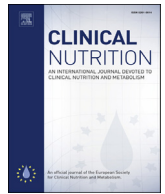




Contents lists available at ScienceDirect

## Clinical Nutrition

journal homepage: <http://www.elsevier.com/locate/clnu>

## Original article

## The association between adherence to a Mediterranean style diet and cognition in older people: The impact of medication

Roy J. Hardman<sup>a,\*</sup>, Denny Meyer<sup>a</sup>, Greg Kennedy<sup>a</sup>, Helen Macpherson<sup>b</sup>, Andrew B. Scholey<sup>a</sup>, Andrew Pipingas<sup>a</sup><sup>a</sup> Centre for Human Psychopharmacology, Swinburne University of Technology, Melbourne, Australia<sup>b</sup> Institute for Physical Activity and Nutrition Research, Deakin University, Melbourne, Australia

## ARTICLE INFO

## Article history:

Received 12 April 2017

Accepted 22 October 2017

## Keywords:

Health of ageing population  
Impacts of diet in the elderly

## SUMMARY

**Background:** Recent reviews indicate that adherence to a Mediterranean diet may be associated with better cognitive functioning. In assessing these relationships in older individuals, previous studies have not taken into account medication usage that may support or compromise cognitive functioning.

**Objective:** To investigate the association between adherence to a Mediterranean style diet, cognition and medication usage in cognitively healthy older individuals.

**Design:** Data were assessed from individuals aged 60–90 years (mean = 77.8 years, SD = 6.7) from 15 independent living aged care villages around Melbourne, Australia. Participants' diets were assessed using a food frequency questionnaire (FFQ). Cognition was assessed using reaction times from the Swinburne University Computerised Cognitive Assessment Battery (SUCCAB). Prescribed medications were recorded and analysed using binary measures. Cluster analyses were used to group participants in terms of cognitive measures and medications taken. Analyses controlled for age, gender, average daily intake and medication cluster.

**Results:** The relationship between cognitive speed clusters and medication clusters was significant (Chi-squared = 10.63, df = 3,  $p = 0.014$ ). The odds ratio of 1.533 for average daily food intake suggested that for each additional kilojoule of average daily intake, the odds of belonging to the slower reaction time cluster increased by 53% and odds ratio of 0.573 for Mediterranean diet score suggested that for every additional unit, the odds of belonging to the slower reaction time cluster declined by 43%. The relationship between Mediterranean diet score and cognition was only significant when medication use was taken into account.

**Conclusion:** These data demonstrate that when medications are considered, a higher Mediterranean diet score is associated with a faster response on cognitive function tests. The present findings also indicate that it is pertinent to take into account medication use when investigating relationships between dietary status and cognitive performance.

© 2017 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Diet is considered to be one of the greatest contributors to overall health. The term 'Western diet' is used to describe a diet containing large amounts of red meat, refined sugars, grains, and high fat foods that is common in Western countries. The high levels of saturated fat and trans-fatty acids consumed in this diet have

contributed to the obesity epidemic in these countries [1]. Obesity has been linked with impaired cognitive function and an elevated risk of late-onset dementia, such as Alzheimer's disease [2,3].

A Western diet and a sedentary lifestyle impacts general health, including increasing the rate of obesity, high blood pressure, high blood triglycerides, high levels of LDL and low levels of HDL cholesterol and insulin resistance. These comorbidities have resulted in an increased incidence of coronary artery disease, diabetes, chronic pain syndrome, inflammatory disease, cardiovascular disease, respiratory disease and end organ damage [4]. The comorbidities including high blood pressure, high cholesterol, insulin resistance and obesity are classified as the metabolic

\* Corresponding author. Faculty of Health, Art and Design, Swinburne University of Technology, Mail H98, Hawthorn, Victoria 3122, Australia.

E-mail address: [rharden@swin.edu.au](mailto:rharden@swin.edu.au) (R.J. Hardman).

<https://doi.org/10.1016/j.clnu.2017.10.015>

0261-5614/© 2017 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Abbreviations

ANOVA	analysis of variance
$\chi^2$ test	chi-squared test
<i>r</i>	coefficient of correlation sample
<i>R</i>	coefficient of multiple regression
CV	coefficient of variation
CI	confidence intervals
DF	degrees of freedom
FFQ	food frequency questionnaire
kj	kilojoules
MedDiet	Mediterranean diet
MedDietS	Mediterranean Diet Score
NS	not significant
<i>n</i>	number of observations
SD	standard deviation
SUCCAB	Swinburne University Computerised Cognitive Assessment Battery
<i>F</i>	variance ratio

syndrome, and can lead to cognitive impairment [5]. This metabolic syndrome may impair cognition in the elderly, especially in those with inflammation. Metabolic syndrome, particularly in ageing populations, is treated pharmacologically, to reduce blood pressure and cholesterol levels [6].

