

Community-Level Sports Group Participation and Older Individuals' Depressive Symptoms—マルチレベル横断分析

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研究要旨

Purpose: Community-level group participation is a structural aspect of social capital that may have a contextual influence on an individual's health. Herein, we sought to investigate a contextual relationship between community-level prevalence of sports group participation and depressive symptoms in older individuals.

Methods: We used data from the 2010 Japan Gerontological Evaluation Study (JAGES), a population-based, cross-sectional study of individuals aged ≥ 65 years without long-term care needs in Japan. Overall, 74,681 participants in 516 communities were analyzed. Depressive symptoms were diagnosed as the 15-item Geriatric Depression Scale score ≥ 5 . Participation in a sports group 1 day/month or more often was defined as “participation.” For this study, we applied two-level multilevel Poisson regression analysis stratified by sex, calculated prevalence ratios (PRs), and 95% confidence intervals (CIs).

Results: Overall, 17,420 individuals (23.3%) had depressive symptoms, and 16,915 (22.6%) participated in a sports group. Higher prevalence of community-level sports group participation had a statistically significant relationship with a lower likelihood of depressive symptoms (male, PR: 0.89, 95% CI: 0.85–0.92; female, PR: 0.96, 95% CI: 0.92–0.99, estimated by 10% of participation proportion) after adjusting for individual-level sports group participation, age, diseases, family form, alcohol, smoking, education, equivalent income, and population density. We found statistically significant cross-level interaction terms in males only (PR: 0.86, 95% CI: 0.77–0.95).

Conclusion: We found a contextual preventive relationship between community-level sports group participation and depressive symptoms in older individuals. Therefore, promoting sports groups in a community may be effective as a population-based strategy for the prevention of depression in older individuals. Furthermore, the benefit may favor male sports group participants.

A. 研究目的

The present study investigated whether older individuals living in community areas with a higher prevalence of sports group participation among older individuals are less likely to have depressive symptoms compared to those living in community areas with a lower prevalence of such participation after controlling for individual-level sports group participation. We

performed community- and individual-level multilevel analyses to clarify the contextual relationship between community-level sports group participation and depressive symptoms in older individuals.

B. 研究方法

We used cross-sectional data from the

Japan Gerontological Evaluation Study (JAGES). Between August 2010 and January 2012, a total of 169,215 community-dwelling people aged ≥ 65 years were randomly selected from 31 municipalities including metropolitan, urban/semiurban, and rural communities in 12 prefectures from as far north as Hokkaido (i.e., the northernmost prefecture) and as far south as Okinawa (i.e., the southernmost prefecture) in Japan and were mailed a set of questionnaires. Overall, 112,123 people participated (response rate, 66.3%). We used data from 74,681 respondents (valid response rate, 44.1%) in 516 community areas, after excluding (i) 46 community areas with ≤ 30 respondents each (a total of 980 respondents), (ii) 4,099 respondents whose areas of residence were unknown, and (iii) 32,363 respondents whose status of sex, age, depressive symptoms or extent of sports group participation was unknown. JAGES participants were informed that participation in the study was voluntary and that completing and returning the questionnaire via mail indicated their consent to participate in the study. Ethical approval for the study was obtained from the Ethics Committee at Nihon Fukushi University, Japan (Approval number: 10-05).

We assessed depressive symptoms using the 15-item Geriatric Depression Scale (GDS). Following previous research, mild or severe depressive symptoms ($\text{GDS} \geq 5$) was set as an outcome of the present study.

Participants were queried on their frequency of sports group participation. We defined participating 1 day/month or more often as “participation” in a sports group and aggregated individual-level sports group participation by community area as a

community-level independent variable.

To examine the contextual relationship of community-level prevalence of sports group participation to individual-level depressive symptoms, we applied two-level multilevel Poisson regression analysis (the individual as level 1 and the community as level 2) with random intercepts and fixed slopes and calculated the multilevel prevalence ratio (PR) and 95% confidence interval (CI). Two models of analysis were used. Both community- and individual-level sports group participation and cross-level interaction terms were included in model 1. In model 2, all covariates (individual-level sports group participation, age, diseases, family form, alcohol, smoking, education, equivalent income, and population density) were added. The PRs and 95% CIs of community-level sports group participation were estimated by 10% of participation proportion. We used STATA 13/SE (StataCorp, College Station, Texas, USA) for all statistical analyses.

C. 研究結果

Of 74,681 analytic samples (mean age \pm standard deviation, 73.4 ± 6.0 years in male and 73.8 ± 6.3 years in female participants), 17,420 (23.3%) had depressive symptoms and 16,915 (22.6%) participated in a sports group 1 day/month or more often. When the proportions of depressive symptoms and sports group participation were calculated for each community area, the ranges were 0.0%–60.6% and 0.0%–56.5%, respectively.

Regardless of whether the model included covariates and sex, community-level higher prevalence of sports group participation had a statistically significant relationship with lower

likelihood of depressive symptoms (male, PR: 0.89, 95% CI: 0.85–0.92; female, PR: 0.96, 95% CI: 0.92–0.99) in the fully adjusted model estimated by 10% of participation proportion. Individual-level sports group participation also had a significant relationship with low likelihood of depressive symptoms (male, PR: 0.56, 95% CI: 0.52–0.60; female, PR: 0.58, 95% CI: 0.55–0.62 in the fully adjusted model). We found statistically significant cross-level interaction terms in males only (PR: 0.86, 95% CI: 0.77–0.95 in the fully adjusted model).

D. 考察

To the best of our knowledge, this is the first study to find the contextual relationship between community-level prevalence of sports group participation in older individuals and depressive symptoms in older individuals. A 10% increase in community-level sports group participation was associated with an 11% and 4% reduction in the prevalence of depressive symptoms after adjusting for individual-level sports group participation and covariates. It is worth noting that the mitigational relationship of 10% increases in community-level sports group participation, which were estimated by the reciprocals of the PRs (1.12 in males and 1.04 in females), were comparable with the age-related differences by 15 years in males (PR = 1.12) and 10 years in females (PR = 1.04).

E. 結論

Older individuals living in community areas with a higher prevalence of sports group participation in older individuals are less likely to have depressive symptoms compared to those living in a community area with lower

prevalence of participation after adjusting for individual-level sports group participation and other covariates, i.e., we found a contextual preventive relationship between community-level sports group participation and depressive symptoms in older individuals. Furthermore, the benefit may favor male sports group participants. Promoting sports groups in a community may be effective as a population-based strategy for the preventing depression in older individuals regardless of each individual's participation status.

F. 研究発表

1. 論文発表

Tsuji T, Miyaguni Y, Kanamori S, Hanazato M, Kondo K. Community-level sports group participation and older individuals' depressive symptoms. *Med Sci Sports Exerc.* 2018 Jan 3. doi: 10.1249/MSS.0000000000001541. [Epub ahead of print]

2. 学会発表

なし

G. 知的財産権の出願・登録状況（予定を含む）

1. 特許取得

なし

2. 実用新案登録

なし

3. その他

なし