmes for Industrial Workers", *Journal of Gerontology*, Vol. 30, September, pp. 595-600.
- Holahan, C. K. (1981), "Life Achievement Patterns, Retirement and life Satisfaction of Gifted Aged Women", *Journal of Gerontology*, 36, pp. 741-749.
- Jaslow, P. (1976), "Employment, Retirement and Morale among Older Women", *Journal of Gerontology*, 31, pp. 212-218.
- Karp, D. A. (1989), "The Social Construction of retirement among Professionals 50-60 years old", *The Gerontologists*, 29, pp. 750-760.
- Maslow, A. H. (1954), *Motivation and Personality*. New York: Harper and Row.
- Ogunbameru, O. A. (1988), "Personal and Social Crisis of Civil service Retirement: The Case of Ondo State", *Ph. D. Dissertation*, submitted to the Department of Sociology and Anthropology, Obafemi Awolowo University, Ile-Ife.
- . (1995), "The Relationship between Health and Retirement: Evidence from Ondo State, Nigeria". *The Journal of Applied Social Sciences*. Vol. 17, 1, pp. 43-56.
- . (1996), "Retirement: On the Need for Planning Policy at the Local Government in Nigeria" *Ife Social Science Review*, 13, 3, 1&2, pp. 78-83.
- Ogunbameru, O. A. and Akinyemi, A. I. (2006), "Financial Planning Attitude towards Retirement among Lagos State Civil Servants, Nigeria", *Journal of Retirement Planning*, Vol, 9, 5, pp. 29-32.
- Otite, O. and Ogionwo, O. (1980), *An Introduction to Sociological Studies*. Ibadan: Heinemann.

- Plovsing, J. (1992), "Home care in Denmark" *Danish Institute of Social Research*, Denmark: Copenhagen.
- Quadagno, J. (1999), *Aging and Life Course: An Introduction to Social Gerontology*, USA: McGraw-Hill.
- Richardson, V. and Kilty, K. M. (1989), Retirement Financial Planning among Black Professionals, *The Gerontologists*, 29, pp. 32-36.
- Secombe, K. and Lee, R. (1986), "Gender Differences in Retirement Satisfaction and its Antecedents", *Research on Aging* 8, pp. 426-440.
- Sen, A. (1983), "Social Theory, Social Understanding and Political Action". In C. Lyoyd (ed.) *Social Theory and Political Practice*. Oxford: Clarendon Press.
- Shanas, E. (1970), "Health Research on Aging and Adjustment in Retirement" *Gerontologist*, 10, pp. 19-21.
- Sheehy, G. (1995), *New Passages: Mapping Your Life across Time*, New York: Random house.
- Sobowale, D. (2008), "The Great Deceit Called Vision 2020, *National Life*, Sunday, September 28, p. 28.

Differential Stress and Subjective well-being as Determinants of Quality of Life among aged

Jaishree Sharma and Ravi Sidhu

Department of Home Science
Dayalbagh Educational Institute, Agra

ABSTRACT

Stress is the non specific result of demands upon the person. A multitude of seemingly dissimilar situations and events can produce stress. A wide range of stresses are experienced in old age, which may be physical, financial, social and family. Subjective well- being is effected by loss of autonomy and environmental mastery, deterioration in family relationships and shrinking social network of the aged. However stress and poor subjective well-being can affect the quality of life of an individual. High levels of stress predispose a person to physiological illness and mental agony. It increases the risk of various chronic old age disorders which include arthritis, cardio-vascular disorder and diabetes to name a few. Stress and poor SWB are thus limiting and restricting factors that can influence the quality of life, by determining the life he is capable of leading, the resources available for his use which include material and non-material both. The two variables together determine the state of mental and physical well-being and thereby quality of life. The present investigation is a study of stress and subjective well- being (SWB) among 65-85 years old men and women. The investigator used self-constructed tools to study subjective well- being and stress. Six components of SWB studied were the same as given by Ryff (1995). Six types of stress were assessed namely self-concept stress, physical stress, family stress, financial stress, role stress and social stress. The study was conducted on 100 aged people selected randomly. Results reveal that males have better SWB and less stress than females and aged with spouse have better SWB and less stress than aged without spouse. When the level of stress increases there is a decline in subjective well-being. Old age is a

time when a person loses his capabilities which increases stress level among them which further affect their SWB. Hence an attempt has been made to study the stress and SWB of aged as they determine his quality of life.

Key words : Stress, Subjective well-being, Quality of life, Aged.

The ageing process is a biological reality that has its own dynamics, largely beyond human control. The age of 60 or 65, roughly equivalent to retirement age in most of the societies is said to be the beginning of old age. In order to understand the life of an aged, one has to perceive both aspects of life, positive (SWB) and negative (stress). A significant source of stress for elderly person is the confrontation of repeated losses, loss of primary control over decision-making, concerning health, mobility, living situations and finances which in turn affect the person's social support system. These losses require adaptiveness of the survivor.

All human being are exposed to stress. The nature of the stressor and the way a person copes with these continually change as he or she grows older. Many studies investigating stress in later life focus upon the relationship among life event, social support, and psychological distress. One consistent finding is that the adverse effects of stress are lower for those who have strong social support systems. Chronic exposure to stress decreases a person's efficiency in aspects of life that may be unrelated to the actual stressor. The older person has had more stress placed on his body during his lifetime. After the prolonged exposure to stress, his resistance breaks down and exhaustion sets in. Since major life stresses and changes tend to pile up in the later adult years, it is more likely that the abilities of aged to handle change may be tested beyond his or her limits and that a serious and even terminal illness may result. All these changes due to stress contribute to lower SWB among aged.

Subjective well- being (SWB) is an attempt to understand people's evaluation of their life. These evaluations may be primarily cognitive (life satisfaction) or may consist of the frequency with which people experience pleasant emotions (joy) and unpleasant emotions (depression). SWB refers to how people evaluate their lives and include variables such as life satisfaction, environmental mastery, lack of depression and anxiety and positive mood and emotions. A person's evaluation of his or her life may be in the form of cognitions (when a

person gives conscious evaluative judgments about his or her satisfaction with life as a whole) or evaluative judgments about specific aspects of his life (such as recreation). However the evaluation of one's life also may be in the form of affect. Thus a person is said to have high SWB if she or he experiences life satisfaction and frequent joy and only infrequently experiences unpleasant emotions such as anger and sadness. A person is said to have low SWB if he or she is dissatisfied with life, experiences little joy and affections and frequently feels negative emotions such as anxiety.

Stress and SWB can affect the quality of life of an individual. The decline in physical health which accompanies aging may be the most severe stressor the elderly experience (Lieberman 1982). High level of stress predisposes a person to physiological illness and mental agony. It increases the risk of various chronic old age disorders which include arthritis, cardio-vascular disorder and diabetes to name a few, it also includes the loss of neurons and increases in abnormal substances in the brain such as B-amyloid plaque, Lewy bodies and neurofibrillary tangles. The behavioural consequences of these physiologically based changes include slowed speed of responding and mild memory impairment (Woodruff-Pak and Hanson 1995).

Losses they have experienced in old age may be another cause of stress. Social and economic losses felt as a result of retirement and the loss of identity from the work role may be felt especially strongly by aged who previously has experienced a position of power and prestige in this community. All these contribute to lower SWB as it is affected by loss of autonomy, environmental mastery, happiness and self acceptance and thereby quality of life.

Old age is a time when a person loses his capabilities which increases stress level among them which further affects their SWB. Hence an attempt has been made to study the stress and SWB of aged as they determine his quality of life.

Objectives

1. To study the subjective well-being (SWB) of the aged with respect to sex and living status of spouse.

2. To study the level of stress among aged with respect to sex and living status of spouse.
3. To correlate stress and subjective well-being among aged.

Methodology

Sample: - A sample of 100 aged people between the age range of 65-85 years was selected by multistage stratified random sampling technique. The sample was drawn from Hariparvat and Chatta ward of Agra City.

Instrument: - A personal bio data sheet was prepared to seek information such as age, sex, education, source of income and living status of spouse. A self made questionnaire was used to assess stress and SWB. Sixty item of SWB with 10 statements on each component was prepared. In stress scale each type of stress has 20 items. The calculated reliability and validity of questionnaire to assess stress was 0.87 and 0.81. The reliability and validity on SWB scale was 0.88 and 0.85 respectively.

Data collection: - The investigator went to each subject individually to explain them about the purpose of study and to assure them that their responses would be kept confidential.

Results

Table 1. Showing the mean, SD and 't' values for SWB scores of the aged males and females

Components of SWB	Sex of the Respondents				Statistical values 't'
	Male		Female		
	Mean	SD	Mean	SD	
Purpose of life	17.13	4.28	15.54	3.95	1.703
Environmental mastery	19.65	5.24	15.54	3.62	3.803*
Happiness	21.94	6.51	18.46	6.16	2.492*
Autonomy	20.69	5.88	18.86	4.36	1.492
Self Acceptance	21.86	4.44	23.57	4.86	1.684
Trusting ties with others	21.13	6.78	18.11	6.66	2.010*
Total SWB	122.40	24.71	110.07	18.43	2.390*

* P<0.05

It is evident from the table that males were significantly better than females on environmental mastery, happiness, trusting ties with others and total SWB, on the other in components of SWB no significant difference existed between the respondents of both the sexes.

Table 2. Showing the mean, SD and 't' values on SWB in two groups of aged.

Components of SWB	Spouse status of the respondents				Statistical values 't'
	With spouse		Without spouse		
	Mean	SD	Mean	SD	
Purpose of life	17.45	4.36	15.31	3.07	2.490*
Environmental mastery	19.34	5.04	17.00	5.09	2.221*
Happiness	22.09	6.48	18.97	6.34	2.329*
Autonomy	21.53	5.44	17.78	4.93	3.421*
Self Acceptance	21.77	4.26	23.36	5.05	1.674
Trusting ties with others	22.05	6.58	17.14	6.25	3.647*
Total SWB	124.23	23.84	109.56	20.55	3.101*

* P<0.05

Table 2 reflects the mean, SD and 't' values of both groups (aged with spouse and aged without spouse). The table indicates that the aged with spouse have better SWB than their counterparts, and this difference is significant for all the components of subjective well-being.

Table 3. Showing the mean, SD and 't' values on six type of stress in aged males and females.

Types of Stress	Sex of the respondents				Statistical values ‘t’
	Male		Female		
	Mean	SD	Mean	SD	
Self concept	40.96	9.50	46.71	7.69	2.855*
Physical	41.25	10.18	45.93	8.94	2.132*
Social	41.64	9.70	45.21	9.55	1.659
Role	42.64	9.17	43.21	8.78	0.282
Family	43.88	8.93	48.07	8.28	2.148*
Financial	43.92	9.30	45.75	9.49	0.879
Total stress	254.28	49.09	274.89	45.94	1.918

* P<0.05

Total scores obtained on six types of stress are shown in the above table. The mean values on all type of stress are higher in females than males. Calculated 't' values show significant difference on self concept stress, physical stress, and family stress, but remaining types of stresses show insignificant difference.

Table 4. Showing the mean, SD and 't' values on six type of stress among aged with and without spouse

Types of Stress	Spouse status of the respondents				Statistical Value 't'
	With spouse		Without spouse		
	Mean	SD	Mean	SD	
Self concept	40.64	9.39	46.00	8.35	4.350*
Physical	40.17	10.56	46.81	7.47	3.335*
Social	40.95	10.31	45.64	7.96	2.362*
Role	40.64	9.42	46.64	6.89	3.351*
Family	42.98	9.01	48.72	7.56	3.235*
Financial	42.86	9.62	47.22	8.24	2.288*
Total stress	248.25	50.06	281.03	39.46	3.302*

* P<0.05

The total level of stress among the aged with and without spouse is shown in table 4. The calculated 't' value shows significant difference between two groups on all type of stresses.

Table 5 : Showing the mean, SD and 't' values on total level of stress with various components of SWB in aged

Parameters	Statistical values			
	Mean	SD	r	t
Total stress	260.05	49.11	-	-
Purpose of life	16.68	4.25	- 0.631	8.052*
Environmental mastery	18.50	5.18	- 0.577	6.994*
Happiness	20.97	6.60	- 0.658	8.650*
Autonomy	20.18	5.56	- 0.589	7.215*
Self Acceptance	22.34	4.62	+ 0.194	1.958
Trusting ties with others	20.28	6.88	- 0.719	10.241*
Total SWB	118.95	23.78	- 0.729	10.543*

* P<0.05

Table 5 shows the inter correlation between total level of stress and the six components of SWB. Tables indicate significant relationship of stress with purpose of life, environmental mastery, happiness, autonomy, trusting ties with others and total SWB. Only one component (self acceptance) is insignificantly related with stress.

Discussion

Findings of the study show lower level of SWB in females than males. Older women reported significantly lower SWB and poor self concept than males when studied by Pinquart *et al.* (2001) and Prakash (1998). On the other hand French *et al.* (1995) reported that well-being appeared to be greater among women than among men. Perhaps the better social support available in west could be the reason for this difference in the results.

Many women are left to live alone in old age due to widowhood. There is a heightened tendency of women to widowhood; being younger than the men they marry. Over 80% of the women over the age of 75 are single, widowed or divorced (Bond *et al.*, 2000). At this stage, life without spouse affects the level of well-being. As reported by Jerrome (1983) youngsters have a higher tendency to make contacts with people outside their family. Infact some of the contacts outside family are relatively very important, especially contacts with people of the same age, interest and position in life. As a result loss of spouse in younger years is not a very heavy loss as establishment of other social interaction possibility exists, which gradually decline with progression in age. Perhaps the present result reflects the weak family relationships which results in a sense of isolation among widowed elderly people thus contributing to reduced subjective well-being. Infact Leslett (1976) feels that if an aged wants to lead a happy life he often prefers to live close to but separate from his children. Even widowed people often maintained their own households.

Females show higher stress than males. Mostly older females are living without their spouse and have more stress because their life is totally dependent on the family. If the trust she has on her family member is low she is likely to have more stress. She may even doubt their positive moves as an attempt to deprive her of her right to exercise control over her moveable/immovable assets. Stress can also results

from the individual's confrontation with one's decreasing capacities and the poor possibility of undoing the mistakes committed in one's life time. It is also the outcome central to Erikson's description of the last task of life as achievement of integrity versus despair (Erikson, 1950).

Stress affects the quality of life of aged; because stressed aged loose their memory, lose control of their bodily functions and show a number of psycho-somatic symptoms which interfere with their functioning ability.

Ageds who are without their spouse have more stress. Sapolsky (1998) reported that half of the aged without social support were dead within five year of stress which is three times higher than those with a spouse. Perhaps ageds without their spouse are deprived of a soul mate with whom they can share their adversities and decide upon the course of action to wriggle out of the difficulties. Further, their social life is already narrowed by loss of work associates, death of spouse or friends (Bond, 2000). The present results report higher physical stress among aged without spouse, similar findings have been reported by Chakraverty (2001) Sushma *et al.* (2002) and Surender *et al.* (1998) who indicate that the negative life events, like widowhood might trigger the intensity of health problem and stress.

The results show that when stress increases the level of SWB is lowered. This is due to mismatch between the demand of environment and the individual's perceived ability to cope. Modernization is the major cause of stress in old age. In older days aged were non-literate in its culture, agrarian in its economy, extended in its family structure, and rural in residence. The old were few in number but their authority was very great. Within the extended family the aged monopolized powers; within an agrarian economy they controlled the land. A traditional culture surrounded them with an almost magical mystique of knowledge and authority. Further, modernization created pressures toward retirement, forced people out of the most values and highly regarded roles, deprived them of utility, curtailed their income and lowered their status. Modern economic technology created new occupations and transformed most of the old ones, which also meant loss of jobs, incomes and status of aged.

Thus, it can be concluded that changed family settings and modernization plays an indirect role in lowering the SWB in aged and increasing their stress levels. The growth of mass education and literacy means that there can be no mystique of age and no reverence for the aged on account of their superiority of knowledge and wisdom (Fischer 1978).

Thus it may be concluded that stress is on the rise as one advances in age which partially or wholly along with subjective well-being determines the quality of life. The quality of life is in no way less affected by the socio-cultural dimension which is dynamic and ever evolving in nature.

References

- Bond, J. & Coleman, P. *Aging in Societies, An Introduction to Social Gerontology*. Sage Publication, London, 1990.
- Chakravarty, J. (2001). Combating Problems of Widows. *The Indian Journal of Gerontology*, 4 : 53-65.
- Erikson, E.H. Reflections on Dr. Borg's Life Cycle. In: Erikson, E.H. (ed). *Adulthood*. Norton, New York, 1950.
- Fischer, D.H. *Growing old in America*. Oxford University Press, New York, 1978.
- French, Sheryl C., Gekoshi, William, C. & Knox. V. (1995). Gender difference in relating life events and well-being in elderly individuals. *Social Indicators Research* Vol 35 (1) : 1-25.
- Jerrrome, D. (1983). Lonely Women in a Friendship Club. *British Journal of Guidance and Counselling*, 11.1: 10-20.
- Leslett, P. (1976). *Societal Development and Aging*. In: Bin stock, R.H. and Shanas, E. (eds) *Handbook of Aging and the social sciences*. Van Nastrand Reinhold. New York pp. 86-116.
- Lieberman, M.A. The Effects of Social Support on Responses to Stress. In L. Goldberger and S. Breznitz (Eds.), *Handbook of Stress: Theoretical and Clinical aspects*. New York: Free Press, 1982.
- Pinquart, Marlin & Sorensen, Silvia. (2001). Gender difference in self concept and psychological well-being in old age. A meta analysis. *Journal of Psychological Sciences and Social Science*, 56B(4) : 195-213.
- Prakash, I.J. Aging Indian women, Public health Implications of aging in India, *Indian Council of Medical Research*, 187-99, 1994.
- Ryff, C.D., & Keyes, C.L.M. The Structure of Psychological Well-being Revisited. *Journal of personality and social psychology*, 69, 719 – 27, 1995.
- Sapolsky, R. *Why Zebras Don't Get ulcers*. New York W.H. Freeman & company, 1998.
- Surender, S., Vaithilingam, M. & Khan, A.G. (1998). Distress of the elderly widows in rural Tamil Nadu. *Research and Development Journal* 2 : 41-45.
- Sushma, S., Savita, V. and Darshana, S. (2002). Psychological Problems of Aged Widows in Rural Communities of Haryana. *Indian Journal of Gerontology* 12 : 1-4.
- Woodruff-Pak, D.S., and Hanson, C. Neuronal plasticity, brain compensation, and brain memory systems. In R.Dixon & L.Backman (Eds.), *Psychological Compensation: Managing Losses and Promoting Gains*, pp 191-217. hillsdle, NJ: ERLBAUM, 1995.

