

An absence of evidence linking perceived memory problems to the menopause

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SUMMARY

Background: Little is known about the prevalence of subjective or perceived memory difficulties in the general population. This is of particular interest in the field of menopause as self-reported memory difficulties make up a large proportion of complaints by women presenting at specialist menopause clinics. There is also a general assumption that memory problems increase with age.

Aim: To investigate the prevalence of perceived memory difficulties in women to establish whether there are variations with menopausal status and age.

Design of study: Cross-sectional questionnaire study.

Setting: Sheffield, United Kingdom.

Method: Standardised questionnaires assessing subjective memory, mood and menopausal symptoms were sent to a random sample of 400 women, aged 25–64 years, identified from a general practice list. Menopausal status and demographic details were also recorded. Two hundred and two women responded, giving a response rate of 50.5%.

Results: The prevalence of perceived memory difficulties was low, and did not differ on the basis of menopausal status or age. Anxiety and depressive symptoms were the main significant predictors of perceived memory difficulties.

Conclusion: Perceived memory difficulties are not specific to particular stages of the life cycle or age, but are experienced to a greater degree by those with high levels of depressive or anxiety symptoms.

Keywords: age factors; climacteric; memory; menopause; perception.

Introduction

RESEARCH assessing the prevalence of perceived or subjective memory problems in the general population is rare. Studies that exist have focused on older age in adults,^{1,2} or those with physical health problems, such as cancer, chronic pain and heart disease.^{3–5} In addition, they have mainly addressed the objective nature of the memory difficulties, neglecting to explore their subjective aspects. Yet, subjective accounts of memory functioning are important as they reflect how people actually experience these problems.

One area that highlights the importance of distinguishing between the subjective and objective aspects of memory is the impact of the menopause. Self-reported memory problems are commonly reported by women in the menopausal stage of life. As many as a third of complaints made by self-referred women at a menopause clinic related to memory difficulties (P Slade *et al*, unpublished data, 1998). An exploration of the types of memory problems reported at a menopause clinic indicated these to be primarily related to speech: forgetting what has just been said; asking the same question several times; or finding the word 'on the tip of your tongue'.⁶ Estimates of prevalence are even greater for more general medical settings where the proportion of women reporting memory difficulties could be as high as 50%.⁷ These findings imply that some women may experience particular difficulties with memory around the menopause. However, a large American survey suggests that few women actually associate memory loss with the menopause.⁸ Therefore, whether the menopausal transition affects perception of memory in women who go through this experience without attending for medical advice remains unclear. Such women may either not experience memory difficulties, or may not consider any experienced difficulties as problematic.

Studies of women undergoing surgical menopause via hysterectomy have certainly suggested increases in memory problems, and hormonal changes have been proposed as one potential cause.⁹ Indeed, oestrogen receptors have been identified in the hippocampus and amygdala,¹⁰ both of which are known to play a role in memory function.¹¹ However, studies in this area have focused on women undergoing surgical menopause via hysterectomy, which causes dramatic changes in hormonal states not shown in the natural menopause. Hurrell and Slade argue that such samples cannot therefore be equated.¹²

In summary, little is known about the prevalence of perceived everyday memory problems in the general female population or how this varies with age or menopausal phase. The impact of any perceived memory difficulties also remains unclear.

This study addresses the following questions:

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HOW THIS FITS IN*What do we know?*

Assumptions that memory problems are a typical feature of both the menopause and increasing age are common.

What does this paper add?

This community-based study suggests that low levels of perceived memory difficulties are reported by women generally. There is no increase in the peri-menopausal stage of life or with age. However, higher levels of perceived memory difficulties correlated with higher levels of psychological distress and this relationship should be investigated further.



- Are there differences in the perception of everyday memory difficulties experienced by women at different stages of their life cycle?
- What is the impact of perceived memory difficulties where they exist and does this vary with menopausal status or age?

Method*Participants and procedure*

Four hundred women between the ages of 25–64 years, randomly selected from the general practice patient list were sent a letter by their general practitioner inviting them to participate in the study. Ethical permission was granted by the North Sheffield Research Ethics Committee. Participants included all responders not excluded by the criteria listed in Box 1.

