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Effects of Journal Writing on Cognitive Function in Older People

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Abstract Continuous interventional programs such as the development of the practice of journal writing have recently been recommended as one way of helping prevent dementia in older people. We used the Kana Pick-out Test, a screening test for cognitive function, to investigate the journal writing status of 227 older people and determine whether journal writing had any positive effect to maintain cognitive function. Forty-seven percent of people (106 people) kept journals; 70% of these people had done so for at least 10 years, and 88% had kept journals every day. Both at home and in care facilities, *t*-tests revealed a significant difference in the numeric value of the Kana Pick-out Test between the group with some journal writing practice and that without it (at home, $P < 0.01$; in care facilities, $P < 0.05$). The results indicated that many older people kept a journal, and that this had some positive effect on maintaining cognitive function.

Key words: journal writing, Kana Pick-out Test, dementia, older people, cognitive function

Introduction

In Japan, since the introduction of a compulsory long-term-care insurance system in 2000, many older people have participated in a diverse range of activity programs, such as singing songs, playing games, and watching

movies, both at home and in care facilities such as day service centers and special nursing homes for older people.¹⁻⁶ The main purpose of these activities is to enrich people's leisure time. However, participants and their families also expect that such programs will help them to maintain cognitive func-

tion. Additionally, these activities are often implemented as group programs, and they are unsuitable for those older people who do not like group activities or for those with physical difficulties that prevent them from participating. Thus journal writing could be a suitable method of maintaining cognitive function for older people in these situations. Previous reports have shown that journal writing can be useful in supporting people to accept the aging process and make the older years enjoyable and productive,⁷ as well as in helping them work through unwelcome issues that have arisen in their rehabilitation and overcome emotionally draining reactions to adverse circumstances.^{8,9} However, to our knowledge, no studies have fully elucidated the real status of the practice of journal writing in older people or clarified the effects of journal writing on their cognitive function. Here, by using the Kana Pick-out Test, a cognitive function scale by picking out specific *kana* (Japanese syllables), we investigated the status of journal writing in these older people and examined whether journal writing had any influence on their cognitive function.¹⁰⁻¹²

Definition

Journal writing: Writing the daily events and their impressions in a reflective way regardless of the length of sentences in forms such as notebook, calendar, and diary.

Methods

Design

This study was performed by semi-structured interview and using the Kana Pick-out Test. This study examined differences of cognitive function between participants categorized by participants' self-report on whether they kept journal or not, whether they frequently went out/made conversation with others, and whether they participated fully in daily life.

Participants

The participants were randomly-recruited people aged 65 and older in two cities in Prefecture Y who lived independently either at

home or in care facilities.

Participants met the following three criteria: (1) they were not diagnosed with dementia; (2) they could write and had no problems with psychophysical functions; and (3) they had completed six years of primary school. The researchers determined whether the participants met criteria (1) and (2) through interview. These three criteria ensured that the participants were able to keep journals. The research was conducted from August to September 2003.

Ethical considerations

This study was implemented after we had received approval from the developer of Kana Pick-out Test, and approvals of the participants and the managers at the homes and institutions where the participants were living. They received the following explanations: that the data obtained would not be used except for the purpose of the research and was kept in a safe place; that individuals would not be identified; that participation in the study was voluntary; and that they could cancel their participation at any time with no disadvantage.

Procedure

For participants at home who agreed to join the study, the researcher visited their homes, interviewed them to collect information about the status of their journal writing and daily activities, and examined their cognitive function by using the Kana Pick-out Test. For participants in facilities, the researcher visited their rooms and performed the same interview and the test.

Instrumentation

The researcher applied the Kana Pick-out Test developed by Kaneko¹⁰, which is frequently used in Japan as a cognition function tests, and has high validity when used with the Mini-Mental State Examination, to examine whether journal writing helped prevent dementia. This test is a kind of screening test for mild dementia in which participants read and understand a story written in *kana* and at the same time have to pick up five specific syllables 'あ,い,う,え,お' and circle them within two minutes.

This scale indicates means and standard deviations of scores at each age group and also dividing line between mild dementia and normal (for example, for the age 70, the mean is 22.4, SD is 9.3 and dividing line is 9).

Data collection

Data were collected by interview of individual participants, in a private quiet room. After they had given their consent the researcher asked the following questions about the journal writing:

- (1) Do you keep a journal? If you do, what is the purpose?
- (2) If you keep a journal, do you feel that it has changed your life?
- (3) If you do not keep a journal, why not?

In addition to these questions, the interviewer asked the participants to choose either 'high' or 'low' on the question of whether they frequently went out, had conversations with others, and whether they participated fully in daily events. The interviews took 15-20 minutes and the interviewer took written notes.

