

# Exploring factors that contribute to regular participation and practice in cognitive stimulation training for mild cognitive impairment: A qualitative study

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## Abstract:

**Background and Objective:** Cognitive stimulation training was effective in reducing risk of cognitive decline and dementia in patients with mild cognitive impairment. The present study aimed to explore factors that contribute to regular participation and practice cognitive stimulation training for elderly patients with mild cognitive impairment.

**Materials and Medthods:** Data were collected through individual face-to-face interviews with 25 elderly subjects with mild cognitive impairment, and analyzed using interpretive description method.

**Results:** Five core themes emerged from the analysis of data: (i) program with four subthemes of "interesting session," "effective teaching materials," "suitable duration and frequency" and "small group activities;" (ii) group facilitators with three subthemes of "good explanation," "always facilitate" and "friendly personality;" (iii) homework assignments with two subthemes of "suitable content" and "can adapt in daily living;" (iv) family members with two subthemes of "supporting" and "sharing;" (v) before and after class notification.

**Conclusion:** Increasing awareness of holistic factors including in clinic and at home should be emphasized in planning cognitive stimulation training. Having an effective program and facilitators and collaboration from family member were the keys of successful training.

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## Background

Mild cognitive impairment (MCI) represents an intermediate state of cognitive function between the changes seen in aging and those fulfilling the criteria for dementia.<sup>1</sup> The estimated prevalence of mild cognitive impairment in population-based studies ranges from 10 to 20% in persons older than 65 years of age.<sup>2,3</sup> As compared with the incidence of dementia in the general population, which is 1 to 2% yearly, the incidence among patients with MCI is significantly higher with an annual rate of 5 to 10% in community-based populations.<sup>4</sup> Dementia drastically affects daily life and personal activities and has numerous clinical complications.<sup>5</sup>

Higher participation in mentally stimulating activities is generally known to be associated with better cognitive function and reduce risk of cognitive decline and dementia.<sup>6-10</sup> In cognitive intervention, cognitive stimulation training (CST) promotes the involvement in activities that are aimed at a general enhancement of cognitive and social functioning, without specific objectives.<sup>11</sup> In patients with MCI, multimodal neuroimaging studies showed consistent training-related increase in brain activity in medial temporal, prefrontal, and posterior default mode networks, as well as increase in gray matter structure in frontoparietal and entorhinal regions.<sup>12</sup> This pattern differs from the observed pattern in healthy older adults that shows a combination of increased and decreased activity in response to training.<sup>12</sup> Moreover, CST was effective in helping MCI patients improve memory function.<sup>13</sup> In addition, Training in an Executive function, Attention, Memory and Visuospatial function (TEAM-V) Program was also effective to improve global cognitive function.<sup>14</sup>

After being diagnosed with MCI, most patients reported initiating one or more health related activities. For example, they were interested in cognitive stimulation such as taking classes and increasing general activity level.<sup>15</sup> However, little is known of the extent to which such practical interventions for cognitive stimulations are actually implemented within the MCI population. Therefore, this study aimed to explore factors that contribute to regular participation and practice in TEAM-V Programs for MCI populations.

## Materials and Methods

### Study Design and Subjects

With approval from the Ethics Committee Board of the Institutional Review Board of the Royal Thai Army Medical Department (IRBTA), the authors conducted semi-structured interviews with 25 elderly patients with MCI at the Geriatric Clinic of Phramongkutklo Hospital between October 2013 and December 2013. A total of 25 participants were recruited through an existing cognitive stimulation group run in the Geriatric Clinic of Phramongkutklo Hospital. The group members were deemed eligible for inclusion if they met the inclusion criteria as set out in the previous TEAM-V Program. These stipulated that elderly subjects met neuropsychological test Petersen criteria for MCI and had some ability to communicate. The distinction between amnesic MCI and non-amnesic MCI was made by neuropsychological battery. Amnesic MCI was defined if participant performance on verbal pair association in Wechsler memory scale (WMS) was 1 to 1.5 standard deviation (SD) below published age- and education- adjusted normative means. Non-amnesic MCI was defined if participant performance on other neuropsychological tests were 1 to 1.5 SD below published age- and education- adjusted normative means. The neuropsychological battery included tests for executive function: verbal fluency; attention: digit span; visuospatial function: clock drawing test and cube test. The exclusion criteria comprised elderly subjects that had uncontrolled metabolic problems such as hypertension with blood pressure more than 150/100 mmHg, diabetes with hemoglobin A1c test more than 7%, chronic kidney disease with serum creatinine more than 2 mg/dL, dyslipidemia with total cholesterol more than 160 mg/dL or triglyceride more than 400 mg/dL, Thyroid disorders with abnormal thyroid-stimulating hormone (TSH) and neurological problems such as stroke and Parkinson's disease. They participated in 6 sessions of 3 hours in group-based multicomponent cognitive stimulation every 2 weeks between July 2013 and September 2013. During the first hour, participants were invited to join movement activities such as stretching and muscle exercises. During the remaining 2 hours of each session, the participants were given cognitive training for each domain that linked to problems commonly found in MCI. The summary of

