Depression in the elderly in rural areas of Japan and its impact on activities of daily living: a longitudinal survey over 10 years

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Abstract

We examined whether depression in elderly people affects instrumental activities of daily living (IADL). Our data are derived from respondents' answers to a health survey conducted three times over a 10 years period (between 2001 and 2011) and carried out in cooperation with Ehime Prefecture's Toon City. The survey respondents were people aged 60–84 years old who were residents of Toon City; that is, at the time of the survey they held an official certificate of residency (2129 people: 895 men, 1234 women). We carried out a 10 years longitudinal survey of elderly people aged 60-75 years old. For the following three groups the score for the depressive group was lower than that of the non-depressive group (using 2001 as the baseline): (1) the total score for the Tokyo Metropolitan Institute of Gerontology (TMIG) index of competence in men and women combined aged 60–75 years old, (2) the IADL score for TMIG in women, and (3) the total score for TMIG in the 70 years and older group of men and women combined. On the other hand, there was an interaction between (4) the score for IADL in TMIG in men and (5) the total score for TMIG in the 60–69 years old group (consisting of men and women). In both (4) and (5), the score for IADL in TMIG in 2006 and 2011 decreased more in the depressive group than in the non-depressive group. Our results also indicate that depending on sex and age, the total score for TMIG and the score of the IADL for TMIG decreased by a greater degree for the depressive group than for the non-depressive group. We conclude that detecting depression early and preventing a decrease in ADL in the elderly is important for an extended healthy life expectancy.

Key Words: Elderly people, Depression, Instrumental activities of daily living

Introduction

It is well established that activities of daily living (ADL) are defined as basic and concrete daily activities that people carry out regularly in the course of their daily lives.

In a narrow sense, basic activities of daily living are defined as personal care and household tasks carried out in the home, such as walking, moving, eating, dressing, bathing, doing one's hair, and going to the toilet. [1)]

Instrumental activities of daily living (IADL) refers to complicated tasks necessary for independently living in the community, such as housework (preparing meals, cleaning the house, washing clothes, using the phone), activities in the neighborhood (shopping, using public transportation facilities), the ability to keep track of finances, and the ability to manage a range of complex tasks (for example, monitoring and taking medications). [2)]

In general, the lives of the elderly involve experiencing loss: from major losses, such as the death of a spouse or sibling, to more minor losses, such as a decrease in the ability to carry out certain physical activities.

It is well known that elderly people who have been suffering from illness, have functional disabilities, or have to care for bedridden persons, have a high risk of developing depression. [3)] Elderly people suffering from depression gradually decrease their IADL, and they reduce their opportunities to move around the neighborhood, becoming what is known as a "shut-in". The "shut-in" state contributes to the elderly person lacking a sense of purpose in life and reduces the level of mental stimulation, resulting in deeper depression.

Depression and a decrease in IADL create a vicious circle: as the level of IADL decreases, the elderly person becomes more depressed, leading to reduce the level of IADL. This pattern has a negative impact on the elderly person's healthy life expectancy.[4)]

Few longitudinal surveys have looked at the relationship between IADL and depression in the elderly. The objective of this study is to shed light on whether or not depression in elderly people affects IADL.

Study design

Baseline data and follow-up data: participants and methods

Our data were derived from respondents' answers to a health survey conducted three times over a 10 years period (between 2001 and 2011) and carried out in cooperation with Ehime Prefecture's Toon City. The baseline data were the answers from the 2001 survey, and the follow-up data were from both the 2006 survey and the 2011 survey. The survey was for people aged between 60 to 84 years old who were residents of Toon City; that is, they held an official certificate of residency at the time of the survey (2129 people: 895 men, 1234 women). We delivered a questionnaire and a self-addressed stamped envelope to each participant. Participants were responsible for answering the questionnaire and returning it to us by post.

To establish baseline and follow-up data for our longitudinal study, we excluded elderly residents who were already suffering from one or more of the following conditions: (1) bed-ridden, (2) stroke, (3) ischemic heart disease, (4) cancer, or (5) bone fracture. If answers from respondents with any of these five conditions had been added to the survey data, the results would have been skewed towards lack of health.

Ethical considerations

Prior to our survey, we explained two important points to the respondents: (1) taking the survey is completely voluntary and there is no disadvantage in not taking part, and (2) because the survey is carried out anonymously and the responses are analyzed statistically, the respondents cannot be identified from the survey.

The Ethics Committee of Ehime University approved this study prior to its implementation.

