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Nutritional Requirements for a Healthy and Graceful Aging

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Abstract- Today, People are now living longer around the world as many people can hope to live into their sixties and more. Interestingly, by 2050, the world's population between 60 years and above is expected to total 2 billion, up from 900 million of what it was in 2015. Healthy aging is the way towards creating and keeping up the functional ability that gives sound health as one age. Functionality entails having the capabilities that enable every individual to do what they enjoy doing, and that which provides them joy and pleasure and have reason to value in good health, this incorporates an individual's capacity to: meet their fundamental needs; to learn, grow and to make decisions, to be mobile, to be social, and most importantly, to add to the society. Importantly, in the realization of this, Nutrition is very paramount. Hence, the need for a review of the nutritional requirements that will aid healthy and graceful aging. This review brings together some of the crucial areas of food and nutrition affecting an individual's health as one age. Therefore, this review will help health practitioners, educators and caregivers to provide sound advice and support to people, in the hope of having healthy and graceful aging.

Keywords: *nutrition, healthy, graceful, aging, requirements.*

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Nutritional Requirements for a Healthy and Graceful Aging

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Abstract- Today, People are now living longer around the world as many people can hope to live into their sixties and more. Interestingly, by 2050, the world's population between 60 years and above is expected to total 2 billion, up from 900 million of what it was in 2015. Healthy aging is the way towards creating and keeping up the functional ability that gives sound health as one age. Functionality entails having the capabilities that enable every individual to do what they enjoy doing, and that which provides them joy and pleasure and have reason to value in good health, this incorporates an individual's capacity to: meet their fundamental needs; to learn, grow and to make decisions, to be mobile, to be social, and most importantly, to add to the society. Importantly, in the realization of this, Nutrition is very paramount. Hence, the need for a review of the nutritional requirements that will aid healthy and graceful aging. This review brings together some of the crucial areas of food and nutrition affecting an individual's health as one age. Therefore, this review will help health practitioners, educators and caregivers to provide sound advice and support to people, in the hope of having healthy and graceful aging.

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I. Introduction

The importance of Nutrition as one is age is enormous; this is because nutrition itself is a fundamental and relevant part of the aging process as it helps to provide the energy one needs. Their is an upsurge in the increment of malnutrition in the elderly population, which according to [1], are attributed to various changes in the biological and physiological nature of the body due to old age. Some of these changes include; reduced functional ability, reduction in the way the muscle functions, reduction of the bone mass in the body, the inability of the immune system to function well, anemia and reduction in the cognitive level [1].

Malnutrition or Hunger is characterized as a state in which there is an insufficiency or uneven distribution of the required body nutrients as a result of one not eating food in the right and correct proportion, in turn, causing adverse and unfavorable effects on body shapes and form, and functioning ability of the entire body system [2]. Understandably, there is a high prevalence and a projected increase of malnutrition in the elderly population as a result of biological and physiological changes of the body due to aging process [1]. Statistically, 16% of the people over 65 years of age and 2% of people over 85 years are classed as malnourished [3]. It is crucial to note that these figures are anticipated to rise significantly in the following 30 years. Malnutrition of the elderly population is not only limited to the underdeveloped and developing countries, as a study carried out by [3] revealed that in developed countries, 15% of home and community-bound elderly have malnutrition problems. Also, 23% to 62% of hospitalized patients and up to 85% of nursing home occupants experience the ill effects of hunger.

According to [4], People are now living longer around the world, and most people can hope to live up to sixties and even more. Interestingly, it was projected by WHO [4] that by the year 2050, the world's population between 60 years and above is expected to total 2 billion, a significant increase it will be from 900 million of what it was in 2015. Presently, 125 million people are aged 80 years or above, and, by 2050, 120 million of those will be living in China alone and 434 million people in this age bracket worldwide. Furthermore, by 2050, low and middle-income countries will account for 80% of all the elderly people worldwide [4]. The above statistics and projections by the world health organization indicate that, there would be many elderly people in the world over the coming years. Although, it is a good thing to see and live with our elderly ones for many period of years, importantly, in good and sound health. Hence, this paper did a review on some of the important nutritional needs for a Healthy and Graceful Aging.

