

す。

- 年々手際が良く行われているように感じた。
- ほんとうにありがとうございました。あらためて、健康でいる事は嬉しい事です。これからも自分を大事にしていきたいと思っております。ほんとうにありがとうございました。
- 平素は余り運動をしないので今回の催しに参加させて頂きましていろいろ検査して頂き、後日の検査結果をみられました事、有難く存じます。大変お世話様になりました。
- 継続して欲しい。
- こういう検査をしていただいてこちらこそ有難うございました。又、機会があればやらせていただきたいと思えます。本当に今回は有難うございました。
- 3年間お世話になりました、有難うございます。今回で終了と思えますと、淋しい気がいたします。来年は代がわりですので、続けて実施して欲しいと思えます(希望者だけ)。費用がかさみ過ぎる。人件(ボランティア)その他で実施は不可能でしょうか。
- 体調がよくわかると思うので続けてやって欲しいです。
- 親切に対応していただきありがとうございました。
- いろいろ検査有難うございました。
- 健康管理にとっても参考にさせていただいています。毎日の生活が楽しく感謝いたします。毎回受診するたび新しい容器が入って楽しみでした。有難うございました。
- 検査の流れが3年目はとてもスムーズ。楽しく受けさせて戴きました。有難うございました。機会があったら又お世話になりたいと思えます。
- ご親切に有難うございました。
- 毎年楽しい時間を過ごさせていただきました。
- 3年間お世話になりました。ありがとうございました。
- 皆様お疲れさまでした。スケジュール合わせは大変でしたでしょう。お世話になりました。
- 年々、自分の体の状態の進行がわかるので楽しみに予定をあけています。
- 日頃、病院等に行っていないので、色々と検査して戴いて、有難うございました。各種の検査データを今後有効に利用して下さい。
- 3年間お世話になりましたありがとうございます。希望としてもっと続けていただきたいです。
- 健康の現状を知る上で3年間の結果を知らせてもらい比較するのは大変参考になり、又活用したいと思っています。有難うございました。
- 1年前にも調べて頂いているのに又新たな検査をしている様に緊張しました。スムーズに運んで頂いて感謝します。
- お世話になりました。三年間健康で過ごせましたこと感謝いたしております。
- ありがとうございました。気が付かない身体の事などを知る事が出来ましたし、今後の生活に生かせれば、と思えます。
- 3回目、台風での連絡も有り大変嬉しく思いました。気分よく、終わる事ができました。ありがとうございます。
- 現在の状態がどの程度なのか、平均的な数値を知らせてください。また、それをもとに、より健康であるためには、何をどうすればよいか教えてください！
- 早く結果と注意点を知らせていただきたい。
- 1. 三年目は腰痛悪化で、動きが悪かった。2. 混雑が昨年にくらべ、ひどかった。待ち時間が長かった。3. 担当の係の方々が、大変親切で、感謝申し上げます。

- 1. 歯検査コーナー ゴム手袋のゴム臭い“ニオイ”気になった。2. 皆様生き生きとしてお疲れ様でした。
- 同じような質問があり混乱することがありました。でも楽しく健診を受けることができました。
- 食生活の調査問診については本人にとってもこれでよいかと思うことあり。たとえば、1回、2回、3回やってみて一致しないことあり。これで統計とられても、大丈夫かと思う。
- 結果が送付されるのが遅いと思う。今日(10/10)の軽食はパサパサでのどを通らなかった。朝食も取らずに来たのだから検討下さい。

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東口高志

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Eating Alone as Social Disengagement is Strongly Associated With Depressive Symptoms in Japanese Community-Dwelling Older Adults

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Eating alone associal disengagementsis strongly associated with depressive symptoms in Japanese community-dwelling older adults

