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Association between satisfaction with meaningful activities and social frailty in community-dwelling Japanese older adults

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ABSTRACT

Objectives: This cross-sectional study investigates the associations among satisfaction with meaningful activities, and social frailty in community-dwelling Japanese older adults.
Methods: We analyzed data from 596 older adults (mean age 74.2 ± 6.4 years, female 63.6%) who participated in the Tarumizu Study 2019, a community-based health survey. Participants selected meaningful activities from 95 activities using the Aid for Decision-Making in Occupation Choice (ADOC) tool. Satisfaction was evaluated from 1 to 5, and those who were assigned a rating of 4 or 5 were operationally classified as the high satisfaction group ($n = 487$), with others occupying the low satisfaction group ($n = 109$). Both groups were evaluated based on the ADOC, social frailty (Makizako's five items), physical function, depressive symptoms, cognitive function, and higher-level competence.
Results: Of the 596 participants, 18.7% showed prevalence of social frailty. The low satisfaction group had a significantly higher prevalence of social frailty (low satisfaction 28.4% vs. high satisfaction 16.4%, $P = 0.004$) and depressive symptoms (low satisfaction 30.3% vs. high satisfaction 17.9%, $P<0.01$), and poor higher-level competence ($P = 0.026$) than the high satisfaction group. Logistic regression analysis showed that social frailty (Odds Ratio 1.78, 95% Confidence Interval 1.068–2.990, $P = 0.027$) was significantly associated with satisfaction with meaningful activity after adjusting for covariates. We found no significant differences in categories of meaningful activities between the low and high satisfaction groups ($P = 0.549$).
Conclusions: This study suggested that social frailty was associated with satisfaction with meaningful activities, regardless of the degree or category of satisfaction.

1. Introduction

Frailty is a major factor to be considered when older adults begin requiring long-term care. It is a condition that increases vulnerability to stress, due to the decline in physiological reserve in old age (Clegg, Young, Iliffe, Rikkert & Rockwood, 2013). Frailty has been recognized as a multifaceted construct that includes not only physical, but also psychological and social aspects (Gobbens, Luijkx, Wijnen-Sponselee & Schols, 2010; Rockwood, 2005). It is believed that these aspects interact with each other and lead to negative health outcomes (Gobbens, Luijkx, Wijnen-Sponselee & Schols, 2009). Social frailty is defined as a continuum of being at risk of losing, or having lost general or social resources, social behaviors, activities, and self-management abilities (Bunt, Steverink, Andrew, van der Schans & Hobbelen, 2017a). Recently, various

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social frailty assessment tools have been developed (Bunt, Steverink, Olthof, van der Schans & Hobbelen, 2017b; Gobbens & van Assen, 2014; Makizako et al., 2015; Teo, Gao, Nyunt, Wee & Ng, 2017; Tsutsumimoto et al., 2017). Other factors of social frailty include social network size, financial satisfaction, social engagement, and social participation in community-dwelling older adults (Hoogendijk, Suanet, Dent, Deeg & Aartsen, 2016; Hsu & Chang, 2015; Jürschik et al., 2012). Japan's aging rate in 2020 is 28.8%, the highest in the world (Cabinet office, 2020). The prevalence of social frailty among community-dwelling older adults in Japan has been reported to be 10.2–11.1% (Makizako et al., 2015; Tsutsumimoto et al., 2017). Social frailty is associated with factors leading to physical frailty (Makizako et al., 2018), increased mortality risk (Garre-Olmo, Calvó-Perxas, López-Pousa, de Gracia Blanco & Vilalta-Franch, 2012), and several problems relating to aspects such as family structure and social participation (Yamada & Arai, 2018). Therefore, it should be noted that social frailty may become a serious concern for older adults as the world ages in the future.

