

Nutritional Status Of Elderly Persons: A Comparison Between Institutionalized And Non – Institutionalized Elderly Persons In Nairobi City County, In Kenya

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Abstract: Malnutrition has been recognized as a common problem among the elderly persons and is associated with certain diseases and impaired functioning. Little is known about Nutritional Intake and Nutritional care among the Elderly Persons. This study determined the nutritional status of the Institutionalized elderly Persons and compared with that of the elderly Persons Living in non-institutions. The MNA questionnaire was used to measure the Nutritional Status of the Elderly Persons. Two hundred and seventy elderly men and women who met the inclusion criteria were sampled, 135 from 4 Institutions and 135 from Non-Institutions. Data were coded and entered using EPI Info version 9 and were analyzed using SPSS version 17. There was a significant relationship between gender and MUAC ($\chi^2 = 12.745$, $df = 2$, $p = 0.002$) with the mean MUAC measure among women (0.77 ± 4.13) being higher than that of men (0.75 ± 0.388), $t = 4.446$, $df = 268$, $p = 0.714$. There was a significant relationship between the place of residence and self-view of nutritional status by the elderly ($\chi^2 = 6.737$, $df = 2$, $p = 0.034$) with those in the non-institution having a better self-view of their nutritional status. These findings will lighten the social protection burden of the elderly, a move in tandem with African modern socialization from Socialistic to Individualistic societies, fueled by migration and urbanization by young employable persons in economic pursuit as well as reduce on disease burden among the elderly.

Keywords: *Elderly, Nutrition, Malnutrition, Institutions and Non-Institutions of the elderly.*

I. INTRODUCTION

The population of older persons is increasing at a very rapid rate, all over in the world. It was about 200 million in 1950, rose to 606 million in the year 2000 and is projected to reach 1.2 and 2.0 billion in 2025 and 2050 respectively. In Africa, the population of older persons, 60 years and above is currently estimated to be 42 million and is projected to reach between 205 to 212 million by the year 2050. One of the biggest increases in population ageing in Africa is expected to

occur in Kenya where it is projected that by 2050, there will be a 470% increase in the number of older persons who will represent approximately 10% of the Kenyan population (1). Malnutrition poses a huge economic cost to society. The malnourished elderly are more likely to require health and social services, have more hospitalizations, and cause a burden on caregivers. Without comprehensive and coherent frameworks guiding nutrition of the old in Kenya, substantial resources and efforts continue to be wasted (2). Despite significant medical advances, under nutrition among the

elderly remains a significant and highly prevalent public health problem of developing countries. The overall prevalence is 22.6%. Nearly 40% of hospitalized elderly and 50% of those in rehabilitation facilities are malnourished, and 86% are either malnourished or at risk for malnutrition. Up to 67% of elderly in nursing homes are malnourished or at risk for malnutrition (2).

II. MATERIALS AND METHODS

THE STUDY DESIGN

The study adopted a Comparative Cross Sectional Study Design in determining the Body Mass Index, Intake of Protein Markers, Mode of feeding, Opinion on Nutrition and Health status, Number of meals consumed, Fluid Intake, Consumption of 3 or more prescription drugs and Appetite and Weight Loss among the Elderly Persons.

STUDY POPULATION

In line with the UN definition of Older Persons (3), the study population comprised of both men and women aged 60 years and above. The respondents age was determined by use of their National Identity cards in which their date of birth is stated and the care-givers. For the elderly persons who could not remember and did not have their National Identity cards, their date of birth was deduced from dates of important historical and social events as applied by the Registrar of births and deaths in Kenya (1).

INCLUSION AND EXCLUSION CRITERIA

The study included elderly men and women aged 60 and above years living in 4 Institutions of the elderly and Non-Institutions in four divisions in Nairobi City County, who had lived in the Institution or with their family members for the last one year. It excluded subjects with cancer, end-age renal disease/terminal illnesses, those receiving Artificial/Parenteral nutrition, cognitive impairment and those attending day care centers of the elderly.

SAMPLING TECHNIQUE

This study did a census of four institutions of the elderly who consented to participate in the study. The Institutions management provided a list of the elderly persons in their Institutions which was used to purposefully identify those who did not meet the Inclusion criteria and eliminate them from the list of potential respondents. Proportionate to size sampling was done in each of the four Institutions of the elderly and a sample of 57 respondents was achieved for Mji wa Huruma in Runda, 11 for Nyumba ya Wazee in Ruaraka, 42 in the Kariobangi Cheshire home and 25 in Mother Teresa home in Huruma. Every 4th elderly person in each of the remaining Institutions list was systematically sampled. Purposeful and Convenient sampling techniques were used to sample Social welfare officers in each of the sampled Institutions (4).

