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Dr. Vinutha U Muktamath
Assistant Professor, Department of Human Development and Family Studies, College of Community Science, UAS, Dharwad, Karnataka, India

Dr. Pushpa B Khadi
Retired Professor (HAG), Department of Human Development and Family Studies, College of Community Science, UAS, Dharwad, Karnataka, India

Priya Ramesh Hegde
Graduate Assistant, Department of Human Development and Family Studies, College of Community Science, UAS, Dharwad, Karnataka, India

Nutritional status and risk factors associated among rural elderly in Northern Karnataka: An intervention study

Dr. Vinutha U Muktamath, Dr. Pushpa B Khadi and Priya Ramesh Hegde

Abstract
The rapidity of ageing population around the world is increasing radically. A longer life brings with it opportunities, not only for older people and their families, but also for societies as a whole. Older people experience poor nutritional status, decline in physical and psychological problems. In this regard, an attempt was made with an objective to improve the nutritional status of the rural elderly of Dharwad district. The participants of the study were elderly (60 +years) under the project "Establishment of Day Care Centre for Elderly and Young children" conducted during the year 2018-20. Education intervention on nutrition and common health issues was provided to the 330 elderly in eight batches from ten villages. Baseline analysis showed that more than twenty per cent of the elderly were having anaemia and physical health problems. More than fifty per cent of the elderly were malnourished and having cognitive impairment. Educational intervention was found to be effective in enhancing the nutritional status and health status of the elderly.

Keywords: elderly, nutritional status, mental health, intervention

Introduction

Ageing an irreversible biological process has health-related, social, cultural, and economic dimensions. It is a universal process and a by-product of demographic transition; the change from high fertility and mortality rates to low fertility and mortality rates. One of the major characters of demographic transition across the world has been the considerable raise in the absolute and relative numbers of elderly people and is true in the case of developing countries like India.

According to Population Census 2011 there are nearly 104 million elderly persons (aged 60 years or above) in India; 53 million females and 51 million males. A report released by the United Nations Population Fund and Help Age India suggests that the number of elderly persons is expected to grow to 173 million by 2026 (Statista, 2020) [8]. The life expectancy at birth during 2009-13 was 69.3 for females as against 65.8 years for males. (Elderly in India-Profile and Challenges-2016) [5].

The increase in life expectancy has brought forward other challenges of health care management. Many senior citizens undergo from malnutrition and other health related issues like diabetes, hypertension, coronary heart disease, osteo-arthritis, osteoporosis, depression, and cataract-related blindness. The problem of poverty, both relative and chronic and dilution of family system pretences additional challenges when it comes to older persons, particularly those in rural and far-flung areas with inadequate access to health care facilities. Approximately 20% of older adults have a mental illness today, yet only half of older adults who acknowledge such problems receive treatment and only a fraction of those receive specialized mental health services (Dupree *et al.,* 2005; U.S. Department of Health and Human Services, 1999) [4, 7].

Nutrition has a vast impact on the physical health and wellbeing of older adults. Many people may not comprehend that nutrition needs vary depending on a person's age. Just like toddlers have different dietary needs than teenagers, nutritional needs for elderly folks are much different than that of younger adults. Unfortunately, senior nutrition doesn't get the attention they deserve and seniors are extremely susceptible to malnutrition. Not only does healthy eating for seniors contribute to physical health, but it also has a huge bearing on memory and mental function.

Corresponding Author
Dr. Vinutha U Muktamath
Assistant Professor, Department of Human Development and Family Studies, College of Community Science, UAS, Dharwad, Karnataka, India

Ageing slows down metabolism and appetite and body's capacity to absorb nutrients (particularly specific important nutrients). Healthy consumption for seniors is exponentially significant for organ functions, managing unceasing illnesses like hypertension, diabetes, dementia, and to strengthen immune system.

In view of this, the present study aimed to assess the nutritional status, mental health status and impact of nutritional intervention in Dharwad district of North Karnataka.

