Factors Related to Participation in an Exercise Program for Nursing Home Residents

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The purpose of this study was to examine factors related to participation in an exercise program for nursing home residents. Logistic regression analysis was applied to investigate the effects of sex, age, length of residence, required nursing care and commitment to group activities. Subjects were 80 residents older than 60 years of age living in a nursing home. Of these, 38 residents participated in the program and 42 residents did not. Logistic regression analysis results revealed significant effects due to age, length of residence, and commitment to group activities outside the exercise program. Furthermore, effects were stronger for younger participants and for participants whose length of residence in the nursing home was shorter.

Keywords: nursing home residents, participation in exercise program, group activities

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1. Introduction

Japan’s total population was about 127.77 million people as of 2005, according to the national census of the Ministry of Internal Affairs and Communications (MIC). The number of elderly people aged 65 and older was about 25.67 million, equivalent to a population ratio of about 20.1%. This number will continue to increase and is expected to reach about 36.37 million (32%) in 2030 and about 36.46 million (41%) in 2055. Japan has one of the most rapidly aging populations in the world. Lengthening the healthy life-span of the elderly and improving their quality of life (QOL) are important issues, and organizations to promote elderly persons’ life motivation and health and measures to promote their social activities are needed. The development of programs to promote health among the elderly population and thus to reduce the need for extensive health care, and the establishment of a system for popularizing these programs are goals of the Japanese government (Current Trends of Social Welfare Editorial Board, 2007; Journal of Health & Welfare Statistics, 2007; Cabinet Office, 2007).

Several authors have pointed out the importance of QOL of the elderly (Asai et al., 2001; Maeda et al., 2002; Yasunaga and Aoyagi 2006). Arao et al. (1998) have demonstrated that QOL is related to living fitness and physical functioning necessary for self-independent life.

The recent aging society with fewer children is influencing the family composition where those at the late-life stage, living with their family members, had previously taken for granted that nursing care would be provided by their family members; now more of the elderly are living alone with assistance such as from the social welfare system. In 2006, the number of elderly persons aged 65 year and older living alone was estimated at 4.1 million across the nation (Journal of Health and Welfare Statistics, 2007). Because the number of households consisting of a husband and wife or a solitary elderly person is increasing, nursing care facilities with nursing care service have been expanded based on the major point that all of society should provide nursing care which had previously been given by family members, and the number of nursing home residents is also expected to increase further. In addition, the Ministry of Health, Labour and Welfare (MHLW) (2007), which has defined care houses as a living place other than an individual’s home or nursing facility, has pointed out that such houses can be
dominant players that will meet the needs for various ways of living in the future. Further, MHLW expects that care houses will be designated as “Care Houses with Nursing Care Service” in the nursing care insurance system to meet increasing needs.

Care houses were established as resident facilities for the elderly by the Gold Plan in 1989. By 1992, there were 3,760 people living in the newly established care houses. However, this number increased with the growth of the elderly population, reaching 53,665 in 2001 and 63,027 by 2004.

Regarding the physical activity of residents in residential facilities for the elderly, Tuji (1987) has pointed that because the residents depend more strongly on others and have their spontaneous activities reduced by spending much time in the facility and receiving personal care services such as meal provision and car transportation, such factors may advance the decrease in their walking activity and fitness. Although some facilities conduct exercise classes for the purpose of enhancing physical activity, many residents do not participate in such classes even when the residents can readily perform the exercises. According to Shigematsu et al. (2007), one reason that physically-inactive elderly people gave is that there are no exercise facilities nearby.” However, why do residents not participate in exercise classes conducted at their own facility?

Care houses were established to provide low-cost care to people who meet the following conditions: 60 years of age or older; decreased physical functions; a degree of independence but anxiety over ability to live by oneself due to old age; and insufficient support from family (Current Trends of Social Welfare Editorial Board, 2007). However, as physical function declines, residents often have to vacate the care house to transfer to a hospital or another facility offering a higher level of care. Thus, maintaining physical function is important too for long-term residence in care houses.