For the Non-institutionalized elderly persons, a list of elderly persons living in Huruma, Kariobangi North, Kawangware and Gumba divisions was obtained with the assistance of Social Workers and Community health volunteers from the respective chiefs. In order to ascertain if the elderly persons met the inclusion criteria, a brief interview was done in the household with either the elderly person or their care-giver. Thirty four elderly Persons were sampled from each of the four divisions and where 2 or more elderly persons were residing in one household, the older elderly person would be conveniently sampled (5).

LOGISTICAL AND ETHICAL CONSIDERATIONS

Prior to the study, approval was sought from Kenyatta University Ethical Clearance Committee (KU/R/COMM/51/167) and research Authorization sought from the National Council for Science, Technology and Innovation (NACOSTI) (NCST/RCD/14/013/299). All participants were informed about the objectives of the study and informed consent was obtained before the non-Institution and Institutions interviews and taking the anthropometric measurements. Participants were informed about their right to discontinue his/her participation from the study at any point of data collection. Informed consent was also sought from the elderly and their care –givers, both at Non-institutions and in Institutions and confidentiality was maintained on all the information and data collected. Nutritional and health counseling was given to all the elderly participants and the care-givers of those who were found to be malnourished or at risk of malnutrition with an aim of improving their Nutritional status.

STRENGTHS AND WEAKNESSES OF THE STUDY

The weaknesses of the study stem from the fact that the respondents participating in the study were all drawn from Nairobi County and were therefore not representative of the whole country. The Inclusion and the Exclusion Criteria was based on the elderly persons subjective reporting of their health conditions. The strengths of the Study were that data was collected by use of the Modified Barthel Index and the Mini Nutritional assessment tools, Standard Universal tools whose validity and Reliability has been tried and tested. These tools were Pre-tested in the Thogoto home for the aged and the Kikuyu town Surbabs after which they were reviewed and domesticated to the Kenyan Context.

ITEMS OF INVESTIGATION

The height and weight were used to compute the nutritional indicator BMI. This was then compared to the WHO/FAO reference chart with BMI cut off points, which are categorized as: Underweight (BMI<19kg/m²), Normal (BMI 19 - 21 kg/m²), at Risk of being Overweight (BMI 21-23kg/M²) and Overweight (23 or greater) (6).

DATA COLLECTION

Nutritional status was assessed using the Mini Nutritional Assessment (MNA), which is a generic way of estimating the ratio of lean body mass to fat percentage in the body. The complete MNA includes 18 items and the score distribution is between 0 (zero) and 30. A score less than 17 points indicates malnutrition; scores between 17 and 23.5 indicate ‘at risk of malnutrition’, and a score ≥ 24 indicates a well-nourished state. However for the elderly who were not able to stand on the bathroom scale, their BMI was established by the use of MUAC, where a MUAC < 23.5 cm is likely to have a BMI of < 20 kg/m² and if the MUAC measure was less than 32.0 cm, the BMI was likely to be > 30 kg/m² (6)

DATA ANALYSIS

Descriptive analyses were performed to report the distribution of the data and presented as frequencies and percentages n (%), and discrete and continuous data presented as mean. Univariate tests of differences between the nutritional status and residence of the elderly were performed using Pearson’s χ^2 -test and independent t-tests.

III. RESULTS AND DISCUSSION

CHARACTERISTICS OF ELDERLY PERSONS IN NAIROBI COUNTY

The total number of respondents was 270. One hundred and thirty five (50%) of the participants were living in non-institutions whereas 135 (50%) were living in institutions of the elderly. Majority of the participants 140 (51.7%) were female. The youngest elderly was aged 60 years and the oldest 113 years. The mean age was 70.53 ± 11.336 . The average height of the elderly was 157.31 ± 11.211 cm and an average weight of 52.904 ± 8.064 . There was no significant relationship between age, gender and place of residence ($\chi^2 = 2.394$, $df = 4$, $p = 0.664$; $\chi^2 = 6.432$, $df = 4$, $p = 0.169$) respectively. According to the National Council for Population and Development, the life expectancy of all the elderly has been rising for females, with a woman who reaches the age of 55 expecting to live for another 24 years. However the male pattern rose and begun to decline (7). A similar study carried out in Venezuela found that the average age of the institutionalized group was 77.3 ± 7.5 years old and 69.5 ± 7.6 years old for the free-living elderly group (8).