Determination of Psychological Well being Status among Older Persons in Northern Peninsular Malaysia

**Yadollah Abolfathi Momtaz, Nurizan Binti Yahaya and
Tengku Aizan Binti Hamid**

Institute of Gerontology, University Putra Malaysia

ABSTRACT

To determine the psychological well-being status and identify predictor variables significantly contribute towards the psychological well-being among older persons in Northern Peninsular Malaysia. A cross-sectional predictive correlational design was used for this study. The population comprised of 385 older persons with an average age of 69.3. Respondents completed a questionnaire booklet containing sociodemographic variables; self rated health, WHO-5 Well-Being Index, Intrinsic/Extrinsic-Revised Scale (I/E-R), Duke Social Support and Stress Scale and WHODAS II 12. The Statistical Package for Social Sciences (version 11.5) was used for data analysis. A total of 62.6 percent of elderly persons had good psychological well being status. Results of multiple regression analysis by enter method revealed that 46.3% of variance in psychological well being was explained by all predictor variables of the study. In addition, stepwise multiple regression analysis indicated seven significant predicting variables and measures namely physical health, disability, religiosity, social support, gender, housing quality, and employment status contributed to psychological well being. It is found that chronological age is not the cause of declining in psychological well being so psychological well being among older persons can be maintained and enhanced on condition that their social and physical needs are met well.

Key words : Psychological well-being, Social needs, Physical needs, Older persons.

Worldwide, the proportion of people age 60 and over is growing faster than any other age group. Between 1970 and 2025, a growth in older persons of some 694 million or 223 percent is expected. In 2025, there will be a total of about 1.2 billion people over the age of 60. By 2050 there will be 2 billion with 80 percent of them living in developing countries (WHO, 2002).

Malaysia, just like other countries in the world, has been experiencing improved health, longer life expectancy, and low mortality as well as declining fertility. The effect of all these changes has brought about a change in the demographic profile of its population and by year 2020 will be a matured society with 9.5% of population aged 60 and above. The changing demography affects not only individuals, but also families, communities and societies. Thus, it requires the immediate attention of policy-makers world-wide (Ong, 2001).

This increased numbers of older persons has been resulted in international interest in the measurement and improvement of psychological well-being in old age. It is one of the most important and significant aspects of life among older persons (Ingersoll-Dayton, Saengtienchai, Kespichayawattana, Aungsueroch, 2001). Psychological well being as an indicator of the quality of life of older adults and successful aging has been a focus of empirical study by gerontologists for decades (Jeffrey & Chatters, 1998). Psychological well-being is an individual's global judgment about the quality of life that can function as a coping mechanism to mediate life stress. Results of the studies revealed a clear tendency for individuals with high levels of psychological well-being to engage in positive activities when managing daily stress, to have a positive self-regard, and a sense of competence and control (Arunya & John, 2005).

Studies show high well being is as an indicator of successful aging (Smith, Borchelt, Maier & Jopp, 2002). In addition, Hajime, Chieko, Yasuyuki, Hiroki, and Takao (2006) found that there is a significant and independent association between a low level of psychological well-being and the risk for all-cause mortality. Furthermore, other studies show that psychological wellbeing is an important predictor for staying

physically active at advanced ages (Andrews, 2001) and elderly people with high psychological well being feel more confident in their ability to face challenges and may be better able to identify specific ways to respond to events of life. In addition, a number of recent studies as well as in the recent WHO active ageing policy framework have noted that that psychological well-being associated with successful and active ageing (Phillips, Siu, Yeh, Kevin, & Cheng, 2005). Conversely, Jin and Zhang (1998) based on LISREL analysis of survey data from 1433 individuals in China found that poor psychological well being is a much strong predictor of suicidal ideation.

Many studies in the field of gerontology, have examined relationship between psychological well being of older persons and a set of independent variables. These variables may include physical activity (Brown, 1992; Ruuskanen & Ruoppilla 1995; Netz, Wu, Becker & Tenenbaum, 2000), physical health (Heidrich, 1993; Helvik, Jacobsen & Hallberg, 2006; Greenfield & Marks, 2007), social and family support (Silverstein & Bengtson, 1994; Keiko, Junko & Makiko, 1997; Rowe, Conwell, Schulberg, Bruce, 2006; Silverstein, Cong, & Li, 2006; Yoon & Lee, 2007; Wong, Yoo, & Stewart, 2007), religiosity (Bolger, 1997; Ellison & Wulff, 1999), work status (Shams & Jackson, 1994; Mackenzie, Rajagopal, Meibohm, & Lavizzo-Mourey, 2000; Moen, 2003; Jacquelyn & Avron, 2006), income (Masuchi & Kishi, 2001), and marital status (Thomas, Gloschen, Shirley, & Bryant, 1988; Skolnik & Heidi, 1997; Masuchi & Kishi, 2001), childlessness (Zhang, 2001; Chou & Chi, 2004; Zhang & Liu, 2007), housing quality (Evans, Kantrowitz & Eshelman, 2002) and gender (Pinquart & Sorensen, 2001). As cited, psychological well being was influenced by varied factors, however it doesn't explain how much of the variance in psychological well-being. In addition, there were few empirical studies on the psychological status of older persons in Northern Peninsular Malaysia. Thus this study will identify factors influencing psychological well being among Malaysian's elderly in order to develop a model that describes factors associated with the psychological well being of the older persons. The findings are hoped

to be used as reference to provide information to the gerontological service agency in the planning of psychological service for older persons.

Objectives

1. To determine the psychological well-being status among older persons in Northern Peninsular Malaysia
2. To identify predictor variables significantly contribute towards the psychological well-being among older persons in Northern Peninsular

Theoretical framework

Social production function theory is used in conceptualization, measurement, and explanation of psychological well-being. This theory states that people create their overall well-being by trying to optimize achievement of universal goals within the limitations that they are facing (Nieboer, Lindenberg, Boomsma, & Van Bruggen, 2005). The social production function (SPF) theory views humans as actively attaining their ultimate goal of psychological wellbeing, using different resources to fulfill instrumental goals and universal needs (Meertens, Scheepers, & Tax, 2003).

According to the SPF theory, psychological well-being comprises of two dimensions: physical and social well-being. Both dimensions can be achieved through the attainment of goals. For physical wellbeing these goals are stimulation and comfort. Stimulation refers to activities that produce arousal, including mental and sensory stimulation and physical effort, and comfort refers to the absence of thirst, hunger, pain, fatigue, etc. (Van Bruggen, 2001). For the enhancement of physical well-being, it is assumed that people seek both comfort (i.e., reduction in noxious stimuli) and stimulation both physically and mentally (Nieboer et al., 2005).

In social well-being, three universal instrumental goals are specified: status, behavioral confirmation, and affection. Status (i.e., distinction in valued aspects, such as skills, education, and wealth) refers

to a relative ranking mainly based on control over scarce resources such as money and education. Behavioral confirmation includes belonging and doing things right, refers to one's belief that they have done the right thing in the eyes of relevant others. Affection includes love, friendship and emotional support, and is to a large extent provided in caring relationships (Nieboer & Lindenberg, 2000). Psychological or subjective well-being is seen as an overall state of well-being that is determined by success in obtaining affection, behavioral confirmation and status for social well-being; and comfort and stimulation for physical well-being. People have multiple means for reaching each of these goals and they also use a variety of means simultaneously, thus building buffers against loss of subjective well-being should a particular means become inaccessible for whatever reason (Steverink & Lindenberg, 2006).

In fact, in SPF theory, psychological well-being is the extent that the universal needs of physical well-being and social well-being are met. SPF theory assumes that people produce their own well-being by trying to optimize their achievement of universal needs. Humans choose cost-effective ways to produce well-being in order to achieve the satisfaction of their needs (Sarris, Soulis, & Yfantopoulos, 2001).

A cross-sectional predictive correlational design was used to determine psychological well being. This method attempts to explore what factors predict dependent variable (Diem, 2002). This kind of study is used where researcher are interested in finding whether individuals retain their relative standing, or rank order, relative to others, over time (Slater and Bremner, 2003).

Method

Sample

385 males and females aged 60 and above from Northern provinces Malaysia were randomly selected through a stratified random sampling.

Table 1. Descriptive characteristics of sample (percent)

Variable		Gender		Total
		Male	Female	
Ethnicity	Malay	85.6	81.3	83.4
	Chinese	8.6	6.1	7.3
	Indian	5.3	12.1	8.8
	Others	0.5	0.5	0.5
Marital status	Now married	86.1	30.3	57.4
	Never married	1.1	0.0	0.5
	Divorced/ Separated	1.6	3.0	2.3
	Widowed	11.2	66.7	39.7
Employment status	Employed	36.4	9.6	22.6
	Un Employed	63.6	90.4	77.4
Level of education	Schooling	87.1	51.5	68.7
	No schooling	12.9	48.5	31.3
Stratum	Rural	83.2	87.6	14.5
	Urban	16.8	12.4	85.5
Age group	Young – old(60-74)	79.1	75.8	77.4
	Old – old(75- 84)	18.7	21.2	20.0
	Oldest – old(>84)	2.1	3.0	2.6

Tools and Data Collection

All respondents completed a questionnaire booklet containing sociodemographic variables; self rated health, WHO-5 Well-Being Index, Intrinsic/Extrinsic-Revised Scale (I/E-R), Duke Social Support and Stress Scale and WHODAS II 12.

1. The WHO-5 Well-Being Index

The WHO-5 Well-Being Index is a self-assessment instrument consisting of five multiple choice questions designed to measure the level of psychological well-being. It was developed for the WHO Collaboration Centre for Mental Health, and is a useful tool for assessment psychological well being status among elderly subjects (Bonsignore, Barkow, Jessen, & Heun, 2001) and has been used in several studies. The maximum possible score is 100 points. A higher score indicates a higher level of psychological well-being (Schenstrom, 2006). Each of the five items is rated on a 6-point Likert scale from 0

to 5. The theoretical raw score ranges from 0 to 25 and is transformed into a scale from 0 (worst thinkable well-being) to 100 (best thinkable well-being). If the raw score is below 13 or the respondent has answered 0 to 1 to any of the five items, it indicates poor well-being (Bonsignore et al., 2001).

2. The Intrinsic/Extrinsic-Revised Scale (I/E-R)

The I/E-R is a measure of religious orientation which consists of 14 items measuring three subscales: Intrinsic Religious Orientation (I) and two Extrinsic Religious Orientations, Extrinsic Social (ES) and Extrinsic Personal (EP). Intrinsic religious orientation attempts to measure individuals' commitment to religion as an end in itself. Extrinsic religious orientation measures attitudes toward religion as a means to some end, whether personal or social (Yakushko, 2005). Responses on I/E-R are measured on a Likert scale (from 1 = strongly disagree, to 5 = strongly agree). Thus scores range from eight to 40 for intrinsic, and from three to 15 for each of the extrinsic scales. Higher scores indicate higher levels of a given religious orientation (Salsman & Carlson, 2005).

3. Duke Social Support and Stress Scale

Social support was assessed with the Duke Social Support and Stress Scale (DUSOCS). In this study, respondents were asked how supportive spouses, parents, children, friends, and co-workers, neighbors and relative were. Possible responses were none, some, a lot, and there is no such person. Overall scores range from 0 (no support) to 100 (most support). Scores are calculated to provide information about the perceived amount of support available, and the sources and size of the support network (Ogedegbe et al., 2007).

4. WHODAS II 12(World Health Organization Disability Assessment Schedule II)

The WHODAS II is a standardized measure developed by the World Health Organization (WHO) to assess the extent of activity limitation experienced by an individual. It is conceptually compatible with the ICF (Van Tubergen et al., 2003). The WHODAS II can be employed for measuring the level of disability across various conditions and interventions. It includes six domains: Understanding and

Communicating, Getting Around, Self Care, Getting Along with Others, Household and Work Activities, Participation in Society (Poesl, 2004).

Data Analysis

The Statistical Package for Social Sciences (version 11.5) was used in data analysis. Ranges, frequency distributions, percentages, means and standard deviations were computed to describe data preliminarily. Reliability of measures was determined using Cronbach's alpha coefficients. Effects of independent variables were analyzed using enter method and stepwise multiple regressions analysis.

Results

Descriptive statistic

The sample consisted of 385 Malaysian's older persons aged from 60 to 91 years old with an average age of 69.3 (SD = 7.08). Descriptive characteristics of sample are shown in Table 1. More than half of the sample was female (51.4 %) and (57.4%) was married and 39.7 of the respondents were widowed. The large majority (85.5%) were rural residents and more than one third (31.3%) never attended school.

Sample had an average of 4.7(SD=.23) surviving children including 2.4 sons and 2.3 daughters. The mean of number of children for Malay, Chinese and Indian was 4.8(SD=2.35), 5.0(SD=2.13) and 4.5(SD=1.92) respectively.

The mean score for the psychological well being was 58.0(SD=23.0). Using a suggested cutoff point of 52.0 (WHO, 1998), 37.4% of the sample fell within the category of poor psychological well being status. However, 65.1% of Malay and 53.6% of Chinese older persons reported good psychological well being. More than half (52.9%) of Indian older persons fell within poor psychological well being status. Other findings showed that almost two thirds (66.0%) of women had poor psychological well being status, conversely 57.3% of men reported good psychological well being condition. More than 40% of the sample rated their overall health status as either good or very good.

The mean scores and reliability for variables of study are presented in Table 2.

Table 2 - The mean scores and reliability for variables of study

Variable and measure	Mean	Std. Deviation	Observed range	Reliability
Disability	27.6	23.83	0.0 - 89.6	0.93
Social support	48.3	18.88	5.0 - 100.0	0.75
Housing quality	88.1	20.17	0.0 - 100.0	0.69
Income	885.2	2708.96	0.0 - 41050.0	
Religiosity	45.9	6.24	19.0 - 55.0	0.85
Psychological well being	58.0	22.97	16.0 - 100.0	0.86

Table 3 shows gender differences of the variables. The results reveal that gender differences were significant in age, income, disability and social support.

Table 3 shows gender differences of the study variables

Variables	Male		Female		t	p
	Mean	Std	Mean	Std		
Age	68.44	6.83	70.03	7.24	-2.22	0.027
Income	1246.11	3655.3	546.3	1217.97	2.48	0.014
Disability	22.55	23.16	32.33	23.54	-4.11	0
Physical health	3.37	1.04	3.17	1.03	1.88	0.06
Social support	53.85	19.53	43.01	16.65	5.85	0
Housing quality	89.22	20.47	86.95	19.86	1.1	0.272
Religiosity	46.46	6.3	45.36	6.14	1.74	0.083
Psychological well being	63.89	21.94	52.36	22.57	5.08	0

Inferential statistic

A two stage, multiple regression analysis was performed. First, all predictor variables were entered into the regression equation to determine the total explained variance. Second, variables which were not significant in the prediction of psychological well being were excluded via a stepwise multiple regression procedure.

Findings of collinearity diagnostics indicated that all variables had Tolerance greater than 0.19 and VIF less than 5.2 (Mean Tolerance=0.86 and Mean VIF=1.17) so there was no problem with collinearity in data set.

Using the enter method, a significant model emerged ($F(14, 311)=19.12$, $p < 0.001$. $R^2=0.463$). In fact 46.3% of variance in the psychological well being is explained by a set of independent variables. Table 4 shows results of enter method multiple regression analysis.

Table 4 results of enter method multiple regression analysis

Variables	B	Std. Error	Beta	p
Physical health	7.97	1.00	0.360	0.000
Disability	-0.20	0.05	-0.202	0.000
Religiosity	0.70	0.18	0.182	0.000
Housing quality	0.17	0.05	0.138	0.002
Social support	0.19	0.06	0.152	0.002
Employment status	6.56	2.70	0.118	0.015
Gender	5.05	2.57	0.108	0.050
level of education	2.55	2.49	0.050	0.307
Ethnicity	14.39	17.87	0.225	0.421
Marital status	1.96	2.51	0.041	0.435
Religion	-11.46	17.93	-0.177	0.523
Stratum	0.84	3.07	0.012	0.785
Income	0.00	0.00	-0.010	0.825
Age	-0.02	0.16	-0.006	0.905

In second stage, stepwise multiple regression analysis was requested. The stepwise regression revealed a good fit ($R^2=46.0\%$) of the variance in the psychological well being is explained by significant independent variables. Models summary is shown in Table 5. The analysis of variance (ANOVA) revealed that the overall model was significant ($F_{(7, 318)}=38.08$, $p < 0.001$).

