

# Differences in dementia prevention knowledge by educational attainment: an analysis of a household survey from Great Britain

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## ABSTRACT

**Background** Higher levels of education are associated with slower cognitive decline and a lower risk of dementia, with some evidence of a causal relationship. However, the mechanisms explaining these associations are not well established.

**Methods** We collected data on dementia knowledge using a cross-sectional household survey representative of the population of Great Britain. Dementia knowledge was assessed using a self-reported measure and a question measuring the knowledge of key risk factors. We examined whether dementia knowledge varied by levels of education (as measured by the level of the highest qualification) by fitting logistic regressions adjusted for confounding factors.

**Findings** Out of the 5036 respondents aged 25 or over (46.6% male; average age 63.8), 9.3% reported knowing a great deal about dementia, and 32.2% quite a lot. We found a strong educational gradient in dementia prevention knowledge. For people with a degree qualification compared with people with no formal qualification, the ORs of reporting having quite a lot or a great deal of knowledge about dementia were 2.54 (95% CIs 1.81 to 3.56). The ORs were 3.58 (2.61 to 4.91) for mentioning all risk factors. The difference in awareness by educational level was largest for some risk factors such as lack of physical and mental activity, alcohol consumption and poor mental health.

**Interpretation** The protective effect of higher levels of education against the risk of dementia may partly be driven by differences in dementia prevention knowledge. Health education efforts on dementia prevention should target people with lower levels of education to reduce inequalities in dementia prevalence.

## INTRODUCTION

Dementia is one of the leading causes of death in the UK. In 2022, Dementia and Alzheimer's disease were the leading cause of death in England and Wales, accounting for 11.4% of all deaths.<sup>1</sup> In Scotland, it was the second leading cause of death, accounting for 10.0% of deaths in 2022.<sup>2</sup> Furthermore, evidence shows that when accounting for sex and age, the incidence rate of dementia increased between 2010 and 2019 in England.<sup>3</sup> As a

## WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ Higher levels of education are associated with slower cognitive decline and a lower risk of dementia and the relationship is likely to be causal.
- ⇒ One mechanism is that education may increase or help maintain the underlying 'brain reserve' of the individual but there is limited evidence to support this theory. Another mechanism could be that education improves health knowledge and, more specifically, knowledge of the risk factors for dementia.

## WHAT THIS STUDY ADDS

- ⇒ We examine whether knowledge of dementia and its risk factors varied by level of educational attainment.
- ⇒ There is strong and consistent educational gradient in dementia prevention knowledge, with people with higher levels of education having better self-reported dementia knowledge and showed a higher awareness of the key risk factors for dementia.
- ⇒ People with higher level of education were more likely to be aware of every risk factor but the difference in awareness by educational level was largest for some risk factors such as lack of physical and mental activity, alcohol consumption and poor mental health.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ The protective effect of higher levels of education against the risk of dementia may partly be driven by differences in dementia knowledge.
- ⇒ Health education efforts on dementia prevention should target people with lower levels of education to reduce inequalities in dementia prevalence.

result, the projected number of people with dementia in England and Wales in 2040 may be significantly higher than initially forecasted, potentially impacting heavily on health and social care services. This is despite there being several known modifiable risk factors.<sup>4</sup>

Many studies document that higher levels of education are associated with slower cognitive

decline and a lower risk of dementia<sup>5 6</sup> and there is evidence that the relationship is likely to be causal.<sup>7 8</sup> However, the mechanisms explaining these associations are not well established. One potential mechanism is that education may increase or help maintain the underlying 'brain reserve' of the individual, by increasing cognitive abilities and as result, helping to tolerate the age-related changes in the brain without developing clear clinical symptoms.<sup>9</sup> However, there is limited evidence to support this theory, since associations between education and ageing-associated cognitive declines are negligible in size, suggesting that educational attainment affects late-life cognitive function primarily by generating individual differences in cognitive skills in early adulthood, which persist into older age.<sup>6</sup>

Education could also reduce the risk of dementia by improving health knowledge in general,<sup>10–12</sup> and in particular awareness of the risk factors for dementia. As a result, people with higher levels of education may adopt behaviours that may reduce the risk of dementia, or at least, delay the onset. Higher level of education is associated with increased use of available screening programmes, adoption of new medical advances and new guidelines.<sup>12–14</sup> While the risk of dementia is largely driven by age and genetic factors, factors such as being mentally or physically active, diet, smoking or alcohol consumptions are also known to affect cognitive decline and the onset of dementia.<sup>4 15</sup> While there are some studies documenting that dementia knowledge varies by educational attainment,<sup>16 17</sup> there is little evidence for the UK, especially based on samples representative of the general population.