II. Method

This is theoretical research and the review centers on the important areas of food and nutrition affecting the aging process. The literature review was gotten from Google, PubMed, and Springer Link data bases. Furthermore, major international and national health sites, to name a few, the World Health Organization, U.S. Department of Health and Human Services and U.S. Department of Agriculture, Ministry of Health. Importantly, these data bases and sites were searched to get the latest and valid information for the topic at discourse. Year of publication was not a major factor in the literature search, but the articles were limited just to those written in English.

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III. Concept of Healthy Ageing

Everyone in each nation, on the planet should have the opportunity to live a long and healthy life. However, the environmental conditions in which we live are very important, as it can either favour health or be harmful to it. Notably, environmental factors are very influential on health as one age; our exposure to health risks in the environment, for instance, pollution and violence, our access to good food and housing, clean water, quality health services and social care, all affect the aging process [4]. The World Health Organization [4] defines healthy aging "as the process of developing and maintaining the functional ability that enables wellbeing in older age." Functional ability entails having the capabilities that enable every individual to be able to do what they enjoy doing, and that which gives them joy and pleasure, and have reason to value in good health, this incorporates an individual's ability to: meet their fundamental needs; to learn, grow, and to make decisions, to be mobile, to be social; and most importantly, to add to the society. Importantly, healthy eating combined with regular physical activity helps improve one's functional ability, thereby making an individual live a full, active life, preserving independence into older age [5]. Notably, for one to have a healthy aging, extraordinary consideration and attention should be given to certain nutrients in the food consumed [6]. Although, the nutritional requirements one needs are generally similar to the general population. However, some nutrients require special attention as one age.

IV. Nutritional Requirements for a Healthy Aging

The wholesome nutritional needs change as one age. Understandably, the changes are due to numerous factors such as physiological, psychological, social, monetary, and the environment where one lives, which influences an individual's ability to plan and prepare healthy food, which the body needs. Invariably, lack of this healthy food affects the body nutritional constituents and needs [7]. Although, there are many nutrients in diet composition, the most important ones an individual needs for healthy aging are discussed.

a) Protein

Proteins are of significant importance in dietary composition because it helps to build and repair worn out tissues, helps in hormone production, aids the immune system response to infections and it is needed for other body functions. Insufficient protein consumption predisposes an individual to increased skin fragility, decreased immune function, poorer healing, and longer recuperation from illness [8]. In light of this, the protein needs for individuals of more than 70 years of age are 25 percent higher than that of adolescents, and younger adults [7]; this is because muscles mass in the body decreases as one age. Nevertheless, the formation of muscle protein in the body can still be stimulated by higher consumption of protein. Thus, it is essential and advised that adequate protein consumption is consumed throughout one's life course [8]. The primary sources of protein are milk, beef and veal, fish/seafood, pork, poultry, beans, peas, eggs, nuts, seeds, and soy products [9]. The suggested requirement of protein consumption is 0.8 g protein/kg body weight every day for all adults regardless of age [10], as this is the base measure of protein consumption required to prevent progressive loss of body mass and to avoid slender weight. Furthermore, protein consumption of more than the recommended 0.8 g protein/kg body weight enhances muscle mass in the body, the strength, and function in elderly people [11], additionally; this intake also enhances the immune system, fast wound and injury healing, and blood pressure [11]. The fears that higher consumption of protein has deleterious health effects on bone, renal function, neurological function and cardiovascular function are untrue, it is advised that, the consumption of 1.5 g protein/kg body weight every day is a sensible proportion for elderly people to balance protein intake in terms of health and function [12].