Material and Methods
A total of 330 rural elderly (60+ years) from Dharwad district formed the sample of study from 2018 September to 2020 January. The study was the part of the project on "Establishment of day Care Centre for Elderly and Young Children" conducted under the aegis of University of Agricultural Sciences, Dharwad.

A correlational design was used to study the influence of nutritional status of rural elderly on selected independent variables and a quasi-experimental design with pre and post-testing to assess the impact of intervention on nutritional status was employed. The tools used for the study included Mini Nutritional Assessment (MNA) (Guigoz, *et al*., 1994) [6], The Mini Mental State Examination (MMSE) (Kurlowicz and Wallace, 1975) [11], Socio-economic status scale (Aggarwal *et al.* 2005) [1] and a self -structured questionnaire to collect general as well as health related issues were used. The nutritional status was assessed using Mini Nutritional Assessment (MNA) and measuring anthropometric parameters such as height, weight, waist circumference, hip circumference calf circumference and mid-arm circumference. The elderly were tested for hemoglobin, hypertension and diabetes at base line and follow-up testings.

The Educational intervention was conducted for duration of 10 weeks/batch for a total of eight batches from ten villages with approximately 40-45 elderly in each batch. A total of 20 sessions, 2-3 hours for each session was taken for providing knowledge on below listed issues. In the intervention programme nutritional diet as per RDA for elderly was planned based on local foods and elderly were made to follow accordingly. Also the family members were educated on the importance elderly diet. Also supplementary diet mixes like ragi malt mix, millet mix,etc were provided to each elderly registered in the programme. Health check-up at baseline and post check-up through follow up sessions were carried out for checking-up diabetes, hypertension, bone density tests, eye and dental problems. Pre and post test was conducted before and after intervention. For the post-test 274 elderly were regained.

The intervention programme was conducted using multimedia techniques, demonstration, and family based counselling on related issues as below
1) Nutritional aspects :Balanced diets –importance of fruits and vegetables, Common eating problems in the elderly, Benefits of drinking sufficient water, Avoidance of Five white poisons in our diet
2) Common Physical Problems of elderly and its management: Healthy eating, Importance of exercises, meditation, Hypertension and Hypo tension, Osteoporosis, Diabetes mellitus, Constipation, Smell and taste: spice of life, Skin care, Foot care , Mud therapy and Hydro therapy.
3) Psychological health problems and management – Remedies: Mental health, Anger management, Sleeplessness and techniques for good sleep, Stress management, Memory decline and compensation strategies, Social participation & isolation
4) Positive Practices for improving quality of life of elderly: Importance of recreational and physical activities, Confidence building, Conflict resolution skills and Effective communication. Coping with grief and loss, Happiness, Spirituality, Positive-thinking, Forgiveness, Relationship with adult children & children-in-law, Bad habits in older people.
5) Yoga, pranayama and exercises sessions were conducted by the Yoga professional to improve the quality of life of elderly.

The study was approved by University of Agricultural Sciences, Dharwad and oral consent of the participants was obtained to take part in the research.

Results
The Table 1 showed the distribution of elderly at pre-test based on the individual characteristics, anaemia, health problems, nutritional status, waist-hip ratio and mental health status. Majority of the elderly (73.30%) were in young old age group. With regard to gender, 65.50 per cent were male and 34.50 per cent were female. More than fifty (55.20%) belonged to lower middle socio-economic status and 73.60 per cent were anaemic. Majority (75.20%) were not having any physical problems and 24.80 per cent were having physical problems. With respect to nutritional status of the elderly, 47.0 per cent were in at risk of malnutrition, 44.80 per cent were normal nutrition status and remaining 8.20 per cent of the elderly were malnourished at pre-test**.** It was observed that 21.52 per cent exhibited abdominal adiposity and with respect to mental health status, forty per cent had mild cognitive impairment, 53.34 per cent had no cognitive impairment and only 5.76 per cent of the elderly had severe cognitive impairment.

