

Nutritional Status of Institutionalized Elderly: A Recommended Plan of Care

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Abstract: Although, proper nutritional status supports healthy aging, the risk malnutrition increases markedly among institutionalized elderly. Therefore, assessment of nutritional status is a crucial nursing role for early detection, providing optimal care and promoting elderly nutritional status. Therefore, the aim of this study was to assess nutritional status of institutionalized elderly and recommend a plan of care. A descriptive cross-sectional research design was used. A multistage cluster random sample of 100 institutionalized elderly was selected from 4 geriatric homes. Data collection tools: 1- an interviewing schedule to fill in a two parts structured questionnaire including: a-personal and medical data, duration of institutionalization, and elderly nutritional status complains and b- dietary assessment; 2-Anthropometric measurement of elderly; 3- An observational checklist for physical signs of malnutrition; and 4- Mini Nutritional Assessment (MNA) standardized scale. *Results:* the current study showed that the mean age of elderly was 68.9 ± 6.37 ; more than one third (35%) of institutionalized elderly were at risk for malnutrition and nearly one third (28%) were malnourished. Significant statistical relationships were found between MNA scores categories, age and oral health problems ($P < 0.01$, & 005 respectively) and gastrointestinal health problems ($\chi^2 = 10.47$, $P < 0.00$) and duration of institutionalization ($\chi^2 = 1.451$, $P < 0.005$) and numbers of medications ($\chi^2 = 1.356$ $P < 0.001$). The current study concludes that a significant portion of the studied institutionalized elderly were either malnourished or at risk of malnutrition with a great risk for deterioration in their health and so increased risk of mortality. *Recommendations:* nutritional screening for all institutionalized elderly and implementation of nutritional nursing care programs.

Key words: Nutritional Status • Screening • Institutionalized Elderly • Nursing role

INTRODUCTION

Nutritional status is an indicator of the physiological state of individuals throughout the life stages, especially elderly population. It reflects the relationship between nutrient intake, requirements and the body's ability to digest, absorb and use these nutrients. Proper nutrition has multidimensional effects on cognition, mood, functional ability and survival, therefore comprehensive assessment of elderly nutritional status is necessary. Components of nutritional assessment included history taking, physical examination, anthropometric measurements, body composition, dietary history, and laboratory values [1, 2].

According to Egypt's Demographic and Health Survey (EDHS) in 2015, elderly population is growing rapidly to constitute around 10% of the total population [1]. Elderly malnutrition is a serious and frequent chronic

condition in which over or under nutrition and inflammatory change occurs in elderly body composition [3]. The prevalence of elders' malnutrition in a recent review was 27 % [4]. In the same line Torma *et al.* [5], Serrano and Garcia [6], and Nie, *et al.* [7], revealed that, the prevalence of malnutrition is reported to be 18-30% in elderly people. On the national level; the prevalence of malnutrition was 10.8 % among Egyptian elders in a study done by Khater and Abouelezz [8].

There are many physical, sociocultural, environmental and financial reasons for an inadequate diet. [9]. In the same line Van Bokhorst, *et al.* [10] and Donini, *et al.* [11] reported many risk factors for under nutrition in elderly, such as the age itself, institutionalization, low income, low educational level, social isolation, food insecurity, and negative self-perception of health. Moreover, age - related physical changes that occur throughout the digestive system such

as a decreased saliva production (xerostomia) and changes in dentition which alter the ability to chew and may lead to changes in food choices and increase the risk for malnutrition among elderly. Decreased gastric acid secretion can also limit the absorption of iron and vitamin B12. As well, slow gastric emptying with a potential detrimental effect on appetite; slower peristalsis cause constipation to be an issue because of decreased fluid intake. Appetite and thirst deregulation also occur, leading to early satiety and a blunted thirst mechanism. Changes in appetite (anorexia of ageing) may also occur due to chronic diseases such as COPD, parkinsonism, dementias, hypo or hyper-thyroidism, chewing problems, use of medications, decline in skeletal muscle mass and tone (sarcopenia), social isolation, economic constraints, which can all adversely affect nutritional status.

In the same respect, Culross [12], and Lewis, *et al.* [13] identified other risk factors for under nutrition in elderly such as changes associated with anorexia and the functional difficulties that interfere with feeding, such as dysphasia, decreased mobility, and changes in smell and taste. Malnutrition may also be secondary to certain conditions (disease-related malnutrition), such as cancer, depression, arthritis, diabetes, or emphysema [14, 15]. More specifically, Donini *et al.* [11] and John *et al.* [16] noted that, institutionalization of elderly was associated with under nutrition risk in many nursing homes due to inadequate intake of calories, proteins, vitamins and minerals, thus, nutritional screening is recommended in order to identify and monitor elderly patients at risk of malnutrition.