The sample

Of the 202 women agreeing to participate in the study, 172 (85.1%) met the inclusion criteria and were categorised into one of five independent groups; pre-menopausal, peri-menopausal, post-menopausal, hormone replacement therapy (HRT) users and hormonal contraceptive (pill) users. The demographic details are summarised in Table 1.

As expected, significant differences were found across the menopausal status groups for age and number of children (separate one-way analysis of variance between groups [ANOVA] comparison: $F = 82.99$, degrees of freedom [df] = 4, $P < 0.0001$ and $F = 5.875$, df = 4, $P < 0.0001$, respectively). Consequently, the group separation was maintained for subsequent analyses and the effect of age was considered separately.

The pack sent to the participants included information about the study, a consent form and a questionnaire booklet. Prepaid and addressed return envelopes were provided.

Previous history of receiving professional medical help for any of the following:

- Mental health problems, 'nerves' (e.g. depression, anxiety, aural hallucinations)
- Central nervous system disorders (e.g. strokes, mini-strokes, epilepsy, multiple sclerosis)
- Thyroid disorders
- Serious head injury involving loss of consciousness
- Those drinking in excess of 30 units of alcohol per week

Box 1. Exclusion criteria.

- Pre-menopause defined by regularity of cycle.
- Peri-menopausal defined as an irregular pattern of menstruation over the last 12 months in women between the ages of 35–55 years.
- Post-menopause defined by amenorrhoea for at least 12 months.

Box 2. Menopausal definitions based on previous research.¹³

- ANOVA — one-way analysis of variance allows for comparisons across several groups on a single variable.
- ANCOVA — one-way analysis of covariance allows for comparisons across several groups on a single variable after the effects of other variables.
- MANCOVA — multiple analysis of covariance is where a similar process is applied but for several related variables.

Box 3. Commentary on statistical methods.

After 3 weeks, a reminder letter was sent to potential responders who had not already replied. The questionnaires covered demographic details and pattern of menstruation, together with standardised measures of perceptions of memory problems, their degree of impact, emotional functioning and menopausal symptoms.

Design

The study employed a cross-sectional design, with menopausal status as the independent variable. Based on the responses to the questionnaires, five groups of women were identified: pre-, peri- and post-menopausal, HRT users and hormonal contraceptives users. Users of hormonal treatments were considered separately because of the possible effects of these treatments on memory. The definitions of menopausal status used are shown in Box 2. Box 3 describes the statistical methods for group comparison.

Table 1. Demographic information for the five groups.

	Pre-menopause <i>n</i> = 42	Peri-menopause <i>n</i> = 25	Post-menopause <i>n</i> = 38	HRT <i>n</i> = 36	Pill <i>n</i> = 31	All <i>n</i> = 172
Mean age in years (SD)	33.68 (6.04)	45.44 (4.94)	55.63 (6.27)	55.03 (6.64)	34.74 (7.88)	45.70 (11.01)
Age range (years)	26–52	38–55	43–64	39–64	26–51	26–64

HRT = hormone replacement therapy; SD = standard deviation.

Measures and analysis

Demographic details including age, marital status, number of years of education, employment history, number of children, current medication, alcohol use and current menstrual pattern were collected together with the following measures:

Subjective memory questionnaire (SMQ).¹⁴ This 35-item questionnaire was designed to assess the degree of memory lapses common in everyday life. The measure incorporates five domains of memory function: speech, reading and writing, faces and places, actions, and learning new things. Each item is rated on a 5-point Likert scale; from several times a day to never. Participants completed the questionnaire retrospectively for memory lapses in the past month.

The SMQ was supplemented by a number of additional questions. These included the extent to which rated items in the SMQ caused concern and an overall subjective rating of memory. This scale has been used for samples with a variety of physical conditions including those with head injury,¹⁴ multiple sclerosis,¹⁵ and attending a menopause clinic.⁷ Cronbach's α coefficient for this measure in the current sample was 0.91, showing high internal reliability.

