



Association of Mediterranean diet and other health behaviours with barriers to healthy eating and perceived health among British adults of retirement age

Jose Lara*, Leigh-Ann McCrum, John C. Mathers

Human Nutrition Research Centre, Institute for Ageing and Health, Newcastle University, Biomedical Research Building, Campus for Ageing and Vitality, Newcastle upon Tyne NE4 5PL, UK

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ABSTRACT

Objectives: Health behaviours including diet, smoking, alcohol consumption, and physical activity, predict health risks at the population level. We explored health behaviours, barriers to healthy eating and self-rated health among individuals of retirement age.

Study design 82 men and 124 women participated in an observational, cross-sectional online survey.

Main outcome measures A 14-item Mediterranean diet score (MDPS), perceived barriers to healthy eating (PBHE), self-reported smoking, physical activity habits, and current and prior perceived health status (PHS) were assessed. A health behaviours score (HBS) including smoking, physical activity, body mass index (BMI) and MDPS was created to evaluate associations with PHS. Two-step cluster analysis identified natural groups based on PBHE. Analysis of variance was used to evaluate between group comparisons.

Results: PBHE number was associated with BMI ($r=0.28$, $P<0.001$), age ($r=-0.19$; $P=0.006$), and MDPS ($r=-0.31$; $P<0.001$). PBHE cluster analysis produced three clusters. Cluster-1 members (busy lifestyle) were significantly younger (57 years), more overweight (28 kg/m²), scored lower on MDPS (4.7) and reported more PBHE (7). Cluster-3 members (no characteristic PBHE) were leaner (25 kg/m²), reported the lowest number of PBHE (2), and scored higher on HBS (2.7) and MDPS (6.2). Those in PHS categories, bad/fair, good, and very good, reported mean HBS of 2.0, 2.4 and 3.0, respectively ($P<0.001$). Compared with the previous year, no significant associations between PHS and HBS were observed.

Conclusions: PBHE clusters were associated with BMI, MDPS and PHS and could be a useful tool to tailor interventions for those of peri-retirement age.

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1. Introduction

There is strong evidence that lifestyle behaviours including poor diet, smoking, low physical activity, high alcohol consumption, or high body mass index (BMI), are strongly associated with health [1]. Together, these behaviours are associated with four-fold increases in total mortality in men and women [2,3] and make a substantial contribution to the global burden of disability [4]. In addition, self-rated health, an independent predictor of mortality, [5] is associated with health behaviours [6].

In an era when the world's population is ageing and the retirement age is being extended in many countries, developing effective lifestyle-based interventions, including dietary

interventions, offers considerable potential to promote healthy ageing [7,8]. Interventions targeting people of retirement age may be particularly useful since this life-transition is associated with other behavioural changes [9,10], and improved eating habits may alter the ageing-trajectory and reduce the burden of age-related disability and disease. The health benefits of consuming a Mediterranean diet (MD) have been demonstrated in numerous epidemiological studies [11–13]; and these observational findings are now supported by evidence from primary [14,15], and secondary prevention randomised clinical trials [16]. However, interventions promoting the MD outside Mediterranean countries are scarce [17–19] and current evidence suggests that most dietary interventions result in only small to moderate effect-size [20].

Identifying and addressing perceived barriers to healthy eating (PBHE) is a critical step in developing effective dietary interventions. There are no studies of PBHE in people of retirement age but a European survey of young and middle-age adults reported that

* Corresponding author. Tel.: +44 0 1912481141.

E-mail addresses: jose.lara@ncl.a.uk, jjlaragallegos@yahoo.com (J. Lara).

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“concerns with time” and “taste” were the most frequently reported PBHE [21]. In addition, a small study on 39 older men (mean age 75 years) identified “poor cooking skills” and “low motivation to change eating habits”, as important PBHE [22].

The aims of the present study were to evaluate the association between PBHE and adherence to the MD and the associations of health behaviours with perceived health based on responses to a cross-sectional online-survey among older UK adults.

2. Methods

This study was approved by the Human Psychology Ethics-Committee at Newcastle University (Registration no. 000436) and conforms to the principles embodied in the Declaration of Helsinki. Participants provided consent via an e-form.

2.1. Study design

Observational, cross-sectional online-survey of dietary habits, PBHE and perceived health. This paper is reported following the STROBE statement [23].

