The Relationship between Regular Exercise and Social Capital among Japanese Community Residents

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The purpose of this study was to examine the relationship between regular exercise levels and social capital among residents in Japanese communities. The present study had a cross-sectional design and was done from November 2006 to January 2007. Questionnaires were distributed to people aged 30 and older who visited dispensing pharmacies. It was explained that returning the questionnaire would be regarded as consent for participation though the participants to return the questionnaires anonymously. Out of the 655 questionnaires returned (response rate was 21.37%), 617 (male: 236, female: 381, mean age=63.26±13.50) were valid for statistical analyses. Demographic data and data on regular exercise levels and on four items (i.e. acquaintances in the community, reciprocal cooperation in their community, contact with community residents, and participation in social activities) which rated social capital were collected. From the results of analyses of covariance, adjusting for age, male residents who were more active had more contact with community residents. On the other hand, it was found that active female residents participated more in social activities. The present study concludes that regular exercise levels relate to some aspects of social capital among residents in Japanese communities.

Key words: social network, community, community residents, social activity, physical activity

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1. Objective

Social capital has attracted attention as a social factor associated with health behavior. Putnam (1993) defined social capital as features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated action. However, as Yuasa et al. (2006) noted social capital does not have a unified definition, so it has been studied based on each researcher’s own definition.

Recently, it has been pointed out that differences in health status among individuals cannot be satisfactorily explained by individual-level factors alone (Diez Roux, 2008). Meanwhile, in a previous study, health-related indices were found to be associated with social capital (Poortinga, 2006); in this context, even earlier, Kawachi et al. (1999) reported that poor social capital was associated with poor self-rated health. According to Yuasa et al. (2006), social elements, such as norms and awareness among community residents, that had previous been intuitively recognized are expected to be objectively recognizable by introducing the concept of social capital. That is, this introduction is expected to obtain new viewpoints on health promotion.

So far, among studies on the relationship between social capital and exercise habit, Leyden (2003) demonstrated that persons living in walkable neighborhoods were more likely to know their neighbors, and trust others. Zlot et al. (2006) reported that social capital was associated consistently with...
physical activity levels. In Japan, however, where the aging population is rapidly increasing, there have been no studies on the relationship between social capital and exercise habit.

Thus, the objective of the present study was to determine whether social capital was a factor associated with the exercise habit for community residents.

2. Method

2.1. Data collection and participants

The present study was an anonymous, mailed, cross-sectional survey on medical care and lifestyles. In this survey, 3 different types of questionnaires were distributed to 9,205 men and women of 30 years and older who visited dispensing pharmacies in 15 neighborhoods around Japan. In the questionnaires, the objective of the study was explicitly stated. Return of the questionnaires was regarded as consent for participation in the present study. The survey period was from November 2006 to January 2007. Of the 3 questionnaire types, the data obtained from one type were used for the present study. This questionnaire had been distributed to 3,065 participants in 14 of 15 neighborhoods.

The present study was carried out with the approval of the institutional review board of the Department of Psychology and Behavioral Sciences, Graduate School of Human Science, Osaka University.

2.2. Measurement indices

2.2.1. Participants

The participants were asked to give their gender, age, employment status, and most recent educational background.

2.2.2. Exercise habit

The exercise habit was measured based on the scale for stages of change for exercise behavior (Oka et al., 2000; Oka, 2003). This scale consisted of parameters for actual exercise behavior in the past and at present and readiness to practice this exercise behavior. The stages were: Precontemplation (“I currently do not exercise and do not intend to exercise.”); Contemplation (“I currently do not exercise, but I intend to exercise within the next six months”); Preparation (“I currently get some exercise, but not regularly”); Action (“I currently exercise regularly, but I have only begun doing so within the past six months”); and Maintenance (“I currently get some exercise and have been doing so for longer than six months”). Oka et al. (2000) and Oka (2003) stated that regular exercise was defined as exercise performed for 20-30 min of each activity on 2-3 days per week; according to this, the participants selected one stage that corresponded most closely to their current readiness or behavior, out of the 5 stages. Next, the participants were classified into the non-regular-exercise group consisting of Precontemplation, Contemplation, Preparation stages; and the regular-exercise group consisting of Action and Maintenance stages in this study.

2.2.3. Social capital

Social capital has neither a unified definition nor a specialized classification (Yuasa et al., 2006). In the present study, thus, parameters for social capital were set by previous studies on social capital and social networks. Further, since it has been suggested that it is important to investigate the relationship of exercise with social capital not specific to exercise alone (Mummery et al., 2008), this relationship was also investigated.

(1) Acquaintance of community residents

Based on the study of Leyden (2003), how well participants knew their neighbors was asked by using the question “How well do you know your neighbors?” with a 5-chotomous answer consisting of (1) Not at all, (2) Just a little, (3) Neither, (4) Moderately well, and (5) Well.

