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Associations of diet quality with health-related quality of life in older Australian men and women

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ABSTRACT

This study investigated associations between diet quality measures and quality of life two years later. Adults 55–65 years participating in the Wellbeing, Eating and Exercise for a Long Life (WELL) study in Victoria, Australia (n = 1150 men and n = 1307 women) completed a postal survey including a 111-item food frequency questionnaire in 2010. Diet quality in 2010 was assessed via the dietary guideline index (DGI), recommended food score (RFS) and Mediterranean diet score (MDS). The RAND 36-item survey assessed health-related quality of life in 2012. Associations were assessed using logistic regression adjusted for covariates. In men, DGI and RFS were associated with better reported energy (OR = 1.79, CI: 1.25, 2.55 and OR = 1.56, CI: 1.11, 2.19 respectively), and DGI was additionally associated with better general health (OR = 1.54, 95% CI: 1.08, 2.20), and overall mental component summary scale (OR = 1.51, CI: 1.07, 2.15) in the fully adjusted model. In women, associations between two indices of diet quality (DGI, RFS) physical function (OR = 1.66, CI: 1.19, 2.31 and OR = 1.70, CI: 1.21, 2.37 respectively) and general health (OR = 1.83, CI: 1.32, 2.54 and OR = 1.54, CI: 1.11, 2.14 respectively) were observed. DGI was also associated with overall physical component summary score (OR = 1.56, CI: 1.12, 2.17). Additional associations between emotional wellbeing and DGI (OR = 1.40, CI: 1.01, 1.93) and RFS (OR = 1.44, CI: 1.04, 1.99), and MDS and energy (OR = 1.53, CI: 1.11, 2.10) were observed in the fully adjusted model, in women only. Older adults with better quality diets report better health-related quality of life, with additional associations with emotional wellbeing observed in women.

1. Introduction

The world's ageing population continues to increase with the number of persons aged 60 years and over expected to exceed the number of children in the world by 2045 (United Nations, 2009). Increased longevity is supporting marked growth in the proportion of adults aged over 85 years (Australian Institute of Health and Welfare, 2007). As chronic disease burden increases with age, it is important that health and function are maintained to complement increased longevity. In 2011, adults aged 65 years and over formed 14% of the total Australian population (Australian Bureau of Statistics, 2012). Ageing is associated with a decline in health and increase in disability. Recent data from Australia indicates that only 42.7% of people aged 65–74 years rated their health as "very good" or "excellent", compared with 63.4% of people aged 25–34 years (Australian Bureau of Statistics, 2013). Furthermore, around 14% of women and 20% of men aged 65–74 years have heart disease, compared with 0.5% of women and men aged 25–34 years (Australian Bureau of Statistics, 2013).

An important aspect of healthy ageing is the maintenance of health-related quality of life (HRQoL) (Fuchs et al., 2013). HRQoL refers to how health impacts on an individual's ability to function and their perceived wellbeing in physical, mental and social domains (Hays and Morales, 2001). Chronic health problems, such as depression and cardiovascular disease, are associated with HRQoL deterioration in older adults (Buckley et al., 2013), which is a predictor of mortality risk (Kroenke et al., 2008).

Whilst previous research into nutrition and healthy ageing has focussed on the role of individual nutrients or foods, there is increasing interest in dietary pattern analysis as a chronic disease determinant (Newby and Tucker, 2004). Dietary patterns can be defined by two approaches: multivariate statistical techniques such as factor or cluster analysis (data driven approaches); and dietary scoring methods informed by a priori guidelines and recommendations, or diet quality indices. Diet quality indices can assess adherence to dietary guidelines (McNaughton et al., 2008), or a particular type of diet such as the Mediterranean diet (Trichopoulou et al., 2005).

Abbreviations: BMI, body mass index; CI, confidence intervals; DGI, dietary guideline index; FFQ, food frequency questionnaire; HRQoL, health-related quality of life; IPAQ-L, international physical activity questionnaire; MCS, mental component summary; MDS, Mediterranean diet score; MET, metabolic equivalent of task; OR, odds ratio; PCS, physical component summary; RAND-36, RAND 36-item general health survey; RFS, recommended food score; WELL study, Wellbeing, Eating and Exercise for a Long Life study.

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Diet quality assessed by adherence to dietary guidelines has been associated with cardio-metabolic risk factors (McNaughton et al., 2009), whilst adherence to a Mediterranean diet has been associated with lower mortality (Australian Bureau of Statistics, 2012; McNaughton et al., 2012a) in older people. Recent cross-sectional evidence from Europe implicates diet quality in depression and anxiety in older age (Jacka et al., 2011b). However investigation of the relationship between diet quality and HRQoL in older adults at a population level is rare, with few longitudinal studies. A 10-year study of 2200 Europeans aged 70–75 years found adherence to a Mediterranean diet was not related to maintenance of health status or physical function (Haveman-Nies et al., 2003). In contrast, a cross-sectional study of 4000 men and women aged 65 years and older in Hong Kong found that diet quality assessed by the Diet Quality Index-International was associated with physical and mental health and frailty (Woo et al., 2010). These differences in findings could be due to methodological differences between studies, including choice of diet quality index. Despite the wide variety of diet quality indices available, few studies have included multiple indices in studies of diet quality and health among older adults.

Given the conflicting findings of previous research and paucity of data available on the relationship between multiple indices of diet quality and HRQoL among older adults, the aim of this study was to investigate associations between a food-based diet quality index reflecting the 2013 Australian Dietary Guidelines (National Health and Medical Research Council, 2013), two other a priori food-based indices of diet quality and HRQoL two years later in older men and women.