Despite the high prevalence and risk of malnutrition among institutionalized elderly, Sperotto and Spinelli [17], reported that malnutrition among elderly is often under-diagnosed. Johansson, *et al.* [18] and Ahmed and Haboubi [19], also recommended proper nutritional status and diet quality to prevent deleterious complications of malnutrition such as cognitive decline, loss of bone and muscle mass, impaired muscle function, frailty, loss of functional ability, immune dysfunction, anemia, poor wound healing, delayed recovering from surgery, increased health care costs, increased morbidity and mortality, poor quality of life, and higher hospital readmission rates. In the same line, Fávvaro and Cristin [20] also recommended nutritional screening to prevent negative consequences of malnutrition.

Significance of the Study: According to Central Agency for Public Mobilization and Statistics (CAPMS) [21], the number of elderly people in Egypt is estimated as 6 million elderly and is expected to rise to 12% in 2030.,

The prevalence of and risk for malnutrition in older adults across settings varies considerably to affect up to 30% in older adults in the community [4, 18], 56-63% of older community dwelling adults who receive home care [4, 22], 48-76% of older adults in hospitals [4, 23, 24] and up to 78% of older adults in nursing homes and institutional long-term care [4].

Notably, nutritional status is influenced by medical, physiological, psychological and social variables. Given these complex contributing factors, a careful nutritional assessment is necessary for early detection and early treatment of elderly malnutrition. Despite the fact that, several studies were carried out in an attempt to assess nutritional status among elderly in Egypt, there is no accurate database for malnutrition among institutionalized elderly in geriatric homes in Egypt. One of these Egyptian studies was carried to assess the nutritional status of elderly and reported exposure of that vulnerable target group to adverse risk factors for malnutrition [19]. Thus, comprehensive assessment should include not only the basic nutritional assessment but also, the overall physical, mental, and psychosocial status of the person. This will lead to a better understanding of how to realistically meet the nutritional needs of the older adults [12].

Despite the high prevalence of malnutrition among elderly, nutritional problems are not yet acknowledged as a priority by nurses. The need for nutritional assessment and interventions are particularly crucial in this vulnerable group, where the incidence of chronic illness is high and a myriad of factors enhance likelihood of malnutrition [25]. From the research's clinical observation, institutionalized elderly people in geriatric homes in Egypt are more vulnerable to malnutrition due to many factors including comorbidities, lack of food choices; imbalanced meals; unavailability of qualified caregivers and certified nutritionists. Nurses spend more time with elderly. Observation and assessment of elderly nutritional status is a fundamental nursing skill. Therefore, gerontological nurses should have a key active role in prevention and early detection of nutritional problems by comprehensive nutritional assessment and by educating elderly and their caregivers about complete balanced diet. Carrying out this research will help in identifying prevalence and understanding risk factors for malnutrition among elderly in geriatric homes that will definitely spot the light on this significant silent health problem among elderly in Egypt. Moreover, conducting this research will add to the nursing body of knowledge and will increase awareness about the problem.

Operational Definitions and Definition of Terms:

Malnutrition is defined for the sake of the current study as “a state of elderly over or under-nutrition as measured by Mini Nutritional Assessment scale, anthropometric measurement and observational checklist for signs of malnutrition.

Aim of the Study:

- Assess nutritional status of institutionalized elderly.
- Recommend a plan of care

Research Question: What is the nutritional status of institutionalized elderly?

MATERIALS AND METHOD

Research Design: A descriptive exploratory cross-sectional research design was used.

Setting: Four governmental geriatric homes that follow ministry of social solidary affairs in Cairo and Giza governorate were randomly selected from a list of all geriatric homes. These geriatric homes provide formal care services for the elderly such as medical, nutritional, social, and cultural services.

Sample: A multistage cluster random sample (3 stages) of 100 elderly (aged 60 years or older) who agreed to participate in the study was selected without restriction to age or gender and who reside in the geriatric home for at least one year. The 1st stage of selecting the sample was random selection of two governorates (Cairo and Giza governorate). The 2nd stage included a random selection of 4 geriatric homes (El-Ta’arouf, Om Hane, El-Habaiband El-Sahwa) from a list of all governmental geriatric homes names that follow the 2 previously mentioned governorates. During the 3rdstage, sample size was determined by free sample size calculator web site (<https://www.calculator.net/sample-size-calculator.html>) to be 100. To select this number, 25 elderly were randomly selected from each geriatric home by picking every odd number from a list of all elderly names in each geriatric home.

Inclusion Criteria: Fully conscious elderly who resides in geriatric home for at least one year, and who are free from depleting condition (such as dementias or cerebrovascular stroke).

Exclusion Criteria: Elderly with any health condition that hinders communication or gait balance was excluded from the study.

Tools for Data Collection: Four tools were used to collect data of the present study: Tool (I) - A structured interview schedule to fill in a 2 parts questionnaire that was developed by researcher:

Part 1: Personal and medical data sheet (15 questions) to assess age, sex, length of hospitalization, comorbidities, medications used and elderly nutritional complains (11 questions about decreased appetite, loss of teeth, loss of taste and smell, vision and hearing problems, gastrointestinal complains such as vomiting, diarrhea or constipation, gastritis, abdominal gases, social isolation, insufficient food intake, total teeth loss and denture use).