In accordance with the Tokyo Metropolitan Institute of Gerontology (TMIG) index of competence, we included a respondent's results only where answers had been provided to all 13 questions in our survey.

In accordance with the scoring guidelines for the Short Form of Geriatric Depression Scale (the GDS Short Form consists of 15 questions relating to depression), we included a respondent's results only where answers had

been provided to all 13 questions in our survey. The higher the GDS score, the higher the possibility of suffering from depression.

Analysis methods

Using two-way analysis of variance (two-way ANOVA), we calculated how depression influenced the TMIG score in the 2011 survey, the 2006 survey and the 2001 survey, according to sex and also according to age group (60–69 years old and 70 years or older).

A statistically significant difference was defined as 5% or less for all analyses using SPSS Version 22 (IBM Japan).

Results

A total of 2,129 respondents participated in all three of our surveys about health in the elderly: the 2001 survey, 2006 survey, and 2011 survey. (Table1)

The age bracket for which we had 10 years of data corresponded to respondents who were 70–85 years old in 2011, comprising 721 men (80.6%) and 971 women (78.7%).

Table1 Demographic characteristics of the survey respondents

	Men		Women	
Age bracket	n=895	(%)	n=1,234	(%)
60-64	210	(23.5)	313	(25.4)
65-69	297	(33.2)	368	(29.8)
70-74	214	(23.9)	290	(23.5)
75-79	136	(15.2)	184	(14.9)
80-84	32	(3.6)	60	(4.9)
85-	6	(0.7)	19	(1.5)

Table2 The number and percentage of respondents who suffered from depression according to sex in the 2001 baseline survey.

	Men		Women	
	n=895	(42.0)	n=1,234	(58.0)
Does not suffer from depression	646	(30.3)	812	(38.1)
Suffers from depression	249	(11.7)	422	(19.8)

