

Assessment of Nutritional status and Malnutrition Problems among Elderly: An Egyptian Experience

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ABSTRACT

Background: It is well established that the elderly have a greater risk of malnutrition. social, physical, & mental aspects all come together to form the multidisciplinary concept of malnutrition in the elderly. In this research, we set out to assess the nutritional condition & to identify the frequency and risk factors for malnutrition between elderly individuals living in nursing homes in addition to those living in the community in Zagazig City, Sharkia governorate.

Methods: A comparative cross-sectional research was performed on 222 cases, 111 cases in each group. Elderly residents of nursing homes and elderly persons attending geriatric clubs in Zagazig city to represent the nursing home living group and the community living group, respectively from the first of October 2022 to the end of April 2023. Anthropometric measures & information gathered from the Mini Nutritional Assessment (MNA) scale were utilized to assess the condition of nutrition.

Results: The mean score of MNA was statistically higher among the elderly in the community than elderly in nursing homes (24.76 ± 3.27 and 17.2 ± 5.25), respectively. The frequency of malnutrition was significantly more prevalent among nursing home living elderly (43.2%) versus zero percent among community living elderly, and the risk of malnourishment was significantly associated with advancement in age among both groups. There was a significant positive correlation amongst the MNA score & the Body Mass Index (BMI) among both groups.

Conclusion: Malnutrition is a greater risk for the elderly. The study's findings highlight the critical value of nutritional screening among elderly people. Counseling families and staff in nursing homes about the appropriate nutritional care of the elderly is advised.

Keywords: anthropometric measurements; elderly; malnutrition; mini-nutritional assessment.

INTRODUCTION

The structural & functional changes that occur as a result of the metabolic, physiological, skeletal, social, & psychological changes brought about by aging are a natural component of the aging process [1]. With aging, malnutrition is a serious problem among the elderly, who are more likely to have nutritional deficiencies as a result of factors such as chronic illnesses, physical infirmities, & physiological changes. These factors may impact the appetite, intake, & absorption of nutrients, making senior residents especially susceptible to this problem [2]. Throughout its

work on aging from 2016 to 2030, the World Health Organization (WHO) has made healthy aging a priority. To achieve this, the organization has built a policy framework that calls for action from several sectors [3]. The older population is increasing in proportion & size in every nation [4]. Elderly malnutrition is still a serious issue with a highly reported frequency, particularly in dependent conditions [5]. Depending on the evaluation technique & research location, malnutrition among older people was present in six to ten % of the world's population [6]. Africa is thought to account for twenty % of the world's

population & has the greatest rate of undernourishment among older individuals [7]. Malnutrition is considered to be caused by a number of reasons. These include being immobile, having dementia or depression, having trouble swallowing or eating, & having a wound or pressure ulcer. Loss of lean body mass & a number of other conditions that lower food & hydration intake are linked to malnutrition in older people [8]. The MNA is one of several tools developed to determine the nutritional health of the elderly; it determines the likelihood of nutritional identification & risk for those who might benefit from preventative care [9]. There are relatively few investigations into the dietary needs of Egypt's elderly population. Therefore, it is anticipated that this study will provide valuable information on the scope of the issue & aid in the comprehension of issues linked to malnutrition in the elderly. In Zagazig city, Sharkia governorate, this research was carried out to evaluate the nutritional status & determine the frequency & risk factors for malnutrition among elderly individuals living in nursing homes as well as those living in the community.

METHODS

A comparative cross-sectional trail was performed on 222 elderly people from the first of October 2022 to the end of April 2023.

Inclusion criteria: subjects aged 60 years old or more.

Exclusion criteria: Those who have speech & communication difficulties, such as aphasia, deafness, or articulation issues, were not included in the research.

Sample size:

The size of the sample was determined by EPI INFOTM, assuming that the prevalence of malnutrition was 6.2% [10] between the elderly in community living versus 19.6% in nursing home living. At an 80% power and 95% confidence level, the estimated sample will be 222 subjects, with 111 subjects in each group.