b) Carbohydrates

The essential function of carbohydrate is to give energy to cells in the body. Among all the classes of food, Carbohydrates gives the biggest single sources of energy in the eating routine, which is usually in glucose form. Importantly, carbohydrate helps to balance the blood glucose levels, and also helps in gastrointestinal health and functioning [7]. Furthermore, carbohydrate is additionally important to prevent ketoacidosis, which is a serious type of ketosis, usually seen in diabetic elderly patients; in which so much ketone is produced in the body that acidosis occurs. Based on the effects on risk of heart disease and obesity in healthy middle-aged adults, [13], the Institute of Medicine recommends that American and Canadian adults get between 45–65% of dietary energy from whole-grain carbohydrates [14]. The Food and Agriculture Organization and World Health Organization jointly recommend that national dietary guidelines set a goal of 55– 75% of total energy from carbohydrates, but only 10% directly from sugars [15]. The essential dietary sources of carbohydrates are bread, vegetables, potatoes, fruits, wheat, rye items, rice, legumes, wheat, oatmeal, popcorn, brown rice and seeds [9]. In addition, Whole grain is a viable source of carbohydrate, in support of this; a 2017 Cochrane Systematic Review study by [16] concluded that there was insufficient evidence to support the claim that whole grain diets can affect cardiovascular disease.

c) Fats / Oil

Fats help in the absorption of vitamins A, D, E, and K, and are the most concentrated type of energy for

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the body. Additionally, Fat also gives energy, helps with satiety and improves tastefulness in adults. Some unsaturated fats are important in the eating routine and furthermore influence the development of chronic disease in the body. Essentially, the type of fat consumed matters, as some aids the creation of some chronic disease conditions, notably cardiovascular disease in the body [7]. Unsaturated fats incorporate monounsaturated and polyunsaturated fats; they lower blood cholesterol levels and low-density lipoprotein (LDL) cholesterol [17]. Furthermore, polyunsaturated fats, which are mostly linoleic acid, help to reduce the frequency of, and mortality from coronary diseases [7]. Basic polyunsaturated fats are required in the daily eating routine because the body cannot produce them, as they are essential for the structural integrity of all cell membranes in the body; in addition, they are the precursors to the biologically active eicosanoids that have roles in physiological processes, for example, reproduction, blood pressure, hemostasis and inflammation [18]. Notable sources of important fat the body needs are olive oil, nuts, seafood, vegetable oil, coconut oil, soybean oil, palm, palm kernel oil, coconut oil, canola, corn, olive, sunflower and peanut oil [9].

d) Calcium

Calcium is one of the major essential nutrients required in the body for the development and maintenance of the skeleton. Also, calcium is required for the normal functioning of neuromuscular and cardiovascular function in the body. Notably, Calcium is usually found and abundant in bonny parts of the body and teeth, where it provides them with structure and strength. Although, there could be a deficient of calcium in the body as the low level of calcium have been related to a low bone density which is also called Osteoporosis. Osteoporosis is a disease, usually common in women following menopause, in which the bones become extremely porous and weak and are subject to fracture or breakage. For example, in New Zealand, Osteoporosis is a major cause of morbidity among older New Zealanders, especially post-menopausal ladies [7]. Importantly, calcium consumption throughout one's life is a main determinate influencing the occurrence of osteoporosis and other related calcium deficiency diseases. However, different factors, prominently of which are vitamin D status in the body and exercise, additionally influence the rate of Osteoporosis [7]. The calcium level in the body is different among people since individual's have different amounts of bone tissue measures as the skeleton develop and grows [19], but one begins to have considerable bone loss at 50 years old in ladies and 65 years old in men [20]. Furthermore, from about these ages, age-related loss of bone has been assessed at 0.5 to 1.0 percent every year [7]. The loss of calcium in ladies is related with menopause and a decrease in intestinal calcium retention as well as an increase in calcium excretion through urination [7]. Importantly, regular physical activity enhances the retention of calcium in the bone at all ages [19]. The important sources of calcium in the diet includes grain, bread, dairy items, cheddar, vegetables, soy milk, and canned fish with bones, nuts, vegetables, dried fruits, legumes, tofu and so on [19].