Table 1: Percentage distribution of the rural elderly at pre test

N=330

Sl. No.	Variables	N	%
	Age (in yrs)		
	Young Old (60-74)	242	73.30
	Old Old (75-84)	69	20.90
	Oldest Old (85 and above)	19	5.80
	Gender		
2.	Male	216	65.50
	Female	114	34.50
3.	**Socio-Economic Status**		
	Poor	58	17.60

	Lower middle	182	55.20	
	Upper middle	90	27.30	
4.	**Anemia**			
	Yes	87	26.40	
	No	243	73.60	
5.	**Physical Problems**			
	Yes	82	24.80	
	No	248	75.20	
6.	**Nutrition status**			
	Malnourished	27	8.20	
	At risk of malnutrition	155	47.00	
	Normal nutritional status	148	44.80	
7.	**Waist to Hip ratio (WHR)**			
	Normal (< 0.85)	259	78.48	
	Abdominal adiposity (> 0.85)	71	21.52	
8.	**Mental Health status**			
	Severe cognitive impairment	19	5.76	
	Mild cognitive impairment	135	40.90	
	No cognitive impairment	176	53.34	

Table 2: Logistic regression analysis indicating predictor factors for nutritional status of the elderly

N=330

Sl. No.	Factors	Undernourishment				OR (95%)	P- value
		Yes		No			
		N	%	N	%		
	Age						
1.	Young old	114	34.54	128	38.78	1	
	Old old	38	11.51	31	9.39	0.772 (0.604, 0.988)	0.117 [NS]
	Oldest old	12	3.63	7	2.12	0.933 (0.558, 1.562)	
	Gender						
2.	Male	115	34.8	101	30.6	1	
	Female	67	20.3	47	14.2	0.351 (0.730, 0.991)	0.38*
	Socio-economic Status						
3.	Poor	55	16.7	3	0.9	1	
	Lower middle	101	30.6	81	24.5	0.225 (0.006, 0.077)	0.002**
	Upper middle	26	7.9	64	19.4	0.326 (0.190, 0.560)	
	Anaemia						
4.	Yes	121	36.7	122	37.0	4.410 (2.47, 7.85)	0.001**
	No	61	18.5	26	7.8	1	
	Physical Problems						
5.	Yes	44	13.3	38	11.5	1	
	No	138	41.8	110	33.3	0.831 (0.413, 0.915)	0.754 [NS]
	Mental Health Status						
6.	Sever cognitive impairment	9	2.72	10	3.03	1	
	Mild cognitive impairment	78	23.64	57	17.27	1.191 (0.516, 2.749)	0.916 [NS]
	No cognitive impairment	91	27.58	85	25.76	1.052 (0.662, 1.671)	

NS-Non Significant
**Significant at 5 per cent level of probability
** Significant at 1 per cent level of probability

Gender, Socio-economic status and anaemia were found (table 2) to be the significant factors predicting malnourishment among the elderly. The risk of malnutrition was high in males compared to females. Lower the SES, higher was the risk of malnutrition and anaemia prevalence increased the risk of malnutrition by 4.4 times. Age, presence of physical health problems and mental health status did not predict the malnutrition among elderly.

Table 3: Effect of personal, health factors and mental health status on Nutritional status of rural elderly

N=330

| Predictors	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Personal factors						
Age	-0.119*	0.058	-0.105*	0.052	-0.100*	0.052
Gender	-0.074	0.067	-0.070	0.060	-0.079	0.060
Socio-economic status	0.130*	0.048	0.123*	0.043	0.116*	0.039
Health factors						
Anemia			0.139*	0.067	0.141*	0.067
Physical problems			0.500**	0.066	0.497**	0.066
Mental health						
Mental Health status					-0.063	0.046
R square	0.018		0.215		0.219	
Adjusted R square	0.009		0.203		0.205	
Standard error of the estimate						
F	1.963^{NS}		17.736*		15.122**	

The simple linear regression analysis (table 3) indicates that the personal factors like age, and SES (model I) were found to influence the nutritional status of elderly, however, the model as such did not have any significant influence. In model II, when health factors like anaemia and physical problems were added to personal factors, the model significantly influenced the nutritional status of elderly to 20.30 per cent (adjusted R square). Also, Model III shows that the personal factors, health factors and mental health status together significantly predict the nutritional status of elderly to 20.50 per cent. The F-value and standard error of estimate indicates that model II and Model III are good fits and significantly predict the nutritional status of elderly.