( ) is %

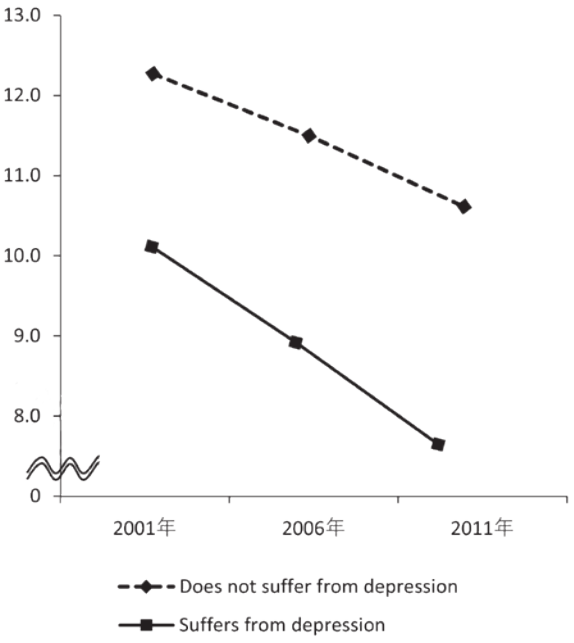

Fig.1 TMIG levels for male respondents

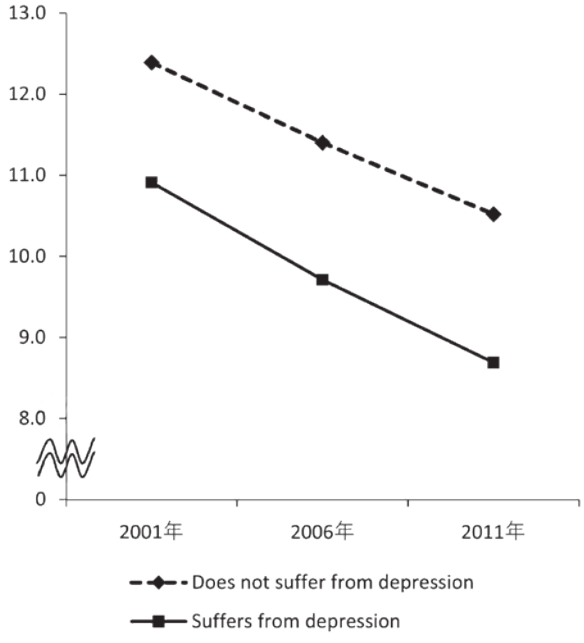

Fig.2 TMIG levels for female respondents

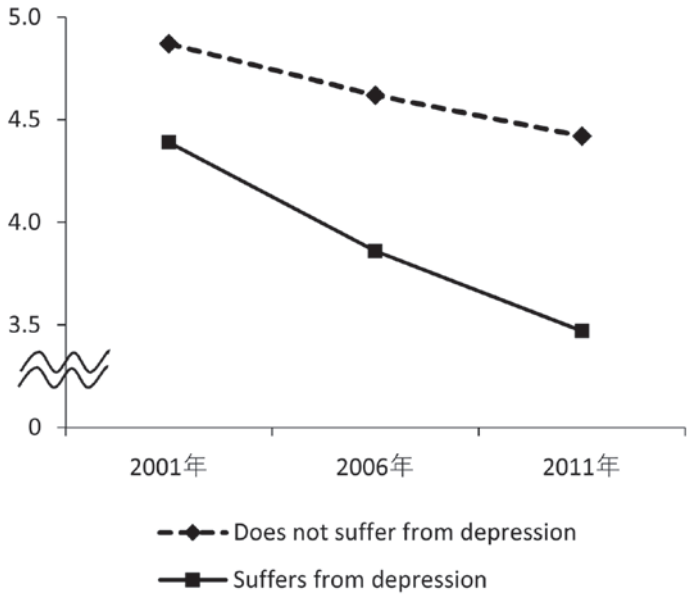

Fig.3 IADL of TMIG in men

In both men and women, depression had a statistically significant main effect on the total score for TMIG, and there was no interaction between the depressive and the non-depressive groups.

In the 2001 baseline survey, the total score for TMIG in the depressive group was lower than that of the non-depressive group. The decrease in the total score for TMIG in the depressive group and that in the non-depressive group (for both men and women) had the same pattern from 2001 to 2006 and from 2006 to 2011, and there was no statistically significant difference in the score between the two groups. (Fig1 and Fig2)

In the men's group, the IADL of TMIG showed an interaction between the depressive group and the non-depressive group. In other words, in the men's group, the decrease in IADL of TMIG from 2001 through two stages (2006 and 2011) in the depressive group was statistically significantly greater than that of the non-depressive group. (Fig 3)

In the women's group, the IADL of TMIG showed no interaction between the depressive group and the non-depressive group. (Fig 4)

In the women's group, the decrease in the IADL of TMIG in the depressive group followed the same pattern as that of the non-depressive group from 2001 through two stages (2006 and 2011), and there was no statistically significant difference in the score of TMIG for the two groups. (Fig 4)

Table 3 showed that the number and percentage of respondents who suffered from depression by age (60–69 years old and 70 years and older) in the 2001 baseline survey.

In the 60–69 years old group (men and women), depression appeared to affect the total TMIG score. That is, in the 60–69 years old group, the decrease in the total score for TMIG in the depressive group was statistically significantly different from that for TMIG in the non-depressive group (which combined men and women) from 2001 through two stages (2006 and 2011). (Fig 5)

Table 3 The number and percentage of respondents who suffered from depression by age (60-69 years old, 70 years and older) in the 2001 baseline survey

	60-69 years old		70 years and older	
	n=1,985	(93.2)	n=144	(6.8)
Does not suffer from depression	1,107	(52.0)	81	(3.8)
Suffers from depression	878	(41.2)	63	(3.0)