In this paper, we assessed whether knowledge of dementia prevention varied by level of educational attainment and whether these differences varied by age and sex. We collected data on dementia knowledge and its risk factors among respondents from a household survey in Great Britain and estimated whether dementia knowledge and awareness of the risk factors for dementia differed by level of educational attainment, after adjusting for key confounding factors.

## METHODS

### Data sources and study population

We used data from the Opinion and Life Style Survey (OPN).<sup>18</sup> The OPN is a cross-sectional survey covering residents of Great Britain who are aged 16 years and over. The survey is conducted fortnightly, with 2000 to 2500 individuals responding to the survey. Data collection is conducted by an online self-completion questionnaire; telephone interviews are available if requested by the respondent, with around 1% of respondents choosing that option—see online supplemental annex A for more detail on the survey.

We used data collected between 9 August and 3 September 2023. Our study population included respondents aged 25 or over (to allow for people to have time to

complete higher education) who lived in private households and provided information about their highest qualification. Out of the 5261 adults who responded to the OPN in that period, 5060 were aged 25 or over. We excluded 24 respondents who did not provide information on their highest qualification. The analytical sample included 5036 respondents.

### Outcomes

The first outcome was a self-reported measure of people's knowledge of dementia. Respondents were asked to rate their knowledge of dementia on a 5-point Likert scale, following the question: 'How much, if anything, would you say you know about dementia?'. The scale included the categories: 'A great deal', 'Quite a lot', 'Some', 'Not very much' and 'Nothing at all'. We created a binary variable equal to one if the response was 'A great deal' or 'Quite a lot', zero otherwise. As a sensitivity analysis, we used the values from the Likert scale.

The second set of outcomes measured knowledge of key risk factors for dementia. These were derived based on a question on what people can do to reduce the risk of dementia. Respondents were asked 'What do you think people can do, if anything, to reduce the risk of dementia?' and provided with a list of eight different things people could do and an option to say none of the above (see online supplemental table S1). As all these actions are associated with a lower risk of developing dementia,<sup>4 19</sup> mentioning these can be interpreted as awareness of the risk factors for dementia. The list of risk factors was based on the 2020 report on dementia prevention conducted by the Lancet Commission.<sup>19</sup> We derived eight binary variables indicating whether respondents had selected each option. We also derived a variable indicating how many factors people had selected (ranging from 0 to 8) as well as a variable indicating whether people had mentioned all factors. We also derived a variable indicating whether people had not mentioned any factor. Another variable indicated that people said yes to the statement 'I don't think any of these can reduce the risk of dementia'.

### Exposure

Our main exposure is the highest qualification level. Degree level qualifications include all undergraduate and postgraduate qualifications, including degree level apprenticeships. Level 4 or 5 qualifications include higher educational qualifications below degree level, such as higher apprenticeships, certificate or diploma of higher education and foundation degrees.

Level 3 qualifications include A levels, Highers or Ordinary National Certificate/National level Business and Technology Education Council qualifications. Level 2 qualifications include O-level or General Certificate of Secondary Education (GCSE) equivalent (grades A–C) or O-Grade/CSE equivalent. Level 1 qualifications include GCSE (grades D–G) or CSE (grades 2–5) or Standard Grade (levels 4–6). Other qualifications also include foreign qualifications below degree level.

## Statistical analysis

Baseline characteristics were calculated using means (with Standard Deviation) for continuous variables and counts (with percentages) for categorical variables.