The Mediterranean diet (MedDiet) is considered a healthier alternative to the Western diet. The MedDiet is a diet with an abundance of plant foods in the form of fruits, vegetables, breads, other forms of cereals, beans, nuts, seeds, fish and olive oil as its main source of monounsaturated fats; while dairy foods, red meat and chicken are consumed in lower quantities, and red wine is consumed moderately with meals. These foods provide a high intake of  $\beta$ -carotene, vitamin C, tocopherols, omega-3 fatty acids, various minerals and other beneficial substances such as polyphenols and anthocyanins [7,8]. Adherence to the MedDiet was initially considered relevant to health when it was demonstrated that mortality was reduced within the populations located in the areas of Southern Europe [8,9].

Two recent systematic reviews have indicated that the MedDiet may be neuroprotective as well as cognition-enhancing in the shorter term [10,11], additionally this diet is likely to be protective against accelerated cognitive decline and the transition to mild cognitive impairment and dementia. Medications taken by older participants, and how medications may impact the protective effects of a MedDiet had not been assessed.

Within a Western society the use of medications is part of the primary armamentarium to reduce the impact of comorbidities, such as the metabolic syndrome. To this end, in Australia, as in the rest of the Western world, there has been a substantial increase in the use of blood pressure medications and statins to alleviate the effects of the metabolic syndrome. The use of medications and the impact of comorbidities may provide further understanding of the effects of cognitive changes within an ageing population [12].

The primary aim of this study was to investigate the association of adherence to a Mediterranean style of diet with respect to cognition, while taking into consideration the use of medications. This study utilised the baseline data from a randomised controlled trial investigating the effects of the MedDiet on cognition in cognitively healthy older people living independently within aged care facilities: the Lifestyle Intervention in Independent Living Aged Care (LILAC) study [ACTRN12614001133628] [13].

## 2. Methods

### 2.1. Recruitment and approval

Participants were aged 60–90 years and living independently in 15 aged care and retirement villages in and around Melbourne, Australia. Recruitment took place between 1 April 2014 and 30 June 2015.

### 2.2. Eligibility criteria

Participants were fluent in written and spoken English. Participants had to obtain the approval of their medical practitioner to be involved in the trial.

### 2.3. Ineligibility criteria

Participants were unable to participate if were visually impaired, had a neurological or uncontrolled psychiatric disorder, were unable to walk independently and safely, or used illicit drugs or cognitive enhancing medications. Finally, those who had suspected cognitive impairment (defined as a score  $\leq 24$  on the Mini Mental State Examination) or depression (a score  $>9$  on the Geriatric Depression Scale) were also excluded.

### 2.4. Ethical clearance

This study was approved by the Swinburne University Human Research Ethics Committee (project number 2013/057).

Selection criteria were followed in accordance with the published protocol [13].

Figure 1 outlines the recruitment and distribution of the 105 participants who entered the trial. Five participants left prior to initiation of any assessment. The 100 remaining participants, 28 males and 72 females, were assessed, of whom 93 responded to the question regarding their use of prescription medications. Among these 93 participants, 75% were prescribed more than two medications, 24% more than five medications, and 9% more than seven medications (mean 4.16, SD = 2.17).

### 2.5. Diet assessment

Diet was assessed using the Cancer Council of Victoria Dietary Questionnaire (Food Frequency Questionnaire [FFQ] for Epidemiological Studies Version 2 [DQES v2], November 2014) [14]. The output was utilised to produce a Mediterranean diet score (MedDietS) in accordance with Trichopoulou et al., 2003 [15]. The sex-specific median allows for a comparative cut-off to be made between genders on food consumption [15]. Beneficial foods, such as vegetables, legumes, fruits, nuts, cereals, and fish, were assigned a value of 0 if a person's consumption was below the median, and a score of 1 if it was equal to, or above, the median. Food components detrimental to health, such as meat, poultry, and dairy, consumption above the median was scored as 0, and intake below the median was scored as 1. For alcohol, a score of 1 was given provided consumption was within a specified range. When considering fat intake, the ratio of monounsaturated lipids to polyunsaturated lipids was evaluated, with a higher ratio being more acceptable and a score of 1 allocated accordingly. Kilojoules consumed were also reported within the FFQ. Thus, the total MedDietS ranged from 0 (minimal adherence to the traditional MedDiet) to 9 (maximal adherence) [15].

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات