Association of cognitive impairment and depressive symptoms with subjective memory complaints in people with dementia

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ABSTRACT

Background. Older adults commonly have memory complaints. The extent of subjective memory complaints (SMCs) may not reflect actual cognitive function in people with dementia. Depressive symptoms are frequently detected in the older population, and may contribute to memory complaints. This study explored the association between cognitive impairment and SMCs, and the effect of depressive symptoms on SMCs.

Methods. This was a cross-sectional study using a structured questionnaire through face-to-face interviews. 28 men and 50 women aged 61 to 91 (mean, 75.5) years were recruited from a dementia day care centre. SMCs were assessed using the Memory Inventory for the Chinese, whereas cognitive function and depression symptoms were evaluated using the Chinese version of the Mini-Mental State Examination and the Cornell Scale for Depression in Dementia, respectively. The association between SMCs and cognitive impairment was analysed by Pearson’s $r$, adjusting for depression symptoms. Pre- and post-adjustment was compared to determine the influence of depressive symptoms on such association.

Results. SMCs were positively correlated with cognitive impairment ($r=0.364, p=0.001$). The discrepancy between SMCs and actual memory deficits as reported by the caregiver became larger as the cognitive impairment increased ($r=−0.643, p<0.001$). The results remained similar after adjusting for depression symptoms.

Conclusion. Older adults with more profound cognitive impairment reported fewer SMCs. The effect of depressive symptoms on the association between SMCs and cognitive function was small, which may be due to an insufficient sample size.

Key words: Dementia; Depression; Mild cognitive impairment

INTRODUCTION

25% to >50% of older adults have subjective memory complaints (SMCs),1 which are associated with future cognitive decline.2,4 People with SMCs are 2.8 times more likely to develop dementia.5 Although the association between SMCs and cognitive function is not conclusive,6,7 the significance of SMCs as an indicator of possible memory decline cannot be disregarded.

SMCs are an indicator of patients’ awareness of
their own memory impairment. SMCs indicate how patients make sense of their experiences or a deeper knowledge of the effects of the symptoms/disease on individuals in the context of their environments. It is important that SMCs reflect accurate appraisal of memory functioning, as this affects help-seeking behaviours, treatment compliance, and risks in daily living (as individuals may act beyond their capabilities). People with dementia have poor insight into their cognitive impairment, even in the early stages. People with lower scores in the Mini-Mental State Examination (MMSE) have more SMCs, and those with mild dementia tend to overestimate their performance in cognitive tests, whereas people with normal cognition tend to underestimate their performance.

SMCs are strongly associated with depression, and people with depressed mood tend to complain about memory deficits more spontaneously. Other factors including age, education level, and sex also affect SMCs. Women report SMCs more frequently than men, as depression is more common among women. Therefore, when investigating the association between SMCs and cognitive function, adjustment has to be made for depressive mood and other contributing factors.

The validity of SMCs in people with normal cognition or mild cognitive impairment in predicting future cognitive decline has been well discussed, as has the trend of impairment in insight in people with mild dementia. However, the implications for people with moderate dementia are less known. This study investigated the association of SMCs with cognitive impairment and depressive symptoms in people with mild-to-moderate dementia.

METHODS

This was a cross-sectional survey using a structured questionnaire through face-to-face interviews. The study was approved by the Joint Chinese University of Hong Kong–New Territories East Cluster Clinical Research Ethics Committee. Participants were recruited from a local dementia day care centre in Hong Kong from October 2010 to April 2011. All newly admitted members were invited to participate. Members were excluded if they (1) had severe behavioural and psychological symptoms of dementia that would hinder the interview and assessment; (2) could not communicate in Cantonese; (3) had physical impairment that would hinder the assessment; or (4) the members’ relatives refused consent.

Participants were interviewed in the presence of their caregivers. If the caregivers were not present, they were interviewed via the telephone afterward. Participants were allowed to take a break during the interview. Each interview lasted for approximately 30 minutes. Demographics, cognitive function, subjective memory impairment, and depression status of the participants were recorded.