Previous studies of community-dwelling older adults have shown that maintaining roles and behaviors such as visiting friends, reaching out for advice, and engaging in intellectual activity can reduce decline in instrumental activities of daily living (IADL) (Fujiwara et al., 2003), and reduce the need for long-term care (Fratiglioni, Wang, Ericsson, Maytan & Winblad, 2000; Hikichi et al., 2015; Makizako et al., 2015). It is recognized that engaging in meaningful activities leads to the well-being of older adults (Cho, Post & Kim, 2018;World Health Organization, 2002; Rantanen et al., 2019). On the other hand, low satisfaction with meaningful activities has been shown to be associated with the risk of developing depressive symptoms and dementia (Kuiper et al., 2015; Maruta et al., 2020). Healthy aging promotes activities that create an environment and enhance opportunities for people to participate in things that they value throughout their lives (World Health Organization, 2015). Therefore, engaging in meaningful activities and active social participation can have a positive impact on social frailty. It is important for each individual to engage in meaningful activities. Furthermore, understanding the characteristics of activities that older adults value may provide hints on group activities and interventions. By increasing activities that involve social participation in addition to individual activities, it can be expected that social aspects such as interaction with others and the construction of social networks will become more active. Our hypothesis is that (1) there would be differences in characteristics of meaningful activities between older adults with high and low satisfaction with meaningful activities, and (2) low satisfaction with activities would be associated with a higher prevalence of social frailty. Investigating meaningful activities and the associated satisfaction among community-dwelling older adults may contribute to formulating strategies that can help prevent social frailty and support older adults who require long-term care.

Given this background, the purpose of this study was (1) to investigate the association between meaningful activity categories and satisfaction with such activities in community-dwelling older adults, and (2) to clarify the association between satisfaction with activities and social frailty.

2. Methods

2.1. Participants

This cross-sectional study used data from the Tarumizu Study 2019, a community-based health checkup that began in 2017 as a collaboration among Kagoshima University, the Tarumizu City Office, and Tarumizu Central Hospital. Tarumizu City in Kagoshima Prefecture is one of the least populated cities in Japan, with a population of 14,451 as of 2020. However, it has a very high population aging rate (43.6%). This survey has been conducted annually since 2017 as part of a comprehensive health check (dental, nutritional, cardiovascular, physical function, etc.) to promote healthy longevity (medical and older adult measures). Reply-paid postcards were mailed to the residents of Tarumizu City who were aged 40 years or older at the time of examination, and residents were recruited through local newspaper advertisements and community campaigns. There were 1028 participants at baseline. The present study excluded those aged less than 65 years ($n = 338$); those with missing data ($n = 28$; related to the scale used for assessment, medication, meaningful activity, etc.); and those with a history of a stroke ($n = 34$), other brain disorders ($n = 15$), depression ($n = 9$), Alzheimer's disease ($n = 3$), vascular dementia ($n = 1$), and other types of dementia ($n = 4$). Finally, data were analyzed from 596 participants (mean age 74.2 ± 6.4 years, female= 63.6%) (Fig. 1).

2.2. Ethical considerations

Informed consent was obtained in writing from all participants before their inclusion in the study. The ethics committee of the Faculty of Medicine, Kagoshima University, approved the study protocol (Ref No. 170,351). All procedures conformed to the principles outlined in the Declaration of Helsinki.

2.3. Measures

2.3.1. Assessment of social frailty

Social frailty was evaluated for five items based on a previous study (Makizako et al., 2015; Tsutsumimoto et al., 2017). This scale makizako-5 includes social resources, social behaviors and activities, which are domains of social frailty by Burnt et al. (Bunt et al., 2017b), and can assess to simple and quick. These items were (1) going out less frequently than last year (yes), (2) visiting friends sometimes (no), (3) feeling like helping friends or family (no), (4) living alone (yes), and (5) talking with someone every day (no). The validity of the social frailty construct has been previously reported (Tsutsumimoto et al., 2019). Participants were classified into groups based on social frailty (two or more characteristics), pre-frailty (one characteristic), and robust characteristics.

2.3.2. Meaningful activity

In this study, meaningful activities were operationally defined as "activities that individuals consider important in their daily life" (Maruta et al., 2020). We evaluated meaningful activities using the Aid for Decision-making in Occupation Choice (ADOC) tool, which was developed in 2011 as an important meaningful activity selection tool for clients in rehabilitation, and is an iPad application (Tomori et al., 2012). The activities in the ADOC comprise 95 illustrations related to "Activities and Participation," included in the International Classification of Functioning, Disability, and Health. They are categorized as follows: (1) self-care (e.g., using the toilet, grooming), (2) mobility (e.g., moving around within the home, moving around outside), (3) domestic life (e.g., shopping, cooking), (4) work/education (e.g., remunerative employment, non-remunerative), (5) interpersonal interaction (e.g., verbal or non-verbal interaction, family relationships), (6) social life (e.g., religion, use of public institutions), (7) sport (e.g., jogging/marathon, walking), and (8) leisure (e.g., painting, reading). The participants selected and ranked three to five meaningful activities from the ADOC. They rated their satisfaction with each meaningful activity on a scale of 1–5 (1= very dissatisfied, 5= very satisfied). We asked the participants about their satisfaction with the execution status of the selected meaningful activities. Before starting this research, we attended a 2-h pre-lecture on the investigation method of meaningful activities. The reliability and validity of individual satisfaction scores on the ADOC have been previously reported (Tomori et al., 2013).