Table 5 shows Modes summary derived by Stepwise regression

Model	R	R ²	ΔR^2	Sig. F Change
1	0.51	0.26	0.26	0.000
2	0.58	0.33	0.08	0.000
3	0.62	0.38	0.05	0.000
4	0.64	0.41	0.03	0.000
5	0.66	0.43	0.02	0.002
6	0.67	0.44	0.01	0.007
7	0.68	0.46	0.01	0.010

Findings of the stepwise multiple regression of psychological well being on independents variables is presented in Table 6.

Table 6 Factors associated with psychological well being according to stepwise regression analysis

Variable	B	SE B	Beta	p
Physical health	7.974	0.988	0.361	0.011
Disability	-0.205	0.045	-0.21	0.000
Religiosity	0.768	0.166	0.199	0.000
Social support	0.206	0.056	0.169	0.000
Gender	6.865	2.117	0.146	0.001
Housing quality	0.169	0.052	0.139	0.000
Employment status	6.471	2.505	0.117	0.001

Discussion

The first purpose of the present study was to determine of psychological well-being status among older persons in Northern Peninsular Malaysia. Findings indicate that the mean psychological well being was 58.0 (SD=23.0) and 62.6 percent of older persons reported good psychological well being status. This result shows that the current state of psychological well-being among older persons in Northern Peninsular Malaysia is less than what reported by older persons in Hong Kong (Phillips, Siu, Yeh, Kevin, & Cheng, 2005) and it is better than psychological well being among older persons in Taiwan (Hwang, Liang, Chiu, Lin, 2003).

Another purpose of the study was to identify significant predicting factors of psychological well-being among older persons in Northern Peninsular Malaysia.

Results of multiple regression analysis by enter method revealed that 46.3% of variance in psychological well being was explained by all predictor variables in the study.

In addition, stepwise multiple regression analysis showed seven significant predicting variables and measures toward psychological well being. The results on Table 6 are quite revealing. It indicates the extent to which each of the independent variables contributed to the prediction. According to these results physical health, disability, religiosity, social support, gender, housing quality, and employment status contributed to psychological well being.

Physical health was the first significant predicting variable of psychological well-being among older persons in Northern Peninsular Malaysia (Beta=0.361). While there is no data known about the physical health and psychological well-being of older persons this study found that physical health is the most important predictor among Northern Peninsular Malaysia. Similarly, Heidrich (1993) investigated relationships among physical health, psychological well-being, and age using a developmental perspective and a multidimensional approach. Multiple regression analyses indicated that poor health associated with more depression and anxiety and lower levels of positive relationships and autonomy.

The second negative significant predicting variable was disability (Beta=-0.210). It can be explained that disability may inhibit elderly people from interacting with friends or family members in leisure or work, restricting opportunities for boosting satisfaction within these life domains and producing poor psychological well being. In the same way, results of a cross-sectional data from the Ethiopian Rural Household Survey indicated that, as expected, disability has a significant negative impact on subjective wellbeing (Kebede & Fafchamps, 2008). Similarly, accordingly a study on elderly people in Northern India, Joshi, Kumar, Avasthi (2003), found that with increase in disability, the psychological well-being decreases.

The third significant predicting variable toward psychological well-being was religiosity (Beta=0.199). It can be explained that higher religiosity as an important coping resource can result in powerful psychological well being in end of life. In this case Meertens et al. (2003) cited, (Koenig, 1998) argued that such beliefs give people a feeling of belonging, promote social integration for management difficulties in life. Similarly, Aranda (2008) examined religious involvement on the psychological well-being among older U.S. racial and ethnic groups. He found higher levels of religious attendance were associated with lower risk of depressive illness after adjusting for selective factors such as physical functioning, stress exposure, and social support. Also, Dong Pil and Eun-Kyoung (2006) using hierarchical regression analyses on a rural community sample of 215 older adults, found significant associations between dimensions of religiousness and psychological well-being. These results suggested that religiosity can help older adults to maintain and recover psychological well-being. Also, Lavric and Flere (2008) as their study found that high level of religiosity in a given cultural setting seems to enhance positive and stronger correlations between religiosity and psychological well-being in contrast in low religious environments, where non-religiousness is widespread and culturally acceptable, devout religionists will show lower or similar levels of psychological well-being as compared to the general population. These findings support the importance of religiosity for adjustment and social integration.

The reasons for the positive influence of religious involvement or religiosity on psychological well-being are many, but four explanations are most important. Firstly, religiosity may provide a coherent frame of reference for understanding events and uncertainties associated with daily experiences. The second, religious involvement may help the individual to cope better with stressful situations, including the death and illness of significant others (especially with aging), by providing logical answers to the problem of meaning. Third, religious organizations provide a supportive environment for social relationships, whereby fellowships and friendships are nurtured, and whereby feelings of reassurance and encouragement are enhanced. Finally, religiosity allows believers to enhance their self-esteem by developing a close relationship with the all-loving (God) (Andrew, 2003).

Finding revealed that the social support (Beta=0.169) is forth significant predicting variable toward psychological well-being. Social support was a critical determinant of psychological well-being for older adults. These findings are consistent with research Yoon and Lee (2007) and Wong et al. (2007) concerning effects social support on psychological well being among older persons. Yoon and Lee (2007) used a hierarchical regression analyses in determining psychological well-being among rural elderly, found that there was a significant associations between dimension of social support and psychological well-being and social support positively related to life satisfaction. Likewise, Wong *et al.* (2007) examined effects social support on psychological well-being among older Chinese and Korean immigrants. They reported more social support significantly contributed to better overall psychological well-being, having less depression and higher positive affect. Also, it has been emphasized that inadequate social support is associated not only with an increase in mortality and morbidity but also a decrease in psychological well being (WHO, 2002).

Gender is the fifth significant predicting variable toward psychological well-being (Beta=0.146). It found that there is a significant difference in psychological well being by gender. The review of the data in this research indicates that two significant predicting factors of psychological well-being namely social support and disability are significantly different between elderly women and elderly men. In this case, Pinquart and Sorensen (2001) conducted a meta-analysis from 300 empirical studies on gender differences in life satisfaction, happiness, self-esteem, loneliness, subjective health, and subjective age in late adulthood. They found that older women had reported significantly lower psychological well-being and less positive self-concept than men on all measures.

Housing quality was sixth significant predicting variable toward psychological well-being (Beta=0.139) among older persons. Evans, Kantrowitz and Eshelman (2002) in their cross-sectional study, examined the role of housing quality and place attachment in elderly citizens' psychological well-being. Findings showed that housing quality is associated with positive affect among the older adults living independently in the community. Similarly, findings of a study with 518 older persons aged 60 and over in Hong Kong, indicated that dwelling

conditions can act as stressors and become contributing factors that impact on older persons' psychological well being (Siu et al., 2005). Therefore, housing can play a critical role in maintaining psychological well-being of older persons. The last significant predicting variable toward psychological well-being (Beta=0.117) was employment status. Jacquelyn and Avron (2006) cited Moen (2003) using data from the Cornell retirement and well-being Study, showed that well-being for retirees who continue working is quite high and that retirees, especially men, who increase volunteer activity are better adjusted than those with lower activity levels. In addition, Shams and Jackson (1994) examined the impact of unemployment on the psychological well-being of British Asians. The results showed that the unemployed group had lower levels of psychological well-being, self-esteem, and employment commitment with high external beliefs than the employed group.

Conversely, findings of stepwise multiple regression analysis indicated that two variables that were expected to predict psychological well-being in this study were not significant in the prediction of psychological well-being among older persons in Northern Peninsular Malaysia. Firstly, it was age. Although, bivariate correlation showed a significant negative relationship between age and psychological well-being ($r = -.18$, $P < 0.01$), stepwise multiple regression analysis indicated there is no a significant relationship between age and psychological well-being. On other hand, while psychological well being decreases with age, age is not reason for decline in psychological well being among older persons. In this way Koo, Rie and Park (2004) reported a similar result.

The second nonsignificant predictor was income. While there was a significant relationship between income and psychological well being ($r = .12$, $P < 0.05$), using stepwise multiple regression analysis indicated that it didn't contribute toward psychological well being at .05 level of significance.

Conclusion

Result of this study indicated that the majority of respondents had good psychological well being. Based on support social production function theory it is found that physical resources and social resources are statistically important on psychological well-being among elderly

persons. In addition we found that psychological well being among older persons can be maintained and enhanced on condition that their social and physical needs are well met. On other hand, chronological age is not a cause of declining in psychological well being among older persons. Therefore, finding of this study can add important information to gerontological literature regarding psychological well-being among older persons.

References

- Andrew, E.K. (2003). Religious Influences on Personal and Societal Well-being. *Social Indicators Research*. 62-63(1-3) : 149-170.
- Andrews, G.R. (2001). Promoting health and function in an ageing population. *BMJ* 322 (7288), 728-729.
- Aranda, M.P. (2008). Relationship between religious involvement and psychological well-being: a social justice perspective. *Health Soc Work*. 33(1) : 9-21
- Arunya, T., & John, R. (2005). Psychological Well-Being of Thai Drug Users: Implications for Prevention. *International Journal for the Advancement of Counseling* 27 (3) : 431-444.
- Bonsignore, M., Barkow, K., Jessen, F. & Heun R. (2001). Validity of the five-item WHO Well-Being Index (WHO-5) in an elderly population. *Eur Arch Psychiatry Clin Neurosci*. 251
- Brown, D.R. (1992). Physical activity, ageing, and psychological well-being: an overview of the research. *Can J Sport Sci*. 17(3) : 185-93.
- Chou, K.L., & Chi, I. (2004). Childlessness and psychological well-being in Chinese older adults. *Int Journal Geriatr Psychiatry* 19(5) : 449-57.
- Diem, K.G. (2002). Using Research Methods to Evaluate Your Extension Program. *Extension Journal* (40). 6. Available from <http://www.joe.org/joe/2002december/a1.shtml>
- Dong Pil, Y., & Eun-Kyoung, L. (2006). The Impact of Religiousness, Spirituality, and Social Support on Psychological Well-Being Among Older Adults in Rural Areas. *Journal of Gerontological Social Work* 48 (3-4) : 281-298

- Evans, G.W., Kantrowitz, E., & Eshelman, P. (2002). Housing Quality and Psychological Well-Being Among the Elderly Population. *The Journal of Gerontology* 57B (4) : 381.
- Greenfield, E.A., & Marks, N.F. (2004). Formal volunteering as a protective factor for older adults' psychological well-being. *Journal Gerontol B Psychol Sci Soc Sci.* 59(5) : 258-64.
- Hajime, I., Chieko, K., Yasuyuki, G., Hiroki, I., & Takao, S. (2006). Subjective well-being as a predictor of all-cause mortality among middle-aged and elderly people living in an urban Japanese community: A seven-year prospective cohort study. *Geriatr Gerontol Int.* 6 : 216-222
- Heidrich, S.M. (1993). The relationship between physical health and psychological well-being in elderly women: a developmental perspective. *Res Nurs Health* 16(2) : 123-30.
- Helvik, A.S., Jacobsen, G., & Hallberg, L.R. (2006). Psychological well-being of adults with acquired hearing impairment. *Journal Disabil Rehabil.* 28(9) : 535-45
- Hwang, H., Liang, W., Chiu, Y., & Lin, M. (2003). Suitability of the WHOQOL-BREF for community-dwelling older people in Taiwan. *Age and Ageing* 32 (6), 593-600.
- Ingersoll-Dayton, B., Saengtienchai, C., Kespichayawattana, J., & Aungsuroch, Y. (2001). Psychological well-being Asian style: The perspective of Thai elders. *Journal of Cross-Cultural Gerontology* 16(3) : 283-302.
- Jacquelyn, B.J., & Avron, S. (2006). The Impact of Work on the Psychological Health and Well-Being of Older Americans. *Annual Review of Gerontology and Geriatrics* (26) : 153.
- Jeffrey, S.L., & Chatters, M.L. (1998). Religion, Health, and Psychological Well Being in Older Adults: Findings from Three National Surveys. *Journal Aging Health* 10 : 504-531.
- Jin, S., & Zhang, J. (1998). The effects of physical and psychological well being on suicidal ideation. *Journal of Clinical Psychology* 54(4) : 401- 413

- Joshi, K., Kumar, R., & Avasthi, A. (2003). Morbidity profile and its relationship with disability and psychological distress among elderly people in Northern India. *International Journal of Epidemiology* 32 : 978-987
- Kebede, B., & Fafchamps, M. (2008). Subjective Well-being, Disability and Adaptation: A Case Study from Rural Ethiopia. *University of East Anglia*. Available from http://works.bepress.com/bereket_kebede/16/
- Keiko, T., Junko, T., & Makiko, T. (1997). Patterns of Social Relationships and Psychological Well-being among the Elderly. *International Journal of Behavioral Development* 21 : 417.
- Koo, J., Rie, J., & Park, K. (2004). Age and gender differences in affect and subjective well being. *Geriatrics and Gerontology International* 4 : 268-270
- Lavric, M., & Flere, S. (2008). The Role of Culture in the Relationship Between Religiosity and Psychological Well-being. *Journal of Religion and Health* 47(2) : 164-175.
- Mackenzie, E.R., Rajagopal, D.E., Meibohm, M., & Lavizzo-Mourey, R. (2000). Spiritual support and psychological well-being: older adults' perceptions of the religion and health connection. *Health Med.* 6(6) : 37-45.
- Masuchi, A., & Kishi, R. (2001). A review of epidemiological studies on the relationship of social networks and support to depressive symptoms in the elderly. *Nippon Kosho Eisei Zasshi* 48 (6) : 435-48.
- Meertens, V., Scheepers, P., & Tax, B. (2003). Depressive symptoms in the Netherlands 1975-1996: a theoretical framework and an empirical analysis of socio-demographic characteristics, gender differences and changes over time. *Sociology of Health & Illness* 25(2) : 208-231.
- Netz, Y., Wu, M.J., Becker, B.J., & Tenenbaum, G. (2005). Physical activity and psychological well-being in advanced age: a meta-analysis of intervention studies. *Psychol Aging* 20(2) : 272-84.

- Nieboer, A., Lindenberg, S., Boomsma, A., & Van Bruggen, A.C. (2005). Dimensions of well-being and their measurement: The SPF-IL Scale. *Social Indicators Research* 73(3) : 313-354.
- Nieboer, A.P. & Lindenberg, S. (2000). Substitution and subjective well-being: Why do we need new measurement instruments? Paper presented at the Third Conference of the International Society for Quality of Life Studies. July 20-22, Girona, Spain.
- Nieboer, A.P. (1997). Life Events and well-being: A prospective study on changes in well-being of elderly people due to a serious illness event or death of the spouse, Thesis Publishers, Amsterdam.
- Nieboer, A.P., Lindenberg, S.M., & Ormel, J. (1999). Conjugal Bereavement and Well-being of Elderly Men and Women: A preliminary Study, *Omega*, 38 (2): 113-141.
- Nieboer, A.P., Schulz, R., Matthews, K.A., Scheier, M.F., Ormel, J., & Lindenberg, S.M. (1998). Spousal caregivers' activity restriction and depression: A model for changes over time. *Social Science & Medicine* 47(9) : 1361-1371
- Nieboer, A.P., Schulz, R., Matthews, K.A., Scheier, M.F., Ormel, J., & Lindenberg, S.M. (1998). Spousal caregivers' activity restriction and depression: A model for changes over time. *Social Science Medicine* 47, 1361-1371.
- Ogedegbe, G., Schoenthaler, A., Richardson, T., Lewis, L., Belue, R., Espinosa, E., Spencer, J., Allegrante, J.P., & Charlson, M.R. (2007). An RCT of the effect of motivational interviewing on medication adherence in hypertensive African Americans: Rationale and design. 28(2) : 169-181
- Ong, F.S. (2001). Ageing in Malaysia: National policy and future direction. Faculty of Business and Accountancy University of Malaya Kuala Lumpur, Malaysia. Available from http://www.idrc.ca/en/ev-28476-201-1-DO_TOPIC.html
- Phillips, D.R., Siu, O., Yeh, A.G.O., Kevin, H.C., & Cheng, K.H.C. (2005). The impacts of dwelling conditions on older persons' psychological well-being in Hong Kong: the mediating role of residential satisfaction. *Social Science & Medicine* 60(12) : 2785-2797.

- Pinquart, M. & Sorensen, S. (2001). Gender differences in self-concept and psychological well-being in old age: a meta-analysis. *Journal Gerontol B Psychol Sci Soc Sci*. 56(4) : 195-213.
- Poesl, M. (2004). Evaluation of the World Health Organization Disability Assessment Schedule II (WHO DAS II) - German Version: Disability in Patients with Musculoskeletal Diseases, Cardiovascular and General Internal Diseases, Stroke, Breast Cancer and Depressive Disorder. Dissertation, LMU Munchen: Faculty of Medicine.
- Rowe, J.L., Conwell, Y., Schulberg, H.C., & Bruce, M.L. (2006). Social Support and Suicidal Ideation in Older Adults Using Home Healthcare Services. *The American Journal of Geriatric Psychiatry*. Washington 14(9) : 758.
- Ruuskanen, J.M., & Ruoppilla I. (1995). Physical Activity and Psychological Well-being among People Aged 65 to 84 Years. *Oxford Journal Medicine Age and Ageing* 24(4) : 292-296.
- Salsman, John M., & Carlson, C.R. (2005). Religious Orientation, Mature Faith, and Psychological Distress: Elements of Positive and Negative Associations. *Journal for the Scientific Study of Religion* 44(2) : 201-209
- Sarris, M., Soulis, S., & Yfantopoulos, J. (2001). Social production functions theory. *Arch Hellen Med* 18(3) : 230-238
- Schenstrom, A. (2006). Mindfulness-Based Cognitive Attitude Training for Primary Care Staff: A Pilot Study. *Complementary Health Practice Review* 11(3): 144-152.
- Shams, M., & Jackson, P.R. (1994). The impact of unemployment on the psychological well-being of British Asians. *Journal Psychol Med*. 24(2) : 347-55.
- Silverstein, M., Cong, Z., & Li, S. (2006). Intergenerational transfers and living arrangements of older people in rural China: consequences for psychological well-being. *Journal Gerontol B Psychol Sci Soc Sci*. 61(5) : 256-66.

