

Geriatric nutrition: The key to longevity of life



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Abstract

One of the most important factors in health-related quality of life, particularly for the elderly, is nutrition. This article addresses the common health conditions faced by the geriatric population like malnutrition, senile asthenia, anorexia, sarcopenia, and frailty. It also covers advanced solutions such as 3D food printing, salutogenic marketing, diagnostic tools, online education, and optimizing longevity. The shift towards traditional grains like millet that may affect nutritional values as a changing paradigm has also been addressed. Overall, the article focuses on advancement in geriatric healthcare and underscores the significance of nutritional science in the management of various diseases.

Keywords: Geriatric Diseases, Nutrition, Healthcare, Advancement, Quality of Life, Sarcopenia, Frailty, Senile asthenia.

1. Introduction

The World Health Organization's (WHO) 2021 report states that the population of older people is increasing as they live longer and constitute a growing share of most countries globally. There are numerous possibilities and public health challenges associated with the aging population, which the healthcare industry should prepare to address (1).

There is also optimism regarding longer life spans and better health in India owing to advancements in medical technology, enhanced healthcare systems, and improved living circumstances. It is expected that by 2050, 340 million people over 60 will be in India. Given that life expectancy has risen in recent decades, nutrition plays a critical role in good aging (2). The physical and mental health of the elderly population, their level of independence, social interactions, personal beliefs, and their environment are some of the elements that determine their quality of life. In order to address health-related quality-of-life issues for the elderly and provide innovative treatment techniques, medical innovations are crucial. Also providing adequate nutrition supplements is one of the key factors for better treatment as well as preventive care (3).

1.1. Current scenario of the geriatric population

The United Nations Fund for Population Activities (UNFPA) Aging Report for 2023 estimates that India's old population will grow at a decadal rate of 4.1%. It is predicted that by 2050, the proportion of elderly people in the nation would have doubled to more than 20% of the entire population. By then, the number of senior people in the country will probably have overtaken that of children (ages 0 to 15).

The phrase "old age" does not refer to a person's physical attributes; rather, it describes their whole state of health, which includes better medical, psychological, and social circumstances. According to the World Health Organization, 15% of elderly adults who are at least 60 years old experience mental health issues such as substance misuse, dementia, sadness, sorrow, delirium, and Alzheimer's (4).

In terms of nutrition, the geriatric population prefers ready-to-eat (RTE), packed food as they are easy to prepare and serve small meal portions for less appetite. However, as per a study conducted, it consequently affects their health as nutritional frailty increases by over 50% due to moderate daily consumption of processed meals. It leads to multimorbidity, nutritional imbalance, and serious adverse health conditions like cancer, physical and mental disorders, cardiovascular disease, and metabolic syndrome (5).

1.2. Various diseases encountered by the geriatric population

As per the suggestions of biologists for several decades, there is an important but undervalued connection between aging and many chronic disorders in humans. The risk of numerous prevalent diseases, including diabetes, Parkinson's disease (PD), Alzheimer's disease (AD), cardiovascular disease, chronic obstructive pulmonary disease (COPD), osteoporosis (OP), and even osteoarthritis (OA) increases with age (6).

Mental disorders, stroke, cancer, and chronic respiratory diseases are also responsible for major reasons of morbidity in the elderly. These chronic diseases worsen with age when different organ systems fail, have common risk factors connected to lifestyle choices, are asymptomatic for extended periods, and require long-term monitoring and care (7).

The co-existence of multiple factors, including frailty, chronic disease, poor dental health, physical restrictions, and psychosocial issues that progressively decrease body function, could render aging itself, which may become a risk indicator of malnutrition. However, as we age, more challenging long-term digestive and swallowing issues, decrease in energy expenditure that can result in anorexia and psychological issues can make it challenging to fulfil our nutritional demands (8).