There have been many previous studies on participation in physical activities by the elderly (e.g. Chogahara, 2003; Saito et al., 2006; Bize et al., 2007) that have demonstrated how important physical activity and social participation are for maintaining and improving health. A previous study on factors associated with elderly persons’ initiating and continuing exercise (Yoshida et al., 2006) cited participation in group activities as a factor associated with starting an exercise program. However, all these previous studies have examined the physical activities of elderly persons residing in ordinary homes.

Examining the external factors beyond individual intent that determine whether residential elderly persons, including the frail, participate in group activities will provide the basis for promoting participation in physical activities in future efforts to reduce the need for health care for the elderly.

Thus, the purpose of the present study was to examine factors affecting participation in a gymnastic exercise program for elderly people residing in a care house, through the comparison of those who responded affirmatively to the invitation to the program and those who did not.

2. Method

2.1. Summary of the research region

Subjects were residents in care house A located in a rural zone in the suburbs of T City lying at the south end of S Prefecture adjacent to metropolitan Tokyo. The population of T City was 336,737 as of February 2004; the number of persons over 65 years of age in the entire population was 48,374, or 14.4%. This city developed as a bed town of Tokyo and has rural agricultural areas.

2.2. Care house A

This facility was opened in November 1998. Care houses may be divided into independent and attached facilities. Care house A is the latter type and neighbors a special nursing home for the elderly, a geriatric health services facility, a hospital, and some other facilities. In addition to providing residential rooms, care houses are characterized by their employees who offer services such as meals, bathing, and welfare counseling. They also provide transportation services to neighboring hospitals and rehabilitation in geriatric health service facilities. Because care house A is near a bus stop and about 8 minutes away by bus from the nearest station at the center of the city, many people visit the care house for shopping, culture lessons, or other purposes. Residents must vacate the care house if they have difficulty making independent decisions or handling their money. Also, if residents meet the conditions for admission to a special elderly nursing home for the aged due to advanced dementia or a need for more care, they are considered to meet the conditions for leaving the care house.
2.3. Survey method and subjects

Subjects were 80 people (19 men, 61 women, mean: 80 ± 7 years old). In July 2004, participants were recruited in a gymnastic exercise program from the residents via the director of the care house. As a result, 38 people responded affirmatively to the invitation to the program (hereinafter they are called “participants”), whereas the other 42 people did not (hereinafter “non-participants”). Table 1 shows their basic characteristics. Other group activities conducted in the facility and recreational group activities and senior citizens’ club activities in which residents participate outside the facility were defined as “other group activities.”

2.4. Analyzed data

Based on previous studies (Shibata et al., 1986; Kim et al., 2004; Ohyama et al., 2005), the data used for the analyses were:

1) Gender (men=0, women=1) and age for the demographic variables; 2) whether nursing care was needed (self-independent=0, nursing care needed=1) for the health index; 3) number of years of residence in care house A for the regional index; and 4) whether other group activities were performed (no=0, yes=1) for social activity index.

2.5. Gymnastic exercise program

From July 2004 to October 2006, a light gymnastic exercise program was conducted for the residents. It was carried out in the facility’s multipurpose auditorium and consisted of two versions: 1) a face-to-face program, in which instructors visited the facility to instruct face-to-face, and 2) a video-based program, in which an instruction video was played for participants.

1) Face-to-face program
The face-to-face program was conducted through visits to the facility by instructors. Visits were made twice a week from 10:00 to 11:00 a.m.

2) Video-based program
For the video-based program, the same content was recorded in videos as in the face-to-face program, in which one instructor performed exercises in the standing position and another instructor did them in the sitting position. The video-based program was done for about 50 minutes daily from 10:00 a.m., Monday-Friday, except on the days of the face-to-face program, from the end of July 2004. Care house staff selected about 3 exercises from the recorded videos to play for the participants.

