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The Prevalence of Frailty and Nutritional Status of the Elderly in Lesotho

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Abstract: ***A common challenge amongst the elderly is that most of them are either frail or malnourished or both and little medical attention is given to them. As a resultthe elderly become vulnerable and there is a need to pay more attention to their needs. This study was mainly aimed at finding the prevalence of frailty and assessing nutritional status of the elderly in Thaba-Tseka. A cross sectional study design was employed, where a purposive sample of 70 elderly was selected. Participants included 25 males and 45 females aged from 65-95. Data collection on frailty and nutritional status of elderly was conducted through a frailty questionnaire, MNA_SF and IDDS. Hand grip was taken to measure the maximum isometric strength of the hand. Findings revealed that there was a high prevalence of frailty among the elderly which was 50% with 51% of the elderly having grip scores below average expected values that ranged from 29. 5 kg to the lowest of 6.9 kg in age groups of 60-95 years. MNA results reported a high risk of malnutrition among the elderly (43% at risk of malnutrition and 19% malnourished). The dietary patterns the of elderly was also reflected by the IDDS where almost all (99%) the elderly in the study consumed monotonous, cereal based diets that lack diversity and 76% of them having a low dietary diversity score. Most of the elderly werefrail and vulnerableto frailty (>50%) and all those that were frail were also malnourished. Findings have confirmed that grip strength decreases with age.***

Keywords: Elderly, Frailty, Nutritional status, Grip strength

1. Introduction

The world is experiencing a continuous upsurge in the number of people aged 65 years and above [1].The population that is aging worldwide has been accelerating rapidly from 461 million people over 65 years in 2004 to an estimated 2 billion people by 2050, which will have major implications for the planning and the delivery of the health and social care [2]. The most problematic concern about population aging is that most of these elderly people are either frail or malnourished or both [3]. Whereas nutrition is an important determinant of health in all persons, those over the age of 65 are vulnerable and there is the need to pay more attention to them [4].

As people grow old, there is a decline in functional ability due to several factors which include frailty and malnutrition. Different schools of thought have defined frailty in uniquemanners; however, frailty defined by [5] includes five variables: unintentional weight loss, exhaustion, loss of grip strength, slowness and reduced physical activity. The combined presence of at least three out of the five above mentioned variables will classify a person as frail [6].Frailty is also said to be a condition of increased susceptibility to poor resolution of homeostasis after a stress which in turn increases the risk of adverse outcomes including falls, delirium and disability [7] and it is a long established clinical expression that implies concern over the older person's vulnerability and diagnosis [8]. A critical and central issue within frailty is the concept of malnutrition in the elderly, therefore poor nutritional status is linked to frailty as one of the main risk factors for frailty that leads to adverse outcomes [9]. It has also been revealed that micronutrient and macronutrient deficiencies are also associated with frailty,[10,11] also stated that the age related changes in the body composition result in a slight decline in lean body mass and this decline is usually more dramatic after the age of sixty.

Most current literature and interventions are directed towards infants, young children, adolescents, pregnant and lactating mothers and the nutrition and health of the elderly is often neglected [12]. The literature on the elderly has not sufficiently met the explanation for the precise estimate of under nourishment in this age group. There is a dearth of studies in developing countries and most of the available literature is for the developed countries. This study seeks to fill that gap by investigating the prevalence of frailty and nutritional status on the elderly in Lesotho. Older people are vulnerable to malnutrition for many reasons including physiological and functional changes that occur with age (which affect their functional status), lack of financial support and inadequate access to food [13]. The functional status of the elderly is their ability to carry out their day to day activities including food preparation and intake thereby influencing their nutritional status [2, 14].

In Lesotho, the problem of the health of the elderly is compounded by poor nutrition together with medical issues as they are vulnerable to communicable diseases and non-communicable diseases [15]. Therefore nutritional and frailty assessments are necessary for both the diagnosis and development of the comprehensive treatment plans for the elderly. The elderly are at risk of so many diseases, like heart diseases, cancer[4] and just like children, they cannot take good care of themselves when they are sick and frail so in this case, assessing the frailty status will give a measure of how well they can care for themselves and the young orphans that are left in their hands while their parents die due to the scourge of HIV/AIDS and other diseases. The proportion of income spend by the elderly on medical bills is very high due to frailty. Unfortunately most of them are pensioners and in some instances they have no source of income and they do not necessarily afford the high medical bills. This is one of the reasons they should be assessed for frailty and necessary interventions taken. Perhaps the high medical costs burden on the elderly and the nation can be

reduced if they are assessed for frailty and nutritional status. This will serve as a platform for early interventions.

