

## TITLE

Willingness to adhere to current UK low-risk alcohol guidelines to potentially reduce dementia risk: A national survey of people aged 50 and over

## RUNNING TITLE

Adhering to alcohol guidelines for dementia risk reduction

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1 **ABSTRACT**

2 **Background:** People over 50 are increasing their alcohol intake, potentially increasing their  
3 risk of dementia.

4 **Objective:** This study investigates whether people would be willing to adhere to current  
5 United Kingdom (UK, “low-risk”) alcohol guidelines to reduce dementia risk.

6 **Methods:** A national cross-sectional online survey recruited a non-probabilistic sample of  
7 3,948 individuals aged 50 and over without dementia in the UK. Self-reported willingness to  
8 comply with low-risk guidelines was predicted using multivariate logistic regression. Other  
9 relevant self-reported variables included physical health, lifestyle, and current alcohol intake.

10 **Results:** Majority of the sample (90%,  $n=3,527$ ) reported drinking alcohol at least once a  
11 month with 23% ( $n=795$ ) exceeding the low-risk guidelines ( $>14$  units per week). A larger  
12 proportion of men, those who were overweight, and people without a partner reported  
13 drinking above the recommended level. Most people who consumed alcohol ( $n=2,934$ ;  
14 74.3%) appeared willing to adhere to low-risk guidelines if they were told that their risk of  
15 having dementia could be reduced. Increased willingness was found in women (OR 1.81; CI  
16 1.47-2.23), in people who had at least one child (OR 1.36; CI 1.09-1.70) and those who slept  
17 well (OR 1.45; CI 1.06-2.00). People who were obese (OR 0.72; CI 0.54-0.95), those who  
18 drank alcohol above limits (OR 0.13; CI 0.11-0.16), and those who were smokers (OR 0.56;  
19 CI 0.36-0.88) were less willing to adhere to current guidelines.

20 **Conclusion:** Men and people with more lifestyle risk factors for common chronic diseases  
21 (e.g., smoking, obesity and excess alcohol consumption) are less willing to adhere to current  
22 alcohol low-risk guidelines to reduce dementia risk.

23

24 **KEYWORDS:** Alcohol, Dementia, Disease prevention, Risk reduction, Older people

1 **BACKGROUND**

2 In the UK, around 57% of the adult population reports drinking alcohol regularly [1]. “Baby  
3 boomers” (people aged between 55 and 64) are “at-risk” for problems with alcohol intake as  
4 they have shown a steady increase in weekly consumption, compared to a decrease in intake  
5 by people aged 16-24 [1]. Crome and Rao [2] have called for a policy response to the over  
6 50s drinking habits based on increasing incidents of harm such as hospital admissions.

7

8 About a third of all cases of dementia might be attributed to modifiable risk factors, such as  
9 alcohol consumption, diabetes, high blood pressure, and obesity [3]. Reducing these risk  
10 factors in middle age could reduce the risk of developing dementia in later life [3]. Moderate  
11 to high consumption of alcohol is a risk factor for diabetes, heart disease, and dementia as it  
12 causes cumulative damage to vascular and brain structures [4-6]. Drinking 14-21 units a week  
13 increases the odds of right hippocampal atrophy (linked to dementia) three-fold while  
14 consuming over 30 units a week leads to the highest risk of hippocampal atrophy in a dose-  
15 dependent manner [7]. A large meta-analysis of international studies found that a daily  
16 alcohol intake of 38g (5 alcohol units) increased the risk of dementia [8].

17

18 Alcohol guidelines vary across the world and there is still no current consensus regarding so-  
19 called “safe” limits. Recent UK Government guidelines (hereafter referred to as “low-risk”  
20 guidelines) have reduced weekly alcohol intake for men (formerly 21 units per week), now  
21 recommending that both men and women drink no more than 14 units per week, spread their  
22 alcohol use over three or more days a week, and include alcohol-free days every week [9]. A  
23 recent meta-analysis has shown that drinking behaviour in later life is strongly associated with  
24 social engagement. However, there is scepticism among older people about the health risks of  
25 drinking alcohol [10]. Little is known about older people’s attitudes to dementia risk or their

1 willingness to moderate alcohol consumption. This study aimed to investigate the  
2 characteristics of people aged 50 and over who would be willing to adhere to low-risk  
3 guidelines to potentially reduce their risk of having dementia in the future.

