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# The meaning of reporting forgetfulness: a cross-sectional study of adults in the English 2007 Adult Psychiatric Morbidity Survey

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## Abstract

**Objectives:** we measured subjective memory impairment (SMI) across the whole adult age range in a representative, national survey. Age is the strongest risk factor for dementia and SMI may be a precursor of objective

cognitive impairment. We therefore hypothesised that SMI prevalence would rise with age in a non-demented population.

**Method:** we analysed data from the English 2007 Adult Psychiatric Morbidity Survey, representative of people in private households. Participants were asked whether they had noticed problems with forgetting in the last month, or forgotten anything important in the last week; and completed the modified Telephone Interview for Cognitive Status.

**Results:** of those contacted, 7,461 (57%) participated. After excluding participants screening positive for dementia, 2,168 (31.7%) reported forgetfulness in the last month, while 449 (6.4%) had forgotten something important in the last week. Reporting forgetfulness was not associated with age. In a multivariate analysis including cognition and age, the only significant associates of reporting forgetfulness were anxiety, depressive and somatic symptoms.

**Conclusions:** our hypothesis that subjective forgetfulness prevalence would rise with age in a non-demented population was not supported. Although subjective forgetfulness can be an early symptom of future or mild dementia, it is common and non-specific and—at population level—is more likely to be related to mood than to be an early symptom of dementia. Asking those presenting with subjective forgetfulness additional questions about memory and functional decline and objective forgetfulness is likely to help clinicians to detect those at risk of dementia.

**Keywords:** memory disorders, dementia, aged, elderly

## Introduction

Between a third and three-quarters of people without dementia report when surveyed having problems with their memory [1, 2]. Subjective cognitive impairment (SCI) is characterised by subjective deficits in capacities including remembering names and recalling where one has placed things, but psychometric and mental status test scores within the normal range.

Dementia may be preceded around 15 years of SCI [3]. SCI has been conceptualised as a precursor to mild cognitive impairment (MCI) [3]. Around 10% of people with MCI, defined as objective cognitive impairment without functional impairment, develop dementia within a year [4]. SCI was associated with lower hippocampal volume, a radiological characteristic of Alzheimer's disease in a prospective neurology outpatient study, even in those without objective cognitive impairment [5]. It has predicted objective memory problems [6, 7] and Alzheimer's disease and dementia [8] in large, non-clinical prospective studies and Alzheimer's disease and dementia in a primary care cohort [9]. Palmer *et al.* [8] found that the predictive value of self-reported memory complaints alone was low, but when they were considered in combination with global and domain-specific cognitive tests, the positive predictivity for identifying dementia within 3 years rose to 85–100%.

If SCI often precedes objective cognitive impairment, its prevalence in a non-demented population should rise with age together with that of dementia. In the only previous representative survey of SCI across the whole adult age range, in Sao Paulo, Brazil, SCI was not associated with age. This survey excluded over a quarter of potential participants who had mental health problems [10].

In a 16-year cohort study of people aged 55–84 recruited from a health insurance organisation, age together with reasoning ability (but not independently) predicted cognitive performance [11, 12]. Participants completed the

Memory Functioning Questionnaire (MFQ; [13]) to measure subjective memory ability; this asks about frequency and seriousness of forgetting, retrospective functioning and mnemonics usage. MFQ score did not predict memory performance. This contradicted the group's previous research [14]. They hypothesised that this was because the predictive power of MFQ scores was not substantial and probably redundant after controlling for age and abilities, which were not included in their earlier research.

Among people aged 60+ from low- and middle-income countries, SCI was associated with older age in participants without dementia, and with worse objective cognitive function, anxiety and hypochondriasis [15]. Geerlings *et al.* [6], in contrast, found no difference between the prevalence of memory complaints in people aged 65–74 and those aged 75 and over in a large-scale epidemiological study.

SCI has been consistently associated with depression [16, 17], and improvement in mood with improvement in memory in younger adults [18]. SCI also predicted dementia in a 3-year prospective study of older primary care patients [19].