Part 2: Dietary assessment sheet: It included 24 hours dietary recall of food intake and estimation of total caloric food intake, nutritional habits, satisfaction with geriatric home food services, and number of regular meals, main meal, and mealtime social activities. To calculate total caloric food intake, first the researcher filled in the 24 hours recall sheet to estimate elderly dietary intake in the previous 24 hours. The average daily caloric and nutrient intake of elderly was then assessed from information gathered by means of one-day 24 hour dietary recalls using food calorie calculator web site WebMD available at <https://www.webmd.com/diet/healthtool-food-calorie-counter> [26] then compared with food tables to identify if of food dietary intake total mean scores is in congruence with the reference standard or not.

Scoring System: Responses in tool (1) are yes and no. Each “Yes” response was scored as 2 and no response was scored as 1.

Tool (II): Anthropometric evaluation to measure elderly body weight, height using a standard scales. Weight and height used to calculate the body mass index (BMI) utilizing the formula $BMI = (\text{Weight in kg}) / \text{height}^2$ in meter. Mid-upper arm circumference (MUAC), calf circumference (CC) and triceps skin fold thickness (TSF) was also measured by standard techniques using tape measurement and skin fold caliber.

Scoring System: BMI was categorized into four weight classes (>18.5 (underweight), 18.5 to 24.9 (healthy weight),

and 25.0 to 29.9 (overweight), 30.0 to 39.9 (obese). Anthropometric measurements were also considered as normal values when above 10th percentile (P10-reference value) for age and gender. Calf circumference: <31cm, Mid-upper arm circumference: <22cm, Triceps skin fold thickness: male<8, female <12 cm. Scales were calibrated and cleaned before every use [30, 31].

Tool (III): An observational checklist was developed by researcher to assess physical signs of malnutrition among elderly such as skin color, hair, eyes, lips, tongue, nails, face. It included 35 questions.

Scoring System: The total scores are 70 classified as: high risk for malnutrition (56-70 scores); moderate risk for malnutrition (45-55 scores) and low risk for malnutrition (less than 45 scores).

Tool (IV): An Arabic version of the standardized Mini- Nutritional Assessment Scale (MNA) developed by Vellas [27], Rubenstein *et al.* [28] and Guigoz [29]. It consists of 2 parts; part 1 is screening (6 questions), and part 2 is assessment/evaluation (12 questions). Part 1 contained 6 questions (such as, food intake decline over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties, mobility, psychological stress or acute disease, and body mass index).

Scoring System: Scoring of questions in this part ranged from (0-2) in three questions and ranged from (0-3) in two questions and one question with (yes or no answers); total score for this part ranged from (0-14). Scores from 12-14 points indicated normal nutritional status, 8-11 points indicated presence of malnutrition risk and 0-7 points indicated malnutrition. Part 2 contained 12 questions asks if elderly lives independently, takes more than 3 prescription drugs per day, pressure ulcers, meal intake, mode of feeding and self -view of nutritional status. Scores ranged from (0-2) in four questions, from (0-1) four questions and with yes or no answers in four questions. Total scores for this part ranged from (24-30 points), 24 to 30 points indicated normal nutritional status, 17 to 23.5 points at risk of malnutrition, less than 17 points indicated malnutrition.

Tools Validity and Reliability: Study tools were tested for content validity by 3 experts in the field of gerontological nursing, nutrition and medical surgical nursing. Content Validity Index (CVI) was calculated to be 85 and 89%

for the developed tools. For the developed tools, Cronbach's Alpha was 0.87 for the structured questionnaire and was 0.89 for the observational checklist. Scales (weighing scale and skin caliber) used for anthropometric measurement were calibrated before every use. Cronbach's Alpha was 0.83 for mini-nutritional assessment scale.

Procedure: Data of the present study was collected over a period of 4 months. Official permissions were obtained from geriatric home directors then written informed consents were obtained from every elderly who agreed to participate in the study. Three interviews were carried out with every elderly per week in the morning until completion of the study. Each interview took about 20 to 35 minutes in every time due to elderly short attention span. The first interview included establishing rapport and explaining the aim, nature and purpose of the study. The second interview included filling in the structured questionnaires (I, III, and IV) and clinical observation of elderly nutritional status by the researcher. The third interview included completing tool II anthropometric measurements (Height, weight, mid-upper arm circumference (MUAC), calf circumference (CC) and triceps skin fold thickness (TSF) for every elderly using weighting scale, skin caliber, measurement tape. Scales were calibrated before every use. Every elderly was provided with an Arabic written copy of a booklet about proper nutrition for elderly including the importance of proper nutrition, nutritional needs of elderly, components of healthy diet and healthy food choices, food guide pyramid and food groups, risk factors of malnutrition among institutionalized elderly (such as age- related changes, poor dental health, medication side-effects, lack of finances, and physical difficulty), and preventive measures and management of malnutrition.