To assess the association between highest qualification level and the knowledge of dementia (using the self-reported dementia prevention knowledge as well as mention of each risk factor), we estimated the difference in knowledge of dementia by highest qualification level using logistic regression models. The main models were adjusted for key confounding factors, including sex, age, ethnicity and region (online supplemental figure S1). Sex, age and ethnicity are clear potential confounders of the relationship between education and dementia knowledge. There is evidence that dementia knowledge varies by these characteristics<sup>16 20</sup> and these characteristics cannot be affected by education. Region could be seen as being affected by education, and we assessed the effect of including region as a confounder in our sensitivity analyses. Age and sex interacted as the age patterns in highest qualification level and the knowledge of dementia may vary by sex. Models were fitted using survey weights and the survey design of the OPN was accounted for to estimate the SE.<sup>18</sup>

To assess whether the association was in part driven by differences in health and socioeconomic positions, we also fitted models further adjusted for measures of socioeconomic position (housing tenure, deciles of the Index of Multiple Deprivation) and health (self-reported health, having activity limiting long-term health problems). Both socioeconomic position and health have been documented to be linked to dementia knowledge.<sup>21</sup> Our main models did not include these factors because these may sit on the causal pathway between education and dementia knowledge (online supplemental figure S1).

We assessed whether the association between highest qualification level and the knowledge of dementia varied by sex and broad age groups (less than 70, 70 or over) by testing for interactions between sex (or age group) and highest qualification level using a likelihood ratio test. If the p value was less than 0.05, we estimated the ORs using stratified models.

As sensitivity analyses, we fitted models (1) without an interaction between age and sex, (2) adjusting for age using 5-year age bands rather than a natural cubic spline, (3) excluded respondents living in Wales or Scotland (because they did not have a valid Index of Multiple Deprivation decile) and (4) not adjusting for region in the minimally adjusted model. For dementia knowledge, we also fitted a weighted ordered logistic regression model using the value from the Likert scale (A great deal, Quite a lot, Some, Not very much, Nothing at all) instead of a binary variable for knowing a lot (A great deal, Quite a lot).

All analyses were conducted using R 4.1.3, using the *svyglm* package to fit logistic regression to survey data. The code is available on Github.

## Research ethics approval

This study analysed anonymised records from the Opinion and Life Style Survey, which is collected by the Office for National Statistics. We engaged with the UK Statistics Authority Data Ethics team, who were satisfied that no further ethical approval was required.

## RESULTS

### Characteristics of the study population

The study population comprised 5036 respondents aged 25 or over (weighted: 45 504 823), 46.6% of whom were male, with an average age of 63.8 (SD 15.5, min 25, max 97) (table 1). 40.0% of respondents had a degree level qualification and 13.3% had no formal qualification. 88.4% of respondents lived in England, 6.9% in Scotland and 4.7% in Wales. When asked about knowledge of dementia, 9.3% of respondents reported knowing a great deal about it, and 32.2% quite a lot. Just over a third (37.7%) of respondents correctly identified all key risk factors for dementia, while 8.9% did not mention any of them. 85.1% of respondents mentioned 'Be mentally active' as something that could prevent dementia, and 57.1% of them mentioned not smoking. The weighted summary statistics show that respondents were older (weighted mean age: 52.5) and had higher levels of qualification than the target population (weighted proportion of people with a degree of 33.2%).

There was a strong relationship between self-reported dementia and the ability to correctly identify the risk factors for dementia, with 43.0% of people reporting knowing a great deal about dementia identifying all the risk factors, compared with 26.0% of those who reported having little or no knowledge about dementia (online supplemental figure S2).

### Association between education and dementia prevention knowledge

There was a strong relationship between highest qualification level and self-reported dementia prevention knowledge (figure 1; Online supplemental table S2). After adjusting for sex, age, ethnicity and region, compared with people with no formal qualification, the ORs of reporting having quite a lot or a great deal of knowledge about dementia were 2.54 (95% CIs 1.81 to 3.56) for people with a degree level qualification, 1.83 (1.18 to 2.82) for people with a level 4 or 5 qualification, 1.49 (1.05 to 2.12) for people with a level 3 qualification and 1.43 (1.05 to 1.96) for a level 2 qualification. Having a level 1 qualification was not associated with better self-reported dementia knowledge (OR 1.02 (0.64 to 1.64)). Adjusting further for potential mediators (such as health status, disability and measures of socioeconomic positions), marginally reduced the ORs but not impacting the clear educational gradient (online supplemental table S2). The fully adjusted OR for people with a degree level qualification was 2.37 (1.67 to 3.36), compared with 2.53 (1.81 to 3.55) for the confounder adjusted model.

