

Malnutrition among Elderly Patients with Selected Chronic Diseases: Screening and Risk Factors at Minia University Hospital

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Abstract

Background: Malnutrition is a major geriatric syndrome with multiple causative factors and severe complications that lead to increased mortality and morbidity rates specifically among older adults with chronic diseases. **Aim of the study:** To assess malnutrition and identify the main risk factors that associated with malnutrition among elderly patients with selected chronic diseases (hypertension and diabetes). **Research design:** A cross sectional descriptive research design was utilized. **Subjects:** A purposive sample of (100) elderly patients involved in the current study. **Setting:** The current study was carried out in medical outpatient clinics, at Minia University Hospital, Egypt. **Tools:** Three tools were utilized to collect data, **First Tool:** Patient Interview Structured Questionnaire, **Second Tool:** Nutritional Assessment (Mini Nutritional Assessment Scale (MNAS) and biochemical measurements. **Third Tool:** Malnutrition Risk Factors Assessment Questionnaire **Results:** It was found that more than half of the studied samples were at risk of malnutrition, with highly statistically significant differences regarding (age, income, education, and physiological and psychological factors). **Conclusion:** More than half of the studied elderly patients with diabetes and/or hypertension were at risk for malnutrition. Additionally, age, place of residence, low education, and income significantly affected their nutritional status. As well as, physiological factors were the most noticeable risk factors for malnutrition among them. **Recommendations:** Educational classes focusing on the proper nutrition and appropriate lifestyles for the elderly patients with chronic disease (DM/hypertension or both) were recommended, also having routine screening tests that evaluate their nutritional status.

Keywords: Chronic Diseases, Elderly Patients, Malnutrition screening, Risk Factors

Introduction

There is a continuous increase in the number of elderly people around the world, as their number is growing rapidly. Some studies indicated that in 2030, the number of elderly people in the world will be 1 out of every 6 people, as they will rise from 1 billion in 2020 to 1.4 billion by 2030, and by 2050, they will double to 2.1 billion. **World Health Organization ,(2022)& Karthika, et al., (2023).**

Malnutrition is an international term that refers to deficiencies, excesses, or imbalances of essential nutrients in a person's intake (**World Health Organization, 2024**). There are three broad forms of malnutrition, including under nutrition and micronutrients such as a lack of important vitamins and being overweight **Soni & Khan, (2023)**. Globally, the rate of malnutrition among the elderly ranges from 1% to about 25%, with the lowest prevalence rate in northern Europe (less than 1%) and the highest percentage in Southeast Asia (24.8%) **Singh& Chattopadhyay,(2023)**.

Aging is often associated with many long-term conditions, such as chronic diseases. The incidence of these diseases has increased among the elderly, which can affect appetite and change the rate of food intake, which negatively affects nutritional status and increases the risk of malnutrition as a result of poor health. **Aly, et al., (2020)**

Physiological, pathological, social, and economic factors can reduce elderly food intake, which affects the efficiency of nutrient utilization and nutritional status, which leads to malnutrition for them. Poor nutritional status exacerbates existing diseases, especially chronic ones, in

addition to increasing health problems. **Muhye & Fentahun (2023)**. So, routine nutritional screening for malnutrition among the elderly, in addition to early intervention and regular follow-up, improves nutritional status and health outcomes for older adults. **Browne, Geraghty, & Corish (2022)**.

Currently, malnutrition among the elderly has become an important issue that needs a great deal of attention because it is often accompanied by various health problems. Therefore, nurses must have sufficient knowledge about how to prevent malnutrition in the service home as well as in the health sector, which in turn helps maintain awareness and prevent malnutrition among the elderly. **Luitel Lama (2023)**. Gerontological nurse plays a vital role in conducting a nutritional examination frequently for elderly people living in the community as a part of secondary prevention, in addition to providing nutritional advice and support for elderly people at risk of malnutrition, especially those elderly people with diabetes and hypertension disease. **Katsas, et al. (2020)**.

Significance of The Study

Malnutrition is widespread among elderly persons and considered a major geriatric syndrome with multiple etiological factors and severe complications, such as; increased risk of frailty, falls, and dependence on activities of daily living (ADL), hospitalization, and longer length of stay. It also causes delayed wound healing and more complications, increased mortality, morbidities, and a poor quality of life,

which leads to increasing the use of primary care services. Volkert, et al., (2019).

