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Meta Analysis on the Increase of Malnutrition and Sarcopenia in Older Adults

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Abstract

Introduction: Between 20% and 50% of patients admitted to hospitals are affected by malnutrition. In a hospital setting, malnutrition can be caused by iatrogenic factors, obstacles to nutrient intake, and the complex physiological and metabolic changes that occur during the acute inflammatory response. These changes disrupt the body's natural process of utilizing nutrients, leading to hypermetabolism and/or catabolism. Sarcopenia is thought to be common in the elderly, particularly those living in nursing homes or hospitals. The decrease of physical function, muscle mass, and muscle strength is known as sarcopenia. In terms of malnutrition and sarcopenia among older adult hospital inpatients, an extensive overview of the corpus of recent research is provided by this review. It also outlines the challenges that can be overcome to improve nutrition assistance across care episodes.

Materials and Methods: The objective is to assess the occurrence of malnourishment and sarcopenia in senior hospital patients, we examined 31 research publications. Using test findings for body composition, BMI, hypertension, handgrip strength, the Chair Stand Test, and handgrip strength, the effects of malnutrition and sarcopenia were examined in inpatient older individuals over the age of 60.

Results and Conclusion: The study of malnutrition and sarcopenia consequences among hospital inpatients involved a total of 14256 older adult participants. The analysis reveals that among hospitalised Elderly patients over 60, The frequency of sarcopenia was 26.7% and malnutrition was 28.6%. Elderly persons with malnutritional effects had greater rates of sarcopenia, suggesting that malnutrition was a significant cause to sarcopenia.

Keywords: Malnutrition, Sarcopenia, Prevalence, Meta-analysis, Inpatients.

1. INTRODUCTION

1.1. Malnutrition

When there is a lack of proper nutritional intake or absorption, it can leads to fat loss and muscle mass reduction, which is known as malnutrition **[1]**. An individual with a low body mass index (BMI) and the diagnosis of malnutrition relies on meeting two out of the three criteria: either having a lower BMI or having a low fat-free mass index score along with experiencing unintended loss of weight. **[2]**. The occurrence of malnutrition among the elderly varies, with prevalence rates ranging from 1% to 24.6% **[3]**. Moreover, the elderly undergoing rehabilitation are impacted by malnutrition at a rate of 50%. Similarly, those residing in care facilities experience malnutrition at a rate of 20%, while 40% of individuals admitted to hospitals also suffer from this condition **[4]**.

1.2. Sarcopenia

Sarcopenia refers to the slow reduction in both strength and skeletal muscle mass is now known to occur before the age of 60, despite the fact that it is typically linked to advance ageing **[5]**. The complex pathophysiology of sarcopenia is caused by hormonal abnormalities, biological changes in the muscle's structure, and exogenous factors including insufficient calorie intake **[6]**. Sarcopenia is commonly evaluated through the measurements of physical attributes of total lean mass, size and mass of muscles, or lean mass in the limbs. In addition, sarcopenia can also be assessed by evaluating physical performance, which includes walking speed, leg muscular strength, grip strength, and balance, or a mix of physical tests such chair stands, walking speed, and balance. Various risk factors for sarcopenia, such as smoking, diabetes, medication intake, and BMI, have been the subject of scrutiny in previous studies **[7,8,9]**. Addressing sarcopenia can be facilitated by enhancing nutrition and promoting a higher intake of food, which can prove advantageous for both prevention and treatment. This is crucial as the elderly, particularly frail individuals, commonly experience widespread poor nutritional status and inadequate diets **[10]**.

1.3. Co-existence : malnutrition with sarcopenia

Sarcopenia was observed in 92% of cases. Every patient who was malnourished had cohabitation of malnutrition and sarcopenia and sarcopenic prevalence was 40.3%. Significant correlations were found in univariate analyses between the presence of potentially unsuitable medicines, comorbidities, oral hygiene, and swallowing ability **[11]**. These issues get worse with age, rise in mortality and morbidity, lower life quality, and raise healthcare costs and usage. The issue is that there is no agreement on screening instruments for malnutrition or sarcopenia in general, or even in certain populations that are at risk. It's interesting to note that the recent GLIM consensus report recommends using a sarcopenic criteria to determine the degree of malnutrition based on phenotype **[12]**.

2. METHODS

2.1. Search techniques

Based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, the systematic review was conducted. Search internet databases such as PubMed and Google Scholar to locate relevant material in order to compile a list of relevant publications. Articles published between 2018 and 2024 were the main focus of the search. During the inquiry, keyword combinations including "Malnutrition," "Sarcopenia," "Prevalence," "Meta-analysis," and "Inpatients" were used.

2.2. Criteria for inclusion and exclusion

Articles must meet the following criteria in order to be regarded for inclusion in the meta-analysis: (1) the cross-sectional population-based studies that were part of the analysis were carried out between 2018 and 2024 and reported that sarcopenia and malnutrition were common in institutional care. (2) Adult participants over 60 were included in the studies that were deemed acceptable for inclusion. Research not released in English was not included in the meta-analysis. Additionally, studies with heterogeneous reporting of prediabetes and those that only reported the frequency of prediabetes without offering information to compute the 95% confidence interval were not included.

