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Research Article

The Association between Mild Cognitive Impairment (MCI) and Traditional Chinese Medicine (TCM) Constitution among Community-Dwelling Elderly in Japan

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Abstract

Alzheimer's Disease (AD) is generally regarded as irreversible, while mild cognitive impairment (MCI) has attracted attention for its potential reversibility. In modern medicine, dementia is primarily viewed as a neurological issue; however, Traditional Chinese Medicine (TCM) perceives the human body as a complex, unified entity where organs interact and harmonize to sustain life. TCM emphasizes that dementia is not solely a brain problem but involves the overall harmony of the body.

In TCM, individual constitution is classified into healthy states and eight types of "pre-disease" conditions, which can influence the progression of various health issues. TCM posits that it is possible to restore a pre-disease constitution to a healthy state. Traditional health practices such as Qigong, emotional therapy, and dietary therapy are offered in TCM to help recover health before the onset of disease. From the TCM perspective, improving constitution is believed to significantly impact the prevention and improvement of MCI.

This study investigates the relationship between mild cognitive impairment and TCM constitution. A cross-sectional survey was conducted involving 323 elderly individuals aged 65 and older residing in K City, utilizing TCM constitution classification and assessment tables, along with the DASC-21. The findings aim to deepen the understanding of MCI from a TCM perspective and contribute to holistic approaches in managing cognitive health among the elderly.

Keywords: Elderly people; Mild Cognition Impaired (MCI); Traditional Chinese Medicine (TCM) Constitution

Introduction

Dementia has become a significant global health concern, with over 55 million people affected worldwide. It is estimated that by 2030, the number of people with dementia will reach approximately 78 million, and by 2050, it will rise to around 139 million [1]. Dementia ranks as the seventh leading cause of death among all diseases and is a primary factor contributing to disability and dependency among the elderly. With the rapid aging of societies, particularly in countries like Japan, addressing dementia has become an increasingly critical issue.

Mild Cognitive Impairment (MCI) represents an intermediate stage between normal cognitive aging and dementia, particularly Alzheimer's disease (AD).

Studies [2] have shown that more than half of individuals with MCI develop dementia within five years, whereas [3]. Appropriate intervention can facilitate recovery to normal cognitive function in 46% of cases. According to the Japanese Neurological Society (2017) [4], the annual conversion rate from MCI to dementia ranges from 5% to 15%, while the probability of returning to normal cognitive function with proper intervention ranges from 16% to 41%. These findings highlight the importance of early detection and intervention in MCI management to delay or prevent its progression to AD.

Currently, there is no definitive cure for dementia, making prevention and delaying its onset a priority. While modern medicine primarily focuses on the neurological aspects of dementia, Traditional Chinese Medicine (TCM) has drawn increasing attention as a complementary approach. In TCM, dementia is classified under "呆証" (dull syndrome) and "郁証" (depressive syndrome), while MCI is described using terms such as "健忘" (forgetfulness) and "喜忘" (habitual forgetfulness). TCM views the human body as an interconnected system in which organ imbalances affect overall health. From this perspective, modifying an individual's constitution is crucial for preventing and managing MCI.

Recent studies have explored the relationship between MCI and TCM-based constitutions. Research in China has reported a high prevalence of certain constitutions, such as blood stasis, phlegm-damp, and yang deficiency, among MCI patients [5-7]. However, there is no unified consensus on this relationship, necessitating further large-scale studies. In Japan, research on the correlation between MCI and TCM-based constitution remains limited, presenting an opportunity for future exploration.

Several TCM-based interventions, including acupuncture, herbal medicine, qigong exercises (e.g., Ba duan Jin), emotional therapy, and dietary therapy, have shown promise in improving cognitive function

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in MCI patients [8-10]. Given the potential benefits of TCM in MCI management, further research and clinical applications should be encouraged to enhance dementia prevention strategies, particularly in aging societies like Japan.

Materials and Methods

Research subjects and duration

Four hundred elderly persons aged 65 years or older living in a community in S ward, K city, Japan. A cross-sectional survey was conducted using a self-administered, anonymous questionnaire. This study was approved by the Research Ethics Review Committee of Kyoto Koka Women's University (Approval No. 22MM01) and was conducted until November 2023.