In Egypt, malnutrition is significantly higher among elderly people, with a percentage of (30.9%) of community dwellers Sabbour, et al., (2018). Based on several related studies, diabetes and hypertension are the most chronic diseases that affect nutritional status among older adults Algameel, (2020). Therefore, this study will be conducted to detect the presence of malnutrition among elderly patients and to identify the most common risk factors that will be useful for nursing planning and intervention for this group of patients, which will reflect positively on patient's outcomes and their quality of life

Aim of the Study:

a) To assess the presence of malnutrition using a screening tool among elderly patients with selected chronic diseases (hypertension and diabetes).

b) To identify the risk factors associated with malnutrition among elderly patients with selected chronic diseases (hypertension and diabetes).

Research Questions:

- 1- What is the nutritional status among elderly patients with selected chronic diseases (hypertension and diabetes)?
- 2- What are the risk factors associated with malnutrition among elderly patients with chronic diseases (hypertension and diabetes)?

Subjects and Methods

Setting:-

The study was carried out in medical outpatient clinics, at Minia University Hospital, Egypt.

Research Design:-

A cross sectional descriptive research design was utilized to fulfill the aim of this study.

Sample:-

A purposive sample of (100) elderly patients was included in this study. The sample size was chosen based upon the following sample calculation formula; Mohamed,et al.,(2019)

N	=	$\frac{(t)^2 \times p(1-p)}{(m)^2}$
N	=	$\frac{(1.96)^2 \times 0.07(1-0.07)}{(0.05)^2}$

Description:

N = required sample size.

- t = Confidence level at 95% (standard value of 1.96)
- p = Estimated prevalence of disease 7%
- m = Margin of error at 5% (standard value of (0.050)).
So, N=100

Study Duration:

- The data was collected over a period of one year starting from January 2022 to December, 2022.

Inclusion Criteria:

- Patients age 65 years and more of both sexes
- Patients with chronic diseases (hypertension or diabetes or both).

Exclusion Criteria:

- Elderly patients who not able to communicate.
- Unconscious elderly patients.
- Elderly patients subjected on artificial/total parenteral nutrition.
- Severely disabling conditions.

Tools of data collection:

The study data was collected by using the following three tools:-

First Tool: Patient Interview Structured Questionnaire;Developed by the researcher by reviewing related literature reviews Bakhtiari, Pourali & Omidvar,(2020)& O’Shea, et al.,(2017) and it covered two main parts;

- **Part I; Socio-Demographic Data;** which include: (code number, patient’s age, gender, level of education, occupation, marital status and etc.....)
- **Part II; Medical Data;** such as history of chronic illness (diabetes, hypertension, both together), disease duration, present diagnosis, types of medication used, nutritional habits that affect nutritional status among diabetics and hypertensive patients and etc.....)

Second Tool: Nutritional Assessment;

-It included two parts designed to cover data related to nutritional status of elderly patients:

- **Part I; : Mini Nutritional Assessment Scale (MNAS);**

The Mini nutritional assessment (full form) is a practical validated and rapid assessment tool for assessing nutritional status of elderly, adopted from Guigoz, (2006), Cereda, 2012& Guigoz & Vellas, 2021)

It consisted of two sections: screening and assessment sections (in the form of 18 questions):-

***scoring system:-**

The total score of MNAS was calculated according to the responses of the 18 items, with a total score of 30 points. The studied sample was classified into the following three groups according to the obtained score:

- Normal nutritional status (24-30 points)
- At risk of malnutrition (17 to 23.5 points)
- Malnutrition (Less than 17points)

- **Part II; Biochemical Measurements;** developed by the researcher by reviewing related literature reviews Zhang, et al., (2017) Such as (hemoglobin, serum albumin levels and white blood cells....and etc..)

Third Tool: Malnutrition Risk Factors Assessment Questionnaire; developed by the researcher by reviewing related literature reviews (Ning, et al., (2021)& Fávoro-Moreira, et al., (2016) and included

- **Physiological Risk Factors** such as ;(dry mouth, taste alteration, vomiting, diarrhea, constipation,...)
- **Psychosocial Risk Factors** as (Loneliness, Loss of spouse, Low income ...)
- **Functional Risk Factors** as (Ability to shop and prepare for food,...)
- **Pathologic Risk Factors** as(Dysphagia, Food allergies, polypharmacy, Acute or chronic pain,..)

Validity and Reliability:-

Validity;

The developed tools tested by a panel of three experts in the field of the study (Medical Surgical Nursing/ Gerontological Nursing –Faculty of Nursing –Minia University).All jury members agreed that current study tools were valid and relevant with aim of the study.

Reliability;

Cronbach’s alpha test for reliability of the internal consistency of Mini Nutritional Assessment Scale (MNAS) detected an increase of accuracy from 92% to 98% comparable to the comprehensive nutritional assessment.