Body Mass Index by Age of the Elderly

Age	Body Mass Index				Total
	Underweight	Normal	At Risk of becoming Over Weight	Overweight	
60-65	9 (3.4%)	39 (14.6%)	17 (6.2%)	11 (3.9%)	76 (28.1%)
66-70	15 (5.6%)	27 (10.1%)	14 (5.1%)	8 (2.8%)	64 (23.6%)
71-75	6 (2.2%)	23 (8.4%)	6 (2.2%)	5 (1.7%)	40 (14.5%)
76-80	6 (2.2%)	27 (10.1%)	3 (1.1%)	12 (4.5%)	48 (17.9%)
81 and above	12 (4.5%)	14 (5.1%)	5 (1.7%)	12 (4.5%)	43 (15.8%)
Total	49 (18.0%)	130 (48.3%)	44 (16.3%)	47 (17.4%)	270 (100%)

$\chi^2 = 15.822$, $df = 12$, $p = 0.200$

Table 1

There were more women (41.7%) at risk of being overweight compared to men (23.8%). Only 9.5% of the men

were underweight, compared to 16.7% of women who were found to be underweight. The results showed that there was no significant relationship between the BMI and gender ($\chi^2 = 1.958$, $df = 3$, $p = 0.581$)

The majority of the elderly both at Institutions and Non-institutions were of a normal BMI (46.3%) and only 17.7% were overweight, with 20.5% of the elderly in Non-institutions being overweight. There was no relationship between BMI and institutionalization of the elderly ($\chi^2 = 1.831$, $df = 3$, $p = 0.608$). The elderly develop malnutrition due to a number of factors. These factors make the elderly vulnerable and susceptible to malnutrition as a result of decreased physical, psychological and or social functions (2). The risk of the elderly suffering from malnutrition is low in healthy elderly persons and it is therefore important to have the elderly nutritional status regularly monitored (8).

Body Mass Index and Protein Intake Markers

Body Mass Index

Body Mass Index	Non-institution	Institution	Total
Underweight	23 (17.2%)	28 (20.2%)	50 (18.6%)
Normal	63 (46.7%)	62 (45.9%)	125 (46.3%)
At Risk of Becoming Over Weight	21 (15.6%)	26 (19.3%)	47 (17.3%)
Overweight	28 (20.5%)	19 (14.7%)	48 (17.7%)
Total	135 (100.0%)	135 (100.0%)	270 (100.0%)

$\chi^2 = 1.831$, $df = 3$, $p = 0.608$

Protein Intake Marker

At least one daily serving of dairy products	104 (77.0%)	30 (22.0%)	134 (49.8%)
Two or more servings of legumes or eggs per week/meat, fish or poultry everyday	31 (23.0%)	105 (77.0%)	136 (50.0%)
Total	135 (100.0%)	135 (100.0%)	270 (100.0%)

$t = 8.663$, $df = 268$, $p < 0.001$

Table 2: Body Mass index and Protein Intake markers of the Institutionalized and Non-institutionalized Elderly Persons

The underweight phenomena among the elderly could be attributed to eating difficulties, difficulties in chewing due to poor dental status as well as dry mouth, red mucus membranes and oral sores which can greatly affect eating and the nutritional status of elderly people (9). More women (41.70%) were at risk of being overweight, compared to men (23.8%). This could be because there is a tendency among the elderly to gain fat mass, which increases the risk of obesity, cardiovascular disease and Non insulin dependent Diabetes. Only 9.5% of the elderly men were underweight, compared to 16.7% of women who were found to be underweight. Majority (46.3%) of the elderly were of a normal BMI. These results are similar to the research findings of Guigoz in 2006 who found that among the community – dwelling elderly people in Sweden, the prevalence of malnutrition was only 2%, compared to the Institutionalized elderly people who had 21% prevalence of malnutrition (10).