2. Methodology

2.1. Study area

The study was carried out at Paray Hospital in Thaba-Tseka. This served as a temporary nursing home for the elderly. Thaba-Tseka is one of the ten districts of Lesotho that has high prevalence of malnutrition and it comes second in the country to having a high number of aging population [16], Thaba-Tseka shares the boarders with KwaZulu-Natal Province of South Africa. Domestically, it borders on Mokhotlong District in Northeast, Leribe District in North, Berea District in Northwest, Maseru District in West, Mohale's Hoek District in Southwest and Qacha's Nek District in the Southern direction.

Figure 1: Location of Thaba-Tseka in Lesotho.

2.1. Sample Design and Data Collection

The target population in this study was all the elderly men and women aged 65 years and above. The study involved both institutionalized elderly and those that were not institutionalized. The elderly that were below 65 but portrayed the signs of old age were not considered. A cross sectional study that was aimed at assessing the prevalence of frailty and assessing nutritional status of the elderly was used.Cross-sectional studies are carried out at one time point or over a short period. They are usually conducted to estimate the prevalence of the outcome of interest for a given population, commonly for the purposes of public health planning[17].A multi-sampling approach was used to collect the data for this study, this approach involved convenience and purposive sampling. Multi sampling approach was employed because the desired population could not be found using only convenient sample since not everyone who was present at the field of study was an elderly. A convenient sample of 70 subjects was selected. A convenient sample consists of subjects included in the study because they happen to be in the right place at the right time [18]. Purposive sampling, where elderly in the district of Thaba-Tseka who were at Paray Hospital were selected based on their characteristics and the objective of the study. This was used because the targeted sample needed to be reached quickly. Subjects that were included in the sample were selected to meet specific criteria using the flow chart in Figure 2.A questionnaire comprising of the questions on frailty, mini nutritional assessment short form and dietary diversity scores were used to collect data on frailty and nutritional status of the elderly. The information obtained through a questionnaire is similar to that obtained by an interview, but the questions in a structured questionnaire tend to have less depth [19]. Therefore, face to face interviews were conducted and a semi-structured interview schedule was used to collect data.

2.2. Study sample and data collection instruments

The instruments that were used for data collection are the digital hand grip dynamometer, bathroom scale, tape measure, individual dietary diversity score (IDDS) and the mini nutritional assessment short forms (MNA® short form).MNA® short form was used to assess nutritional status in the elderly and the frailty scale by [20] was used to assess the frailty status. The hand grip test was taken to measure the maximum isometric strength of the hand and muscles of the forearm [21].Bathroom scale was used to collect the weight and tape measure was used to collect data on calf circumference. Moreover, dietary diversity score and the mini nutritional assessment short forms were used to assess the nutritional status of elderly.

The flowchart in Figure 2, clearly outlines how the respondents were included and excluded in the study. The sample included 70 elderly males and females. Available subjects were entered into the study until a sample size of 70 was reached. Subjects who met the sample criteria were identified by the researcher at Paray Hospital and in the wards and outpatients department of the Hospital. A sample size of 70 elderly males and females was the total of subjects who were willing to participate in the research and those who met the sampling criteria during the study period of data collection.

3. Data Analysis

The qualitative data obtained from the survey was coded so that it could be analysed meaningfully. The quantitative data was recorded in Excel and exported to SPSS 20. All the data was analysed using descriptive statistics which included frequencies and percentages. The findings of the study are reported in the results Section 4.

