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Addressing Malnutrition in Elderly Patients Using Biochemical Markers: The Role of Nurses in Nutrition Screening and Intervention

Mohammed Yahya Hantoul¹, Naha Faleh Alrasheedi², Yassin Ahmed Suwaid Majrashi³, Fatima Ibrahim Ahmed Awaf⁴, Amirah Ali Alshahrani⁵, Layla Hassan Ghanem Alghanim⁶, Khalid Mohammed Abed Alruwaily⁷, Haifa Farraj Shafi Alntaifat⁸, Rahma Teni Sharea Aldossary⁹, Yahya Fahd G Almutairi¹⁰, Batla Faraj Shafi Alnutefat¹¹, Nourah Abdullah Mobasher Alammari¹², Lina Mohammed Alanazi¹³, Khulood Yahya Mohsen Jafari¹⁴, Haya Mohammed Aldawsari¹⁵, Wafa Bashar Mashhur Alruwaili¹⁶, Aliyah Abdo Asiriy Al Tajmoa Achi Al Awal¹⁷ 1 Ministry of Health, Forensic Medical Services Center in Riyadh, Saudi Arabia 2 Maternity and Children's Hospital in Hafer albatan, Ministry of Health, Saudi Arabia 3 Irada Mental Health Hospital in Jazan, Jazan Health Cluster, Ministry of Health, Saudi Arabia CrossMark 4 Jazan Health Cluster, Jazan, Ministry of Health, Saudi Arabia 5 Western Janadriyah Health Center, Riyadh Health Cluster 2, Ministry of Health, Saudi Arabia 6 Al Adamah Health Care Center Dammam, Eastern Health Cluster, Ministry of Health, Saudi Arabia 7 King Khalid Hospital -Al-Haytham Health Center, Ministry of Health, Saudi Arabia 8 Al Yamamah Health Care Center First Settlement, Ministry of Health, Saudi Arabia 9 Riyadh Health Cluster 1 - Wadi Ad-Dawasir general hospital, Ministry of Health, Saudi Arabia 10 Riyadh Third health cluster, Eradh complex for mental in Riyadh, Ministry of Health, Saudi Arabia 11 Riyadh First Health Cluster, Ministry of Health, Saudi Arabia 12 Qaisumah General Hospital, Ministry of Health, Saudi Arabia 13 Al-Rawdah Health Center. Senior Nursing Specialist, Ministry of Health, Saudi Arabia 14 Sabya General Hospital Jazan Health Clustar, Ministry of Health, Saudi Arabia 15Branch of the ministry of health in Riyadh region, Ministry of Health, Saudi Arabia 16 Erada and Mental Health Hospital, Ministry of Health, Saudi Arabia 17 Ministry of Health, Saudi Arabia.

Abstract

Background: A common problem among senior people, malnutrition greatly affects their quality of life, functional level, and health results. The complexity of malnutrition in this population calls for a multifarious strategy for nutrition screening and treatment. **Aim:** This study aims to explore the critical role of nursing staff in identifying malnutrition and implementing effective nutritional interventions for elderly patients.

Methods: With an eye on definitions of malnutrition, biomarkers, related hazards, management techniques, and present guidelines and recommendations, a thorough literature study was undertaken. The study looks at the constraints and obstacles nursing staff members encounter in this regard as well as the nursing interventions required to solve malnutrition—including screening methods and tailored care plans.

Results: Results show that although many medical experts evaluate nutritional status using biochemical markers, these can be deceptive, particularly in very unwell patients. The study emphasizes the need of include physical evaluations and patient-centered strategies to more precisely spot malnutrition. Improving patient outcomes proved to depend critically on nursing interventions including regular nutritional screening, dietary modification instruction, and working with dietitians. Notwithstanding these suggestions, time restrictions, lack of expertise, and inadequate resources all impede successful application.

Conclusion: The results underscore the essential role of nurses in the early identification and management of malnutrition among elderly patients. Enhancing nursing education and training related to nutrition can significantly improve referral rates and intervention efficacy. Addressing the existing limitations will facilitate better care and optimize nutritional support for vulnerable populations. **Keywords:** malnutrition, elderly patients, nursing interventions, nutrition screening, healthcare professionals, patient-centered care..