(2) Reciprocal cooperation in community

Based on the studies of Sampson et al. (1997), Kawachi et al. (1999), and Anme et al. (2006), how much participants felt about reciprocal cooperation in their community was asked by using the question “In general, are your neighbors willing to help others?” with a 5-chotomous answer consisting of (1) I do not think so, (2) I think slightly willing, (3) Neither, (4) I think moderately willing, and (5) I think strongly willing.

(3) Contact with community residents

Based on the studies of Kishi and Horikawa (2004), Shinkai et al. (2005), Yoshii et al. (2005), Anme et al. (2006), Mitsuhashi et al. (2006), and Tanaka et al. (2006), how often participants had contact with their community residents was asked by the question “How often do you have contact with your neighbors directly?” with a 5-chotomous answer consisting of (1)
Rarely, (2) Once or twice per month, (3) Once per week, (4) Twice or 3 times per week, and (5) Almost every day.

(4) Participation in social activities

Based on the studies of Kawachi et al. (1999), Lindström et al. (2003), Kishi and Horikawa (2004), Shinkai et al. (2005), Yoshii et al. (2005), Anme et al. (2006), Mitsuhashi et al. (2006), Tanaka et al. (2006), and Zlot et al. (2006), how often participants participated in social activities was asked by the question “How often do you participate in social activities? (e.g., volunteer activities)” with a 5-chotomous answer consisting of (1) Rarely, (2) Once or twice per month, (3) Once per week, (4) Twice or 3 times per week, and (5) Almost every day.

2.4. Analysis

Whether social capital was different from exercise habit was analyzed by an analysis of covariance using age as a covariate. This analysis was performed on all participants, followed by male participants only and female participants only. In the present analysis, the factor scores of any participants who had a factor containing an incompletely answered item were excluded from the data.

3. Results

3.1. Gender and age in valid participants

Of the 3,065 participants who received the questionnaire, 655 participants (21.37%) returned it. Any participants who did not give their gender or age or were less than 30 years old were excluded; as a result, 39 were excluded and 617 (236 men, 381 women, 63.26±13.50 years old) were analyzed. Regarding age, the analyzed participants consisted of 8 men and 44 women in their 30 s, 21 men and 35 women in their 40 s, 33 men and 61 women in their 50 s, 55 men and 111 women in their 60 s, 102 men and 110 women in their 70 s, 17 men and 19 women in their 80 s, and 1 woman in her 90 s. For employment status, 132 (57.14%) of 231 men and 144 (38.40%) of 375 women had an occupation. For most recent educational background, 31 men and 26 women were junior high school graduates, 19 men and 65 women were high school graduates, 19 men and 65 women were vocational school or 2-year college graduates, 65 men and 37 women were graduates of 4-year colleges or universities, 11 men and 26 women were graduates of other schools, and 13 participants did not answer the question.

3.2. Social capital of participants with or without exercise habit

Table 1 shows the results of the analysis of covariance for all participants. Compared to the participants without a regular exercise habit, the participants with it had more frequent contact with their community residents and more often participated in social activities. Tables 2 and 3 summarize the results for analysis of covariance for male and female participants, respectively. In the male participants, the participants with the regular exercise habit had more frequent contact with their community residents (Table 2). Among the female participants, the participants with the regular exercise habit more often participated in social activities (Table 3).

4. Discussion

The objective of the present study was to investigate the relationship between social capital and the exercise habit in community residents. Among the participants studied by Oka (2003), using the standards of the present study, 27.6% of those middle-aged participants had the exercise habit. In the present study, on the other hand, 31.9% of them (range 30 to 90 years of age) had the exercise habit. Considering that the mean age was older in the present study, the present participants were presumed to have the exercise habit that was not remarkably different from those of the other similar previous study.

The most interesting finding in the present study is that the exercise habit was found to be associated with some aspects of social capital in Japanese communities. Concretely, the participants with the exercise habit had more frequent contact with their community residents and more often participated in social activities. On the other hand, 2 parameters for social capital (i.e., acquaintance of community residents and reciprocal cooperation in their community) were not associated with the exercise habit. This suggests that whether a factor is associated with social capital may depend on aspects of the social capital.
The second most interesting finding may be that the relationship between social capital and the exercise habit differed between genders. Among the male participants, those with the exercise habit had more frequent contact with their community residents. This may indicate that male residents performed exercises together with other residents in their neighborhood, or that other residents in their neighborhood were a correlational factor for performing regular exercises. This may be supported by the finding of Itakura et al. (2003) that those at later stages of change for exercise behavior had a higher score for social support. In their review on the elderly, Kishi and Horikawa (2004) stated that extended social networks provided a larger suppression effect on early death for male residents compared to female residents. Combining this finding of Kishi and Horikawa and the present findings, engaging in regular exercise may mediate how extended social networks provide a suppression effect on early death.

