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Influences on diet quality in older age: the importance of social factors.

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Influences on diet quality in older age: the importance of social factors

ABSTRACT

Background: Poor diet quality is common among older people, but little is known about influences on food choice, including the role of psychosocial factors at this age.

Objective: To identify psychosocial correlates of diet quality in a community-dwelling population of men and women aged 59-73 years; to describe relationships with change in diet quality over 10 years.

Design: Longitudinal cohort, Hertfordshire Cohort Study (HCS).

Subjects: HCS participants assessed at baseline (1998-2001: 1048 men, 862 women); 183 men and 189 women re-assessed in 2011.

Methods: Diet was assessed by administered food frequency questionnaire; diet scores were calculated to describe diet quality at baseline and follow-up. A range of psychosocial factors (social support, social network, participation in leisure activities, depression and anxiety, sense of control) were assessed by questionnaire.

Results: At baseline, better diet quality was related to a range of social factors, including increased confiding/emotional social support (men and women), practical support (men), and a larger social network (women) (all $p<0.05$). For both men and women, greater participation in social and cognitive leisure activities was related to better diet quality ($p<0.005$). There were few associations between measured psychosocial factors at baseline and change in diet score over 10 years, in the follow-up sub-group. However, greater participation in leisure activities, especially cognitive activities, at baseline was associated with smaller declines in diet quality over the 10-year follow-up period for both men ($p=0.017$) and women ($p=0.014$).

Conclusions: In community-dwelling older adults, a range of social factors, that includes greater participation in leisure activities, were associated with diets of better quality.

Key words: ageing, diet, older people, social relationships, UK.

INTRODUCTION

Poor diet quality in older people is associated with poorer future health [1-4] and greater mortality [5, 6]. However, little is known about influences on food choice at this age. Poor diets are known to be more common among younger and older adults of lower social class [7, 8] and those with lower levels of education [7, 9]. Among younger adults, psychosocial factors have been shown to be important determinants of diet quality [10]. Less is known about their importance in older age, although findings from Canada [11] have highlighted the roles of 'resilience' and self-efficacy as important influences on diet quality, and among older Japanese adults, psychosocial factors have been shown to mediate associations between socioeconomic status and diet [12].

There is cross-sectional evidence to suggest that some social factors contribute to poorer diets in older age, such as social isolation and lack of social support [13, 14]. Marital status, living arrangements and frequency of contact with friends have been associated with diet quality. For example, less frequent social contact has been associated with low fruit and vegetable consumption in older adults [15], and both living alone and having less frequent contact with friends have been found to enhance the negative association of widowhood with diet [16]. Such differences in diet may contribute to the higher risk of mortality observed in people who have poor social connections [17], although the mechanisms that underlie this association are not fully understood [17].

Understanding psychosocial influences on diet is important for the development of future interventions to improve diet quality in older people. The aim of this study was to identify psychosocial correlates of diet quality in a cohort of older community-dwelling men and women, and determine their associations with change in diet quality over 10 years.

METHODS

The Hertfordshire Cohort Study (HCS)

In 1998, 7106 men and women who were born between 1931 and 1939 in Hertfordshire were traced [18]. A total of 1684 (54%) men and 1541 (52%) women agreed to be interviewed at home. In 2004-2005, 642 participants, resident in East Hertfordshire, took part in a sub-study that collected musculoskeletal data. In 2011, 592 of these participants were further approached, of whom 443 (75%) agreed to be followed up [19].

Dietary Assessment

At baseline (1998-2003), the diets of 1677 men and 1540 women, were assessed using an administered food frequency questionnaire (FFQ) [7]. A 'prudent' diet score was calculated for each participant based on their consumption of 24 indicator foods [20] and was used as a measure of diet quality. Prudent diet scores calculated using these indicator foods have been shown to be highly correlated with scores calculated from a complete dietary assessment (0.912 in men, 0.904 in women). High scores indicated diets characterised by frequent consumption of fruit, vegetables, wholegrain cereals and oily fish but low consumption of white bread, added sugar, full-fat dairy products, chips and processed meat [20]. At follow-up (2011), the diets of 221 men and 221 women were re-assessed using a short FFQ that was administered by trained research nurses [7, 20]. Changes in prudent diet scores from baseline were calculated by subtracting baseline diet scores from follow-up scores, such that a positive change value indicates an increase in diet quality and a negative change value indicates a decline.