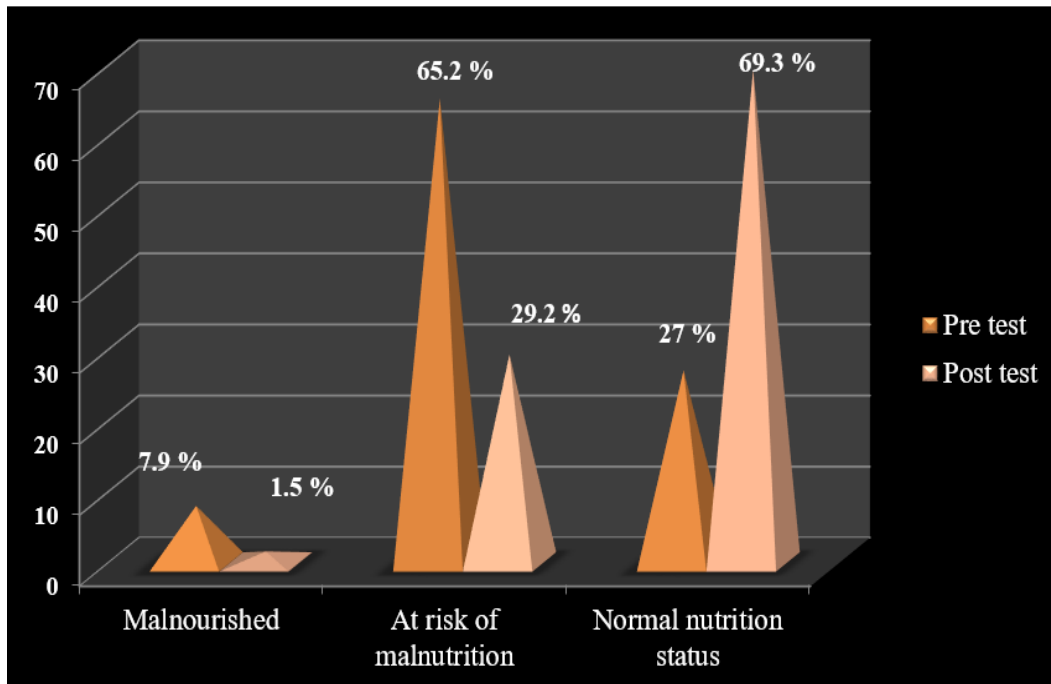**Effect of intervention on the anaemia and Physical health problems, Nutritional status and Mental health status of rural elderly**