**Table 1** Characteristics of the study population

	Unweighted	Weighted
Total	5036	45 504 823
Number of factors mentioned (mean (SD))	5.50 (2.66)	5.25 (2.81)
All factors mentioned	1900 (37.7)	16 622 433.5 (36.5)
No factor mentioned	447 (8.9)	5 176 061.8 (11.4)
Whether specified 'Be physically active'	3959 (78.6)	33 567 631.4 (73.8)
Whether specified 'Not smoke'	2877 (57.1)	24 853 469.3 (54.6)
Whether specified 'Be mentally active'	4316 (85.7)	37 371 048.3 (82.1)
Whether specified 'Eat a healthy diet'	3676 (73.0)	31 763 023.0 (69.8)
Whether specified 'Limit alcohol intake'	3105 (61.7)	26 776 991.3 (58.8)
Whether specified 'Look after mental health conditions'	3034 (60.2)	27 740 233.3 (61.0)
Whether specified 'Socialise regularly'	3529 (70.1)	29 409 426.0 (64.6)
Whether specified 'Look after physical health conditions'	3227 (64.1)	27 568 339.0 (60.6)
Whether specified 'I don't think any of these can reduce the risk of dementia'	357 (7.1)	3 796 677.3 (8.3)
Knowledge of dementia (%)		
A great deal	469 (9.4)	3 952 274.9 (8.7)
Quite a lot	1620 (32.3)	11 839 067.4 (26.2)
Some	2241 (44.7)	20 722 506.3 (45.8)
Not very much	629 (12.5)	7 751 870.4 (17.1)
Nothing at all	57 (1.1)	951 827.2 (2.1)
Level of highest qualification (%)		
No formal qualifications	670 (13.3)	5 555 898.5 (12.2)
Other	310 (6.2)	3 077 418.5 (6.8)
Level 1 qualifications	177 (3.5)	2 906 119.8 (6.4)
Level 2 qualifications	736 (14.6)	8 044 560.9 (17.7)
Level 3 qualifications	573 (11.4)	8 192 496.2 (18.0)
Level 4 or 5 qualifications	557 (11.1)	2 610 923.1 (5.7)
Degree level qualifications	2013 (40.0)	15 117 405.7 (33.2)
Age (mean (SD))	63.80 (15.49)	52.54 (16.59)
Sex=female (%)	2690 (53.4)	23 310 152.3 (51.2)
Index of Multiple Deprivation Decile (%)		
1	196 (3.9)	2 349 993.7 (5.2)
2	242 (4.8)	3 095 634.5 (6.8)
3	286 (5.7)	3 290 357.6 (7.2)
4	374 (7.4)	3 720 577.1 (8.2)
5	436 (8.7)	4 041 919.5 (8.9)
6	474 (9.4)	3 832 748.8 (8.4)
7	531 (10.5)	4 635 803.8 (10.2)
8	605 (12.0)	4 559 878.3 (10.0)
9	575 (11.4)	3 951 383.3 (8.7)
10	678 (13.5)	4 828 704.6 (10.6)
NA	639 (12.7)	7 197 821.6 (15.8)
Disability status (%)		
Disabled	1893 (37.6)	14 906 952.7 (32.8)
Non-disabled	2944 (58.5)	28 373 255.9 (62.4)
RF/DK	199 (4.0)	2 224 614.2 (4.9)