( ) is %

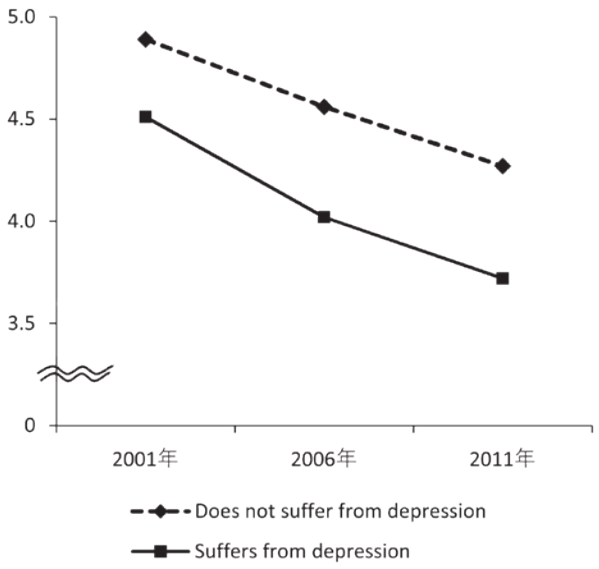

Fig. 4 IADL of TMIG in women

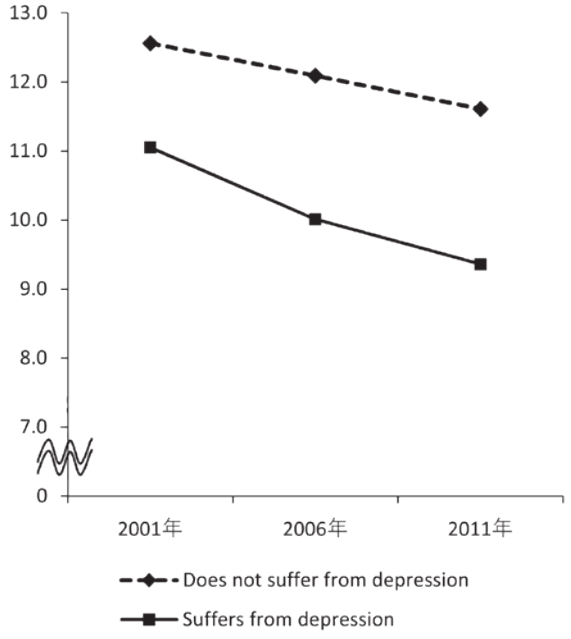

Fig5 TMIG levels for respondents 60-69 years old

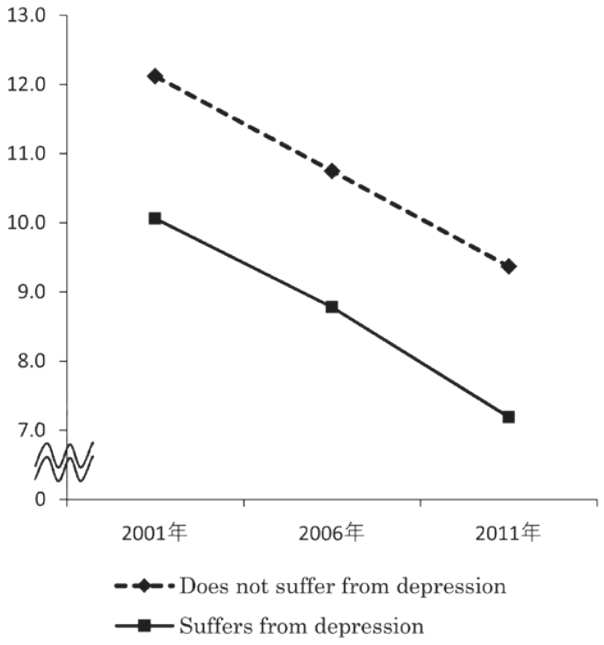

Fig. 6 TMIG levels for respondents 70 years old and older

In the 70 years old and older group (which combined men and women), depression had a main effect on the total score of TMIG, and there was no interaction between the depressive group and the non-depressive group.

In the 70 years old and older age group, the decrease in the total score of TMIG in the depressive group followed the same pattern as that of the non-depressive group from 2001 through two stages (2006 and 2011), and there was no statistically significant difference in the TMIG score between the two groups. (Fig 6)

Discussion

We carried out a 10 years longitudinal survey of elderly people aged 60–75 years old.

For the following three groups, the score for the depressive group was lower compared with the non-depressive group (using 2001 as the baseline): (1) the total score for TMIG in both men and women aged 60–75 years old, (2) the IADL score for TMIG in women, and (3) the total score for TMIG in the 70 years and older group.

For groups (1), (2), and (3), the decrease in the total score for TMIG and the IADL of TMIG was not statistically significantly different between the depressive group and the non-depressive group.

On the other hand, there was an interaction between (4) the score for IADL in TMIG in men, and (5) the total score for TMIG in the 60–69 years old group (consisting of men and women).

The score for IADL in TMIG in group (4) and the total score of TMIG in group (5) were lower in the depressive group than the non-depressive group.

The decrease in the score for IADL in TMIG in (4) and the total score for TMIG in group (5) was statistically significantly different between the depressive group and the non-depressive group.

In summary, in both (4) and (5), the score for IADL in TMIG in 2006 and 2011 decreased more in the depressive group than the non-depressive group.

It is natural that in elderly people, the total score for TMIG decreases with age. [5)]

Our results showed that depression in the 2001 baseline survey affected not only the initial total score for TMIG, but also the score over the decade over which the longitudinal survey was carried out. Our results also showed that

depending on sex and age, the total score for TMIG and the score of the IADL for TMIG decreased more for the depressive group than for the non-depressive group.

In general, the elderly frequently suffer from depression.[6] We consider that early detection of depression and preventing a decrease in ADL in the elderly is important for an extended healthy life expectancy.

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