2.4. Outcome measures

Licensed doctors or nurses interviewed participants regarding their medical history. Cognitive status was assessed using the Mini-Cog test,

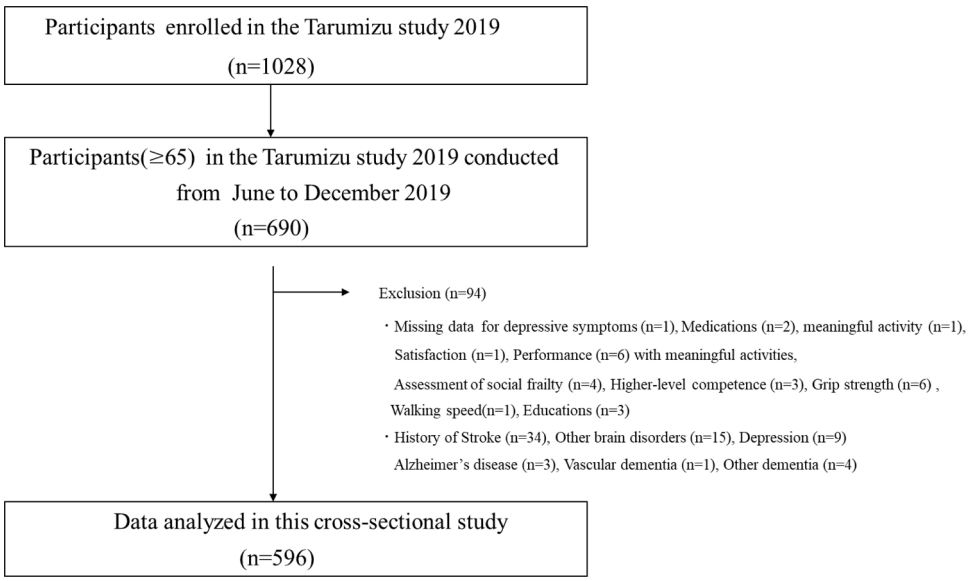

Fig. 1. Flowchart of the present study.

which comprised the recall of three words and the clock drawing test (Borson, Scanlan, Brush, Vitaliano & Dokmak, 2000). The total score was the sum of the correct words recalled (0–3), and the clock drawing test score (0 or 2). A cutoff score of <3 points distinguished between those with and without cognitive impairment (Borson et al., 2000; Borson, Scanlan, Watanabe, Tu & Lessig, 2005). Therefore, in this study, a total score of <3 was defined as cognitive decline. Depressive symptoms were assessed using the 15-item (range: 0–15 points) Geriatric Depression Scale (GDS-15), with higher scores indicating greater depressive symptoms (Yesavage, 1988). A cutoff point of >5 was used to define the presence of depressive symptoms (Almeida & Almeida, 1999). Physical functions were assessed based on walking speed and grip strength tests. Higher-level competence was assessed using the Japan Science and Technology Agency Index of Competence (JST-IC) (Iwasa et al., 2015, 2018). Its item scores (social engagement, technology, information practice, life management; range 0–16) and those for its subscales (range 0–4) were added to obtain the total scores. They were scored on a dichotomous rating scale (0 = "no", 1 = "yes"), with higher scores indicating greater competence.

2.5. Statistical analysis

Participants were classified into two groups based on their satisfaction with the most meaningful activities selected in the ADOC. Those who responded with a five or four were classified as the high satisfaction group, while the others were classified as the low satisfaction group. A five-step analysis was performed on the activities that participants considered most meaningful, to determine the relationship between satisfaction with meaningful activities and social frailty. First, to compare characteristics between the two groups, we used the Student's *t*-test for continuous variables, and the Pearson's χ^2 tests and the Mann–Whitney U test for ordinal variables. Second, to compare meaningful activity categories selected by individuals in the high and low satisfaction groups, we used the Pearson's χ^2 test to understand the characteristics of the categories according to the level of satisfaction. Third, to compare the proportion of meaningful activity categories for high and low satisfaction groups by gender, we used Fisher's exact test and χ^2 test.