Continued



Table 1 Continued

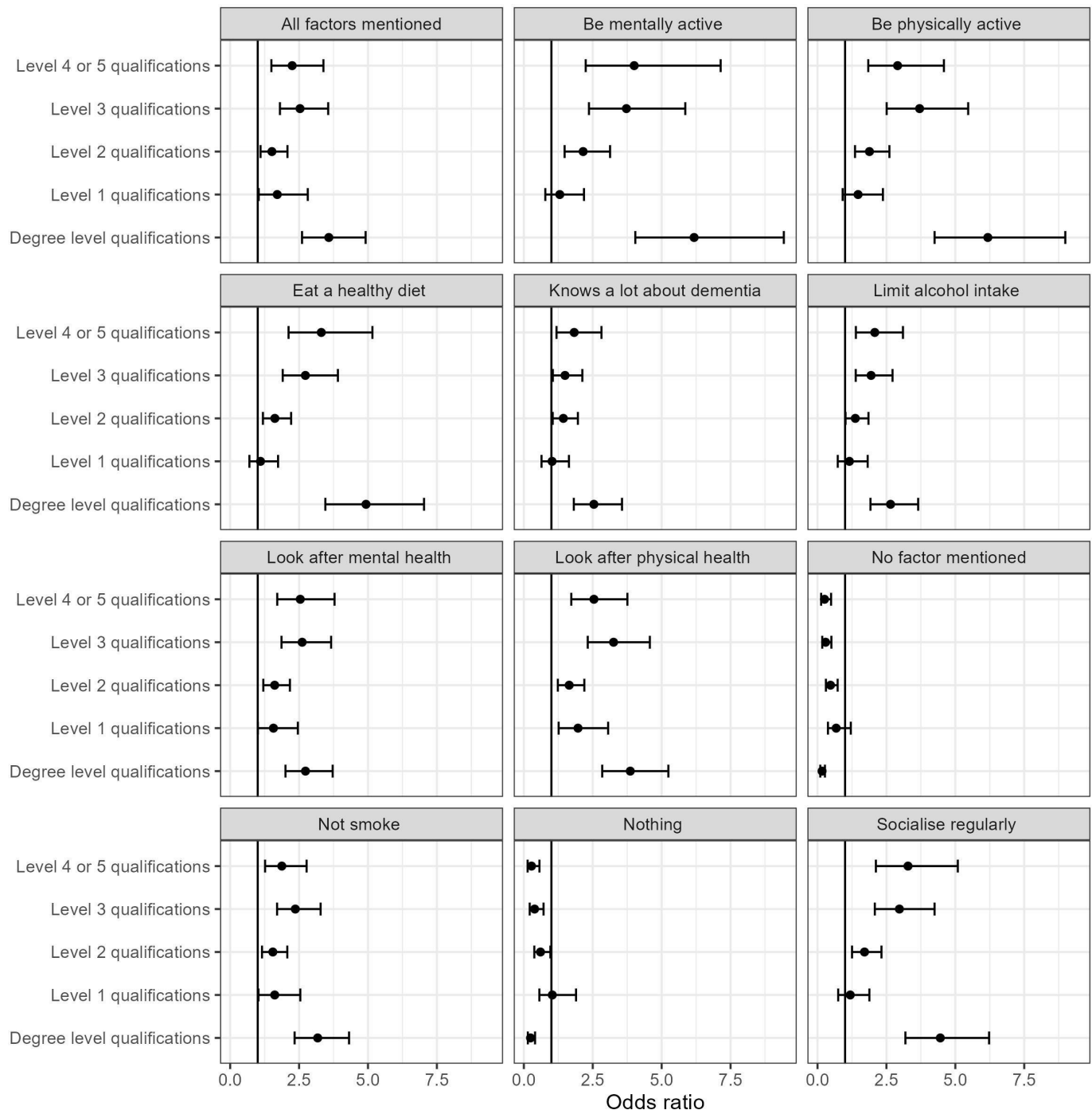
	Unweighted	Weighted
Health (%)		
Very good or good	3141 (62.4)	28 734 853.6 (63.1)
Bad or very bad	430 (8.5)	4 434 992.0 (9.7)
Fair	1439 (28.6)	11 970 380.1 (26.3)
Don't know or prefer not to say	26 (0.5)	364 597.0 (0.8)
White=non-white (%)	216 (4.3)	3 931 932.2 (8.6)
Economic activity (%)		
Economically inactive—other	426 (8.5)	5 076 010.5 (11.2)
Economically inactive—retired	2693 (53.5)	11 500 378.1 (25.3)
Employed/self-employed	1855 (36.9)	28 200 408.9 (62.0)
Unemployed	49 (1.0)	693 661.2 (1.5)
Unpaid family worker	8 (0.2)	18 291.9 (0.0)
Country of residence (%)		
England	4454 (88.4)	38 982 085.4 (85.7)
Scotland	345 (6.9)	4 167 888.6 (9.2)
Wales	237 (4.7)	2 354 848.8 (5.2)
Housing tenure (grouped) (%)		
Owner	3264 (64.8)	16 076 901.9 (35.3)
Mortgage	910 (18.1)	15 325 666.1 (33.7)
Renting	862 (17.1)	14 102 254.8 (31.0)
Government Office Region (%)		
North East	218 (4.3)	1 990 604.9 (4.4)
North West	532 (10.6)	4 915 869.5 (10.8)
Yorkshire and The Humber	445 (8.8)	3 733 163.0 (8.2)
East Midlands	438 (8.7)	3 219 442.1 (7.1)
West Midlands	443 (8.8)	4 322 967.4 (9.5)
East of England	538 (10.7)	4 334 525.4 (9.5)
London	363 (7.2)	6 290 407.8 (13.8)
South East	857 (17.0)	6 222 213.3 (13.7)
South West	620 (12.3)	3 952 891.9 (8.7)
Wales	237 (4.7)	2 354 848.8 (5.2)
Scotland	345 (6.9)	4 167 888.6 (9.2)

Data presented is mean or count (column-wise percentage for variables with  $\geq 2$  levels).  
IMD, Index of Multiple Deprivation; RF/DK, refused/don't know.