Survey contents

Basic Attributes of the Elderly: Background information including age, gender, chronic disease status (whether the participant had a chronic disease and the specific name of the disease), and presence of cohabitants (yes or no) were collected using a checklist.

Japanese version of the Questionnaire on Chinese Medicine Constitution (CCMQ-J

Criteria for determining TCM constitution (Chinese Society of Traditional Chinese Medicine 2009) [11] (Table 1)

classification	total score	determination
balanced constitution total score	≧60 8 types of biased constitutions <30	yes
	≧60 8 types of biased constitutions <40	basically matches
	other than the aforementioned	no
biased constitution total score	≧40	yes
	30~39	Have a tendency
	<30	no

Table 1: Formula for calculating the Chugai constitution = [(total score of items - number of items)/number of items x 4] x 100

(* Items 2, 7, 8, 9, 22, and 53 are inverted items when calculating the number of peace pledges.)

In this study, to analyze the results statistically, the constitution with a tendency to ○○ was also judged as ○○ constitution.

Those with a score of <60 for the Peace constitution and <30 for the Unwellness constitution is judged as not having one of the 9 types of TCM constitutions.

In this study, an individual may have a single constitution or several constitutions at the same time, but the constitution with the highest score was determined as the constitution of the study subject.

Dementia Assessment Sheet for Community-based Integrated Care System 21 items (DAS C-21): The DASC-21 is an assessment sheet consisting of an introductory section (A and B) and items 1 to 21, with each item rated on a 4-point scale (1 to 4). When evaluating using this 4-point scale, anchor points are placed between 1-2 and 3-4, with scores of 1 and 2 considered within the normal range, and scores of 3 and 4 indicating possible impairment. The total score ranges from 21 to 84 points, with a score of 31 or higher suggesting a potential risk of dementia. The severity of dementia is assessed based on patterns in the subcategories of remote memory, spatial cognition, social awareness, and physical ADL, with severity classified into four levels: (1) none, (2) mild, (3) moderate, and (4) severe.

According to a study [12], the average DASC-21 score among 17 MCI patients attending a memory clinic was 28.1 ± 3.9. Based on this, the current study defines MCI if the participant's DASC-21 score is 28 or higher, and if the following criteria are met:

- The individual is not diagnosed with dementia.
- The individual reports memory complaints.
- The individual is independent in activities of daily living (ADL).
- The DASC-21 score is 28 or higher.

Statistical Methods

Statistical analysis was performed using the Japanese version of SPSS 28.0 J. The Mann-Whitney U test and The Kruskal-Walli's chi-square test were performed. P values less than 0.05 were considered statistically significant.

Results

Participant Characteristics

A total of 400 questionnaires were distributed, after excluding individuals with incomplete information, 323 participants were included. Due to incomplete entries on some forms, the total number of data points varied during analysis. Of the respondents, 251 were female (77.7%) and 72 were male (22.3%), with ages ranging from 65 to 90 years. Participant characteristics are shown in table 2. A total of 122 participants (37.8%) lived alone, while 201 (62.2%) did not. Additionally, 203 participants (62.8%) had chronic medical conditions, while 116 (35.9%) did not.

Variables	N=323	
Mean age (SD+) in years	Maximum	90
	Minimum	65
	Mean age (SD+)	77.03±5.51
Sex	Male	72 (22.3%)
	Female	251 (77.7%)
Presence or absence of cohabitants	Yes	201 (62.2%)
	No	122 (37.8%)
Presence or chronic illness	None	116 (35.9%)
	Single	139 (43.0%)
	Two or more comorbidities	64 (19.8%)

Table 2: Participant's characteristics.

Distribution of TCM Constitutions

Among the collaborators, the results of the Traditional Chinese Medicine constitution distribution are shown in table 3.