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ABSTRACT

Objectives: Depression in later life poses a grave challenge for the aging countries. The reported key risk factors include social disengagement, but the lack of social companionship during mealtimes, namely eating alone, has not been examined extensively, especially in relation to living arrangement. Past studies on changes along geriatric trajectories in the association between social engagement and depression also remain inadequate. This study aims to examine the association between social engagement and depressive symptoms with a particular focus on eating alone and how the association changes along the aging and mental frailty trajectories. **Design:** A cross-sectional study. **Setting:** Kashiwa-city, Chiba-prefecture in Japan. **Participants:** 1,856 community-dwelling older adults. **Measurements:** The 15-item Geriatric Depression Scale was used to measure depressive symptoms. The indicators used to assess social engagement included eating alone, living arrangement, reciprocity of social support, social participation, social stressors and social ties. **Results:** Social engagement was significantly associated with depressive symptoms. Those who live with others yet eat alone were found to be at particular risk (Odds Ratio (OR)=5.02, 95% Confidence Interval (CI): 2.5-9.9 for young-old; OR=2.41, 95% CI: 1.2-4.8 for old-old). Younger and less mentally frail populations showed stronger associations. **Conclusion:** Eating alone was a key risk factor for depressive symptoms in community-dwelling older adults. The living arrangement in which they eat alone is important in identifying those with the greatest risk. Mental health management for older adults requires comprehensive assessment of their social relations that takes into account their companionship during mealtimes. Social preventive measures need to involve early interventions in order to augment their effectiveness against mental frailty.

KEY WORDS: eating alone, depressive symptoms, social engagement

INTRODUCTION

The problem of depression in later life has become a pressing global concern, as the population aging continues worldwide¹. It undermines well-being and quality of life (QOL) while adding to healthcare costs, with potential consequences on a wide range of health outcomes². The problem poses a grave socio-economic burden on aging countries, not least in Japan where the unprecedented level of aging threatens to undermine its social security system³. The prevalence of depression among community-dwelling older adults varies enormously and has been reported to be as high as 35%⁴.

The key reported predictors of depressive symptoms include female gender, cognitive and functional impairments, medical disorders, low level of education and social disengagement^{1, 5-10}. Social engagement is an 'umbrella concept for the various components of an individual's social behavior and social structure'¹¹ and its different aspects have consistently been found to predict mortality, disease outcomes, disability, cognitive decline as well as depressive symptoms¹²⁻¹⁶. While the conceptualization of social engagement lacks a strong consensus¹⁷, this should not be viewed as a weakness but as an invitation to explore its unexamined aspects in a search for the most relevant screening questions to identify older adults at risk¹¹. This study thus aims to examine new concepts and ideas that remain under-explored, especially in relation to depression.

One such aspect is the social behavior during mealtimes. Commensality i.e. the act of eating with others provides opportunities for social interactions and exchange of information and support by facilitating participation in shared social activities of mealtimes¹⁸. Eating alone deprives older adults such valuable social opportunities. Eating alone has been studied in relation to dietary intake, but research in relation to depression and wider health outcomes remains limited¹⁹. To our knowledge, none has examined its association with depression in combination with other components of social engagement nor investigated it in relation to the living arrangement. Living alone is often cited as a key risk factor for older adults, as does the Ministry of Health, Labour and Welfare, Japan (MHLW), but eating alone is rarely discussed. A shared living arrangement may result in increased opportunities for commensality, but does not guarantee it^{18, 19}, requiring independent considerations.

Furthermore, past studies have not adequately examined how the association between social engagement and depression changes along geriatric trajectories such as aging and frailty. Frailty is not only a physical but a multidimensional concept²⁰ and mental frailty, one important dimension, may manifest as depressive states. The role of social engagement vis-à-vis depression is expected to change as older adults age or become more mentally frail, influencing the effectiveness of social intervention measures.

The purpose of the present study is two-fold. The first objective is to examine whether social engagement is associated with depressive symptoms with a particular focus on eating alone and its relation to the living arrangement. Secondly, effects of geriatric trajectories, namely aging and mental frailty trajectory on the above association are examined in order to better identify the most effective social intervention sites for depressive symptoms.

METHODS

Study design:

The study was cross-sectional.

Setting and Participants:

This study was based on data from 1,856 randomly selected community-dwelling older adults (independent or those requiring support), aged 65-94, who participated in the first year health assessment of a 3-year cohort study between 2012 and 2014 in Kashiwa city, Japan. A total of 2,044 persons participated in the assessment and 188 subjects were excluded due to missing items of data.