Among the female participants, on the other hand, those with the exercise habit more often participated in social activities. According to a previous study on social capital (Wen et al., 2007), the physical activity level of adult women was affected by the personal connection with residents in their neighborhood. In addition to this finding, the present finding that engaging in social activities was associated with engaging in regular exercise may provide an important implication for intervention in exercise promotion in neighborhood settings.

### Table 1
Comparison whether the participants have a regular exercise habit or not (all participants, adjusting for age).

<table>
<thead>
<tr>
<th></th>
<th>Non-regular-exercise group</th>
<th>Regularly-exercise group</th>
<th>df</th>
<th>F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>Acquaintance of community residents</td>
<td>3.45 1.27 397</td>
<td>3.52 1.12 187</td>
<td>582</td>
<td>0.00 n.s.</td>
</tr>
<tr>
<td>Reciprocal cooperation in their community</td>
<td>3.26 1.00 397</td>
<td>3.46 0.95 184</td>
<td>579</td>
<td>2.93 n.s.</td>
</tr>
<tr>
<td>Contact with community residents</td>
<td>3.16 1.44 396</td>
<td>3.61 1.22 186</td>
<td>580</td>
<td>9.51**</td>
</tr>
<tr>
<td>Participation in social activities</td>
<td>1.50 0.92 390</td>
<td>1.74 1.02 187</td>
<td>575</td>
<td>5.47*</td>
</tr>
</tbody>
</table>

Data were analyzed using analysis of covariance with age as a covariate. n.s. = not significant, *p<.05, **p<.01

### Table 2
Comparison whether the participants have regular exercise habit or not (male participants, adjusting for age).

<table>
<thead>
<tr>
<th></th>
<th>Non-regular-exercise group</th>
<th>Regularly-exercise group</th>
<th>df</th>
<th>F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>Acquaintance of community residents</td>
<td>3.39 1.30 148</td>
<td>3.56 1.17 82</td>
<td>228</td>
<td>0.43 n.s.</td>
</tr>
<tr>
<td>Reciprocal cooperation in their community</td>
<td>3.24 1.02 147</td>
<td>3.52 0.99 81</td>
<td>226</td>
<td>3.23 n.s.</td>
</tr>
<tr>
<td>Contact with community residents</td>
<td>2.93 1.50 147</td>
<td>3.64 1.10 83</td>
<td>228</td>
<td>11.91**</td>
</tr>
<tr>
<td>Participation in social activities</td>
<td>1.69 1.04 144</td>
<td>1.87 1.00 83</td>
<td>225</td>
<td>1.21 n.s.</td>
</tr>
</tbody>
</table>

Data were analyzed using analysis of covariance with age as a covariate. n.s. = not significant, **p<.01

### Table 3
Comparison whether the participants have regular exercise habit or not (female participants, adjusting for age).

<table>
<thead>
<tr>
<th></th>
<th>Non-regular-exercise group</th>
<th>Regularly-exercise group</th>
<th>df</th>
<th>F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>Acquaintance of community residents</td>
<td>3.48 1.25 249</td>
<td>3.50 1.09 105</td>
<td>352</td>
<td>0.35 n.s.</td>
</tr>
<tr>
<td>Reciprocal cooperation in their community</td>
<td>3.28 1.00 250</td>
<td>3.41 0.92 103</td>
<td>351</td>
<td>0.54 n.s.</td>
</tr>
<tr>
<td>Contact with community residents</td>
<td>3.30 1.39 249</td>
<td>3.58 1.31 103</td>
<td>350</td>
<td>1.73 n.s.</td>
</tr>
<tr>
<td>Participation in social activities</td>
<td>1.39 0.83 246</td>
<td>1.63 1.02 104</td>
<td>348</td>
<td>4.01*</td>
</tr>
</tbody>
</table>

Data were analyzed using analysis of covariance with age as a covariate. n.s. = not significant, **p<.05

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5. Limitations of the Present Study and Future Considerations

The first limitation was that this study was a cross-sectional design so it was difficult to discuss any causal relationships. The second limitation was that the findings should not be generalized because the participants were recruited from a broad range of ages but they were not randomly selected. The third limitation was that social capital was not necessarily measured by an established method. Different indicators of social capital from that in the present study should also be considered.

In the future, factors that the present study did not investigate and mechanisms that mediate between social capital and the exercise habit should be studied. For example, Cohen and Lemay (2007), who conducted a longitudinal study, stated that a reason why social networks change health may be that they are affected by response to social effects from other persons. Meanwhile, because not only effects of social capital on the exercise habit but also vice versa effects were presumed, these bidirectional effects should be studied.

6. Conclusion

In the present study, the relationship between social capital and the exercise habit was investigated in community residents in Japan. It was concluded that a practical level of regular exercise by the community residents may be associated with some aspects of social capital.

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