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RESEARCH ARTICLE

A STUDY ON THE HEALTH STATUS OF THE INSTITUTIONALIZED AND NON-INSTITUTIONALIZED ELDERLY IN MUMBAI CITY

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ABSTRACT

There are physiological, psycho - social changes which are the characteristics of aging in elderly and also dietary factors that influence their nutritional status. A cross sectional study using purposive sampling method with 190 elderly (90 institutionalized and 100 non - institutionalized) above 60 years of age including both men and women was conducted in Mumbai, India. Tool used was interview schedule, anthropometric measurements and a three day 24 hrs diet recall. Non-institutional males and females had significantly higher weight, BMI, waist and hip circumference, and had significantly lower energy, protein and fat intakes. Females had significantly higher fat intake as compared to males. Significantly higher percentage of non-institutional had impaired glucose tolerance ($\chi2$=46.558), osteoarthritis, back pain, used denture, complained of soft gums, higher prevalence of blood pressure as compared to institutional elderly ($p<0.05$). There was no significant difference in prevalence of diabetes ($\chi2$=0.627). On the other hand, significantly higher number of institutional elderly had renal disease ($\chi2$=16.367), presence of oedema ($\chi2$=17.675), osteoporosis, used sticks, suffered from gastro-intestinal disorders (constipation) and parkinson's disease as compared to non-institutional elderly ($p<0.05$). The prevalence of illness was significantly higher in Institutional elderly except for diabetes, blood pressure and osteoarthritis.

INTRODUCTION

There are physiological, psycho - social changes which are the characteristics of aging in elderly and also dietary factors that influence their nutritional status (Silveira *et al*., 2007). The elderly are at increased risk of malnutrition due to insufficient food intake (amount) and poor selection of food (quality). This situation is aggravated when institutionalized, the occurrence of nutritional disorders in institutionalized elderly ranging from 30% to 80%, with a consequent negative impact on their health (Alibhai *et al*., 2005). Good nutrition status in elderly benefits the individual as well as the society by decreasing health care costs, promoting independence and improving physical functioning (WHO, 2011). The relationship between the socioeconomic status and energy intake of elderly are also associated with the quality of life (Battino and Maria, 2004). The prevalence of metabolic syndrome is increased and is often under-evaluated in elderly. Hence, early identification of high risk groups for metabolic syndrome in elderly may benefit them by better care which can be given at the preliminary stage (Das, 2012). According to World Health Organization, the world's elderly population i.e. people 60 years of age and older, is 650 million. Along with the positive trend of increasing global health, however, special health challenges for the 21st century are preparing health providers and societies to meet the needs of elderly people, training for health professionals on old-age care, preventing and managing age-associated chronic diseases, designing sustainable policies on long term care and developing age-friendly services and settings (WHO, 2011). Current family structure is unable to provide support and care to the older persons because of the changing socio-economic and demographic conditions. Along with this changes in the occupational structure and decline in the family size which is due to their children not living with their parents which has led to many security problems for the elderly (Thakkar, 2013).

Old Age Homes (OAH) provides residential care for elderly who are in search for alternative home for security, companionship, care or who are unable to function independently. Geriatric services are largely unorganized though there are 1018 old age homes all over India (Directory of Old Age Homes, 2002).

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MATERIALS AND METHODS

A cross sectional study was conducted in Mumbai, India involving 190 (90 institutionalized and 100 non-institutionalized) elderly above 60 years of age including both men and women and purposive sampling method was used for sample selection. For non - institutionalized elderly, subjects were selected from the residential areas of Mumbai metropolitan city and for institutionalized elderly subjects were taken from Kishangopal Rajpuripa Vanprathashram, Bhayander and Ahura, Dahanu Road. Interview schedule including personal background information, anthropometric data (height, weight, waist and hip measurements), medical history (diabetes mellitus, cardiovascular diseases, hypertension, renal system, skeletal system, gastro intestinal system, hepatic and neural system), three days 24 hour dietary recall (one weekend and two weekdays) were collected. Diet recall was taken by using standard volumetric measures. BMI and waist hip ratio were calculated. Statistical Analyses were performed using SPSS software for Windows (version 16.0, 2007, SPSS Inc, Chicago, IL). Data are presented as Mean ±SD and Frequencies (percentages). P-value < 0.05 was considered to be statistically significant.

