

The Effect of Serum Albumin Level on the Frailty Score in Elderly Patients Attending Primary Health Care Centres in Babel

Ali Mousa Essa Al_Badri, Hayder F. Al-Bayati, Ammar Waheeb Obeid

Babil Health Directorate, Babylon, Iraq

Abstract

Background: Frailty can be described as a clinical state of practical reserve decline related to ageing. Slowness, fragile, fatigue, and low performance are incorporated and affect the fulfilment of effective tasks negatively. Both under and overweight could lead to a frailty dilemma. It is well known that serum albumin is the most considerable serum protein and is used as an indication of nutritional status. Many studies revealed that hypoalbuminemia was related to higher frailty scores. The universal prevalence of frailty among the elderly population varies between 4% and 59.1% **Objective:** Assessment of the effect of serum albumin on frailty score among patients who are attending primary health care centres. **Materials and Methods:** A cross-sectional study was conducted in a primary health care centre in Babil governorate/Iraq. A convenient sample of 71 old patients attending the primary health care centre. Selected patients of either sex were included and any old patients 60 yrs. old and above (male or female) were included, whereas, anyone below 60 yrs. old were excluded. The Socio-demographic characteristics of the patients (name, age, gender, residence, marital status, occupation, and level of education), and anthropometric measurements (weight, height, body mass index) were analyzed in this study. Frailty score was measured by using (rockwood_cfs) for each patient. P_value of ≤ 0.05 was considered significant. **Results:** Sociodemographic characteristics showed that frailty score was higher among the age group between 60 to 69 years with a mean age of 67.10 ± 6.75 yrs ($P = 0.000$). Male gender, urban residence, married, housewife group and primary education showed the highest proportion among the study group patients. Overweight and obesity comprised 33.8% and 50.7% respectively. Our study demonstrated that weight was significantly associated with frailty score ($P = 0.031$). physical activity was not statistically significant in association with the frailty score. Serum albumin levels of the study group patients was a statistically significant association with frailty scores, where the highest proportion of high frailty scores was among those with low serum albumin levels ($P = 0.047$).

Keyword: Frailty, hypoalbuminemia, nutrition, serum

INTRODUCTION

Frailty can be described as a clinical state of practical reserve decline related to ageing. Slowness, fragile, fatigue, and low performance are incorporated and affect the fulfilment of effective tasks negatively.^[1]

Disability, hospitalization, fragility, fracture, institutionalization, and premature deaths are the major sequelae of this feebleness.^[2,3] Many systems of the body have been dysregulated in frailty and lead lastly to loss of function; such as the musculoskeletal system, the endocrine system, and the inflammatory system. Frailty can be considered a complex problem, where some studies proposed that frailty can be defined as an at-risk state caused by the age-associated accumulation of disabilities.

This model of accumulation proposed that the individual with more deficits had more risks of adverse health consequences.^[4-6]

Some biochemical measures like albumin and CRP were associated with frailty. It is well known that serum albumin is the most considerable serum protein and is used as one of the indications of nutritional status. Hypoalbuminemia can reflect complications in different systems in elderly patients.

Address for correspondence: Dr. Ali Mousa Essa Al_Badri,
Babil Health Directorate, Babylon, Iraq.
E-mail: ameh1962@yahoo.com

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Since frailty is associated with a functional imbalance in several organs, that could explain the observed reciprocal association between albumin and frailty score in the study population.^[7] Data from other studies revealed that hypoalbuminemia was related to higher frailty scores.^[8-10] Recently, some studies showed that hypoalbuminemia was correlated with chronic inflammation,^[11] where chronic low-grade inflammation is considered a risk factor for the development of ageing-related diseases and is associated with organ damage, muscle emaciation, and chronic diseases, which all subscribe to frailty.^[12] Hypoalbuminemia has also been used as a predictor of malnutrition,^[1] hence, the association between frailty and serum albumin deficiency could reflect compromised nutritional status in frail patients. Studies assessing frailty in Middle East countries can be even more intricate that showed a wide range of frailty scores prevalence (4% and 59.1%) may be due to, in some regions, the health resources are scarce of health resources, lack of supplies, lack of qualified personnel, or lack of suitable certified estimation instruments, which may influence the assessment of frailty.^[13] According to bodyweight the prevalence of frailty among community-dwelling older adults, the previous study had shown that both under and overweight could lead to frailty dilemma.^[14] Studies conducted in the United States, Canada, Europe, and Australia have revealed that frailty rates ranged between 4% and 60%.^[15]