Data analysis

According to Kaneko, the scores of the Kana Pick-out Test in the participants who did not understand the meaning of the sentences were 30% higher than those who understood the meanings, therefore we subtracted 30% from the former's searching scores and used the revised scores for analysis. IBM SPSS21.0 for Windows was used for

statistical analysis. χ^2 , *t*-test and ANOVA were performed to examine the differences in frequency and means between different conditions. To clarify the main factors that influenced the performance of the Kana Pick-out Test, Hayashi's Quantification Theory Type I was used.

Results

The total number of participants analyzed statistically were 227, consisting of 127 at home (men, 37; women, 90; mean age 76.2 years, range from 65 to 92 years) and 100 (men, 16; women, 84; mean age 82.0 years, range from 67 to 98 years) in care facilities.

The practice of journal writing

There were no differences in each item on the questionnaire, which listed participants' characteristics between those at home and those at care facilities; therefore, the data obtained from both types of participant were summed. Table 1 shows the number of participants who kept a journal, period of journal writing, and frequency of journal writing.

Frequencies and percentages of journal writing

Forty-seven percent (106 participants) had kept journals and 53% (121) had not, a ratio of approximately half and half. Of the 106 journal-keepers, 74 (70%) had been keeping journals for at least 10 years, and 93 (88%) kept them every day.

Table 1 Journal writing in older people

Variable	n	%
Practice of journal writing (n=227)		
Keeps a journal	106	47
Does not keep a journal	121	53
Period of journal writing (n=106)		
Under 10 years	32	30
10 years or more	74	70
Frequency of journal writing (n=106)		
Every day	93	88
Every second or fewer days	13	12

Distribution of reasons for journal writing

Of the 106 participants who kept journals, 81 (76%, the highest frequency) said that they did so in order not to forget their daily events. The second most common reason was because it was a habit from their youth ($n=20$, 19%). The desire to prevent dementia was stated by 16 participants (15%), and 5 (5%) said that they did it for stress reduction.

Changes attributed to journal writing

Fifty-nine participants (56%, the highest frequency) answered that they were able to reflect on their lives. Second, 18 participants (17%) answered that the reflections on their lives had led to modifications in their behavior. Fourteen participants (13%) answered that they had experienced no change. Six (6%) said that they got practice at writing sentences, and 4 (4%) said that they experienced stress relief.

Reasons for discontinuing journal writing

Of the 121 participants who answered that they did not keep a journal, 35 (29%) answered

that they had stopped journal writing when they had entered hospital or developed a disease; 29 (24%) answered that they had never thought of keeping a journal, and 19 (16%) said that it was too much of a bother to keep a journal.

The relationships between journal writing and two activities in the participants' daily lives are shown in Table 2. The rates in participants with journal writing who think they go out frequently or they hold a conversation with others frequently were significantly higher than those in participants with no journal writing ($\chi^2=6.66$, $P < 0.05$ for the former, and $\chi^2=9.25$, $P < 0.05$ for the latter).

Journal writing maintains cognitive function

Table 3 shows the means of the revised scores in each age group of older participants at home or in care facilities. Analysis of variance (ANOVA) proved a significant effect of age only in older people living at home ($F(3,123) = 5.76$, $P < 0.01$), not in care facilities. Therefore, the data from both groups were analyzed separately. Fig. 1 shows the distri-

Table 2 Relationships between journal writing and participants' choice of daily activities $N=227$

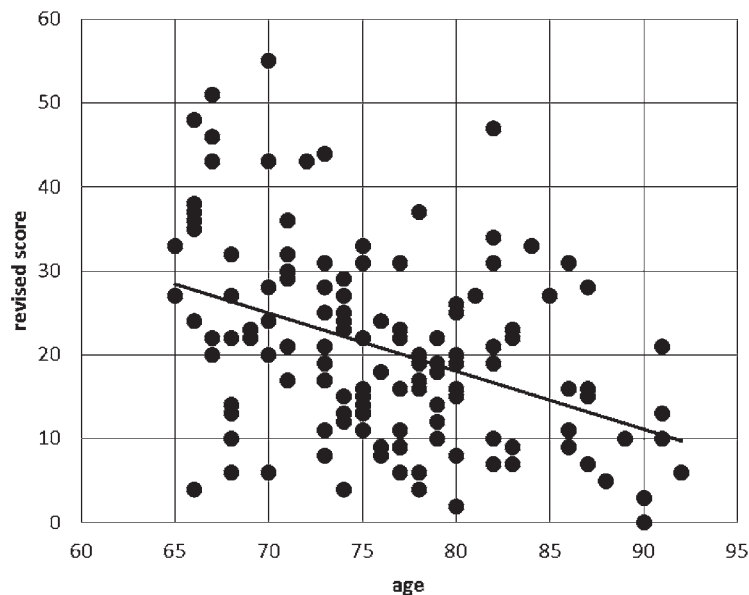
Variable		Journal writing		<i>P</i>
		Yes (%)	No (%)	
Frequency of going out	High	52 (57)	39 (43)	< 0.05
	Low	54 (40)	82 (60)	
Frequency of conversation with others	High	80 (54)	68 (46)	< 0.05
	Low	26 (33)	53 (67)	