Ethical Considerations: Participation in this study is entirely voluntary after explanation of purpose and nature of the study. Each elderly had the right to accept or refuse participation in the study and that they can withdraw from the study at any time. An informed written consent had been obtained. Anonymity and confidentiality were assured through coding the data, elderly were assured that this data was not be reused in another research without permission and that data collected will be used in for purpose the current research only.

Pilot Study: It was conducted on 10 institutionalized elderly (equal 10% of total sample size) who reside in

geriatric homes for at least one year and was conducted in the original study settings to assess the feasibility of the study as well as clarity of data collection tools and to determine the needed time for application of study tools.

Statistical Data Analysis: Data were coded, scored, tabulated, and analyzed by computer using “Statistical Package for Social Science” (SPSS windows) Version 22. Numerical data were expressed as mean ± SD. Quantitative data were expressed as frequency and percentage. Chi-square test was used to assess relationships between categorical variables. Probability (p-value) less than 0.05 was considered significant and less than 0.01 was considered as highly statistically significant.

RESULTS

Section I. Part 1: Personal, and medical data of elderly:

It is clear from Figure (1) that, 32% of elderly aged from 60 to less than 65 while, 31% of them aged from 65 to less than 70 years. Moreover, 62% were widow/widowed; furthermore, 52% were males. In relation to educational level, 32% of elderly completed primary education.

Figure (2) illustrates that, elderly complains of chronic diseases/ comorbidities such as hypertension (35%), diabetes (29%), osteoarthritis (31%), high cholesterol level (22%) and osteoporosis (12%) and anemia (5%).

Figure (3) clarifies that, elderly complains in relation to nutritional status were diminished taste (31%), constipation (29%), denture use (26%), gastrointestinal complains (24%).

Figure (4) reveals that, medications taken by elderly were antihypertensive (30%), anti- diabetic (21%), cardiac medications (12%) and analgesics (20%) and only 5% of elderly consumes vitamin supplementation.

Section I. Part 2: Dietary assessment (daily meal intake, nutritional habits, satisfaction with geriatric home food services, and mealtime social activities):

Table (1) reveals that, 51% of elderly energy intake met the standard caloric intake, whereas fibers and water intake didn’t meet the reference standards among 89 and 80% of elderly, respectively. Moreover 78% of elderly protein intake didn’t meet the reference standard.

Table (2) shows that, 44% of elderly reported that geriatric home serve sufficient food amount per meal., Only 15% reported that meals presented are considering special cases, whereas, only 10% of elderly mentioned that food choices are allowed in these geriatric homes.

Regarding dietary habits, Table (3) reveals that, 88% of elderly mentioned that lunch is the main meal while 24% of elderly eat between meals. In relation to social mealtime activities, 48% of elderly preferred to take meals alone. As regards the place where elderly took meal, 52% of elderly reported that they took meal in the specified place of meal serving (the dining room).

Section II: Anthropometric measurement:

Figure (5) reveals that, 35% of elderly had acceptable weight for height, while 26% were obese, 22% were overweight and 17% were underweight.

Section III: Clinical observation of physical signs of elderly malnutrition:

Table (4) clarifies that, observed physical signs of malnutrition were: generalized fatigue (22%), dull hair (70%), dry skin (67%), weak and easily lost hair (69%), unhealthy scalp with dandruff (55%), inflamed and edematous eyelid (54%) and dotted skin (51%). Edematous extremities were also observed among 53% of elderly.

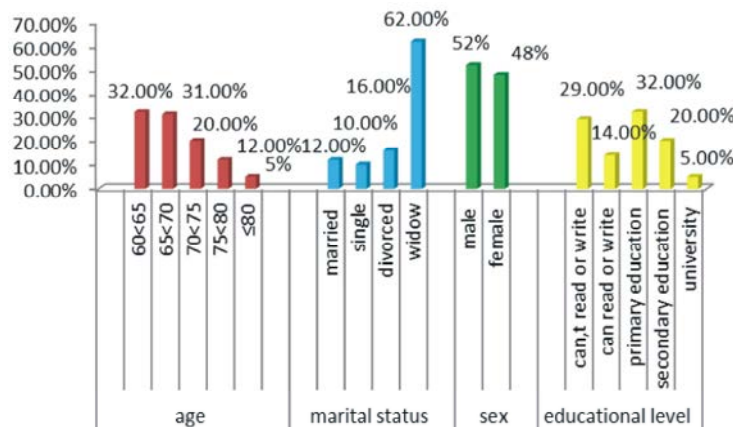


Fig.1: Percentage distribution of elderly personal data (N = 100)

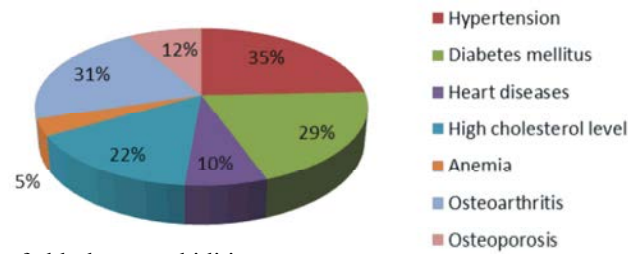


Fig. 2: Percentage distribution of elderly comorbidities

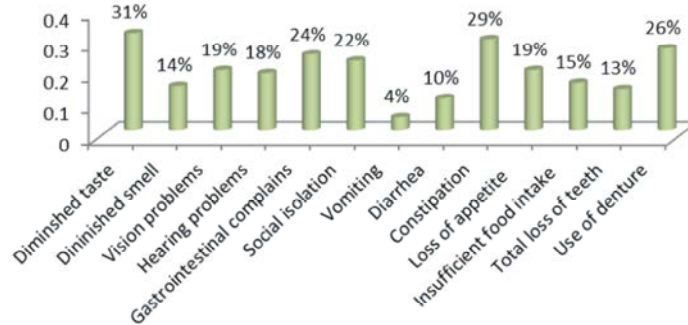


Fig. 3: Percentage distribution of elderly complains regarding nutrition

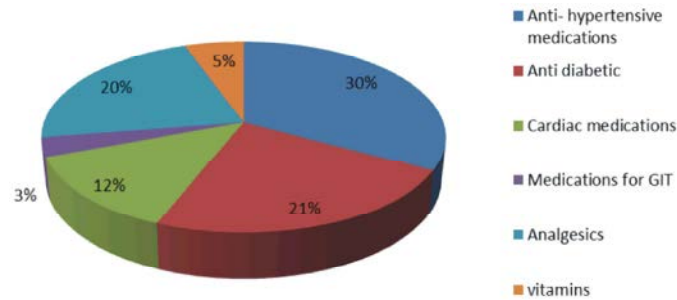


Fig. 4: Percentage distribution of medication used by elderly (N = 100)

Table 1: Mean of daily caloric food intake consumed by institutionalized elderly

Nutrients	Daily food caloric intake X±SD	Meet the standard reference intake (%)	Doesn't meet the standard reference intake (%)
Energy (Kcal)	1475.69±653.67	51	49
Carbohydrates (g)	275.39±105.16	40	60
Protein (g)	65.27±22.43	22	78
Fats (g)	65.79±29.67	50	50
Fibers (g)	11 (2)	11	89
Water (g)	(1465) 462	20	80
Calcium (mg/d)	341.61±433.66	69	29
Vitamin C(mg/d)	69.45±110.32	44	56
Sodium (mg/d)	411.52±570.33	65	35
Potassium (mg/d)	428.22±510.50	69	31

Table 2: Frequency distribution of institutionalized elderly regarding satisfaction with food services

Item	Number (%)*
Elderly satisfaction with nutritional services in the geriatric home	
• Sufficient food amount/ meals	44
• Essential nutritional elements are considered	18
• Meals presented considering special cases (special diet)	15
• Availability of equipment for food preparation in elderly room	5
• Bringing food from outside the home is allowed	89
• Income is enough to buy necessary extra complementary food	58
• Food choices is allowed	10

*Responses are not mutually exclusive

Table 3: Frequency distribution of institutionalized elderly in relation to dietary habits

Item	Number (%)*
Dietary habits:	
• Eating or drinking before sleeping	15
• Eating or drinking during TV watching	8
• Eating or drinking between meals (snacks)	24
Main meal	
• Breakfast	5
• Lunch	88
• Dinner	7
Number of water liters /day	
• Less than one liter	55
• 1 liter	25
• 2 liter	15
• More than 2	5
Smoking	28
Exposure to sun	33
Where do you usually take meals	
• In my room	48
• In the specified place of meal serving (the dining room)	52

*Responses are not mutually exclusive

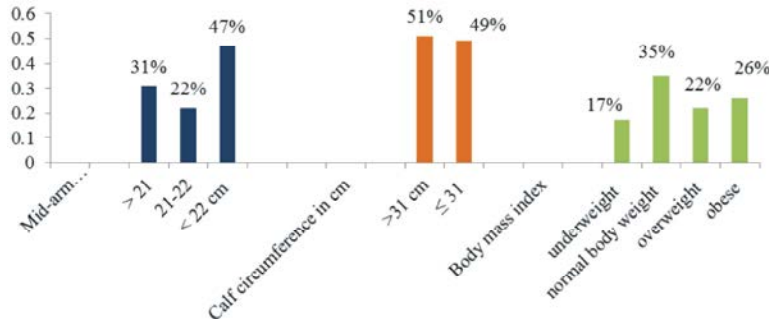


Fig. 5: Percentage distribution of anthropometric measurements of elderly (N = 100)