The available data from the Middle East countries revealed an overall prevalence of frailty among individuals who are 60 years old or more, 40% in Saudi Arabia 47% in the United Arab Emirates, 60% in Iran, 28.7% in Turkey 66.3% in Egypt, and 81.3% in Lebanon. However, these contradictions in the prevalence of frailty require a comprehensive survey of frailty prevalence in these countries since there are commonly shared geographical and sociodemographic factors.^[16-21]

It is worth mentioning that there is no previous study about the association between serum albumin level and frailty scores among old patients attending primary health care centres in Iraq, so this study consider is the first study in Iraq

Objective

Assessment of the effect of serum albumin level on frailty score among patients attending primary health care centres.

MATERIALS AND METHODS

A cross-sectional study was conducted in a primary health care centre in Babil governorate/Iraq. The study was conducted during the period from the first of December 2021 to 28th February 2022.

A convenient sample of 71 old patients attended the primary health care centre. selected patients of either sex were included and any old patients 60 yrs. old and above

were included. Anyone below 60 yrs. old were excluded from the study. The attendance of the researcher at the primary health care centre was twice weekly from 9:00 AM to 12:00 PM for 3 months.

Data being collected by direct interview with patients and filled by the researcher according to the questionnaire which was written in English and designed after reviewing the literature, which included the Sociodemographic characteristics of the patients (name, age, gender, residence, marital status, occupation, and level of education), anthropometric measurements (weight, height, body mass index) Height would be measured in centimetres and weight would be measured in kg, BMI was calculated on kg/m^2 (weight (kg)/height m^2 (according to WHO: BMI < 18.5 underweight, 18.5–24.9 normal, 25–29.9 overweight, 30–39.9 obesity, ≥ 40 morbid obesity).^[22]

level of physical activity factor (sedentary or no activity 1.2, light activity 1.375, moderate activity 1.55, and very active 1.725).^[23]

Reference range of Serum albumin level (≥ 3.5 –5.5g/dl), where a level below 3.5g/dl was considered a low serum albumin level (Hypoalbuminemia).^[24]

In this study the frailty score of each patient included was measured by using (rockwood_cfs); the Clinical Frailty Scale (CFS) was created by Rockwood *et al.* in 2005 to provide a simple approach with good predictive value.^[25]

The original 7-point scale was later upgraded to 9-points, one for the “severely frail”, “very severely frail”, and one for the terminally ill^[26] **Clinical Frailty Scale Components**

- 1- Very Fit: People who are robust, active, energetic, and motivated. These people commonly exercise regularly. They are among the fittest for their age.
- 2- Well: People who have no intense disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g., seasonally.
- 3- Managing Well: People whose medical problems are well-controlled but are not regularly active beyond routine walking.
- 4- Vulnerable: While not dependent on others for daily help, symptoms often limit activities. A common complaint is being “slowed-up” and being tired during the day.
- 5- Mildly Frail: These people usually have more evident slowing and need help in higher-order instrumental activities of daily living (IADLs) such as finance, transportation, heavy housework, and medications. Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation, and housekeeping.
- 6- Moderately Frail: People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing, and might need minimal assistance (stand-by) with dressing.

- 7- Severely Frail: Completely dependent on personal care from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within six months).
- 8- Very Severely Frail: These patients are completely dependent, approaching the end of life. Typically, they could not recover even from minor illnesses.
- 9- Terminally Ill: Approaching the end of life. This category applies to people with a life expectancy of under 6 months, which are not otherwise evidently frail^[27]

The statistical correlation between frailty score and age, weight, physical activity level, and serum albumin level was assessed in this study.

In statistical analysis, each questionnaire assigned a serial identification number using Statistical Package for Social Sciences (SPSS) version 26.0. The categorical data were presented as frequency and percentages tables; a pie chart was used also. The continuous variables were represented as the mean and standard deviation for normally distributed data. Chi-square (χ^2) test was performed to assess statistical relations between defined dependent and independent variables. A level of p -value ≤ 0.05 was considered significant.

Ethical considerations

The study was conducted under the ethical principles that have their origin in the Declaration of Helsinki. It was carried out with the patient's verbal and analytical approval before the sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee according to document number 1789 on the 30th of December 2021.