1. Introduction

Affecting a significant fraction of older persons in many different care environments, malnutrition is a common and major issue that causes great concern among them [1,2].With up to 30% of community-dwelling older individuals affected [3], and 56%–63% among those getting in-home care [4],

the occurrence and susceptibility to malnutrition varies greatly. In hospital environments, where 48%– 76% of senior patients suffer with malnutrition [5], this rate is considerably higher; in nursing homes and institutional long-term care, it exceeds 78%. Among elderly persons with geriatric syndromes and cognitive impairment, the prevalence is shockingly high at 83%

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and 44% respectively [6,7]. True population variations combined with the lack of a consistent standard for malnutrition screening, assessment, and tracking could explain this great range in recorded prevalence [8]. The several causes and several contributing elements of malnutrition in older individuals define its complexity. Many health disorders and associated problems, including poor oral health, changed taste, and problems with mastication and deglutition, have been connected to malnutrition. Malnutrition in this demographic also correlates with cognitive and functional deficits [9], infections, and depressed symptoms. Additionally social factors are social factors including living alone or in isolation. Malnourishment adds to lower quality of life, increased morbidity, mortality, and higher healthcare use and expenses.

Although its prevalence varies greatly depending on the community, healthcare setting, and assessment instruments used, malnutrition affects about half of older persons [10-12]. Based on a recent systematic review and meta-analysis of studies using the Mini Nutritional Assessment®-a frequently used screening tool for malnutrition in senior populationsthe prevalence estimates by care setting follow: 3% in community-dwelling older individuals, 6% in outpatient care, 9% in home-care receivers, 17.5% in nursing homes, 22% in hospitals, 29% in long-term care institutions, and 29% in rehabilitation or subacute care settings. Moreover, a significant number of elderly persons have a high risk for malnutrition; estimates range from 27% (community/outpatients) to 50% (across several clinical environments). These results coincide with earlier research and reviews that show that as health, functional ability, and independence decrease, malnutrition prevalence increases [13,14]. Nevertheless, even in like healthcare environments with the same definitions, prevalence rates could differ significantly among study groups [15].

Low muscle mass is now a fundamental phenotypic criterion included in the revised worldwide definition of malnutrition [16,17]. Given age, limited physical activity, and poor tolerance to nutritional deficits, aging individuals inevitably undergo muscle mass decline; so, malnutrition prevalence in this population is probably significantly higher than previously recorded [18]. Many elements lead to the higher malnutrition risk among elderly people. especially those in hospitals. Common [19] is a decrease in food intake, usually accompanied with illness (acute or chronic), which raises energy need. Older persons are more vulnerable to malnutrition when their nutritional intake declines concurrently with their increasing energy demands during illness. Age-related sensory deficits including diminished taste and smell help to explain "anorexia of aging" [20,21]. Furthermore contributing to lower food intake in senior people are poor oral health, chewing and swallowing problems, side effects from medications, cognitive limitations, social isolation, and sadness. Chronic diseases (e.g., heart failure, respiratory sickness, cancer, and renal disease) coupled with acute health crises (e.g., infections or operations) increase energy demand and raise malnutrition risk in already vulnerable older persons.

Beyond personal elements, including meal quality, the dining setting, and the quality of medical and nutritional treatment, especially in hospitals and care homes, food intake and malnutrition risk is influenced by external variables. Different elements may be more important in different healthcare environments and vary from person to person, therefore underscoring the multidimensional and complicated nature of malnutrition in older persons, which are only partially understood [22-24]. In both acute and chronic disease, malnutrition is connected to higher morbidity and death, therefore profoundly affecting recovery after trauma, illness, and surgery [25]. Along with reduced immunity and muscle atrophy, inadequate protein intake or raised needs resulting from illness help to significantly reduce body protein levels-a basic characteristic of malnutrition. Reduced muscle mass and strength (sarcopenia) in older or sick people causes additional decreases in physical activity, loss of independence, and increased risk of falls and fractures—all of which worsen quality of life [26,27]. Malnutrition not only increases the chance of unplanned readmissions and outpatient healthcare demands, therefore burdening people and healthcare systems, but it also prolongs hospital stays due to complications. With hospital admissions as the main cost driver, a recent study in persons over 70 found that, adjusted for several characteristics, healthcare expenditures were 714 € annually more for malnourished or at-risk individuals than wellnourished patients [28].

Malnutrition Management:

Nutritional therapies in elderly individuals fulfill multiple complimentary functions [29]. Primary encompass objectives the preservation or improvement of nutritional status, which aids in replenishing protein and energy stores essential for managing metabolic stressors. Another objective is to maintain or enhance physical function and rehabilitation potential, especially regarding muscle mass and strength. This promotes autonomy in everyday tasks and social participation. Moreover, a primary objective is to improve health-related quality of life, as reinstating food consumption not only bolsters physical health but also enhances psychological well-being by promoting happiness and contentment. Minimizing morbidity is an additional goal, as it facilitates superior management of chronic ailments, ultimately augmenting survival rates by boosting treatment tolerance for underlying disorders, such as cancer. Mitigating the economic burden of malnutrition is essential, as improved nutritional

treatment can decrease hospitalizations, subacute care needs, and the frequency of medical interventions and medications.