Ethical Consideration;-

- As regard to the managerial arrangements, the research plan was initially approved by the research ethics committee at the Faculty of Nursing - Minia University and an official approval was obtained from the Head of Minia University Hospitals to conduct the study.
- Voluntary and oral consent obtained from each participant after explaining in brief about the need, purpose and nature of the study and that he/she has the right to withdraw from the study at any time.
- The importance of each participant cooperation for the success of the study and possible benefits to the community through the findings of the study also emphasized.
- Confidentiality of each participant was ensured through coding of all data and protecting the obtained data.

Study Procedure:

- The current study was conducted by preparing of different data collection tools, in addition to, obtaining the permission from the research ethical committee of the faculty of nursing - Minia University, and formal permission n from the head of Minia University Hospital in order to conduct our study.
- The investigator collected and filled all the study tools by individual face to face interview during the elderly patients' attendance to the medical outpatient clinics only one time. Data collected over a period of one year starting from January 2022 to December, 2022.
- The investigator visited the selected settings three days weekly. The study included (100) of elderly

patients with selected chronic diseases (hypertension and diabetes) according to the inclusion criteria. The voluntary and oral consent obtained from each participant after explaining the nature and aim of that study, and then the investigator started to collect the needed data.

- Firstly the researchers collect the initial personal, medical data, as well as knowledge and behaviors related to malnutrition among diabetics and hypertensive patients, and it took (10 minutes).
- After that the researcher assessed the nutritional status of each participant by using the Mini Nutritional Assessment Scale (MNAS), which consists of two sections: screening and assessment sections, it took about (10-20) minutes.

A) **The screening section** consisted of six parts to evaluate the declining in food intake, weight loss in last three months, perceived psychological stress or any neuropsychiatric symptoms.

B) **The assessment section** consisted of twelve parameters that included questions about independent living status of the elderly, number of prescription drugs taken, presence of pressure sores, frequency of meals; assessment of protein intake, consumption of fruits and vegetables, fluid intake; mode of feeding, self-assessment of health and nutritional status, how the patient consider of his/her health status in comparison with others, also included examination of anthropometric measurements, including measurement Body Mass Index (BMI), Mid-Arm Circumference (MAC), Calf Circumference (CC), Height and Weight. It took from 20 to 30 minutes.

- Finally the associated risk factors of malnutrition were assessed using the third tool and it took about (5-10) minutes.

Statistical Design:

Statistical methods for data analysis;-

The collected Data were summarized, tabulated, and presented using statistical package for the social science (SPSS), version (20) for statistical analysis of the data. Numerical data were expressed as mean & SD. Qualitative data were expressed as frequency and percentage. Chi-square test used as a way to test the association between two categorical variables. Probability (P-value) is the degree of significance, less than 0.05 was considered significant. The smaller the P-value obtained, the more significant is the result less than 0.001 considered highly significant

Results

Section (I): Socio-demographic Data:

Table (1): Distribution of the Studied sample according to their Socio-demographic Data (n=100)

Socio-demographic Data	Study (n=100)	
	No.	%
Age / Years		
65 > 70	83	83
70 > 75	12	12
≥ 75	5	5
Mean ± SD	67.4 ± 3.05	
Gender		
Male	14	14
Female	86	86
Residence		
Rural	70	70
Urban	30	30
Marital Status		
Single	1	1

Socio-demographic Data	Study (n=100)	
	No.	%
Married	36	36
Divorced	1	1
Widow	62	62
Level of Education		
Illiterate	58	58
Read and Write	16	16
Primary – Preparatory	2	2
Secondary	24	24
Occupation		
House wife	80	80
Employer	4	4
Farmer	5	5
Unemployed	2	2
Retired	9	9
Living Condition		
Living with family	94	94
Living alone	6	6
Monthly Income		
Enough	41	41
Not-enough	57	57
Enough and Saved	2	2

Table (1) Revealed the distribution of studied sample according to their socio-demographic characteristics. In relation to age; it was found that the mean age of studied sample was (67.4 ± 3.05). Concerning gender, it was found that (86%) of studied sample were females, and (70%) of the studied sample lived in rural areas. Concerning their marital Status, the finding represented that (62%) were widows. Also, the results revealed that (57%, 58%, 80% and 94%) of the studied sample; had low income, were illiterate, were housewives, and were living with family, respectively.