Current dementia care guidelines focus on early diagnosis to prevent crises and allow planning. It is anticipated that, in the future, disease-modifying drugs will be delivered to people with MCI to prevent dementia, and possibly also to those with SCI [3]. We therefore need to know the prevalence and significance of SCI. In the current study, we establish, for the first time in a nationally representative survey, the prevalence and correlates of reporting forgetfulness across the whole adult age range using the 2007 English Adult Psychiatric Morbidity Survey (APMS), and test our hypothesis that in people without dementia, the prevalence of subjective forgetfulness would rise with age. We also hypothesised that reporting forgetfulness would be associated with more objective cognitive impairment and with depressive, anxious and somatic symptoms.

## Method

### Procedures

The 2007 third English APMS was part of the Psychiatric Survey Programme in Great Britain [20]. It was designed to be representative, by age, sex and region of people in private households. The sampling frame was the Small User Postcode Address File. The Primary Sampling Units were postcode sectors. The population was stratified before sampling by region (Strategic Health Authorities) and by manual and non-manual socio-economic grouping. In households with more than one adult aged 16 or over, one adult was randomly selected for interview. Ethics approval was obtained from an appropriate research ethics committee. Interviews took place in participants' homes. More details are available in the APMS main report [21].

### Measures

Participants were asked standardised questions about age, sex and highest educational qualifications. Subjective memory impairment (SMI) was elicited with a single question, an approach used previously [6, 22]. Participants were asked: 'have you noticed problems with forgetting in the last month?', and, if so, whether they had forgotten anything important in the last week.

We used anxiety, depression and somatic symptom subscales (aches, pains or discomfort associated with low mood or anxiety) of the revised Clinical Interview Schedule (CIS-R), a structured interview asking about symptoms in the last week of known reliability and validity [23, 24]. These subscale scores ranged from zero to four, being the sum of the endorsed items.

The modified Telephone Interview for Cognitive Status (TICS-M) was administered face-to-face to all participants aged 60 and over [25]. It tests orientation, concentration, immediate and delayed memory, naming, calculation, comprehension and reasoning. A score of <21, equivalent to an MMSE score <25, was used to denote cases of dementia. Reported sensitivity and specificity in detecting dementia in community-dwelling older adults are 73.3 and 67.1% [26]. Thus it would be expected to screen positive a higher percentage of the population than had dementia.

Participants completed the National Adult Reading Test, a validated brief measure of premorbid intelligence for native English speakers, comprising a list of 50 words [27]. The number of errors made reading the words is converted into a verbal IQ estimate using an algorithm.

We included measures of physical dependency and alcohol use, as both are associated with objective cognitive impairment. We reported how many of seven activities of daily living (ADLs) participants needed help with. These were: personal care; mobility; medical care; preparing meals, shopping, laundry, housework; practical activities; dealing with paperwork and managing money. This was developed from a previous measure [28]. The Alcohol Use Disorders Identification Test (AUDIT) measured recent alcohol use [29].

### Data analysis

Comparisons of the age and sex distribution of the survey sample with the national English population are in the main survey report [Table 13.5]. The survey data were weighted such that the results were representative of the household population of England aged 16 years and over. Because only one person per household was selected, people living in larger households had a lower chance of selection, so were weighted accordingly. Response rates were higher in regions where more households were owner-occupied; and among households with no physical barriers to entry to the property (as observed by interviewers). These variables were used to calculate a household level weight.

We used the STATA 10.0 'survey' commands that allow for the use of clustered data modified by probability weights. We describe the variables using actual numbers, but proportions and odds ratios are weighted.

After excluding people identified as having dementia, we report the prevalence of reporting subjective forgetfulness, and univariate associations with the variables studied. We conducted logistic regressions with reported forgetfulness as the dependent variable, and gender, age and characteristics that were associated with reported forgetfulness on univariate analyses as independent variables.

To determine whether reported forgetfulness is associated with objective cognitive decline among older people, we entered forgetfulness in a linear regression with objective cognitive performance as the dependent variable, together with age and IQ score, our measure of premorbid intelligence.

