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EXPLORING THE RELATIONSHIP BETWEEN NUTRITION AND COGNITIVE FUNCTION IN OLDER ADULTS

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Abstract
The purpose of this study was to ascertain if sleep quality could mediate the association between older adults with chronic illnesses' nutritional condition and cognitive function. Between January and December 2022, 248 elderly patients with chronic illnesses who were admitted to a district tertiary hospital in Shenzhen, China, participated in a cross-sectional study. This study found that in older persons with chronic conditions, sleep quality somewhat controlled the connection between cognitive function and nutritional status. proving once more how important it is to have adequate restful sleep-in order to maintain brain function as we age. Monitoring and enhancing sleep quality and nutritional status can help reduce the rate of cognitive deterioration.
Keywords:sociodemographic, compromised nutritional status, cognitive performance

1. INTRODUCTION

The ability of elderly persons to carry out daily tasks and interact with others may be threatened by moderate cognitive decline, which can develop into mild cognitive impairment or perhaps dementia if left untreated. It has been acknowledged that cognitive impairment is a significant barrier to healthy aging, a significant public health issue, and a significant financial strain on families and healthcare systems [1]. Nearly 75% of Chinese adults aged 60 and over suffer from at least one chronic ailment, according to monitoring data. Cognitive impairment is estimated to affect up to 35.02 percent of older adults with chronic conditions.

The complex relationship between dietary status and cognitive performance has drawn a lot of attention from professionals and scholars in recent decades [2]. A balance between dietary needs and intake leads to nutritional health, which is complex and influenced by social, psychological, and physiological factors. In older persons with chronic conditions, malnutrition is a serious nutritional health problem that frequently coexists with poor physical and mental health and has several negative clinical outcomes [11]. It is well recognized that dietary deficiencies in the elderly might impact cognitive function, especially as malnourished people are more prone to cognitive impairment. Cohort studies, for instance, showed that a 50% increased risk of dementia was linked to every point increase in the nutritional status index, which takes into account factors like homocysteine, vitamin D, and n-3 PUFAs. This implies that enhancing dietary status could be a feasible strategy to postpone cognitive aging. Investigating beneficial elements that can lessen the negative effects of hunger on cognitive function is therefore essential.

A restful night's sleep promotes the preservation of synaptic plasticity, eases waste removal in the brain, and guarantees the nervous system operates normally. Notably, sleep disruption can raise the need for more frequent doctor's appointments and the chance that age-related chronic illnesses will worsen [3]. Prior research has shown that sleep disturbances link to higher death rates and hasten the onset of dementia and age-related cognitive decline. discovered a link between a higher risk of dementia later on and sleep-maintenance insomnia and the use of sleep aids before cognitive changes. In the meanwhile, studies have shown a clear correlation between poor nutritional health and irregular sleep. Poor subjective sleep quality, insomnia, daytime dysfunction, and irregular sleep-wake cycles are more common in people with impaired nutritional status. Therefore, further research into the possible connections between them is still necessary.

2. REVIEW OF LITERATURE

Factor analysis (FA) is the most widely utilized data-driven technique for investigating food habits. The nutritional intake of a particular community is reflected by this approach, which is not constrained by theory [4]. For instance, following a "plant" pattern may be protective for cognitive function, whereas following a "grain" pattern may be risky. People in southwest Guangxi drink oil tea every day, with Gongcheng oil tea being the most well-known type. Gongcheng County is known as the "hometown of longevity" in China [6]. According to Chinese medicine, oil tea is a compound preparation of traditional Chinese medicine that can help with bowel loosening and cold treatment, spleen strengthening and food elimination, diarrhea symptoms, and diarrhea prevention [16]. Polyphenols found in tea and ginger have been demonstrated to have neuroprotective properties. We discovered that the older population's food habits are comparatively steady and less impacted by outside factors. Studies on the connection between oil tea drinkers' food habits and cognitive function are, nevertheless, scarce [12].

Given the research, we postulated that in older persons with chronic illnesses, a number of aspects of sleep quality would govern the connection between cognitive performance and nutritional health [5]. In addition to the non-modifiable risk factors that are crucial for the development of dementia, like age and genetic profile, there is mounting evidence that modifiable risk factors can either raise or lower the chance of developing dementia later in life. There is mounting evidence that eating can prevent cognitive decline in elderly adults. Despite the limited data, a Mediterranean diet, increased cognitive activity, and vegetable intake may reduce the prevalence of dementia [13]. According to some study, situations including an early death of a parent and persistent sleep problems in middle age may raise the chance of dementia.