learnings was discussed at the end of each session. Moreover, during the weeks between sessions, participants were assigned homework to summarize what they had learned in sessions. After approaching the participants, the interviewers introduced themselves. After explaining the objectives of the study, written informed consent was obtained and the participants had an individual interview in the end of the program. All of the interviews were video recorded for nonverbal language interpretation. Conversations were fully transcribed along with field notes and an audit trail immediately after each session. After demographic data collection, participants were asked about the cognitive stimulation program that they participated in. Two factors were explored: factors to regular participation in the program and factors to regular practice of cognitive stimulation at home. The two main questions were "What factors influenced your decision to regular participate in the program" and "What factors influenced your decision to regular practice of cognitive stimulation at home". The interview took 30 to 50 minutes each session, depending on the participant.

### Data Analysis

Open codes were created and analyzed using investigator triangulation method. The codes were purely data driven. After that, the codes were discussed, modified and merged by the authors and final revised codes were developed afterward. Emerging concepts were extracted and analyzed using a thematic analysis approach. Themes were based on the model (Figure 1) and were described along with verbatim quotes from the participants. The model was designed based on the data.

### Results

#### 1. Participant Characteristics

A total of 25 patients with MCI were eligible without exclusions (n = 0). The authors interviewed all 25 participants (aged 70.5 + 7.5 years old). In all, 18 of

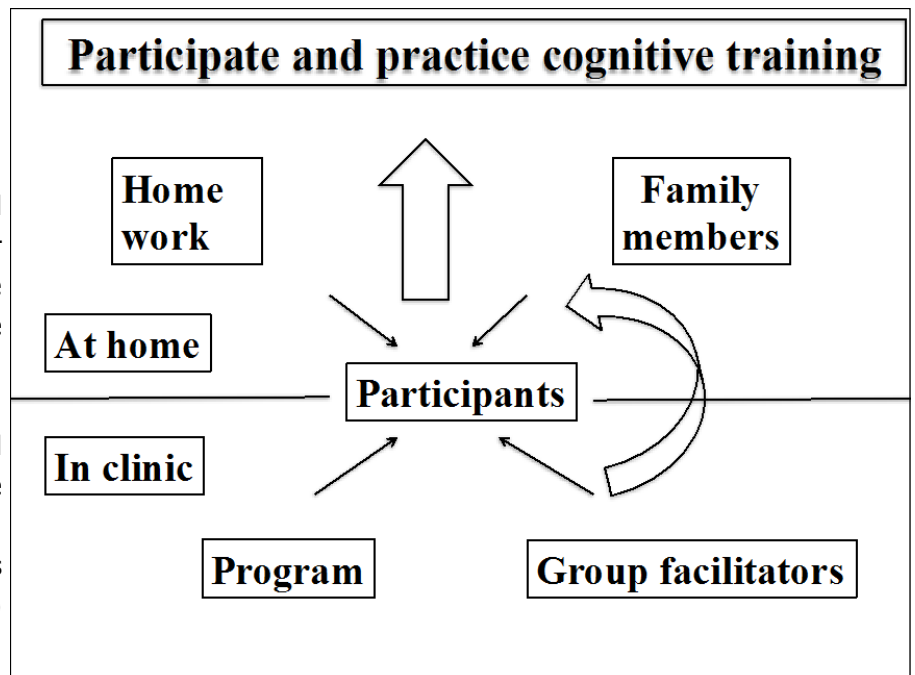
them had amnesic MCI (Table 1).