## Results

Of those contacted 7,461 (57%) responded to the survey, 7,402 answered questions about forgetfulness, of whom 2,389 (31.9%) reported forgetfulness in the last month and 504 (6.5%) forgetting something important in the last week. Reporting of neither of these indices of forgetfulness was associated with age, in analyses that included the 595 (21.2%) people aged 60 and over, who scored as cases for dementia and were therefore excluded from subsequent analyses ( $F=0.1$ ,  $P=0.7$ ;  $F=1.8$ ,  $P=0.2$ ); 35.4% of people with dementia reported forgetfulness, compared with 30.6% of those without dementia (OR: 1.2,  $P=0.04$ ).

Of the participants who did not screen as potential cases for dementia, 2,168 (31.7%) reported forgetfulness in the last month, while 449 (6.4%) had forgotten something important in the last week. Reporting neither of these indicators of forgetfulness was associated on univariate analyses with age (whether analysed as a continuous variable or in 20-year age categories), gender, qualifications, alcohol use or ADL impairments (Table 1). They were both associated with higher depression, anxiety and somatic scores and

**Table 1.** The relationship of variables studied to reporting forgetfulness in people without dementia

Characteristic	<i>n</i>	Mean (standard error) in people who report forgetfulness	Mean (standard error) in people who do not	Wald test	<i>P</i> -value	Mean (standard error) in those forgetting something important in last week	Mean (standard error) in people who did not	Wald test	<i>P</i> -value
.....									
(a) Continuous variables									
Age	6,756	44.5 (0.5)	44.6 (0.3)	0.09	0.8	45.2 (0.9)	44.5 (0.3)	0.44	0.5
Verbal IQ	6,322	106.5 (0.4)	107.8 (0.4)	6.8	0.009	105.0 (0.9)	107.5 (0.3)	6.6	0.01
Depression score	6,814	0.73 (0.3)	0.24 (0.1)	274.6	<0.0001	1.3 (0.06)	0.34 (0.01)	203.6	<0.0001
Somatic score	6,814	0.44 (0.3)	0.10 (0.1)	153.9	<0.0001	0.8 (0.07)	0.17 (0.01)	82.9	<0.0001
Anxiety score	6,814	0.60 (0.3)	0.16 (0.1)	253.7	<0.0001	1.0 (0.07)	0.25 (0.01)	115.8	<0.0001
Cognitive score (aged 60+)	2,022	25.5 (0.1)	25.7 (0.1)	1.4	0.2	25.0 (0.3)	25.7 (0.08)	6.1	0.01
No. of ADLs dependencies	6,756	0.71(0.03)	0.68 (0.03)	0.9	0.4	0.7 (0.05)	0.7 (0.02)	0.13	0.7
AUDIT score (alcohol use)	6,751	5.2 (0.1)	5.1 (0.1)	1.5	0.2	5.2 (0.3)	5.1 (0.1)	0.04	0.9
(b) Categorical variables									
Characteristic	<i>n</i> (%) reporting forgetfulness in last month	Design-base $\chi^2$	<i>P</i> -value	<i>n</i> (%) people reporting forgetful who forgot something important in last week	Design-base $\chi^2$	<i>P</i> -value			
Gender									
Male	1,028 (32.1)	0.1	0.71	199 (24.5)	0.1	0.8			
Female	1,343 (31.7)			249 (23.8)					
Age group									
16–34	519 (32.1)	1.1	0.34	101 (21.8)	1.0	0.4			
35–54	795 (31.4)			174 (25.7)					
55–74	730 (31.3)			138 (25.4)					
75+	327 (35.1)			35 (22.2)					
Any educational qualifications?									
Yes	1,654 (31.5)	1.9	0.2	331 (23.6)	0.55	0.46			
No	701 (33.3)			114 (24.4)					