2.3. Data extraction

The titles, abstracts, and keywords were used to filter the articles that were located in databases. An established and standardized data extraction form was employed in order to systematically gather pertinent data from each study. This gave details about the study's design, sample makeup, study location, year of publication, prevalence of sarcopenia and malnutrition in inpatients, and related variables. It also revealed the first author's identity. The framework of a random-effects meta-analysis was employed to aggregate prevalence estimates from many researches, taking into consideration the variations between them. After evaluating the pertinent articles, data extraction was done from the ones that qualified. Following collection, Microsoft Excel was used to store the data.

RESULTS

During the literature review carried out from 2018 to 2024, a comprehensive screening of 31 articles was conducted. The analysis of the gathered data revealed that the occurrence of malnutrition and sarcopenia among elderly patients aged 60 years and above in hospitals and healthcare institutions stands at 26.86% and 26.73% respectively. The study encompassed a total of 14,256 individuals who were above the age of 60. The meta-analysis findings indicated that elderly individuals residing in institutions exhibited a higher occurrence of malnutrition **(Figure 1)** and sarcopenia **(Figure 2)**. Among the elderly living in institutions, 138 of them had sarcopenia, making the prevalence of 63.01%. Of these, 24 were ambulatory and demonstrated a high level of cognitive function, and 114 lacked the ability to move and/or had impaired cognitive abilities. This means that Sarcopenia was present in 32 and 76.3% of these groups, respectively. **[23]**. 91 elder adults were enlisted for the research study, wherein the European Working Group on Sarcopenia in Older People criteria were utilized to diagnose sarcopenia and evaluate the risk of malnutrition. The findings indicated that a significant proportion (83%) of the patients were either malnourished or at risk of malnutrition, while 41% were diagnosed with sarcopenia. Through the utilization of multivariate regression analysis, it was observed that lower body mass index and lower MNA-SF score were strong predictors of sarcopenia. Despite considering variables such as age, number of medications, depression, and level of care, these associations remained statistically significant **[22]**. The cross-sectional analysis conducted revealed that 23.5% of the geriatric rehabilitation patients demonstrated concurrent sarcopenia and malnutrition, as determined by consensus-based criteria. Furthermore, certain factors were identified as potentially linked to the presence of both sarcopenia and malnutrition, such as a extended interval between begining and admission, deconditioning associated with hospitalization, and impaired swallowing function **[13]**.

Figure 1: Prevalence of Malnutrition in Elder Adults

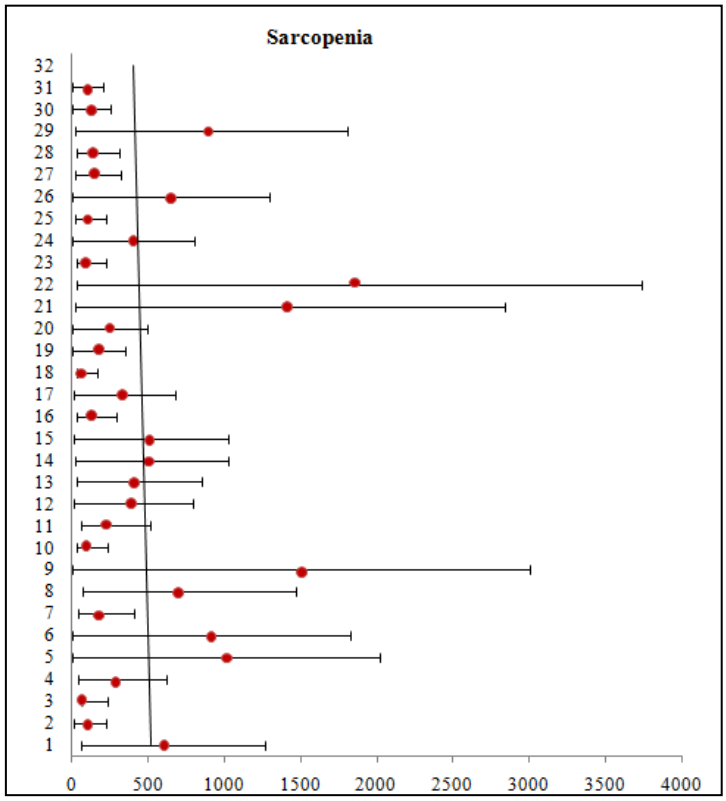

Figure 2: Prevalence of Sarcopenia in Elder Adults

CONCLUSION

Therefore, it is evident from the present study that among the factors examined, namely nutritional, anthropometric, and physical aspects; sarcopenia in the institutionalized elderly is primarily associated

with these aspects. Additionally, it is essential to reconsider sarcopenia as a diagnosis exclusively related to the muscle mass loss, as this decline was not found to be specific to the musculature of elderly individuals residing in institutions. The findings underscore the significance of regular screening for malnutrition in Residential Aged Care, hospitalized elderly adults, and primary care settings to stop sarcopenia from developing. In cases where individuals display low body weight or inadvertent weight reduction, it is crucial to conduct sarcopenia screening and assessment.

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