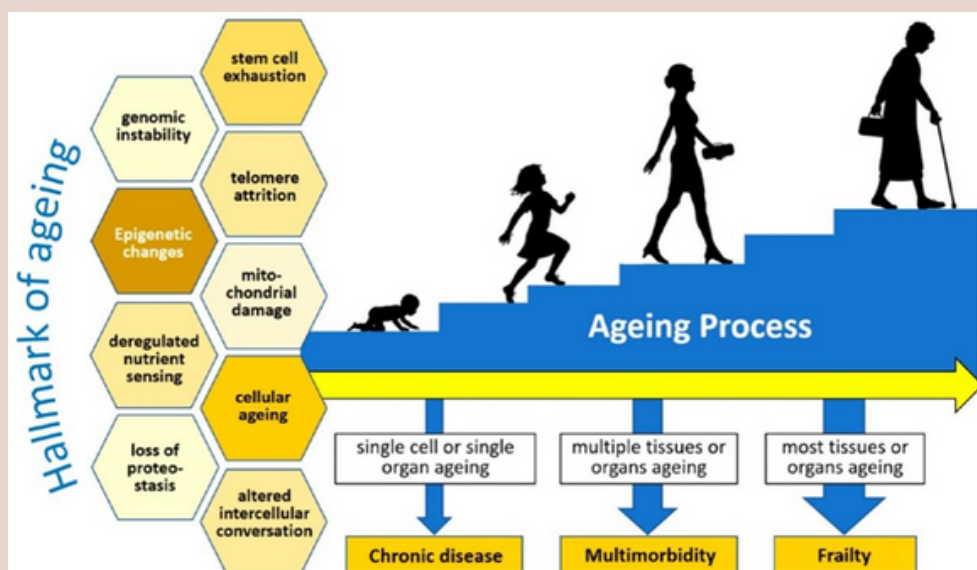


Figure 1. Hallmark of ageing (9)

2. 'Millets' as Nutri-cereals: A changing paradigm in nutritional science

India's agricultural development, termed as "Green Revolution (GR)," has transformed food sufficiency while compromising nutritional safety. Astonishingly, undernutrition is still a problem in India even in the face of ample food. In the last decades, the shift in grains from millet to wheat has deleteriously affected the nutrition field (10).

Producing nutritious foods and nutraceuticals has been hampered by cereals like wheat and rice. Wheat contains ingredients that can cause adverse reactions like non-celiac wheat sensitivity, wheat allergies, and irritable bowel syndrome (IBS) which is linked to rapidly fermentable carbohydrates that are not digested (mono-saccharides, fermentable oligo-, di-, and polyols, or FODMAPs) in susceptible person (11).

A resurgence of interest in millets as a possible nutritional replacement in food formulations, pharmaceutical applications, animal feed, and commercial starch production has occurred in recent years. The Food and Agriculture Organization (FAO) announced 2023 as the "International Year of Millets" due to the grain's tremendous potential for agriculture. Due to its gluten-free nature, millet seed protein is particularly favoured by celiac disease patients as a wheat alternative (12). It has been widely used in nutraceuticals as it contains enriched nutritional values. The bioactive millet peptides have anticancer, antimicrobial, anti-inflammatory, anti-hypertension, anti-obesity, antioxidant, anti-diabetic properties (13).

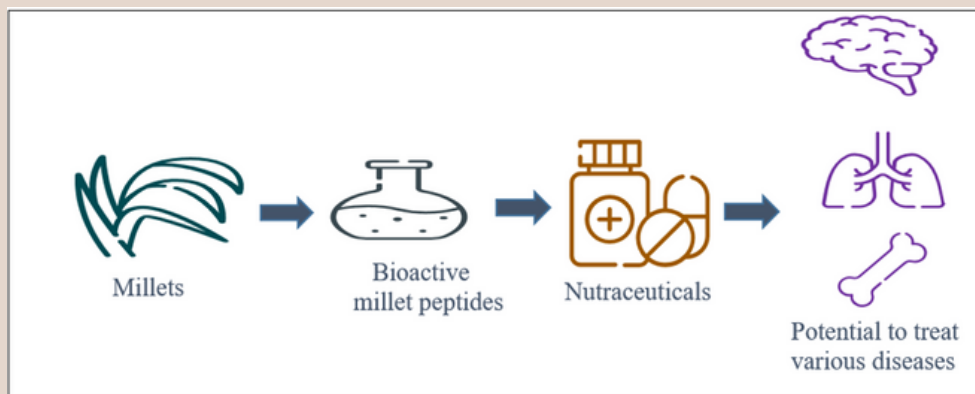


Figure 2. Millets-Nutri-cereals

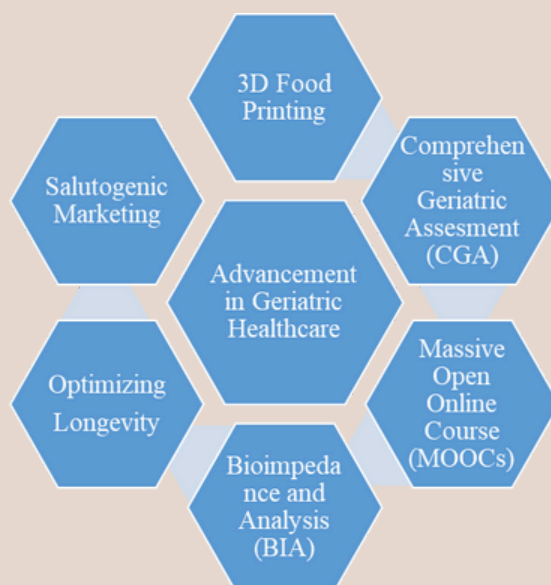


Figure 3. Other advancements in geriatric healthcare along with the challenges

3. Geriatric diseases as challenges and its advancements

3.1. Malnutrition

Malnutrition is common and has been connected to the increase in geriatric illnesses in the senior population. Even when malnutrition in older persons is detected early, doctors and nursing professionals have challenges in recognizing and treating the condition due to a lack of education, awareness, and time (14).