RESULTS

Seventy-one patients were enrolled in this study who were obtained from a Primary health care centre between the 1st of December 2021 to the 28th of February 2022. [Table 1] showed the frequencies and distribution of sociodemographic characteristics of the study group patients; age, gender, residence, marital status, occupation, and educational level, where age groups (60–69) years, showed the highest percentage of patients 52 (73%) with mean age (67.10 ± 6.75 yrs.). Male gender patients were predominant 38 (53.5%). Married patients revealed the highest proportion among other groups 45 (63.4%). Also, job categories of the housewife group showed the highest percentage 23 (32.4%). In addition, urban residence patients occupied 67 (94.4%) in comparison to rural 4 (5.6%). Educational level among the studied group showed the highest percentage of patients among primary education 27 (38%).

[Figure 1], showed the distribution of BMI among the selected patients, which were 50.7% obese, 4.2% have morbid obesity, 8.5% with normal body weight, 2.8% underweight, and 33.8% overweight. Mean BMI of

Table 1: Frequency and percentages of socio-demographic features of patients, $n = 71$

Variable		Frequency	Percentage %
Age	60-69	52	73
	70-79	16	32
	80-89	3	4
Mean $\pm$ SD (Range) 67.10 ± 6.75 yr. (60-89)			
Gender	male	38	53.5
	female	33	46.5
Marital status	single	2	2.8
	married	45	63.4
	divorced	3	4.2
	widow	21	29.6
occupation	no job	19	26.8
	Housewife	23	32.4
	Retired	21	29.6
	Business	3	4.2
	Clerk	5	7.0
Residence	urban	67	94.4
	rural	4	5.6
Education level	illiterate	17	23.9
	primary	27	38.0
	secondary	14	19.7
	higher education	13	18.3
Total		71	100.0%

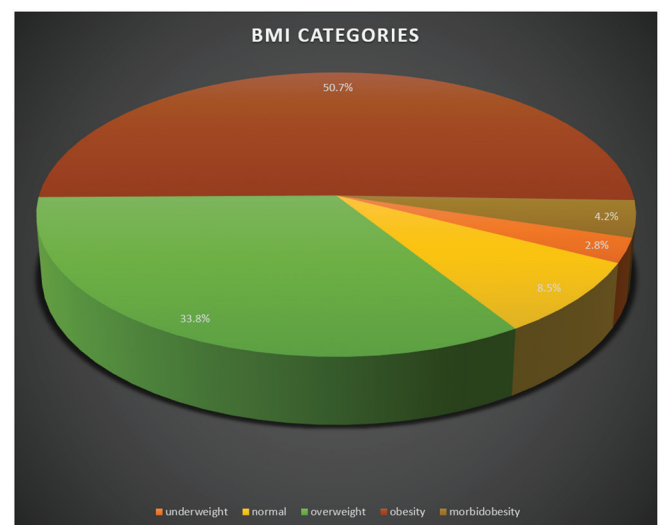


Figure 1: frequency and percentages of patients according to body mass index (BMI), $n = 71$

study patients (30.30), with mean BMI $30.3 \text{ kg/m}^2 \pm 5.4$ ($17.7\text{--}49.9$) kg/m^2 .

[Table 2] shows the relation of frailty score with the mean age group, where the age group between 60–69 yrs showed the highest proportion of 52 (73%) among other age groups with a highly statistically significant association between the mean age group and frailty score ($P = 0.000$)

[Table 3] showed the relation of frailty score with the mean weight of study patients which was statistically

Table 2: Relation of frailty score with the mean age of the studied patients, n = 71

		Frailty score							X2 (df)	p-value
		Mean age (67.10 ± 6.75 yrs.).								
		1.00	2.00	3.00	4.00	5.00	6.00	total		
AGE GROUP	60-69	15	8	24	5	0	0	52	39.40	0.000
	70-79	4	3	5	3	1	0	16	10	
	80-89	0	1	0	0	1	1	3		
Total		19	12	29	8	2	1	71		

Table 3: Relation of frailty score with a mean weight of the studied patients = 71

Frailty score					
Mean weight	Mean wt./kg	Min.Wt/kg	Max wt./kg	X2 (df)	p-value
78.90 ± 16.7 (40–123) kg	78.90	40	123	255.40 (215)	0.031

Table 4: relation of frailty score with physical activity of study patient (n = 71)

		Frailty score						Total	X ² (df)	p.value
		1.00	2.00	3.00	4.00	5.00	6.00			
Physical activity level group	sedentary	2	4	9	4	1	1	21	10.72 (10)	0.380
	light activity	10	6	12	4	1	0	33		
	moderate activity or very active	7	2	8	0	0	0	17		
	Total	19	12	29	8	2	1	71		

Table 5: Relation of frailty score with the serum albumin level(g/dl) of the studied patients = 71

		Frailty score							X ² (df)	P value
		1.00	2.00	3.00	4.00	5.00	6.00	total		
Serum albumin level (g/dl)	≥3.5	18	11	25	8	2	0	64	11.20 (5)	0.047
	<3.5	1	1	4	0	0	1	7		
Total		19	12	29	8	2	1	71		

significant ($P = 0.031$).mean weight/kg 78.90kg,minimum 40kg,maximum 123kg.