There was a strong association between highest qualification level and knowledge of the risk factors for dementia. After adjusting for sex, age, ethnicity and region, the odds of mentioning all risk factors were 3.58 (2.61 to 4.91) higher for people with a degree qualification compared with people with no formal qualification. The ORs were significantly above 1.5 for all people with other qualifications: 2.25 (1.50 to 3.38) for level 4 or 5 qualification, 2.53 (1.81 to 3.56) for level 3 qualifications, 1.51 (1.10 to 2.08) for level 2 qualifications and 1.71 (1.04 to 2.82) for level 1 qualification. A steep gradient was observed for not mentioning any of the risk factors:

the ORs were 0.16 (0.10 to 0.27) for people with a degree level qualification, 0.25 (0.13 to 0.49) for levels 4 or 5, 0.29 (0.17 to 0.50) for level 3, 0.47 (0.30 to 0.73) for level 2 and 0.68 (0.38 to 1.21) for level 1 qualifications.

People with higher level of education were more likely to be aware of every risk factor. But the difference in awareness by educational level was larger for some risk factors than others. The difference between people with a degree level qualification and those with no formal qualification was highest for the mention of being mentally active (OR 6.24 (4.10 to 9.50)) and physically active (6.18 (4.25 to 8.99)) and was lowest



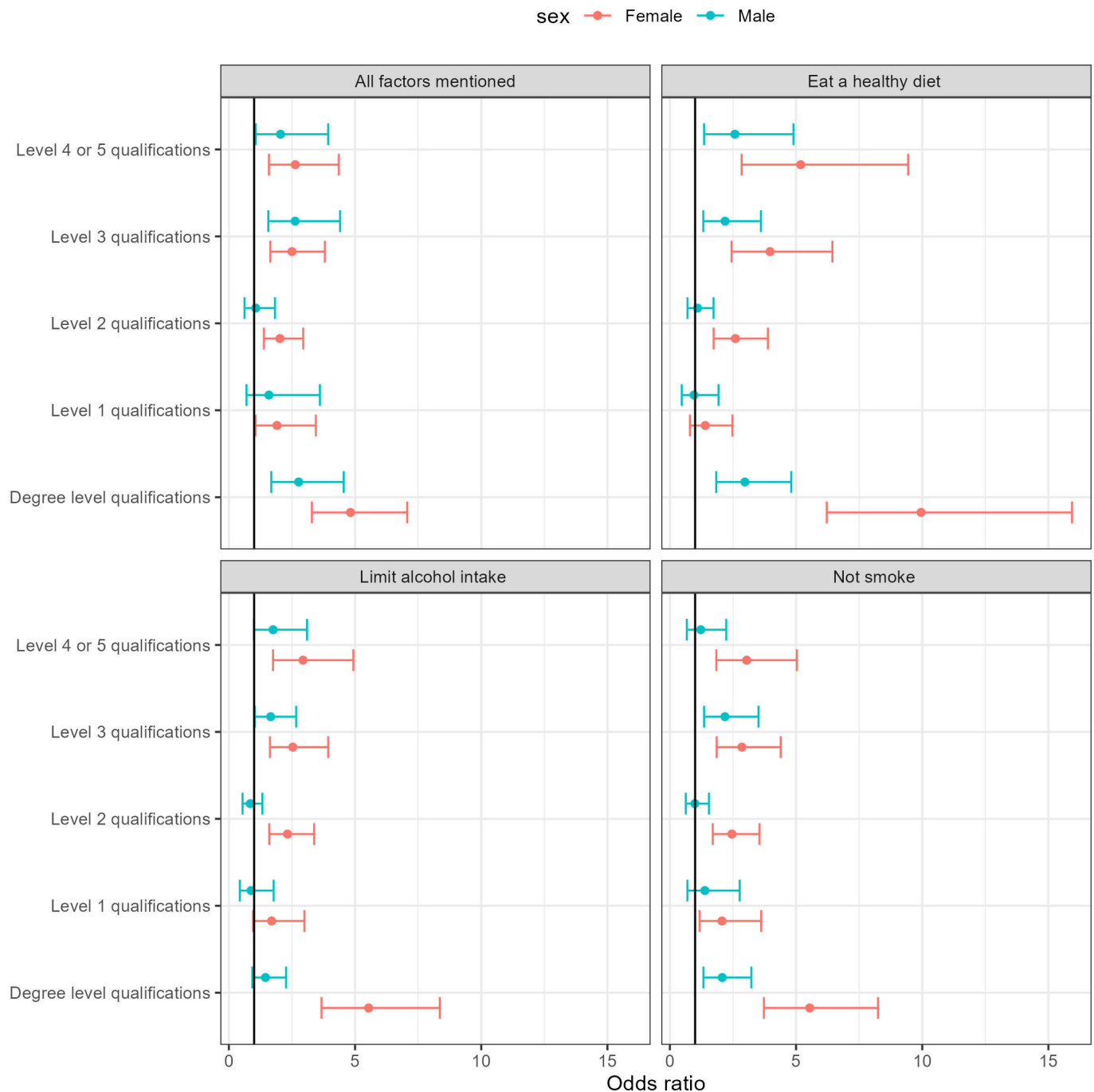
**Figure 1** ORs for indicators of dementia knowledge for different level of highest qualification, compared with having no formal qualification. Weighted logistic regression models adjusted for age (using natural cubic splines), sex, region and ethnicity. Survey weights were used and CIs account for the survey design.