- Skolnik, & Heidi, S. (1997). A social ecological investigation of the associations among social network participation, psychological well-being, and survival. University of California, Irvine.128
- Slater, A., & Bremner, G. (2003). Introduction to human development. ... The Blackwell reader in developmental psychology. Blackwell Publishers. P 22
- Smith, J., Borchelt, M., Maier, H., & Jopp, D. (2002). Functional Status, Well-Being, and Successful Aging. Health and Well-Being in the Young Old and Oldest Old. *Journal of Social Issues* 58(4): 715-732.
- Steverink, N. & Lindenberg, S. (2006): Which Social Needs are Important for Subjective Well-being? What Happens to Them with Aging? *Psychology and Aging* 21(2) : 281–290.
- Steverink, N., Lindenberg, S., & Slaets, P.J. (2005). How to understand and improve older people's self-management of wellbeing. *European Journal of Ageing Social, Behavioral and Health Perspectives*. Published online: 6 December 2005.
- Thomas, H., Gloschen, M., Shirley, L., & Bryant, O. (1988). Psychology of Women. *Worthington, OH Quarterly*. 12(1) : 99-116.
- Van Bruggen A. (2001). Social production function theory: a closer look. In: Bruggen A van. Individual production of social well-being: An exploratory study. Dissertation, Interuniversity Center for Social Science Theory and Methodology. 77-113.
- Van Tubergen, A., Landewe, R., Heuft-Dorenbosch, L., Spoorenberg, A., van der Heijde, D., van der Tempel, H., & van der Linden, S. (2003). Assessment of disability with the World Health Organization Disability Assessment Schedule II in patients with ankylosing spondylitis. *Annals of the Rheumatic Diseases* 62 : 140-145.
- Wong, S.T., Yoo, G.J., & Stewart, A.L. (2007). An empirical evaluation of social support and psychological well-being in older Chinese and Korean immigrants. *Ethn Health* 12(1) : 43-67.

- World Health Organization. (2002). Active ageing: a policy framework. Geneva: World Health Organization.
- Yakushko, O. (2005). Influence of Social Support, Existential Well-Being, and Stress Over Sexual Orientation on Self Esteem of Gay, Lesbian, and Bisexual Individuals. *International Journal for the Advancement of Counseling* 27(1) : 131-143
- Yoon, D.P., & Lee, E.K. (2007). The impact of religiousness, spirituality, and social support on psychological well-being among older adults in rural areas. *Journal Gerontol Soc Work* 48(3-4) : 281-98.
- Zhang, W., & Liu, G. (2007). Childlessness, psychological well-being, and life satisfaction among the elderly in China. *Journal Cross Cult Gerontol*. 22(2) : 185-203.
- Zhang, Z., & Hayward, M.D. (2001). Childlessness and the psychological well-being of older persons. *Journal Gerontol B Psychol Sci Soc Sci*. 56(5) : 311-20.

Study of Generation Gap in Rural West Bengal

Prafulla Chakrabarti

Socio – economic Research Institute
Mohona , Flat # 7,5 New Raipur
Kolkata – 700 084

ABSTRACT

Generation gap, popularly known as inter-generational relation is undergoing transitions because of rapid change in societal scenario which tends to have afflicted it with social toxaemia. This paper makes an in-depth study of the nature of generation gap of ten cases from different villages in the districts of Nadia, Howrah, Hooghly, and Purulia in West Bengal with a view to examining how do the elderly parents and their young children judge one another. Besides case study, interview and observation methods were applied to collect basic data and for analyzing the materials the technique of content analysis was resorted to. The deductive positivistic approach has been followed because of qualitative nature of data. The results of the study revealed that most of the aged parents were unhappy with the asocial, individualistic and self-centric attitude of their sons and daughters and the children too were not so happy with their parents because of the orthodox and stubborn behaviours. However, the overall findings of the study could trace out seemingly four major factors for the conflicting relations between the members of two generations, namely (i) consumerism, (ii) authoritarianism, (iii) individualism combined with collectivism and (iv) relation priority. The paper concludes with furnishing some plausible measures for reducing the relation hiatus between the members of old and young generations.

Key Words : Social identity, Social toxaemia, Social support, Alien culture, Relation pollution, Asocial behaviour, Co-survivorship

A generation gap is a term commonly used to describe differences in cultural norms between younger and older generations. The relation between young and old was harmonious in the past in almost every culture all over the world. However, in the present period conflicting relations have continuously been widening the nature of generation gap. Various factors like socio-cultural, psychological, economic, health and medicare etc. are reported to have influenced the intergenerational relations (Ramamurthi, 2002; Bajpai, 1998; Lowenstein, 2002; Hegstad, 1985 etc.). There have been spate of literature on generation gap or intergenerational relations in both western and eastern countries since the last three decades. In the south Asian countries like India, Bangladesh, Pakistan, Sri Lanka, Hong Kong etc. the topic has begun to attract the attention of scholars from the last decade or so. But most studies seemed to have confined to urban areas by adopting synoptic approach (see for instance, Anantharam, 1979; Jamuna, 1991; Gayathri Devi (2004); Chakrabarti, 2006; Anderson, 1973; Bengston, 1973 & Silverstein et. al, 1997 etc. Majority of these works focused mainly on psychological aspects. Holistic studies are seemingly absent. The need for studying intergenerational relations between older parents and adult children i.e., two-generation gap in rural areas is very much important for assessing the well-being of the elderly as well as formulating policy and framing intervention programme. The present study based on micro approach makes an attempt to fill up our gaps in the understanding of the phenomenon in rural areas.

Objectives

The study deals with the following objectives :

1. To present the nature of complaints made by the elderly parents and adult children against one another who belonged to different villages in West Bengal.
2. To find out the factors that vitiate intergenerational relations in generating differences of ideas, customs, and value orientations between the old and young.
3. To suggest some intervention strategies for enhancing the intergenerational relations between elderly parents and their adult children.

The main aim of the study, however, is to address the question : *How do the young and old in rural areas judge one another ?*

Materials and Methods

The study materials comprise ten case studies of older parents and their young children belonging to the villages of Krishnaganj, & Teorkhali and Swarupnagar in the district of Nadia, Bally and Kulgachia in the Howrah district, Chhoto Belu in (Serampore) Hooghly and Gadi Bero in the Purulia district. These case-studies were conducted from time to time in-between the survey of a major research project in 1993. The families in which intergenerational conflicts were reported to have occurred frequently had been chosen purposively in order to save time, labour and cost. The items of information that were collected from the family include : occupation, education, caste, family composition, age, sex, marital status, literacy of each member, noted on a structured schedule. Information about the nature of conflict, complaints, grievance etc. were recorded on a tape-recorder. Content analysis of the materials was done manually.

Case Studies

Case # 1

Padma Ghara, a 70- year old widow of Chhoto Belu, Serampore in Hooghly lost her husband about 15 years ago, who was a labour in a Silk Screen Factory at Chatra. She used to supplement the family income by selling edible herbs, creepers, vegetables, greens etc on the foot-path of a local market (Nao ga mor). Since the last 6/7 years she had been suffering from back pain, vertigo and debility which is why Padma was unable to contribute her son's family where she lived with daughter-in-law and grand-children. Her only son, Dulal worked as a Border Security Force at Mahadipur (Murshidabad). So long as she was little active, used to serve the family by collecting dry twigs and shrubs for fuel, tending goats, sweeping the courtyard, looking after the babies and so on. Now that she had a failing health, could not perform the domestic chores. Being completely dependent and unable to fulfill the expectation of her daughter-in-law, she had to face frequent verbal and physical abuse from her. She would also face torture from Dulal (possibly at the instance of his wife). She was compelled to take refuge to distant relative's houses for many a times.

Apart from the usual mother-in-law and daughter-in-law conflicts over trivial issues, she had an ill-feeling on her adult son because of his lack of husband's courage and control over the wife. When asked Padma how she felt living with the son's family, her reply was, "*Baba kee bolbo. Ekhon morey gelei baanchi*" (Son, what shall I say ? It is much better if I die now).

The lady investigator sought the opinion of the son as well as his wife about the nature of relations each one had with the old woman. From the heart of his heart the son seemed to have a deep love for her mother but outwardly he showed a hostile attitude towards her to please his wife. He wanted peace in the family but his mother was so rude and quarrel some that he had to take occasional steps against her. "*Sab samay eto chopa karey je sajyo kora jaina. Gharer kotha para-parshir kachhe lagay*" (She always shows her temper. It is difficult to endure her irksome behaviour. She has a habit of disclosing family matters to the neighbours). The daughter-in-law's complaints were : '*bhatarkha ki magi sab samay amar dosh dhorey aar katha sunhai*' (That husband – killer woman would always find faults in my duties and shout at me with dirty language), would eat voraciously twice a day but still complain others that I do not feed her well; feign to be an ailing person to avoid domestic work, and draw sympathy from the neighbours by making false allegation against her and so on.

Padma Ghara's case represents the pitiable condition of an old widow who is physically weak, completely dependent on her son for sustenance and care and cannot fulfill the expectations of the family. The nature of intergenerational relations between the mother and adult son as well as daughter-in-law is not at all healthy for the well - being of the family.

Case # 2

Malati Biswas, aged 75, was a widow living at the Malopara of Krishnaganj village in Nadia. She belonged to a middle class family and her husband was a railway employee who passed away long ago leaving behind the wife, two sons and a baby daughter. She brought her children up by simultaneously taking the roles of father and mother so that they did not feel the absence of their father. The children grew up. The eldest son passed the L.C.Exam., got a job and raised no voice

against her mother's selection of his bride. He had one daughter and three sons who were in schools. The youngest son had education up to B.Com level and employed at a private company. He also had arranged marriage fixed by her mother. He was the father of one child. The young 19 - year old daughter was a First Year student of Majdia college. Thus, Malati led a large joint family and acted as a role of head of her family. She had affectionate relations with every one in her family except with her daughter. She had frequent conflicts with her obstinate daughter who was adamant and fond of independent life-style. Often she would return home late at night and mix with boy friends who had bad reputation. She showed embriety and above all could not care to understand that she was hampering the social image of the family. Her indecent way of life caused concern not only to the family but also enraged the village elderly. No amount of advice, request and persuasion from her mother, elder brothers and other members of the family would rectify her hostile attitude, impulsiveness and unruly behaviour. "*Maiyada amago ekkere nasto hoiya gyal*" (My daughter became totally a spoilt child) – lamented the frustrated mother. "*Jakhan sashon kori, tahon koi je line a matha dibo*" (when I used to take her into task she threatens to commit suicide on the rail line) - told the helpless mother.

The lady investigator could obtain the version of the daughter in camera. She alleged her mother calling her an old - timer, narrow minded, suspicious, habituated in creating fuss, and non-comprising. "*Burir matha kharap* (The old woman is crazy), *Janena je chhele meye baro holey tader pichoney sarakshan kyat kyat kora thik noi*. *Tarder o maan samman aachhe* (The woman does not know how to behave with the grown up children who also have their respective self esteem) etc. Malati Biswas's case clearly indicates how the impact of polluted social environment and modernization can vitiate the intergenerational relations.

Case # 3

Khagen Nayek, a 72- year old share cropper lived with his paralytic wife at Kulgachia village in Howrah. He had, of course, two adult sons and a married daughter who were living separately in their respective families. The eldest son settled at his wife's parental family as *ghar-*

jamai (a custom of living at in-law's house) in a different village despite strong resistance from his parents. But the son was so much allured by her in-laws' property and asset that he shirked his filial responsibility and inclined towards his wife's parental abode. The younger son became a lorry driver in Howrah and casually visited the parents. He was habituated in fast life and imbibed all sorts of vices. The father was terribly hurt by the wayward and selfish behaviour of his adult sons. The difference in life-styles, lowering the social image by ruthless son and hostile behaviour of both the sons made the relationship bitter. "*Oi rakam cheleder baap boley parichay ditey lajja korey*." (I feel ashamed to be introduced as father of those spoilt sons) – said the father in utter disgust. The chief investigator could not meet the younger son while he came to see his mother. His complaints against the father were : "*ashambhab mejaji*" (very rough temperament) "*khit khitey*" (fastidious), "*bhangbey tobu machkabey na*" (stubborn) etc. The message that can be derived from the above case is: the differences between the two generations in fundamental values led to conflict in the family.

Case # 4

Haran Sadhukhan (71) lived at the Krishnaganj village in Nadia with his wife ,one adult son ,daughter-in-law and grandchildren. He was a retail dealer-cum-agriculturist possessing four bighas of land, an orchard, two semi-pucca buildings and a van-rickshaw. For the last 6/ 7 years he had been suffering from visionary and asthma problems which compelled him to hand over the retail shop to his youngest son. His eldest son, however, worked as a hotel manager at Majdia and set up his own establishment there but never looked after his parents. He did not even take the responsibility of his own wife and children who would rotate from in-law's house to parent's houses. From several years he had been pestering the father to transfer his share of property to his name so that he could start a hotel business of his own by disposing of his share. But Haran was not ready to do that. He had already mortgaged his land to the Kundus to procure a lump sum of Rs 15000/- for the expenses of his neice's marriage. Moreover, he did not have faith in his son. This embittered the relationship between them.

When asked the eldest son about the nature of relations which he had with his father he uttered derogatory comments about him : “*Burota harey harey badjat. Ekebarey abastab*” (The old haggard is very wicked. Totally impractical), “*Nijer chhelekey na dekhe bhai er chhele-meyeder janyo sab kichhu ujar korey diyeche*” (He is so fool that he spent everything for the well-being of his nephews and niece without looking after his own son). “*Karta-giri falatey giye ja khushi tai korechhe*” (He acted whimsically to show his power as a head of the family) etc. This shows his antagonistic relations with the father.

This case study revealed a typical patriarch who attaches utmost values on joint living, refuses to transfer land and lacks reciprocity between older and younger generations.

Case # 5

Manoda Halder of Krishnaganj village was a 73-year old widow living in a single member household under abject poverty. She lost her husband during the time of “*otha pola*” (Get up and flee) and crossed the Bangladesh border to settle in this village with her three minor children in a penny-less condition. She run the family by husking paddy in the local farmer’s house, selling cow-dung cakes and puffed rice and also by working as a maid servant. She brought up her two daughters and the son with utmost difficulty. She was a devout women who spent her leisure times in chanting the name of Radha-Govinda. When her children grew up they used to help their mother by collecting cow-dung, fetching dry leaves and twigs as fuel, obtaining roots and tubers, working as a day labour, catching fish and so on.

The woman got-a tremendous shock when her eldest daughter fled away with her boy friend, a non-Bengali truck driver. Prior to that incident, she used to have constant quarrel and frictions with the eldest daughter for her adamant behaviour, illicit relations with young wayward boys, and indecent dress. After that shameful incident, the woman cooled down and accepted her fate. After a few years, with the persuasion of the eldest daughter, she also allowed the younger daughter to go to Delhi for working in a garments factory so that the latter could support her mother. In the meantime, his son used to supplement the family by working as a van-rickshaw driver.

The poor woman suspected something fishy when the communication from both the daughters began to cease and received another blow from the younger daughter when the remittance totally stopped. She came to know that her eldest daughter in connivance with her husband sold her sister to a broker who ran a girl trafficking business. From the very beginning her son stood against the move and vehemently opposed her sister’s leaving the village. He fought tooth and nail to resist the move. But his mother became so much attracted by the allurements of a rosy future that his voice became subdued.

The third and the most severe blow came from his son when he married a girl from an untouchable caste by putting vermilion on her forehead at the Kali temple of the village without her knowledge.

It was too much for the woman to tolerate such a heinous act. When the newly-wed couple arrived at the gate and about to take entry into the house the woman shut the door in front of them and kept herself confined in the room and wailing “*Kee koira abagir beti amar poladarey bos korlo go ! Orey ehon kamney ghorey nibam jehaney amar Rabha Govindaree nitya seva kori*” “*Hai hai, ploada ida ki korlo !*” (How could that daughter of a bitch hooked my son ? How could I allow that untouchable girl enter my room where my presiding deity Radha-Govinda gets daily worship! Oh God, how could my son do such a thing !”)

The son waited the whole day with his bride in front of the entrance gate to pacify her. Ultimately, finding no other alternative, he sought the help of a neighbour to give them a shelter for the night. Next morning, the son rented a room near the market place and began to live there. Since then neither the woman nor the son kept any relation with one other. The central message of Manoda’s case suggests how the life-long struggle against poverty and repeated shocks perpetrated by her daughters and adult son made her frenzy, superstitious which embittered the intergenerational relations.