Selection criteria flow diagram

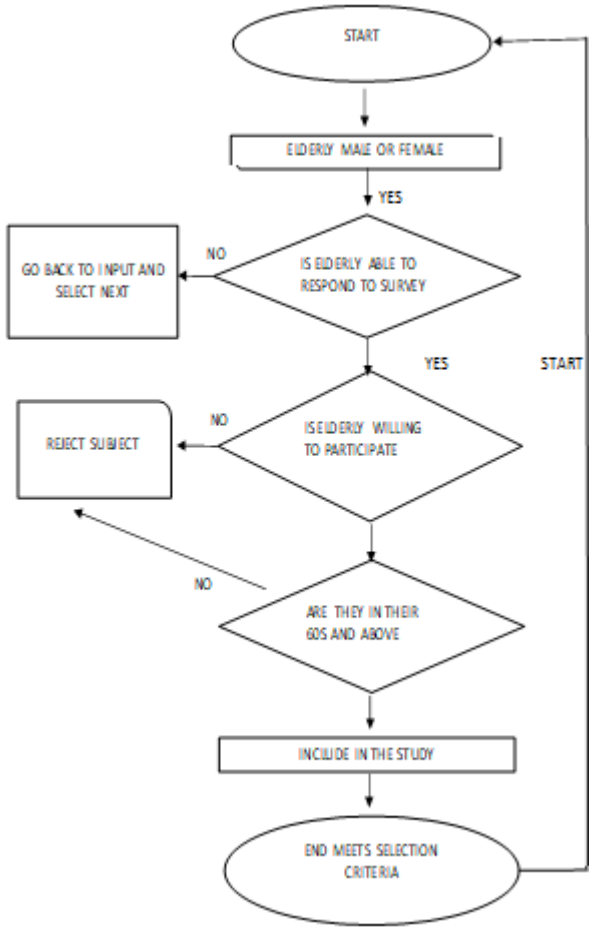

Figure 2: Flow Diagrams of Selection Criteria of the Study

4. Results

4.1 Summary of socio-demographic characteristics of elderly

The results of the study revealed that most (64%, N=25) of the elderly were females and the rest (36%, N=25) were males as shown in Table 4.1 below. The age distribution of the elderly in this study indicated that (48.6%, N=34) of the elderly were between ages of 65-69 years, (14.3%, N=10) were between 70-74 years, (21.4%, N=15) were aged between 75-79 years while (11.4%, N=8) were aged between 80-84 years, the rest (4.3%, N=3) of the elderly were between 85 and above**.**

Table 4.1: Socio-demographic characteristics of elderly

Category	Frequency	Percentage
Gender		
Male	25	36
Female	45	64
Age (in years)		
65-69	34	48.6
70-74	10	14.3
75-79	15	21.4
80-84	8	11.4
85+	3	4.3

The study also showed that most of the elderly were females who constituted 64%). This is in line with [22], who stated that, women make up most of the older global population. Studies have shown that there are more women who live longer than men [23]. In the same vein, studies by [24], also show that gender exerts a powerful influence on health and ageing across life and women have a higher life expectancy than men. In this study, the high number of females might have been due to the fact that in the rural areas like Thaba-Tseka most men do not seek for primary healthcare and some of them might have been away in urban areas for work purposes this is why females outnumbered males [25].

Furthermore, results from the study have shown that the modal age group of the elderly was 65-69 years. This shows that most of the elderly were aged from65-69.This is similar to[26]that argued thatthe demographics are changing in many countries, most deaths now occur in people over the age of 65 years. Studies inBritain have evidence that 91% of all deaths were among older population, [27]. Very few elderly people were aged 85 and above according to the current study, this has shown that not all elderly can live up to a life expectancy of 85 in Lesotho due to life long term problems such as mobility, cognitive impairment, declining vision andheart problems [28]. It is also prudent to assume that the low number of elderly in the advanced age groups who participated in the study could because some of them were very frail and too malnourished to even go to hospital for consultation. In contrast to the findings of this study that very few elderly can live up to 85, a study by[29]show that life expectancy has increased globally over the past century, with the number of people aged 65 and over increasing at the faster rate than total population growth.

4.2 Individual dietary diversity score

The actual individual dietary diversity scores for the elderly were based on summations of the number of unique food groups consumed during the last 24 hours before the study. Scores that were below the calculated mean of (3 ± 0.5) were regarded as low individual dietary diversity, scores between 4-5 as medium individual dietary diversity, while scores of 6 and above were high dietary diversity scores as shown in Figure 3.The low dietary diversity (see Figure 3) in the current study may probably be an indication of nutritional inadequacy and/ or as a of result inadequate nutrient intake. A possible reason for the low dietary diversity is poor weather conditions characterized by low and erratic rainfall that does not favour agricultural production since Lesotho has been going through a period of unbearable drought and also the fact that Thaba-Tseka is a low income district in rural areas [30].