4

## 5 **METHODS**

### 6 *Study design*

7 A UK-based cross-sectional online survey was undertaken from September 2017 to February  
8 2018. The study is reported as per the Strengthening the Reporting of Observational Studies  
9 in Epidemiology (STROBE) checklist [11].

10

### 11 *Recruitment*

12 Participants were aged 50 and over and had no dementia diagnosis (self-report). Potential  
13 participants were identified via social media and adverts. The Join Dementia Research  
14 network (a UK online platform for dementia research recruitment including mostly people  
15 without dementia) and the UK National Institute for Health Research (NIHR) Portfolio, were  
16 also used. Before completing the survey, all individuals confirmed that they met the study  
17 inclusion criteria and consented to take part in the research. Participants took approximately  
18 15 minutes to complete the anonymous survey.

19

### 20 *Variables*

21 As well as demographic information (area of residency; gender; age; highest qualification;  
22 relationship status; number of children; working status; ethnic group; know or knew and cared  
23 or care for someone with dementia), we measured several self-reported variables via online  
24 survey (all selected based on international consensus for risk factors for dementia) [3].

25

1 *General health and wellbeing*

2 Participants reported current health issues (e.g. diabetes, dyslipidaemia, high blood pressure)  
3 and lifestyle factors including smoking. Using 5-point Likert scales, participants were also  
4 asked about sleep quality; social and mental activity; stress; and depression.

5

6 *Lifestyle*

7 *Alcohol consumption:* Individuals were given examples of units of alcohol in common  
8 beverages. Quantity and frequency of alcohol intake were based on the first two items of the  
9 Alcohol Use Disorder Identification Test Consumption (AUDIT-C) [12]. The second item was  
10 modified to reflect the number of units of alcohol consumed, rather than the number of drinks  
11 so that approximate alcohol intake for each person per week could be calculated. Individuals  
12 consuming >14 units were classed as exceeding current low-risk guidelines [9]. All participants  
13 were asked how likely they would be to adhere to low-risk guidelines if they were told this  
14 could reduce their risk of developing dementia (5-point Likert scale).

15

16 *Physical activity:* Participants were asked about their level of physical activity (5-point Likert  
17 scales) and the number of hours of exercise per week. People who reported doing at least 60  
18 minutes of physical activity a week were asked how often their physical activity was moderate  
19 or vigorous.

20

21 *Diet and Body Mass Index (BMI):* Self-reported weight and height were collected to calculate  
22 BMI (weight [kg]/height<sup>2</sup> [m]) (BMI <18.5 = underweight; 18.5 to 24.9 = normal weight; 25.0  
23 to 29.9 = overweight; ≥30 = obese). Participants were asked how “healthy” they perceived their  
24 diet (5-point Likert scales) and how many portions of fruits/vegetables they consumed per day  
25 (1 portion = a handful).

1

2 ***Ethical approval***

3 The authors assert that all procedures contributing to this work comply with the ethical  
4 standards of the relevant national and institutional committees on human experimentation and  
5 with the Helsinki Declaration of 1975, as revised in 2008. Written informed consent was  
6 obtained from all participants. All procedures involving human subjects/patients were  
7 approved by the East Midlands - Nottingham Research Ethics Committee (IRAS project ID  
8 177280; REC reference 16/EM/0044).