Distribution of the elderly on anaemia and physical health problems shows a significant decrease in the number of elderly having anaemia and for physical health problems from pre-test to post-test. Intervention helped in many ways by reducing the anaemia and physical health problems among elderly.
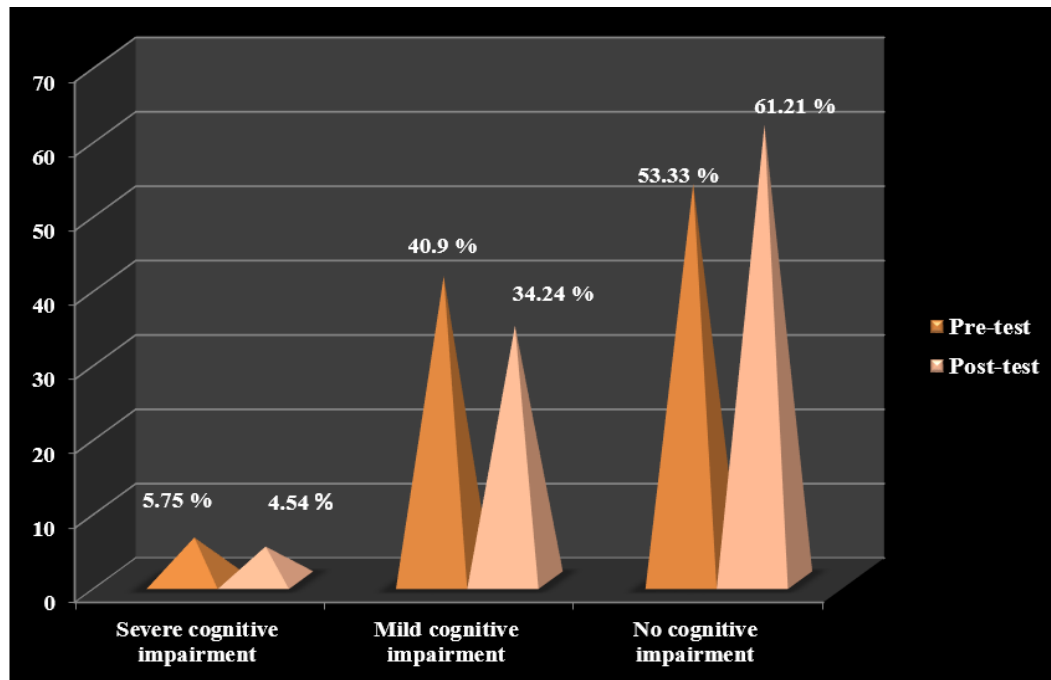
Nutritional status and mental health status scores of the elderly were subjected to statistical analysis. A significant improved was observed in the both nutritional status and mental health status of the elderly from pre-test to post test. Post- test analysis showed that there was significant reduction in the percentage of malnourished, reduction in abdominal adiposity and severe cognitive impairment category. Intervention provided was proved to be effective in improving the health status of the rural elderly. (Fig 1, 2 & 3, Table 4)**.**
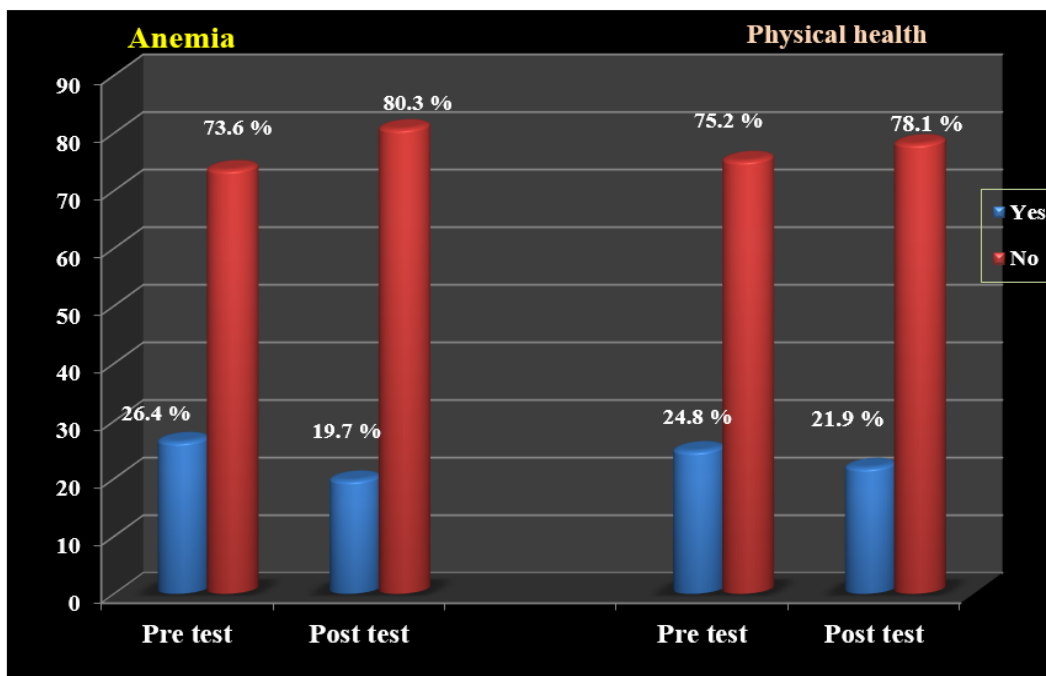
Fig 1: Percentage distribution of the elderly on anaemia and Physical health problems at Pre and Post test