**Table 2.** Results of logistic regression with indices of forgetfulness as dependent variables

Independent variables in equation	Reporting forgetfulness in last month		Forgetting something important in last week	
	Odds ratio [95% confidence interval (CI)]	<i>P</i> -value	Odds ratio (95% CI)	<i>P</i> -value
Age	1.0 (1.0–1.0)	0.9	1.0 (0.99–1.0)	0.52
Gender	1.0 (0.9–1.2)	0.5	1.1 (0.89–1.5)	0.31
Verbal IQ	1.0 (1.0–1.0)	0.5	1.0 (0.99–1.01)	0.48
Depression score	1.4 (1.4–1.7)	<0.001	1.6 (1.5–1.8)	<0.001
Somatic score	1.4 (1.3–1.7)	<0.001	1.4 (1.3–1.6)	<0.001
Anxiety score	1.7 (1.4–1.7)	<0.001	1.4 (1.3–1.6)	<0.001

**Table 3.** Results of linear regression with TIC-M as dependent variable

Independent variables in equation	Coefficient (95% confidence interval)	<i>t</i> ( <i>P</i> -value)
Age	−0.23 (−0.25 to −0.21)	19.5 (<0.0005)
Forgetfulness in last month (controlling for age)	0.22 (−0.17 to 0.61)	1.1 (0.28)
Forgetfulness in last month (controlling for verbal IQ and age)	0.16 (−0.24 to 0.55)	0.77 (0.44)
Forgetting something important in last week (controlling for age)	−0.62 (−1.3 to 0.05)	1.8 (0.071)
Forgetting something important in last week (controlling for age and verbal IQ)	−0.73 (−1.5 to 0.01)	2.0 (0.046)

with lower verbal intelligence score. In people aged 60+, cognition was associated with reporting forgetting something important in the last week, but not reporting forgetfulness in the last month.

In multivariate analyses, our indicators of reporting forgetfulness were associated with anxiety, depressive and somatic symptoms, but not age or cognitive impairment (Table 2).

We also conducted analyses with TICS-M score as the dependent variable in people aged 60+ (Table 3). TICS-M score decreased with age. Reporting forgetfulness in the last month was not associated with cognitive score. Reporting forgetting something important in the past week was associated with lower cognitive score after controlling for age and IQ score.

We repeated our main analysis using a lower cut point on the TICS-M of 18/19 to define dementia, under which 380 (13.4%) of people screened positive for possible dementia and were excluded. Of those now included 2,253 (31.8%) reported being forgetful. In a linear regression, the association between reporting forgetfulness in the last month and cognitive score was significant before (coefficient 0.30,  $t = 1.9$ ,  $P = 0.05$ ) and after (0.29,  $t = 1.8$ ,  $P = 0.07$ ) controlling for premorbid intelligence.

## Discussion

A third of respondents who screened negative for dementia reported forgetfulness in the last month, and 1 in 15 had forgotten something important in the last week. Reporting forgetfulness did not increase with age, even when including people who screened as cases for dementia. A third of adults reported forgetfulness but less than 5% would be likely to develop dementia in the next 15 years, suggesting that reporting forgetfulness was not a prelude to dementia in most of the younger adults who reported it. The only significant associates of reporting forgetfulness across the age range were depressive, anxiety and somatic symptoms, indicating that even in the older general population, reporting subjective forgetfulness is often a symptom of psychological morbidity. Some of the participants reporting both psychological morbidity and forgetfulness may have been distressed as they were attuned to a developing problem with their memory.

The association between reporting forgetfulness in the last month and objective cognitive performance in people aged 60 and over approached significance when we used a higher screening threshold for cases of possible dementia. Unsurprisingly those who reported the more objective measure of forgetting something important in the last week had more objective cognitive deficits; although even this indicator of possibly objective memory problems showed no association with age, the strongest known risk factor for dementia. The interpretation of reporting forgetting something as ‘important’ may relate to mood.