Almost all (99%) the elderly in the study consumed monotonous, cereal based diets that lacks diversity. Consumption of animal rich proteins was the lowest in the elderly with the lowest consumed animal protein being fish and highest protein source as legumes especially beans. This is in conformity with other studies that have shown that this kind of diet is typical of many developing countries [31]. The implication of such compromised dietaryconsumption is inadequate intake of micronutrients given that animal products are the richest sources of macronutrients for example, the preformed vitamin A in the case of vitamin A and the heme iron in the case of iron. The result is continued deprivation of micronutrient resulting in high levels of malnutrition in elderly as well as frailty**.**

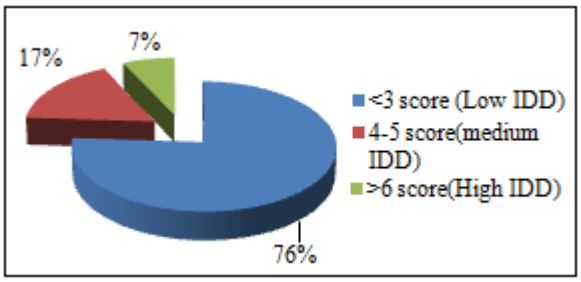

Figure 3: Elderly Distribution According To Individual Dietary Diversity Score of Elderly

4.3 MNA-SF score

The parameters in Figure 4were aggregated to yield a score where the ranges were as follows; 0-7 points indicated that the elderly were malnourished, 8-11 points at risk of malnutrition and 12-14 well nourished. The current study using the MNA®short form has shown that most of the elderly (43%) were at risk of malnutrition. This is in congruence with the Canadian study which used 55 veterans living in residential centres where, the study identified most of the elderly (58%) as those who were at risk of malnutrition and 31% as malnourished using MNA®short form [32].

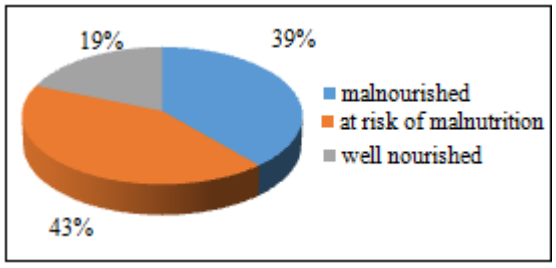

Figure 4: Nutritional Score of Elderly

The MNA results of this current study showed that malnourished individuals had smaller mid-arm and calf circumferences, poorer self-perception of malnutrition, greater weight loss and global disabilities (including mobility, neuropsychological problems, and acute stress. In a study conducted by [32], results have shown that within the dietary component of the MNA, only 35% of the residents managed to feed themselves with no decline in food intake whereas 65% of them had a decrease in food intake and were unable to feed without assistance. And this has been the same with the current study where most of the elderly had a severe decrease in food intake. Most elderly claimed that the decrease in the food intake have been due to physiological problems they experienced such as dental problem because their teeth fall off and as a result they cannot be able to eat some foods. Also Sensory influences on food intake that elderly experience might have led to decrease in food intake, for literature shows thatageing is accompanied by deterioration in the acuity of taste and smell perceptionand itimpacts on appetite and food intake[33]. These results were however expected as [34] indicated that alterations in taste and smell are associated with aging. Furthermore other gastrointestinal changes in theelderly may occur with age and may affect oral intake. Oral and dental issues, oesophageal motility, and atrophic gastritis may also affect nutritional status. It is also reasonable to assume that the severe decrease in food intake might have been due to low agricultural productivity due to the prevailing poverty at the time of the study and as a result people did not have enough food to eat as reflected in the MNA questionnaire that was used to calculate the MNA score.

The reason elderly people in this study were at a greater risk of nutritional deficiencies is due to physiological changes associated with aging, acute and chronic diseases, financial and social status because most of them were poor as reflected in the MNA questionnaire that was used to calculate the MNA score.

4.4 Clinical frailty scale

The results of the study show that half (50%, N=35) of the elderly were found to be frail that is (mildly frail, moderately frail and severely frail) while the other half were not as shown in Table 4.2below.