Sample technique:

There were two geriatric groups in Zagazig City, which is the capital of the Egyptian governorate (Sharkia). At the geriatric home level (111 elderly), a simple random sampling technique was used. And at the community level (111 elderly): There were two geriatric clubs in zagazig city (Tahseen El Seha and Al Hokamaa) [11]. A simple random sampling procedure was utilized, and half of the sample was selected from each club.

Data collection:

Data was collected through four standardized questionnaires to assess the sociodemographic status and medical history of the studied subjects

[12]. Participants were asked about the presence of chronic medical conditions (e.g., diabetes mellitus, hypertension, respiratory system diseases, renal diseases, liver diseases, heart diseases, arthritis, & digestive system diseases). MNA (The Mini Nutritional Assessment) scale was used to check the nutrition level of older people [13]. It has questions & measures spread out in 4 areas: anthropometric measurements, weight, height, & weight loss [14]. General evaluation included 6 questions about your habits, medicines, & ability to mobility. Dietary evaluation considered 8 questions that had to do with feeding independence, meal frequency, fluid & food consumption. Self-evaluation includes one's own perception of one's own nutritional status and health. After adding up the scores for each of the eighteen criteria, we got the MNA score. Elderly participants were categorized into the following 3 groups in accordance with the obtained score: Over 23.5: satisfactory nutritional status (MNA score over 23.5), at-risk of malnutrition (MNA score 17–23.5), & malnutrition (MNA score under seventeen). Internal consistency measurement was utilized to assess the reliability of the questionnaire. The degree of consistency was good. (Cronbach's alpha = 0.85) [15].

Pilot study:

This phase lasted from October 2022 to November 2022 before starting to collect the final data. It was performed on 10% of the sample size of elderly people who were in community and nursing homes in Zagazig City in order to find out how long it will take to gather the data, evaluate the reliability & validity of the translated questionnaire, & identify any problems with data collection. The pilot sample was included in the main sample since there were no modifications made to it.

Field work:

Duration: Five months (from the first of October 2022 to the end of Febreury2023). Each club and geriatric home were visited two times per week. Each visit lasted for three to four hours.

Activities:

1-Building initial rapport with all elderly who were involved in this research.

2-Taking an informed consent from each individual.

3-Evaluation of some sociodemographic characteristics for each participant. This included age, sex, marital status, residence, current occupation, and the eight

domains of the socioeconomic questionnaire developed by Fahmy et al [12]. Time taken to fill these data was about 5 to 7 minutes.

4-Assessment for presence of chronic medical conditions. Participants were asked about the presence of six common diseases which are:

- Diabetes Mellitus (DM)
- Hypertension
- Arthritis (Rheumatoid arthritis, osteo arthritis, gout)
- Renal illnesses (e.g., CKD, renal stones)
- Liver diseases (Chronic viral hepatitis, liver cirrhosis, fatty liver)
- Cancer

5 -Anthropometric measurements: Standard procedures were applied to determine all individuals' height, weight, mid-upper arm circumference (MUAC), calf circumference (CC), and triceps skinfold thickness (TSF). The time it took to complete the questionnaire was around 10-15 minutes.

6-Assessment of nutritional status for each participant using Mini Nutritional Assessment Scale (MNA). It took 8–10 minutes to complete this questionnaire.

Ethical and administrative considerations: After the study protocol was revised, the Zagazig University Institutional Review Board (ZU-IRB#:9741), dated August 31, 2022, granted approval. The study's nature, rationale, & aims were explained clearly to the selected participants, as well as to their friends & family members. Additionally, strict confidentiality measures were ensured. All participants provided informed verbal consent. A formal authorization letter was acquired from the authorities & sent to geriatric clubs & homes that were involved in the research.

STATISTICAL ANALYSIS

The information that was gathered was examined by a computer utilizing the Statistical Package for Social Services version twenty-four (SPSS) [16]. The information was presented in tables & graphs. Continuous quantitative variables, such as ages, were expressed as the mean \pm standard deviation & median (range). On the other hand, categorical qualitative variables were expressed as absolute frequencies (numbers) & relative frequencies (percentages). Following the analysis of the normality of the data, appropriate statistical tests of significance were used. The quantitative variables were compared utilizing an independent samples t-test (t). When it came to categorical variables, we compared groups via Fisher's exact tests and chi-square (X²). Pearson correlation coefficient (r) was used for correlation of quantitative variables.