## Clinical implications

Our findings suggest that because reporting subjective forgetfulness is so common, its presence alone is not a specific predictor of future risk of dementia at a population level. Our findings underline the importance of providing information for healthcare professionals and the general public about when SMI are more likely to indicate a future or current cognitive disorder. The Alzheimer’s Society 2008 ‘Worried about your memory?’ campaign provided useful information about when to seek help, for example if your memory (or that of someone you know) is getting worse or impacting on everyday life. Targeting similar information at all adults may improve detection of objective cognitive impairment and common mental disorders. While early-onset dementia is rare, carers often report a long struggle to receive an accurate diagnosis [30]. Despite the apparent low sensitivity of self-reported memory problems as a predictor of future dementia, they are currently the best single indicator we have of objective problems [8], so we need to encourage people to report them.

Effective pre-screening in primary care can help to ensure that specialist memory services are well targeted and that people in whom SCI is related to depression or anxiety are directed early to appropriate treatment.

Clinicians need an evidence base on the future implications of SCI (as they now have for MCI [4]), to help reassure and inform the worried well, and to identify those at future risk of dementia who may in future benefit from disease-modifying drugs. We recommend large-scale epidemiological studies of SCI, to identify the clinical characteristics of those who are more and less likely to progress to dementia.

### Limitations

People with subjective memory problems usually attribute these to fatigue, sleeplessness and trying to do too many things at once [31]. Relatively few present to services, and those who do probably differ from those who report them in surveys, with higher levels of cognitive and psychological morbidity.

We used single item measures of reported forgetfulness. They had face validity and were very similar to questions used previously [6, 22], but their psychometric properties are unknown. People may be more likely to report SMI if asked about specific scenarios, such as getting geographical disorientation. However, a previous representative survey using a more detailed, validated measure of SCI also found no association between SCI and age [10]. Memory complaints may differ qualitatively between younger and older adults [1], and we did not explore this. We did not ask participants about subjective memory deterioration, which appears to predict future risk of dementia [32]. Measures of SCI may be less reliable in older people who have impaired awareness of memory problems, because of memory loss or as a protective mechanism [33]. Only just over a third of people who screened positive for dementia reported subjective forgetfulness, indicating that many of those with memory impairment are not aware of it. As we excluded people who screened positive for dementia from our main analyses, most of the older people in our study would have no or mild objective cognitive impairment, so we think it is unlikely this would have significantly affected our results.

Our cross-sectional design does not affect our conclusion that there is no relationship between reporting forgetfulness and age. However, a prospective survey could investigate whether reporting forgetfulness predicts subsequent objective cognitive impairment in the whole adult population, and we think that such a study is needed. We excluded people who scored below a cut point on our measure of cognition with known sensitivity and specificity for dementia, but we did not confirm cases with diagnostic interviews. One-fifth of people aged 60 and over screened positive for dementia and were excluded, suggesting that some of those detected were false positives. However, even before excluding people with possible dementia, reported forgetfulness was not associated with age. We did not seek to exclude people with MCI, although many probably were, given the high number of people screening positive for dementia. Cognition was only measured in those aged 60 and over. Therefore, a few people with very early onset

dementia may have been included in our sample of people without dementia. We also excluded those in residential care, the majority of whom are likely to have had some level of cognitive impairment. It is possible that the 'worried well' might be more likely to opt in to such a survey, and so be over-represented.

### Conclusion

Nearly a third of the whole population reported problems with their memory in the last month, and 1 in 15 had forgotten something important in the last week. Our hypothesis that subjective forgetfulness prevalence would rise with age in a non-demented population was not supported. Although subjective forgetfulness can be an early symptom of future or mild dementia it is common and non-specific and at population level is more likely to be related to mood than to be an early symptom of dementia. Asking those presenting with subjective forgetfulness about memory and functional decline and objective forgetfulness is likely to help clinicians to detect those at risk of dementia.

### Key points

- A third of adults of all ages report subjective forgetfulness in the last month.
- In most people who report forgetfulness, it is not a prodromal stage of cognitive decline.
- Asking those presenting with subjective forgetfulness additional questions about memory and functional decline and objective forgetfulness is likely to help clinicians to detect those at risk of dementia.

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### Conflicts of interest

None declared.

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