


Community gender norms, mental health, and suicide ideation and attempts among older Japanese adults: a cross-sectional study

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ABSTRACT

Objectives: Gender norms embedded in communities may restrict opportunities and harm the mental health of older adults, yet this phenomenon has received little attention. This study investigates the connection between older adults' perceptions of community gender norms and mental health and suicide-related outcomes.

Design: Cross-sectional.

Setting: This study analyzed data from the 2019 wave of the Japan Gerontological Evaluation Study.

Participants: In total, 25,937 participants aged 65 years or older in 61 municipalities.

Measurements: Perceptions of community gender norms were assessed by the respondents' perceptions of the gender-differentiating language used by those around them such as “You should/should not do XXX, because you are a man/woman.”

Results: The prevalence of all mental health outcomes was higher among both men and women who perceived community gender norms as restrictive. These associations remained in fully adjusted multivariable analyses. Prevalence ratios for men were 1.36 [95% confidence interval: 1.13, 1.65] for psychological resistance to obtaining help, 1.85 [1.54, 2.23] for depressive symptoms, 1.99 [1.34, 2.96] for suicidal ideation, and 2.15 [1.21, 3.80] for suicide attempts. The corresponding figures for women were 1.39 [1.17, 1.65], 1.80 [1.55, 2.10], 2.13 [1.65, 2.74], 2.62 [1.78, 3.87]. There was a more pronounced association between perceiving community gender norms as restrictive and depressive symptoms and suicidal behaviors among those with nonconventional gender role attitudes compared to those with conventional attitudes.

Conclusions: Considering the effects of community gender norms, in addition to individual gender role attitudes, may be critical in designing effective public health interventions for improving mental health.

Key words: Community, gender norms, gender role attitudes, mental health, depression, suicide, older adult, Japan

Introduction

Suicide is an important public health issue worldwide, with the World Health Organization estimating that 703,000 people die each year as a result of suicide (World Health Organization, 2021). Although the mechanisms associated with suicide

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are complex, both individual-level risk factors including mental disorders such as depression and a previous suicide attempt, and population-level risk factors including various social pressures that can serve as barriers to seeking help have been linked to suicidal behavior (Kondo and Oh, 2010; World Health Organization, 2014). In recent years, gender norms have also gained increasing attention as an important factor related to suicide. In particular, hegemonic masculine norms that idealize strong and resilient behavior, emotional control, and self-reliance have been recognized as playing a detrimental role in male suicide (Fleming and Agnew-Brune, 2015; Payne *et al.*, 2008; Pitts-Tucker, 2012). Indeed, there is abundant evidence from clinical psychology research, which suggests that conformity to conventional masculine norms has a negative effect on mental health, help-seeking attitudes and behaviors, and symptom management (Wong *et al.*, 2017; Seidler *et al.*, 2016).

In relation to suicide, prior research has focused primarily on conformity to masculine norms. However, there has been less attention placed on the impact of perceptions of dichotomous gender norms in the community (e.g. “men should XXX” or “women should not XXX”) on the mental health of men and women, even though a recent study of young adolescents living in Bangladesh and Ethiopia found that restrictive community gender norms were associated with a variety of health indicators, including mental health (Baird *et al.*, 2019). Cislaghi and Heise defined gender norms as the “social norms defining acceptable and appropriate actions for women and men in a given group or society” (Cislaghi and Heise, 2020). Gender norms embedded in families, communities, and institutions can restrict opportunities and social freedoms for men, women, and gender minorities and negatively impact various health outcomes (Heise *et al.*, 2019). Given the nature of gender norms, it is possible that community gender norms might also affect mental health in various ways beyond simple adherence to individual norms. For example, if an individual perceives that the community has restrictive gender norms that are rigid about gender roles and do not allow for diversity, he/she may believe that any behavior that deviates from these gender norms is unacceptable to the community members, regardless of his/her own gender role attitudes (Fig. 1). Especially if a person does not have conventional gender role attitudes, community gender norms may inconveniently affect various daily life decisions and behaviors. Known as “minority stress” in studies of gender minorities (Meyer, 2003), fear of exclusion from the community may prevent an individual from expressing authentic feelings or engaging in necessary

help-seeking behavior, thus potentially leading to worse mental health outcomes (Hoy-Ellis, 2021).