e) Vitamins D

Vitamin D is a fat-solvent vitamin which also serves as hormones in the body. It balances calcium and phosphate in the body and also regulates bone health and muscle function. According to [21], Vitamin D with or without calcium also helps in the prevention of falls. Notably, the lack of vitamin D in the body results in insufficient mineralization and demineralization of the skeleton and other bone structures. Furthermore, in grown-ups, insufficiency of vitamin D can trigger an increased bone turnover and osteoporosis and osteomalacia; a medical condition which is a porous bone, resulting in bone and muscle pains, and weakness. Also, older individuals are especially in danger of vitamin D insufficiency due to lack of exposure to sunlight since they have restricted mobility, are house-bound, or live in a care homes. Also, those with dark skin or who dependably covers their skin and additionally wear a shroud are likewise going to suffer from vitamin D deficiency [21]. To augment the level of vitamin D in the body, a walk in hours around twelve, with the face, arms, and hands uncovered, is suggested [21] as bodily required needs of vitamin D is difficult to get through food alone [7]. In situations and circumstances where walking in the sun is not possible due to other challenges or health diseases, for instance, skin cancer, then Vitamin D supplementation should be recommended by a medical doctor. Vitamin D can be gotten in little amounts in a couple of diet, for example, greasy fish, Ocean salmon, herring and mackerel, liver, eggs, and fortified foods, for example, margarine; some low-fat dairy items like grain and yogurt contain a minute quantity of vitamin D [7].

f) Iodine

Iodine is a fundamental part of the thyroid hormones called thyroxine (T4) and 3, 5, 3'-triiodothyronine (T3). These hormones are required for the development and growth of tissues in the body, most importantly, the central nervous system (CNS). Also, they have a more extensive part in the maturation of the overall body cells. Furthermore, they are imperative for the synthesis of energy in the body and oxygen consumption in cells, in this manner regulating the body's metabolic rate [7]. Iodine insufficiency is a pathway to an extensive variety of health problems medically known as 'iodine deficiency disorders' (IDD) [22]. Universally, IDD is a typical medical issue. As indicated by the WHO, in 2007, almost 2 billion people had suffered from iodine insufficiency [23]. The nature

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and seriousness of IDD can differ broadly, and depends on the severity and length of the iodine deficiency and the age range of the people affected [24]. Also, lack of Iodine in the body may result in goiter; which is an enlargement of the front sides of the neck caused by inflammation of the thyroid gland. Also, the complication of goiter causes hypothyroidism, impaired mental function and iodine-induced hyperthyroidism [25]. Seafood's like seaweed and kelp are rich sources of iodine. Furthermore, Iodine is found in milk, so milk and milk products are viable sources. Also, iodine is gotten from eggs, some meat and grains, and bread; when sweetened with iodized salt [9].

g) Folate

Folate' is a collective name for more than 100 compounds that have the same vitamin activity. Importantly, folate is a nutrient needed for aging because it helps in DNA formation, and without folate, the partition of living cells cannot occur in the body [7]. Deficient of folate and vitamin B12 can both cause an abnormally large red blood cell in the body, medically known as megaloblastic anemia. Insufficiency of Secondary folate in the body may result from impaired absorption due to infection of the small digestive system such as coeliac disease and Crohn's disease, as well as chronic alcohol consumption [26]. Furthermore, smokers are likewise in danger for folate insufficiency because smoking of cigarette may deter smokers from eating high quantity of folate-containing foods, such as vegetables and fruit [27]. Folate is abundant in green leafy vegetables, legumes, liver, fruit, fruit juices, nuts, and seeds. However, heat and steam when cooking can destroy the folate constituents in food; it is advised that uncooked vegetables and fruits are preferable sources of folate over cooked ones and should be eaten in raw form.

h) Zinc

Zinc is a part of different enzymes that maintain the structural integrity of proteins and regulates gene expression in the body. Zinc is an essential element needed in the body, as of lack of zinc in the body causes impaired immune responses, thereby, rendering the immune system susceptible to diseases and infection. Furthermore, zinc helps to prevent the age-related decline in immune system function [28, 29, 30]. Zinc nutrient is gotten from meat, fish and poultry products. Also, Oats, milk and milk items are other great sources of zinc in food. Also, peanuts, almonds, cashew nuts, and sesame seeds are high in zinc [31]. Preferably, dark red meat has higher zinc content than white meat and fish [19].