9

10 ***Data analysis***

11 The primary outcome was participant's rating of willingness to follow low-risk alcohol  
12 guidelines to potentially reduce their risk of dementia (5-point Likert scale): (1) very likely, (2)  
13 quite likely, (3) not sure, (4) quite unlikely, and (5) very unlikely. Data were dichotomised for  
14 logistic regression analysis by combining categories (1) and (2) versus (3) to (5). All other  
15 variables collected were analysed as potential predictors of individuals' willingness to reduce  
16 alcohol consumption.

17

18 Number and percentage of (a) people having a drink containing alcohol in a typical month; (b)  
19 people exceeding the low-risk guideline; and (c) people who were willing to follow the low-  
20 risk guideline were calculated. Logistic regression models were used to examine the association  
21 between the potential predictors and the primary outcome. The univariate association between  
22 each potential predictor and outcome was examined and those with p-values <0.25 were  
23 selected for inclusion in the multivariable model. Potential predictors were tested for the  
24 presence of multicollinearity. If multicollinearity was identified, one of the correlated predictors  
25 was dropped from the multivariable model. Manual backward elimination procedure was used

1 to remove variables from the multivariable model until only variables with a p-value <0.05 were  
2 retained in the final model. The total number of variables considered in the initial multivariable  
3 logistic model complied with the rule of at least 10 events per variable [13] in order to avoid  
4 possible overfitting. All analyses were performed in Stata 15. Odds ratios were presented with  
5 the 95% confidence intervals.

6

## 7 **RESULTS**

8 A total of 3,948 individuals responded to the survey. They had a mean age of 62 ( $\pm 8.0$ ) and  
9 were mostly female ( $n=2,880$ ; 73%). Of the 3,527 participants who reported drinking alcohol,  
10 it was calculated that 795 (23%) exceeded the low-risk guideline on a typical week. Of the  
11 1,060 males taking part in the study, 977 (92%) reported having a drink containing alcohol in  
12 a typical month. Table 1 shows that a higher proportion of those drinking alcohol at least once  
13 a month ( $n=3,527$ ; 89.3%) were males ( $n=977$ ; 92.2%), slightly younger [mean age 62.2 (8.0)  
14 vs. 63.3 (7.5)], in a relationship ( $n=2,663$ ; 75.5%), educated to university level ( $n=2,096$ ;  
15 91.3%), and in good health ( $n=3,245$ ; 90.5%). A significantly larger proportion of males  
16 ( $n=362$ ; 37.1%), those without a partner ( $n=657$ ; 24.7%) and individuals who were overweight  
17 ( $n=325$ ; 26.2) reported drinking above the low-risk guideline.

18

19 Most people ( $n=2,934$ ; 74.3%) who drank alcohol said they were likely to follow the low-risk  
20 guidelines if it meant their risk of developing dementia could be reduced. Table 2 shows  
21 demographic, health and lifestyle factors in relation to a willingness to follow low-risk  
22 guidelines. After adjusting for all other variables in the model, women (OR 1.81; CI 1.47-2.23),  
23 those with at least one child (OR 1.36; CI 1.09-1.70) and those with good sleep on some nights  
24 (OR 1.45; CI 1.06-2.00) or most nights (OR 1.42; CI 1.05-1.91) were more likely to follow  
25 low-risk alcohol guidelines. Being obese (OR 0.72; CI 0.54-0.95), consuming alcohol above

1 the recommended limits (OR 0.13; CI 0.11-0.16) and being a smoker (OR 0.56; CI 0.36-0.88)  
2 were associated with decreased willingness to adhere to low-risk guidelines.

3

#### 4 **DISCUSSION**

##### 5 *Main findings*

6 Most people who consumed alcohol (74%) appeared willing to adhere to low-risk guidelines  
7 if they were told that their risk of having dementia could be reduced. Most people (90%)  
8 drank alcohol on a regular basis and a large proportion (23%) reported to exceed the low-risk  
9 guidelines (>14 units per week). A significantly larger proportion of men, those who were  
10 overweight, and people without a partner reported drinking above the recommended limits.  
11 Increased willingness to adhere to the low-risk guidelines was found in women, in people  
12 who had at least one child, and in those who slept well. People who were obese, those who  
13 drank alcohol above limits, and smokers were less willing to adhere to current guidelines.