Table (2): Distribution of the Studied Sample Regarding Their Medical Data (n=100)

Medical Data	No.	%
Presence of Chronic Illness (n=100)		
Diabetes	29	29
Hypertension	18	18
Diabetes & Hypertension	53	53
Diabetes Duration (n=82)		
< 5	44	44
5 - < 10	14	14
≥ 10	24	24
Hypertension Duration (n=71)		
< 5	28	28
5 - < 10	19	19
≥ 10	24	24
Number of used Medications (n=100)		
≥ two medications	25	25
Three	31	31
Four	24	24
Five or more	20	20
Smoking (n=100)		
No	95	95
Cigarette	5	5

Table (2): Displayed distribution of studied sample regarding to their past and present medical data. Regarding the presence of chronic illness, it was found that (53%) of studied sample had diabetes and hypertension, and (28% and 44% respectively) had hypertension and diabetes for less than 5 years.

Regarding the number of medications took, it was found that about (31%) of the studied sample took three types on a daily basis. Concerning to smoking habits, it was found that (95%) of the studied sample were non-smokers.

Table (3: A): Distribution of the Studied Sample According to the Mini Nutritional Assessment Scale (MNAS) (n=100)

Variables	Study (n=100)	
	No.	%
- Food intake over the past 3 months		
Severe decrease	17	17
Moderate decrease	45	45
No decrease	38	38
- Weight loss during the last 3 months:		
Weight loss more than 3 kilo	10	10
Unknown	16	16
Weight loss ranged from 1 to 3 kilo	42	42
No weight loss	32	32
- Mobility:		
Bed or chair bound.	0	0
Able to get out of bed / chair but does not go out	42	42
Goes out.	58	58

Variables	Study (n=100)	
	No.	%
- Presence of psychological stress or acute disease in the past 3 months		
- Yes	37	37
- No	63	63
- Neuropsychological problems:		
- Severe dementia or depression	3	3
- Mild dementia	27	27
- No psychological problems	70	70
- Body mass index: (BMI)		
- Underweight	0	0
- Normal weight	13	13
- Overweight	49	49
- Obese	38	38
- Screening Score		
- Normal	27	27
- At risk of malnutrition	52	52
- Malnourished	21	21

Table (3-A):

Shows that (42%, 45% and 70% respectively) of the studied sample had the percentage of weight loss ranged from 1 to 3 kilo had moderate decrease in their food and they did not suffer from psychological problems during the last 3 months. According to the mobility, it was found that (58%) of the studied sample were gone out. Regarding body mass index (BMI), it was observed that (49%) of the studied sample were overweight. According to the screening score, (52%) were at risk of malnutrition.

Table (3: B): Distribution of Studied sample regarding to Mini Nutritional Assessment (MNA) Scale (n=100)

Variables	Study (n=100)	
	No.	%
Lives independently		
- Yes	70	70
- No	30	30
Takes more than 3 prescription drugs per day:		
-Yes	57	57
- -No	43	43
Pressure sores or skin ulcer		
- Yes	18	18
- No	82	82
Numbers of full meals/daily:		
- One meal	1	1
- Two meal	44	44
- Three meals	55	55
Selected consumption markers for protein intake:		
- 0.0 = if 0 or 1 yes	46	46
- 0.5 = if 2 yes	46	46
- 1=if 3 yes	8	8
Consumes two or more servings of fruit or vegetables per day?		
- Yes	63	63
- No	37	37
How much fluid is consumed daily?		
- Less than 3 cups	48	48
- 3 - 5 cups	36	36
- More than 5 cups	16	16
Mode of feeding		
- Un able to eat without assistance	0	0
- Feeds himself with some difficulty	66	66
- Feeds himself without any problem	34	34
Self-view of nutritional status		
- Malnourished	13	13
- Uncertain of nutritional state	65	65
- Having no nutritional problem	22	22
In comparison with other people, your health status?		
- Not as good.	25	25
- Does not know.	49	49
- As good.	26	26
Mid-arm circumference (MAC) in cm		
- 0.0 = MAC less than 21	3	3
- 0.5 = MAC 21 to 22	10	10
- 1 = MAC greater than 22	87	87
Calf circumference (CC) in cm		
- CC less than 31	22	22
- CC 31 or greater	78	78

Table (3: B): According to living independently, (70%) of the studied sample lived independently, also (57%) of the studied sample took more than 3 prescribed drugs per day. As regards to pressure sores, (82%) of the studied sample did not suffer

from pressure sores. In addition to, (55%) had been eaten three full meals/daily. Added to, (46%) of the studied sample had consumed the selected consumption markers for protein consumption per day, while (63%) of consumed two or more servings of fruit or vegetables per day.