Case # 7

Haripada Dutta, a retired school teacher, aged 68 years, was living in a nuclear family with his wife (60), two sons and a young daughter at Krishnaganj village. The father reported that despite his continuous

insistence to the sons and daughter to devote their whole hearted effort in achieving good results in examinations, they paid no heed to it as they found no interest in studying beyond School Final Level. The sons were, on the contrary, paid more attraction towards earning easy bucks through showing their muscle power to the road-side shop, owners, truck drivers, promoters, those who are going to construct new buildings and so on to squeeze money in connivance with the local police. They hardly looked after their parents and were unmindful about the domestic affairs. The eldest son was very much demanding while the younger one spoilt his career at the instance of her peer group. Both the sons put constant pressure on the father for helping them with a lump sum money for investing in smuggling business and to buy a lorry for transport business. Since the parents had no trust in them because of their illegal activities and immoral character, he did not yield to their demand which made them hostile.

When asked the elder one what made him to discontinue his higher education, he replied, *Hajar hazrar chelera BA, MA pass korey fa fa korey ghurey morchhe restay rastay, takhon ki labh baje samay nasto korey lekha-poray? Kintu burotakey ke bojhaba se kotha?* (When thousands of highly qualified young persons are being loitered here and there for a job without any success, then why should I waste my time unnecessary on education? But who will make that old haggard understand this simple fact.). “Why did you choose this life? - we asked. *“E chhara aar ki korar ache”* ? (What else I could do?). “How did you fare with your parents” – was our last question. The answer was, *Ma amader bhalo, tobey khamaka kande. Babadai hochhey nater guru. Tar kachhey takar chaitey paribarar maan ijjat tai holo ashol*” (Ma is a very nice lady. But she would unnecessarily shed tears. But our father is the main trouble-shooter for generating conflict in the family, because of his stupid idealism that family prestige is far more important than money).

This case suggests that difference in opinions about monetary matter between elderly father and adult sons results family conflict. Younger generation would prefer keeping in tune with the changing socio-economic scenario but the older generations continued to stick to conservatism which lead to family tension.

Case # 8

Kalipada Majee – an old man of 77, lived in Namopara at the Gadi Bero village in Purulia. He held a large family comprising wife, two sons, two daughters, daughters-in-law, six grandchildren, his elder brother's widowed wife and children. He owned five acres of agricultural land, a power tiller, lot of cattle, and three thatched houses surrounded by a mud wall. Besides cultivation, the family had other sources of income too e.g., money lending, renting out power-tiller, salary of his youngest son. For sometime past, he was having constant hitch with his sons and nephews who are pressing him to transfer the land and asset to their individual names. Their plea was as the head of the family had already become very old and not able to perform the duty of a patriarch as he used to do, it would be better if he distributed the property and asset amongst the successors. But the old man was quite strict to his principles for : (i) For he had still three daughters and niece to be married away. There was every possibility that his sons and nephews might not take the liability. If he had to transfer the property it should not only be among the sons and nephews but proportionately to his wife, brother's wife, daughters and nieces also. This enraged the children very much who got disappointed. (ii) So long as he was alive, would not allow his family to get disintegrated. (iii) Suppose, he transferred the land in the name of his sons and nephews, would it be viable?

- (i) “Still we, the old members have some respect, importance and status in the family. Is there any guarantee that the inheritors will look after us and render care when I transfer my land and property to them?”

The central message from the case cited above is that conflicts and tensions between older and younger generation does not always generate out of poverty, unemployment, lack of proper understanding and compromise. These can also take place because of unwillingness of the elderly to hand over the property and asset and individualistic attitude as well as mistrust which in their turn widens the generation gap.

Case # 9

Duli Bewa – an ill-fated woman of Teorkhali village in Nadia, about 80 years old was living in a single household on begging door to door. This is notwithstanding the fact that she had two well-to-do adult sons who failed to comply their filial roles to take care of their widowed mother even though they gave a false assurance at the time of getting their respective share of agricultural land.

The interview with the sons revealed that Duli Bewa was too much demanding and used to make the life of their wives a hell with her foul mouth and tantrum. So to maintain peace and tranquility in the family no one would dare to keep her in his family. The case of Duli Bewa suggests that when an old person, particularly an aged widow, becomes a popper and displays her meaningless existence, she becomes an intolerable burden to her own progeny.

Case # 10

Kartick Gayen, aged 70, was living at Ghoshpara, Bally in Howrah with a widowed cousin sister. He had, of course, his wife and children but they lived in different places. Kartic was a Jute-mill worker and presently eked out her living on interests and savings from retirement benefit. He led thirty years of married life and was a father of five children. Although he was addicted to country liquor and casual visitor of commercial sex-worker, he led somehow a peaceful family life till the arrival of his young widowed cousin sister. His wife vehemently opposed to allow her permanently to give shelter because of her close intimacy with the husband. In many a occasions the wife found her husband and that woman in an indecent posture. When the wife questioned about that kind of immoral and nefarious affairs with the cousin sister, Kartic used to get furious and shout at her, "*Amar ja ichhey tai korbo. Tor baper ki?* (I shall do whatever I wish. How does it matter to your father?). Quarrels, frictions, physical assaults were the regular features in the family. Being totally disgusted and unable to bear the torture, the wife ran away to take refuge in an *ashram* at Nabadwip and never returned. His adult sons also failed to rectify their father's character. Once the adult sons drove that woman out of the family after severely beating the father. Kartic went to the police-station and lodged a complaint against the torturous behaviour

of his sons. The adult sons left the house with their respective families and settled at different places at Uttarpara, Hindmotor and Baranagar by severing tie with the father. The cousin sister came back and looked after her so-called *dada* (elder brother).

The immoral character of the older parents generate conflict and tensions in the family as noticed in the above case-study.

Content Analysis

The ten case studies presented in the preceding section may be considered as raw materials on intergenerational conflicts and tensions which lead to generation gap. It is imperative that these should be processed, analysed and interpreted to extract the message they would convey.. The technique of content analysis has been resorted to for this purpose. First of all, the general characteristics of the elderly may be discussed in brief.

1. General characteristics of the selected elderly

There were six males, having an average age of 73.6 years, all married, literate, gainfully employed, living Krishnaganj and Swarupnagar villages in the district of Nadia (3-cases), Kulgachia and Gohspara (Bally) in Howrah (2 Case) and Gadi Bero in Purulia.

There were four widows having an average age of 74.5 years, illiterate and except for one who lived on begging, all the rest were dependent. They were found at Krishnaganj and Teorkhali villages in Nadia and only one belonged to Chhoto Belu (Serampore) in Hooghly. Caste-wise, not a single elderly belonged to upper caste. As the seven cases out of ten belonged to Other Backward Class and the rest, from the Scheduled Caste.

2. Nature of Complaints

- (i) By the elderly parents against their married sons and teen-aged daughters.
- (ii) Majority of the adult sons were wayward, disobedient, alcoholic extortionist, demanding not interested in domestic work, impulsive, self-centred, henpecked, not oriented to filial values and so on.
- (iii) The teen-aged daughters were, on the other hand, obstinate, whimsical, care-free, uncontrollable, foul-mouthed, least interested

in assisting home work, demeaning family prestige and indulged in free mixing and often habituated in creating scandal.

2. By the adult sons against their fathers and mothers.

- (i) Fathers were old-timers, uncompromising, dominant, thrifty, demanding, selfish, incapable of keeping pace with the changing world, and sometime indulged in illicit relations and having thereby immoral characters. Similarly, the mothers were too much orthodox, sentimental, uncompromising, least concerned about adult sons' and young daughter's needs and aspirations, unwilling to relegate responsibility to the daughters-in-law, quarrelsome, having irk-some behaviour, and so on.
- (ii) The young daughters' conflict was mainly centred round their mothers who were very much worried about the daughters' unruly behaviour highly suspicious, habituated in making a fuss on trivial issues, uttering derogatory words, and imposing punishments like, keeping the daughter in a locked room, not allowing them to wear modern dress, denial of food, and some-times inflicting physical assault if she refused to disobey mother's stern objection against mixing with her boy-friends. Interestingly, not a single instance could be found where a daughter made allegations against her father.

From the above discussion, it appears that the behaviour, attitudes and values of the rural parents are entirely different from those of their adult sons and young daughters. The behaviour of the rural elderly are not always guided by rational thinking and their attitudes and values are often based on traditional ideas.

Generation gap : Causal Factors

From a close introspection of the case studies it was found that four major factors seemed to have played an important role singly or in combination to shape the nature of generation gap. These are : (1) Conservatism, (2) Authoritarianism, (3) Individualism and collectivism and (4) Relation priority.

Factor 1 expresses itself through regular conservative behaviour "*Nichu Jate biye korona*" (Don't marry a low caste girl,) *Prem tram korte Jeona* (Don't involve in love affairs), selection of career: "*Baba*

kei santaner bhabishyat thikh kora uchit (Childrens' career should be decided by father etc.), habit : *Raat korey gharey fera* (Return home late at night), *Deri korey ghum thekey utha* (rising late in the morning), Life-style : *Bad sangey mesha* (mixing with ruffians), *Nesha-Bhang kora* (addicted to alcohol and hemp); Taking decision by emotional experience and feelings : *Meyeke ato bashi leha para shekhano uchit noy* (Daughter must not go for higher education); Instrumental and fundamental values : *Kasto korley Kesto mele* (Try hard and you will succeed), *Paro dareshu matrubat* (Treat the other's wife as mother).

Similarly, factor 2 denotes parental authority in terms of power, status, autonomy of decision - making : *Aami sangsarer karta, ami jakey khushi take debo* (I am the head of my family. I can jolly well contribute anybody as per my wish), style of living : *Banchtey holey banchar mato bancha chai* (If you want to live, live lavishly) autonomy of decision – making : *Amar ichhe ami amar bhaipo- bhaiji der dekhbo. Tatey kar kee bolar ache?* (This is my wish that I shall look after my nephew and neice. I couldn't care less who says what ?)

Factor 3 deals with individualism and collectivism in which the former suggests weak relationship between one individual and the other. Everyone is concerned with fulfillment of self-interest, while the latter denotes strong cohesiveness of people having utmost loyalty to society.

Factor 4 i.e. the last factor which influences the intergenerational relations is relation priority primary vs secondary group. It denotes the maintenance of relationship with family, relatives (primary group) and with friend circle and people outside the family (secondary group).

Discussion

The study made an attempt to address the four fundamental questions concerning the prevailing intergenerational relations between parents and children in rural areas. The questions are :

- (1) What is generation gap ?
- (2) How is it? i.e how the generation gap generates in families ?
- (3) Why is it that generation gap is influenced by external as well as internal forces ?

- (4) What will it be if inter- generational conflict (generation gap) continues to enhance unabated ? Before entering into the exploration of inter-generational relations in the rural family, the concept and meaning of generation gap has to be dealt with. Generally, generation gap is defined as differences in cultural norms and behaviours between members of proceeding and succeeding generations. "It is a belief, thought and value system to be adopted by both the young and the old".

In a study as the most common themes of conflicts between ageing parents and their children, Clarke et.al (1999) found six types of themes : (1) Communication and interactional style; (2) habits and life-style choices; (3) child rearing practices and values; (4) politics, religion and ideology, (5) work habits and orientation; (6) household standards and maintenance. Bengston et.al (2003) found that a longer years of shared lived involves protracted years of care-giving for dependent elders and likely protracted conflicts. Though Sheriff & Sheriff (1953) found four sources of conflict, namely, "power, resource, justice and social identity." The present study, however, could find lack of understanding, resource and, conservative behaviours that generate conflicts between the upper and lower generations. The difference between the two generations in fundamental values also generate tension and conflict in the family which lead to separation. Parental expectation from sons and unmarried daughters seldom get fulfilled. They would not perform their respective familial duties. Instead, their waywardness, violation of familial and cultural norms, differences in life style which appeared to be the sources of tension in the family.

Taking cue from the above it can be said that the fast changing socio-economic scenario even in rural areas due to the pervading influence of industrialisation, individualism, modernisation, globalisation and technological advancement have had a decisive role in widening the generation up.

What will happen if the intergenerational relations between the older and younger members in the family continue to show an increasing trend ? In order to address the question, it is imperative that the case-study materials should be kept in mind. Perhaps no body will deny the fact that for becoming a healthy nation we must have healthy

society which again depends on healthy intra-family relationships. As family is the fundamental unit of society any kind of hostility between the members of different generations bound to generate tension, conflict in the family and social toxaemia in society. The entire social system may loose its function because of the resulting effect of social toxaemia. Because of relation pollution the older generation will encounter neglect, abuse and violence from their adult sons and daughters. Lack of carer will be highly pronounced. Emphasis on conjugal relationship, individualistic attitude and consumerism by the children will replace the importance of filial values.

Suggestive measures for reducing generation gap.

From the materials as well as discussions made in the preceding sections, it is apparent that in contemporary rural society inter - generational differences developed due to numerous stressors within the family. Some recommendations for reducing the generation gap or improving inter-generational relations can be made :

- (1) It should be borne in mind that whatever changes have taken place in the structure and function of the family, it is still the family which can be considered as the best institution for every member including the aged. Hence, it should be the main task of the private and public enterprises to provide much incentive to the family for continuing its fundamental role.
- (2) Identification of factors that promote family cohesion and generate conflict in the family should be made so that necessary measures could be taken to strengthen the former and weaken the latter.
- (3) Since in almost everywhere portraying a negative image of the old persons is a norm, its positive dimension should be highlighted in a manner that our elderly is a social asset through mass media (newspapers, films, television etc.)
- (4) All out effort should be made to support productive aging so that the older generation could play meaningful roles in the lives of their families and communities. Those who are physically fit and capable of doing something less strenuous work like, for instance, making ropes, spinning thread with the spinning-wheel, preparing paper packet out of used newspapers, *kaantha*, (cotton wrapper),

making *bodi* (a small conical ball made of the paste of pigeon-pea and dried in the sun), making brooms out of dried coconut leaves, and so on. The elderly women can also earn by preparing prickles, jam, jelly, or other food processing work. In this way the elderly can contribute to the family to sustain reciprocity and enhance intergenerational relations.

- (5) From the very childhood, children should be taught to pay due regard and respect to the elderly and be allowed to spend sometime with their grand parents. The adult sons and daughters need to know the family norms and values, and control their life-style as per cultural expectation. They should be compromising, understanding and sympathetic to the parents.
- (6) By making the members of older generations involved in religious, recreational and social welfare work by the community leaders and voluntary agencies for enhancing thereby their social status. In this way the generation gap can be narrowed down to a considerable extent.
- (7) The social worker, *Panchayats* and NGOs can arrange regular group counseling of the elderly in the village community hall with a view to making them flexible by discarding their stereotypic attitudes towards the adult sons and daughters. Similarly, the sons should be ready to join in the counseling session to rectify their habits, behaviours, life style and so on. Finally, by arranging a focus group discussion among both the adult sons and the parental group together, the difference of each others ideas, beliefs, habits, style of life etc. can be minimized amicably. This kind of attempt for launching counseling programme of the members of older and younger generation separately as well as conjointly for changing the conflicting relationships may be explored to narrow down the generation gap.

Conclusion

Generation gap occurring due to conflicting intergenerational relationships between adult sons and older parents is not an urban phenomenon only, it has made its in-roads into the remote rural areas also. It is apprehended that unless there is some intervention

programmes at all levels Indian culture will soon be drastically affected by incongenial external forces.

This study has revealed that most elderly are unhappy with the asocial behaviour and independent and materialistic attitude of their adult sons. Majority of the members of younger generation are influenced by alien culture showing least interest in following their own traditions. The parents also are unable to keep pace with the fast changing socio-economic and ideological conditions. This often leads to conflicting relationships between the younger and older generations. The lack of compromising attitude of both the generations and flexibility widens the generation gap. Already there are more years of co-survivorship between generations (Bengston, 1996) than ever before. This longer years of shared lives involves protracted years of care giving for dependent elders and likely protracted conflict between them (Bengston et.al, 2003). The study has revealed that old widows face much wider generation gap than elderly males because of their dependency and maximum attachment to traditional values than those of their male counter-parts. Though it may sound cleche, no society can remain encapsulated from the impact of external forces.

References

- Anantharam, R. N. (1979). "Perception of old age by two generations", *Journal of Psychological Research* 23(3): 198-199.
- Anderson, B. (1973). "The generation gap : Imagination or relality ?" *Institute of Education*, Goteborg, Sweden.
- Bengston, V. L., Loweinstein, A., Putney, N. M., & Gans, D. (2003). "Global ageing and challenge to families", in : Bengston, V. L. and Loweinstein, A. (eds.). *Global Aging and Challenge to Families*, New York, Aldine de Gruyter, 1-24.
- Bengston, V. L. (1996). Continuities and discontinuities in intergenerational relations over time", In : Bengston, V. L. *Adulthood and Aging : Research on Continuities and Discontinuities*. New York, Springer.
- Chakrabarti, Prafulla (2006). "Elder abuse in rural West Bengal : An exploratory study", In : Sattar, M. A. (ed.) *Elder Abuse &*

Successful Ageing, Dhaka & Rajshahi, Bangladesh Association of Gerontology & Department of Statistics, Rajshahi University, 1-22.

Clarke, E. J., Preston, M., Raskin, J. & Bengston, V. L. (1999). "Types of conflict and tensions between older parents and adult children," *Gerontologist* 39(3) : 261-70.

Dhooper, S. S. (2004). Intergenerational Relationships and Well - being of Elderly", *Indian Journal of Gerontology* 18(3&4) : 488-500.