To assess cognitive function, the Chinese version of the MMSE (C-MMSE) was used. The C-MMSE is a validated instrument with good reliability; the total score is 30, and the cut-off score is 23.

To assess patients’ awareness of memory deficits and SMCs, the Memory Inventory for the Chinese (MIC) was used. The MIC is a culturally appropriate and valid instrument for measuring awareness of memory deficits in Chinese patients with dementia. It consists of 27 questions concerning SMCs in everyday life. Each question addresses a specific SMC, and answers are rated by the frequency of occurrence ranging from none (0 point) to once or more per day (4 points). The total maximum score is 108. Higher scores indicate higher SMCs. By interviewing the patients and their caregivers, MIC–patient score (MIC-P) and MIC–caregiver score (MIC-C) are yielded, respectively. MIC-C reflects the objective severity of patients’ memory impairment in daily life. The Memory Deficit Awareness Score (MDAS) is obtained by subtracting the MIC-P from the MIC-C. The MDAS reflects the discrepancy between patients’ actual memory and their subjective awareness. Higher MDASs indicate greater impairment of patients’ insight into their illness, and positive MDASs indicate that patients have overestimated their cognitive function.

To assess patients’ depressive symptoms during the previous week, the Cornell Scale for Depression in Dementia (CSDD) was used. Apart from patients’ subjective answers, collateral information from patients’ caregivers is also included, as patients’ ability to give accurate information may be impaired in later-stage dementia. The CSDD consists of 19 questions relating to common depressive symptoms.
such as decreased motivation, crying spells, loss of appetite, and suicidal ideation. Each question is rated on a 3-point scale, with 0 being absent for the specific symptom, 1 being mild or intermittent, and 2 being severe or continuous. The maximum score is 38. The CSDD has high inter-rater reliability (κ=0.67), internal consistency (coefficient α=0.84), sensitivity (91.7%), and specificity (80%), and has the best diagnostic performance for detecting depression in elderly Chinese people with dementia.21

Associations between the C-MMSE, MIC-P/ MIC-C, CSDD, and MDAS were computed using the Spearman’s correlation. A p value of <0.05 was considered statistically significant.

RESULTS

Of 103 new members, 92 were invited to participate. Of whom, 84.8% (28 men and 50 women) agreed. The mean age of participants was 75.5 (standard deviation [SD], 7.11) years. The mean education level was 4.85 (SD, 4.66) years. The mean scores for the C-MMSE, CSDD, MIC-P, MIC-C, and MDAS are shown in Table 1.

Association between cognitive impairment and SMCs was assessed by correlating MIC-P and MIC-C with C-MMSE (Table 2). Scores of C-MMSE and MIC-P were positively correlated (r=0.364, p=0.001); people with milder cognitive impairment tended to have more spontaneous SMCs. However, scores of C-MMSE and MIC-C were negatively correlated (r=−0.577, p<0.001); people with more severe cognitive impairment tended to have more memory problems according to the caregivers. To further explore the association between cognitive impairment and the accuracy of reporting memory problems, scores for the C-MMSE and MDAS were analysed. These scores were negatively correlated (r=−0.643, p<0.001); people with lower cognitive impairment tended to report their memory problems more accurately.

To explore the effect of depressive symptoms on cognitive function and SMCs, a partial correlation analysis was conducted, with the CSDD being the controlling variable and the C-MMSE and MIC-P being variables (Table 3). After controlling for CSDD, C-MMSE and MIC-P remained positively correlated (r=0.350, p=0.002). The correlation without adjusting for the CSDD was slightly higher (r=0.364, p=0.001), which indicated a modest effect for the CSDD.