According to amount of fluids consumed per day, it was found that (48%) had consumed less than 3 cups per day. Regarding to the mode of feeding, (66%) fed themselves with some difficulty. Concerning to self-view of nutritional status, (65%) were uncertain of nutritional state. Also, results reveals that (49%) of the studied samples did not know about their health status in comparison with other people. In addition, (87%) of studied sample, had a mid-arm circumference (MAC) greater than (22 cm), while (78%) had Calf circumference (CC) (31cm) or greater.

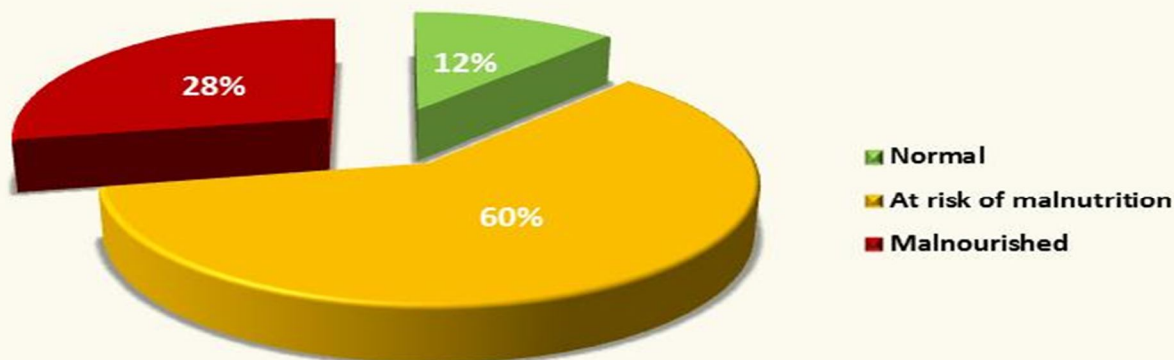


Figure (1): Total Score of Mini-Nutritional Assessment Scale (MNAS) among the Studied Sample (n=100):
Figure (1): It illustrated that more than half of studied sample (60%) were at risk of malnutrition.

Table (4): Distribution of Studied Sample Regarding to Biochemical Measurements (n=100)

Biochemical Measurements	Study (n=100)	
	No.	%
Serum albumin		
- Normal	35	35
- Below normal	65	65
Mean ± SD	3.01 ± 0.697	
Hemoglobin		
- Normal	39	39
- Below normal	61	61
Mean ± SD	10.8 ± 0.933	
White Blood Cells (WBCs)		
- Normal	77	77
- Below normal	1	1
- Above normal	22	22
Mean ± SD	7.84 ± 2.48	
Red Blood Cells (RBCs)		
- Normal	52	52
- Below normal	48	48
Mean ± SD	3.45 ± 0.664	
Hemoglobin A1C (HbA1C)		
- Non Diabetic	13	13
- Pre diabetic	17	17
- Controlled Diabetic	15	15
- Un Controlled diabetic	55	55
Mean ± SD	7.78 ± 2.01	
Fasting Blood Sugar		
- Normal	27	27
- Above normal	73	73
Mean ± SD	150.9 ± 53.02	

Table (4); - Displayed the distribution of studied sample regarding to biochemical measurements. According to (serum albumin) it was detected that (65%) of studied sample had serum albumin below normal with a mean score (**3.01 ± 0.697**). Also, it was found that (61%) of the studied sample had hemoglobin below normal.

Regarding to white blood cells, it was found that (77%) of studied sample had a normal percentage, while (22%) was above normal. Considering to red blood cells (RBCs) , it was found that (52 %) of the studied sample were normal, while (48%) had RBC below normal. According to hemoglobin A1C (HbA1C), it was detected that (55%) of the studied sample had an uncontrolled diabetic percentage and the mean score was (**7.78 ± 2.01**). Also, as regarding to fasting blood sugar, it was found that (73%) of the studied sample was above normal, while (27%) was normal and the mean score was (**150.9 ± 53.02**).

Table (5): Distribution of Studied Sample Regarding to Physiological Risk Factors of Malnutrition (n=100)

Physiological Risk Factors	Study (n=100)			
	Yes		No	
	No	%	No	%
Anorexia	73	73	27	27
Dry Mouth	55	55	45	45
Taste Alteration	76	76	24	24
Smell Alteration	83	83	17	17
Vomiting	44	44	66	66
Diarrhea	45	45	55	55
Constipation	61	61	39	39
Sense of Fullness	70	70	30	30

Table (5): shows the distribution of studied sample regarding to physiologic risk factors of malnutrition. It was found that (83%, 76%, 73% and 70%) of the studied sample had smell alteration, taste alteration, anorexia and sense of fullness respectively.