RESULTS AND DISCUSSION

Basic characteristics

The current study described data on 190 elderly (103 males, 87 females). Among the 103 males, 57 (55%) were non-institutionalised whereas 46 (45%) were institutionalised. Among the 87 females, 43 (49%) were non-institutionalised whereas 44 (51%) were institutionalised. A significant association of marital status and place of living was found [non-institutional: married 74 (74%), unmarried 1(1%), widow/widower 25 (25%); institutional: married 12 (14%), unmarried 20 (22%), widow/widower 57 (64%)] ($\chi2$=73.986, p<0.05). Significantly higher percentage of non-institutional elderly were non-vegetarians [84(84%)] ($\chi2$=31.106) and used government facilities [31(31%)] ($\chi2$=24.678) as compared to institutional elderly [non-vegetarian 41(46%), use government facility 3 (3%)] (p<0.05). On the other hand, significantly higher percentage of institutional elderly were literate [68(76%)] ($\chi2$=5.858) and were non-ambulatory [10(11%)] ($\chi2$=6.646) as compared to non-institutional elderly [literate; non-ambulatory 2 (2%)] (p<0.05). There was no significant difference in non- institutional elderly [35(35%)] and institutional elderly [32(36%)] availing pension ($\chi2$=0.006, p=0.936).

Anthropometric characteristics & Nutritional Intake

Males had significantly higher height (163.3±5.6 cm), weight (64.0±10.1 kg), waist circumference (92.5±12.1 cm) and waist: hip ratio (0.98±0.06) as compared to females [height (152.3±6.8 cm), weight (56.1±11.2 kg), waist circumference (86.3±12.5 cm) and waist: hip ratio (0.93±0.7)] (p<0.05). There was no significant difference BMI and hip circumference between males [BMI (24±3.4 kg/m2) and hip circumference (94.3±14.9 cm)] and females [BMI (24±4.3 kg/m2) and hip circumference (93.7±14.6 cm)] (p>0.05). Energy (1503±269 kcal), protein (45.8±13.5 g) and CHO (243.4±41.0 g) intake was similar in males and females [energy (1509±257 kcal), protein (45.8±9.0 g) and CHO (236.0±38.6 g) (p>0.05). Females (42.4±2 g) had significantly higher fat intake as compared to males (38.4±14.2 g) (p<0.05). Anthropometric characteristics and nutritional intake in males and females when classified according to place of living is given in Table 1. As seen in Table 1, non-institutional males had significantly higher weight, BMI, waist and hip circumference as compared to institutional males (p<0.05). Similarly, non-institutional females had significantly higher weight, BMI, hip circumference and lower waist: hip circumference as compared to institutional females (p<0.05) (Table 1). Both non-institutional males and females had significantly lower energy, protein and fat intakes as compared to institutionalised males and females (p<0.05) (Table 1). There was no significant difference in height or CHO intakes of institutional or non-institutional males or female (p>0.05) (Table 1).

One of the studies concludes that socio-demographic attributes such as age, sex have strong influence on the energy intake of the elderly. One of most significant trends in the industrializing societies which are adversely affecting the older people is the change in their living arrangements and family structure. In our country, the elderly enjoy a privileged status in the family where they are respected and not usually forced to live in isolation (Rajhans and Sharma, 2011).

Basic Health and Medical History

Off the 190 adults studied in the current study, 135 (71%) [74 (72%) males, 61 (70%) females] suffered from some disease. 78 (41%) elderly had been treated for the disease. Amongst the total elderly, 119 (62.6%) had medical insurance and 56 (30%) had undergone medical surgery. Fig. 1. represents the basic medical history and health status of institutional and non-institutional elderly. As seen in Fig. 1. significantly higher number of institutional elderly had medical insurance ($\chi2$=102.025) and significantly lower history of medical surgery as compared to non-institutional elderly ($\chi2$=0.922) (p<0.05). There was no significant association of disease prevalence ($\chi2$=1.686), treated for disease ($\chi2$=0.097) and consumption of medication ($\chi2$=0.029) between institutional and non-institutional elderly (p>0.05) (Fig 1). Data presented as percentage (frequency). p<0.05 is significant for comparison between non-institutional and institutional elderly.