Assessment of Social and Psychological Variables

At baseline, a social health questionnaire was completed by 1048 men and 862 women; this assessed a range of psychosocial factors, including social support, social network, participation in social and cognitive leisure activities, and control at home. The measures were based on those used

in the Whitehall II Study [21-23]. See Appendix 1 in the supplementary data at http://www.ageing.oxfordjournals.org/ for details of the social and psychological variables assessed. Of the 442 participants who had follow-up dietary data, 183 men and 189 women (372, 84%) had completed the social health questionnaire at baseline.

Statistical Analysis

Descriptive characteristics were given as mean with standard deviation (SD), median with interquartile range (IQR), or counts and percentages, as appropriate. Differences between men and women were assessed using t-tests, Mann-Whitney tests or χ^2 tests as appropriate. Univariate and multivariate linear regressions were used to explore the correlates of dietary pattern scores and their changes over time; based on earlier analysis of dietary patterns in this cohort [7], the potential confounding factors considered were social class and education. In addition we considered the number of comorbidities (out of bronchitis, diabetes, ischaemic heart disease, hypertension, stroke and fracture after age 45). Data were analysed using Stata version 14.

RESULTS

At baseline, participants (n=1910; 1048 men and 862 women) were aged between 59 and 73 years (mean 66 years). Fifty-seven per cent of men and women were in manual social classes. Most men (81%) and women (84%) left full-time education at age 15 or above, and most (86% and 73% respectively) were married or living with a partner. There were differences between men and women in the social factors assessed – men had higher scores for confiding/emotional support, practical support, and for social activities, and lower scores for cognitive activities (all $p<0.05$). There were also differences in the number of people that men and women felt close to ($p<0.001$) – a higher proportion of men felt close to fewer than 5 people. With regard to psychological factors, a lower proportion of men than women had anxiety ($p<0.001$). See Appendix 2 in the supplementary

data at http://www.ageing.oxfordjournals.org/ for a summary of baseline population characteristics in terms of social and psychological factors. At baseline, mean (SD) prudent diet score was significantly lower in men -0.245 (1.216) than women 0.388 (1.109), indicating less healthy diets ($p<0.001$). Over half (59%) of men and women had at least 1 comorbidity at baseline; 6% of men and 5% of women had 3 or more.

In comparison with other HCS participants, the sub-group who were followed up (183 men, 189 women) were younger (64.8 v. 66.0 years), had healthier diets (0.239 v. -0.007), and had fewer comorbidities (45.9 with none v. 40.1%) (p for all<0.05). In addition, their leisure activity scores and scores for 'cognitive' activities were slightly higher and they were more likely not to have depression or anxiety (p for all<0.05). Prudent diet scores at follow-up were highly correlated with baseline scores (men: $r=0.696$; $p<0.001$; women: $r=0.656$; $p<0.001$). In men, average diet quality remained stable with increasing age, but in women there was an overall decline in diet quality with age: mean (SD) change in diet score per year 0.008 (0.099) in men and -0.025 (0.108) in women ($p=0.003$).

Correlates of baseline diet

Table 1 shows associations between baseline social and psychological factors and baseline prudent diet score. At baseline, diet quality was related to a range of psychosocial factors. In both men and women, diet quality was related to social support; specifically, greater confiding/emotional support was associated with a higher prudent diet score ($p<0.02$). In men, but not in women, greater practical support was also associated with a higher diet score ($p=0.014$). A large social network and feeling close to many people were associated with higher prudent diet scores in women only (all $p<0.05$). For both men and women, greater overall participation in leisure activities was related to higher prudent diet scores; furthermore, increased participation in activities of a more cognitive nature, as well as in activities of a more social nature were both associated with higher prudent diet scores (all $p<0.005$). Diet score was not related to control at home. Diet scores were lower in men who had a possible case of depression, compared to non-cases, and in men who had anxiety,

compared to non-cases (both $p<0.05$), whereas there were no associations with depression or anxiety in women. The pattern of all associations was similar after adjusting for social class, education and number of comorbidities, for both men and women separately.