#### 2. Participants' adherence rate and benefits of the program

CST Activity adherence rates were 99.33%. There were no differences in the adherence rates between amnesic and non-amnesic MCI. More than two thirds of participants revealed all the sessions had benefit and were practical for daily living. Especially, movement activities were very useful. Most participants reported benefits from each session and homework (Table 2). Group facilitators encouraged participants did 9-square-table aerobic exercise by their legs as much as possible. However, in participants with physical limitations participated 9-square-table aerobic exercise by their arms.

#### 3. Thematic Analysis

After analyzing final codes, two main themes in



**Figure 1.** Factors that contribute to regular participation and practice in CST in people with MCI

clinic and three main themes at home five themes were identified. Twelve subthemes emerged (Table 3). The quoted statements were examples of the response by the participants.

#### 3.1 In clinic

Theme 1: Program

**Table 1.** Participant characteristics

Characteristics	Mean or percent
Age (years), mean +/- SD	70.5 + 7.5
Gender	
Female, n (%)	22 (88)
Male, n (%)	2 (12)
Type of MCI	
Amnesic MCI, n (%)	18 (72)
Non-amnesic MCI, n (%)	7 (28)
Education (years), mean +/- SD	14.6 + 2.9
History of hypertension or diabetes, n (%)	18 (72)

Benefits of the overall program were reported by 89.5% of participants (Table 2). They suggested 6 sessions were not enough for them to learn. Most wanted to join activities at least every 3-6 months to continue improving their brain function. Three main subthemes of effective program emerged.

**Table 2.** Group-based multicomponent cognitive training activities

Sessions	Type/main domains of training	Example of activities in class	Example of homework	Benefit of session (%)	Homework: practical strategies for daily living (%)
1-6	Movement	Short stretching exercise of 9-square-table aerobic exercise	9-square-table aerobic exercise	91	94
1	Memory	Short-term memory: face recognition	Long-term memory: autobiography	82	89
2	Attention	Self-focused listening, mindfulness-based task	Pay attention to news or story and summarize them	71	69
3	Visuospatial	Identify number of overlap descriptions	Draw a map from home to hospital	70	68
4	Memory	Draw pictures from description	Memory techniques in daily living	72	74
5	Executive function	Shopping furniture and balance budget	Balance budget in daily living	81	68
6	Memory and visuospatial	Walk from geriatric clinic to Phayathai palace and remember the way	-	70	69
	Summary			89.5	88.5

Subtheme: Session

The consensus among participants was that the

program was very interesting due to a lot of training techniques. Participants could practice step by step beginning from easy techniques to difficult techniques.

'This program helped me to improve my memory. I learn a lot of tips and techniques such as remembering people's names, my national identity number and people's phone numbers.'

'At the beginning, I think brain training was very complex, maybe I couldn't follow all the steps of training, but step by step training from easy to difficult techniques helped me to understand.'

Subtheme: Teaching materials

Participants said that teaching materials were very useful because cognitive stimulation was very complex. The teaching materials helped participants to understand and practice step by step. The quality of the materials was also important to draw participants' attention.

'I like the good quality of teaching materials. It gives one an impression. It's going to be interesting.'

'The 9-square-table aerobic exercise paper board helped me a lot to practice with both hands before walking in the pattern of numbers. I found it good.'

'It would be better if facilitators provided CDs of activities, so I could practice by myself at home'.

Subtheme: Duration and frequency of session

Most participants reported that the duration of sessions (3 hours) was appropriate. However, 3 participants reported that the duration of sessions was too long. They could concentrate only 2 hours. On the other hand, 5 participants said the duration of the sessions was too short. They wanted to practice in the class all day (3 hours in the morning and 2-3 hours in the afternoon).

Subtheme: activities

Most participants reported small group activities were very essential because they could practice more than in a large class. Moreover, the small groups were a nonthreatening and supportive environment. One of the participants suggested that the number in one group should be 4-5 participants.