Consequently, although the goals of malnutrition treatment in elderly patients resemble those for younger ones, there is a heightened emphasis on preserving functional capabilities and improving quality of life, rather than merely seeking to decrease mortality rates. Nutritional interventions for the elderly involve several strategies to guarantee adequate intake, extending beyond the mere provision of necessary energy and nutritional levels. Effective nutritional management in geriatrics necessitates the identification and resolution of the various underlying causes of malnutrition. Furthermore, practical techniques, including assistance with eating, are essential, with oral intake as the predominant method. This may entail altering conventional foods or integrating oral nutritional supplements, whilst enteral and parenteral nutrition are deemed necessary when appropriate, however less commonly advised in elderly individuals.

The most recent recommendations, detailed in the 2019 ESPEN guidelines on clinical nutrition and hydration in geriatrics, offer insights grounded in contemporary science and underscore interdisciplinary strategies for managing nutrition and hydration in elderly populations. These guidelines, formulated by specialists from multiple European nations, underscore the necessity for systematic evaluations and integrate dehydration as a critical component in tackling malnutrition [29]. Fundamental protocols encompass regular malnutrition screening utilizing recognized instruments, succeeded by a tailored evaluation, intervention, and monitoring strategy (GPP). Comprehensive and personalized nutritional therapy (A) should be integrated into a multimodal, multidisciplinary team intervention (B), targeting probable underlying causes of malnutrition (GPP) while minimizing unnecessary food restrictions. It is advisable to implement supportive interventions to establish a conducive dining atmosphere in institutional settings (A), offer mealtime help as needed (A in institutions, GPP in and promote communal home-care), dining experiences (GPP). Supplementary techniques encompass providing energy-dense meals to residences with supplemental meals (B), nutritional education (B), and facilitating convenient access to food. Additional recommendations advocate for tailored nutritional counseling (B) administered by skilled specialists over numerous sessions (GPP). Food changes may encompass fortification (B), supplementary snacks or meals, finger foods (GPP), and alterations to texture and flavor to enhance palatability. Oral nutritional supplements (ONS) are strongly endorsed (3 A, 3 GPP), with enteral or parenteral nutrition recommended as adjunctive choices where appropriate (12 GPP).

Basic Recommendations:

Effective management of malnutrition depends on both the person affected and those at risk identification. Regardless of underlying illnesses, weight status, or obesity present, routine screening for malnutrition or associated risk is advised for all older persons in institutional and community settings at admission and on frequent intervals [29]. Considered best practice is the use of validated screening methods; recent research show that their usage corresponds with a reduced malnutrition prevalence and better nutritional therapy in healthcare environments [24]. For older persons in many different geriatric settings, the Mini Nutritional Assessment (MNA) short form is the most extensively validated tool [29-33]. Additional useful instruments are DETERMINE for community settings, Nutritional Form for the Elderly (NUFFE) for rehabilitation, Short Nutritional Assessment Ouestionnaire-Residential Care (SNAORC) for residential facilities, and both the Malnutrition Screening Tool (MST) and MNA-SF-V1 for hospital use [34]. Designing focused treatments for those with a positive malnutrition screening result depends on a thorough nutritional assessment [29]. This assessment should find basic reasons of malnutrition, take personal preferences into account, weigh available resources and goals, estimate the degree of nutritional shortfalls, and closely review present dietary recommendations. Determining whether intervention targets are reached calls for regular monitoring [29]. Individualized and thorough intervention techniques are advised considering the various demands and possible causes of malnutrition in older people [22-23]. Customized treatments have been proved in randomized controlled trials to favorably affect many outcomes, most importantly quality of life [29]. Although direct data is lacking, it is agreed that reducing the causes of malnutrition is very basic. Effective medical treatment is essential for older people; ideally, this means avoiding drugs that affect cognitive ability, taste, salivation, or hunger. Dietitians, nurses, kitchen staff, doctors, dentists, and therapists-e.g., speech, occupational, physical, and psychological—should all be part of an interdisciplinary team working on a comprehensive nutritional intervention. A successful nutrition outcome depends on this team-based strategy; various studies show good effects on body weight, functionality, and clinical health even if the outcomes differ [29].

Emphasizing practical help, environmental changes, and tailored care approaches, the ESPEN guidelines offer many supporting treatments targeted at controlling malnutrition in older individuals. Helping elderly people with eating is especially important in institutional environments since this help has been found to increase food intake among those who run a risk of malnutrition [35][29]. Additionally advised are establishing a nice, home-like dining environment and supporting social meal events since these might improve nutritious intake and hence quality of life. Systematic review data supports the theory that social interaction at mealtimes increases food consumption among elderly persons [29].