The statistical significance of the data was determined by determining the significant probability to be < 0.05 . P-values that were < 0.001 were deemed highly statistically significant (HS),

whereas P-values that were ≥ 0.05 were deemed statistically non-significant (NS).

RESULTS

The age of the study's subjects varied, the mean age of the studied old people in the nursing home group was statistically higher, 70.67 ± 5.36 years old, ranging from 60 to 80 years old, than the mean age of the elderly in the community, which was 69.78 ± 5.78 years old. There were 45 males (40.5%) and 66 females (59.5%) living in their homes, & 51 men (45.5%) & 60 women (54.1%) living in elderly homes, with no statistical variance, as more than half of the studied elderly in the community group & elderly in nursing homes were female (59.5%) and 54.1%, respectively. Regarding their marital status, there was no significant variation among both groups. As regards socioeconomic level, there was no significant distinction among both groups, as 47.7% of the elderly in the community have a middle socioeconomic level compared to 36% of the elderly studied in nursing homes. While about 52.3% of the elderly in the community have high socioeconomic status (**Table 1**). Regarding chronic diseases and comorbidities among the studied groups, all the elderly in the community suffers from chronic diseases in the form of hypertension, diabetes, arthritis, dental decay, and visual vision disability (71.2, 35.1%, 58.6%, 75.7%, and 61.3%), respectively, while the elderly in nursing homes suffer from hypertension. GIT problem, anemia, loss of taste sensation and other diseases (Alzheimer, dysarthria, hallucinations) in 14.4%, 19.8%, 54.1%, 50.5% and 60.4%, respectively with high statistically significant difference (**Table 2**). The results of MNA revealed that two-thirds of the elderly in the community had normal nutritional status (64%), while only 12.6 percent of the elderly in nursing homes had normal nutritional status, with a statistically significant variance. Also, the frequency of malnutrition was significantly more prevalent among nursing home-living elderly (43.2%) versus zero percent among community-living elderly. The mean score of the MNA was statistically higher among the elderly in the community than the elderly in nursing homes (24.76 ± 3.27 and 17.2 ± 5.25), respectively (**Table 3**). Regarding relation between socio-demographic data, comorbidities of the examined groups and malnutrition indicator score grading among elderly in community group and in nursing home group, the risk of malnutrition was significantly more prevalent among the older age group 50% among those aged 60- 65 years, and in the nursing home group, the frequency of malnutrition was

significantly more prevalent (47.6%) among those aged > 65 years and there was statistical significant relation between liver disease, arthritis, anemia and loss of taste sensation and risk of malnutrition in community group 61.1% , 44.6 % , 85.7, % 75% respectively ,in nursing home group there was statistical significant between diabetes mellitus, GIT disease, anemia, vision disability and loss of taste sensation and risk of malnutrition 72.7% , 86.4 , 55% , 100% , 58.9% respectively (**Table 4**).

Regarding anthropometric measurements among the studied groups according to sex, there was statistically significant variance amongst both groups in males with regard to calf circumference,

while there was no statistically significant variance regarding mid-upper arm circumference, triceps skin fold thickness, arm muscle area, and arm muscle circumference. Regarding anthropometric measurements among the studied groups in females, there was a statistically significant difference regarding calf circumference, mid-upper arm circumference, triceps skin fold thickness, arm muscle area, & arm muscle circumference (**Table 5**). Among the community group, there was a significant positive correlation between MNA & BMI. On the other hand, among the elderly in nursing homes, there was a significant positive correlation among Mini Nutritional Assessment score & BMI, (Table 6), (Table 7) respectively.

Table (1): Sociodemographic characteristics of the Studied groups (No=222).