Table 3 Means of revised Kana Pick-out Test scores for each participant age group at home and in care facilities $N=227$

Age group	At home	In facilities
	Mean scores(number)	Mean scores(number)
Sixties	27.52 (23)	9.50 (2)
Seventies	20.03 (66)	16.06 (34)
Eighties	18.63 (32)	15.00 (50)
Nineties	8.83 (6)	13.93 (14)

Table 4 Results of Hayashi's quantification theory type I for the scores of the Kana Pick-out Test $N=227$

Inquiry item	Category	At home ($n = 127$)		In care facilities ($n = 100$)	
		Numeric value	Range	Numeric value	Range
Practice of journal writing	Yes	2.94 (65)	6.03	2.05 (41)	3.47
	No	-3.09 (62)		-1.42 (59)	
Chosen frequency of going out	High	2.28 (57)	4.13	1.10 (34)	1.67
	Low	-1.85 (70)		-0.57 (66)	
Chosen extent of interest in daily events	High	0.57 (102)	2.92	0.34 (70)	1.14
	Low	-2.35 (25)		-0.80 (30)	
Chosen frequency of Conversation	High	-0.55 (90)	1.90	1.11 (58)	2.64
	Low	1.35 (37)		-1.53 (42)	

* $P < 0.05$; ** $P < 0.01$ Fig. 1 Observed plot (black circles) and modeled plot (solid line) of the relationship between age of participants at home (x-axis) and revised scores in the Kana Pick-out Test (y-axis) ($y = -0.69x + 73.5$; x is age and y is score)

bution of the scores against age on the horizontal axis for the older at home. The linear function best fitted to this distribution was $y = -0.69x + 73.5$.

Using the revised scores from the Kana Pick-out Test to compare the differences among groups carried the risk of confounding the results by the age factor. Therefore, for older people at home, the difference between the theoretical devised scores for age (derived from the linear function) and the actual ones was regarded as the standard score.

In the case of older people in care facilities, in whom there was no main effect of age, the difference from the mean scores for all participants was regarded as the standard score.

Table 4 shows the means for the standard scores in the Kana Pick-out Test for the four inquiry items, namely "whether or not the subject keeps a journal," "whether or not they think they go out frequently," "whether or not they think they make conversation with others frequently," and "whether or not they have participated fully in daily events." The

differences in the scores of the Kana Pick-out Test between two groups in four items were clarified by using *t*-test. The results showed significant differences between two groups in 'Practice of journal writing' both at home and in care facilities ($t = 3.44, P < 0.05$ and $t = 2.61, P < 0.05$), significant difference between two groups in 'Going out' only at home ($t = 2.66, P < 0.05$), significant difference between two groups in 'Interest in daily life' only at home ($t = 2.23, P < 0.05$). To clarify the main factors that influenced the performance of the Kana Pick-out Test, the results were analyzed (range and partial correlation coefficient) by Hayashi's Quantification Theory Type I, in which the above-mentioned four items were independent variables and the standard scores of the Kana Pick-out Test were dependent variables. Among older people at home, journal writing had the greatest effect on both the range and the partial correlation coefficient. The results of *t*-tests showed a significant difference only between keeping a journal and not keeping one ($t = 2.8, P < 0.01$), supporting the results of the mathematical quantification theory class I. Among older people in care facilities, judging from both the range and the partial correlation coefficient, the journal writing was most related to the frequency of speaking with others; this was the independent variable that best explained the results. The results of *t*-tests showed a significant difference between keeping a journal and not keeping one ($t = 2.1, P < 0.05$), high and low frequency of going out ($t = 2.7, P < 0.05$), and high and low frequency of speaking with others ($t = 2.5, P < 0.01$), supporting the results of the mathematical quantification theory class I.