for the mention of limiting alcohol consumption (OR 2.65 (1.92 to 3.65)) and looking after mental health (OR 2.73 (2.01 to 3.72)).

For most risk factors, there was no evidence that the educational differences in awareness differed by sex nor broad age groups (online supplemental table S3). However, the educational differences in awareness were more marked among women than men for risk factors related to eating, drinking and smoking. Compared with those with no formal qualification, the

odds of mentioning eating a healthy diet as a potential risk factor were 9.95 (6.22 to 15.94) for women and 2.97 (1.84 to 4.81) for men (figure 2, online supplemental table S4). The ORs were also higher for women than men for mentioning limiting alcohol consumption (women: OR 5.54 (3.67 to 8.36), men: OR 1.45 (0.93, 2.27)) and not smoking (women: OR 5.54 (3.73 to 8.25), men: OR 2.07 (1.33, 3.23)).

The educational gradient in dementia prevention knowledge was not altered by any additional



**Figure 2** ORs for indicators of dementia knowledge for different level of highest qualification, compared with having no formal qualification, by sex. Weighted logistic regression models adjusted for age (using natural cubic splines), sex, region and ethnicity. Survey weights are used and CIs account for the survey design.

sensitivity analyses. The results were not affected by not including an interaction between age and sex, adjusting for age using 5-year age bands rather than a natural cubic spline, restricting the results to England only, or not adjusting for region in the minimally adjusted models (online supplemental figure S3 and table S4). Using a Likert scale variable rather than a binary variable resulted in very similar results for self-reported dementia prevention knowledge (online supplemental table S5).

## DISCUSSION

### Summary of key findings

We found a strong and consistent educational gradient in dementia prevention knowledge. People with higher levels of education had better self-reported dementia knowledge and showed a higher awareness of the key risk factors for dementia and what could be done to reduce the risk of developing dementia. They were more likely to be aware of every risk factor but the difference in awareness by educational level was largest for some

risk factors such as lack of physical and mental activity, alcohol consumption and poor mental health. The educational differences in awareness were more marked among women than men for risk factors related to eating, drinking and smoking. The educational gradient in dementia prevention knowledge was not altered by adjustment for potential mediators such as health status, disability and measures of socioeconomic positions, not by any sensitivity analysis performed.