Gayathri Devi, B. P. (2004). "Young and old judge one another. Report of focus group discussion". In : Prakash, Indira J. (ed.) *Aging : Search for a New Paradigm*, Bangalore, Bangalore University.

Hagestad, G. O. (1985). "Continuity and connectedness" In : Bengston, V. L. & Robertson, J. F. (eds), *Ground Parenthood*, Beverley Hills, Sage.

Jamuna, D. (1991). Perceptions of the problems of the elderly in three generations". *Journal of Psychological Research* 35 : 99-103.

Lowenstein, A. (2002). "Solidarity and conflicts in co-residence of three generational immigrant families from Soviet Union", *Journal of Aging Studies* 16: 221-241.

Ramamurthi, P. V. (2002). "Intergenerational Relation" In : Gangadharan K. R. (ed.) *Ageing in India : Emerging Trends and Perspectives*, Heritage, Hyderabad, Heritage Hospital, 24-26.

Raju, Siva. S. (2002). "Meeting the needs of the older poor and excluded in India", *Population and Development Strategies* 2 : 93-110.

Reddy, P. J. (1989). "Intergenerational support : A reality or myth ?" In : Pati, R. N. & Jena, B. (eds.) *Aged in India : Socio-Demographic Dimensions*, New Delhi, Ashish Publishing House. 180-198.

Silverstein, M. & Bengston, V. L. (1997). "Intergenerational Solidarity and the Structure of adult child – Parent relationships", *American Journal of Sociology* 24(3): 337-359.

Seriff, M. & Seriff, C. W. (1953). *Group in Harmony and Tension : An integration of Studies on Intergroup relations*, New York, Octagon.

Verma, S. K. & Satyanarayana, A. (2007). "Influencing factors of intergenerational relations in family : A narrative approach, *Research & Development Journal* 13(1) : 10-17.

The Notion of Elderly Sexuality: Views of Older People in Two Yoruba Communities in Osun State, Nigeria.

TITILAYO Ayotunde†, AGUNBIADE Ojo Melvin‡, OPATOLA Mustapha‡ and LAWANI Ajibike*

†Department of Demography and Social Statistics, Obafemi Awolowo University, Ile Ife, Nigeria

‡Department of Sociology and Anthropology, Obafemi Awolowo University, Ile Ife, Nigeria

*Department of Educational Foundation and Counseling, Obafemi Awolowo University, Ile Ife, Nigeria

ABSTRACT

The study examined sexuality in old age through the lens of older people (55years and above) in two Yoruba communities in Osun State, Nigeria. An assessment of sexuality beliefs and relevance in old age was done using in-depth interviews and questionnaire. Selected questions based on the study objective were adopted from the Aging Sexual Knowledge and Attitude Scale (ASKAS) questionnaire. Findings show that more than eight in every ten of the elderly believed that sexual activity may be psychologically beneficial, but more males (93.1%) than females (69.8%) shared such notion. Half (48.3%) of the older males believed that aged people need younger sexual partners for stimulation, but almost all the older females (91%) disagreed. However, a high proportion (92.7%) unanimously declined that sexual intercourse in old age increases the risk of heart attack. However, both genders approved the plausibility of improving men's sexual performance in old age. The study concludes that sexuality in late life is a desirable experience. Hence, urgent attention from all stakeholders will be necessary in safeguarding older peoples' sexual health with the increasing wave of sexually transmitted infections including HIV/AIDS. Sensitization efforts on protected sex would also be necessary among older people.

Keywords: Elderly, Sexuality, Beliefs, Relevance, Sexual Health

Sexuality and sexual health are important parts of human life at all ages and thus command special attention in both psychosocial and reproductive health studies. Regardless of its importance and newfound attention in reproductive health arena, little is actually heard and known about sexuality in later life (Deacon *et al.*, 1995; Gott, & Hinchliff, 2003; Sharpe, 2004; Adepoju, 2007) especially that of the aged in developing countries of the world. Discussion of adult men's sexual agility is a welcome issue, but appears more like a taboo when it comes to their female counterparts. The relevance of human sexuality and desire of human being should not be determined by age or gender. Stone, Wyman and Salisbury (1999) argued that sexual activity in older individuals represents a satisfying sexual expression and even more directly to the motivation, needs, and satisfaction of the parties involved.

With a relatively increasing life expectancy due to improvements in quality of life, and advanced longevity all over the world, the challenge of sexuality in old age is worth reconsideration. Each stage of sexual development has its own tasks and outcomes (Levy, 1994; Week, 2003; Sharpe, 2004). Age confers specific challenges on males and female sexuality. One of the common sexual health challenges with men is Andropause also known as male menopause or viropause. It is a multidimensional change of life involving seven aspects namely: Hormonal, physical, psychological, interpersonal, sexual, social and spiritual. In terms of intensity, it has varying degrees of intensity and duration (Tan, 2008). Interestingly, it accounts for one of the main alterations in the sexual, physical and mental domains of the elderly (Fatusi *et al.*, 2004). According to Fatusi (*ibid*), the male sexually related manifestations in old age include reduced libido, erectile dysfunction, and decreased ejaculatory force and volume. It could also result into easy fatigue, hot flushes, blushing and sweating. Not only these, depression, mood swings, nervousness, anxiety and irritability, poor concentration and memory could also set in (Fatusi, *ibid*).

Challenges such as mentioned above among others have coloured societal conception of the sexual aged and replaced it with the asexual aged. The notion of the asexual aged may have health affects as well as the general quality of life and psychosocial relationships between old partners and this deserves research attention. However, many factors have led to scanty literature on sexuality in old age most

especially in the developing countries' studies. Studies in the past have failed to provide a comprehensive picture of life in old age; instead, more attention has been on dysfunction or disease than on healthy sexual development at different ages (Sharpe, 2004), later life inclusive. Another factor is the diverse views in the definition of the aged when discussing the issue of sexuality. There is a popular saying among the Yoruba's in south western Nigeria where the study was carried out that "mo o dagba ma la be" meaning "not too old to enjoy the good things of life" including 'sex'. Though, utterance like this may be more used in sexual discourse among men than women.

For this study, it is pertinent to state our operational definition of old age both for the sample and for the further discussion. Herein, we adopt Schuster and Ashburn (1992) subjective definition of old age and state that adults aged 55 years and above are regarded to people in old age in the study. Current research efforts on sexuality have challenged the various assumptions and myths about value and importance of sex in later life (Gott, & Hinchliff, 2003; MacNab, 1994; Sharpe, 2004; Van der Geest, 2001). Thus, this study, explore the relevance of the sexuality in old age from the perspectives of adults and the aged in two Yoruba communities, in Osun State, Nigeria.

Methodology

The study was carried out among adults aged (55 years and above) in two ancient Yoruba communities (Ile -Ife and Modakeke-Ife) to examine factors that influence sexuality in old age and to assess the relevance of sexuality in later life. There are two Local Government Areas (Ife central and Ife East) in both communities. The inhabitants of the two communities are predominantly farmers of both cash and food crops. Ile Ife town play host to the Obafemi Awolowo University as well as a private polytechnic. Also there are other private owned establishments including banks and schools in both communities. This explains the presence of retirees in the study. Both communities have witnessed series of communal clashes in the recent past; however, they now co-exist peacefully. In order to achieve the set objectives of the study, we used a mixed-methods approach, integrating qualitative (In-depth Interview) and quantitative (structured questionnaire). The use of qualitative and quantitative methods was necessitated to avert

what Gott and Hinchliff (2003) explained as barrier in conducting sexuality research among the aged.

The study was household based. Selection of respondents was done using purposive sampling technique. The Enumeration Area (EAs) Maps developed for both communities during the 2006 Census in Nigeria were used in selecting high residential areas. Equal number of residential areas based on the EAs was selected from the two communities. In total, 20 residential (Streets) areas were selected. From the list of selected residential areas, a list of houses was generated out of which households listing was derived. Only households with adults (55 years and above) that were Yoruba's were included. In total, 240 households met the inclusion criteria. Based on this number, a total of 190 copies of the questionnaire were administered. Only Saturdays and Sundays evenings were used in administering the questionnaire. While out of the remaining 50 households, 37 adults who met the inclusion criteria were recruited for the interview. The IDIs were conducted by the authors in English and Yoruba Languages as preferred by the interviewees. Each interview session lasted for an average of 24 minutes. All interviews were transcribed and where necessary, translated from Yoruba into English Language. Translation from Yoruba to English was done by a linguistic conversant with both languages.

The IDI was done to compliment the Aging Sexual Knowledge and Attitude Scale (ASKAS) instrument as developed by White C.B. (1982). The questions in the research instrument were translated into the local language (Yoruba).

Sample Characteristics

The background characteristics of the respondents as presented in Table 1 shows the analysis of the 150 questionnaires that were satisfactorily completed. Results revealed that 49 respondents (32.7%) were below 60 years, 70 (52%) were within 60 and 69 years, while the remaining (15.3%) were 70 years and above. Table 1 also showed that more than half (58.0%) of the respondents were male. In terms of occupational status, respondents who are farmers constituted the largest proportion (35.3%), followed by civil servants and Traders (21.3% and 17.3% respectively), while Artisans (14.7%) and Retirees (11.3%) are least respondents.

**Table 1: Background characteristics of Respondents
(Percentage distribution)**

Variables (categories)	Number	Percentage
Age		
55-59	49	32.7
60-64	47	31.3
65-69	31	20.7
70 and above	23	15.3
Sex		
Male	87	58.0
Female	63	42.0
Education		
None	30	20.0
Primary	46	30.7
Secondary and higher	74	49.3
Marital Status		
Currently married	128	85.3
Separated/Divorced	12	08.0
Widow/Widower	10	06.7
Type of marriage		
Monogamy	97	64.7
Polygamy	53	35.3
Religion		
Christian	92	61.3
Islam	45	30.0
Traditional and Others	13	08.7
Occupation		
Trading	26	17.3
Farming	53	35.3
Artisan	22	14.7
Civil service	32	21.3
Retiree	17	11.3

Source: Field Survey, 2008

Table 1 further revealed that slightly more than half (50.7%) of the studied samples had low educational background (primary or none) and the remaining 74 (49.3%) respondents had secondary school experience or higher. Additional information also showed that all the

respondents had been in marital relationships (ever married) with 128 (85.3%) being currently married and it was also discovered that majority of the respondents 97 (64.7%) were in monogamous relationship (Table 1).

Table 2: Socio-demographic characteristics of the in-depth interview Participants

Demographic	Females (n=21)	Males (n=16)
Age		
55-65 years	66.7%	62.50%
66 years and above	33.3%	37.5%
Religion		
Christianity	59.0%	48.0%
Islam	33.0%	35.0%
Traditional/Christianity/Islam	8.0%	17.0%
Educational		
Educated	29.0%	61.0%
Uneducated	71.0%	39.0%
Type of marriage		
Monogamy	48.0%	41.0%
Polygamy	52.0%	59.0%
Marital status		
Married	85.7%	82.0%
Divorced	2.5%	15.0%
Widowed/widower	11.8%	3.0%
Occupation		
Trader	47.62%	18.75%
Artisan	23.81%	43.75%
Civil servant	19.05%	18.75%
Retiree	9.52%	18.75%

Source: Field Survey, 2008

The socio-demographic characteristics of the in-depth interview participants presented in Table 2 shows that a high proportion of the participants were below 60 years, 66.7% and 62.5% of females and males were within 55-65 years respectively. Christianity was the major religion of the participants as 59% and 48% of females and males indicated Christianity. On the other hand, about 35% of females and males also claimed Islamic religion. Other information on the participants are available in table 2.

Series of questions were asked and presented in table 3 for a clearer understanding of the old age belief in sexuality. The presentation was made by gender (male/female) in order to show the differences by sex if any. Results indicate that a high proportion 84 percent of the total respondents (90.8% and 74.6% among male and female respectively) believe that sexuality issue is typically a life long need. No wonder the aforementioned common saying though by aged male “mi o dagba ma la be”. It could be inferred through this, that sexual behaviour and desire among the Yoruba’s in the study locality as expressed has no age limit. More than eight in every ten of elderly believed that sexual activity may be psychologically beneficial, however, to older participants, more males (93.1%) than females (69.8%) shared such notion. Majority of them (92.7%) unanimously declined that sexual behaviour in older people increases the risk of heart attack. Panel 7 of Table 3 shows that slightly less than half of the respondents reacted positively to the question “There is a greater decrease in male sexuality with age than there is in female sexuality”.

For a clearer picture of sexuality as conceived in old age, respondents were asked to react to the following statements: (i) sex urge typically increases with age in males (ii) most older females are sexually unresponsive (iii) older males and females cannot act as sex partners as both need younger partners for stimulation. Panel 4 of Table 3 shows that only 15.6 percent of the total respondents were of the opinion that sex urge increases with age in males, while a high proportion representing 84.4 percent declined. One-tenth of the respondents (10.3% in male and 11.1% in female) subscribed to the idea that older females are sexually unresponsive, while the remaining 89.3 percent were of the negative opinion toward the assertion (panel 5). Almost half (48.3%) of the older males believed that aged people need younger

Table 3: Percentage distribution of respondents’ belief in old age sexuality

Variables (categories)	Number(percentages)		
	Male (n=87)	Female (n=63)	Total (n=150)
1. Sexuality is typically a life long need			
Yes	79(90.8)	47(74.6)	126 (84.0)
No	08(9.20)	16(25.4)	24(16.0)
2. Basically, changes with advanced age in sexuality involve a slowing of response time rather than a reduction of interest in sex			
Yes	71(81.6)	43(68.3)	114(76.0)
No	16(18.4)	20(31.7)	36(24.0)
3. Prescription drugs may alter a person’s sex drive especially in old age ^{††}			
Yes	37(42.5)	08(13.3)	52(34.7)
No	50(57.5)	52(86.7)	98(65.3)
4. The sex urge typically increases with age in males			
Yes	15(17.2)	07(11.1)	23(15.6)
No	72(82.8)	56(88.9)	124(84.4)
5. Most older females are sexually unresponsive			
Yes	09(10.3)	44(69.8)	16(10.7)
No	78(89.7)	19(30.2)	134(89.3)
6. Sexual activity may be psychologically beneficial to older person participants			
Yes	81(93.1)	24(38.1)	125(83.3)
No	06(6.9)	39(61.9)	25(16.7)
7. There is a greater decrease in male sexuality with age than there is in female sexuality			
Yes	40(46.0)	24(38.1)	64(42.7)
No	47(54.0)	39(61.9)	86(57.3)
8. The ending of sexual activity in old age is most likely and primarily due to social and psychological causes rather than biological and physical causes			
Yes	59(67.8)	21(33.3)	80(53.3)
No	28(32.2)	42(66.7)	70(46.7)
9. Older males and females cannot act as sex partners as both need younger partners for stimulation			
Yes	42(48.3)	06(9.5)	48(32.0)
No	45(51.7)	57(90.5)	102(68.0)
10. Sexual behaviour in older people increases the risk of heart attack			
Yes	09(10.3)	02(3.2)	11(7.3)
No	78(89.7)	61(96.8)	139(92.7)

^{††} Only 60 out of 63 female respondents answered the question in this panel, bringing the total to 147.

sexual partners for stimulation but almost all older females 91 percent did not see any reason for younger sexual partners stimulant.

While the quantitative data has revealed the views of the respondents in statistical terms, a detailed picture of sexuality in old age was captured through the in-depth interviews. Participants' opinions were analysed based on the two broad emerged themes from the data: relevance of sexuality in old age and chances of improving sexual performance in late life.

The relevance of sexuality in late life: Sex in old age beneficial or not?

Quite a number of the participants narrated their present sexuality experiences with mixed reactions. There were those who still considered sex in old age as a game that must continue. This view was echoed more among males than females. Below are some of the extracts from the in-depth interviews:

As you age so also your responsibilities in life increases, especially when you have many relatives around that need your support. Such challenges among others especially when not met are enough to reduce your sexual desires. Apart from such demands and ill health, I use to find time to satisfy myself sexually. I do not patronise commercial sex workers, but there are many young ladies in town that are ready once you have your money. (Married male aged 66).

Sharing a view to the above, a female participant expressed a shrouded experience representing socially coerced feelings:

There is more to life in old age to cope with especially ones children. Sex is just one of such things and since is not food, even food; one must take it easy especially in old age. As a grandmother, it will be shameful for me to start having man friends for the sake of sex. My husband hardly request for sex, because of his old age and ill-health. Besides, my religion does not permit extra-marital affairs. So what do you expect? I keep my body and control the urge to have sex (Married female aged 62).

The orientation that life is more than having sex was also expressed by another female participant as extracted below:

As a matter of fact, my husband has four wives, but as for me I can't be competing with my co-wives because of sex. I would rather focus on what my children would become in future that is the only gain for a woman. Omo ni are aiye (Children are life's heritage) (Married female aged 57).

However, there are variations in life experiences. A slight variation from the above could be found in the experience of another woman. Sexuality is multi-context and influenced by series of factors especially cultural ones. Examples may be found in religious beliefs, the death of a partner as well as the influence of children. On gender, basis the influence of cultural factors on sexuality does not terminate easily even when aged as could be observed in the view of the below female participant:

As a woman, despite my age I still have the urge to have sex at times, but culture demands that I control the urge and it's only my husband that could make the first move and not me and when he doesn't I hold myself (Married female aged 69).