Discussion

Recent status of journal writing in older people

Forty-seven percent of participants (106 people) kept journals; of these, 70% had kept them for at least 10 years and 88% kept them every day. These results imply that many of the older people do not find it hard to keep a journal. Among the 106 participants who kept journals, 76% mentioned that they did so in order not to forget events. Half of them (56%, the highest frequency) answered that

they did so to reflect on their lives, and 17% said that the reflections on their lives had led to modification of their behavior. These results suggested that keeping a journal might be a way for older people to record daily events and reflect on their lives about which, with age, they might forget. This task in older people may be useful for integrating their lives and adapting to aging. Journal writing enables older people to create their own biographies; it reminds them of their experiences, allows them to reflect on their lives, and consequently helps them to achieve developmental tasks.⁷

As a reason for stopping journal writing, participants mentioned that they had done so when they had become ill or were in hospital. These results do not deny the likelihood that older people who become ill might stop journal writing. On the other hand, the fact that some people continued their journal writing so as to record the changes in their symptoms and their struggles with illness suggests that if people have no problems with writing then they might continue keeping their journals independently of their physical condition. Some of the older people in care facilities had stopped keeping journals because they considered their daily lives uneventful. However, there was no significant difference in the numbers that gave this reason between those at home and those in care facilities. Regardless of housing or lifestyle, the desire to notice and record subtle changes in daily life led them to keep a journal. Some people had continued keeping a journal for 10 years or more by writing in their journals every two days; this suggests that they had formed habits that matched their individual pace and lifestyle.

The numbers of people who went out often and held conversations frequently were greater in older people who kept journals than in those who did not. This might suggest the possibility that journal writing influenced how often people went out and how often they held conversations; alternatively, going out or talking more often could have encouraged them to write journals. Nevertheless, further evidences will be necessary to support the possibility because in this study the participants' choices of high or low of

daily activities were based only on subjective criteria but objective ones and therefore, the choices might be biased by various factors such as preceding 'yes' or 'no' response of habit of keeping journal.

Journal writing maintains cognitive function

The scores in the Kana Pick-out Test were higher among people who maintained a journal than in those who did not. These results indicated that keeping journal might influence the score. Seventy-six percent (81 participants), the highest frequency of the participants answered that they had kept a journal in order not to forget their daily events. This reason suggested that journal writing reminded older people of their life events, and once they had written these memories down they used them to remind them again of such events. In this work the older people would use language and various visual/auditory images, which would activate the total function of the brain, and consequently be useful to maintain brain function.

Kaneko mentioned that 90% of dementia praecox is a lifestyle-related disease caused by undesirable environmental factors; he coined the term "dementia due to lack of utilization and aging," pointing out that it is important to have habits and reasons for living, as well as desirable friendships, and to maintain the quality of life with regular physical exercise.¹⁰

We found here that, in older groups either at home or in care facilities, the scores of the Kana Pick-out Test were higher in people who kept journals than in those who did not. These results suggested that not only those older people who went out and spoke with others frequently, but also those who suffered declining high-level functions and depended on others, and who have little stimulation from outings and daily activities, might be able to help maintain their cognitive function through journal writing. Thus, for many older people living in a variety of circumstances, journal writing might help to prevent dementia.

Our findings imply that, for older people, keeping a journal is an easy practice to start and maintain as long as they can write. Furthermore, journal writing probably main-

tains cognitive function, thus helping to prevent senile dementia. Many people, including those who do not keep journals, could benefit from the positive effects of this activity as a tool to maintain their cognitive function.

Study limitations

Though this study showed that older people with the habit of keeping journals had higher scores of Kana Pick-out Test than those who did not follow this practice, this evidence does not directly support the preventive effects of journal writing on dementia. For the purpose of drawing the conclusion that keeping journals prevents dementia, further evidence of significantly lower percentage of dementia in the older people who write journals than that in those who do not will be necessary. In future, we expect that preventive effects on dementia of keeping journals might be supported directly by the combination of some other assessment scales with Kana Pick-out Test.

Conclusions

In this study, we clarified the actual status of journal-writing practice in 227 older people and the effect of journal-writing in helping them to maintain their cognitive function by using the Kana Pick-out Test, a cognitive function scale. Forty-seven percent of people (106 people) kept journals, and 70% of them had done so for at least 10 years, and 88% had kept journals every day. Both at home and in care facilities, *t*-tests revealed a significant difference in the numeric value of the Kana Pick-out Test between the group with some journal writing and that without one. The results indicated that many older people kept a journal, and that keeping a journal had some positive effect in maintaining their cognitive function.

For clinicians working with older people this study has a number of implications. We have shown that journal writing is important and clinicians working with this population should therefore encourage them and facilitate this practice. This might mean that nurses need to ensure that older people have access to journal writing materials and the opportunity to do this. If someone has

stopped their regular journal writing, it may indicate the decline in his/her physical or cognitive functions.

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Conflict of Interest

The authors state no conflict of interest.

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