i) Vitamin B12

Vitamin B12 is needed in the body for the production of fatty acids in myelin, and also with folate, for DNA formation. Consumption of vitamin B12 is fundamental for the normal blood and neurological functions in the body and blood capacity. Although, there is a significant amount of vitamin B12 stored in the body, nevertheless, there is still the need for secretions of gastric acid and pepsin from the stomach for the absorption of vitamin B12 to take place. As one age, these secretions are reduced and sadly, in older people with atrophy of the stomach mucosa, or atrophic gastritis, these secretions are diminished, hence reducing the bioavailability of vitamin B12 [32]. The Inadequacy of Vitamin B12 in the body causes two major side effects; namely hematological and neurological. The hematological effects are megaloblastic anemia which could results in skin whiteness, lowered energy and exercise tolerance, fatigue, shortness of breath and palpitations. Neurological side effects include; sensory disturbances in the extremities, motor disturbance, and cognitive changes ranging from memory loss to dementia [7]. There may also be visual disturbances, impotence, and impaired bowel and bladder control [19]. Virtually, all dietary sources of vitamin B12 originate from animal foods, and they include; milk, hamburger and veal, fish and eggs. Plants based sources of vitamin B12 are algae and plants exposed to bacterial action or contaminated by insects [7]. As the bioavailability of vitamin B12 is reduced in older individuals with atrophic gastritis, they may require vitamin B12 supplements or intramuscular infusions. Also, people who do not eat meat or animal products (vegans) will require vitamin B12 supplementation [7].

j) Sodium

Sodium is an essential part of the extracellular fluid in the body and is imperative for the transportation of molecules across cell membranes. Furthermore, sodium is likewise a key factor in the retention of fluids in the body. Albeit, sodium is a basic nutrient needed in the body. Unfortunately, its consumption in developed countries enormously surpasses the requirements needed daily. Notably, there is substantial evidence of a relationship between dietary salt intake and high blood pressure which is a major risk factor for cardiovascular disease, most importantly stroke and coronary heart disease, and renal diseases inclusive [7]. Furthermore, high Sodium consumption antagonistically affects calcium balance in the body through the promotion of urinary calcium loss, which is a major implication for bone breakage or fracture (Osteoporosis) [32]. In developed and western nations, up to 60– 85 percent of the salt intake is found in processed foods [33, 34, 35].

k) Supplements

Dietary supplements are products taken to make up for a dietary deficiency. Supplements could be recommended by a doctor or self-chosen, and are usually in diverse forms and shape, for example, tablets, capsules, powders, and liquids. Additionally, a single

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nutrient supplement is consumed alone or multiple nutrient supplements, and examples of supplements include vitamins, minerals, herbals and herbal preparations, oils, for example, fish oil and products that give glucosamine as well as chondroitin. If one eats well, supplementation is rarely needed in the body, it should be noted that intake of dietary supplement may be of concern as one age and most importantly, among older people. The likely reasons to that include adverse health effects related to the continued use of large quantity of specific vitamins and minerals in excess of the body requirements, for example vitamin A and iron; interactions among minerals and trace elements when one supplemental nutrient intake exceeds the body needs, for example, excess intake of zinc reduces copper status in the body; the risk of supplements interfering with prescribed medicines; over-reliance on dietary supplements instead of healthy diet [36, 37, 38, 39]. Importantly, Supplementation of any type should not be prescribed except under strict medical supervision because of the adverse outcomes which come along with it, for example, beta-carotene and cancer risk. Furthermore, individual requirements should come first in prescribing any supplementation [7]. Additionally, health specialists and practitioners need to know about the dangers and advantages related to supplements use in older individuals, the most appropriate types and doses required for this group.