A masculine view was however expressed by a male participant as stated below:

...Why not there is no problem with me having sex at this age. "Mo dagba ma labe" (I am not too old to enjoy sex). Thank "Eledumare" (the supreme God in Yoruba oral tradition) for the good health. I have been enjoying it (sex) with my wives. You can even ask any of my wives they will tell you...even you cannot beat me to it. He laughs. Although not everybody of my age can still perform the way I do, there are secrets to it and I got this from my father who married 42 wives (Married male aged 76).

Related to the above opinion is the view of a male trader

Although I am old, but I still have young women as wives and none has ever complained of my inability to satisfy them sexually... (Married male 71)

There are obvious socio-cultural values regulating the sexuality of the participants even in old age. Religious beliefs, marriage, economic factor and other psychological factors could have influenced their views. Further findings as extracted below reveals this struggle in the lives of some of them:

Religion has a way of taking care of our sexual needs. For instance, Christianity makes provision for humans to enjoy sex only within the context of marriage and this is the ultimate means through which maximum sexual pleasure can be derived. In fact even when you are still sexually active and your partner is no more active, you just have to manage the urge so that the Devil will not use it against you. (Married male aged 63).

Enhancing sexual performance in old age

A critical theme that cut across both gender is the plausibility of improving sexual performance in old age. Both male and female participants expressed their experiences and reservations.

I have encouraged and helped my husband on several occasions in getting some local herbs in improving his sexual performance. (Married female aged 56).

At times I take some locally prepared herbs to help me perform more sexually. Even some young ladies in town enjoy having sex that will last for several minutes. I have some of them as girlfriends and I don't want to loose them... (Married male 59).

...I have been using some local herbs for so long and they have never failed me. To date I can still perform sexually as I use to in my youth days. I have also assisted many people with some of the concoctions on sexual enhancements. However, ill-health, poverty and lack of good food could hinder your ability to enjoy sex even when you are young. (Married male aged 72).

I combine both orthodox and non-orthodox drugs to keep my self fit. For sometime I have stopped using such drugs because of the fear of falling ill. I noticed that I was

becoming addicted to the drugs. I no longer have confidence in myself like I used to have when I was much younger, and this has been affecting my sexual life seriously. For instance I have been having quick ejaculation and can't have sex for more than a minute (Married male aged 59).

There are times it would be difficult to improve one's sexual performance in old age. For instance an old man suffering from a chronic illness would find it difficult to improve his sexual performance. Again when you are poor and old you will only be thinking of how to survive and not how to improve your sexual performance. (Married male Traditionalist/Muslim aged 63).

Discussion

To our knowledge, this is the first study to examine sexuality in old age from a perspective that includes that of the aged in a Nigerian community using a mixed method. The study attempt to explore sexuality experiences of the aged. Data analysis was done on gender basis in order to gain more insight into the world of older people's sexuality as well as the general belief and myths shrouding this phenomenon. Our literature search did not yield much previous study in developing countries. Many of the available studies on sexuality in Nigeria focused mainly on adolescents and the young people; the issue of sexuality in old age was left unattended to. Thus, our study represents an investigation in what we call an untapped area within sexual health in Nigeria.

The findings showed a high readiness among the aged to the issue of sexuality. This is similar to what Gott and Hinchliff (2003) observed. Results showed sexual activities is typically a life long thing among the elderly. Apart from the majority (84%) of the respondents that supported this, the in-depth interview participants also attested to the fact that sexual activities is a life long need. It was clearly shown in the findings that old age is not a factor not to perform well sexually, but factors like ill health and psychosocial (poverty, family demand and responsibilities, religion doctrine, death of a spouse) would influence sexuality in old age. This finding was also similar to that of Gott and Hinchliff (ibid)

where many of the participants cited ill-health and loss of partner as a determinant. Additional findings also showed that majority (76%) of the respondents declared that there could only be a slowing of response time and this does not translate to reduction of interest in sexual matters. Further findings through the in-depth interviews revealed that according to the participants in this study that sexual activity is psychologically beneficial in old age. With these findings, it is interesting to note that sexual activity does terminate during reproductive years alone as it enters into old age.

In the final analysis, some of the participants in the in-depth interviews claimed that at times one needs to support the sexual strength with prescribed drugs or local herb and concoctions. There is clear indication that both gender approved better sexual performance in old age. However, it is also obvious that there are many odds against women. None considered the plausibility of improving sexual performance of females in old age. Again, the available therapies mentioned by the participants indicate the availability of male sexual enhancing drugs alone. This may not be peculiar to this alone. But a large number of such drugs are available in many cultures are tailored towards meeting the sexual needs of men. Besides the functionality and acceptability of drugs enhancing sexual performance more up to average expressed fears as 52(34.7%) of the respondents (42.5% male and 13.3% out of 60 female) declared that prescription drugs may alter a person's sex drive in old age.

Our study has some limitations. Our sample size was moderate, which means a clear limitation of generalisation of findings compared to a study with a large sample size. We assessed only adults that are from the Yoruba ethnic group. Nigeria has three major ethnic groups and sexuality could likewise vary among the three major ethnic groups in Nigeria (Igbo, Hausa and Yoruba). Also, we did not investigate the plausibility of homosexual relations as our focus was only on heterosexual relations. The strength of our study lies in its coming from a population and culture that considers sexual discourse a private sphere. We also conducted the study with mixed methods as well as entertaining the views of older adults themselves.

Conclusion

Sexuality in late life is still relevant among older people in the two communities. Although there are differences in the level of relevance and values placed on elderly sexuality; however, it is obvious that good sexual health in old age is a desirable experience. Hence, urgent attention from all stakeholders will be necessary in safeguarding older peoples' sexual health especially with the increasing wave of sexually transmitted infections including HIV/AIDs. Sensitization efforts on protected sex would also be necessary among older people, instead of the total focus on adolescents and young adults.

References

- Adepoju, A. (2007). Sexuality and gender stereotyping: an exploratory discourse. *Ife Social Sciences Review* 1(22) : 81-89.
- Deacon, S., Minichiello, V. and Plummer, D. (1995). Sexuality and Older People: Revisiting the assumptions. *Journal of Educational Gerontology* 21(5): 497-513.
- Fatusi, A.O., Ijadunola, K.T., Ojofeitimi, E.O., Odumabo, A.O., Adewuyi, A.A., Akinyemi, A., Omideyi, A.K., and Aderounmu, A.O. (2004). The influence of sociodemographic factors on awareness, knowledge and attitude toward andropause among health professionals in Ile-Ife, Nigeria. *The Aging Male* 7 : 269-279.
- Gott, M., and Hinchliff, S. (2003). How important is sex in later life? The views of older people. *Social Science and Medicine* 1617-1628. Retrieved July 14, 2008 from <http://www.elsevier.com>.
- Levy, J. (1994). Sex and sexuality in late life stages. In A.S. Rossi (Ed.). *Sexuality across the life course*, pp. 287-313. Chicago: University of Chicago Press.
- Macnab, F. (1994). *The thirty vital years*. New York: Wiley.
- Schuster, C.S. and Ashburn, S.S. (1992). *The process of human development: A holistic approach*. Philadelphia: Lipponcott.
- Sharpe, T.H. (2004). Introduction to sexuality in late life. *The family Journal*, 199-2005. Retrieved July 16, 2008 from <http://tfj.sagepub.com>.

- Stone, J.T., Wyman, J.F., and Salisbury, S.A. (1999). *Clinical Gerontological Nursing: A guide to advanced practice* (2nd Ed.). Philadelphia: W.B.Saunders.
- Tan, R.(2008). *Andropause*. Retrieved August 11, 2008 from <http://www.menstuff.org/issues/byissue/andropause.html>
- Van der Geest, S.(2001). "No Strength": Sex and old age in a rural town in Ghana. *Social Science and Medicine* 53(10) : 1383-1396. Retrieved July 14, 2008 from <http://www.elsevier.com>.
- Week, J. (2003). *Sexuality*, 2nd Edition, London: Routledge.
- White, C.B. (1982). Interest, attitude, knowledge, and sexuality history in relation to sexual behaviour in the institutionalized aged. *Archives of Sexual behaviour* 11 : 11-21.

Marginalization of Elderly: Aftermath of Tsunami in Kerala

Lekshmi V Nair and Sonny Jose

Department of Sociology, Loyola College of Social Sciences
Thiruvananthapuram, Kerala

ABSTRACT

The paper draws attention towards the vulnerable section in the society viz. the elderly, who were severely hit by the Tsunami in Kerala on 26th December 2004. This group was totally neglected by Government and voluntary agencies from the reconstruction dimension. No data bank on Tsunami gives the data on elderly even after 3 years of intense studies and intervention in these regions. One can not suspect any malice except the mere reason being the fact that elderly are no longer productive, incapable of demanding or influencing considering their age. It is suggested that Government and NGOs should also consider the needs of elderly in the relief, rehabilitation, reconstruction and reconcialation.

Key words : Elderly, Natural disasters, Tsunami, Marginalization of elderly

From time immemorial man has at each stage of history sought to understand and conquer nature. But each time man thought that he comprehended some truth, nature presented something still more mystical and enigmatic. The statement of Karl Marx's "...nature has her own wisdom holds good even today. Nature continues to elude human control. Natural disasters disrupt life in many ways. Cyclones, earthquakes, tsunamis, floods, etc. are examples of natural disasters, beyond human limitations.



When Tsunami struck Alappad, Kollam

According to TAUT Informational Manual (2003), there are 2 types of disasters -Natural and Man-made. Dr. Oommen (2004) classified disasters into 3 categories- Man-made disasters, disasters due to human neglect and natural disasters. The TAUT classification further grouped Natural disasters into two- major and minor. In India, four major kinds of natural disasters- floods, earthquakes, cyclone and droughts – occur. Tsunami, is a natural disaster of horrendous proportions. It was the first time since Independence that a Tsunami occurred in India; the earlier reference of Tsunami in India was on the year 26 June 1941. However as per records available, Tsunami was first experienced on 31 Dec. 1881 (Lunde, 1998). Whereas, all the other natural disasters take a longer duration for the disaster itself to occur, Tsunami strikes in a very short time, but with long term consequences.

India was one of the three countries severely affected in the disaster that struck the south-east Asia on 26th December, 2004. Within India, the worst affected territories were Tamil Nadu, Pondicherry, Kerala & Andaman Nicobar Islands. After Tamil Nadu, Kerala coast

was the most affected, with 24,70,000 people being hit in it. Around 11,832 dwelling units were destroyed in Kerala alone. In Kerala, Kollam was the worst hit recording 132 deaths. Alappuzha had a toll of 32 and Ernakulam, 5 (Government of Kerala, 2005). In effect the Tsunami entered 1-2 kms inland and destroyed in all 187 villages. In Kollam district, where the study was conducted the disaster was very severe, leaving 132 dead and more than 6,000 people without livelihood.

Men lost their precious possessions such as boats and fishing nets, while women lost the whole household. Children lost their parents and parents lost their children. Such losses which occur almost every year during the monsoons were amplified when Tsunami struck the coastal region. Till date, these social categories are given due attention by the Government and the various voluntary agencies. There is yet another vulnerable section in the society, viz. the elderly. The survey revealed that both men and women in the age group of 65 and above, were totally neglected by the Government and voluntary agencies from the reconstruction dimension. No data bank on Tsunami gives the data on elderly even after 3 years of intense studies and interventions in these regions. One cannot suspect any malice except the mere reason being the fact that elderly are no longer productive, incapable of demanding or influencing considering their age.

A peripheral analysis of Tsunami affected areas showed that many who lost their lives were the senior citizens of the region as they were inside the house during that time. The coastal regions of Kerala - Kollam, Alappuzha and Ernakulam, was hit by Tsunami at 9.30 in the morning of 26 December 2004. The timing itself was vulnerable for elderly, as during this time many house holds in the coastal region were left with elderly alone. Men were engaged in stitching of nets and women go door-to-door for selling fish. The immobile members of the family- the elderly who do the sentry jobs in the house were left alone in the hutments. Although the children were hit they were accountable, whereas data regarding the loss of elderly was not accurate. The children were also given all attention during rehabilitation whereas the elderly who survived the disaster were totally neglected during this process.

Kerala is a state where the elderly population is relatively high (11%) as the life expectancy here is higher than the other states - 72 yrs for male and 68 yrs - female). Given this situation it is paradoxical to find out that there was no data on the elderly of Tsunami affected areas. Further, the elderly were meted a step-motherly treatment during the rehabilitation. Raja Durai, Director of Help Age India, Southern Regional Office (2004), was more eloquent when he stated, "we felt that in many relief operations, it is the elders who are not getting their share".

These disasters destructions present 3 cides- genocide, culturocide and ecocide (Oommen, 2004). *Genocide* and *ecocide* are the understandable side of the disasters. However, *culturocide* although voluminous in proportion, is a blind spot for those who studied Tsunami. Many studies come out on genocide and ecocide. But the degrees of cultural disasters are not studied by many. *This paper attempts to analyse the culturocide of the Tsunami disaster which occurred recently in India and affected the southern parts of the country. The present study focuses on the problems of the elderly post-Tsunami, in the Tsunami hit region of Alapad Grama panchayat of Kollam district of Kerala. The study makes an intense dissection of the minds of the elderly in these regions.*

Tsunami as any other natural disaster had far reaching consequences. The main phases of aftermath of Tsunami are relief, rehabilitation and reconciliation (Oommen, 2004). All these three are important for holistic approach to meet the disaster. Relief is attending to the immediate needs of the people, whereas rehabilitation is done according to the availability of resources, while reconciliation, the last stage is to be achieved either by the affected party themselves or with the help of an external agency. The relief, rehabilitation and reconciliation phases however are palce and context specific.

Immediate relief was extended to the affected in the form of food supplies. During the first few days they were happy to receive it. But within a week, they became unhappy and expressed their dissatisfaction stating to the effect "we don't want your food". Soon they began demanding that if at all given anything, it ought to be given in the form of raw-materials such as rice, pulses, chillies, etc. so that we can cook according to our taste". Likewise, truck loads of relief materials were

left lying unwanted because of the social and cultural incompatibility between the materials supplied and those required by the coastal people. It has to be mentioned here that the relief reached the main stream among the affected namely, the adults and children. The elderly were marginalized in this operation too.

Given the above two questions come to one's mind. The first was essentially regarding the dynamics of why the elderly were neglected during the relief operation. Secondly, one wondered how they coped with the situation after the immediate relief. Studies and surveys conducted post-Tsunami in Tamil Nadu as well as Kerala reveal that the elders are not given priority as they were unable to come to the forefront when the relief and rehabilitation activities were being undertaken. As there are no special packages for the elderly, they had to go relief camp where they were literally pushed into the background by their own community people including own kins. Many elderly men and women complained that when they were in the queue or when they stretch their hands in the crowd, the younger people hurled abuses at them asking them why are they were there, and demanded that they go and wait elsewhere instead of being trampled. Heeding this they often withdrew from the scene but never to see those who turned them away. This happened to many elderly men and women not just once, but more than 3-4 times. There are many cases where the elderly people become more dependent post-Tsunami on their family members or community. This is because they were unable to live on their own in the anomic situation post-Tsunami.

The elderly were the ones among the population who had to bear most, the brunt of a cultural conflict post-Tsunami. This cultural conflict is the result of the impact - physical, psychological, social & economic – of the disaster which are culturally determined. The aged experience cultural conflict not only within, but also outside their own selves. The change in domicile and the living conditions in itself also posed a dilemma for the aged. Being habituated to living nearby the sea, getting up early in the morning to the sounds of boats and the shouts of joy of a fresh catch, breathing in the all pervasive smell of dried fish and worshipping the sea goddess in their immediate vicinity, the Tsunami literally uprooted them and threw them into a new time and space totally alien to them. Most of the tin roofed tents they lived in, were far away from the sea.

The camp wash rooms were common and at a distance. Although a safe distance from the vulnerable beaches, these camp houses were entirely different from the traditional homes that hardly anyone among the elderly was satisfied. The inner conflict and frustration due to the inability to adjust to these shelters manifested as anger towards the people around them.

Added to these hardships, once when the permanent houses were distributed, the elderly were again marginalized. Among the fishermen community of Kerala, the family structure is nuclear especially since both boys and girls lived separately from their families of origin. As long as the parents were healthy, they would do independent jobs such as fishing in the sea or selling fishes in the neighborhood. When they become old, they prefer to sit just outside the hut, and do odd jobs such as maintenance of nets, repairing country boats, processing the catch, etc. Elderly women in the community engaged in drying the fish in front of their houses with salt and these were sold. Further, because of

the active lifestyle the coastal people enjoyed a longevity that was higher than those who lived on the mainland. Moreover, they had fewer health problems and were able to do their jobs independently (Nayar, 2001). It is in this backdrop that the change from traditional living to a new, artificial created a cultural dilemma for the elderly fishermen community.

The physical impact of the rehabilitation includes not only the housing condition but also the natural sources of living like kitchen utensils, etc. The cots of the fisherman community were unique in that they could be movable and



would withstand the nature. Being so much used to the old ones, if these cots were replaced by sturdy, steel cots, they could not sleep. It was no surprise to witness in the rehabilitation centers, elderly men and women lying on the floor even when steel cots are provided. Their dressing pattern was so unique, and they simply rejected the modern dresses provided as part of the relief packages.