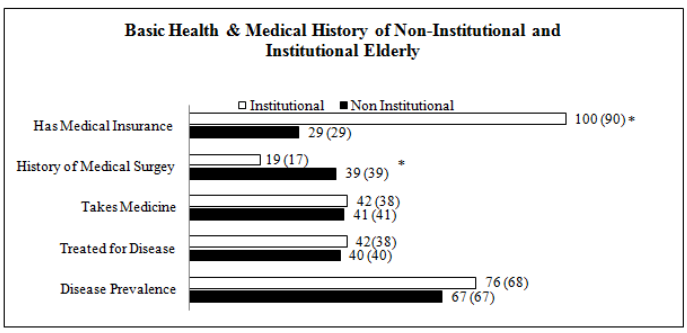

Fig. 1. Basic Health and Medical History of Non-Institutional and Institutional Elderly

Diabetes: Prevalence and treatment

Off the 190 adults, 25 (13%) had diabetes and 47 (25%) had impaired glucose intolerance. Three (2%) were on insulin, 20 (11%) took diabetic medication whereas 59 (31%) were on diabetic diet to control diabetes. Three (2%) suffered from complications of diabetes. Fig. 2. represents diabetes prevalence and treatment when classified according to institutional and non-institutional elderly. Significantly higher percentage of non-institutional had impaired glucose tolerance ($\chi2$=46.558) and were on diabetic diet ($\chi2$=7.894) as compared to institutional elderly ($p<0.05$) (Fig. 2). There was no significant difference in prevalence of diabetes ($\chi2$=0.627), use of insulin ($\chi2$=2.743), use of diabetic medication ($\chi2$=2.705) and prevalence of diabetic complications ($\chi2$==2.743) and place of living ($p>0.05$) (Fig. 2).

Data presented as percentage (frequency). $p<0.05$ is significant for comparison between non-institutional and institutional elderly. Majorly in older people with high sugar levels are predisposed to Type 2 diabetes mellitus (Hoskote and Joshi, 2008). With more people living longer and growing heavier there is increase in the prevalence of diabetes mellitus this is because of increase in life expectancy, rural urban shifts, moves from traditional to modern life style (i.e. change in diet and physical inactivity and obesity). A survey done in 2005-2006 represents a positive association in the prevalence of diabetes with age and peaked at 60yrs to 74yrs (Cowie *et al*., 2009). A study done by Singh and his colleagues (2011) show the prevalence of diabetes amongst older population which ranges from 3.3% to 36.0%. 16.41% is the average prevalence of diabetes amongst geriatric population in urban areas of India.

Table 1. Anthropometric characteristics and Nutritional Intake of elderly when classified according to place of living

	Males			Females		
Characteristics	Non- Institutionalised	Institutionalised	P value	Non- Institutionalised	Institutionalised	P value
Height (cm)	164.2±5.7	162.3±5.4	0.082	152.8±7.1	152.4±6.6	0.783
Weight (kg)	67.6±8.0	59.5±10.7	0.000	59.5±11.7	52.9±9.8	0.006
BMI (kg/m2)	25.1±2.9	22.5±3.4	0.000	25.4±4.1	22.8±4.0	0.004
Waist (cm)	96.9±9.2	87.0±13.1	0.000	88.7±9.7	83.9±14.5	0.077
Hip (cm)	99.1±7.1	88.3±12.6	0.000	98.3±11.7	89.2±15.8	0.003
Waist: Hip Ratio	0.98±0.7	0.99±0.06	0.506	0.91±0.07	0.95±0.7	0.011
Energy	1387±306	1648±92	0.000	1372±302	1644±69	0.000
Protein	41.4±16.3	51.2±5.4	0.000	40.9±9.6	50.6±5.2	0.000
CHO	242.2±53.5	244.9±15.7	0.741	228.5±51.2	243.3±17.5	0.072
Fat	27.9±9.1	51.5±6.0	0.000	32.7±9.0	52.0±4.4	0.000

Data presented as Mean ±SD. $p<0.05$ is significant for comparison between non-institutional and institutional elderly

Table 2. Bone and Dental Health of Non-Institutional and Institutional Elderly

	Non Institutional	Institutional	chi square	p value
Osteoporosis	4 (4)	34 (38)	33.778	0.000
Osteoarthritis	24 (24)	10 (11)	5.356	0.021
Rheumatoid	6 (6)	1 (1)	3.191	0.074
Joint Pain	56 (56)	44 (49)	0.961	0.327
Back pain	43 (43)	24 (27)	5.29	0.021
Difficulty getting up from chair	54 (54)	40 (44)	1.73	0.188
Walking Difficulty	49 (49)	41 (46)	0.225	0.635
Use of Wheel Chair	2 (2)	2 (2)	0.011	0.915
Use of Stick	19 (19)	30 (33)	5.085	0.024
Fracture	15 (15)	8 (9)	1.663	0.197
Denture	44 (44)	25 (28)	5.39	0.020
Bleeding Gums	0 (0)	1 (1)	1.117	0.291
Soft Gums	35 (35)	8 (9)	18.444	0.000
Inflamed gums	8 (8)	5 (6)	0.444	0.505

Data presented as frequency (percentage). $p<0.05$ is significant for comparison between non-institutional and institutional elderly.

