

Findings from the HELIAD Study on the Longitudinal Association of Lifestyle with Cognitive Health and Dementia Risk

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Abstract

The current study's objective was to determine whether, in a representative cohort of older people, a Total Lifestyle Index (TLI), which includes adherence to the Mediterranean diet, sleep duration, physical activity, and participation in activities of daily living, is associated with long-term cognitive health and dementia risk. The HELIAD study comprised 1018 community-dwelling older individuals 65 years old who were not demented, 60% of whom were women. A dementia diagnosis was made following a thorough neurological and neuropsychological evaluation of cognitive functioning at baseline and three years later. At the outset, conventional, validated questionnaires were used to measure diet, exercise, sleep duration, and participation in daily activities. At the follow-up, 61 people had dementia; these individuals were older and had fewer years of education than those with normal cognition. Participants with normal cognition at follow-up scored higher in each of the individual lifestyle characteristics than those who developed dementia, except for sleep duration. Participants with dementia had lower TLI ratings than participants with normal cognition. The Global Cognition score decreased by 0.5% of a standard deviation less annually for each extra unit of the TLI, but the risk of dementia decreased by 0.2% annually for each more unit of the TLI ($p < 0.05$). Our findings imply that higher adherence to a healthy living pattern is linked to a slower loss of cognitive function and a lower chance of developing dementia.

Keywords: Total lifestyle • Cognition • dementia • Mediterranean diet • Sleep • Physical activity • Functionality

Introduction

Even while dementia has become a common medical problem among older people, there is currently no known effective treatment, and even the suggested medicines have only modest success [1]. The function of primary prevention and the lifestyle factors that can be changed to slow the progression of the disease is thus the main topics of data from observational studies and clinical trials [2]. Numerous studies have shown a protective association between different lifestyle factors, including food, exercise, and sleep, and cognitive decline and the risk of dementia. Total lifestyle patterns have also been investigated because the combined effect of lifestyle factors on the risk of dementia may be fairly significant overall. For instance, our research team previously demonstrated through cross-sectional analysis

that a lifestyle index that combined adherence to the Mediterranean diet, quality sleep, physical activity, and participation in daily living activities, including social activities, was cross-sectionally associated with decreased odds for dementia, mild cognitive impairment, and low global cognition [3]. Large-scale, prospective studies have further demonstrated that a healthy lifestyle, including abstinence from smoking, frequent physical activity, a balanced diet, and moderate alcohol intake, has been linked to a lower incidence of dementia. However, multi-domain therapies that focus on lifestyle factors like food, exercise, cognitive training, and the management of cardiovascular risk factors have produced conflicting outcomes [4-6]. Some research on this subject has relied solely on imprecise estimates of cognitive function rather than conducting a thorough neuropsychological evaluation of the subjects. Furthermore, rather than evaluating cognitive functioning and differentiating between rates of cognitive change over time, they primarily concentrate on the risk of dementia and/or moderate cognitive impairment. Given the lengthy preclinical phase of dementia, research on cognitive function is crucial to understanding its etiology. Finally, the majority of these indices has assumed monotonic effects between the investigated components and cognitive function and has only included a small number of components, whereas significant lifestyle factors, like sleep and participation in leisure activities, have been ignored to varying degrees. Therefore, it is possible to surmise that the disputed clinical trial outcomes may be partially explained by the indices' small number of lifestyle factors and the assumption of monotonic effects. To overcome these limitations, we investigated whether dementia incidence and cognitive trajectories in a representative sample of older adults were related to an index that included adherence to the Mediterranean diet, sleep duration, physical activity, and participation in activities of daily living.

Literature review

According to the current longitudinal study, stronger lifestyle adherence a lifestyle that includes following a Mediterranean diet, getting enough sleep, exercising, and participating in everyday activities was linked to a slower rate of cognitive function decrease over time and a lower risk of dementia. These results show that a lifestyle index, based on the baseline connection of cognitive functioning with the individual components, is longitudinally validated because it is linked to cognitive health in the follow-up. The index was created using both an a priori and a posteriori basis; the former was used to select the individual lifestyle factors by taking into account prior research on the relationship between those factors and cognitive health, and the latter was used to build the index by considering the distribution of the Global Cognition score about those same lifestyle factors at baseline. One could contend that the indicator is population-specific as a result. On the other hand, this index was created using relationships between lifestyle factors and cognitive function in a random sample of people living in a community; under the assumption of good sample representativeness, results may be extrapolated to other populations with similar characteristics. Although the best strategy for creating lifestyle indices a priori, a posteriori, or both have not yet been discovered, we think that our index's longitudinal evaluation may have therapeutic consequences and offer promise for use in clinical practice. We demonstrated that the biennial cognitive benefit of a 6-unit gain in TLI score, which was largely comprised of modifiable lifestyle factors, outweighs the cognitive decline brought on by an increase in age of one year. The current results are consistent with earlier research that has demonstrated several lifestyle factors can lessen the likelihood of developing dementia [7]. The current study, however, builds on earlier research by demonstrating that, aside from dementia risk, lifestyle