Health problems arising as a result of physical impact was yet another area of cultural conflict. Many among the elderly who survived the disaster or were saved by the onlookers, sustained physical injuries such as fractures, muscle pain, tendon problems, cough and cold. Usually when they fall ill they went to the nearby primary health centers and procured medicine. But following the Tsunami, they lost their identity cards and health cards, preventing them from accessing the health care system. Even after repeated pleas for a way out, the authorities turned a deaf ear. Further, being familiar with the local family doctor, the elderly were not feeling at ease with that particular doctor who came in to serve as part of the relief operations. Christopher aged 72 yrs, simply refused to consult the doctor who came to the relief camp stating that "I cannot believe that he is a physician. I will go only to my old doctor". Post-disaster trauma counselling is very essential. But even the counsellors involved apparently also neglected the elderly.

The Tsunami had tremendous economic impact on these senior members of the community. Those engaged in petty occupations were thrown out of their occupation. For nearly 3 months after the disaster, most of the young or the old were without any occupation. Most of the old people were involved in work allied to the sea, and unless the young went to sea, the elderly would not get work. Post-tsunami they were left without food for days together. At one point of time when the researchers visited a house where an old couple was living, they found food in the vessels. But the couple was unable to eat that food because it was cooked over a kerosene stove and smelt unusually pungent, something they were so unused to. Although many thought that there was not much difference in the taste, they could not eat because of the feeling that the food contained kerosene. The role of culture in the gastronomical behaviour of the people is so great that it was visible among the elderly in the fisherman community even during the post-tsunami period. During the tsunami many economic resources including

pension cards- old age pension, widow pension, cancer pension, etc. were lost.

The socio-cultural impact of Tsunami is in other words the cultural conflict is a conflict between tradition and modernity especially when the younger generation of fishermen community assimilated the modern culture, while the old generation continued living in a traditional way. Alappad *taluk*, Karunagappally Grama panchayat is in itself a rural area and the fisher folks of Alappad are not so much exposed as their counterparts in Alappad or Cochin. Fish and the sea are the cultural symbols of this community. The Hindu Arayas who belong to the OBCs and Dalit Christians who are SCs, the major categories of the area form an endogamous unit. According to the Government of Kerala, fisherfolks come under OBCs. Even the SCs among the fisherfolk are not given any concession legally due to the SCs. Dr. Oommen comments "the presumption behind categorizing the fishermen of peninsular India as OBC is the absence of the practice of untouchability among them." The rehabilitation process of Tsunami was caste- and class- based as most of the agencies who were involved gave priority for their own people. The Dalit NGOs gave priority to the Dalits, whereas the Christian NGOs gave preference to their community. It is reported that the non-Dalit NGOs prevented Dalits from using the camp toilet and even went to the extreme of denying others food and water. The most affected were the Dalit elderly, who literally went starving during the days following the Tsunami. The high castes were given a preferential treatment by all including their own community and were put up in separate camps and assigned primary resources. Here again, the elderly among this community were given a marginal treatment. In short, the researcher tried to argue that there existed a social ranking on the basis of caste and class, even among the elderly, during the rehabilitation process.

The aged among the fisher folks require more emotional support in the society. The loss of the grandchildren affected them more than the loss of their children. The affinity between the grandchildren and grand parents has no bounds and boundaries. NIMHANS reported a case study of a 65 yr old women, who was giving bath to her grandchildren when she saw the waves coming. She caught hold of the children and started running away from the shore to save herself

and her grandchildren. However, the waves washed away her grand children. She continued to say "I could have saved my grand children if I had held them more tightly. I am responsible for their death". In another case, the loss of their children put an additional burden on them as they were forced to bring up the grandchildren. In either case, they remained tense and fearful when they think about tsunami. In the former, an unnecessary guilt haunts as a result of which psychosomatic symptoms manifest as digestive problems, mental disorders and constant fear. In the latter case, tension and fear are the main mechanisms playing on them.

Social and cultural changes in both the cases, affect the elderly personality more. A few women who lost their grand parenting role, found it hard to accept the change; e.g. when other children called them "*Ammooma*" (grandma) they became emotional and their face suddenly changed and fear loomed in their eyes.

Although the emotional problem affected their health very easily, they believe that it was the socio-cultural transformation that they had undergone that had affected them more. In one instance an elderly man who lost both son and grandson was so angry with the daughter - in -law that he found a reason to get even with her every now and then. When she served chapathis for supper he was unable to chew them nor able to consume the expected quantity because of his faulty tooth. Unable to accept the fact, he blamed it on his daughter-in-law. The inference is that he was bent upon changing the diet instead of going to the dentist.

Among the elderly, women are much more affected than men from the emotional and social angle. The women who had been confined to their respective households doing household work found it extremely hard to stomach the change in environment when they had to live in common settlements or camps. Portable drinking water was another problem during the post-Tsunami period. The elderly seldom accepted by bottled water; although hygienic, they thought that it did not contain natural water.

The change in the family structure was another serious problem encountered by the elderly. The loss of children, grand children and relatives shattered their families. Although the fishermen moved away

after marriage to have nuclear families, they continued to associate and remain inextricably linked with their larger parent family. This structure was broken and this also affected the elderly to a great extent.

This cultural and social conflict affected the personality of the individuals which at times precipitated suicidal tendencies. The feeling of loss, economic deprivation, loneliness, mental stress and anxiety about the future, livelihood, etc. are some of the factors that affected the elderly more than the youngsters. During the interviews many of the elderly revealed that they wished that they had died along with their close kins they lost. The new lease of life was considered to be a burden that they often contemplated of suicide. Despite all this expression, the researchers could not record even a single case of suicide in the coastal area post- Tsunami.

Relief and rehabilitation was very haphazard as far as the elderly were concerned. Once the fishermen are temporarily rehabilitated, reconstruction started. The concept of reconstruction is differently used by sociologists. One of the terms used is reconciliation (Oommen, 2004). Reconciliation is a process of coming to a compromise with nature in the event of natural disorders. In man made disasters, the reconciliation has to be between two groups of men, while here, it is between man and the sea. Another important factor is that the fishermen regarded the sea as Goddess, and in this event the reconciliation had to be between man and the God. But the process of reconciliation is not that easy such as in a natural disaster like tsunami. Although the sea never alienates people, the fear of sea gives a feeling of alienation from the sea to the people. The comments find expression in various forms. One of the comments goes 'Our goddess betrayed us. How can we believe her in future?' Another was just the opposite. An 80 yr old man saw Tsunami as a result of man's abuse of the sea. He believed that deep sea trenching, mechanized boats, nylon nets, etc. angered the Goddess, and revenge came back in the form of Tsunami. A majority of the fisher folks believed that Tsunami to be a supernatural phenomenon that came to destroy the Earth. The scientific background of Tsunami was unknown to the coastal people. After Tsunami those residing in the coastal area were so much afraid of the sea, rain, darkness, tides, etc. For a few days nobody ventured out, went near the sea nor went fishing. During the night, except in groups, they never went out

alone for the fear that Tsunami might hit again. Children were not sent to school during cloudy days and during rains, instead were confined to their houses for the fear that Tsunami might take them away. Allaying such fears from the minds of the people was the immediate concern of reconstruction and reconciliation.

Devoid of fear and anxiety reconstruction and reconciliation will be easy. Unfortunately, the community never cared nor bothered to remove fear from the minds of the elderly. Even external agencies such as NGOs, churches and the Government focused their attention on children and adult. Only negligible assistance in the form of counselling was provided to the elderly. Repeated visits of the elderly in the Tsunami hit areas highlighted the fact that counselling is more necessary for this group as much as it was to the youngsters. Cultural contradictions in the form of belief system, folk ways wielded a strong influence among the elderly and hence counseling was necessary to dispel these. Many external agencies came into the scene during the reconstruction time. Among them the most important ones are Help Age India and NABARD. Both the agencies helped the elderly by providing financial assistance as well as counselling. They also helped in the formation of ESHGs (Elderly SHG), perhaps the first of its kind in this part of the world. This was a unique outcome and a boon for the elderly. Elderly SHGs mainly depended on income generating activity was a novel initiative to improve the socio-economic and psychological well being, in other words the continuous survival of the elderly. Reconstruction was the main goal of these SHGs. It was a successful movement as many men and women over 60 years of age got a new lease of life, a suitable orientation and guidance for the future. During the relief and rehabilitation stages there was no proper coordination and attention for the elderly. Though there were many volunteers and a lot of relief materials, the elderly as a group were totally neglected during the first two stages of post-Tsunami work. But during the reconstruction period Help Age India and some other NGOs took conscious efforts to lend a helping hand to the elderly in forming ESHGs in the Alappad Gramapanchayath. Poverty alleviation was partially met through these ESHGs. Following the establishment of ESHGs, the members of the ESHGs took to reconciliation with the sea, their Goddess. It was quite after a long time that they realized that Tsunami

was a natural disaster having geological and geographical bases. It was a surprise for them to learn that it was not God's curse, but rather nature's way of retribution. It was after this reconciliation, people began moving freely to the sea. Majority of the coastal people now feel the need of an early warning system for Tsunami. The members of ESHGs now remain more reassured that the authorities are taking care for them through financial assistance, social assistance as well as scientific assistance by means of an early warning system.

Conclusion

Hence, the researchers concluded that marginal groups in an anomic situation will become further marginalized due to inherent vulnerabilities. The help of external agencies becomes necessary as they are the most vulnerable group in the population. In the event of a natural disaster where there is a complete social breakdown, normalcy is achieved through different stages like - relief, rehabilitation, reconstruction and reconciliation. The speed and the duration of this purposive change take place depending upon the influence of external agencies which are operating on them. Thus from a social breakdown there has been a reconstruction in the lives of these people.

References

- Issacs, B., Livingstone, M. and Neville, Y. (1983). *Survival of the Fittest: A Study of Geriatric Patients*. Routledge: London.
- Lunde, D. B. (1998). Aftermath of a Disaster: Establishing a Rebinding Program." *The Next Library Scene* 17 (2).
- Nayar, P.K.B. (2001). Health and Health Care Systems among the Old. Report submitted to the Ministry of Social Welfare, GoK.
- Oommen, T.K. (2004). *Relief, Rehabilitation and Reconciliation of a Natural Disaster*. Paper presented at the National Seminar on Disaster Management, Madurai Kamaraj University, Madurai.
- Ramamurthi, P.V. (2002). *Positive Aging in Elderly*, Sage Publication: New Delhi.
- The World Economic Outlook Database. (2002). International Monetary Fund: Washington D.C.

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 is 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.

REQUEST

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**.

VISIT OUR WEBSITE : www.gerontologyindia.com

You may contact us on : gerontoindia@gmail.com

NEW LIFE MEMBERS

559Dr. Reeta Kumar

Associate Professor, Department of Psychology

B.H.U., Varanasi 221005

Book Received for Review

Dimensions of Ageing : Indian Studies

Editor : K.L. Sharma

Rawat Publications, Jawahar Nagar, Jaipur

2009, pp. 347. Price Rs.

The present compilation of 33 papers (empirical studies) by eminent Indian Social scientists have been grouped in six sections viz. Quality of life, Personality and adjustment, Attitudes towards the elderly, Problems of elderly, Social status of social support and Successful ageing.

Researchers, policy makers and NGO's working in the fields of gerontology, social sciences and psychology would find this book informative and thought provoking. The empirical findings of these studies will also help NGOs and policy makers in organising and directing their social action.

OBITUARY

With a very heavy heart we express our deep feelings of loss on the untimely demise of Prof A.L. Bhatia of the Zoology Department, University of Rajasthan, on our personal behalf and on behalf of the Indian Gerontological Association. He happened to be an active member of our Association and also a member of editorial board of Indian Journal of Gerontology, was always ready to help the cause of the Association and its activities.

INDIAN COUNCIL OF SOCIAL RESEARCH

The Indian Council of Social Science Research (ICSSR), an autonomous organization established by the Government of India, promotes research in social sciences and facilitates its utilization.

It covers the disciplines of (1) Economics (including Commerce), (2) Education, (3) Management (including Business Administration), (4) Political Science (including International Relations), (5) Psychology, (6) Public Administration; and (7) Sociology (including Criminology, Social Work). In addition, it covers the social science aspects of the disciplines of (1) Anthropology, (2) Demography, (3) Geography, (4) History, (5) Law and (6) Linguistics.

As part of its activities, ICSSR publishes the following journals which are available for sale as per details given below :

INDIAN SOCIAL SCIENCE REVIEW (HALF-YEARLY)

The Journal brings multi-disciplinary and interdisciplinary approaches to bear upon the study of social, economic and political problems of contemporary concern. It publishes article of general nature as well as those focused on particular themes. It also contains book - review.

For subscription, kindly write to M/s. Sage Publications Pvt. Ltd., Post Box No. 4215, M-32, Greater Kailash Market-1, New Delhi - 110 048.

Subscription Rates	Individuals	Institutions
	Rs. 250.00	Rs. 495.00
	US \$ 43	US \$ 88
	£ 26	£ 63

ICSSR JOURNAL OF ABSTRACTS AND REVIEWS : ECONOMICS (Half-yearly)

Abstracts of selected articles from Indian economics periodicals and reviews of selected books published in English in India are published during the 1991-97, and was revived in 1998 as a new series. The following Volumes are available for sale :

Subscription Rates	Individuals	Institutions
Volume 1-12	Rs. 25.00	Rs. 30.00
Volume 16-21	Rs. 30.00	Rs. 50.00

Volume No. 1 & No.2 (1998) (New Series)	Rs. 150.00	Rs. 250.00
	US\$ 120	US\$ 250.00
	£ 80	£ 80
Volume 2 No. 1 & No. 2 (July-Dec. 1999)	Rs. 1500.00	Rs. 250.00

ICSSR JOURNAL OF ABSTRACTS AND REVIEWS : GEOGRAPHY (Half-yearly)

The Journal publishes abstracts of research work as well as book-review. It was started in 1977. The following Volumes are available for sale :

Subscription Rates	Individuals	Institutions
Volume 1-8	Rs. 15.00	Rs. 20.00
Volume 9-21	Rs. 30.00	Rs. 50.00
Volumes 22 & 23 (1996 & 1997)	Rs.150.00	Rs.250.00
	US\$ 120.00	US\$ 120.00
	£ 80	£ 80
Volume 24 & 25 (1998 & 1999)	--	--

ICSSR JOURNAL OF ABSTRACTS AND REVIEWS : POLITICAL SCIENCE (Half-yearly)

This journal publishes abstracts, of articles in Political Science published in Indian Journals, book reviews and a list of reviews published in Political Science Journals. It was started in 1977. The following Volumes are available for sale :

Subscription Rates	Individuals	Institutions
Volume 1-12	Rs. 15.00	Rs. 20.00
From Volume 13-24	Rs. 30.00	Rs. 50.00
Volume 25 (1998) onwards	Rs. 150.00	Rs. 250.00
	US\$ 120	US\$ 210.00
	£ 80	£ 80

Upto Volume 28 (1) (Jan - June, 2001)

ICSSR JOURNAL OF ABSTRACTS AND REVIEWS : (Half-yearly) (New Series)

The journal commenced publication in 1972 for the dissemination of relevant research-based information in the form of abstracts and review articles on contemporary issues in psychology and related disciplines in India. The new series started in 1994.

The following Volumes are available for sale in the ICSSR Volume 2-10, 11, 15, 21 to 28.

For subscription and trade inquiries of new series, please write to M/s. Sag Publications India Pvt. Ltd., Post Box No. 14215, M-32, Block Market, Greater Kailash-1, New Delhi - 110 048.

Subscription Rates	Individuals	Institutions
Volume 1-24	Rs. 20.00	Rs. 30.00
Volume 25-28	Rs. 30.00	Rs. 50.00
Volume 1 (1994) New Series	Rs. 270.00	Rs. 545.00
	US\$ 61	US\$ 155
	£ 39	£ 90

Onwards upto Volume 8 No. 2 (July-Dec.2001)
(Volume 1 and 13-14, and 16-17 are out of print)

ICSSR JOURNAL OF ABSTRACTS AND REVIEWS : SOCIOLOGY AND SOCIAL ANTHROPOLOGY (Half-yearly)

This journal publishes selected reviews of publication in the broad fields indicated in the title of the journal as well as abstracts of research works. The following Volumes are available for sale :

Subscription Rates	Individuals	Institutions
Volume 1-6	Rs. 12.00	Rs. 12.00
Volume 7-13	Rs. 16.00	Rs. 20.00
Volume 14-23	Rs. 30.00	Rs. 50.00
Volumes 24-25, 26-27 (Single issue)	Rs. 150.00	Rs. 250.00
	US\$ 120	US\$ 120
	£ 80	£ 80

Volumes 28 No. 1 & 2 Rs. 150.00 Rs. 250.00

Volumes 29 No. 1 & 2 (Jan. - June, 2000)
(July - Dec., 2000)

US \$ 120 US \$ 120
£ 80 £ 80

(Volumes 5 to 13, 16 are out of print)

The journals/publications are supplied against advance payment only. Payment should be made through Cheque/D.D. drawn in favour of **Indian Council of Social Science Research, New Delhi.**

Four outstanding cheques, please add Rs. 15.00 towards the clearing charges,

For Subscription / order and trade inquiries, please write to :

Assistant Director (Sales)
Indian Council of Social Science Research
National Social Science Documentation Centre
35, Ferozeshah Road, New Delhi - 110 001
Phone : 3385959, 3383091
e-mail : nassdocigess@hotmail.com
website : www.ICSSR.Org
Fax : 91-3381571

Dissemination of Research Information through journals of Professional Organisations of Social Scientists.

The ICSSR provides financial assistance, on an *ad hoc* basis, to professional organisations of social scientists for running their journals (as also for the maintenance and development of organisations).

Proposals for grant, in the prescribed proforma, are required to reach the Council in the beginning of the financial year.