14

##### 15 *Findings in the context of the current evidence*

16 The number of people aged 50 and over who drank alcohol in our study was higher than other  
17 UK estimates [14], but broadly corroborated general UK alcohol intake trends (92% of men  
18 and 88% of women reporting drinking regularly). The increased number of middle-aged and  
19 older women drinking regularly supports the closing gender gap [15, 16] and may reflect  
20 increasing social acceptability of alcohol use in women. In contrast to other work with older  
21 people (Meier [17] showed most frequent drinkers to be women aged 65-74, and men aged 75  
22 and over), we found no significant differences between age and drinking habits or willingness  
23 to adhere to the low-risk guideline. Such contradicting evidence may be explained by the  
24 relatively larger number of educated people in our sample in relation to the general UK older  
25 population, as increased education has been associated with higher drinking patterns in older



1 age [14]. This may also be because we had a comparatively younger sample (average age of  
2 62) in comparison to most research with older people (age  $\geq 65$ ), meaning that the views and  
3 habits of relatively older groups (e.g., aged 70+) may not have been well represented.

4

5 Our findings support the idea that “healthy and wealthy” middle-aged and older people  
6 consume alcohol most frequently. Health and wealth may affect drinking patterns due to  
7 increased exposure to social activities involving drinking, need to alleviate increasing stress,  
8 and more disposable income to purchase alcohol, for example [10]. Our findings also support  
9 some previous studies that found middle-aged and older adults who were single were drinking  
10 more than those in partnerships [14]. Other work has shown, however, that people in  
11 partnerships drink more frequently [18]. The reasons for such differing findings are currently  
12 unclear but might suggest that some older couples may have alcohol habits embedded in their  
13 relationships. Taking existing findings, and our work, it may also be that those in a  
14 relationship may need guidance about moderating frequency, while people who are single  
15 need advice about limiting quantity. The current lack of research examining relationship  
16 patterns and alcohol intake in middle and later life, as opposed to the more established  
17 evidence around drinking in early life and during pre- or post-divorce, limits further  
18 interpretations of our findings.

19

20 Of concern was that those with other risk factors for dementia were self-reportedly less likely  
21 to change their drinking behaviour and research has shown that the presence of more risk  
22 factors contributes to a higher dementia risk due to the shared variance among these [3].

23 Female gender, parenthood, and good sleep quality seemed to play a role towards healthier  
24 behaviour in relation to alcohol-related behaviour. People with children may feel more  
25 responsibility to look after their health as a diagnosis of dementia could mean becoming

1 dependent on their children or dying earlier or leaving their offspring behind. Middle-aged  
2 and older women may be more acutely aware of the issues related to dementia and caregiving  
3 than men, or more motivated by these issues [19]. However, further research is needed to  
4 establish the plausibility of such arguments. Sleep disruptions become more frequent in later  
5 life, with older people more frequently complaining about insomnia or multiple waking in  
6 previous studies [20]. Alcohol is often used by older people to medicate sleep [21], thus self-  
7 ascribed “poor sleepers” in the current study may have been less inclined to modify their  
8 drinking patterns for believing that alcohol can help improve their sleep quality. Health  
9 education about the negative effects on alcohol on sleep is needed to help reduce alcohol  
10 consumption in later life.