Item	Elderly in Community (N=111)		Elderly in nursing home (N=111)		Test	P-value
	No.	%	No.	%		
Age (years)						
• Mean ± SD	69.78 ± 5.78		70.67 ± 5.36		1.18@	0.239 (NS)
• (Range)	(60 - 83)		(60 - 80)			
Sex						
• Male	45	40.5	51	45.5	0.661#	0.416 (NS)
• Female	66	59.5	60	54.1		
Marital status						
• Single	4	3.6	8	7%	1.69#	0.429 (NS)
• Married	47	42.3	49	44%		
• Widow	60	54.1	54	49%		
Socioeconomic level						
Middle	53	47.7	40	36%	3.127#	0.077 (NS)
High	58	52.3	71	64%		

@ student t - test. # Chi-square test. *Statistically significant NS: Non-Significant

Table (2): Chronic diseases & comorbidities among the Studied groups (No=222).

Item	Elderly in Community (N=111)		Elderly in nursing home (N=111)		Test	P-value
	No.	%	No.	%		
Presence of chronic diseases						
▪ No	0	0.0	10	9.0	Fisher's	0.001*
▪ Yes	111	100.0	101	91.0		
Chronic diseases and comorbidities						
▪ Hypertension	79	71.2	16	14.4	73.031 #	<0.001**
▪ Diabetes mellitus	39	35.1	11	9.9	20.238 #	<0.001**
▪ IHD	19	17.1	0	0	20.778 #	<0.001**
▪ Kidney disease	9	8.1	0	0	9.380 #	0.002*
▪ Respiratory diseases	12	10.8	0	0	12.686#	<0.001**
▪ Thyroid disorders	13	11.7	8	7.2	1.315#	0.25 (NS)
▪ Liver diseases	18	16.2	0	0	19.588#	<0.001**

▪ GIT diseases	28	25.2	22	19.8	0.929#	0.335 (NS)
▪ Arthritis	65	58.6	0	0	91.911#	<0.001**
▪ Anemia	14	12.6	60	54.1	42.892#	<0.001**
▪ Dental decay	84	75.7	0	0	131.1#	<0.001**
▪ Stroke	18	16.2	0	0	19.588#	<0.001**
▪ Cancer	20	18	0	0	21.98#	<0.001**
▪ Asthma	0	0	8	7.2	8.299#	0.004*
▪ Hearing disability	20	18	3	2.7	14.017#	<0.001**
▪ Vision disability	68	61.3	12	10.8	61.285#	<0.001**
▪ Loss of taste sensation	8	7.2	56	50.5	50.58#	<0.001**
▪ Risk of depression	16	14.4	0	0	17.24#	<0.001**
▪ Others (Alzheimer, Dysarthria, Hallucinations)	0	0	67	60.4	95.98#	<0.001**

Chi-square test.

(*) P < 0.05 is significant. (**) P<0.001 is highly significant.

NS: Not significant. IHD: Ischemic heart disease. GIT: Gastrointestinal tract

Table (3): Nutritional status according to Mini Nutritional Assessment (MNA) total score among the Studied groups

Item	Elderly in Community (N=111)		Elderly in nursing home (N=111)		Test of significance	P-value
	No.	%	No.	%		
Malnutrition Indicator Score Grading						
▪ Malnourished	0	0.0	48	43.2	82.13#	0.001* <
▪ At risk of malnutrition	40	36.0	49	44.1		
▪ Normal nutritional status	71	64.0	14	12.6		
Total assessment MNA scoring						
Mean ± SD	24.76± 3.27		17.2±5.25		7.000 (t)	0.001** <
(Range)	17.5- 29.5		6-25.5			

Chi-square test.

*Statistically significant. ** P<0.001 is highly significant. (t) student (t) test.

Table (4): Relation between sociodemographic data and comorbidities of the studied groups and Malnutrition Indicator Score Grading among Elderly in Community group and in nursing home group.