3. MATERIALS AND METHODS

Cognitive health may be impacted by a wide range of events, including diseases, trauma, mental disorders, substance addiction, and aging-related changes in the brain. There is evidence that numerous lifestyle factors, including food, physical exercise, social and cognitive engagement, and alcohol and tobacco use, may be able to maintain or enhance deteriorating cognitive performance, even though some cannot be changed [7]. Dietary study has primarily focused on how nutrition affects early brain development. Understanding how food and nutrition affect age-related cognitive decline is becoming increasingly important because it will allow for the development of novel strategies for treating, preventing, or curing age-related illnesses and preserving older people's quality of life [8].While low-fat diets are protective against cognitive decline, research on the effects of high-protein diets is mixed. A range of micronutrients, including iron, B group vitamins, and many polyphenols, are necessary to maintain cognitive function. Diets including the Mediterranean, Nordic, DASH, and MIND are associated with a decreased risk of dementia and cognitive decline[17].

Numerous factors, such as illnesses, trauma, mood disorders, substance abuse, and aging-related changes in the brain, can affect brain health. There is proof that a number of lifestyle factors, including food and exercise, social interaction, cognitive activity, and alcohol and tobacco use, can stabilize or enhance deteriorating cognitive function, even though some cannot be altered[9]. Symptoms of dementia or cognitive impairment may only appear when the threshold or load of illness is greater. For older people to retain a high quality of life and manage, prevent, or treat age-related illnesses, it is essential to comprehend how different lifestyle factors, such as diet, exercise, and nutrition, affect age-related cognitive decline [14].

Furthermore, the growth and maturation paths of various brain structures vary. The development of the brain depends on genetic predisposition. Early experiences have a significant impact on brain function, resulting in individual variances that may raise the risk of chronic diseases throughout one's lifespan and cause behavioural dysfunction.Early brain development is significantly influenced by nutrition, frequently more so than by the child's surroundings [10]. In addition to widespread undernutrition in macronutrients, deficiencies in certain nutrients can have a major impact on neurodevelopment and have long-term effects. Rapid brain development and growth also occur throughout infancy, primarily due to the baby's nutrition. Breastfeeding is linked to improved IQ scores in children and adolescents across all income levels.It is said that breastfeeding improves cognitive function into adulthood. The effects of general malnutrition in the first few months of life and in the early stages of development are lifelong and lead to learning issues (e.g., diminished academic success and difficulty with self-regulation). Because synapses are rapidly created in early and middle infancy and subsequently selectively destroyed during puberty, a consistent supply of nutrients is required[15]. Through adolescence, the brain continues to develop, especially in areas linked to higher cognitive ability.

4. RESULT AND DISCUSSION

A high-fat diet has been linked to negative cognitive outcomes in a number of adult and older adult studies. Conversely, increasing MUFA intake was associated with better trajectories.

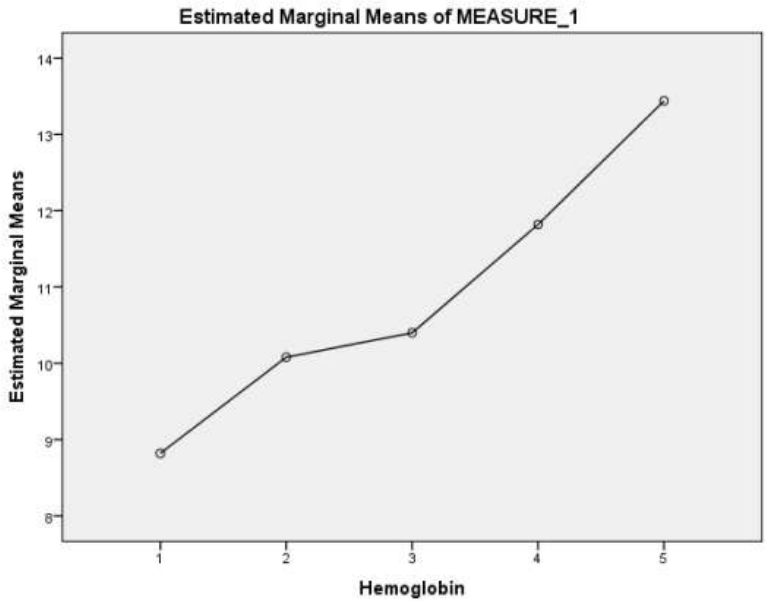

Figure 1: Mean Hb values

Because even a minor immunological insult causes the hippocampus to undergo a neuro-inflammatory reaction, a high-fat diet damages memory. A high-fat diet increases the risk of diabetes, obesity, cognitive impairment, and even Alzheimer's disease (AD). Insulin resistance, impaired glucose metabolism, and type 2 diabetes mellitus are well-known risk factors for AD. Although there is conflicting data about the effects of high-protein diets, low-fat diets are protective against cognitive impairment.