2.2. Sample

We recruited 82 men and 124 women, aged ≥ 50 years, from among the general public. By design, participants of this study had to have regular access to internet and email and, apart from age, no other inclusion/exclusion criteria were employed. Recruitment was supported by Voice North, the community engagement panel at Newcastle University (<http://www.ncl.ac.uk/changingage/engagement/voicenorth/>), and the University of the Third Age (<http://www.u3a.org.uk/>). The study was also advertised among staff at Newcastle University, Queens University Belfast and University of Ulster. A “snowball” sampling procedure was attempted by asking participants to forward the invitation to join the study to others. Although participants of this study were a convenience sample, we recruited a wide range of individuals in terms of education, physical activity levels, marital and socioeconomic status and sex.

2.3. E-survey

The survey was developed using Newcastle University Information Systems and Services’ Form Builder resource for the creation of web forms. Participants volunteering to take part in this survey received the uniform resource locator (URL) for the survey by Pilot testing of the survey materials for clarity, understanding and time taken to complete the survey was undertaken prior to the current survey.

2.4. Measures

The e-survey included the following questionnaires:

- (1) A questionnaire requesting information on demographic and lifestyle factors and self-rated health status. Participants self-reported their smoking habits and self-rated their physical activity in a five-point Likert scale from “very low” to “very high”. BMI was estimated from self-reported weight and height. Participants self-rated their current perceived health status (PHS) using a five-point Likert scale from “very bad” to “very good”, and reported perceived changes in their health during the year preceding the survey.

- (2) MD adherence was assessed using the 14-item PREDIMED score (MDPS) [24]. The range of possible scores for MDPS is 0–14 with higher scores indicating greater MD adherence.
- (3) A questionnaire asking participants to identify PBHE from a previously published list derived from a pan-EU consumer attitudinal survey [21].

2.5. Statistical analysis

A health behaviours score (HBS) including tobacco smoking, self-rated physical activity level, BMI and the MDPS was created to evaluate associations between health behaviours and self-rated health. Participants were assigned one-point for each variable based on the following four criteria: BMI < 25; currently being a non-smoker; having moderate/high physical activity status; and being in the top MDPS-tertile (i.e. MDPS ≥ 7). Values for this score ranged from 0 to 4, with higher values indicating the presence of more healthy behaviours.

Two-step cluster-analysis was used to identify natural groups of PBHE. Step one involved creation of pre-clusters from cases by constructing an algorithm known as the Cluster feature tree. In Step two, pre-clusters were merged using agglomerative hierarchical clustering. Cluster-membership and the optimal number of clusters were determined using model fit indices including log-likelihood distance measure and the Schwarz’s Bayesian information criterion.

PBHE cluster-membership was used as a categorical variable when investigating links with lifestyle behaviours including MD adherence using the General Linear Model. Results were adjusted for covariates including age, sex, and BMI. Adjusted results were reported as the Least Squares Means (LSM) and standard errors (SE). Spearman’s and Pearson’s correlation coefficients were used to assess associations between variables. Partial correlation was used to adjust for additional variables. Categorical variables were compared using the chi-square test. Statistical analyses were carried out with IBM SPSS v19 for Windows.

3. Results

3.1. Participant characteristics

Participants in this survey were on average 61 (SD 7) years of age with males being 2.3 years older than females ($P=0.03$). The sample had a sex ratio of 2:3 of male to female respectively. On average participants were overweight (BMI 26 ± 4 kg/m²), with no significant difference in mean BMI between men and women. A significantly ($P=0.01$) higher proportion of males reported that they were retired from work and men were more likely ($P=0.02$) to be educated to degree level or above (Table 1). Most participants (95%) were not current tobacco smokers and over 70% reported being moderate alcohol consumers.

3.2. Mediterranean diet adherence

Overall mean MDPS was 5.6 ± 2 ; participants in the top tertile (31% of sample) scored ≥ 7 , and only 6% of participants scored ≥ 10 . After adjustment for age and BMI, women ($n=124$) scored significantly ($P=0.016$) higher than men ($n=82$) (Table 2). There was an inverse statistically significant association between MDPS and BMI (Fig. 1). Age- and sex-adjusted comparisons showed that participants scoring ≥ 9 in the MDPS were significantly ($P=0.004$) leaner (LSM \pm SE BMI 23.8 ± 0.926) than those scoring ≤ 8 (LSM \pm SE BMI 26.7 ± 0.294).

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