Item In community	At risk of malnutrition (N= 40)		Normal nutritional status (N= 71)		Test	P-value	OR (95% CI)
	No.	%	No.	%			
Age distribution							
• 60 - 65 years (n=36)	18	50	18	50	4.507 #	0.034*	1.705 (1.055- 2.754)
• > 65 years (n=75)	22	29.3	53	70.7			
Sex							
• Male (n=45)	16	35.6	29	64.4	0.008 #	0.931 (NS)	0.978 (0.589- 1.623)
• Female (n=66)	24	36.4	42	63.6			
Marital status							
• Single (n=4)	2	50	2	50	0.822 #	0.663 (NS)	NA
• Married (n=47)	15	31.9	32	68.1			
• Widow (n=60)	23	38.3	37	61.7			
Socioeconomic level							
• Middle (n= 53)	23	43.4	30	56.6	2.384 #	0.123 (NS)	1.481 (0.894- 2.451)
• High (n= 58)	17	29.3	41	70.7			
Chronic diseases co-morbidities							

• Hypertension (n=79)	30	38	49	62	0.447 #	0.504 (NS)	0.823 (0.458-1.479)	
• Diabetes mellitus (n=39)	16	41	23	59	0.649#	0.420 (NS)	0.813 (0.494-1.337)	
• IHD (n=19)	6	31.6	13	68.4	0.198#	0.657 (NS)	1.170 (0.573-2.389)	
• Kidney disease (n=9)	5	55.9	4	44.4	1.619#	0.203 (NS)	0.618 (0.325-1.175)	
• Respiratory diseases (n=12)	5	41.7	7	58.3	0.185#	0.667 (NS)	0.848 (0.413-1.744)	
• Thyroid disorders (n=12)	2	16.7	10	83.3	2.190#	0.139 (NS)	2.303 (0.643-8.363)	
• Liver diseases (n=18)	11	61.1	7	38.9	5.860#	0.015*	0.510 (0.317-0.822)	
• GIT diseases (n=28)	14	50	14	50	3.168#	0.075 (NS)	0.627 (0.348-1.021)	
• Arthritis (n=65)	29	44.6	36	55.4	5.009#	0.025*	0.536 (0.299-0.959)	
• Anemia (n=14)	12	85.7	2	14.3	17.153#	<0.001 **	0.337 (0.231-0.492)	
• Dental decay (n=84)	27	32.1	57	67.9	2.271#	0.123 (NS)	1.498 (0.909-2.469)	
• Stroke (n=18)	6	33.3	12	66.6	0.068#	0.749 (NS)	1.097 (0.541-2.22)	
• Cancer (n=20)	10	50	10	50	2.064#	0.151 (NS)	0.659 (0.389-1.117)	
• Hearing disability (n=20)	4	20	16	80	0.386#	0.535 (NS)	1.245 (0.606-2.560)	
• Vision disability (n=68)	28	41.2	40	58.8	2.012#	0.156 (NS)	0.678 (0.388-1.184)	
• Loss of taste sensation (n=8)	6	75	2	25	5.678#	0.017*	0.440 (0.271-0.715)	
• Risk of depression (n=16)	8	50	8	50	1.581#	0.209 (NS)	0.674 (0.383-1.186)	
Item in nursing home	Malnourished (N= 48)		At risk of malnutrition (N= 49)		Normal nutritional status (N= 14)		Test	P-value
	No.	%	No.	%	No.	%		
Age distribution								
• 60 - 65 years=27	8	29.6	11	40.7	8	29.6	9.814 #	0.007*
• > 65 years=84	40	47.6	38	45.2	6	7.1		
Sex								
• Male=51	22	43.1	21	41.2	8	15.7	0.895 #	0.639 (NS)
• Female=60	26	43.3	28	46.7	6	10		
Marital status								
• Single (n=8)	5	62.5	2	25	1	12.5	1.894 #	0.755 (NS)
• Married (n=49)	19	38.8	24	49	6	12.2		
• Widow (n=54)	24	44.4	23	42.6	7	13		
Socioeconomic level								
• Middle (n=40)	18	45	18	45	4	10	0.393 #	0.821 (NS)
• High (n=71)	30	42.3	31	43.7	10	14.1		
Chronic diseases co-morbidities								