11  
12 The UK “low-risk” alcohol guidelines are relatively recent and for the first time they include  
13 gender-neutral recommendations (14 units a week for both men and women) and abandon the  
14 idea of “safe” drinking [9]. Consequently, younger generations started their drinking habits  
15 when gender neutral and low-risk guidelines with a more conservative narrative about alcohol  
16 consumption had already been established. In contrast, people over 50 who took part in our  
17 study had over 30 years of exposure to potentially confusing and contradictory messages  
18 about how much alcohol is “safe”, “sensible”, “good” or “bad” for one’s health. The concept  
19 of “sensible drinking” was introduced in 1981, followed by the “safe” unit limits published in  
20 1984, had allowed higher consumption for men compared to women [18 units a week for men  
21 and 9 for women [22]]. Such historical changes may explain not only why men are more  
22 likely to be drinkers and why women’s drinking is increasing, but it may also explain why we  
23 found men to be less willing to change their drinking behaviour [23]. Older men may have  
24 more difficulties with changing alcohol-related behaviour due to several decades of heavier  
25 drinking patterns reinforced by higher-unit guidelines available for them.

1

2 Ideas about alcohol being good for your heart were introduced in the early 1990s, further  
3 contributing to the confusion around the potential harm of alcohol to one’s health and  
4 potentially influencing patterns of heavier drinking in middle and later life. Both alcohol  
5 consumption as a risk factor for brain disease and dementia are considered to be newsworthy  
6 topics and are subject to frequent and potentially inaccurate reporting [24, 25]. For example,  
7 recent studies reported by the media have portrayed conflicting messages about whether  
8 “moderate drinking” is protective or a risk factor for dementia [[e.g. 26] and [7]]. Such  
9 disparities may encourage people to continue to consume alcohol as usual and may make  
10 them likely to adhere to current guidance due to the absence of a clear consensus regarding  
11 the potential risks. Our study suggests that many people would reduce intake if they were  
12 clearly told that this is indeed a risk factor for dementia, demonstrating that consistent and  
13 coherent reporting about the risks could be a drive for people to adjust their drinking patterns  
14 if they had consistent information.

15

16 ***Implications***

17 Our findings have important implications for clinical practice and future research. Middle-  
18 aged and older men and those who are obese, smokers or heavy drinkers may be less willing  
19 to adhere to the alcohol guidelines and should receive more attention from primary and  
20 secondary health care services. Individuals with such characteristics could benefit from  
21 motivational interviewing or brief counselling interventions to help them identify and  
22 implement gradual, but effective and permanent changes in lifestyle. There is moderate-  
23 quality evidence that such strategies can be more effective than no treatment to reducing  
24 alcohol consumption [27]. Clinicians should be aware of the “social role” of alcohol and  
25 should try and identify the best ways by which alcohol consumption could be reduced whilst

1 still maintaining any social activities that are meaningful to individuals. Older people who  
2 have sleep problems might be using alcohol to medicate sleep and so awareness should be  
3 raised regarding the negative effect of alcohol on sleep quality among these individuals.  
4 Further research needs to be conducted regarding alcohol and sleep and on the relationship  
5 between alcohol consumption and relationship status. More consistent and coherence  
6 guidance across genders needs to be provided to the public in order to encourage them to  
7 adhere to the low-risk guidelines, particularly to those who have other risk factors for  
8 dementia.

9

#### 10 *Strengths and weaknesses*

11 As it is the case of most surveys, this was a cross-sectional study and was limited by self-  
12 report data and non-probabilistic sample, which can be less generalisable to the entire  
13 population and less sensitive due to people's underestimations of their own alcohol intake  
14 [28] or insight into their own physical health. Self-report of willingness to change lifestyle  
15 may also have 'temporal' limitations as people's understandings of health risks and their  
16 motivations to change lifestyle may vary according to people's mood, life experiences and  
17 health knowledge, for example. However, the subjective assessment of other variables such  
18 sleep quality can be as powerful as their objective measurement and contributed to the  
19 robustness of our study [29]. Older people are likely to be the least informed about alcohol  
20 units [23], though we attempted to address this by providing illustrations of the number of  
21 units of alcohol in common beverages.

22

23 The large representation of women is a strength as less is known about older women's alcohol  
24 consumption and attitudes towards it [16]. However, the study is limited by having fewer  
25 men, who are more likely to be drinkers in later life [23]. Most people were highly educated

1 and from a white European background and previous studies have shown that dementia risk  
2 varies according to different ethnic groups and tends to be higher in less educated individuals  
3 [14, 30, 31]. Nevertheless, as alcohol consumption tends to be higher in highly educated and  
4 wealthy people [14, 32], this study included those who are more likely to need advice about  
5 alcohol.