I) Water

Water is characterized as an important nutrient in the body because it is required in the quantity that surpasses the body's capacity to deliver it. Interestingly, every single biochemical reaction in the body happens in water. Furthermore, water fills the spaces in and between cells and helps forms the structures of large molecules, for example, proteins and glycogen in the body. Water is needed for other functions in the body such as digestion, transportation, absorption, nutrients dissolving, waste product elimination and thermoregulation [7]. As one age, the more the level of water required in the body. Although, older people might be at more danger of lack of hydration than younger adults because the thirst system reduces with age, medications frequently used by older populations, for example, diuretics and laxatives can cause loss of liquids, and deterioration of the renal functioning with age. Cognitive changes can cause insufficient water consumption as elderly people may be more sensitive to heat stress, and subsequent water depletion leading to heat exhaustion, loss of consciousness and heat stroke [40]. Liquid intake can likewise influence the level and quantity of saliva produced in the mouth, which is fundamental for oral health. Diminished body water is related to salivary dysfunction; this is usually common among older people [7]. Sources of water-riched foods that help the body stay hydrated includes; watermelon, strawberries, cantaloupe, peaches, oranges, skim milk, cucumber, lettuce, broth and soup, zucchini, celery, plain your gut, tomatoes, bell pepper, cauliflower, cabbage, grapefruit, coconut water, cottage cheese [41].

V. Conclusions

The importance of Nutrition cannot be underestimated as it was reviewed heavily in this paper; this is because nutrition is an important component of health as it influences the aging process. Notably, healthy aging is the process of developing and maintaining the functional ability that enables wellbeing in older age [4], to making sure an individual enjoy sound health during old age, eating of food with the required nutrients, coupled with physical activity is essential.

Conflict of Interest

The authors' declares no conflict of interest.

References Références Referencias

1. Drey, M., & Kaiser, M. J. (2011). Malnutrition in the elderly. Dtsch Med Wochenschr.136 (5), 176-8.
2. Rebecca, J. S, Ceri, J. G., &Marinos, E. (2004). Disease-Related Malnutrition: An Evidence-Based Approach to Treatment. The American Journal of Clinical Nutrition, Volume 79, Issue 6, 1 June 2004, Pages 1128– 1129.
3. Morely, J. E. (1997). Anorexia of aging: physiological and pathological. Am J Clin Nutr. 66, 760– 773.
4. World Health Organization.(2018). Ageing and health. http://www.who.int/en/news-room/factsheets /detail/ageing-and-health. Retrieved 9 Septe- mber, 2018.
5. Irish Nutrition and Dietics. (2016). Good Nutrition for the older person. https://www.indi.ie/fact-sheets-on-nutrition-for-the-older-person.html.RetrievedSeptem-ber 13, 2018.
6. Sheena, R. (2018). Nutritional needs of older people. https://www.inmo.ie/Article/PrintArticle/1527. Retrieved 9 September, 2018.
7. Ministry of Health. (2013). Food and Nutrition Guidelines for Healthy Older People: A background paper. Wellington: Ministry of Health. PDF. https://www.health.govt.nz/publication/food-and-nutrition-guidelines-healthy-older-people-back ground-paper. Retrieved 18 November, 2018.
8. Nowson, C., & O'Connell, S. (2015). Protein Requirements and Recommendations for Older People: A Review. Nutrients. 7(8), 6874-99.
9. U. S. Department of Health and Human Services and U. S. Department of Agriculture. (2015). 2015–2020 Dietary Guidelines for Americans.8th Edition. December 2015. PDF. Available at http:// health.gov/dietaryguidelines/2015/guidelines