• Hypertension (n=16)	8	50	8	50	0	0	2.70#	0.259 (NS)
• Diabetes mellitus (n=11)	0	0	8	72.7	3	27.3	9.62#	0.008*
• Respiratory diseases (n=3)	0	0	3	100	0	0	3.901#	0.142 (NS)
• GIT diseases (n=22)	19	86.4	0	0	3	13.6	23.933 #	<0.001* *
• Anemia (n=60)	33	55	21	35	6	10	7.354#	0.025*
• Asthma (n=8)	3	37.5	5	62.5	0	0	1.811#	0.404 (NS)
• Hearing disability (n=3)	3	100	0	0	0	0	4.047#	0.132 (NS)
• Vision disability (n=12)	12	100	0	0	0	0	17.659 #	<0.001* *
• Loss of taste sensation (n=56)	33	58.9	20	35.7	3	5.4	12.967 #	0.002*
• Others (Alzheimer, Dysarthria, Hallucinations) (n=67)	26	38.8	33	49.3	8	11.9	1.830 #	0.401 (NS)

Chi-square test. *P<0.05 is significant. ** P<0.001 is highly significant. OR: Odds Ratio. CI: Confidence interval. NS: non-significant. IHD: Ischemic heart disease. GIT: Gastrointestinal disease. NA: Not applicable (Risk estimate calculated only for 2*2 table).

Table (5): Anthropometric measurements among the Studied groups according to sex

Item	Elderly in Community (N=111)		Elderly in nursing home (N=111)		Test	P-value
Male						
Calf circumference						
▪ < 31 cm	15	33%	8	16%	4.086 #	0.043*
▪ ≥ 31 cm	30	67%	43	84%		
Mid- upper arm circumference						
▪ < 22 cm	9	20%	8	16%	0.305 #	0.581 (NS)
▪ ≥ 22 cm	36	80%	43	84%		
Triceps skin fold thickness						
Mean ± SD	12.3 ± 4.17		11.4 ± 1.9		1.38 (t)	0.171 (NS)
(Range)	7- 20		6-14			
Arm muscle area						
Mean ± SD	51.3 ± 14.6		57.1 ± 15.2		- 1.92 (t)	0.057 (NS)
(Range)	24.3-75.8		17.6-72.7			
Arm muscle circumference						
Mean ± SD	27.9± 4.44		26.2± 4.2		1.93 (t)	0.056 (NS)
(Range)	19.74- 33.7		14.8- 28.3			
In females						
Calf circumference						
< 31 cm	2	3%	13	22%	10.408 #	0.001*
≥ 31 cm	64	97%	47	78%		
Mid- upper arm circumference						
< 22 cm	0	0%	14	23%	17.325 #	<0.001**
≥ 22 cm	66	100%	46	77%		
Triceps skin fold thickness						
Mean ± SD	19 ± 7.7		14.8± 4.5		3.69 (t)	0.001***<
(Range)	8-40		7-20			
Arm muscle area						

Mean ± SD	64.9± 16.27	49.1 ± 13.9	5.83	0.001**<
(Range)	14.2-105.1	19.9- 63.4	(t)	
Arm muscle circumference				
Mean ± SD	28.49 ± 3.41	24.6± 4.07	5.72	0.001**<
(Range)	22.4-36.3	15.8-28.2	(t)	

(t) Student (t) test *P<0.05 is significant. ** p<0.001 is highly significant. # Chi-Square test

Table (6): Pearson rank Correlation co-efficient between MNA total malnutrition indicator and other variables in Elderly in Community group

Elderly in Community	MNA total malnutrition indicator	
	Pearson’s correlation coefficients (r)	P-value
Age (years)	0.028	0.772 (NS)
BMI (Kg/m ²)	0.666	<0.001**

BMI: body mass index. NS: Non-significant

**P<0.001 is highly significant.

Table (7): Pearson rank Correlation co-efficient between MNA total malnutrition indicator and other variables in Elderly in nursing home group

Elderly in nursing home	MNA total malnutrition indicator	
	Pearson’s correlation coefficients (r)	P
Age (years)	0.059	0.539 (NS)
BMI (Kg/m ²)	0.652	<0.001**

BMI: body mass index. NS: Non-significant.