Food accessibility is absolutely important; it should be simple to get and eat, particularly for people with limited mobility. For these people, helping with meal preparation, reaching eating locations, and utilizing modified utensils will greatly improve their dining experience [35-36]. Moreover, staff education on the importance of nutrition is essential since it helps older persons and their caregivers to have better eating habits and increase awareness of malnutrition hazards by means of dietary knowledge [35][29]. Considered the first line of nutrition therapy for older persons at risk of malnutrition is nutritional counseling, which seeks to promote a better knowledge of nutrition and support sustainable, health-promoting eating habits [29]. Along with written materials and phone support, this counseling should ideally consist of competent dietician both individual and group sessions [37]. Although dietitians should be included, practical issues can make it challenging to offer this service consistently, especially for home-bound individuals who might contact mostly with their primary healthcare teams [37]. To meet unique dietary requirements and improve intake for older persons, especially those having chewing and swallowing problems, food changes including nutritional enrichment and texture tweaks are advised. Studies show that food fortification with natural components or nutrient supplements can help to maintain same food quantities while facilitating higher energy and nutrient consumption [29][38-40]. Though there is no data on their effectiveness, texture-modified foods should also be provided to help those with dysphagia or other eating difficulties consume enough [29]. Although these areas have not been well investigated, ultimately logical approaches to guarantee sufficient nutrition are diversifying dietary options and responding to personal tastes [29].

Oral Nutritional Supplements (ONS)

The ESPEN guidelines on clinical nutrition and hydration for geriatric populations offer multiple recommendations regarding the administration of oral nutritional supplements (ONS) to older adults experiencing malnutrition or at risk thereof. ONS are designed to supply essential macroand micronutrients and are available in various forms. including ready-to-drink liquids, semi-solids, or powders that can be mixed with beverages or food. A comprehensive review of high-quality evidence, coupled with expert consensus, indicates that these supplements should deliver a minimum of 400 kcal and at least 30 g of protein daily. They are particularly advised for older individuals when nutritional objectives cannot be achieved through dietary counseling aimed at increasing the consumption of fortified foods. The goal is to enhance dietary intake,

improve body weight, reduce the likelihood of complications and readmissions, and mitigate the risk of functional decline post-discharge. Upon initiation, ONS should be administered for a minimum of one month, accompanied by monthly assessments to evaluate perceived benefits and adherence, allowing for customization of the ONS type, flavor, texture, and timing based on the individual characteristics of the older adult [29].

Enteral and Parenteral Nutrition:

For older patients, especially those who are fragile, enteral nutrition (EN), usually given by nasogastric tubes or percutaneous endoscopic gastrostomy (PEG), together with paredteral nutrition (PN) supplied via central or peripheral veins, offer important nutritional alternatives. These intrusive treatments should be saved for patients who show a decent chance of general recovery or stability for their health but cannot meet their nutritional needs via oral or enteral means. Twelve recommendations on this topic comprise the ESPEN guidelines, all based on current descriptive studies and expert consensus as running randomized trials in this field would be immoral. Using these dietary guidelines calls for a careful evaluation of the possible personal advantages against the hazards [29].

Relevance of the Refeeding Syndrome (RFS):

Recent studies underline that treating malnutrition in elderly people cannot ignore the refeeding syndrome (RFS), a severe metabolic consequence that may develop upon reinitiating nutrition in malnourished people [41-44]. Poor control of RFS can produce negative effects ranging from muscle weakness and peripheral edema to multi-organ malfunction and maybe lethal consequences [44]. Not confined to those on enteral or parenteral nutrition, the frequency of RFS is rather high among malnourished older individuals. But because of the vague character of first symptoms [44] and a general lack of understanding among many healthcare professionals [45], RFS sometimes remains unnoticed and untreated in these people [46]. Nearly three-quarters of 342 hospitalized geriatric patients at risk of malnutrition indicated in a recent multicenter research strong sensitivity to RFS [47]. Like malnutrition, RFS is still mainly unknown and poorly controlled in clinical settings.

Improving patient care calls for more understanding of RFS among healthcare professionals involved in nutritional therapy to find at-risk patients and spot RFS starting point. The ESPEN guidelines advise close monitoring of serum levels of phosphate, magnesium, potassium, and thiamine during the first three days of EN and PN therapy for malnourished patients since these values usually drop in the framework of RFS and should be supplemented accordingly [29]. Moreover, a recent review [46] supports vigilant monitoring of vital signs, fluid balance, serum electrolytes, and thiamine in elderly patients vulnerable to RFS while nutrition repletion should start slowly and be raised carefully to reach dietary targets within four to seven days. In a randomized clinical trial, this approach has shown to lower the death risk among critically sick patients [48]. **New Evidence after the ESPEN Guidelines:**