© 2019 Global Journals

10. Institute of Medicine. (2018). Dietary reference intakes for energy, carbohydrates, fibre, fat fatty acids, cholesterol, protein and amino acids. Washington D C: National Academy Press. https://www.nap.edu/catalog/10490/dietary-reference-intakes-for-energy-carbohydrate-fiber-fat-fatty-acids-cholesterol-protein-and-amino-acids. Retrieved 18 November, 2018.
11. Traylor, D. A., Gorissen, S.H. M., & Phillips, S. M. (2018). Perspective: Protein Requirements and Optimal Intakes in Aging: Are We Ready to Recommend More Than the Recommended Daily Allowance? Adv Nutr. 9(3), 171-182.
12. Courtney-Martin, G., Ball, R. O., Pencharz, P. B., & Elango, R. (2016). Protein Requirements during Aging. Nutrients. 8(8), 492.
13. Tighe, P., Duthie, G., Vaughan, N., Brittenden, J., Simpson, W. G., Duthie, S., Mutch, W., Wahle, K., Horgan, G., & Thies, F. (2010). "Effect of increased consumption of whole- grain foods on blood pressure and other cardiovascular risk markers in healthy middle-aged persons: a randomized controlled trial". The American Journal of Clinical Nutrition.92 (4), 733–40.
14. Food and Nutrition Board. (2005). Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein and Amino Acids. Washington, D. C.: The National Academies Press. Page 769. ISBN 0-309-08537-3.
15. World Health Organization and Food Agricultural Organization. (2003). Joint WHO/FAO expert consultation (2003). (PDF). Geneva: World Health Organization. pp. 55–56. ISBN 92-4-120916-X.
16. Kelly, S. A., Hartley, L., Loveman, E., Colquitt, J. L., Jones, H. M., Al-Khudairy, L., Clar, C., Germanò, R., Lunn, H. R., Frost, G., & Rees, K. (2017). "Whole grain cereals for the primary or secondary prevention of cardiovascular disease" (PDF). The Cochrane Database of Systematic Reviews. 8: CD005051. doi:10.1002/14651858.CD005051. pub3. PMID 28836672.
17. National Heart Foundation. (1999). Nutrition and Cardiovascular Disease: An evidence summary. Report No. 77 from the National Heart Foundation's Technical Advisory Committee. Auckland: National Heart Foundation. PDF. https://www.google.com/search?q=National+Heart+Foundation.+1999.+Nutrition+and+Cardiovascular+Disease%3A+An+evidence+summary.+Report+No.+77+from+the+National+Heart+Foundation%E2%80%99s+Technical+Advisory+Committee.+Auckland%3A+National+Heart+Foundation+&client=ms-opera-mini-android&channel=new. Retrieved 18 November, 2018.
18. Mann, J., & Truswell, A. S. (2012). Essentials of human nutrition (Fourth edition).Oxford University Press, Oxford; New York. https://trove.nla.gov.au/work/7980880?q&sort=holdings+desc&_=1542550119636&versionId=177363353+209128742. Retrieved 18 November, 2018.
19. Mann, J., & Truswell, A. S., & Ovid Technologies Inc. (2007). Essentials of human nutrition (3rd ed). Oxford University Press, Oxford. https://trove.nla.gov.au/work/7980880?q&sort=holdings+desc&_=1542550925701&versionId=45741784+220283172+254479311. Retrieved 18 November, 2018.
20. World Health Organization.(2003). Prevention and Management of Osteoporosis.Report of a WHO Scientific Group. Geneva: World Health Organization. PDF. http://apps.who.int/iris/handle/10665/42841. Retrieved 18 November, 2018.
21. Cameron, I. D., Dyer, S. M., Panagoda, C. E., Murray, G. R., Hill, K. D., Cumming, R. G., & Krese, N. (2018). Interventions for preventing falls in older people in nursing care facilities and hospitals. Cochrane Database of Systematic Reviews (1). https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD005465.pub4/full. Retrieved 18 November, 2018.
22. Hetzel, B. S. (2000). Iodine and neuropsychological development. The Journal of Nutrition. 130(2), 493S–495S.
23. De Beniost, B., Mclean, E., Anderson, M., & Rogers, L. (2008). Iodine deficiency in 2007: global progress since 2003. Food Nutr Bull. 29(3), 195-202.
24. Eastman, C. J., & Zimmermann, M. B. (2018).The Iodine Deficiency Disorders. In: De Groot L J, Chrousos G, Dungan K, et al., editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc. Available from: https://www.ncbi.nlm.nih.gov/books/NBK285556/
25. International Council for Control of Iodine Deficiency Disorder, United Nations Internaltional Children Emergency Fund and World Health Organization. (2008). Assessment of Iodine Deficiency Disorders and Monitoring their Elimination (3rd ed). http://www.who.int/nutrition/publications/micronutrients/iodine_deficiency/9789241595827/en/. Retrieved November 18, 2018.
26. Kao, T. T., Chu, C. Y., Lee, G. H., Hsiao, T. H., Cheng, N. W., Chang, N. S., Chen, B. H., & Fu, T. F. (2014). Folate deficiency-induced oxidative stress contributes to neuropathy in young and aged zebrafish--implication in neural tube defects and Alzheimer's diseases. Neurobiol Dis. 71, 234-244.
27. Shekoohi, N., Javanbakht, M. H., Sohrabi, M., Zarei, M., Mohammadi, H., & Djalali, M. (2017). Smoking Discriminately Changes the Serum Active and Non-Active Forms of Vitamin B12. Acta Med Iran. 55(6), 389-394.
28. Wessels, I., Maywald, M., & Rink, L. (2017). Zinc as a Gatekeeper of ImmuneFunction. Nutrients. 9(12). pii: E1286. doi:10.3390/nu9121286.
29. Vaz, F.N.C., Fermino, B .L., Haskel, M.V.L., Wouk, J., de Freitas, G.B.L., Fabbri, R., Montagna, E., Rocha,