Predictors of change in diet

Table 2 shows baseline social and psychological factors as predictors of change in prudent diet score in the follow-up sub-group of men and women. Overall, there were few associations between psychosocial factors at baseline and change in diet score over 10 years. However, in men and women, baseline participation in leisure activities, as well as participation in cognitive leisure activities, were associated with smaller declines in diet scores: for a one point increase in leisure activity score, change in diet score increased by 0.002 (95% CI 0.000, 0.003, p=0.017) in men and 0.002 (95% CI 0.000, 0.003, p=0.014) in women. With the exception of women who had a possible case of anxiety, there were no associations between psychological factors and change in diet score. The pattern of associations remained robust to adjustment for social class, education and number of comorbidities.

The relationship between the leisure activity score and prudent diet score at baseline and follow-up is illustrated in Figure 1. There were graded increases in scores across the range of leisure activity. As an example, in the highest quarter of leisure activity score, 81% of men and 84% of women were involved in clubs and organisations weekly or monthly, compared to around 12% of men and women in the lowest quarter. To illustrate the nature of differences in diet quality across the range of leisure activity scores at baseline, green salad was consumed more frequently in the highest quarter (men and women: median 3 times per week (IQR 1-3)) than the lowest (men: 1 (0.2-3), women: 1 (0.5-3)); the equivalent figures for wholemeal bread consumption were men: 3.5 (0.1-8.8), women: 3.5 (0.5-8.8) vs men: 1.5 (0-8.8), women: 2.8 (0.1-8.8).

DISCUSSION

We have identified psychosocial correlates of diet quality in a cohort of community-dwelling older men and women, and described relationships with change in diet quality over 10 years in a sub-group. Baseline diet quality was positively related to a range of psychosocial factors; a consistent finding for both men and women, was that greater participation in leisure activities, as well as in cognitive and social activities, was related to higher diet scores. There were few associations between psychosocial factors at baseline and change in diet score over 10 years in the follow-up sub-group of men and women. However, baseline participation in leisure activities, as well as participation in cognitive leisure activities, was associated with smaller declines in diet quality over time. These associations were not explained by social class, education or number of comorbidities. To our knowledge these findings have not been described before in a UK population.

There were some differences in the pattern of associations between social and psychological factors and diet quality between men and women. One consistent finding at baseline was that for men and women diet quality was positively related to having greater confiding/emotional support. This may be explained by a greater level of confiding, sharing interests, and reciprocity with a person someone feels very close to, contributing to increased self-esteem, sense of mattering to others, and mastery over activities [24]. Although this includes tasks such as cooking, which might increase motivation to cook and eat healthier meals, confiding/emotional support was not related to change in diet quality in men and women followed up at 10 years. At baseline, greater practical support was also associated with better diet quality among men. Poor cooking skills have been identified as a barrier to a healthy diet in older men [25], and these skills may be poorer in older men than in older women [26]. A greater level of practical support might reflect greater help received with shopping for food and cooking, but consistent with associations with emotional support, it was not related to changes in diet quality over the follow-up period. In a recent Canadian study [27], Rugel and Carpiano found that higher emotional support was positively associated with adequate fruit and

vegetable consumption in older women, whereas for older men, there was no association with emotional support nor practical (or tangible) support. The differences in findings could in part reflect the different measures used to assess social support; for example in the Canadian study [27] participants were asked about social support availability, rather that the support received, as in the present study.

In women, a large social network and feeling close to many people were associated with better quality diets at baseline, although not with change over follow-up. Older women may lose motivation to cook for themselves when alone [14] and may regard social aspects of meals to be of great importance for maintaining an adequate diet [27], which could explain the benefits of a larger social network. Positive effects of maintaining social contact have also been reported by Conklin and colleagues [16], although in this case an association was evident in both genders. Although 'number of people close to' was higher in HCS women (Appendix 2), there was no difference in social network scores between men and women and it is not clear why their associations with social network differed.