Fourth, to determine the association between satisfaction with meaningful activities and social frailty, we performed multiple logistic analyses. The effect of multicollinearity was considered. There were three regression models: the crude model, adjusted model 1, and adjusted model 2. In each model, satisfaction was set as the dependent variable and social frailty was set as the independent variable. Items that showed significant group differences between groups were used as adjustment model 1, wherein the potential covariates were depressive symptoms and higher-level competence. Items that were added in previous studies to adjustment model 1, including gender, age, and education, were used as adjustment model 2 (Maruta et al., 2021). In this model, the potential covariates were depressive symptoms, higher-level competence, gender, age, and education. The adjusted odds ratio (OR) was calculated with 95% confidence interval (CI). Finally, we compared the degree of satisfaction with the social frailty sub-items, and selected meaningful activities between the high and low satisfaction groups using the Pearson's χ^2. All the analyses were performed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY USA). A p-value less than <0.05 was considered statistically significant.

3. Results

3.1. Participant characteristics

Table 1 summarizes the participant characteristics. Of the 596 participants, 487 (81.7%) were reported to have high satisfaction with meaningful activities. Overall, 18.6%, 35.9%, and 45.5% of the participants were classified into the social frailty, social pre-frailty, and robust groups, respectively (Fig. 2). The low satisfaction group had a significantly higher percentage of social frailty ($P = 0.004$) and depressive symptoms ($P<0.01$) and a significantly lower higher-level competence ($P = 0.026$) than the high satisfaction group.

3.2. Association between satisfaction and meaningful activity categories

Fig. 3 summarizes the characteristics of the activity categories for the high and low satisfaction groups. There were no significant differences in meaningful activity categories between the two groups ($p = 0.549$). In the high satisfaction group, leisure (27.9%) was most frequently selected, followed by interpersonal interactions (17.9%). In the low satisfaction group, leisure (22.0%) was most frequently selected, followed by domestic life (19.3%) Fig. 4., based on gender, summarizes the meaningful activity categories selected by the high and low satisfaction groups. There were no significant differences between the two groups among males ($P = 0.611$) and females ($P = 0.904$). In the high satisfaction group with males, leisure (32.2%) was most frequently selected, followed by sport (17.5%). In the high satisfaction group with females,

Table 1
Characteristics of the participants.

	Overall ($n = 596$)	High satisfaction group ($n = 487$)	Low satisfaction group ($n = 109$)	P value
Age, mean ± SD (years)	74.2 ± 6.4	74.4 ± 6.4	73.7 ± 6.3	0.349a
Female, n (%)	379(63.6)	310(63.7)	69(63.3)	0.945b
Social pre-frailty, n(%)	214(35.9)	179(36.8)	35(32.1)	0.361b
Social frailty, n (%)	111(18.6)	80(16.4)	31(28.4)	0.004b
Poor cognitive status, n (%)	176(29.5)	146(30.0)	30(27.5)	0.611a
Depressive symptoms, n (%)	120(20.1)	87(17.9)	33(30.3)	<0.01b
Gait, mean ± SD (ms)	8.1 ± 2.1	8.1 ± 2.2	8.4 ± 1.7	0.253a
Grip strength, mean ± SD (kg)	25.2 ± 7.5	25.3 ± 7.5	24.9 ± 7.8	0.634b
Higher-level competence, mean ± SD (points)	11.8 ± 3.0	12.0 ± 3.1	11.3 ± 2.8	0.026a
Education, mean ± SD (years)	11.4 ± 2.2	11.5 ± 2.2	11.3 ± 2.3	0.054a
Medication, n (%)	484(81.2)	390(80.1)	94(86.2)	0.137b

SD, standard deviation; ms, millisecond; a: Students' *t*-test; b: Pearson's χ^2 test; c: Mann–Whitney U test.

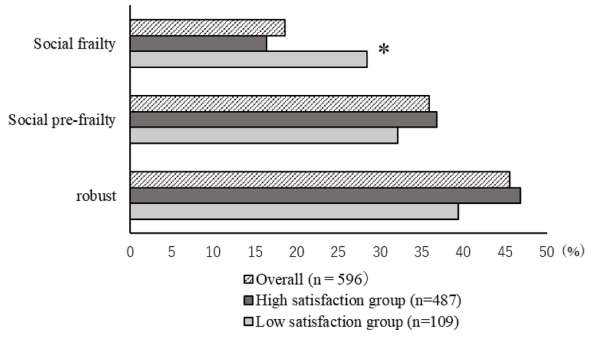

Fig 2. Prevalence of social frailty in the low and high satisfaction groups.