DISCUSSION

The frequency of SMCs in cognitively impaired elderly people was measured using the MIC, which covers

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**Table 1**

Demographics and test scores of the participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean±SD (range)</th>
</tr>
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<tbody>
<tr>
<td>Age (years)</td>
<td>75.5±7.11 (61-91)</td>
</tr>
<tr>
<td>Education (years)</td>
<td>4.85±4.66 (0-20)</td>
</tr>
<tr>
<td>Chinese version of the Mini-Mental State Examination</td>
<td>18.4±3.31 (12-24)</td>
</tr>
<tr>
<td>Cornell Scale for Depression in Dementia</td>
<td>11.0±6.44 (2-29)</td>
</tr>
<tr>
<td>Memory Inventory for the Chinese–patient score (MIC-P)</td>
<td>31.9±10.4 (12-62)</td>
</tr>
<tr>
<td>Memory Inventory for the Chinese–caregiver score (MIC-C)</td>
<td>54.9±13.4 (32-95)</td>
</tr>
<tr>
<td>Memory Deficit Awareness Score (MIC-C minus MIC-P)</td>
<td>22.7±17.1 (-13 to 79)</td>
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</tbody>
</table>

**Table 2**

Correlations between the Chinese version of the Mini-Mental State Examination and the Memory Inventory for the Chinese

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chinese version of the Mini-Mental State Examination (Pearson’s r)</th>
<th>p Value</th>
</tr>
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<tbody>
<tr>
<td>Memory Inventory for the Chinese–patient score (MIC-P)</td>
<td>0.364</td>
<td>0.001</td>
</tr>
<tr>
<td>Memory Inventory for the Chinese–caregiver score (MIC-C)</td>
<td>-0.577</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Memory Deficit Awareness Score (MIC-C minus MIC-P)</td>
<td>-0.643</td>
<td>&lt;0.001</td>
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</table>
a wide range of cognitive impairment symptoms in everyday life, and the discrepancy between MIC-P and MIC-C was also calculated. When exploring the association between cognitive impairment and SMCs, the MIC-P was used as the outcome variable. People with more severe cognitive impairment tended to report fewer SMCs. The discrepancy between MIC-P and MIC-C increased in people with more severe cognitive impairment. People with more severe cognitive impairment had poorer insight and lost their ability to accurately report their cognitive function and tended to overestimate it. This finding echoes previous study results.22-24 SMCs have been reported to increase with the extent of cognitive impairment.10 This seems contradictory to our findings, but may be because most of the participants in the Wong et al. study10 were cognitively normal or had mild cognitive impairment only, whereas all the participants in our study had mild-to-moderate dementia. It is likely that impairment of insight is not significant with mild cognitive impairment, and that cognitive function is preserved until the mild-to-moderate stage of dementia.

In Hong Kong, a proportion of elderly people with mild-to-moderate dementia may live alone or at least are alone in the daytime while their relatives go to work. These elderly people could wrongly assess their performance ability and do things that are beyond their capabilities or make inappropriate judgements. For example, an elderly person with moderate dementia may still try to cook, but with memory impairment and judgemental dysfunction, this person is at risk of domestic accidents. Another risk is going outside and getting lost when patients think that they are still capable of taking transportation by themselves. People with mild-to-moderate cognitive impairment, if they live alone or have minimal daytime support, should be provided with daytime supervision services (day activity centre, day hospital, or home care services). This may benefit the health care system by reducing the rate of unplanned admission and subsequent rehabilitation. Education should also be provided to the caregivers so that they are aware of this when planning care.

After adjusting for CSDD, the Pearson’s $r$ between the C-MMSE and MIC-P changed to 0.350 from 0.364. This indicated that the effect of depressive symptoms on cognitive impairment was minimal. The lack of any significant influence may be due to the small sample size and the sampling technique used. Although many of the participants reported some extent of depressive symptoms, patients who did not attend the dementia day centre owing to lack of motivation secondary to more profound depression were not included in the study. Another factor that influences the frequency of depressive symptoms is financial status. All the participants could afford transportation and day centre service costs, and none relied on social security. Elderly people who rely on government welfare have more depressive symptoms, and financial strain is a risk factor for development of depression.25,26

The limitations of this study were that the sample size was small and that convenience sampling was adopted. Patients with more severe depression may have been excluded. Future studies should involve a larger sample and adopt random sampling or include those with more profound depressive symptoms.

**REFERENCES**


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