PROTEIN INTAKE

There was a significant variance in protein consumption between the institutionalized (0.67 ± 0.409) and the non-institutionalized elderly (0.23 ± 0.422), $t = 8.663$, $df = 268$, $p < 0.001$. There is evidence that protein intake, greater than the recommended RDA of 0.8g/kg/day can improve among other things, the muscle mass, function level in carrying out

ADLs and general body strength (11). There was a significant relationship between the residence of the elderly and intake of proteins. Concerns about the detrimental effects likely to result from increased consumption of proteins such as poor bone health, renal function, cardiovascular function and neurological function are unfounded. Intake of 1.5 g of protein/kg/day or 15-20% of the total caloric intake by the elderly is ideal for those elderly who may wish to improve on their health and function levels (12).

MODE OF FEEDING AND RESIDENCE OF THE ELDERLY PERSONS

Majority of the elderly were able to feed themselves without any problem (72.4%) while only 6.7% were unable to feed without assistance. The institutions of the elderly had the lowest number of elderly who were unable to feed without assistance. There was no significant relationship between the mode of feeding and the residence of the elderly ($\chi^2 = .157$, $df = 2$, $p = 0.925$). The elderly living in institutions of the elderly who were underweight and had difficulties in feeding themselves accounted for 60.2%. These may be the elderly who did not receive enough assistance during mealtimes and about one-third of these elderly leave more than two-thirds of their meals un consumed (13). The significant relationship between age and mode of feeding could be attributed to the degenerative effects of aging, where the more elderly one got, the more dependent they are likely to become. These could further be explained by the variations that occurred between age and mode of feeding (13).

Elderly opinion on Nutritional Status

	Non-institution	Institution	Total
Malnourished	34(25.2%)	41(30.1%)	74 (27.2%)
Uncertain of Nutritional Status	36(26.7%)	52(38.7%)	86 (31.7%)
Good nutritional status	65 (48.1%)	42 (31.2%)	110 (41.1%)
Total	135(100.0%)	135(100.0%)	270(100.0%)

$\chi^2 = 6.737$, $df = 2$, $p = 0.034$; $t = 1.984$, $df = 268$, $p = 0.048$

Self-view of Health Status

	Non-institution	Institution	Total
Not As Good	46(34.1%)	45(33.7%)	91(33.9%)
Don't Know	21(15.9%)	17(12.5%)	38(14.4%)
As Good	41(30.3%)	44(32.7%)	85(31.4%)
Better	27(19.7%)	29(21.2%)	56(20.3%)
Total	135(100.0%)	135(100.0%)	270(100.0%)

$\chi^2 = 0.639$, $df = 3$, $p = 0.887$

Table 3: Opinion of the elderly Persons on their Nutritional and Health status

There was a significant relationship between the place of residence and self-view of nutritional status by the elderly ($\chi^2 = 6.737$, $df = 2$, $p = 0.034$) with those in the Non-institution having a better self-view of their nutritional status by a mean of 1.23 ± 0.828 compared to 1.01 ± 0.787 in the institution, $t = 1.984$, $df = 268$, $p = 0.048$. Self-perception of health status and the BMI was correlated and the highest population of elderly in institutions (47.4%) who were found to be at risk of becoming over weight reported to view their health status as being better than that of their colleagues in the Institutions. About 15.8% of those at risk of being overweight felt that they were not as good. There were no elderly overweight elderly in the Institution who thought that they had better health status than their colleagues. More women (37.6%) than men (29.7%) felt that their health status was not as good compared to other elderly people. There was no significant relationship between

self-views of health status and gender or between self-view of health status and place of residence. In a similar study conducted by Bales in 2009, more than half of the participants, (54% $n=314$) perceived themselves as healthy, 50% ($n=139$) among women and 57.8% ($n=175$) among men. Both similarities and differences were found in women's and men's self perceived health. Irrespective of how they perceived their health, no cognitive impairment was found among women or men (14)

NUMBER OF MEALS CONSUMED

The mean number of meals consumed by the Institutionalized elderly ($1.88 \pm .325$) was higher than that of the elderly in Non-institutions (1.49 ± 0.603), $t = 6.370$, $df = 268$, $p < 0.001$.