A key finding was that higher overall participation in leisure activities, including both social and cognitive activities, was related to better quality diets at baseline. Furthermore, baseline participation in leisure activities was associated with smaller declines in diet quality over time, in the follow-up sub-group; this was a consistent finding for both men and women although the effect size was modest. A previous study [28] from the US found that high social contact, including meeting with family and friends and engaging in leisure activities, namely attending religious services and club meetings, was related to better diet quality in older adults. In addition, a longitudinal study of community-living older disabled women in the US [29] found that attending more activities predicted an increase in diet quality over a 1-year period. There are various possible pathways through which participation in leisure activities, and indeed other social relationships, might impact upon diet, such as increased social support, social influence, an increased sense of purpose, meaning

in life and sense of belonging [24]. These pathways may promote positive psychological states that could motivate healthy behaviours, including diet [24].

Strengths and Limitations

This study uses baseline data from a large well characterised cohort. As baseline participants' characteristics are comparable with those of the wider population [18], the cross-sectional findings should have relevance to older adults in other parts of the country. A strength of the present study is the longitudinal data, although these were only available for a subsection of the HCS, who were slightly younger and healthier than the remainder of the cohort, which may have implications for the generalisability of the findings, and the interpretation of the changes in diet quality we describe. Additionally, we cannot exclude the possibility of residual confounding by factors that were not considered in the multivariate analyses, such as the general health status of participants. We considered a limited number of comorbidities and did not consider other linked health behaviours that may be relevant, such as levels of physical activity. A further limitation is that social factors were not re-assessed at follow-up and it is unknown if there were changes that could have affected diet quality over time. Self-reported diet may be affected by measurement error. However, short questionnaires have been shown to describe diet quality well [20]. Diet quality scores assessed using the questionnaire in this study have been shown to be correlated with blood biomarker concentrations and compared to a full FFQ, show comparable associations with nutrient intake [20]. It is unlikely that measurement error explains the associations we describe.

CONCLUSION

In community-dwelling older adults, a range of social factors, that include greater participation in social and cognitive leisure activities, were associated with diets of better quality. Further exploration is warranted of the role and importance of psychosocial factors as determinants of diet quality in later life, and the implications of the present study's findings for future practice.

Key points:

1) Although poor diet quality is common among older people, little is known about psychosocial influences on diet at this age.
2) We found cross-sectional associations between a range of social factors and diet quality.
3) Participation in leisure activities, especially cognitive activities, was associated with smaller declines in diet quality.
4) Further work is needed to extend and replicate these findings, to understand how social factors influence diet in later life.
5) This will be important for the development of interventions to promote diet quality in older people.

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Table 1: Associations between baseline social and psychological factors and baseline 24-item prudent diet score in all men and women.[1]

	Men			Women		
	N	Regression coefficient (95% CI)	p-value	N	Regression coefficient (95% CI)	p-value
Social factors						
Confiding/emotional support score	922	0.006 (0.002, 0.010)	0.002	775	0.005 (0.001, 0.009)	0.019
Practical support score	932	0.004 (0.001, 0.006)	0.014	781	0.002 (-0.001, 0.004)	0.261
Negative aspects of support score	912	-0.001 (-0.006, 0.003)	0.601	763	-0.002 (-0.006, 0.003)	0.448
Social Network Score	878	0 (-0.004, 0.005)	0.864	749	0.006 (0.001, 0.011)	0.015
Number of people close to	907			757		
<5 (reference)		0 (0.000, 0.000)	.		0 (0.000, 0.000)	.
5-9		-0.042 (-0.252, 0.168)	0.693		0.140 (-0.095, 0.375)	0.243
10-19		0.066 (-0.141, 0.274)	0.531		0.241 (0.004, 0.478)	0.046
20+		-0.006 (-0.258, 0.245)	0.960		0.418 (0.101, 0.736)	0.010
Leisure activity score	861	0.019 (0.013, 0.025)	<0.001	696	0.016 (0.009, 0.022)	<0.001
score for 'social' activities	861	0.009 (0.004, 0.014)	<0.001	696	0.008 (0.003, 0.013)	0.003
score for 'cognitive' activities	861	0.017 (0.012, 0.022)	<0.001	696	0.014 (0.009, 0.020)	<0.001
Psychological factors						
Control at home	919			784		
High (reference)		0 (0.000, 0.000)	.		0 (0.000, 0.000)	.
Low		-0.194 (-0.466, 0.079)	0.163		0.032 (-0.268, 0.332)	0.835
HAD-D	957			810		
Non-case (score 0-7) (reference)		0 (0.000, 0.000)	.		0 (0.000, 0.000)	.
Possible case (score 8-10)		-0.524 (-0.924, -0.125)	0.010		-0.165 (-0.528, 0.198)	0.371
Probable case (score 11+)		0.331 (-0.547, 1.210)	0.460		-0.411 (-1.106, 0.284)	0.246
HAD-A	957			810		
Non-case (score 0-7) (reference)		0 (0.000, 0.000)	.		0 (0.000, 0.000)	.
Possible case (score 8-10)		-0.289 (-0.546, -0.031)	0.028		-0.187 (-0.404, 0.029)	0.090
Probable case (score 11+)		-0.198 (-0.578, 0.182)	0.306		0.031 (-0.232, 0.295)	0.816