Hospital anxiety and depression scale (HADS).¹⁶ The scale consists of 14 items each rated on a 4-point Likert scale and completed for the past week. This is one of the most well validated and widely used measures of emotional distress providing both a total score and separate measures for anxiety and depressive symptoms.

Women's health questionnaire (WHQ).¹⁷ This scale was designed to measure emotional and physical health in middle-aged women. It has been extensively validated, widely used, and translated into eight European languages. It contains 36 items, each rated on a 4-point scale, consisting of nine subscales: depressed mood, somatic symptoms, anxiety/fears, sexual behaviour, sleep problems, menstrual symptoms, memory/concentration, and attractiveness. Depression, anxiety and memory concentration subscales

were not analysed in this study as these were covered by the more detailed measures. Cronbach's α coefficient for this measure was 0.83, showing an acceptable level of internal reliability.

Data analysis was completed using the Statistical Package for Social Sciences version 10.

Results

Were there differences between the groups on measures of mood and health?

The mean and standard deviation subscales of the HADS and WHQ are summarised in Table 2. To test whether groups differed on these measures of mood and health, a multivariate analysis of covariance was carried out, with age considered as a covariate. Except for the menstrual symptoms subscale, no significant group effects were found, and age was not a significant factor.

Were there differences between the groups in the perception of everyday memory difficulties?

Descriptive findings of the SMQ are shown in Table 3. The higher the score the greater the degree of perceived memory difficulties. The mean subtotal scores for each section of the SMQ were approximately 25% or less of the totals possible, indicating low rates of perceived everyday memory difficulties. The mean frequency ratings for perceived memory difficulties were found to be <1 across all groups, which, on the 5-point scale used, indicated the frequency of memory slips occurring less than once a week or very rarely.

In order to distinguish the role of age and psychological distress (HADS total score) in the level of perceived memory difficulties, these were used as covariates in analyses used to determine whether the groups designated by menopausal status differed in the level of perceived memory difficulties. Using an analysis of covariance (ANCOVA) no significant differences were found between the groups in terms of perceived memory difficulties (SMQ total score). Age was not a significant factor ($F = 0.83$, $df = 1$, $P = 0.36$ [non-significant]).

Table 2. Mean ratings and standard deviations for HADS and WHQ subscales^a including the level of significance as found by MANCOVA analysis (age as covariate).

Section	Pre-menopause <i>n</i> = 42	Peri-menopause <i>n</i> = 25	Post-menopause <i>n</i> = 38	HRT <i>n</i> = 36	Pill <i>n</i> = 31	Number of items	Significance (MANCOVA)
HADS — anxiety (SD)	6.48 (3.72)	8.20 (3.54)	7.03 (4.51)	6.97 (3.23)	8.34 (4.56)	7	0.20
HADS — depression (SD)	4.21 (3.46)	4.12 (3.33)	3.76 (3.00)	5.14 (3.70)	5.10 (4.43)	7	0.64
WHQ — somatic (SD)	0.37 (0.26)	0.52 (0.27)	0.51 (0.29)	0.50 (0.26)	0.48 (0.27)	7	0.39
WHQ — memory (SD)	0.33 (0.33)	0.53 (0.41)	0.42 (0.40)	0.47 (0.35)	0.46 (0.35)	3	0.25
WHQ — sexual (SD)	0.23 (0.25)	0.41 (0.35)	0.40 (0.36)	0.44 (0.40)	0.21 (0.27)	3	0.82
WHQ — sleep (SD)	0.38 (0.34)	0.52 (0.36)	0.50 (0.36)	0.49 (0.37)	0.48 (0.34)	3	0.67
WHQ — attractiveness (SD)	0.57 (0.38)	0.64 (0.40)	0.54 (0.36)	0.56 (0.37)	0.60 (0.37)	2	0.60
WHQ — vasomotor (SD)	0.17 (0.33)	0.42 (0.40)	0.57 (0.46)	0.42 (0.44)	0.26 (0.36)	2	0.41
WHQ — menstrual (SD)	0.46 (0.29)	0.58 (0.31)	0.28 (0.25)	0.39 (0.29)	0.48 (0.32)	2	0.01 ^b
Difficulty coping with any of the WHQ symptoms (%)	25.6	34.8	33.3	57.1	34.6		8.57 ^{c,d}

^aAlthough WHQ also measures anxiety and depression, the two subscales were not included as they were already addressed by HADS. ^b $P < 0.01$. ^c χ^2 test.