Table 4.2: Clinical Frailty Scale

Category	Female		Male	
	Frequency	%	Frequency	%
Very fit	0	0	1	1.4
Managing well	20	28.6	8	11.4
vulnerable	6	8.6	0	0
Mildly frail	6	8.6	4	5.7
Moderately frail	10	14.3	4	5.7
Severely frail	9	12.9	2	2.9

[21]Stated that frailty scale scoring classifies the elderly in seven categories as: very fit, well, managing well, vulnerable, mildly frail, moderately frail, severely frail, very severely frail, and terminally ill respectively. In the current study, 50% of the elderly were found to be frail. This is in agreement with a retrospective study conducted by [35] where 179 eligible patients were assessed 41% of the elderly were frail with no significant differences in age and gender. In this study there was also no significant difference in age and gender in the use of the clinical frailty scale.

The elderly might have been frail due to poor nutritional status and illness as found in a previousstudyby [36]on the interaction between frailty and nutritional status on mortality and long-term hospitalization in older Koreans. [36]has indicated that frailty and nutritional status have a multiplicative effect in older adults. And therefore Nutritional Status Assessment in the elderly is important. Furthermore, for some of the elderly their frailty status might have been due to the inevitable aging processes such as a decline in the functional status as described by [5] in the definition of frailty.

4.5 Hand grip measurement

Nutritional assessment and screening tools require values for clinical measurements to compare against a reference value. A cut-off value for hand grip strength is required to define a threshold in which below that particular threshold indicates a risk of malnutrition or functional disability [37]. Summary of actual hand grips measured hand grip strength and cut-off values from different studies is presented in Table 4.4. The cut off were obtained from the North West Adelaide Health

Study (NWAHS) and Bohannon *et al.* (2007) study of hand grips of the elderly.

In accordance to [38], decreased hand grip strength is a sign of frailty and may lead to cognitive impairment in elderly.This study has revealed that the hand grip strength decreases with increasing age for both women and men. According to a frailty study by [39], the grip strength declined from ages of 60-65 from the grip value of 29.5 kg in females and depreciated going up to ages of 90-95 with a grip value of 6.5 kg. This is in line with the other previous studies that showed that a hand grip strength decline starts in the ages of 40s and depreciates going up at an increasing rate. The decrease in grip strength as the age increases may be due to muscle loss due to aging, malnutrition and illness among the elderly[39].

The results of the actual measured hand grip from the study have shown that (48.6%, N=34) of the elderly had a grip strength of 52. 8 for males and 29.5 for females aged 60-69. (14.3%, N=10) of those between ages of 70-74 had average grips of 20.5 for males and 18.3 for females. (21.4%, N=15) of the elderly aged 75-79 had grip strengths of 29.6 for males and 14.9 for females. For those aged 80-84 (11.4%N=8) females had the average grip strength of 16.3 and males (14.5) while (2.9%, N=2) of the sample those aged 85-89 had the average grip strength of 14.5 for females. (1.4%, N=1) elderly aged 90-99 was a female with the average grip of 6.9.The highest hand grip strength (29.5 kg) was measured among female elderly aged between 60-65 years while the lowest hand grip strength (6.9 kg) was measured among one female elderly aged between 90-99 years. Only (48.6%, N=34) elderly had an actual hand grip strength value that was above the expected average hand grip while the rest (51.4%, N=36) had hand grip strengths that were below expected average values. Results have also shown that most of the elderly (51%) had their hand grip values below the expected average grips and the lowest grips were recorded in all the age groups above 69 in both males and females. This is very different from the results obtained in the studies carried out by [40] which suggested the values of 18.9 kg for males between the ages 90-99 and 15.0 kg for females in the same age group. The big difference in the readings may have been due to that some elderly in the current study complained of hunger and tiredness during the time of measurement so as a result they could not exert their maximal strength because they had insufficient energy.