It is fundamental that older people living in the community are empowered to recognize when they are susceptible to malnutrition and accept responsibility for obtaining nutritional support and medical care (15). Hence, it is required to educate people regarding malnutrition in an easy accessible way. Massive open online courses (MOOCs) are an advanced educational platform that may help medical practitioners become more knowledgeable. From a cross-sectional descriptive study, it is concluded that the MOOCs course significantly broadened the participants' understanding of malnutrition by 91%, indicating that it is an effective tool for the management of malnutrition in clinical practice (16).

3.2. Senile asthenia

Senile asthenia is a disorder of the body that impairs the function of many, occasionally all, of the organs. Disability is a common outcome of this illness. Age-related changes are caused by the accumulation of chronic diseases. A multifaceted, interdisciplinary diagnostic process known as comprehensive geriatric assessment (CGA) evaluates an elderly person's functional abilities, social problems, and physical and psycho-emotional status to develop a treatment plan and follow-up that will aid in maintaining or restoring the level of functional activity (17).

3.3. Anorexia and poor dietary intake

Elderly health can be affected by various nutrition-related issues, such as decreased appetite, impaired digestion, and reduced nutrient absorption. Furthermore, a poor diet and an imbalance in food intake are the primary causes of nutritional imbalances in the elderly. The issue could potentially be resolved by employing 3D food printing in food design. Within the food sector, 3D food printing is considered a revolutionary processing method. By merging various printing techniques and food ingredients, the user's flexibility of design enables them to create unique food products with digitally detailed design, unique forms, and high nutritional quality (18).

3.4. Sarcopenia and frailty

Sarcopenia is a geriatric syndrome associated with aging that is identified by the loss of muscular mass and function. It is linked to a progressive deterioration in physical capacity as well as a higher chance of requiring physical assistance and care. Frailty syndrome is a geriatric condition linked to decreased stress tolerance and impaired clinical outcomes.

Body composition evaluation imaging methods like dual X-ray absorptiometry (DXA) and computed tomography (CT) are time-consuming and costly. Instead, bioimpedance analysis (BIA) has been considered an appealing alternative due to its simplicity, non-invasiveness, affordability, and safety at the bedside (19).

3.5. Preventive measures

3.5.1. Salutogenic marketing

Salutogenic marketing is distinct in several ways from conventional marketing strategies that concentrate on illness treatment or prevention. Firstly, salutogenic marketing embraces a positive, comprehensive perspective on health and not negative and demoralizing aspects. It acknowledges that rather than merely the absence of disease, health is a dynamic condition of mental, emotional, social, and spiritual well-being. It also recognizes that a variety of factors, including environment, genetics, lifestyle, individual choices, culture, and have an impact on one's health (20).

3.5.2. Optimizing longevity

Smart nutrition is about creating well-versed food varieties that support overall health and well-being. Given that older persons frequently encounter physical changes that impair their capacity to properly absorb and utilize nutrients, nutrition is crucial to healthy aging.

The combination of cutting-edge digital technologies and smart nutrition offers a revolutionary way to address the problems associated with aging in the context of modern healthcare. People can measure and analyze their nutritional intake more effectively by combining digital technology with smart nutrition. These technologies can help understand nutrition in relation to preferences, lifestyle, and health objectives (21).

4. Conclusion

Geriatric healthcare needs notable attention as it holds a highly growing share of the global population. They encounter many health-related conditions due to various aspects like social, physical, and mental challenges. Nutrition is one of the overlooked factors that have a significant part in the health-related quality of life of the geriatric population. Through online education, advanced technology in nutritional science, and healthcare management along with preventive measures, these challenges can be addressed. Continued development in technology is necessary to improve outcomes and ease the aging process and the challenges associated with it.