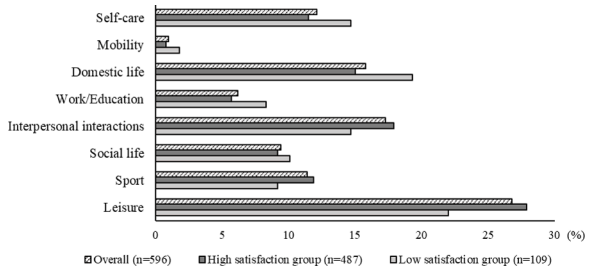

Fig 3. Comparison of activities participants found meaningful in the low and high satisfaction groups.

leisure (25.5%) was most frequently selected, followed by interpersonal interactions (19.7%).

3.3. Association between satisfaction with meaningful activities and social frailty

Table 2 summarizes the results of the logistic regression models. The logistic regression analysis showed that social frailty (OR 2.02, 95% CI 1.251–3.268 $P = 0.004$) was significantly associated with satisfaction with meaningful activity (crude model). After adjusting for potential covariates, social frailty (OR 1.78, 95% CI 1.068–2.990, $P = 0.027$) and age (OR 0.96, 95% CI 0.926–0.998, $P = 0.041$) were significantly associated with satisfaction with meaningful activity (adjusted model 2) Table 3. summarizes the satisfaction with meaningful activity and social frailty sub-items. It shows that the low satisfaction group had significantly higher percentages of not feeling helpful toward friends or family ($P = 0.005$) and not talking with someone every day, ($P = 0.005$) than the high satisfaction group.

4. Discussion

In this study, we investigated the association between meaningful activity categories, satisfaction with activities, and social frailty in community-dwelling Japanese older adults. The prevalence of social frailty in previous studies that used this assessment tool ranged from 10.2% to 20.5% (Makizako et al., 2015; Park et al., 2019; Tsutsumimoto et al., 2017), and in this study, it was 18.6% among the 596 participants, making it consistent with the previous findings. These findings suggest that areas with an aging population of more than 40% in Japan tend to have a higher prevalence of social frailty. Social frailty and age were significantly associated with satisfactory meaningful activities, after adjusting for depressive symptoms, higher-level competence, gender, age, and education. Previous studies have shown that social frailty affects life satisfaction (Ko & Jung, 2021). Among the sub-items of social frailty, "not feeling helpful to family or friends" and "not talking with someone every day" were related to low satisfaction with meaningful activity. Previous research has shown that social limitations are associated with depression (Gignac et al., 2013; Teo et al., 2015). Therefore, this may be a possible reason for participants' low rating for satisfaction with meaningful activity. It is important to engage in social activities, increase the satisfaction of older people with meaningful activities, and thereby maintain their mental health.

Additionally, the low satisfaction group had a significantly higher percentage of depressive symptoms than the high satisfaction group. Depressive symptoms have been reported to limit social activities in daily life (Polku et al., 2015), increase the prevalence of social frailty (Ma, Sun & Tang, 2018), and could decrease the overall quality of life (Demura & Sato, 2003). Those with greater social limitations and lower role satisfaction tend to report greater depression (Gignac et al., 2013). However, engaging in meaningful life tasks increases physical activity and reduces cognitive decline (Wang, Xu & Pei, 2012). It may be important for older adults to interact and play particular roles inside and outside the home in order to maintain their mental health.

This study revealed that meaningful activity categories did not differ significantly between the high and low satisfaction groups. In addition, there were no significant gender differences between the two groups. A previous study reported that individuals are more motivated when they engage in meaningful activities (Rebeiro, 1999). Another study found that when older adults reflect on their life activities through group education and counseling, and set life goals that match their personal values, positive effects on life satisfaction and physical functioning could be observed (Clark et al., 1997). Furthermore, the addition of life-goal setting based on the assessment of meaningful activities for frailty among older adults, as part of a standard prevention program, was shown to improve scores on the Ministry of Health, Labor, and Welfare's "Kihon Checklist for Assessment frailty and Quality of Life" and to increase subjective self-rated health. (Yuri, Takabatake, Nishikawa, Oka & Fujiwara, 2016). Therefore, regardless of the type of activity, it is important for individuals to get involved in meaningful activities and continue these engagements .