6

7 In general, surveys like ours are often confounded by selection bias (white, higher educated  
8 etc). However, a future investigation should recruit a randomized sample to include a more  
9 representative sample (e.g. more people over 70, more men, a broader range of educational  
10 qualifications, and a more ethnically diverse population). This could help confirm and would  
11 allow for broader generalisation of the findings. Future studies should also attempt to use or  
12 develop standardised measurements of willingness to reduce alcohol intake for dementia risk  
13 reduction. One measure that could be used to assess people's general motivation to change  
14 lifestyle specifically for dementia risk reduction is the Motivation to Change Lifestyle and  
15 Health Behaviours for Dementia Risk Reduction (MCLHB-DRR), which has been developed  
16 and validated in Australia [33].

17

18 It is important to consider that people who completed the survey may have been those who  
19 are more likely to change behaviour as they have an interest in this topic than those who did  
20 not complete the survey. This means that the population of those who are less likely to change  
21 their alcohol intake may have been underrepresented in this study. Previous work examining  
22 change in risk behaviour has shown that long-term risk can be a weak driver of behaviour,  
23 with people tending to monitor their behaviour by certain and immediate pleasure [34]. It  
24 might therefore be unclear whether a person's perception of what they may do would match  
25 with future behaviour.

26

1 **Conclusions**

2 The majority of middle-aged and older people were willing to adhere to low-risk guidelines if  
3 they were told that their risk of having dementia could be reduced. Those who were most  
4 reluctant may be at greatest need of health intervention. Gender, parental roles, and other  
5 health behaviours, such as smoking, sleep patterns, weight management and amount of  
6 alcohol intake, may influence willingness to follow alcohol guidelines. Although behaviour  
7 change and risk calculation are complex and involve socioeconomic, psychological and  
8 cultural factors, this study helped identify suggestive evidence of those who might be at the  
9 highest risk for non-adherence to alcohol guidelines for dementia risk reduction. Future public  
10 health actions should consider differences in willingness to change risk behaviour according  
11 to gender, sleep quality, parental roles, obesity, smoking status and amount of alcohol  
12 consumed in order to increase the sensitiveness of alcohol-related interventions.

13  
14 **ACKNOWLEDGEMENTS**

15 This work was funded by the Alzheimer’s Research UK. The funder had no role in study  
16 design, data collection and analysis, decision to publish, or preparation of the manuscript.

17  
18 **CONFLICT OF INTEREST/DISCLOSURE STATEMENT**

19 DO has received funding from the Alzheimer’s Research UK. MO has received grants from  
20 the ESRC, NIHR and EU Commission for dementia care research. All the other authors have  
21 no conflict of interest.