References

1. Sharkiya SH. Impact of healthcare service quality on older people's satisfaction at geriatric medical centers: a rapid review. *Journal of Public Health in Africa*. 2023 Aug 8;14(8).
2. Khan J, Chattopadhyay A, Shaw S. Assessment of nutritional status using anthropometric index among older adult and elderly population in India. *Scientific Reports*. 2023 Aug 10;13(1):13015.
3. Rony MK, Parvin MR, Wahiduzzaman M, Akter K, Ullah M. Challenges and advancements in the health-related quality of life of older people. *Advances in Public Health*. 2024;2024(1):8839631.
4. Sharma G, Morishetty SK. Common mental and physical health issues with elderly: A narrative review. *ASEAN Journal of Psychiatry*. 2023;23:1-1.
5. Zupo R, Donghia R, Castellana F, Bortone I, De Nucci S, Sila A, Tatoli R, Lampignano L, Sborgia G, Panza F, Lozupone M. Ultra-processed food consumption and nutritional frailty in older age. *GeroScience*. 2023 Aug;45(4):2229-43.
6. Guo J, Huang X, Dou L, Yan M, Shen T, Tang W, Li J. Aging and aging-related diseases: from molecular mechanisms to interventions and treatments. *Signal Transduction and Targeted Therapy*. 2022 Dec 16;7(1):391.
7. Malik C, Khanna S, Jain Y, Jain R. Geriatric population in India: Demography, vulnerabilities, and healthcare challenges. *Journal of family medicine and primary care*. 2021 Jan 1;10(1):72-6.
8. Nazri NS, Vanoh D, Leng SK. Malnutrition, low diet quality and its risk factors among older adults with low socioeconomic status: a scoping review. *Nutrition Research Reviews*. 2021 Jun;34(1):107-16.
9. Soegiarto G, Purnomosari D. Challenges in the Vaccination of the Elderly and Strategies for Improvement. *Pathophysiology*. 2023 Apr 22;30(2):155-73.
10. Debnath S, Dey A, Khanam R, Saha S, Sarkar D, Saha JK, Coumar MV, Patra BC, Biswas T, Ray M, Radhika MS. Historical shifting in grain mineral density of landmark rice and wheat cultivars released over the past 50 years in India. *Scientific Reports*. 2023 Nov 30;13(1):21164.
11. Erenstein O, Poole N, Donovan J. Role of staple cereals in human nutrition: Separating the wheat from the chaff in the infodemics age. *Trends in Food Science & Technology*. 2022 Jan 1;119:508-13.
12. Kumar A, Tripathi MK, Joshi D, Kumar V, editors. *Millet and millet technology*. Singapore: Springer; 2021 Jun 30.
13. Rani R, Pandey C, Kapoor N. Nurturing health through millet derived nutraceuticals. *Food and Humanity*. 2024 Mar 14:100277.
14. Norman K, Haß U, Pirlich M. Malnutrition in older adults—recent advances and remaining challenges. *Nutrients*. 2021 Aug 12;13(8):2764.
15. Visser M, Sealy MJ, Leistra E, Naumann E, De van der Schueren MA, Jager-Wittenaar H. The Malnutrition Awareness Scale for community-dwelling older adults: Development and psychometric properties. *Clinical Nutrition*. 2024 Feb 1;43(2):446-52.
16. Eglseer D. Development and evaluation of a Massive Open Online Course (MOOC) for healthcare professionals on malnutrition in older adults. *Nurse Education Today*. 2023 Apr 1;123:105741.
17. Musayeva O, Nomozboeva M, Khalilova B. FEATURES OF PROVIDING MEDICAL CARE TO ELDERLY AND SENILE CITIZENS. *Евразийский журнал медицинских и естественных наук*. 2023 Feb 23;3(2 Part 2):36-40.
18. Xie Y, Liu Q, Zhang W, Yang F, Zhao K, Dong X, Prakash S, Yuan Y. Advances in the potential application of 3D food printing to enhance elderly nutritional dietary intake. *Foods*. 2023 Apr 28;12(9):1842.
19. Norman K, Herpich C, Müller-Werdan U. Role of phase angle in older adults with focus on the geriatric syndromes sarcopenia and frailty. *Reviews in Endocrine and Metabolic Disorders*. 2023 Jun;24(3):429-37.
20. Sakib SN. Salutogenic Marketing in the Elderly: Leveraging Digital Transformation in Geriatric Dentistry—Creating Positive and Meaningful Experiences for Older Adults. In *Geriatric Dentistry in the Age of Digital Technology 2024*;117-143.
21. Armand TP, Deji-Olorunboba O, Bhattacharjee S, Nfor KA, Kim HC. Optimizing longevity: Integrating Smart Nutrition and Digital Technologies for Personalized Anti-aging Healthcare. In *2024 International Conference on Artificial Intelligence in Information and Communication (ICAIC)*. 2024;243-248.