'At the beginning in the large class, I was a bit hesitant to do or say much, but after participating in a small group I was not hesitant at all due to the friendly environment. It made me a bit more confident to answer questions.'

'It would be better if we can do small group activities outside of the clinic such as gardening'

**Table 3.** Setting, themes, subthemes and codes of the participants after the interview.

Setting	Themes	Sub-theme	Codes
In clinic	Program	Session	Interesting training techniques, practice step by step, easy to difficult
		Teaching materials	Help to understand the training
		Duration and frequency of session	Not too short, not too long
	Group facilitators	Activities	Prefer small group interactive activities, individual practice in difficult activities
		Explanation	Beginning with objectives of training for each session, explain step by step and summary
		Facilitation	Help to interact, pay attention to all participant
In home	Home work	Personality	Prefer friendly, warm, enthusiastic facilitators
		Content	Good objectives, suitable for each participant
	Family members	Adaptation	Can do in daily living
		Supporting	Encourage participants to join class and do home work
	Notification	Sharing	Share knowledge and experience to participants
	Before and after class	Phone call to remind to joint classes, encourage doing homework and daily practice	

'Training 3 hours in the morning is good for me. I'm still fresh to remember.'

'I can concentrate only 2 hours, and I want to have lunch at home with my husband.'

'I want all day; 3 hours per session is not enough. The training should be 3 hours in the morning for learning theory and 3 hours in the afternoon for practice.'

'I preferred individual practice in difficult sessions because if I can't do it, nobody will know.'

Theme 2: Group facilitators

Subtheme: Explanation

Despite that the cognitive stimulation program was very complex, most participants reported that they could understand because group facilitators explained the objectives of each session, trained step by step and

summarized at the end of each session.

'Most of the facilitators helped me to understand the sessions, explained the objectives and summarized the session. If they did not explain, I would not have understood.'

Subtheme: Facilitation

Most participants said that group facilitator helped to promote interactive sessions and paid attention to all participants.

'The facilitators paid attention to me, always encouraged me to do activities with them. It seems we're in the same boat on the same road, I'm so lucky in the group.'

Subtheme: Personality

Some of the participants explained that the personality of group facilitators was very important because participants can ask questions. An appropriate personality was friendly, warm and enthusiastic.

'When they first enter, all facilitators are smiling, and they are always enthusiastic to answer my questions through the session. They are very friendly, so I dared to ask or answer.'

### 3.2 At home

Theme 3: home works

Benefits of overall homework for daily living were reported by 88.5% of participants (Table 2).

Subtheme: Content

Most participants said that homework was an important part to improve their cognitive function.

However, the amount of homework was very essential. Participants resisted too much or too difficult homework. On the other hands, some participants were not enthusiastic to complete even easy homework. The effective home-work consisted of good objectives and was appropriate to each participant.

'I know I have to exercise my brain to improve my

brain function, but some homework such as autobiography takes time. I completed all the housework, so I didn't have time to write.'

'Some homework was too easy. I am an accountant. Balancing budgets in daily life was too easy.'

Subtheme: Adaptation

Most participants said that the benefits in everyday life were necessary. Therefore, participants were interested to completing homework that they could adapt in daily life to improve their cognition.

'I felt at first that homework was going to be boring. However, after doing homework, I realized it was quite fun and I could adapt to my daily life. My favorite homework is 9-square-table aerobic exercise. I practice every morning. I enjoy it.'

Theme 4: Family members

Subtheme: Supporting

Participants reported that if family members supported them to join the session and encouraged them to do homework, they could practice as much as possible.

'At the beginning of the program, I found it difficult to me to join the class by public transportation. After that, I asked my daughter to drop me at the hospital.'

Subtheme: Sharing

When participants and family members shared their knowledge and experience, it made participants enthusiastic to practice.

'My husband always asked me about homework and wanted to do for himself. I think it encouraged me to do'

Theme 5: Notification

Subtheme: Before and after class

Before class, notification by phone call from one of the group facilitators to remind participants to join the session was essential. Moreover, reminding participants

to practice homework and encouraging practice in daily living after class were important.