^dNon-significant. HADS = hospital anxiety and depression scale; WHQ = women's health questionnaire; HRT = hormone replacement therapy; MANCOVA = multivariate analysis of covariance; SD = standard deviation.

Table 3. SMQ mean total scores, standard deviations, range of scores and % of maximum score for each section of the SMQ.

Section	Pre-menopause <i>n</i> = 42	Peri-menopause <i>n</i> = 25	Post-menopause <i>n</i> = 38	HRT <i>n</i> = 36	Pill <i>n</i> = 31	Total <i>n</i> = 172	Maximum score
Speech (SD)	13.93 (8.57)	11.37 (6.01)	12.49 (9.84)	13.38 (11.30)	13.97 (10.33)	13.14 (9.43)	52
% maximum	26.78	21.86	24.02	25.73	26.87	25.27	
Read/writing (SD)	2.57 (3.67)	2.92 (2.96)	3.24 (2.98)	3.58 (3.54)	4.06 (3.14)	3.52 (3.03)	16
% maximum	16.06	18.25	20.25	22.38	25.38	22.00	
Faces/places (SD)	2.07 (1.72)	3.04 (2.12)	3.18 (3.14)	2.42 (1.75)	2.77 (2.79)	2.65 (2.37)	24
% maximum	8.63	12.66	13.08	10.08	11.54	11.04	
Actions (SD)	3.50 (2.70)	3.88 (3.57)	3.68 (4.84)	3.03 (3.49)	4.71 (4.24)	3.71 (3.82)	24
% maximum	14.58	16.17	15.33	12.63	19.63	15.46	
Learning (SD)	6.26 (3.44)	5.83 (4.32)	5.92 (4.44)	5.61 (4.40)	6.58 (4.29)	6.05 (4.13)	24
% maximum	26.08	24.29	24.67	23.34	27.42	25.21	
Total SMQ (SD)	29.43 (14.97)	22.17 (16.02)	27.89 (22.02)	28.47 (21.36)	31.60 (20.41)	28.96 (19.02)	140
% maximum	21.02	15.84	19.92	20.33	22.57	20.69	
Mean level of concern score 0–5 (SD)	0.62 (0.76)	0.72 (0.94)	0.73 (1.01)	0.94 (1.14)	0.76 (1.09)		
Those rating concern as 'not' or 'a little' (%)	83.3	84.0	81.8	72.7	80.0		

SMQ = subjective memory questionnaire; HRT = hormone replacement therapy; SD = standard deviation.

However, perceived memory difficulties were found to covary with psychological distress (total HADS score) ($F = 74.81$, $df = 1$, $P < 0.001$).

Further analysis of the different subsections of the SMQ (again, with age and psychological distress considered separately) found psychological distress to be a highly significant factor across all five subsections of the questionnaire. Small effects of age were found for two of the subscales; 'faces and places' and 'learning new things'.

Similarly, analyses (one-way ANCOVA) addressing the level of concern about memory and overall rating of memory were not significantly different between the groups based on menopausal status and age was not a significant factor. However, psychological distress was again significant ($F = 4.44$, $P < 0.04$ and $F = 6.74$, $P < 0.01$ respectively). The level of concern was also highly correlated with perceived memory problems (Spearman's ρ coefficient [2-tailed] = 0.486, $P < 0.001$).

How did mood and health relate to perceived memory?

A standard multiple regression analysis was conducted to predict perceived memory problems using the mood and health subscales as predictor variables and SMQ total as the dependent variable. The model was highly significant, $F = 28.57$, $df = 1125$, $P < 0.0001$, and accounted for 30% of the variability. Of the variables entered, only anxiety and depression were found to be significant predictors of perceived memory difficulties (significance level of $P < 0.05$).

The contribution of menopausal status to the model was examined using a stepwise multiple regression analysis using only the significant predictor variables.