is also linked to a slower rate of deterioration in cognitive ability. This shows that changing one's lifestyle may be advantageous even before cognitive deterioration leads to dementia. This is corroborated by the fact that in the sub-sample of subjects who fell within the normal range of cognition, the relationship between lifestyle and overall cognitive function remained substantial (i.e., excluding participants with dementia and mild cognitive impairment both at baseline and at follow-up). We demonstrated that a lifestyle index, which incorporated elements beyond the fundamental lifestyle determinants, was prospectively favorably related to cognitive health. The partial failure of earlier clinical studies may be attributed to the absence of these elements. In any event, subsequent clinical trials should repeat the findings from the current study. To a greater or lesser extent, each component of the index has been independently looked at in connection to cognitive health. Adherence to the Mediterranean diet has specifically been linked to lowered dementia risk and improved cognitive performance. Similarly to this, increasing physical exercise benefits cognitive health, especially in dementia patients. A faster deterioration in cognitive performance has been linked to short or extended sleep durations [8]. Last but not least, even in the very early stages of cognitive impairment, there have been reports of considerable difficulties performing activities of daily living. Many different mechanisms, including anti-oxidant and anti-inflammatory pathways and the enhancement of cardiovascular health, have been suggested for these relationships. Given the complexity of the pathophysiology underlying dementia and cognitive decline, a combination of lifestyle factors may be able to impact the aforementioned pathways at various levels, with a higher cumulative effect. A recent clinical trial revealed that the interaction of lifestyle factors has an anti-aging effect on the epigenome [9]. The greatest TLI scorers had a 5.8% standard deviation less drop in the Global Cognitive score each year, but people with the highest scores in participation in activities of daily living had a 5.9% decreased risk of deterioration in cognitive functioning per year. This emphasizes how important participation in daily activities is in predicting cognitive performance. We believe that the association with cognitive function may be largely attributable to the complex activities of daily living rather than the leisure time ones because the questionnaire used included both engagement in leisure time activities (such as visiting friends or going to classes) and complex/advanced activities (such as having difficulty shopping or getting around the neighborhood). Older people with difficulties in complex activities of daily living may be in the pre-clinical stage of dementia [10]. On the other hand, the overall lifestyle appears to be a better predictor of dementia than the specific components of the lifestyle, such as participation in everyday activities. In any event, health practitioners must take a more comprehensive approach when evaluating older people's lifestyles; not just a few of the components, such as food and/or physical activity, but also synergy between them, should be targeted. Similarly to this, policymakers must progressively shift from a single-component approach to comprehensive lifestyle recommendations for healthy living, as these may be more efficient in terms of both outcomes and money. The strengths and weaknesses of this research should be taken into consideration while interpreting the current results. Limitations include the use of self-reported, measurement-prone methods for the assessment of lifestyle factors. The employment of objective methods in a large-scale investigation is challenging, though. All lifestyle factors were also evaluated at baseline, and this study did not take changes over time into account. The possibility of reverse causality cannot be completely ruled out because of the brief follow-up period. Our certainty that reverse causality may not be the cause of our findings was enhanced by the fact that the observed relationships persisted even when people with baseline and follow-up dementia and mild cognitive impairment were excluded. Furthermore, despite adjusting for significant confounders in our models, residual confounding, or the impact of other factors that were not considered in this investigation, cannot be completely ruled out. Last but not least, additional dementia cases might enable stronger connections to emerge and be discovered, even though we have found significant associations between TLI and lifestyle variables and dementia. On the other hand, the study has several advantages, the most important of which is its longitudinal design, which enables

potential causality insight. All individuals underwent thorough neurological and neuropsychological testing, which allowed us to examine both cognitive performance and dementia. Another significant characteristic is that we longitudinally validated an indicator based on the greatest anticipated cognitive function at baseline while also taking into account the possibility that there may be non-linear correlations between the various lifestyle determinants and cognitive performance. Finally, the thorough analysis of diverse lifestyle factors enabled us to take into account factors that were only superficially investigated in research with comparable objectives.

Conclusions

In conclusion, the current study found that a healthy lifestyle, which included adopting a plant-based diet, getting enough sleep, participating in physical activity, and carrying out activities of daily living, was associated with a slower rate of cognitive decline and a lower risk of dementia, even in participants with completely normal cognitive function. To prevent cognitive decline, health practitioners should regularly evaluate lifestyle as a full pattern with intercorrelations and synergies between components.

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