**P<0.001 is highly significant.

DISCUSSION

The normal aging process, which includes physiological and functional changes, makes people more susceptible to undernutrition. Acute and chronic illnesses with a bad prognosis might have an influence on nutritional status, resulting in insufficient nutrition. Tadesse et al. [17]. One hundred and eleven of the two hundred and twenty-two older people who were the patients of the study were nursing home living, while one hundred and eleven of the individuals were living at home with their family (community living). Their ages ranged from sixty to one hundred years old. The mean age of the studied elderly in the nursing home group was statistically greater than the mean age of the elderly in the community, In line with our study, a research by Fang et al. [18], which was carried out in China, found that the elderly studied in the community were 75±6.3 and in nursing homes, 84.0±6.6, with a statistically significant difference. Also, in accordance with research reported in India by Rashid et al. [19], who discovered that 68.2 ±

0.4 was the average age of the old individuals analysed. Consistent with Giebel et al. [20], who reported that subjects in the community had advanced degrees of education & family income compared to those in nursing homes, our results reported no significant correlation between socioeconomic level & MNA score among the elderly in both groups. In contrast, a study in Bangladesh stated that a significant reason for malnutrition in the older population was the reduction in respondents' educational condition, according to Rahman et al. [21]. Lack of education was shown to be adversely correlated with the nutritional state of the older population. Regarding the results of the current study, the percentage of normal nutritional status was significantly more prevalent among the community group (64%) versus (12.5%) among the nursing home group, with about half of participants from nursing homes were malnourished versus zero percent among the community group. The mean value of the MNA is statistically higher among the elderly in the

community group than the elderly in nursing homes (24.76 ± 3.27 and 17.2 ± 5.25), respectively. This is consistent with a study conducted in China by Liu et al. [22] who reported increased frequency of malnutrition among elderly living in nursing homes, also in line with a study performed in UK by Gordon et al. [23] stated that thirty percent of care home residents were malnourished. However, the frequency of malnutrition among the community group in the current study was lower than that of a study carried out in Iran by Aliabadi et al. [24], which reported that twelve percent of free-living elderly were malnourished. This variation may be attributed to the variation of cultural & social habits that affect the nutritional habits of elderly people in different communities. while & fifty six percent were at risk of malnutrition in the UK. Regarding age distribution in the community group, the risk of malnutrition was significantly more prevalent among the older age group. Also, in the nursing home group, the frequency of malnutrition was significantly more prevalent (47.6%) among those aged > 65 years. Similarly, Joymati et al. [25] found a statistically significant correlation among malnutrition & advanced age in Indian research. Issues with the mouth & gums, lower taste & smell perceptions and impaired cognitive & functional abilities are some of the mental, physiological, and biological changes that accompany aging, which is positively associated with underweight and malnutrition. Regarding relation with comorbidities and malnutrition indicator score grading among elderly in the community, there was statistically significant relation with liver disease, arthritis, anemia, and loss of taste sensation in nursing home group. In addition, there was significant relation between diabetes mellitus, GIT disease, anemia, vision disability and loss of taste sensation and risk of malnutrition. This finding is corroborated by research findings from Lattakia, Syrian Arab Republic Hallaj [26] who reported that elders suffered from musculoskeletal disorders, GIT disorders, metabolic disorders as DM, by (32.29%, 25.71%, 21.43%.) respectively. Also, this goes in harmony with study conducted in Austria by Silvia [27] who reported that chronic conditions like