After the ESPEN guidelines' literature evaluation was finished, many systematic reviews and clinical studies looking at different nutritional therapies in several contexts have been published. One systematic review and meta-analysis limited to older people with malnutrition found no appreciable positive outcomes from ONS regarding body weight, body mass index, Mini Nutritional Assessment (MNA) scores, muscle strength, activities of daily life, Timed Up and Go test results, quality of life, or mortality. The outcomes for additional interventions-including nutritional counseling mixed with ONS, ONS combined with exercise, and new ONS delivery systems-showcased inconsistency [49]. Based mostly on low to very low-quality evidence, another systematic review looking at the effect of exercise alongside oral nutritional supplementation revealed improvements in muscle strength albeit not in other metrics [50]. Especially, a study indicated that compared to simpler therapies, nutritional support given by a multidisciplinary team-as recommended by the ESPEN guidelinesmay have greater results in lowering mortality risk and improving quality of life [51]. Only handgrip strength showed improvement according to a methodical analysis of trials done in nursing homes; benefits on other functional assessments were absent [52]. While urging for methodological changes in studies, a recent review addressing therapies for anorexia linked with aging, including pharmaceutical methods and taste enhancement, revealed that some interventions could alter energy intake and body weight [53].

Rising from a comprehensive review and meta-analysis, the use of telehealth interventions seems to be a promising new technique for managing malnutrition in older persons, showing benefits in protein consumption and quality of life, however more research is needed [38]. As a result, although original investigations remain very scarce, the number of systematic reviews is fast rising. Among these first contributions, a pooled analysis of individual data from nine randomized controlled trials (RCTs) involving older adults at risk of malnutrition is noteworthy since it revealed positive effects on energy intake and body weight, with the most significant benefits observed from the combination of nutritional counseling and ONS [54]. On the other hand, pooled data from studies aiming at muscle strength and mortality revealed no appreciable intervention impact [55]. On important clinical outcomes connected to routine malnutrition screening paired with tailored nutrition support overseen by a dietitian during hospital stays, the recently published large multicenter EFFORT trial showed beneficial effects [56].

Biomarkers of Malnutrition:

Biomarkers play a crucial role in diagnosing monitoring malnutrition among elderly and populations. These biomarkers can be divided into categories, including anthropometric several measures, biochemical markers, inflammatory markers, and functional markers, each offering distinct insights into an individual's nutritional status. The following section addresses the limitations associated with the biomarkers currently in use.

Anthropometric Measures:

Usually used to assess nutritional status by means of body composition and fat reserves, measurements-which anthropometric include indicators including body mass index (BMI), midupper arm circumference (MUAC), and skinfold thickness-are commonly applied. Simplicity and simplicity of computation make BMI, derived from the formula weight in kg divided by height in meters squared, preferred. Still, these policies have major flaws, especially with relation to the older population. When depending only on BMI, age-related changes in body composition-including sarcopenia (muscle loss) and fat redistribution-can lead to false conclusions. An aged person could, for example, show a normal BMI but show significant muscle atrophy and change fat distribution, therefore hiding underlying malnutrition. Similarly, changes in skin elasticity and muscular atrophy common among older adults can influence both MUAC and skinfold thickness assessments, hence possibly resulting in misrepresentation of nutritional status. These restrictions highlight the need for more precise diagnostic criteria including the physiological changes following aging, which would improve early detection and treatment of malnutrition in elderly people.

Biochemical Markers:

Serum albumin, prealbumin, transferrin, and retinol-binding protein [57] are common biochemical markers used in senior patient evaluations of malnutrition. These markers provide very important information on general nutritional quality and protein levels. While prealbumin and transferrin offer information on temporary fluctuations due to their shorter half-lives, serum albumin, generated by the liver, marks long-term nutritional status. Retinolbinding protein also serves in nutritional analyses and acts as a transporter of vitamin A in the bloodstream. These biochemical indicators do, however, have certain limits in the aged population. Variables other dietary consumption could affect their than concentrations: inflammation, infection, hydration level, liver function, chronic diseases [58]. Low serum albumin levels, for instance, could indicate either acute or chronic inflammation instead of starvation, hence causing possible misdiagnoses. The frequency of several comorbidities and polypharmacy among elderly persons significantly hampers the accuracy of these markers. Therefore, depending just on these biochemical markers might lead to false positives or negatives, which emphasizes the need of more specific and sensitive biomarkers that fairly depict nutritional condition independent of other age-related physiological changes. Recent studies show that amino acid profiles—especially those of tyrosine (Tyr), tryptophan (Trp), and phenylalanine (Phe) may be interesting indicators for malnutrition [59,60], offering more consistent evaluations than standard markers like BMI and blood albumin. Individuals who are malnourished have been shown to have much less of these amino acids than those in normal nutritional condition.