22  
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13

**Table 1.** Characteristics of those having a drink containing alcohol and who drink beyond “low-risk” limit

	Having a drink containing alcohol in a typical month			Drinking beyond limit		<i>p</i>
	No ( <i>n</i> =421)	Yes ( <i>n</i> =3,527)	<i>p</i>	No ( <i>n</i> =2,732)	Yes ( <i>n</i> =795)	
<b>Gender</b>			**			***
Male	83 (7.8)	977 (92.2)		615 (63.0)	362 (37.1)	
Female	336 (11.7)	2,544 (88.3)		2,111 (830)	433 (17.0)	
<b>Age (years): mean (SD)</b>	63.3 (7.5)	62.2 (8.0)	*	62.3 (8.0)	61.7 (7.7)	
<b>Age (group)</b>			*			
50-59	139 (8.8)	1,448 (91.2)		1,112 (76.8)	336 (23.2)	
60-69	191 (12.3)	1,363 (87.7)		1,047 (76.8)	316 (23.2)	
70+	87 (11.3)	684 (88.7)		544 (79.5)	140 (20.5)	
<b>Relationship status</b>			***			***
No partner	270 (64.1)	2,663 (75.5)		2,006 (75.3)	657 (24.7)	
Partner	151 (35.9)	864 (24.5)		726 (84.0)	138 (16.0)	
<b>Highest qualification</b>			***			
Non-graduate	220 (13.3)	1,431 (86.7)		1,126 (78.7)	305 (21.3)	
Graduate and post-graduate	201 (8.8)	2,096 (91.3)		1,606 (76.6)	490 (23.4)	
<b>General health</b>			***			
Fair/poor	81 (22.3)	282 (77.7)		228 (80.9)	54 (19.2)	
Good to excellent	340 (9.5)	3,245 (90.5)		2,504 (77.2)	741 (22.8)	
<b>Body Mass Index (BMI)</b>			***			***
Underweight (<18.5)	14 (24.6)	43 (75.4)		35 (81.4)	8 (18.6)	
Normal (18.5-24.9)	185 (10.0)	1,663 (90.0)		1,329 (79.9)	334 (20.1)	
Overweight (25.0-29.9)	128 (9.3)	1,242 (90.7)		917 (73.8)	325 (26.2)	
Obese (≥30)	91 (13.9)	566 (86.2)		440 (77.7)	126 (22.3)	

\**p*<0.01; \*\**p*<0.001; \*\*\**p*<0.001*SD*= Standard Deviation

**Table 2.** Characteristics of individuals who drink alcohol who would follow UK Government guidelines on low risk intake and unadjusted and adjusted odds ratios of association with willingness to follow low-risk alcohol guidelines

<b>Variables</b>	<b>Quite/very unlikely to follow low-risk levels (n=1,014; 25.7%)</b>	<b>Very/quite likely to follow low-risk levels (n=2,934; 74.3%)</b>	<b>Unadjusted (Univariate)* OR (95% CI)</b>	<b>Adjusted† OR (95% CI)</b>
<b>Gender</b>				
Male	265 (27.1)	712 (72.9)	1	1
Female	326 (12.8)	2,218 (87.2)	2.53 (2.11, 3.04)	1.81 (1.47, 2.23)
<b>Age (years): mean (SD)</b>	61.8 (7.7)	62.3 (8.0)	1.01 (0.99, 1.02)	-
<b>Relationship status</b>				
No partner	144 (6.7)	720 (83.3)	1	-
Partner	449 (16.9)	2,214 (83.1)	0.99 (0.80, 1.21)	-
<b>Highest qualification</b>				
Non-graduate	217 (15.2)	1,214 (84.8)	1	-
Graduate and post-graduate	376 (17.9)	1,720 (82.1)	0.82 (0.68, 0.98)	-
<b>General health</b>				
Fair/poor	56 (19.9)	226 (80.1)	1	-
Good to excellent	537 (16.6)	2,708 (83.5)	1.25 (0.92, 1.70)	-
<b>Body Mass Index (BMI)</b>				
Underweight	7 (16.3)	36 (83.7)	0.87 (0.38, 1.98)	0.82 (0.34, 2.00)
Normal	241 (14.5)	1,422 (85.5)	1	1
Overweight	234 (18.8)	1,008 (81.2)	0.73 (0.60, 0.89)	0.88 (0.71, 1.10)
Obese	109 (19.3)	457 (80.7)	0.71 (0.55, 0.91)	0.72 (0.54, 0.95)
<b>Currently employed</b>				
No	283 (16.2)	1,464 (83.3)	1	-
Yes	310 (17.4)	1,470 (82.6)	0.92 (0.77, 1.09)	-
<b>Ethnic group</b>				
Non-white	13 (14.8)	75 (85.2)	1	-
White	580 (16.9)	2,859 (83.1)	0.85 (0.47, 1.55)	-
<b>Has children</b>				
No	172 (20.0)	688 (80.0)	1	1