Table 4: Physical signs of malnutrition among institutionalized elderly

Variables	Number (%)
General health status	
• Generalized fatigue	22
Face	
• Pale face	70
• Splash or an abnormal color face	50
Skin	
• Dry skin	67
• Bruises	8
• Rash	6
• Shelled skin	30
• Cracks	25
• Dotted skin	51
Hair	
• Dull hair	70
• Weak and easily lost hair	69
• Unhealthy scalp with dandruff	55
Eye	
• Glamorous eye	42
• Squint	2
• Dark spots under eyes	19
• Inflamed and edematous eyelid	54
• Red color eye	39
• Yellowish eye	49
• Dry eye	48
Extremities	
• Abnormal pain sensation	19
• Edematous extremities	53

*Responses are not mutually exclusive.

Table 5: Clinical observation of oral health among institutionalized elderly

Item	Number (%)
Oral assessment	
Lips	
• Pale lips	71
• Inflamed and cracked lips	41
Tongue	
• Pale tongue	55
• Dry tongue	53
• Dry with splash tongue	44
Gum	
• Inflammation, edema and wounds on gum	22
• Bleeding gums	14
• Teeth decay	90
• Partial tooth loss	69
• Total teeth loss	31
• Use of denture n = 20	20
Nails	
• Fragile nails	61
• Pale nails	74
• White spots on nails	50
• Tea spoon shape nails	37

*Responses are not mutually exclusive

Table (5) clarifies that, pallor was prevalent among elderly who had of pale nails, lips and tongue in percentages of 74%, 71% and 55% respectively. Furthermore, 90% of elderly complained of teeth decay while 69% had partial loss of teeth, 31% had total teeth loss and 20% use denture.

Table 6: Nutritional screening of institutionalized elderly (as measured by MNA scale)

Variable	Number (%)
Loss of appetite over the past 3 months due to gastrointestinal problems:	
• Severe loss of appetite	9
• Moderate loss of appetite	61
• No loss of appetite	30
Weight loss during the last 3 months	
• More than 3 kilograms	5
• Loss of unknown weight	51
• From 1-3 kilograms	13
• No loss of weight	31
Mobility	
• Immobile	5
• Able to move from bed	73
• Able to leave home	22
Psychological stress or acute disease in the past 3 months	18
Body mass index (BMI) classification according to MNA assessment scale	
19>21	14
21>23	29
<23	57

*Responses are not mutually exclusive.

Table 7: Frequency distribution of institutionalized elderly regarding nutritional status screening (as measured by MNA scale)

Item	Number (%)
Takes more than 3 prescription drugs /day	59
No pressure sores or skin ulcers	95
Number meals/day	
One	15
Two meals	46
Three meals	39
Selected consumption markers for protein intake	
Milk product daily	13
Two times cereal per week	46
Animal protein daily	41
Daily intake of fruits or vegetables	55
Fluid (water, juice, coffee, tea, milk...) daily intake	
Less than 3 cups	54
From 3-5 cups	46
Method of feeding	
Not able to eat alone	3
Eat alone with difficulty	38
Eat alone without difficulty	59
Elderly self-rated nutritional status	
Have malnutrition	14
Not sure about nutrition status	65
Have no nutrition problems	20
Perception of health status in relation to other people of the same age	
Not on the same quality	23
Do not know	37
The same quality	37
Better than others	3

*Responses are not mutually exclusive

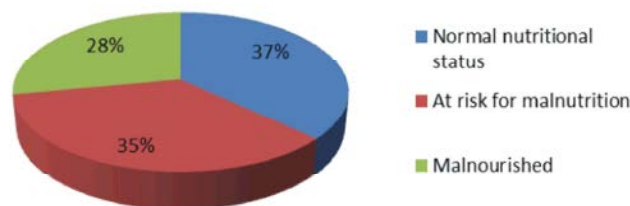


Fig. 6: Categories of nutritional status according to MNA scores

Table 8: Relationship between categories of nutritional status and age, oral health problems, gastrointestinal problems, institutionalization and medication used N=100

Items	Nutritional status (MNA categories)			χ^2 test & P Value
	Malnourished Elderly N (%)	Elderly at risk for malnutrition N (%)	Elderly with normal nutritional status N (%)	
Age				
60<65	5	6	11	15.45
65<70	6	6	10	0.01*
70<5	10	10	8	
75<80	6	10	6	
≥80	1	3	2	
Oral health problems				
• Yes	9	10	1	16.21
• No	19	16	25	0.005**
Gastrointestinal problems				
• Yes	39	25	16	10.47
• No	3	6	11	0.00**
Institutionalization duration				
• ≥ 5 years	38	20	12	1.451
• < 5 years	4	10	15	0.00**
Number of medications				
• ≥ 5 drugs	35	19	12	1.356
• < 5 drugs	9	20	5	0.005**

* Significant at p<0.05 ** highly significant at p<0.005 NS: Not significant

Section IV: Nutritional screening findings among elderly:

Table (6) shows that, 61% of elderly complains of moderate loss of appetite in the past 3 months while 51% lost weight of unknown cause during the last 3 months. Moreover, 73% of elderly were able to move from bed; only 18% had psychological stress or acute disease in the past 3 months.