Since relaxation is very important for exercise, and music has a relaxing effect, music was employed for exercise instruction. Music was selected appropriate to the exercise. Some exercise programs consisted of slow movements, and others of more vigorous movements, and music was selected whose rhythms fit the exercise. For stretching at the beginning and end of the program, relaxing music was played. For the muscle training intended for maintenance and enhancement of activities of daily living (ADL), cheerful tunes were used as background music so as to provide mental encouragement. The instruments used were cloth dumbbells intended for muscle training use.

Table 1  Characteristics of the participants and non participants groups at baseline.

<table>
<thead>
<tr>
<th></th>
<th>Participants (n=38)</th>
<th>Non participants (n=42)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year: mean±SD)</td>
<td>77.4±5.5</td>
<td>83.1±7.6</td>
<td>***</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>8</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>30</td>
<td>31</td>
<td>ns</td>
</tr>
<tr>
<td>Self-independent</td>
<td>27</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Number requiring nursing care</td>
<td>11</td>
<td>14</td>
<td>ns</td>
</tr>
<tr>
<td>Years of residence (year: mean±SD)</td>
<td>2.9±2.2</td>
<td>4.0±1.7</td>
<td>***</td>
</tr>
<tr>
<td>Other group activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>18 (77.9±5.8)</td>
<td>7 (79.6±5.5)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>20 (77.0±5.4)</td>
<td>35 (83.9±7.4)</td>
<td>††</td>
</tr>
</tbody>
</table>

Comparison between participants and non participants.
Significant difference with t-test (*** p<0.001) and Pearson’s χ²-test †† p<0.01, ns: not significant
2.6. Ethical considerations

The subjects consented to participate by giving their written signature after being informed of the purposes of the study and receiving explanations of the anonymity of the data verbally and in writing. Variables used in the analyses of the present study—gender, age, whether nursing care was needed, and the number of years of residence—were obtained from the facility records via the director of the facility. Information as to whether other group activities were performed was also obtained in a similar manner.

The present study was carried out with the approval of the Institutional Review Board of Waseda University Faculty of Sport Sciences.

2.7. Analysis methods

Gender, age, whether nursing care was needed, whether other group activities were performed, and the number of years of residence were selected as the data to be analyzed. For both participants and non-participants, age and the number of years of residence were analyzed by an independent samples t-test, and gender and whether nursing care was needed were analyzed by a chi-square test. Logistic regression analysis was conducted with the decision to participate in the gymnastic exercise program as the dependent variable and gender, the number of years of residence, age, whether nursing care was needed, or whether other group activities were performed as the independent variables, to examine how each variable affected the decision.

3. Results

Results of the t-test showed significant differences in age \((p<0.001)\) and the number of years of residence \((p<0.001)\) between the participants and non-participants. Results of the chi-square test showed no significant difference in gender or whether nursing care was needed, whereas a significant difference was observed in whether other group activities were performed \((p<0.01)\) (Table 1).

Table 2 lists the types of other group activities that residents participated in and the number of people that participated in each type. Of these group activities, activities performed while seated accounted for 73.7%, physical activities such as social dancing and walking accounted for 21%, and work and voluntary activities accounted for 5.3%.

Since no significant correlation was observed for each variable in the above-described logistic regression analysis, all variables were analyzed concurrently and the results are shown in Table 3. Of the five explanatory variables that were assumed to be associated with the decision to participate in the exercise program, age (odds ratio=0.876, 95% confidence interval=0.804-0.953), the number of years of residence (odds ratio=0.739, 95% CI=0.561-0.974), and whether other group activities were performed (odds ratio=3.897, 95% CI=1.229-12.359) were significant; age and whether nursing care was needed were not significant. That is to say, the odds ratio of participating in the gymnastic exercise program was about 0.88 for age and about 0.74 for the number of years of residence, whereas this odds ratio was about 3.9 for whether other group activities were performed.