2. Methods

2.1. Design

This study is based on data from the Wellbeing, Eating and Exercise for a Long Life (WELL) study. The WELL study is a prospective, population-based longitudinal cohort study of nutrition and physical activity behaviours, obesity and quality of life, and the intrapersonal, social and environmental influences on these behaviours among adults (McNaughton et al., 2012b). Participants aged between 55 and 65 years, living in the community in urban or rural Victoria, Australia were selected from the Australian Electoral Roll, stratified by socioeconomic position using the Socioeconomic Index for Areas score (SEIFA) (Australian Bureau of Statistics, 2003). Potential participants living in a suburb with a population of less than 1000 overall or less than 200 in the 55–65 year age bracket were excluded. All eligible suburbs were classified by SEIFA and divided into tertiles (representing low, medium and high SEIFA). Fourteen postcodes from each SEIFA tertile were randomly selected. From each postcode, 134 participants (equal numbers of men and women) were selected for invitation into the study. A total of 11256 surveys were distributed to potential participants at baseline in 2010. Of these, 380 were returned as undeliverable and 95 were returned from individuals outside the age bracket. In total, 4082 completed surveys were returned at baseline (response rate 38%). Participation was voluntary and informed consent was obtained by return of the survey. In 2012, participants who agreed to take part in a follow-up were sent a similar survey (n = 3368). Of these, 2758 completed surveys were returned (response rate 82%). Data was collected as the same time of year in 2010 and 2012 to negate any potential seasonal effects.

Ethical approval for the survey was obtained from the Deakin University Human Research Ethics Committee (2009-105). Full details of the survey have been described elsewhere (McNaughton et al., 2012b).

2.2. Health-related quality of life

Self-rated HRQoL was assessed at follow-up via the RAND 36-item general health survey (RAND-36) (Hays and Morales, 2001). This measure is also known as the SF-36 health survey or Health Status Questionnaire and covers HRQoL across mental and physical domains. Questions were altered to Australian conditions consistent with other cohort studies (Lee et al., 2005; Mishra et al., 2011; Schofield and Mishra, 1998). The RAND-36 consists of 36 items which are converted into eight subscales to describe the amount an individual's health state impacts on their physical functioning, role limitations due to physical health, bodily pain, general health, energy/fatigue, social functioning, role limitations due to emotional problems and emotional wellbeing. Scores for the eight scales were calculated according to the summative method of calculating the mean of the items for each scale. Missing scores on items were treated as follows: for individuals with subscales where less than 50% of the items were missing, the mean of the remaining items was used to calculate the scale. Individuals with greater than 50% of items missing for a subscale (n = 1361) did not have the subscales calculated (4). Scores for the 8 subscales range from 0 to 100, where a higher score reflects a more positive health state. Physical component summary (PCS) and mental component summary (MCS) scale measures of the survey were also calculated based on factor analysis of the eight subscales from the 2004 South Australian Health Omnibus Survey (Hawthorne et al., 2007). Participants were divided into groups by the median cut-points of the 8 subscales, PCS and MCS for analysis.

2.3. Dietary intake

Usual dietary intake at baseline was assessed using a 111-item food frequency questionnaire (FFQ) (Hodge et al., 2000; Ireland et al., 1994), which assessed self-reported intake of food and beverages over the last six months. The FFQ has been previously used in other national studies (McLennan and Podger, 1995; Smith et al., 2010a, 2010b). The survey included seven additional validated short questions on food habits including salt use (during and after cooking), type of milk and bread consumed, trimming the fat from meat and daily fruit and vegetable consumption (McLennan and Podger, 1995; Rutishauser et al., 2001). Frequencies were converted into daily equivalents for analysis (Willett, 2013).

2.4. Diet quality

Diet quality was assessed using three previously developed indices: the dietary guideline index (DGI), the recommended food score (RFS) and the Mediterranean diet score (MDS). The indices were adapted for use with the data from the FFQ. The DGI is an updated version of a previous index developed to reflect Australian guidelines for optimal eating patterns which was shown to be a valid measure of diet quality (McNaughton et al., 2008). The index was updated to reflect the 2013 Australian Dietary Guidelines (National Health and Medical Research Council, 2013). For each dietary guideline component, indicators from the FFQ were identified and food groupings determined. Age and sex-specific scoring cut-offs for the five core food groups (vegetables, fruits, grains, meat and alternatives, and dairy), fluids and discretionary foods were devised. Discretionary foods (also commonly known as “extra” foods), are foods that are not essential to provide nutrient requirements due to the high content of sugar, fat and salt such as soft drinks, cordials, fruit juice drinks, chips, confectionary, chocolate, hamburgers, meat pies, pizza, cakes and muffins, pies and pastries, biscuits, and alcoholic beverages (National Health and Medical Research Council, 2013). Diet quality was incorporated through items referring to whole-grain cereals, lean protein, reduced-/low-fat dairy, unsaturated fats and dietary variety. A total of 13 components were included in the updated DGI. Each component of the DGI was scored proportionally from 0 to 10, where 10 indicated that a participant was fully meeting the recommendation. The total score was the sum of 13 items so that the diet score had a possible range of 0 to 130, with higher scores reflecting greater compliance with the Australian Dietary Guidelines. The previous version of the DGI was evaluated in the Australian population and shown to be related to sociodemographic factors, health behaviours, self-assessed health and intakes of key nutrients (McNaughton et al., 2008).

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