Regarding evaluation of nutritional status, Table (7) shows that, 59% of elderly took more than three drugs per day, 55% of consumed fruits and vegetables daily. Regarding the ability to eat alone, 3% of elderly were not able to eat alone, while 38% ate alone with difficulty, whereas 59% ate alone without difficulty. Concerning self-rated nutritional status, 14% of elderly believed that they have malnutrition, while 65% of them weren't sure about their nutritional status, whereas 20% of them indicated that they had no nutritional problems. Regarding self-rated health in comparison to others, it was found that 23% of elderly viewed themselves as not on the same quality, whereas 37% of them indicated that they were on the same quality.

Figure (6) illustrates that, according to total MNA scores, more than two thirds (63%) of institutionalized elderly had nutritional status risks (35% at risk of malnutrition, and 28% had malnutrition). However, 37% had normal nutritional status.

Section V: Relationships between study variables:

Table (8) reveals that, there is a significant statistical relationship between MNA scores categories, age at χ^2 & p=15.45 & 0.01, oral health problems at χ^2 & p=16.21 & .005**, gastrointestinal health problems at χ^2 & p=10.47 & 0.00*, institutionalization duration at χ^2 & p=1.451 0.00** and medication use at χ^2 & p=1.356 0.005**.

DISCUSSION

Nutritional status is a reflection of elderly overall health status. Malnutrition of institutionalized elderly is a serious underdiagnosed health problem that adversely affects elderly wellbeing and functional status, worsening of existing medical problems and even increasing mortality rates. Therefore, nutritional assessment should be an essential part of routine nursing care. The current study revealed that, more than half of institutionalized elderly aged from sixty to less than seventy years, moreover, more than half of elderly were widow/widowed; whereas, around one half of elderly were males, furthermore, more than two thirds of elderly complained of chronic diseases such as hypertension, diabetes and high cholesterol level, while, less than fourth of elderly had osteoarthritis. Medications taken by elderly were antihypertensive,

anti-diabetic, cardiac medications and analgesics among elderly. These findings are in agreement with a similar comparative study carried out by El-Kady and Tayel [32], in Alexandria about nutritional assessment of institutionalized and free-living elderly.

In relation to elderly energy intake, it was found that around half of elderly consume the standard caloric intake, whereas protein, fibers and water intake didn't meet the reference standards among majority of elderly, this is goes with Sumaila [33], who reported similar results in a project in Ghana to assess dietary intake and nutritional status of elderly people living in a care home. Regarding dietary habits, majority of elderly mentioned that lunch was the main meal while, less than one fourth of elderly ate snacks between meals. Adding to that, a significant portion of elderly reported unhealthy lifestyle practices such as smoking, lack of sunlight exposure (two thirds of elderly) and drinking less than one liter of water per day (more than one half of elderly). From researcher point of view, these findings necessitate educating institutionalized elderly to adopt a healthier dietary habits and lifestyle practices since it is an essential element of proper nutrition and health promotion. Current researcher also recommends food-based fortification of the standard diet served for elderly in geriatric homes to prevent malnutrition risk among this vulnerable group.

Regarding satisfaction with food services in geriatric homes, unfortunately, majority of elderly reported that meals presented are not considering special cases such as diabetics or hypertensive elderly and that food choices are not allowed in these geriatric homes. Additionally, more than half of them mentioned that food amounts served by the geriatric home kitchen per meal were insufficient and that income was not enough to buy extra complementary food other than food that is served by geriatric home kitchens. Current findings are in the same line with Santelle *et al.* [34], who found that factors that affect Brazilian elderly nutritional status include food preparation and monotony of menus and institutional feeding routine. These findings is supported by De Lima *et al.* [35], who assessed nutritional status and its' associated factors among institutionalized elderly and reported a high percentage of malnutrition that was contributed to the lower income and inability to purchase complementary foods such as vegetables and fruits. Similarly, Bouis *et al.* [36] and Ferdous *et al.* [37] found that malnutrition was more encountered among the poor elderly. From current researcher point of view, food choices should be allowed in all geriatric homes and

presence of qualified dieticians to consider nutritional needs of all institutionalized elderly with different health conditions, moreover continuous professional training for nurses about nutritional assessment and nutritional care of elderly should be an integral part of nursing education and practice.

Although, careful nutritional assessment is necessary for both successful diagnosis and treatment plans of malnutrition among elderly, it is an unrecognized aspect of elderly health assessment. In this respect, Wells and Jyvakorpi [38, 39], reported that nutritional assessment deserves special attention because nutrition is crucial to elderly health promotion, health maintenance and preservation of normal immune functioning. As regards BMI, current study revealed a high prevalence of overweight and obesity among half of the studied elderly, this is in the same line with De Lima *et al.* [35], who reported similar results in their research.