4. Discussion

In the present study, how the five variables—age, gender, whether nursing care was needed, the number of years of residence, and whether other group activities were performed—affect the decision to
participate in the gymnastic exercise program was analyzed by logistic regression analysis. As a result, age, the number of years of residence, and whether other group activities were performed were extracted as the factors. This suggests that factors that encouraged residents to decide to participate were a younger age, a shorter number of years of residence, and participation in other group activities. On the other hand, gender and whether nursing care was needed were not associated with the decision. Ohyama et al. (2005) have pointed out that the characteristics of non-participants in a community-offered fall-prevention program for elderly people living at home were participating less actively in society, having a low self-efficacy, and being male.

Among the residents in care house A in the present study, although the number of male participants in the gymnastic exercise program was small compared to that of female participants, gender was not associated with the decision to participate. One reason that gender was not a factor in this study may be that most of the male residents lived alone without their spouses, bathing and taking their meals communally with other residents, so from the standpoint of relationships to others they may feel less uncomfortable participating in society than elderly men living at home.

Participation in other group activities was found to be a factor associated with participation in the exercise program. This is similar to the results of Yoshida et al. (2006). It is possible, though, following their findings, to assume that friendships formed through participation in other group activities motivated residents to participate in the exercise programs. However, of the 38 participants in the present study, 20 did not participate in other group activities. On this point the results of this study differ from Yoshida et al.: many subjects were motivated to participate voluntarily through posters placed in the facility, hearing others talk about the program at meals, bathing and other communal activities, and direct invitations from care-house staff, rather than friendships formed through other group activities.

Ohyama et al. (2005) found that a characteristic of non-participants in exercise programs is that they tended not to join group activities such as hobby clubs and peer activities, i.e. they tended to participate less in society. However, in the present study, of the 55 residents who had not previously participated in other group activities, 20 residents (corresponding to about 40%) could be motivated to participate in the exercise program.

In addition, because the activities performed by more than 70% of the participants in other group activities were primarily performed while seated, persuading them to participate in activities involving physical exertion may be required from the standpoint of reducing the need for excessive health care in the future.

The present study demonstrated that those who had lived in the care house for more years tended to participate in the exercise program less actively, but this could be interpreted as showing that staying for a long time might discourage residents from participating in activities conducted in the facility. Chogahara (2003) stated that encouraging the elderly to participate in a physical activity program for their future welfare would require an intra-regional development of the program and verification studies on its social and cultural effects as well as health effects.

Care-house facilities may be divided by location into “urban” and “rural.” Residents of rural facilities, although previously reported to be disadvantaged in terms of the frequency of activities because of significantly fewer outing activities (Takeshima, 1993), may require a more aggressive approach to encouraging residents to participate, in view of the findings for care house A which was the rural type, and to promote physical activities such as walking. In addition, Yanagimoto et al. (1997) have indicated that behavior of female elderly residents living in a care house may be associated with the location of the care house.

Regarding the physical status of residents in the care house, those who are certified as needing long-term nursing care accounted for 25 (40%) of 80 residents. Given the large number of frail elderly people, the guidelines that call for care-houses to support self-reliance can only be realized by increasing physical activities to maintain the resident’s health.

Care houses are also located within communities, and each community has its own special characteristics (Waseda University Local Community Research, 1994). From this viewpoint, it may be more effective to provide an exercise program after the characteristics of the community are revealed. To satisfy residents’ needs, it may be necessary to provide activities similar to those conducted in the larger community, and opportunities and venues in which residents can easily participate in such activities.

The present study had several limitations. (1) It analyzed only a very small number of variables (five, i.e. gender, age, whether nursing care was needed, the
number of years of residence, and whether other group activities were performed. (2) It was a cross-sectional study. (3) It studied residents in one facility only. (4) It obtained limited information from non-participants. (5) The care house was located in the outskirts of a suburban community, and different results may be obtained depending on location.

The gymnastic exercise program in the present study was conducted within the subjects’ resident facility and it was easy for the very elderly (aged 75 years or older) to participate in a familiar environment. Care directors and exercise instructors should implement exercise promotion through various approaches to encourage residents to participate in physical activities.

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