Measurements:

Depressive symptoms: The 15-item Geriatric Depression Scale (GDS) was used. Scores of ≥ 6 were defined as 'depressive symptoms'²¹, 6-9 as 'mild depression' and ≥ 10 as 'severe depression'⁴.

Social engagement: Seven components were assessed: (1) living arrangement; (2) eating arrangement; (3) reciprocal social support; (4) social participation; (5) social stressors; (6) social ties with family; (7) social ties with friends. Following questions were asked regarding each item: (1) Do you live with your family: yes or no? (No=living alone); (2) Do you eat your meals with anyone else, at least once a day: yes or no? (No=eating alone); (3) Do you give advice and a helping hand to your family or friends: yes or no? (No=low reciprocal social support); (4) Are you going out less frequently compared to last year: yes or no? (The Kihon Check List, MHLW) (No=fewer frequency of going out); (5) Did you experience any major changes in life in the past year, such as moving home, retirement, loss of relatives, financial troubles, troubles in the relationships with people: yes or no? (Yes=major change in life). For (6) and (7), the abbreviated Lubben Social Network Scale (LSNS-6) and its Family and Friends subscales^{22,23} were used. Living arrangement and eating arrangement were crossed to construct four dummy variables: 'Living & Eating alone', 'Living alone yet Eating with others', 'Living with others yet Eating alone' and 'Living & Eating with others' (reference).

Socio-demographic variables: Age and the years of education were included in the analysis as a continuous variable. Health literacy was measured by five items developed for Japanese subjects²⁴. Information on economic status was obtained as income ranking based on long-term care insurance premiums. Logistic regression was performed with the income ranking and depressive symptoms as the independent and dependent variables respectively. The odds ratios were plotted to observe changes in the trend and those with less than 1.4 million Japanese Yen per person were categorized as the 'low income' group.

Medical histories: Medical histories of hypertension, osteoporosis, cerebrovascular diseases, diabetes, heart diseases and malignant neoplasm were obtained through medical interviews by nurses.

Number of medications: The total number of oral medications was recorded as a continuous variable, as polypharmacy is known to be associated with increased depressive symptoms²⁵.

Physical health & functions: Instrumental Activities of Daily Living (IADL) was measured using the Tokyo Metropolitan Institute of Gerontology index of competence²⁶. Mobility was assessed by Life-Space Assessment^{27,28}, measured with the Elderly-Status Assessment Set^{29,30}. The highest level

of life-spaces (level 5) was used. To assess usual and maximum gait speeds, participants were instructed to walk over an 11-m course and the time spent in the middle 5m was recorded³¹.

Cognitive function: Mini-Mental State Examination (MMSE) was used and its score was included in the analysis as a continuous variable.

Oral health & functions: The Japanese version of the General Oral Health Assessment Index (GOHAI)^{32,33} was used to measure the oral health-related QOL. Numbers of remaining teeth were counted by dental hygienists. Occlusal force was assessed by Dental Prescale (Fujifilm).

Nutritional & dietary status: BMI was calculated by dividing the weight by the square of height. Food variety score was calculated from a ten-item questionnaire³⁴. Nutritional status was assessed by Mini-Nutrition Assessment-Short Form (MNA-SF), with scores ≤ 11 indicating possible malnutrition³⁵.

Statistical analysis:

Binomial multiple logistic regression analysis was performed with depressive symptoms as the dependent variable, stratified by the age groups (65-74 years old indicating 'young-old' and ≥ 75 years old indicating 'old-old'). Multinomial multiple logistic regression analysis was performed with different degrees of depressive states ('mild depression' and 'severe depression') as the outcome. The characteristics of the four groups by eating and living arrangement were also compared, to explore the reasons behind their differing associations with depressive symptoms. For continuous variables only, multiple comparison test (Dunnnett T3) was used to test whether there were significant differences between "Living with others yet Eating alone" and "Living & Eating with others". IBM SPSS statistics version 22 for Windows (IBM Japan) was used to perform statistical analysis. $P < 0.05$ was considered to indicate statistical significance.

Ethical considerations:

The study was approved by the Ethics Committee of the University of Tokyo. Data received for analysis had the participants' names substituted with ID numbers, and confidential information was excluded to ensure protection of personal information.