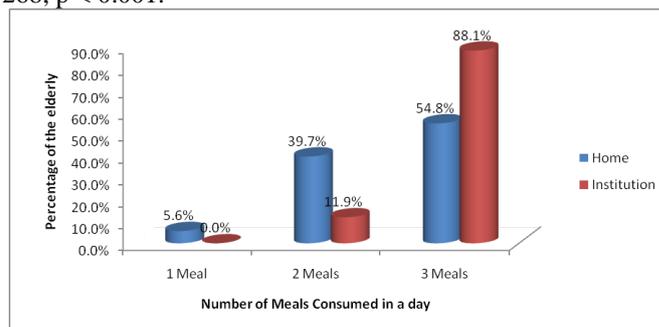


Figure 1: Number of Meals Consumed by Residence of the elderly Persons

More males (73.2%) were able to consume at least three meals per day compared to 69.8% of the women. There was no significant relationship between the two genders. There was a significant relationship between the number of meals consumed and the place of residence of the elderly. Ortega et al., 1998 (15) found that women subjects who took 2-3 meals per day showed greater body mass indices and a greater proportion were overweight/obese compared to those who took 4-5 meals per day. This could be because reported energy intakes tend to be lower than the measured intakes (11).

FLUID INTAKE BY RESIDENCE OF THE ELDERLY

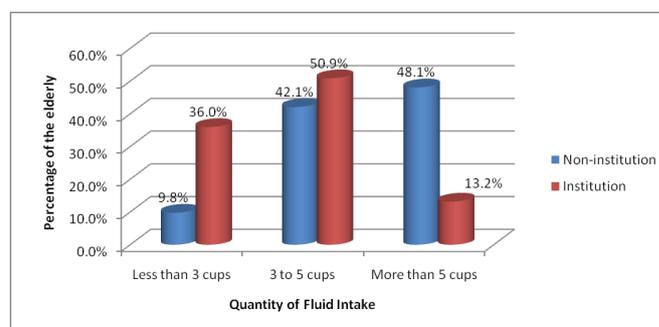


Figure 2: Fluid Intake by Residence of the Elderly Persons

The mean fluid intake in the non-institutions was 0.69 ± 0.330 , whereas that of the institutions was 0.39 ± 0.333 , $t = 7.233$, $df = 268$, $p < 0.001$. Many institutional factors among them insufficient number of care-givers underlie the problem of dehydration among the elderly Persons living in Institutions. As a result of the care-givers and the elderly ratio, the care-givers in institutions of the elderly are overworked

and therefore not able to spend appropriate time with each elderly in order to assist in eating and drinking during the mealtimes (16). Simple measures such as opening the bottle for the elderly or drawing drinking water for them into a cup or a glass can affect the health of the resident elderly.

CONSUMPTION OF MORE THAN 3 PRESCRIPTION DRUGS BY RESIDENCE OF THE ELDERLY PERSONS

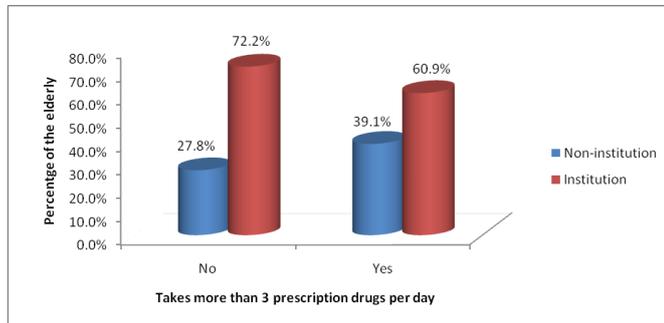


Figure 3: Consumption of more than 3 Prescription Drugs by Residence of the Elderly

There was no significant association between taking more than 3 prescription drugs and the residence of the elderly. The consumption of medication may lead to distortion in the way nutrients are absorbed, digested and expelled from the body. This may lead to changes in food choices and malnutrition (17). A similar study conducted by Saeidlou et al., in 2011 indicated that older people in institutions who take an average of 3 or more different medications a day have a higher risk of malnutrition. This is because medications like anticonvulsants, diuretics, and antidepressants may change taste perception (18). Bischoff-Ferrari et al., 2009 reported that a lot of medications are known to affect directly the sense of smell and taste. Some of these medications include calcium channel blockers, lipid-lowering drugs and anti-inflammatory drugs (19).