© 2019 Global Journals

J.B.T., & Bonini, J. S. (2018). The Relationship between Copper, Iron, and Selenium Levels and Alzheimer Disease. Biol Trace Elem Res. 181(2), 185-191.
30. MacDonell, S. O., Miller, J. C., Harper, M. J., Reid, M. R., Haszard, J. J., Gibson, R. S., & Houghton, L. A. (2018). A comparison of methods for adjusting biomarkers of iron, zinc, and selenium status for the effect of inflammation in an older population: a case for interleukin 6. Am J Clin Nutr. (6), 932-940.
31. Sivakumaran S., Huffman L., Sivakumaran, S. (2015). The Concise New Zealand Food Composition Tables, 11th edition. The New Zealand Institute for Plant & Food Research Limited and Ministry of Health. https://www.health.govt.nz/publication/concise-new-zealand-food-composition-tables-11th-edition. Retrieved 18 November, 2018.
32. World Health Organization. (2002). Keep Fit for Life: Meeting the nutritional needs of older persons. Geneva: World Health Organization. PDF. http://apps.who.int/iris/handle/10665/42515. Retrieved 18 November, 2018.
33. Ning, S. X., Mainvil, L. A., Thomson, R. K., & McLean, R. M. (2017). Dietary sodium reduction in New Zealand: influence of the Tick label. Asia Pac J Clin Nutr. 26 (6), 1133-1138.
34. Emma, M., Jacqui, W., & Julie, B. (2017). Effect of 25% Sodium Reduction on Sales of a Top-Selling Bread in Remote Indigenous Australian Community Stores: A Controlled Intervention Trial. Nutrients. 9(3), 214.
35. Rachael, M. M., Jim, I. M., & Janet, H. (2011). World Salt Awareness Week: more action needed in New Zealand. https://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2011/vol-124-no-1332/view-mclean. Retrieved 18 November, 2018.
36. Dickinson, A., & MacKay, D. (2014). Health habits and other characteristics of dietary supplement users: a review. Nutrition journal, 13, 14. doi: 10.1186/1475-2891-13-14.
37. Marra, M. V., & Boyar, A. P. (2009). Position of the American Dietetic Association: nutrient supplementation. J Am Diet Assoc. 109(12), 2073-85.
38. O'Brien, S. K.; Malacova, E.; Sherriff, J. L.; & Black, L. J. (2017).The Prevalence and Predictors of Dietary Supplement Use in the Australian Population. Nutrients. 9 (9), 1154.
39. Sebastian, R. S., Cleveland, L. E., Goldman, J. D., Moshfegh, A. J. (2007). Older adults who use vitamin/mineral supplements differ from non-users in nutrient intake adequacy and dietary attitudes. Journal of the American Dietetic Association. 107(8), 1322–1332.
40. Bryant, H. (2007). Dehydration in older people: assessment and management. Emerg Nurse. 15(4), 22-6.
41. Brianna, E. (2017). 19 Water-Rich Foods That Help You Stay Hydrated. https://www.healthline.com/nutrition/19-hydrating-foods. Retrieved November 22, 2018.

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