Table (6): Distribution of Studied Sample Regarding to Psychosocial Risk Factors of Malnutrition (n=100)

Psychosocial Risk Factors	Study (n=100)			
	Yes		No	
	No	%	No	%
Loneliness	25	25	75	75
Stress	44	44	66	66
Grief	53	53	47	47
Dysphoria	35	35	65	65
Lack of support	55	55	45	45
Loss of spouse	64	64	36	36
Low income	57	57	43	43
Impaired interaction with others at mealtime	92	92	8	8

Table (6):- Revealed the distribution of studied sample regarding to psychosocial risk factors of malnutrition. It was found that their common psychosocial factors affecting nutritional status were; impaired interaction with others at mealtime, loss of spouse ,low income and lack of support with percentages of 92%, 64%, % 57 and 55% respectively.

Table (7): Distribution of Studied Sample Regarding to Physical and Functional Risk Factors of Malnutrition (n=100)

Physical/functional Risk Factors	Study (n=100)			
	Yes		No	
	No	%	No	%
Tremors	44	44	66	66
Ability to shop for food	48	48	52	52
Ability to prepare food	40	40	60	60
Ability to feed self with some difficulty	66	66	34	34
Ability to walk outside	58	58	42	42

Table (7): displays the distribution of studied sample regarding to Physical and functional factors of malnutrition. It reflected that 60% and 52% of the studied sample didn't have the ability to prepare food or shop for food respectively

Table (8): Distribution of Studied Sample Regarding to Pathological Risk Factors of Malnutrition (n=100)

Pathological Risk Factors	Study (n=100)			
	Yes		No	
	No	%	No	%
Peptic ulcer	20	20	80	80
Cough comes with eating	92	92	8	8
Difficulty cutting	59	59	41	41
Difficulty chewing	69	69	31	31
Dysphagia/swallowing problems	60	60	40	40
Facial paralysis or paresthesia	0	0	100	100
Indigestion	84	84	16	16
Acute or chronic pain	60	60	40	40
Recent surgery/trauma or sepsis	5	5	95	95
Food allergies or intolerance	3	3	97	97
Multiple medication/ polypharmacy	68	68	32	32
History of Over The-Counter (OTC) drugs prescribed	75	75	25	25

Table (8); displayed distribution of studied sample regarding to pathologic risk factors of malnutrition. It was detected that indigestion, difficulty chewing, polypharmacy, dysphagia and chronic pain were the commonest pathological factors affecting nutritional status with percentages of 84%,69%, 68% and 60% respectively

Table (9): Relation of Socio-demographic Data with the Total Score of the Mini-Nutritional Assessment Scale among the Studied Sample (n=100)

Socio-demographic Data	Mini- Nutritional Assessment Scale						X ² P value
	Normal (n=12)		At risk (n=60)		Malnourished (n=28)		
	No.	%	No.	%	No.	%	
Age / Years							
65 > 70	8	66.6	56	93.3	15	53.3	24.2

Socio-demographic Data	Mini- Nutritional Assessment Scale						X ² P value
	Normal (n=12)		At risk (n=60)		Malnourished (n=28)		
	No.	%	No.	%	No.	%	
70 > 75	0	0	4	6.6	9	32.1	(0.001**)
≥ 75	4	33.3	0	0	4	14.2	
Gender							
Male	2	16.6	8	13.3	4	14.2	0.095 (0.945)
Female	10	83.3	52	86.6	24	85.7	
Residence							
Rural	6	50	47	78.3	17	60.7	1.61 (0.447)
Urban	6	50	13	21.6	11	39.2	
Marital Status							
Single	0	0	1	1.6	0	0	7.48 (0.279)
Married	5	41.6	26	43.3	5	17.8	
Divorced	0	0	1	1.6	0	0	
Widow	7	58.3	32	53.3	23	82.1	
Level of Education							
Illiterate	9	75	28	46.6	21	75	10.9 (0.090)
Read and Write	1	8.3	10	16.6	5	17.8	
Primary – Preparatory	0	0	2	3.3	0	0	
Secondary	2	16.6	20	33.3	2	7.1	
Occupation							
House wife	10	83.3	46	76.6	24	85.7	12.3 (0.137)
Employer	0	0	3	5	1	3.5	
Farmer	2	16.6	1	1.6	2	7.1	
Unemployed	0	0	1	1.6	1	3.5	
Retired	0	0	9	15	0	0	
Living condition							
Living with family	12	100	57	95	25	89.2	1.97 (0.372)
Living alone	0	0	3	5	3	10.7	
Income							
Enough	1	8.3	31	51.6	9	32.1	11.2 (0.024*)
Not enough	11	91.3	27	45	19	67.8	
Enough and save	0	0	2	3.3	0	0	