Table 3. Cardiac, Gastro-intestinal and Mental Health of Non-Institutional and Institutional Elderly

	Non Institutional	Institutional	chi square	p value
Cardiovascular Health				
Cardio-Vascular Disease	13 (13)	13 (14)	0.084	0.772
Myocardial Infarction	7 (7)	11 (12)	1.506	0.22
Angina Pectoris	6 (6)	10 (11)	1.605	0.205
Blood Pressure Problem	55 (55)	32 (36)	7.215	0.007
Gastro-intestinal health				
Gastro-Intestinal Disorder	22 (22)	52 (58)	26	0.000
Diarrhoea	0 (0)	2 (2)	2.246	0.134
Constipation	9 (9)	41 (46)	32.644	0.000
Mal-absorption	5 (5)	3 (3)	0.326	0.568
Acidity	15 (15)	21 (23)	2.142	0.143
Ulcer	1 (1)	0(0)	0.905	0.343
Mental Health				
Parkinson's Disease	0 (0)	26 (26)	33.469	0.000
Alzheimer Disease	3 (3)	7 (8)	2.169	0.141

Data presented as frequency (percentage). $p<0.05$ is significant for comparison between non-institutional and institutional elderly.

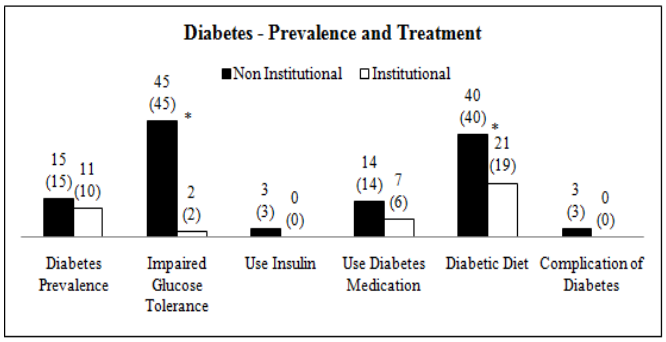

Fig. 2. Diabetes – Prevalence and treatment of Non-Institutional and Institutional Elderly

Renal Health

Off the 190 adults, 17 (9%) had renal disease, 3 (2%) had abnormal albumin levels, 7 (4%) underwent dialysis and 18 (10%) had oedema. Twenty-five (13%) elderly had high urine frequency, 154 (81%) had average or normal urine frequency and 11 (6%) complained of low urine frequency.

Fig 3 represents renal health of institutional and non-institutional elderly. Significantly higher number of institutional elderly had renal disease ($\chi2=16.367$), high urine frequency ($\chi2=9.456$), low urine frequency ($\chi2=5.558$), undergo dialysis ($\chi2=4.286$) and presence of oedema ($\chi2=17.675$) as compared to non-institutional elderly) ($p<0.5$) (Fig 3). On the other hand, significantly higher number of non-institutional elderly had average urine frequency as compared to institutional elderly ($\chi2=16.475$, $p<0.05$) (Fig 3). There was no significant difference in the number of institutional and non-institutional elderly having abnormal album levels ($\chi2=0.455$, $p>0.05$) (Fig 3). Data presented as percentage (frequency). $p<0.05$ is significant for comparison between non-institutional and institutional elderly. Dugdale (2012) says aging causes muscle changes which affects bladder control. There are changes in kidney and bladder. As person ages, there is overall reduction in amount of kidney tissue and number of nephrons, blood vessels supplying the kidney becomes harder and elastic tissue becomes tough and thus bladder becomes less stretchy, also there can be blockages in urethra.