Fig 2: Percentage distribution of the elderly on nutritional status at Pre and Post test

Fig 3: Percentage distribution of the elderly on mental health status at Pre and Post tes

Table 4: Anemia, Physical health problems, Nutritional status and mental health status among rural elderly at Pre and Post test

Variables	Pre test (n=330)		Post test (n=274)		Paired t-value
	Mean	SD	Mean	SD	
Anemia	9.95	1.84	10.94	1.91	5.36*
Physical health problems	3.5	1.02	2.1	1.05	4.71*
Waist to Hip ratio	1.37	7.71	1.58	7.12	3.36*
Nutritional status	22.28	5.03	24.37	3.76	16.08**
Mental health status	23.15	4.89	24.98	3.37	14.09**

Discussion

It is observed from the study that nearly twenty five per cent of the elderly participants were having health problems and anaemia. Hypertension, diabetes, back pain, knee pain and

digestion problems were the major health problems noted among elderly. Apart from this elderly were suffering from dental problems, hearing impairment, cataract and arthritis. Health problems increased with advancing age which is because of normal process of ageing. Also it was evident from the results that elderly exhibited lack of knowledge on nutrition, health care practices and facilities. Similarly Shankar *et al*. (2007) [16] reported that more than eighty per cent of the elderly were found to suffer from one or more illness and morbidity was directly proportional to the age. The most common morbidity was arthritis followed by hypertension. Clausen *et al*. (2010) [2] stated that majority of the elderly experienced good or only somewhat reduced health, while one quarter suffered more serious health problems. Takur *et al*. (2013) [17] reported that a large number

of unmet health need, such as un-operated cataract, uncontrolled hypertension, uncorrected hearing impairment and tobacco use, exist in marginalized groups of elderly.

Nutritional status indicated a relatively high prevalence of malnutrition among elderly. The malnutrition rate was high among male elderly compare to female elderly. Anaemia and physical health problems were the contributing factors for the malnourishment in elderly. Socio-economic status was a reliable predictor of a huge array of outcomes of health including nutrition. Neglect and isolation at the home was sharpened by financial and emotional dependency on their families and others. It was also observed that male elderly who lost their spouses found to be at the risk of malnutrition. In Indian society, domestic chores and meal preparation for the family members are mainly done by women. In most of the families women are the servers of food. So, death of the spouse/wife could be a life-shattering experience for male elderly and it may cause psychological impacts such as depression and grief. In addition physical consequences such as sleeplessness, loss of appetite and digestion problems may arise in the elderly. Shankar et al. (2007) [16] found that compared to married people higher percentage of widow / widower suffered from old age related morbidities. The study results were also consistent with the study conducted by Kansal et al. (2016) [10], who found a high prevalence of elderly individuals at risk of malnutrition and but however there was no association found between gender and nutritional status of elderly. Lahiri et al. (2015) [12] stated that 29.4% elderly had malnutrition and 60.4% were at risk of malnutrition. Older age, lower income of family, low literacy level, decreased food intake, and fewer consumption of meals were independently associated with lower nutritional status. (Cuervo et al. 2009, Kabir et al. 2006) [3, 9].

In the present study, mental health status of the rural elderly showed that, more than fifty per cent of the participants had mild cognitive impairment at pre-test. This might be due to age related memory loss, effect of the medications, depression, dementia etc. Sengupta et al. (2014) [15] who revealed increasing age, unmarried/widowed status, illiteracy, unemployment and poverty were found to be independently associated with cognitive impairment.