Differences in DASC-21 scores by TCM constitution: Biased and Balanced

The subjects were divided into two groups based on their TCM constitutional types: the healthy Balanced constitution and the sub-healthy Biased constitution. The DASC-21 scores were examined

TCM constitution	N=299	%
Balanced constitution	157	52.5%
biased constitution	142	47.5%
Qi deficiency	17	5.7%
Yang deficiency	30	10.0%
Yin deficiency	16	5.4%
Phlegm-dampness	22	7.4%
Dampness-heat	1	0.3%
Blood stasis	25	8.4%
Qi stagnation	7	2.3%
Special constitution	17	5.7%
Unable to assess the TCM constitution	7	2.3%

Table 3: Distribution of TCM constitution.

using the Mann-Whitney U test. The results are shown in table 4. The average ranks for each item indicated that the scores for elderly individuals with the Bias constitution were significantly higher in "Total Score of DASC-21," "DASC-21 Item 1 - Memory," "DASC-21 Item 2 - Orientation," "DASC-21 Item 3 - Problem-Solving and Judgment," "DASC-21 Item 4 - IADL Outside the Home," "DASC-21 Item 5 - IADL Inside the Home," and "DASC-21 Item 6 - Physical ADL ①." ($P < 0.05$).

						N=291
DASC-21 Items	Biased N=135		Balanced N=156		Mann-Whitney	
	Average rank	sum of ranks	Average rank	sum of ranks	z	p
Total Score of DASC-21	179.13	24182.50	117.33	18303.50	-6.336	0.000
DASC-21 Item 1 - Memory	175.49	23690.50	120.48	18795.50	-5.851	0.000
DASC-21 Item 2 - Orientation	156.85	21175.00	136.61	21311.00	-2.544	0.011
DASC-21 Item 3 - Problem Solving and Judgment	166.35	22457.50	128.39	20028.50	-4.214	0.000
DASC-21 Item 4 - IADL Outside the Home	154.53	20862.00	138.62	21624.00	-2.661	0.008
DASC-21 Item 5 - IADL Inside the Home	161.14	21754.00	132.90	20732.00	-3.925	0.000
DASC-21 Item 6 - Physical ADL ①	148.94	20107.50	143.45	22378.50	-2.092	0.036
DASC-21 Item 7 - Physical ADL ②	147.22	19875.00	144.94	22611.00	-1.143	0.253

Table 4: Differences in DASC-21 scores by TCM constitution.

Differences in DASC-21 scores Based on Gender

The differences in DASC-21 scores between males and females were examined using the Mann-Whitney U test. The results are shown in table 5. The average rank for the total DASC-21 significantly higher for males ($P < 0.05$). Among the seven evaluation items, "DASC-21 Item 4 - IADL Outside the Home," "DASC-21 Item 5 - IADL Inside the Home," and "DASC-21 Item 7 - Physical ADL ②" were also significantly higher for males ($P < 0.05$).

						N=323
DASC-21 Items	male N=72		female N=251		Mann-Whitney	
	Average rank	sum of ranks	Average rank	sum of ranks	z	p
Total Score of DASC-21	195.22	14056.00	152.47	38270.00	-3.474	0.001
DASC-21 Item 1 - Memory	174.91	12593.50	158.30	39732.50	-1.401	0.161
DASC-21 Item 2 - Orientation	162.10	11671.50	161.97	40654.50	-0.013	0.989
DASC-21 Item 3 - Problem Solving and Judgment	165.34	11904.50	161.04	40421.50	-0.378	0.706
DASC-21 Item 4 - IADL Outside the Home	188.68	13585.00	154.35	38741.00	-4.569	0.000
DASC-21 Item 5 - IADL Inside the Home	215.49	15515.00	146.66	36811.00	-7.749	0.000
DASC-21 Item 6 - Physical ADL ①	167.03	12026.00	160.56	40300.00	-1.925	0.054
DASC-21 Item 7 - Physical ADL ②	168.97	12166.00	160.00	40160.00	-3.752	0.000

Table 5: The Differences in DASC-21 scores by Gender.

Differences in DASC-21 scores Based on Chronic Diseases

The subjects were divided into three groups based on their chronic disease status: none, single occurrence, and two or more comorbidities. The differences in DASC-21 scores among the groups were examined using the Kruskal-Wallis chi-squared test. The results are shown in table 6. A significant difference was observed in the average rank values of the Total Score of DASC-21 among the three groups. Among the seven items, a significant difference was noted in "DASC-21 Item 3 - Problem-Solving and Judgment" among the three groups ($P < 0.05$).