'I have a lot of activities at home, so I can't concentrate to do homework or practice all the time but fortunately phone calls always remind me'

## Discussion

From these results, the first homogenous finding was that participants had a high participation rate (99.33%). Moreover, they had positive experiences of being in the group, and enjoyed participating in the program the same as studies of people with dementia.<sup>16</sup> The program may benefit by reducing psychological distress because cognitive decline correlated with greater psychological distress, especially depression, anxiety, and somatization.<sup>17</sup> Five main factors contribute to regular participation and practice in CST. This phenomenon leads to several suggestions. First, most patients with MCI thought CST was complex and difficult to learn. Therefore, designing programs was very essential. Effective activities should be step by step or from easy to difficult. Explanation of objectives and steps of activities will help participants to understand and follow activities. Physical training should be combined in the CST because combined physical and cognitive training improves global cognition in a dose-responsive manner, but these benefits may be less pronounced in older adults with more severe neurocognitive disorder.<sup>18</sup> Therefore, MCI should have more benefit compared with dementia. In this study, participants reported that 9-square-table aerobic exercise was the most beneficial and practical strategy for daily living. The methods to facilitate effective learning were small group interactive activities and variety of teaching materials including home-based personal computers and a webcam.<sup>19</sup> The tailor made design may fit each participant. Therefore, not only frequency and duration of sessions but also assignment of homework should be flexible for each participant. Individual CST in MCI patients may gain benefit<sup>20</sup> and improve access to psychological therapies similar to the studies of people with dementia.<sup>21</sup> Second, family members were an important factor to support participants. A pilot study of couples-focused intervention for MCI revealed positive trends in meaningful activity performance and maintenance of

health-related outcomes, as well as high program satisfaction.<sup>22</sup> Therefore, information and benefits of CST should be provided to family members or main caregivers such as couples before the training, so they will support and encourage participants to practice CST. For example, family meetings should be held before training, or some part of CST may be performed by caregivers.<sup>23</sup> Third, group facilitators were important factors by encouraging participants to regularly participate. Group facilitators meeting to emphasize friendly personality, enthusiasm to help participants and notification before and after classes were essential. Fourth, community and society were one of the factors to increase participation. For example, transportation from home to clinic is a barrier to joining the sessions. Volunteers or transportation support from the community may help to reduce this barrier. Finally, further research should explore the factors to promote or barriers, impacts and benefits of longer term CST from different viewpoints such as from participants, family members, group facilitators, community and policy makers.

To the authors' knowledge, this study is the first qualitative research in Thailand to explore the factors that contribute to regular participation and practice of CST in patients with MCI. This study was conducted under a holistic perspective. Not only factors in clinic, but also at home were explored. Indirectly, the study revealed barriers of MCI patients to participate and practice CST. Therefore, the results will lead to develop effective CST strategies in patients with MCI in the future. Increasing awareness of 5 main factors will help participants regularly participate in sessions and practice CST at home. However, our study had several limitations. First, the interviews were conducted in a large tertiary care hospital in the capital city. Participants' answers may differ from another setting such as secondary care hospitals, primary care units or in community due to different education and socioeconomic factors. Second, despite using semi-structured interview guidelines, they were all one-session interviews. Important issues may have been missed or not explored thoroughly. Further, mutual relationship between participants and the interviewer with multiple-session interviews may be explored thoroughly. Furthermore, many interesting emerging issues from the interviews were not explored much further because they were not the main objectives

of the study. In addition, there was an opportunity for responder bias due to the face-to-face data collection method. A self-administered questionnaire will reduce this bias in the future study. Moreover, translation bias occurred in quotations of this work. We first conducted the interviews and made audit trails in Thai. Afterwards, interviewers and a native English speaker helped to translate in English. However, this process also mistranslated English expressions to some extent. Finally, just like other qualitative research, participants were selected and voluntary. The thoughts of nonparticipating subjects were impossible to ascertain. Such is an inevitable weakness of all qualitative (and also quantitative) research.

This study showed that design of the program; group facilitators, homework, family members' involvement and notification were 5 main factors to maintain regular participation and practice in CST. This provides further evidence to support the use of CST in routine practice for people with MCI and encourages program designs focusing on the 5 main factors that will increase the participation rate in each session of the program and daily practice at home.

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