RESULTS

Sample characteristics:

Of the total 1,856 subjects (928 male and 928 female, mean age was 72.9 ± 5.5 years), 1,201 (64.7%) were young-old while 655 (35.3%) were old-old. 14.7% showed depressive symptoms (14.0% of young-old and 15.9% of old-old, 15.6% of women and 13.7% of men). 10.6% were living alone (8.1% of young-old and 15.1% of old-old, 15.4% of women and 5.7% of men). 14.6% were eating alone (11.1% of young-old and 21.1% of old-old, 17.9% of women and 11.3% of men). 6.0% were eating alone despite living with family members (4.2% of young-old and 9.2% of old-old, 5.2% of women and 6.8% of men).

Social engagement and depressive symptoms by age groups:

Table 1 shows the comparison of the geriatric characteristics between normal and depressed subjects for young-old and old-old respectively. Based on this result, logistic regression was performed to identify the key risk factors for depressive symptoms (Table 2). The variables independently associated with depressive symptoms for both age-groups were 'living with others yet eating alone', social participation (fewer frequency of going out), social stressors (major change in life) and social ties of friends, health literacy and GOHAI. Those unique to young-old were low reciprocal social support, social ties with family, low income, mobility and MNA-SF scores. Risk factor unique to old-old was the number of medications.

Social engagement and different degrees of depression:

Table 3 shows the comparison of the geriatric characteristics between 'normal', 'mildly depressed' and 'severely depressed' subjects. Based on this result, multinomial logistic regression was performed, as shown in Table 4. The variables independently associated with both degrees of depression were eating alone, social participation (fewer frequency of going out), social ties with friends, health literacy, the number of medications and GOHAI. Those unique for 'mild depression' were living alone, low reciprocal social support, social stressors (major change in life), social ties with family, age, low income and mobility. Risk factors unique for 'severe depression' were male gender, history of cerebrovascular diseases and MNA-SF scores.

Living arrangement and eating arrangement:

To examine further the role of eating alone and its potential risk factors, living arrangement and eating arrangement were crossed and the physical, mental, oral, cognitive, nutritional/dietary as well as social characteristics of the four resultant groups (Living & Eating alone (n=160), Living alone yet Eating with others (n=36), Living with others yet Eating alone (n=111), Living & Eating with others (n=1,549)) were compared. The results are shown in Table 5.

The subjects 'living with others yet eating alone' had the poorest scores of social ties with family and friends, years of education, health literacy, physical health & functions (normal and maximum gait speeds, IADL and mobility), cognitive function, oral health & functions (GOHAI, number of remaining teeth and occlusal force), nutritional and dietary status (MNA-SF and food variety).

Furthermore, greater proportion of those who 'live with others yet eat alone' live with their

children, children-in-law and grand-children, compared to those who 'live and eat with others', most of whom live with their spouse.

DISCUSSION

The main aim of the present study was to examine the association between social engagement and depressive symptoms in community-dwelling Japanese older adults, with a particular focus on eating alone and on the changes in the association along geriatric trajectories of aging and mental frailty.

The study was carried out on a population sample of Japanese older adults, of whom 14.7% showed depressive symptoms ($GDS \geq 6$). This is on the lower end compared to previous studies that used the same GDS cut-off point, in which the prevalence ranged between 14% and 40%⁴.

The results highlighted a significant association between depressive symptoms and social engagement variables such as social ties, eating alone, social participation, social stressors and reciprocity of social support. Of particular interest was eating alone, which to our knowledge has not been assessed before in combination with different components of social engagement and in relation to the living arrangement. 'Living with others yet eating alone' was a significant predictor of depression for both age groups, with odds ratio reaching as high as 5 times for the young-old. This suggests that eating alone acts as a stronger risk factor than living alone, and that the living arrangement in which older adults eat alone can act as a critical determinant of depressive risks. Meals are an important location of socialization whereby older adults enjoy intimate interactions, and when shared with others, they can provide valuable opportunities for companionship and social support¹⁸. A lack of communication during meals may result in feelings of loneliness and depressed moods¹⁹.