[Table 4] showed there is no significant association among frailty scores and level groups of physical activity (sedentary, light activity, and moderate activity or very active) of the studied patients, (p value=0.380)

[Table 5] showed a statistically significant association between the serum albumin level of the study group patients and frailty scores, where the highest proportion of high frailty scores was among those with low serum albumin levels ($P = 0.047$).

DISCUSSION

This cross-sectional study included 71 old patients who attended a primary health care centre in Babel city, their age was 60 years old and above, with mean age

(67.10 ± 6.75 yr.), which revealed that the age group (60-69yr) was the highest one (73.2%), and this result was agreed with the study conducted in Brazil in Ceara city which showed that most participants were 60–69 years old ($n = 154$; 55.0%).^[14] Regarding gender, our study showed that males patients were more than females (53.5%,46.5%) respectively, in Contrary to our study, the study held in Brazil showed that women were a higher proportion than men (65%).^[28]

According to marital status, the present study showed that married patients were higher than other groups of visitors to the primary public health centres (45, 63.4%), which disagrees with another study in German, which indicated that frequent visitors are not married.^[29]

Another finding of this study was that the housewife occupation had a higher percentage than other professions

(23,32.4%), and this result coincided with another study done in São Paulo, Brazil, (a cross-sectional and quantitative study with 48 elderlies. Data were collected with a sociodemographic interview, the Edmonton Frail Scale also it appeared that housewife occupation was the highest ($P = 0.0127$).^[30]

The current study also revealed that selected patients, most of them live in an urban area (67,94.4%) which agrees with another study in China which revealed that old patients (≥ 65 yr) live in urban in a higher number ($OR = 1.47, 95\%CI\ 1.03-2.11, P = 0.036$).^[31] The current study shows that primary educated patients had a higher proportion than other old patients (27, 38%) which disagrees with another study in A Riyadh city in Saudi Arabia, their patients were selected randomly from the five geographical regions of Riyadh that revealed intermediate and secondary educated patients was the highest.^[32]

As for the body mass index, the result of this study revealed that overweight and obesity comprised 33.8% and 50.7% respectively which were the highest percentages, this result was in agreement with another study conducted in Saudi Arabia which showed a comparable percentage to our result (overweight 36%, obesity 41%).^[33]

The current study exhibited that the frailty score was a highly significant association with the mean age group ($P = 0.000$), it was comparable to another study in Prague, Czech Republic, the prevalence of frailty ranges substantially depending on the criteria used, but was shown to increase with advancing age.^[34]

Our study demonstrated that weight was significantly associated with frailty score ($P = 0.031$), meanwhile, it was matched with another study in the United States which asserted that overweight and obese older adults also experience age-related muscle loss and may also be frail.^[35]

The current study showed that frailty was not statistically significant association with the physical activity, so it did not coincide with a study conducted in Alobaca, Brazil, which concluded that frailty is more prevalent among individuals who attend with insufficient levels of physical activity and, at the same time, spend extreme time as sedentary behaviour. Expert strategies to encourage physical activity trying to prevent frailty, in older adults should simultaneously focus on reducing the time spent in sedentary behaviour.^[36]

The present study demonstrated a statistically significant association between serum albumin level of the study group patients and frailty scores, where the highest proportion of high frailty scores was among those with low serum albumin levels ($P = 0.047$). By this result, the study conducted in China revealed that low albumin was an independent risk marker for cognitive decline in older adults.^[37]

Our study is also in agreement with the conducted study in Bali, Indonesia, which exhibited a significant relationship between serum albumin and frailty in elderly admitted to the inpatient unit and outpatient clinic. The lower the serum albumin level, the higher the probability of the elderly experiencing frailty.^[38]

CONCLUSIONS

The majority of our patients who attended primary health care centres were either obese or overweight. A frailty score of 3 was abundant among those between 60-and 69 years with a statistically significant association. The mean weight of our study patient was a statistically significant association with frailty score. The physical activity of our patients had no association with frailty score. Patients with low albumin levels had high frailty scores with a statistically significant association.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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