Yes	419 (15.8)	2242 (84.3)	1.34 (1.09, 1.63)	1.36 (1.09, 1.70)
<b>Ever known someone living with dementia</b>				
No	83 (18.8)	359 (81.2)	1	-
Yes	510 (16.5)	2,575 (83.5)	1.17 (0.90, 1.51)	-
<b>Ever been a carer for someone with dementia</b>				
No	240 (18.3)	1,069 (81.7)	1	-
Yes (family/informal)	208 (15.2)	1,164 (84.8)	1.26 (1.03, 1.54)	-
Yes (professional)	34 (14.2)	205 (85.8)	1.35 (0.92, 2.00)	-
Yes (professional & family)	28 (17.0)	137 (83.0)	1.10 (0.71, 1.69)	-
<b>Co-morbidity</b>				
No disease/disorder	320 (17.5)	1,510 (82.5)	1	-
1 disease/disorder	119 (16.2)	615 (83.8)	1.10 (0.87, 1.38)	-
2 or more diseases/disorder	154 (16.0)	809 (84.0)	1.11 (0.90, 1.37)	-
<b>Weekly alcohol consumption</b>				
Low risk (1 to 14 units)	237 (8.7)	2,495 (91.3)	1	1
At risk (>14 units)	356 (44.8)	439 (5.2)	0.12 (0.09, 0.14)	0.13 (0.11, 0.16)
<b>Current smoker</b>				
No	555 (16.3)	2,846 (83.7)	1	1
Yes	38 (30.2)	88 (69.8)	0.45 (0.31, 0.67)	0.56 (0.36, 0.88)
<b>Physical activity</b>				
Not active	125 (17.1)	607 (82.9)	1	-
Moderately/very active	468 (16.7)	2,327 (83.3)	1.02 (0.82, 1.27)	-
<b>Portions of fruit consumed per day</b>				
0-2 portions	124 (19.9)	500 (80.1)	1	-
3-4 portions	267 (17.1)	1,292 (82.9)	1.20 (0.95, 1.52)	-
5 or more portions	202 (15.0)	1,142 (85.0)	1.40 (1.10, 1.80)	-
<b>Sleep well</b>				
Almost never/never	90 (21.5)	329 (78.5)	1	1
Some nights	196 (16.0)	1,027 (84.0)	1.43 (1.08, 1.89)	1.45 (1.06, 2.00)
Always/most nights	307 (16.3)	1,578 (83.7)	1.41 (1.08, 1.83)	1.42 (1.05, 1.91)

**Feel depressed**

Never/rarely	305 (16.5)	1,547 (83.5)	1	-
Sometimes	258 (16.9)	1,268 (83.1)	0.97 (0.81, 1.16)	-
Always/most times	30 (20.1)	119 (79.9)	0.78 (0.51, 1.19)	-

**Feel stressed**

Never/rarely	203 (18.2)	910 (81.8)	1	-
Sometimes	321 (15.6)	1,731 (84.4)	1.20 (0.99, 1.46)	-
Always/most times	69 (19.1)	293 (80.9)	0.95 (0.70, 1.28)	-

**Social activity**

Not socially active	143 (17.9)	658 (82.2)	1	-
Very/quite socially active	450 (16.5)	2,276 (83.5)	1.10 (0.89, 1.35)	-

**Mental activity**

Not mentally active	51 (15.6)	275 (84.4)	1	-
Very/quite mentally active	542 (16.9)	2,659 (83.1)	0.91 (0.67, 1.24)	-

\* Univariate association between each variable and willingness to follow UK Government low-risk level.

† Adjusted for all the other variables in the final model. All the variables in the univariate model except relationship status, job status, ethnicity, knowing someone living with dementia, number of health problems, physical activity, depression and social activity were significant ( $p < 0.25$ ) and were included in the initial multivariable model. Only significant variables ( $p < 0.05$ ) are presented in the final multivariable model.

SD= Standard Deviation

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