[1] Analyses were adjusted for social class, age left education and number of comorbidities.

Table 2: Baseline social and psychological factors as predictors of change in 24-item prudent diet score in men and women subgroups.[2]

	Men			Women		
	N	**Regression coefficient (95% CI)**	**p-value**	**N**	**Regression coefficient (95% CI)**	**p-value**
Social factors						
Confiding/emotional support score	160	-0.001 (-0.001, -0.000)	0.040	179	-0.001 (-0.001, 0.000)	0.187
Practical support score	163	-0.001 (-0.001, 0.000)	0.076	179	0.000 (-0.001, 0.000)	0.493
Negative aspects of support score	158	0.000 (-0.001, 0.001)	0.718	174	0.001 (-0.000, 0.001)	0.288
Social Network Score	153	0.000 (-0.001, 0.001)	0.847	173	0.000 (-0.001, 0.001)	0.844
Number of people close to	157			178		
<5 (reference)		0 (0.000, 0.000)	.		0 (0.000, 0.000)	.
5-9		-0.018 (-0.060, 0.025)	0.414		0.007 (-0.042, 0.056)	0.781
10-19		-0.039 (-0.081, 0.004)	0.074		-0.003 (-0.050, 0.044)	0.899
20+		0.009 (-0.043, 0.060)	0.733		0.003 (-0.060, 0.067)	0.922
Leisure activity score	149	0.002 (0.000, 0.003)	0.017	169	0.002 (0.000, 0.003)	0.014
score for 'social' activities	149	0.001 (-0.000, 0.002)	0.070	169	0.001 (-0.000, 0.002)	0.238
score for 'cognitive' activities	149	0.001 (0.000, 0.002)	0.041	169	0.001 (0.000, 0.002)	0.023
Psychological factors						
Control at home	161			178		
High (reference)		0 (0.000, 0.000)	.		0 (0.000, 0.000)	.
Low		-0.036 (-0.095, 0.023)	0.226		-0.044 (-0.104, 0.016)	0.149
HAD-D	165			182		
Non-case (score 0-7) (reference)		0 (0.000, 0.000)	.		0 (0.000, 0.000)	.
Possible case (score 8-10)		0.001 (-0.116, 0.118)	0.987		-0.075 (-0.164, 0.014)	0.097
Probable case (score 11+)		0.073 (-0.126, 0.272)	0.471		-	-
HAD-A	165			182		
Non-case (score 0-7) (reference)		0 (0.000, 0.000)	.		0 (0.000, 0.000)	.
Possible case (score 8-10)		-0.030 (-0.102, 0.043)	0.415		-0.051 (-0.099, -0.003)	0.038
Probable case (score 11+)		-0.015 (-0.092, 0.062)	0.701		-0.035 (-0.098, 0.027)	0.261

[2] Analyses were adjusted for social class, age left education and number of comorbidities.

Figure 1: Mean prudent diet score by quartile of leisure activity score for men and women.