* p = ≤ .05 (Statistical Significant Difference)

** p = ≤ .01 (Highly Statistical Significant Difference).

Table (9): Displayed the relation of socio-demographic characteristics with mini-nutritional assessment scale among the studied sample. It was found that (93.3%) of the studied sample who were at age (65-70 years) were at risk of malnutrition, while (53.3%) of the same age were malnourished. Added to (67.8%) of the studied sample who did not have enough income were malnourished with statistically significant differences.

Table (10): Relation of Body Mass Index (BMI) with the Total Score of Mini Nutritional Assessment Scale (MNAS) among the Studied Sample (n=100)

BMI	Mini-Nutritional Assessment Scale						X ²	P value
	Normal (n=12)		At Risk (n=60)		Malnourished (n=28)			
	No.	%	No.	%	No.	%		
- Normal weight	0	0	5	8.3	8	28.5	11.4 (0.017*)	
- Overweight	4	33.3	31	51.6	14	50		
- Obese	8	66.6	24	40	6	21.4		

P- value is Statistical Significant Difference

Table (10); displayed the relation of body mass index (BMI) with the total score of Mini-Nutritional Assessment Scale (MNA) among the participants. It was reflected that (51.6%) of the studied sample who were at risk for malnutrition were overweight, with statistically significant.

Table (11): Correlation between Malnutrition Risk Factors and the total score of Mini-nutritional Assessment Scale among Studied Subjects (n=100)

Risk Factors	Total Score of Mini-Nutritional Assessment Scale	
	r	P
- Physiological factors	- 0.447	0.001**
- Psychosocial factors	- 0.431	0.002**
- Functional factors	- 0.355	0.027*
- Pathological factors	- 0.357	0.019*

* P- value is Statistical Significant Difference ** P- value is Highly statistical significant Statistical Significant Difference

Table (11): Shows a highly statistically significant negative correlation between physiological, psychosocial risk factors and the total score of nutritional status among the studied sample. While a statistically significant negative correlation was found between functional and pathological risk factors and the total score of nutritional status among the studied sample

Discussion

Elderly people are more likely to suffer from malnutrition due to various factors such as; the occurrence of many chronic diseases, problems with the digestive system, in addition to problems with chewing or swallowing **Fauzy, et al., (2023) & Ahmad, et al., (2021)**.

Findings of the current study revealed that the mean age (67.4 ± 3.05). This is due to changes that occur with aging, including physiological and psychological changes, in addition to the incidence of chronic diseases such as hypertension and diabetes, which in turn have systemic effects that affect the nutritional status of the elderly. This result was similar to a study conducted in Iran by **Gilani, et al., (2022)**, which showed that the majority of the participants were between the ages of (65-74) years.

Findings of current study revealed that more than two thirds of the participants lived in rural areas. This result matched with the study of **Khan, Chattopadhyay & Shaw, (2023)**, which showed that about two thirds of the study sample resided in rural area, while it was in contrast to the study conducted by **Gajda, et al., (2022)**, who mentioned that almost two-thirds of the participants live in urban areas or in large cities

As regarding to medical data, the finding illustrated that more than half and nearly half respectively of the participants were diabetic and hypertensive and had taken three types of medications daily. These findings were supported by a study carried out in turkey by **Demirdag, Kolbasi & Pehlivan, (2022)** and another study by **Özkoç, & Ardiç, (2023)**, who revealed that, more than two thirds and less than half respectively of participants were hypertensive and diabetic. Moreover it was compatible with the study of **Velázquez-Alva, et al., (2020)** who documented that more than two thirds of participants taking three or more drugs.

Concerning to the total score of Mini-Nutritional Assessment Scale (MNA), the current finding represented that about two thirds were at risk for malnutrition. From the researcher point of view; Malnutrition results in many negative outcomes that can affect the normal functioning of a person and it is more prevalent among elderly patients, due to age-related changes and their effects on various aspects of their lives. This result was in accordance with the study by **Reza, et al., (2023)** who reported that more than half of the participants were at risk of malnutrition and a quarter of the sample population were malnourished according to the MNA score. In addition the study applied by **Abd Allah & Abdel-Aziz, (2020)** at Zagazig University Hospitals, Egypt showed that more than half of the studied elderly were at risk for malnutrition.