### Comparison with other studies

Our study contributes to the literature on the effect of educational attainment on the risk of dementia, by providing evidence on one of the potential mechanisms. Many studies document that higher levels of education are associated with slower cognitive decline and a lower risk of dementia.<sup>5 6</sup> Studies using Mendelian randomisation or using compulsory schooling laws to instrument education suggest that the relationship is partly causal.<sup>7 8</sup> However, the mechanisms explaining these associations are not well established. Education may increase or help maintain the underlying 'brain reserve' of the individual.<sup>9</sup> However, associations between education and cognitive declines due to ageing are negligible, suggesting that differences in late-life cognitive function by educational attainment are likely to be due to differences in cognitive skills in early adulthood, which persist into older age.<sup>6</sup>

Our study shows that another complementary mechanism may be that higher levels of education may result in improved dementia knowledge and increased awareness of the risk factors for dementia. The better understanding of the risk factors for dementia, and more generally, the increased knowledge about healthy behaviours, could lead to more educated people having healthier lifestyles, hence delaying, or reducing the risk of dementia onset. People with higher levels of education may have better dementia knowledge because they may be more likely to hear about new development in health and dementia research. Several studies show that people with higher level of education are more likely to use available screening programmes, adopt new medical advances and follow new guidelines.<sup>12–14</sup>

Our study also contributes to the literature on inequalities in dementia prevention knowledge. Our results on educational differences in dementia prevention knowledge are in line with a meta-analysis showing that education is a strong predictor for dementia knowledge.<sup>16</sup> They are also consistent with more recent data showing that people with a higher educational level had better dementia knowledge compared with people with lower levels of education from Italy and Switzerland,<sup>20</sup> South Korea<sup>21</sup> Northern Ireland,<sup>22</sup> Australia<sup>23</sup> and Norway.<sup>17</sup> Our results are also consistent with a study from Australia showing that using data from Ireland and showing that dementia knowledge varied by social class<sup>24</sup> and with a study showing that illiteracy was strongly associated with the risk of dementia.<sup>25</sup>

### Strengths and limitations

Our study has several strengths. First, the data on dementia knowledge include self-reported, self-assessed dementia knowledge and questions to assess knowledge of the potential risk factors for dementia, which were developed using the latest available evidence on risk factors for dementia.<sup>19</sup> For a given level of dementia knowledge, responses to self-reported dementia knowledge may differ by educational level, which could introduce a bias. However, such reporting bias is unlikely to affect the responses to questions assessing the knowledge of risk factors for dementia. Second, we used a sample of the population of adults living in private households in Great Britain. This allows us to measure the differences in dementia knowledge in the general population and not among patients with selected health conditions. Third, the information on the highest qualification held by respondents is detailed and allows for a granular analysis.

Our study also has several limitations. First, the sample is relatively small, which limits our ability to look at interactions. Second, our measures of dementia knowledge only capture some aspects of dementia knowledge and do not include factors not associated with the risk of dementia. Third, our sample may not be fully representative of the population of interest. We can see that the respondents are older, more privileged than the population as a whole. We do apply sample weights to ensure that the sample is representative of the target population. While the weights are not calibrated to the level of the highest qualification, they are calibrated to several measures of socioeconomic position, which are strongly correlated with education.<sup>18</sup> Finally, we do not observe all the factors that could confound the relationship between levels of education and dementia knowledge. For instance, we do not observe parental background, which could affect both level of education and health knowledge in general, and dementia knowledge in particular.

### Implications

Our results have several implications for the understanding of educational differences in cognitive decline and the risk of dementia onset. Our results suggest that the protective effect of higher levels of education against the risk of dementia may partly be driven by differences in dementia knowledge. If people with a higher level of education have a better understanding of the risk factors for dementia, they may be more likely to adopt behaviours that could reduce the risk of dementia.

Our results suggest that health education efforts on dementia prevention should target people with lower levels of education. Closing the gap in dementia prevention knowledge among people with low level of education could help reduce the burden of dementia the inequalities generate.

**Contributors** VN and EC conceptualised the study. SE curated the data, which were analysed by VN. The analysis was checked by SE. SE conducted a literature review. VN wrote the first draft, which was reviewed by SE and EC. All authors



contributed to the interpretation of the results. VN is responsible for the overall content [as guarantor].

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**Patient consent for publication** Not applicable.

**Ethics approval** This study involves human participants. This study analysed anonymised records from the Opinion and Life Style Survey, which is collected by the Office for National Statistics. We engaged with the UK Statistics Authority Data Ethics team, who were satisfied that no further ethical approval was required. Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data may be obtained from a third party and are not publicly available. The Opinion and Lifestyle Survey data can be accessed from the UK Data Service. <https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=8635>.

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