diabetes and musculoskeletal disorders were significantly correlated with under nutrition. In the current study 75% of the community group suffered from loss of taste sensation and 58.9% of the nursing home which has a significant association with undernutrition in agreement with Cox et al [28]. Changes in taste, smell, & appetite often drop with age, making it more difficult to enjoy eating and maintain regular eating habits. Appetite loss in older people, the Anorexia of Aging (AA), is commonly associated with undernutrition. The possible justification may be that they could not feed adequately and poor appetite due to loss of taste sensation. This justification is supported by a study conducted in Germany by Kiesswetter et al [29] who revealed that from the domain of dietary intake related problems, poor appetite was identified as a major factor related to malnutrition. In addition, it may be explained by decrease in salivary secretion and quality of saliva with normal aging [30]. Saliva plays a crucial role in the oral digestion of food and is closely linked to the sensory and texture experience. There is a common belief that the production and characteristics of saliva undergo alterations as a person gets older, leading to the development of dry mouth disorders and abnormalities in taste perception [31]. Poor oral health, a major concern in geriatrics, is a condition that is prevalent in the elderly and has adverse effects related to mastication and nutritional problems. Poor oral health is also strongly associated with malnutrition in the elderly [32]. Anaemia was statistically significant related with malnutrition indicator score grading among both groups in agreement with a study conducted by Gupta et al [33] who revealed that 92.1% of the elderly subjects were anaemic. Moderate and severe anaemia was found to be significantly higher among malnourished and underweight subjects. Diabetes mellitus and vision disability were statistically significant related to malnutrition indicator score grading among elderly in nursing home 72.7% and 100% respectively. In agreement with the present study, Yang and Lee [34] revealed that older adults with diabetes, who also have severed visual impairment, are more likely to have

nutritional risk status than those without impairment after controlling for covariates (odds ratio [OR]=2.44, 95% confidence interval [CI] 1.16~5.13). This may be due to vision impairment which is accompanied by difficulty in performing day's basic activities such as preparing food and self-feeding. Regarding anthropometric measurements among the studied groups according to sex, there was statistically significant variance among both groups in males as regard calf circumference, while there was no significant variance regarding mid-upper arm circumference, triceps skin fold thickness, arm muscle area, and arm muscle circumference. On the other hand, concerning anthropometric measurements studied females group, there was a statistically significant difference regarding calf circumference, mid-upper arm circumference, triceps skin fold thickness, arm muscle area, and arm muscle circumference. These results goes in harmony with Elghazally and Saied [35], who demonstrated that there was no statistically significant difference in the mean body mass index among the elderly living in care homes (31.938 ± 6.603) & those residing in their own residences (30.69 ± 6.5). On the other hand, arm muscle area and arm muscle circumference were statistically higher among elderly females in the community than elderly females in nursing homes. This may be attributable to the higher subcutaneous fat content of women, which may decrease the accuracy of mid upper arm circumference (MUAC). In addition, women experience a proportionally greater age-related loss of subcutaneous fat than men [36]. The present study revealed a significant positive correlation among MNA score & BMI in the community group as well as the nursing home group. This was in agreement with Ghimire et al. [37], who reported that body mass index was significantly correlated with the total Mini Nutritional Assessment score. Also, Sukkriang and Somrak [38] demonstrated that there was a significant positive correlation between body mass index & Mini Nutritional Assessment total score.

Strengths and limitations of the study:

Our study's primary strengths are its comparative cross-sectional study design and the paucity of

research on the dietary needs of Egypt's elderly population. Therefore, our research advances knowledge of problems associated with malnutrition in the elderly. However, there are few limitations in the conduct of the study. Non-compliance and a lack of urgency in the study's importance. Traditional ideas and fears regarding making anthropometric measures. Fear and psychological effects of a positive diagnosis. Difficult communications with elderly people with psychological diseases like Alzheimer, dysarthria, and hallucinations.

CONCLUSION

Our study concluded that malnutrition is a considerable problem among the elderly, with a significantly higher frequency in nursing home living than in community living. Being older than 65 was significantly associated with both malnutrition & the risk of malnutrition. The findings of the study detect and confirm that the associated risks of malnutrition like liver diseases, arthritis, anemia ,loss of taste sensation , Diabetes mellitus ,GIT diseases, and vision disability are statistically significant among included elderly. The older group and residents of nursing homes should be the primary targets of interventions aimed at improving nutritional status among the elderly. It is recommended that families and nursing home workers receive counselling regarding proper nutritional care for the elderly.

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