Table 5 suggests that those who eat alone despite living with their families tend to be the most socially withdrawn, with least awareness of their health conditions and the poorest physical, oral and cognitive functions as well as nutritional status. The fact that they do not share a single meal with their families despite living together suggests that they have distant relationships with them. Compared to those who eat with others, a greater proportion of those who eat alone live with their children, children-in-law or grandchildren, and less with their spouse. This suggests that they may be eating alone because they lead different life styles, suffer from emotional distance, concerns that they will add burdens on their families if they eat together, or from uncomfortable relationships with family members such as children-in-law. This is supported by the fact that they have the weakest social ties with family. This may result in lower interest in their health shown by their families, as well as in lower self-interest. The fact that they show the lowest health literacy also supports this hypothesis. They also exhibit the lowest mobility and social ties with friends, suggesting that they are the most socially isolated not only at home but also outside. The fact that their gait speeds and IADL are the lowest imply that their poor physical functions play a role in limiting their social activities. GOHAI scores, number of remaining teeth and occlusal force are lowest in this group, indicating the possibility that they eat alone because they eat too slowly, require different menus or because they have concerns about their oral appearance. The poor oral functions and nutritional/dietary status (low food variety and MNA-SF scores) may also be another manifestation of the lack of interest in their health shown by their families as well as by themselves.

In any case, the sentiments or perceptions that lead them to eat alone despite living with their families are likely to be negative in nature, and may be internally conceived by the older adults themselves, or externally imposed by families living together or the wider society. The functional declines which may cause as well as result from eating alone may also contribute to the depressive outcomes.

Stratification by age groups and multinomial regression analysis by different severities of depression revealed that fewer variables of social engagement were associated with depressive outcomes as the population ages or becomes more mentally frail. This suggests that social engagement is a more powerful predictor of mental health at earlier points along geriatric trajectories, and thus that effective social preventive measures require early interventions. Lower down the geriatric trajectories, social factors fall in their relative importance and the role of health and functional factors increase. This is suggested by the fact that the number of medications becomes a significant predictor for old-old, and the history of cerebrovascular diseases and MNA-SF scores become significant for severe depression.

Outside the domain of social engagement, the independent risk factors for depressive symptoms in both age groups included GOHAI and health literacy, supporting the findings of previous studies³⁶⁻³⁸. Uniquely for young-old, mobility, MNA-SF and income were associated. For old-old only, the number of medications remained a predictor of depressive symptoms.

This study elucidates that reducing the risk of depression requires much more than medical care and that preventive measures need to be introduced early on in the geriatric trajectories, before frailty sets in. The present study shows that social factors such as eating alone pose substantial risk for mental health. Comprehensive assessment that covers a wide range of health-related domains including physical health, oral functions, nutritional and dietary status as well as social relations will be necessary to identify those at risk effectively.

The limitations of our study are mainly four-fold. First, the cross-sectional nature of the study prevents it from making any conclusive comments about the causality between independent variables and the outcome. Second, data on household income were not available, and instead individual income was used. Given that the older adults in the present study grew up in a period when it was rare for women to work after marriage, household income would have been a better indicator of the economic environment for women. Third, depressive symptoms were measured using self-administered GDS questionnaire rather than diagnosis by physicians. Fourth, the participants inevitably comprised those who had greater degrees of interest in health and lower barriers to participation in the study. This may have skewed the nature of participants, to those who were more socially active and interested in health, missing out those who were most socially disengaged.

CONCLUSION

For community-dwelling Japanese older adults, depressive symptoms were significantly associated with social engagement, with greater associations in younger and less mentally frail populations. Eating alone was identified as a key risk factor for depressive symptoms, and those who live with their families yet eat their meals alone were at highest risk. Mental health management for older adults therefore requires comprehensive assessment of their social relations, taking into account their companionship during mealtimes. Social preventive measures need to involve early interventions in order to augment its effectiveness against mental frailty.

Given that depression can lay the ground for further frailty and various detrimental health outcomes, further study with a longitudinal design, with more detailed data collection on social predictors of depression, may play a pivotal role in identifying possible intervention opportunities to prevent not only mental but also physical frailties.

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