Inflammatory Markers:

Many times used to assess malnutrition in the elderly include inflammatory markers including Creactive protein (CRP), interleukins (e.g., IL-6), and tumor necrosis factor-alpha (TNF- α). These markers capture the inflammatory reaction of the body, which can significantly affect nutritional state. For example, high CRP levels have been linked to acute inflammation and could lead to underlying infections chronic diseases sometimes linked with or malnutrition [61]. Cytokines essential to the inflammatory process, interleukins and TNF-a are also elevated in chronic inflammatory conditions. Still, evaluating malnutrition in elderly persons using these inflammatory indicators comes with great difficulty. Inflammation can influence protein metabolism and food use, therefore confounding the difference between whether changes in marker levels are resulting from the inflammatory process or malnutrition [62]. Moreover, aging and several comorbidities cause chronic low-grade inflammation in the elderly, which can lead to chronically raised inflammatory markers not always reflecting nutritional status [63]. This overlap hampers the interpretation of these markers, hence perhaps causing undervaluation of malnutrition or misdiagnosis. More specific markers like certain cytokine profiles or the combined assessment of inflammatory and noninflammatory biomarkers have been advised given the limits of inflammatory markers like CRP in differentiating between malnutrition and inflammation. Furthermore promising to improve our knowledge of malnutrition are omics technologies and advanced imaging methods [64]. Therefore, even if inflammatory indicators are very important in giving an aged patient's health a larger context, their usage should be matched by other diagnostic instruments to precisely evaluate malnutrition considering the complicated interplay of aging and disease.

Functional Markers:

Commonly used functional markers for malnutrition in older persons are handgrip strength, gait speed, and activities of daily living (ADLs [65,66]). Evaluated with a dynamometer, handgrip strength provides a quick and useful gauge of muscle activity and general nutritional state. On the other hand, gait speed—derived from timing a brief distance walk-indices physical performance and can project negative health effects. ADLs-which cover basic self-care chores including washing, dressing, and eating-offer insights on a person's functional independence and nutritional state. These functional indicators, nevertheless, also have limits in precisely identifying malnutrition in the elderly. Age-related changes in muscle mass and function, sometimes known as sarcopenia, can affect these measurements and complicate the differentiation between starvation and normal aging [67]. Incorporating extra evaluations, such muscle mass assessments using DXA scans or bioelectrical impedance analysis [68,69] would help to distinguish sarcopenia from malnutrition. These tests together help to differentiate between general dietary deficits and muscle atrophy brought on by sarcopenia. Furthermore affecting functional measures are chronic diseases, cognitive problems, and comorbidities common among elderly people, which can cause possible misinterpretation of nutritional status [70]. Therefore, even if functional indicators are important for assessing the impact of malnutrition on physical capacities, they should be used together with other diagnostic methods to give a complete evaluation of the nutritional condition of an aged person. Recent meta-analyses and systematic studies have examined several biomarkers linked to older adult malnutrition risk. Although their levels can be greatly changed under acute disease scenarios, findings show that BMI, hemoglobin, and total cholesterol are excellent biomarkers; serum albumin and prealbumin are very sensitive indicators [57]. Furthermore helping to provide a more complex knowledge of the biochemical changes linked with hunger are newly developed advanced technologies such targeted metabolomics [60]. For the correct diagnosis and treatment of malnutrition in elderly persons, a thorough strategy including several biomarkers is therefore advised. By providing dietary recommendations and therapies catered to an individual's unique genetic composition, metabolic profile, and health needs, the integration of modern technologies and personalized nutrition tactics may further increase the efficacy of these assessments. Interventions carried out by Nurses:

Identified Interventions:

Four categories of interventions that could be incorporated into nursing care were recognized within the reviewed studies: oral nutritional supplements, food/fluid fortification or enrichment, dietary counseling, and educational interventions. A total of 19 studies documented single-component interventions. The duration of these interventions varied from the length of hospitalization to up to 12 months post-discharge, though two studies did not clearly specify the intervention duration [71]. **Oral Nutritional Supplements**:

The provision of oral nutritional supplements was featured as an intervention, or part of a multi-

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faceted approach, in 12 studies. Nutritional beverages characterized by high nutrient and energy density were administered to older adults in 10 studies. One study provided oral supplements containing vitamin D3, while another included magnesium. Additionally, vitamin D3 and calcium supplements were provided along with nutritional drinks. The administration of these supplements typically occurred once or twice daily, or as tailored to individual patient requirements alongside their standard oral diet [71].



Figure 1: Biomarkers in Malnutrition caused by Chronic Kidney Diseases.