Table 4.4: Summary of hand grip scores of elderly compared to those expected according to age

EXPECTED AVERAGE GRIPS					Measured average grip strength		Number elderly (male & female)	
Study	NWAHS		BOHANNON et al., 2007		Hand grip values(kg)		(n)	(%)
AGE(years)	Male	Female	Male	Female	Male	Female		
60-69	.	23.5	-	-	52.8	29.5	34	48.6
70-74	32.5	19.5	-	-	20.5	18.3	10	14.3
75-79	-	-	32.1	20.5	29.6	14.9	15	21.4
80-84	-	-	28.6	17.2	14.5	16.3	8	11.4
85-89	-	-	25.5	16.4	-	14.5	2	2.9
90-99	-	-	18.9	15	-	6.9	1	1.4

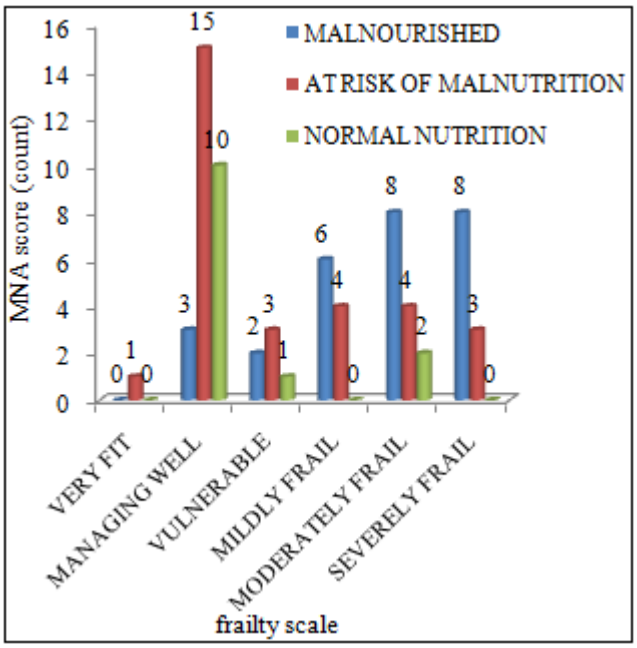

Figure 5: Relationship between Nutrition Screening Score (MNA Score) and Clinical Frailty Scale

Results of the relationship between nutrition screening and frailty scale (Figure 5) have shown that most (31.4%, N=22) of the malnourished elderly were frail while a very few (4.3%, N=3) of those who were managing well were malnourished and most (14.3%, N=10) of the well-nourished elderly were managing well. The result confirm that there is a relationship between malnutrition and frailty[9].

5. Conclusion and recommendations

The current study revealed a high prevalence (50%) of frailty among the elderly and those that were frail were malnourished. Most of the elderly (42.9%) were malnourished and majority of them (76%) had a low dietary diversity because they ate monotonous diets without variation every day. Results of the hand grip strength measurements have revealed that in the current study, the grip strength of the elderly decreased with increasing age but unlike other studies the results did not show a clear pattern of the grip strengths according to gender.

The malnutrition rate among the elderly was too high and a conclusion that can be drawn from these results is that this study had several limitations, among those limitations was that it was conducted only at the hospital, thus the results may not be generalized to those that were at home. The overall health status of the elderly was not good because most of them were likely to have had declined food intake, neurophysiological problems and psychological stress aswell as perceived weight loss. Compared to other previous studies that were conducted in the developing countries, these results were expected since the current study was carried out in a developing country, Lesotho. It is concluded from the study that nutritional status affects frailty. Most of the elderly who were also frail were malnourished. On the other hand, elderly who had grip strengths below average were also frail.

Since most elderly had a low dietary diversity scores; it is of utmost importance to recommend that the elderly should be advised to eat a diet that has variation daily instead of eating the same monotonous meals every day. Diversifying diets can be achieved by using criteria for the balanced diet such as food exchange lists and food guide pyramids.

Due to the high prevalence of malnutrition among the elderly, it is recommended that, the elderly should receive nutrition education and nutrition interventions based on healthy eating to guide them on good eating habits. They should also receive nutrition counselling so that the can adopt good nutrition behaviour. Moreover, for the high prevalence of frailty, it is also recommended that the elderly be advised to engage in more physical activity to improve their muscle strength. In addition, the frail elderly should also eat healthy food that has variety of nutrients in it because malnutrition is also a risk factor of frailty. This study also has clearly highlighted a high prevalence of malnutrition and frailty in older adults in Thaba-Tseka. The impact of malnutrition and frailty on clinical outcomes such as mortality would inevitably increase overall healthcare costs. This situation is likely to become worse as the elderly age, unless preventative strategies are implemented. It is therefore pertinent that vulnerable older adultsare screened and assessed so that timely and appropriate interventions can be provided upon hospital consultation.

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