Original Article

Association between a Change in Social Interaction and Dementia among Elderly People[☆]

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S U M M A R Y

Background: Since limited, specific assessments of social environments have previously been used, with the effect of a change in social interaction proving rare in previous studies, this study sought to clarify the specific association between changes in social interaction and symptoms of dementia.
Methods: The participants were elderly people, aged > 60 years, from a suburban community. All the participants formed part of the investigation from 2008 to 2011. The Index of Social Interaction was used to measure social interaction among elderly people. Data of dementia were obtained from Health and Welfare Center of local government. The chi-square test and a logistical regression analysis were used to examine the relationship between changes in social interaction and dementia.
Results: There were 321 participants without missing data. The results showed that "reading newspapers" was a positive change in social interaction in relation to the risk of dementia (odds ratio = 3.45, confidence interval: 1.04—11.45).
Conclusion: This study focused on changes in social interaction and found that a positive change could help prevent dementia. Specifically, this study indicated that elderly people's engagement with the social environment and in intellectual activities would prevent dementia.

1. Introduction

Since health is defined as a state of complete physical, mental, and social well-being[1], successful aging is given greater consideration on "health and disease" or "physical, mental, and social activity."[2] Besides avoidance of disease and disability, successful aging includes maintenance of high physical and valid cognitive function, productive activities, and engagements with social interaction[3]. Prevention of cognitive decline is very important for successful aging[4]. However, elderly people's cognitive function declines with advancing age; this is a pervasive issue in gerontology[5].

In order to prevent dementia, by delaying a decline in cognitive function, it is necessary to study the environmental factors related to dementia. For example, Suzuki[6] pointed out that cognitive function among humans does not just decline with advancing age, but can also be improved by their experiences in environmental contexts. Moreover, Park and Bischof[7] demonstrated that engagements in environments that require sustained cognitive efforts may facilitate cognitive function. Hertzog et al[8] found that environmental contexts can enhance the development of cognitive function for humans both in adulthood and in old age.

Generally, the environment refers to external aspects that involve individuals[9]. The social environment can be defined as an individual's social background and culture[10]. Importantly, human beings tend to set their targets, with expectations for the future, so as to change their external environment according to their desires, rather than, through sheer motivation, being assimilated into the external environment. Therefore, humans can actively create and modify their developmental environments, based on their targets[6]. In social environments, this interaction is considered social interaction and can be rated in terms of both qualitative and quantitative aspects, such as the frequency of interaction with one's family or community[10].

As mentioned above, environmental stimuli are beneficial for the prevention of dementia. For example, Zunzunegui et al[11] found that a decline in elderly people's cognitive function could be predicted by poor social interactions, infrequent participation in social

activities, and social disengagement. In their review, Fratiglioni et al[12] found that social engagement, social activities, and physical exercise can improve cognitive function among elderly people. These studies implied that the stimuli within social interactions might contribute toward the prevention of dementia.

Although social interaction has been proved as an important factor of dementia prevention, several issues need to be studied further. First, there are a few studies using specific assessments to measure social interaction; therefore, specific correlates of social interaction are not clear. Second, a few studies have focused on the effect of a change in social interaction on the prevention of dementia.

Thus, this study sought to clarify the specific association between changes in social interaction and symptoms of dementia.

2. Materials and methods

2.1. Design

This was a 3-year, longitudinal prospective cohort study using data from a project implemented in a suburban area, named "Community empowerment and care for well-being and healthy longevity: evidence from a cohort study (CEC)[13]." The "CEC" commenced in 1991, and all the residents participated in this investigation every 3 years.

2.2. Participants

In the baseline year (2008), 1176 elderly people without dementia participated in the study. Between the period 2008 and 2011, 153 participants were excluded due to relocation and death. Therefore, there were 1023 participants until 2011. To facilitate analysis of complete data only, 702 individuals with missing data were eliminated. Ultimately, 321 elderly people were retained in the analysis, and the response rate was 31.4%.

2.3. Items of investigation

In this study, the investigation consisted of three distinct parts.

Social interaction was evaluated through the Index of Social Interaction (ISI), which was developed to enable evaluation of different types of social interactions among Japanese people. The ISI contains five subscales and 18 items (Appendix 1). The Cronbach α for the subscales ranged from 0.78 to 0.81; previous studies also demonstrated the measure's validity and reliability[10]. The score on each item was determined through the frequency indicated on the items, and a higher score indicated a higher frequency.

Data of dementia were obtained from Health and Welfare Center of local government. Dementia was determined through a clinical diagnosis by medical doctors and examination by professionals. If participants were diagnosed to "have dementia" or "have symptoms of dementia," they were classified as the "dementia group." Else, they belonged to the "normal group."

Participants were required to indicate their age, gender, and disease status. With regard to disease status related to the question "were you hospitalized within the past year or do you have any diseases that must be treated for more than 2 weeks continually?", participants were classified into the "disease group" or "no-disease group," based on their answers (i.e., "yes" or "no").

2.4. Data analysis

The chi-square test and multiple logistical regression analysis were used to examine the relationship between a change in social interaction and the status of dementia.

The independent variable was the change in social interaction. The change in social interaction was considered a "negative change" if the score on the item during the baseline year was higher than that in the following year; else, the change was considered a "positive change."

The dependent variable was dementia status. Based on diagnoses, the participants were classified as the "dementia group" and the "normal group."

Age (60−74 years old = 0, older than 75 years = 1), gender (male = 0, female = 1), and disease status (no = 0, yes = 1) were analyzed as control variables since these might have an influence on daily living abilities and dementia.

All procedures of analysis were conducted using the SAS 9.3, and $p < 0.05$ was the accepted significance level for all statistical results.

2.5. Ethical considerations

All participants agreed to sign an informed consent form and were made aware that they had the right to withdraw from this study after being notified of its objective and processes. Additionally, the data were collected anonymously, and a personal identification system was used to maintain the confidentiality of the participants' personal information. This study was implemented after being approved by the ethics committee of the University of Tsukuba.

3. Results

3.1. Demographics on background and dementia status

Table 1 depicts the characteristics of 321 participants, and the associations between the characteristics and dementia. With regard to age, of the participants with symptoms of dementia, 22 (8.5%) were in the 60−74-year-old group and 16 (25.4%) in the group aged > 75 years. The chi-square results revealed a significant association between age and symptoms of dementia ($\chi^2 = 13.80$, $p < 0.001$). In addition, there were no significant results with regard to gender, diseases, and dementia.

3.2. ISI and dementia status

Table 2 shows the chi-square results for a change in the ISI and symptoms of dementia from 2008 to 2011. For items of the social curiosity subscale, the chi-square results regarding dementia symptoms and a change relating to "reading newspapers" were significant ($\chi^2 = 5.10$, $p = 0.02$).

3.3. Multidimensional analysis for the ISI and dementia status

After controlling for age, gender, and diseases, multiple logistic regression analysis was performed to predict symptoms of dementia 3 years after the change relating to ISI items. As shown in Table 3, the change in "reading newspapers" was significantly related to symptoms of dementia after 3 years (odds ratio = 3.45).

4. Discussion

This study focused on changes in social interaction and found that a positive change in this regard could help prevent dementia. Although previous studies have pointed out the importance of social interaction in cognitive function, the results of this study further suggested that continuous enrichment of social interaction is also necessary for cognitive functioning among elderly people. Notably, situations comprising social interaction among elderly people were measured through a specific mode of assessment