Food/Fluid Fortification or Enrichment:

Multiple studies on therapies including the fortification or enrichment of meals and fluids for elderly people reported on Two of these research concentrated on fortifying fluids by dissolving a mixture including amino acids, whey protein, and vitamin D or a protein powder. In the latter investigation, which followed a three-arm randomized controlled trial design, oral nutritional supplements were provided to the first intervention group and the protein powder to the second intervention group. One study presented protein-enhanced food and beverage products either substituting for conventional options or augmenting the menu. Under a 2 x 2 factorial design, another study used a crossover design whereby participants ate four meals comprising beef or chicken on separate days, each meal varying in protein content (25 g vs. 30 g) and portion size (normal vs. reduced). One study also enriched tiny servings with protein powder and included naturally occurring energy-dense foods. Two multi-component programs provided fortified meals and beverages and protein-enriched diets together with energy [71].

Dietary Counseling:

Multiple research summarized dietary advice. Aiming to help older persons in obtaining and

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maintaining good nutritional status at home, the first study offered tailored counseling for them via phone and home visits following their discharge from a rehabilitation hospital. In another study, a dietician either through home visits or phone consultations gave dietary counseling customized to the nutritional needs and personal circumstances of older individuals and informal caregivers following hospital discharge. Offering advice and encouragement to follow the advised nutritional intake over phone sessions with a dietitian, the third research used dietary counseling as part of a multi-component intervention. At last, dietitians offered older patients dietary counseling as part of a customized nutrition plan, including sessions where recent weight data were gathered and discussions concerning the side effects of supplementation and adherence to the dietary plan took place [71].

Educational Interventions:

Multiple research is mostly focused on instructional interventions. Focusing on reducing malnutrition risks in dependent patients and individual dietary monitoring at home, one study included nurses holding nutritional education sessions targeted at informal caregivers. Another study looked at a teaching and training program giving patients and caregivers knowledge on diet and Alzheimer's disease including weight monitoring support. Additionally involved in educational seminars run by dietitians, caregivers follow guidelines pertaining to malnutrition risk. In another study, patient education covered fluid intake, consumption of both animal and plant protein, and energy intake as well as strength training exercises supported by non-professional volunteers for elderly persons [71].

Knowledge Gaps:

Though there are more and more systematic studies on dietary interventions for malnourished elderly persons, a considerable amount of the suggestions made in the ESPEN guidelines fall under "good practice point" classification. This classification shows that, lacking enough empirical data, these suggestions are essentially dependent on the clinical experiences of the group guiding the formulation of guidelines. Out of the 82 recommendations, only 15 have a grade A recommendation; three of them are directed on patient-centered outcomes. When looking at outcome measures, most studies looking at dietary changes or supportive interventions usually focus just on dietary intake, sometimes overlooking functional or clinical results. Most randomized clinical studies in this field have concentrated mostly on the effects of oral nutritional supplements (ONS) on older malnourished individuals. Although the compliance rates—about 78% are somewhat high—the data basis from these trials still shows the most strength. Although these studies show good results in nutritional status and dietary intake, the results about functional and clinical outcomes are sometimes contradicting or negative. Moreover, multiple systematic studies have revealed a general dearth of scientific data on the effect of dietary treatments on functional or clinical outcomes within this population [72].

Limitations of Existing Studies:

Regarding sample selection, several earlier studies have included older persons without malnutrition in addition to malnourished people, therefore probably reducing the apparent treatment effects on outcomes. Moreover, the different definitions of malnutrition are applied in research confound comparability. Common limits in study design include small sample numbers and insufficient power calculations connected to main outcome variables, therefore limiting the capacity to find significant impacts. Often not recorded is baseline nutritional consumption; also, the degree of nutritional care in control arms is often not well stated, which results in uncertainty about the variations between control and intervention groups. Therefore, any noted discrepancies could be reflections of disparities in general nutritional care rather than the particular intervention itself. Furthermore causing performance bias is the absence of blinding for study staff members as well as for participants. Such blinding is rare even in circumstances when placebo interventions could be

possible (such as testing ONS with a low-calorie, visually comparable supplement). Many studies adopt a single intervention across all participants, thus ignoring unique health statuses, other treatments, and personal preferences, so perhaps limiting the efficacy of the interventions. Often insufficiently stated are compliance and adherence to the interventions; low compliance and poor integrity can reduce the possible influence of the therapies. Regarding study results, some studies can exclude clinically relevant or patient-centered criteria like quality of life. Non-blinding of outcome assessors could cause detection bias [72].

Furthermore, even if studies usually show the energy and protein amount given, they may neglect to show the net effect on daily intake, which might not have changed much depending on compensation during other mealtimes. Lastly, many studies rely more on complete case analysis than on intention-totreat analyses, which can introduce even more bias. Most current research produce low or intermediate quality findings due to one or more of these restrictions. Pooling individual patient data for metaanalyses is much hampered by the great variability in inclusion criteria, study populations, forms of therapies, and outcome measures. Future studies should consider using a uniform definition of malnutrition to improve the comparability among studies. Furthermore, the creation of a minimal dataset (MDS) for clinically relevant outcome variablesadapted to particular environments as needed-could inspire the inclusion of standardized outcome measurements in next studies. This project would help to aggregate data and enable the completion of metaanalyses, therefore improving the quality of evidence on relevant clinical outcomes by means of dietary interventions [72].