However, there are differences related to national and regional characteristics (e.g., urban vs. rural), environment (e.g., access to transportation), and living conditions (e.g., distance to a nearby supermarket) that need to be carefully considered. The study results suggest

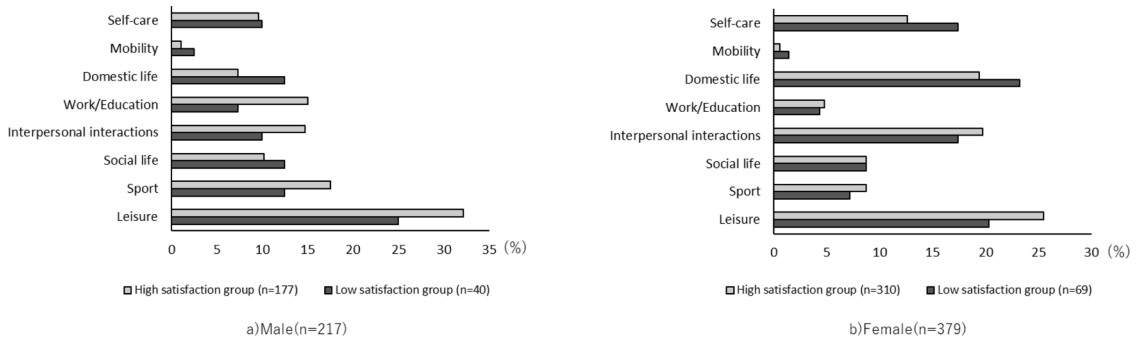

Fig 4. Proportions of meaningful activity categories for the high and low satisfaction groups by gender.

Table 2
Association between social frailty and satisfaction with meaningful activities.

	Crude model	Adjusted model 1	Adjusted model 2
	OR 95% CI P Value	OR 95% CI P Value	OR 95% CI P Value
Social frailty	2.02 1.251–3.268 0.004*	1.68 1.010–2.806 0.046*	1.78 1.068–2.990 0.027*
Depressive symptoms		1.66 1.007–2.750 0.047*	1.61 0.970–2.682 0.065
Higher-level competence		0.96 0.900–1.040 0.365	0.94 0.870–1.017 0.127
Gender			1.03 0.657–1.615 0.897
Age			0.96 0.926–0.998 0.041*
Education			0.98 0.886–1.093 0.766

*$P < 0.05$.
OR: odds ratio; CI: confidence interval. In both models, presence of satisfaction with meaningful activity was a dependent variable and social frailty was the independent variable. In adjusted model 1, the potential covariates were depressive symptoms and higher-level competence. In adjusted model 2, the potential covariates were depressive symptoms, higher-level competence, gender, age, and education.

Table 3
Associations of satisfaction with meaningful activity and sub-items of social frailty.

	High satisfaction group	Low satisfaction group	P Value
Going out less frequently than last year	14.6	21.1	0.091
Not visiting friends sometimes	18.3	24.8	0.122
Not feeling helpful to friends or family	4.4	12.8	0.005*
Living alone	28.5	30.3	0.718
Not talking with someone every day	8.4	17.4	0.005*

*$P < 0.05$.
Values are presented as (%). P-values were determined using χ^2-tests.

that engaging in meaningful and satisfactory activities may enhance social participation and interaction, thereby exerting a positive impact on preventing social frailty among older adults.

In this study, we investigated meaningful activities, which are "the activities that individuals consider important in their daily life." The major strength of this study is that satisfaction with meaningful activity is related to social frailty regardless of activity category. It may be important for community-dwelling older adults to increase their level of satisfaction with, and engage in, meaningful social activities.

The present study has some limitations. First, we cannot clearly confirm the causal relationship between social frailty and satisfaction with meaningful activities in this cross-sectional study. Second, this study is based on data from Tarumizu city alone, which has an aging population of over 40%. In addition, the participants included here are those who participated in the health checkup survey on their own. Therefore, these older adults may be highly aware of their health. In the future, it will be necessary to conduct this study across multiple cities with similar regional characteristics. We need to accumulate valuable evidence by conducting longitudinal studies. This study was completed before the outbreak of the COVID-19 pandemic. Different findings could emerge if it were conducted during the pandemic.

5. Conclusion

This study indicated that being dissatisfied with meaningful activities may affect a high percentage of older adults with social frailty and depressive symptoms. With regard to satisfaction, there were no differences in meaningful activity categories selected by the high and low groups among community-dwelling Japanese older adults. Therefore, understanding the social environment of older adults and facilitating their engagement in meaningful and satisfying activities may help in more effective support for social frailty.

Declaration of Competing Interest

None.

Acknowledgments

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.archger.2022.104665.

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