Regarding clinical observation of malnutrition physical signs total scores, current study revealed that more than half of elderly were at low (eighteen percent), moderate (seventeen percent) or high (twenty seven percent) risk of malnutrition. In relation to anthropometric measurement, more than half of the studied elderly suffered from either under or over nutrition. It is also worth saying that, loss of appetite among elderly over the past 3 months was due to gastrointestinal problems; moderate loss of appetite and lost weight during the last 3 months among more than half of elderly, moreover, majority of elderly were able to move from bed and had no psychological stress or acute disease in the past 3 months. Additionally, regarding category of nutritional status among current studied elderly sample according to MNA scores, it was found that more than one fourth of elderly suffered from malnutrition, while more than two thirds of them were at risk of malnutrition. These finding is in agreement with Caçador *et al.* [40]. This finding also goes with El-Kady and Tayel [32], who compared the nutritional status of institutionalized elderly with free living elderly in Alexandria and found also that two thirds of the institutionalized elderly were at risk of malnutrition but they reported lower percent of elderly who were actually malnourished. Current study findings also goes with, De Lima *et al.* [35], who reported high prevalence of overweight according to BM and high risk for malnutrition according to MNA scale. Regarding evaluation of nutritional status among elderly in the current study, around two thirds of elderly took more than three drugs per day. Additionally, regarding the elderly ability to eat alone, almost all elderly were able to eat alone.

Regarding elderly self-rated health in comparison to others, it was found that less than one fourth of elderly viewed themselves as not on the same quality of other elderly health, whereas more than one third of them indicated that they were on the same quality.

This finding is supported by a study by Amorim *et al.* [41], that assessed nutritional status of institutionalized Brazilians elderly with MNA scale, the percentage of malnutrition among institutionalized elderly was much more higher than the current study findings because sixty six percent of elderly were malnourished or at risk of malnutrition, according to MNA. Another similar study by Nazemi *et al.* [42], in Tehran detected different grades of malnutrition among more than 50% of elderly. Evidently, many previous studies found high prevalence of under-nutrition in geriatric institutions and claim that institutionalized older adults tend to have poorer nutritional status than those non-institutionalized older adults [43]. From researcher point of view, these findings may signal an urgent need for nationwide nutritional assessment of all institutionalized elderly. Planning and implementation of nutritional care programs for institutionalized elderly is also vital to tackle malnutrition among elderly.

Specifically, physical observation of elderly for physical signs of malnutrition revealed dull hair, dry skin, weak and easily lost hair, unhealthy scalp with dandruff, dotted skin, Inflamed and edematous eyelid, pallor was a prevalent observation among majority of elderly institutionalized (pale nails, lips and face). Edematous extremities were also observed among half of elderly. Fragile and white spots on nails were observed among two thirds and more than half of elderly respectively. As regards dental problems, it was also observed among more than two thirds of elderly including dental caries, partial loss of teeth among, total loss of teeth or use of denture, these findings are in agreement with De Lima *et al.* [35], and Enabuleleb and Omo [44] who observed high prevalence of dental impairments that was contributed to low intake of nutrients and decrease in the average intake of vitamins and minerals. Additionally, Toniazzo *et al.* [45] found that, teeth loss may induce inappropriate food selection and texture by elderly to adapt for dental condition which is consequently may result in loss of appetite and pleasure in eating.

Current study findings revealed significant statistical relationship between MNA scores categories and age, oral health problems and gastrointestinal health problems and between length of institutionalization and numbers of medications. Evidently, current research findings are supported by a systematic review of 6 longitudinal

studies done in 2016 by Fávoro *et al.* [20] who reported similar risk factors for elderly malnutrition including age, institutionalization, constipation, and polypharmacy. To sum up, the following study highlighted the crucial nursing role in comprehensive nutritional assessment of institutionalized elderly for malnutrition. Using simple routine and easy to use assessment methods, gerontological nurses can early detect and intervene with institutionalized elderly malnutrition.

CONCLUSIONS

Studied institutionalized elderly in geriatric homes suffered from malnutrition which may predispose them to detrimental health effects. Significant statistical relationships were found between MNA scores categories and age, oral health problems and gastrointestinal health problems, and between length of institutionalization, numbers of medications. These findings clearly necessitate the integration of elderly nutritional assessment into routine nursing care.

Recommendations:

- Conduct a nation-wide nutritional screening survey of institutionalized elderly malnutrition.
- Integrate multiple reliable biochemical marker methods (blood, urine, stool, hair and nail samples) to assess nutritional status of institutionalized elderly such as laboratory investigations (albumin test and complete blood count).
- Plan and implement educational programs about proper nutrition for institutionalized elderly and caregivers.
- Introduce food-based fortification nutritional programs for institutionalized elderly in geriatric homes.

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