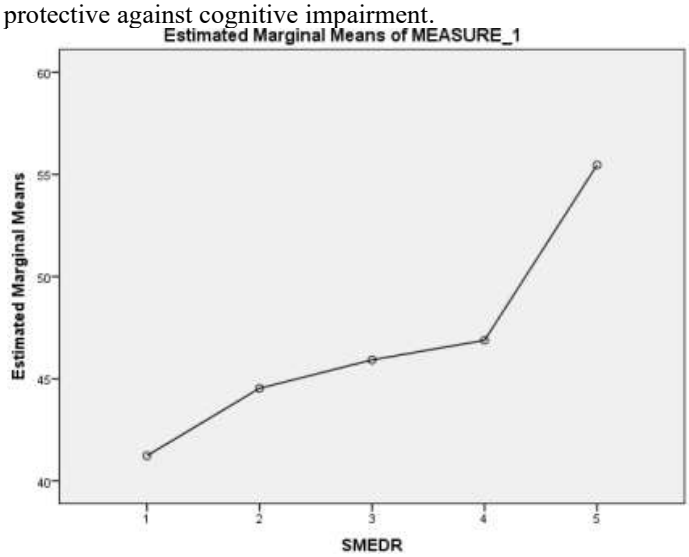

Figure 2: Sensory Median Nerve Conduction Measure

Two omega-3 fatty acids, docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), also alter neurotransmission, lessen neuro-inflammation, and encourage neuronal survival and neurogenesis. These brain regions control impulsivity, inhibition, and attention. A Chinese retrospective study found that a low energy intake from carbohydrates and a high energy intake from fat and protein are associated with cognitive deterioration in later life. Low consumption of omega-3 PUFAs in the diet might potentially cause memory loss.

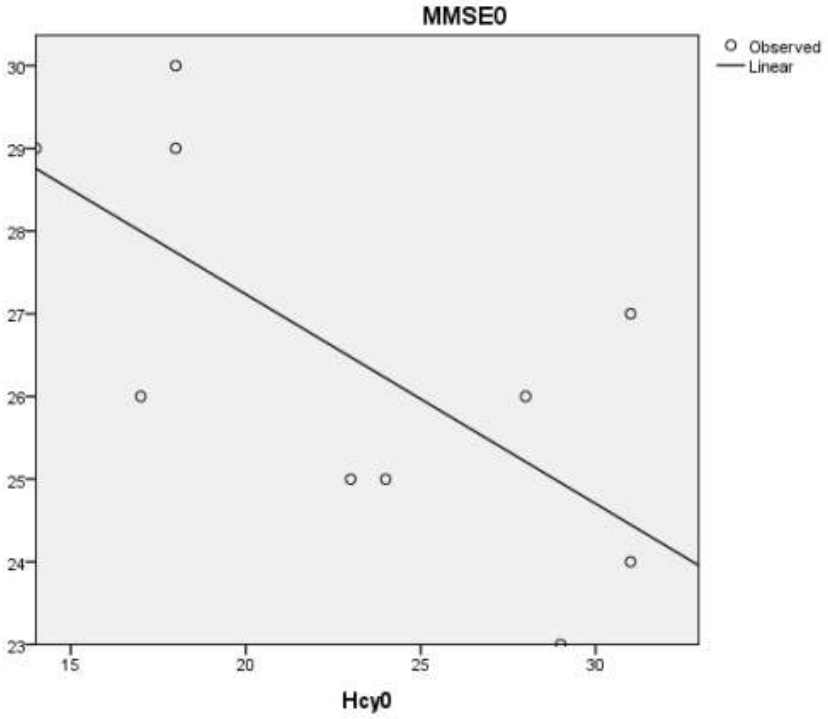

Figure 3: Correlation of Homocysteine and Mini Mental State Examination

Micronutrients aid in the body's production of hormones, enzymes, and other substances required for healthy growth and development. Iron, iodine, and vitamin A deficiencies are the biggest public health issues because they have a major effect on people's health worldwide, especially for young children and expectant mothers in low-income nations. The majority of research has been on their part in later-life cognitive deterioration.

5. CONCLUSION

6.

Cognitive function depends on several micronutrients, including iron and B group vitamins. Diets that are low in fat and high in protein can help stop cognitive decline. The connection between dietary and lifestyle choices and cognitive development, function, and decline has drawn more attention in recent years. Examining the impact of the sociocultural and epidemiological shift on cognitive health is crucial, though. Furthermore, the estimated parameters are based on observational research, and the results could be skewed by unknown confounders. The way lifestyle factors are described or categorized in this research is frequently inconsistent and vague, and occasionally the cognitive outcomes that are examined are as well.To gain a deeper understanding of the lifestyle factors influencing cognition, longer-term longitudinal studies or cohorts are required. Even though old age is currently the subject of a large number of studies, adulthood is often neglected.

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