Nutritional Status Assessment and Referral Barriers:

When assessing nutritional state, medical professionals mostly rely on biochemical markersespecially levels of serum albumin. This strategy can be challenging, particularly in severely sick individuals, though, since a range of clinical diseases unrelated to nutritional status can affect blood albumin levels. On the other hand, to evaluate nutritional condition, nursing staff members sometimes focus on physical traits such skin integrity and turgor. Although doctors know the risk factors for malnutrition, there is a clear discrepancy in the active patient referrals for dietetic evaluations. Time restrictions, work pressures, inadequate training or skills, and a perceived lack of resources-such as efficient screening tools-all contribute to this problem in some degree. Furthermore, some medical experts might not see their duties including nutritional evaluation as such. Still, study results revealed that if a nurse detected malnutrition, all of the staff members—including 95% of the medical staff-would recommend a patient to a dietician, therefore emphasizing a disparity between

knowledge and actual practice. It is noteworthy that the presence of a student dietitian during the survey would have affected answers since it would have increased awareness of the requirement of dietetic recommendations.

To minimize any bias, the survey was given without verbal cues and respondents had several weeks to finish it without the dietitian around. The insufficient rates of identification and referral for individuals at nutritional risk highlight the need for better nutritional risk screening and evaluations carried out by dietitians. For instance, even a simple screening system based on patient age, diagnosis, and dietary code found only 26 out of 91 patients (around 29%), as underweight or at risk of malnutrition. Establishing a uniform nutrition screening program for every patient admitted to a general medical or fast assessment ward might help to solve poor referral rates. Standard practices include protected mealtimes, help with feeding, and the availability of nutrientdense food and drink alternatives might all be included in this regimen. Further improving referral rates would include educating and training healthcare workers on the need of seeing and sending malnourished patients. Finally, this study shows that among hospitalized elderly patients, malnutrition is still a major problem marked by inadequate recognition, recording, and professional referral policies. Moreover, the results that medical professionals can have imply misunderstandings about important signs, such weight loss and loss of appetite, and have poor awareness about dietary risk factors for malnutrition. Customized education and training materials have great potential to help healthcare workers better grasp malnutrition risk factors, thereby improving their knowledge and skills and hence patient care and results.

Conclusion:

In essence, malnutrition in older patients is still a major public health concern that calls for quick and coordinated actions among medical personnel, particularly nurses who are vital in their identification and treatment. Early screening, focused treatments, and ongoing support are all part of the complex range of malnutrition in the elderly that comprises several physiological, psychological, and social elements. Healthcare professionals must thus adopt a comprehensive strategy covering all these aspects. Malnutrition affects not only general quality of life but also the health results of elderly people. Higher healthcare costs, longer hospital stays, and more morbidity can all follow from it. Many healthcare professionals rely on conventional biochemical indicators that might not fairly represent nutritional status in severely ill patients, so even with knowledge of the hazards connected with malnutrition, many of them fail to identify its presence. This emphasizes the need for more complete evaluation techniques combining clinical assessments, patient histories, biochemical data with clinical evaluations and functional evaluations. Effective malnutrition depends

interventions. nursing Regular nutritional on screenings using standardized instruments should be carried out by nurses; they should also create customized treatment plans and encourage cooperative partnerships between dietitians and other medical experts. By teaching nursing staff members the value of nutrition and how it affects patient health, they will be far better able to spot at-risk people and enable quick referrals for dietary help. The study points up a number of obstacles to efficient clinical nutrition screening and intervention. Among these obstacles could be time limits, restricted resources, and a lack of faith in dietary knowledge among medical professionals. Healthcare institutions should provide clear recommendations for nutrition screening and management top priority in order to meet these issues; so, they are absolutely necessary for normal treatment. Standardizing screening techniques guarantees timely interventions and helps to improve early detection of individuals. malnourished Moreover, good management of nutrition depends on a patientcentered approach. Including patients in their treatment plans and teaching them about their nutritional requirements helps them to make wise food decisions, therefore enhancing the results of their health. During their hospital stays, strategies including guarded mealtimes, help with feeding, and nutrientdense food selections can give malnourished patients necessary support. Dealing with malnutrition in senior patients calls for an all-encompassing effort by healthcare teams to upgrade screening procedures, raise professional expertise, and apply patient-oriented interventions. Healthcare professionals can greatly increase the health and well-being of elderly people at danger of malnutrition by giving nutrition top priority as a basic component of patient care.

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