Anorexia was most noticeable physiological factor that affect nutritional status of the participants. It is due to the fact that appetite is affected by several factors, including physiological and pathological factors, psychological stress, dementia, frequent use of medications, bad or missing teeth, This result matched with the study of **Cox, (2024)** who documented that anorexia affected directly the nutritional status of diabetic and hypertensive elderly patients.

Present results revealed that more than two third of the studied sample have taste and smell alteration. It can be returned to sensory and physiological changes that occur in elderly affecting their perception of smelling and tasting food which, in turn causing decrease food intake and lead to malnutrition. These results were consistent with the study of **Fluitman, et al., (2021)**, who reported that majority of studied

sample have self-reported of lowering of taste and smell impairments, in addition to these were associated with poor appetite.

The current result revealed that more than half of studied sample have lack of support and lost their spouse as psychosocial risk factors for malnutrition. It was compatible with the study of **Özkoç & Ardiç, (2023)**, who showed more than half of studied subjects had lost their spouses and have low support. Also it matched with the studies of **Bae & Pachucki, (2024)** and **Burris, et al., (2021)**, who indicated that most of the studied sample had a feeling of loneliness and lack of support, also showed that feeling of loneliness and lack of social support were significantly associated with a higher risk of malnutrition.

As regards functional risk factors, results reflected that that more than half of the studied sample didn't have the ability to shop and to prepare food. This result is due to physiological and cognitive age – related changes which limit their abilities to perform activities of daily livings as well as, psychological and economic changes. This agrees with the study by **Bakhtiari, Pourali & Omidvar, (2020)**, who indicated that a strong association was found between score of malnutrition or the risk of malnutrition, and the inability to shop and prepare meals.

Concerning to pathological risk factors of malnutrition; chewing difficulty was the most observed among studied sample. It was similar to the study by **Zewdu, et al., (2023)**, who documented that more than two third of the subjected sample had difficulty chewing. Also dysphagia was detected in more than half of the studied sample. It can return to that most of studied were very old and have oral problems as lose of teeth, difficulty of cutting and chewing which make most of food were hard to be swallowed by them. This result was consistent with study **Gallo, et al., (2024)**, who reported that more than half of malnourished elderly in nursing home had dysphagia.

Regarding to the relation between socio-demographic characteristics and total score of MNAS, it was found that, age of the participants was significantly associated with malnutrition, especially in those elderly with low income and low educational level were also significantly associated risk factors for malnutrition. These results agreed with study conducted by **Rahman, et al., (2022)**, who interpreted the results of his study similar to the results of our current study that the elderly who are unemployed or isolated may have a low financial status or unhealthy eating habits, which leads to reduced access to nutritional foods, because of high rates of illiteracy and unemployment. Also elderly, who have lack income and savings, have not received enough nutrient-rich food and health care, which increases the risk of malnutrition. Also our study illustrated that, there was a statistical significant relation between overweight and risk of malnutrition. This result was compatible with a study by **Kıskaç, et al., (2022)** mentioned that more than half of participants were overweight and reported that malnourished people in this study were with higher body mass index.

Finally our study revealed that there was a highly significant negative correlation between physiological, psychosocial, functional and pathological risk factors and the total score of nutritional status among the studied sample and observed the most effective factors were physiological risk factors. This result matched with the study of **Franz, et al., (2023)**, who found that there are multiple causes of malnutrition in the elderly that are multifactorial and linked to

physiological, pathological, social, and mental and other problems in the aging stage. Also, this finding was compatible with the study by **Pourhassan, et al., (2018)**, who discussed that, the process of aging is accompanied by many physical and psychological changes, in addition to many associated diseases, especially chronic diseases, which lead to complications and negative effects on food intake, which ends up increasing the risk of malnutrition.

Conclusion

Based on the findings of the current study it can be concluded that more than half of the studied elderly patients with diabetes and /or hypertension were at risk for malnutrition. Additionally age, place of residence, low education and income were significantly affected their nutritional status. As well as, physiological factors were the most noticeable risk factors for malnutrition among them.

Recommendations

Based on the findings of the recent study the researcher suggested that:

Recommendations for Nurses:-

Continuing education and training program for nurses that focuses on age related changes affecting the nutrition.

Recommendations for Patients:-

- Educational classes focusing on the proper nutrition and appropriate lifestyles for the elderly patients with chronic disease as (DM and hypertension or both).
- The necessity of seeking nutritional counseling from a health team such as nutrition experts, nurses, and caregivers.

Recommendations for Further Researches:-

- Further researches for nutritional screening among elderly patients with other chronic diseases.
- Generalize the results of the current study, using a larger probability sample in the community from multiple geographical locations

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