The study emphasizes the role educational interventions in improving nutritional status, health and cognitive status among elderly. Elderly participants expressed that intervention programmes helped in improve their health, status and psychological needs. It assisted to create cordial relationship in the family and with neighbours and social networks. It enhanced the knowledge on nutrition, self -care and medication Meditation and pranayama helped in reducing stress and enhanced relaxation and tranquility among older adults. The study results were consistent with the study by Majumdar et al. (2012) [13] and Muktamath et al. (2020) [14] who reported that the impact of education intervention programme on the nutrition and health knowledge of residents had significant and the detailed scores obtained by the elderly inmates in nutrition and health aspects has improved significantly in all the participants after the education intervention programme.

Acknowledgement

References
1. Aggarwal OP, Bhasin SK, Sharma AK, Chhabra P, Aggarwal K, Rajoura OP. A new instrument (scale) for measuring the socioeconomic status of a family: preliminary study. Indian. Journal of Community Medicine 2005, 30(4).
2. Clausen F, Sandberg E, Ingstad B, Hjortdahl P. Morbidity and health care utilisation among elderly people in Mmankgodi village, Botswana. Journal of Epidemiology and Community Health, 2020, 54 (1).
3. Cuervo M, García A, Ansorena D, Sánchez-Villegas A, Martinez Gonzalez M, Astiasarán I. Nutritional assessment interpretation on 22,007 Spanish community dwelling elders through the Mini Nutritional Assessment test. Public Health Nutrition 2009;12:82-90.
4. Dupree LW, Watson MA, Schneider MG. Preference for mental health care: A comparison of older African Americans and older Caucasians. Journal of Applied Gerontology 2005;24(3):196-210.
5. Elderly in India-Profile and Challenges. Central Statistics Office, Ministry of Statistics and Programme Implementation, Government of India 2016
6. Doi: www.mospi.gov.in
7. Guigoz Y, Vellas B, Garry PJ. Mini Nutritional Assessment: a practical assessment tool for grading the nutritional state of elderly patients. Facts and Research in Gerontology 1994, 15-59.
8. Health, United States, Health and Aging Chart book (1999). U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, Maryland, 1999.
9. India - perceived and actual share of population over 60. July, 2020. Doi: www.statista.com.
10. Kabir ZN, Ferdous T, Cederholm T, Khanam MA, Streatfied K, Wahlin A. Mini Nutritional Assessment of rural elderly people in Bangladesh: The impact of demographic, socio-economic and health factors. Public Health Nutrition 2006;9:968-974.
11. Kansal D, Baliga SS, Kruthika K, Mallapur DM. Nutritional assessment among elderly population of rural Belagavi: a cross-sectional study. International Journal of Medical Science and Public Health 2016;5(7):1496-1499.
12. Kurlowicz L, Wallace M. Mini-Mental State: A practical method for grading the cognitive state of patients for the clinician. Journal of Psychiatric Research 1975;12(3):189-198.
13. Lahiri S, Biswas A, Santra S, Lahiri SK. Assessment of nutritional status among elderly population in a rural area of West Bengal, India. International Journal of Medical Science and Public Health 2015;4(4):569-572 doi: 10.5455/ijmsph.2015.20122014117.
14. Majumdar, Padmini, Saraswathi G, Premavalli KS. Impact of education intervention on the nutrition and health knowledge of elderly residents and staff of old age care institutions. Help-age India-Research and Development Journal 2012;18(1):29-35.
15. Muktamath VU, Khadi PB, Hegde, PR, Koppad A. Nutritional status of rural elderly of Dharwad district: An intervention study. International Journal of Chemical Studies 2020;8(6):815-818.
16. Sengupta P, Benjamin A, Singh Y, Grove A. Prevalence and correlates of cognitive impairment in a north Indian elderly population, WHO South-East Asia Journal of Public Health 2014, 3(2).

17. Shankar R, Tondon J, Gambhir IS, Tripathi CB. Health status of elderly population in rural area of Varanasi district. Indian Journal of Public Health 2007;51(1):56-58.
18. Thaku RP, Banerjee A, Nikumb VB. Health problems among the elderly: A Cross-Sectional Study. Annals of Medical and Health Sciences Research 2013;1:19-25.