As categorical data cannot be used in multiple regression analyses, both analyses utilised dichotomous variables. In the first regression, data from the three menopausal groups (pre, peri and post) were combined to form a 'peri versus other menopausal groups' variable. For the second analysis, data were combined from all five groups to create a dichotomous

variable of hormonal treatment versus no hormonal treatment. Neither menopausal status nor hormonal treatments acted as significant predictors for perceived memory problems.

Discussion

Summary of findings

Essentially, the results found that levels of perceived memory difficulties, as measured by the SMQ, across all samples were low and were unrelated to menopausal status or hormonal treatments. No differences were found between the groups in terms of the subjective rating of memory performance and neither did they differ in level of concern. There was no general effect for age, although two subcategories perceived memory for 'faces and places' and 'learning new things' did show some deterioration with age. Anxiety and depression were found to be significant factors in predicting the degree of subjective memory difficulties reported by women.

Previous research has found high levels of perceived memory difficulties in peri-menopausal women attending clinics. Based on these findings, it was hypothesised that there would be a greater number of memory difficulties reported by peri-menopausal women. There was no support for this hypothesis. The effect of hormonal treatments on perceived memory difficulties was also considered and was not found to influence the level of perceived memory difficulties. Indeed, the similarities between the three menopausal status groups are notable. Overall, the levels of self-reported memory difficulties were found to be low. Most difficulties occurred less than once a week, and the majority of women considered their memory ability to be average to good.

Mirroring the low levels of perceived memory difficulties found in the sample, the degree of concern reported in relation to perceived memory difficulties was also low. Concern correlated significantly with perceived memory difficulties. However, more than half the responders reported no concern and the average rating was 'a little concerned'. No significant differences were found between the groups.

Role of depression and anxiety

Despite the exclusion of patients with previous psychiatric history, it is of interest that anxiety and depression were still found to be the main predictors of perceived memory difficulties. This finding is consistent with the literature in relation to memory difficulties in women and mood,¹⁸ and memory and psychological distress in general.¹⁹⁻²⁰ The clear implication is that perceived memory functioning is more closely related to psychological distress than to menopausal stage or age. While direction of causation cannot be concluded from correlation, the low levels of perceived memory problems reported would mitigate against their creating a response of anxiety and/or depressive symptoms. Interestingly, a study of people with epilepsy found that self-reported memory problems were linked to emotional status rather than objective measures of memory or features of their condition.²¹

Limitations of the study

The study was limited in several ways in terms of the exclusion criteria, definition of menopause, and response rate. To prevent findings being confounded by known causes of memory difficulties, a rigorous set of exclusion criteria was used. Although the criteria limit the inferences that can be drawn from the data, a balance needed to be reached between excluding as many confounders as possible and including everyone and using the variables as factors. In terms of power, while it could be argued that a larger sample may have detected significant differences, the means reported in the descriptive data are very similar (the majority being <1) and where differences are suggested by the data, these are not in the predicted direction. Consideration of the definition used for menopause is also pertinent. The meaning of the term 'menopause' varies according to the context in which it is used, resulting in problems determining menopausal status in surveys — whichever definition is used it will never be 100% accurate.²² In the present study, the definition of menopause was based on the changes women noticed in their menstrual cycles. This may have also correlated with mood; women who are stressed may experience more irregularity in their cycle and consequently be considered as perimenopausal. However, psychological distress was not significantly greater in the peri-menopausal group than other groups. Finally, although just over 50% of women responded to the study and chose to participate, this may have resulted in a response bias. Clearly, it is not possible to know the levels of perceived memory problems or distress in women who declined to participate in the research and the effect on findings.

Implications for general practice

This paper provides evidence that a low level of perceived memory difficulties exists across a wide range of women. Moreover, this finding did not vary with either menopausal status or age. A further paper will address the sense that women make of their memory difficulties. The lack of evidence for perceived memory problems in a general practice sample suggests that the higher levels of memory difficulties

reported at specialist menopause clinics are not necessarily representative of more general responses during the menopause. Consequently, it is important not to pathologise this phase of life. When memory problems are reported their relation to emotional distress should be explored and appropriate investigation provided.

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