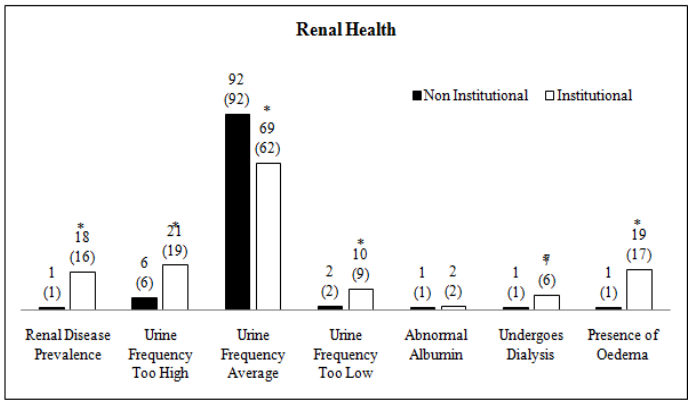

Fig. 3. Renal Health of Non-Institutional and Institutional Elderly

Bone and Dental Health

Off the 190 adults, 38 (20%) had osteoporosis, 34 (18%) had osteoarthritis, 7 (4%) had rheumatoid arthritis, 100 (53%) complained of joint pain, 67 (35%) complained of back pain, 95 (50%) had difficulty getting up from chair, 90 (47%) had difficulty walking, 23 (12%) had suffered from a fracture, 4 (2%) used wheel chair and 49 (26%) used stick). When dental health was assessed, 69 (36%) used dentures, 1 (1%) complained of bleeding gums, 43 (23%) complained of soft gums whereas 13 (7%) complained of inflamed gums. Table 2 describes the bone and dental health of institutional and non-institutional elderly. Significantly higher number of institutional elderly had osteoporosis and used sticks as compared to non-institutional elderly ($p<0.05$) (Table 2). On the other hand, non-institutional elderly had osteoarthritis, back pan, used denture and complained of soft gums as compared to institutional elderly ($p<0.05$) (Table 2). There was no significant difference in prevalence of any other bone or dental health of institutional or non-institutional elderly ($p>0.05$) (Table 2). In developed countries cost of musculoskeletal disorders has been increased. True figure are not available for India but global estimate suggest it being a public health problem especially in developed nations with 9.6% of men and 18% of women ≥ 60 years having symptomatic osteoporosis. Age standardized prevalence rate per 100,000 persons for knee osteoporosis as 1770 for males and 2693 for females (wolf and Pfleger, 2003 and Symmons *et al*., 2011).

Cardiac, Gastro-intestinal and Mental health

Off the 190 adults, 26 (14%) had cardio-vascular disease, 18 (10%) suffered from myocardial infarction, 16 (8%) suffered from angina pectoris, 87 (46%) had blood pressure problem, 74 (39%) had gastro-intestinal disorder, 26 (14%) had Parkinson disease and 10 (5%) had Alzheimer's disease. The different gastro-intestinal diseases that the elderly suffered included diarrhoea [2 (1%)], constipation [50 (26%)], mal-absorption [8 (4%)], acidity [36 (19%)], ulcer [1 (1%)] and liver disease [2(1%)]. Table 3 represents the prevalence of cardiac, gastro-intestinal and mental health in institutional and non-institutional elderly. As seen in the Table 3, institutional elderly had significantly lower prevalence of blood pressure as compared to non-institutional elderly ($p<0.05$).

On the other hand, institutional elderly had significantly higher prevalence of renal disease, gastro-intestinal disorders specifically constipation and Parkinson's disease as compared to non-institutional elderly ($p<0.05$) (Table 3). There was no difference in other cardiac, gastro-intestinal or Alzheimer's disease in elderly when classified according institutional or non-institutional ($p>0.05$) (Table 3). Risk of cardiovascular diseases is almost 2 folds higher in men than in women (Dick *et al*., 2007 and Yatte *et al*., 2004). With age there are changes in gastrointestinal system. Also some pathological factors like diabetes, pancreatitis and liver disease have potential effect on gastrointestinal system (Saffrey, 2004). Constipation is a common problem with prevalence ranging from 15% to 20% in the community-dwelling elderly population and up to 50% in nursing home residents. Constipation results from a combination of risk factors, such as reduced fibre and fluid

intake, decreased physical activity resulting from chronic diseases and multiple medications (Bosshard *et al*., 2004). According to the National Institute of Health (2013). Parkinson's affects 50% more men than women, but impacts people of all ethnicity and socio-economic backgrounds. According to the National Parkinson Foundation (2013), approximately 60,000 new cases of PD are diagnosed each year, joining the 1.5 million Americans who have the disease. The condition usually affects those over age 65. Approximately 1% of seniors have some form of the disease. To conclude, prevalence of illness in institutional and non-institutional elderly was assessed. The prevalence of illness was significantly higher in Institutional elderly as compared to non-Institutional elderly except for diabetes, blood pressure and osteoarthritis, the prevalence of which was significantly higher in non-institutional elderly.

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