					N=319
	Average rank			Kruskal-Wallis	
DASC-21 Items	0.none N=116	1.single N=139	2.Two or more comorbidities N=64	K	P
Total Score of DASC-21	141.80	168.40	174.75	7.515	0.023
DASC-21 Item 1 - Memory	145.64	168.41	167.75	4.898	0.086
DASC-21 Item 2 - Orientation	151.44	167.83	158.52	3.129	0.209

DASC-21 Item 3 - Problem Solving and Judgment	146.14	160.15	184.79	8.717	0.013
DASC-21 Item 4 - IADL Outside the Home	150.13	164.89	167.27	5.788	0.055
DASC-21 Item 5 - IADL Inside the Home	153.04	167.01	157.38	2.966	0.227
DASC-21 Item 6 - Physical ADL ①	158.77	159.42	163.48	1.600	0.449
DASC-21 Item 7 - Physical ADL ②	159.39	159.14	162.97	2.245	0.325

Table 6: Differences in DASC-21 scores Based on Chronic Diseases.

Furthermore, to clarify which groups had significant differences, the LSD (L) multiple comparison method was used after the Kruskal-Walli's chi-squared test? As shown in table 7, a significant difference in the total DASC-21 score was found between the group with no chronic diseases and the group with two or more comorbidities ($P < 0.05$). A significant difference was also noted in "DASC-21 Item 3 - Problem-Solving and Judgment" between the no disease group and the two or more comorbidities group ($P < 0.05$).

Item	Chronic Diseases		p
Total Score of DASC-21	0.none	⎫	0.047
	1.single	⎬	
	2.Two or more co-morbidities	⎭	
DASC-21 Item 3 - Problem Solving and Judgment	0.none	⎫	0.007
	1.single	⎬	
	2.Two or more co-morbidities	⎭	

Table 7: Multiple comparisons of DASC items showing significant differences in chronic diseases.

Discussion

The average age of the study participants was 77.03 (SD ± 5.51) years. Among the participants, 22.3% were male and 77.7% were female, with a higher proportion of women, which aligns with trends in Japan where social activities are predominantly led by women. This suggests a need to encourage older men to engage more in social activities.

The formation of TCM constitution is influenced by both genetic and environmental factors, including climate, region, social environment, diet, and lifestyle habits. In this study, 52.5% of participants had a healthy Peace Constitution. Previous studies in China and Japan reported [13-15] lower proportions of the Peace Constitution compared to this study, suggesting that the participants were healthier than the general population.

The participants were divided into two groups based on their TCM constitution: Peace Constitution (healthy) and Bias Constitution (pre-disease). Mann-Whitney U tests revealed that elderly individuals with a Peace Constitution had better cognitive function compared to those with a Bias Constitution.

Factors significantly related to cognitive function included gender and the presence of chronic diseases, consistent with findings from previous studies [16]. Several studies [8-10] reported improvements in cognitive function in MCI patients through acupuncture, acupressure, and traditional practices like Tai Chi and Baduanjin. In China, studies [5-7] indicated that MCI was more common in people with blood stasis, phlegm-dampness, and Yang deficiency constitutions. There is still no unified conclusion on the relationship between TCM constitution and MCI, suggesting the need for further research to explore its impact.

Limitations of the Study

Due to the small sample size of the participants in the statistical analysis, there is a possibility of bias in the results. Therefore, it cannot be generalized to the characteristics of elderly people nationwide in Japan. Future studies should expand the target area and increase the number of participants to improve the research.

Conclusion

Factors significantly associated with DASC-21 scores included gender and the presence of chronic diseases. Older adults with a balanced constitution exhibited higher cognitive function than those with a biased constitution. TCM has the potential to restore sub-healthy constitutions to a healthy state. Improving biased constitutions may positively impact cognitive function and enhance overall community health and quality of life. Further large-scale studies are needed to clarify the relationship between these TCM constitutions and MCI.

Declaration of Conflicting Interests

The authors declare no conflicts of interest.

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