APPETITE LOSS IN THE LAST THREE MONTHS BY RESIDENCE OF THE ELDERLY PERSONS

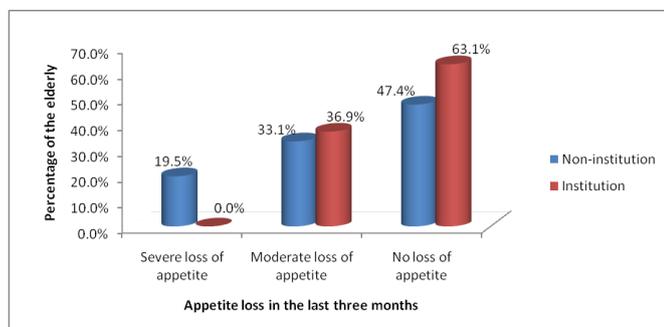


Figure 4: Appetite Loss in the last three months by Residence of the Elderly Persons

There was a significant relationship between loss of appetite and gender of the elderly ($\chi^2 = 6.98$, $df = 2$, $p = 0.030$) with more males reporting decline in food intake compared to the women. The mean decline in food intake by men was 1.55 ± 0.652 , while that of women was 1.36 ± 0.674 , $t = 2.230$, $df = 268$, $p = 0.027$. Majority of the elderly had no decline in food intake in the last three months. The majority of these (63.5%)

were men compared to 47.4% of the women. This decrease in food intake could be due to changes in taste thresholds and decreasing of olfaction, leading to decreased food intake in the elderly (20). Eight point seven percent of the men had severe loss of appetite in the last three months compared to 10.9% of the women.

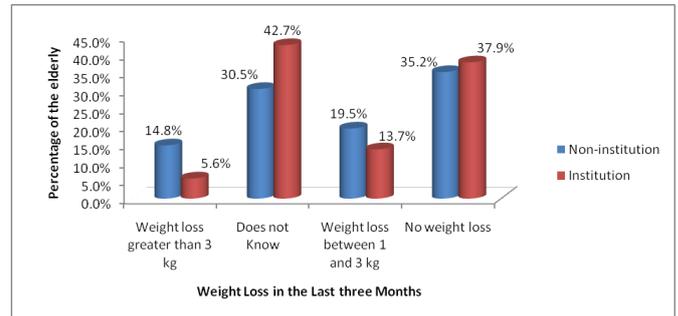


Figure 5: Weight Loss in the last three Months by Residence of the Elderly Persons

There was a significant relationship between weight loss in the last three months and the type of residence for the elderly ($\chi^2 = 9.175$, $df = 3$, $p = 0.027$), with the elderly in the institutions having lost more weight (1.84 ± 1.007) compared to the non-institutionalized elderly (1.75 ± 1.094), $t = 0.669$, $df = 268$, $p = 0.504$. Weight loss among the elderly is the gold standard measure of a nutritional problem in the aging population. A weight loss of 5% in any period up to a year is a clear indication of a problem, which could be poor nutrient intake or absorption, age-related loss of muscle mass (Sarcopenia), severe Osteoporosis, loss of fat and muscle mass (Cachexia) and dehydration (11). More males (39.2%) reported to have had no weight loss in the last three months compared to 33.9% of the women. However, it was more males (12.8%) who reported greater weight loss (greater than 3 kg) compared to 7.9% of women. There was no significant relationship between weight loss in the last three months and the gender of the elderly.

It may take longer to reverse weight loss and achieve weight gain among the elderly than it would among younger people. This is because ageing may change the metabolic response to any kind of nutritional treatment that may be given. Another challenge is as a result of the multifactorial causes of malnutrition which makes individual elderly not respond in the same way to nutritional treatment (21).

IV. CONCLUSION

The mean age of elderly persons was 70.53 ± 11.336 . The majority of the elderly persons both in the Institutions and Non- Institutions of the elderly were of a normal BMI. Consumption of protein markers was significantly varied between the elderly persons place of residence with a higher intake being reported among the Institutionalized elderly. More than half of the elderly living in Institutions of the elderly were underweight and had difficulties in feeding themselves. The elderly in Non-institutions had a better self-view of their nutritional status with more women than men feeling that their health status was not as good as that of Non-institutionalized elderly. The mean number of meals consumed by the Institutionalized elderly was higher than that

consumed in the Non-institutions. The mean fluid intake in a Non-institution was higher than in the Institutions. A higher number of elderly persons living in the Institutions were not taking 3 or more prescription drugs compared to 27.8% of the Non-institutions. The mean decline in food intake by men was higher than that of women. The elderly in the institutions reported more weight loss than those in the Non-institutions.

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CONFLICT OF INTEREST

The authors declare that "there is no conflict of interest regarding the publication of this article."

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