In addition, despite increasing recognition that gender norms might be important for suicidal behavior, until now, research on the effects of gender norms on mental health has been limited to younger age groups, and there is little evidence on this association among older adults (Herreen *et al.*, 2021; Hunt *et al.*, 2006). This may be an important omission given that an earlier population-based study in the United Kingdom, which focused on generational differences, found that traditional gender role attitudes were more strongly associated with suicidal ideation among individuals in their 40s and 60s than among those in their 20s (Hunt *et al.*, 2006).

Therefore, in the current study, we aimed to clarify whether perceptions of community gender norms are associated with psychological resistance to obtaining help, depressive symptoms, and suicidal behavior among community-dwelling older adults. We also examined whether the association between an individual’s perception of community gender norms and their mental health differs depending on their conformity to gender norms (i.e. gender role attitudes).

Methods

Data

This study analyzed cross-sectional data from the 2019 wave of the Japan Gerontological Evaluation Study (JAGES), a large-scale ongoing population-based cohort study undertaken in cooperation with local regional authorities (municipalities). Participants were randomly selected in the larger municipalities, while all eligible participants were included in the smaller municipalities. In the 2019 wave, during November 2019 to January 2020 a self-report questionnaire was mailed to residents aged 65 years or older who were not certified as needing public long-term care. In total, 376,649 questionnaires were sent to potential participants in 64 municipalities and 260,310 were returned (response rate = 69.1%). Of these, 62,859 were excluded for the following reasons: respondents were not the subject of this study, e.g. being a person certified as needing long-term care ($n = 12,410$); research consent was not clearly confirmed ($n = 42,543$); there was no research use agreement with the municipality ($n = 7789$); data were missing for age ($n = 69$) or gender ($n = 48$) and could not be obtained from registered data. Details of the survey are available on the JAGES website (<https://www.jages.net/>).

The 2019 wave questionnaire had two parts: a section that all respondents were expected to answer, and eight additional modules randomly assigned to

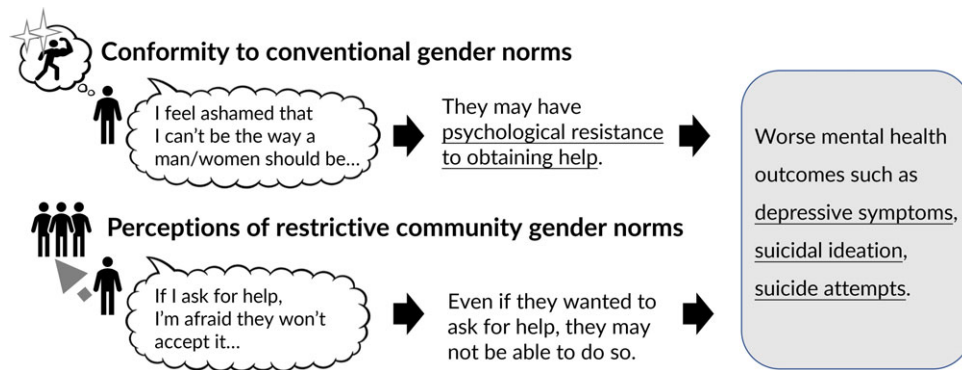


Figure 1. Potential mechanisms linking conformity to gender norms and perceptions of community gender norms to mental health. The underlined text indicates the outcomes used in this study.

participants; i.e. each module was assigned to 12.5% of the respondents. We used data from one of these modules, which included items on gender norms. That module was distributed to 45,951 potential participants in 60 municipalities with 31,493 questionnaires being returned (response rate = 68.5%); while in one additional municipality, the questionnaire was distributed and collected, but the response rate could not be determined. After the above-mentioned cleaning process, data were available for 25,937 residents in 61 municipalities.

Measurements

MENTAL HEALTH (DEPENDENT VARIABLE)

Four outcomes were used to examine mental health: (i) psychological resistance to obtaining help, (ii) depressive symptoms, (iii) suicidal ideation, and (iv) suicide attempt. To evaluate depressive symptoms, we used the Japanese short version of the Geriatric Depression Scale (GDS-15), which consists of 15 items with “Yes” (scored 1) and “No” (0) answer options, resulting in a total score ranging from 0–15, where higher scores indicate greater depressive symptoms. We applied a cutoff score of 6 or above, which was used to indicate moderate depressive symptoms in an earlier validation study on older Japanese adults (Schreiner *et al.*, 2003). Cronbach’s alpha value for the scale was 0.83. To evaluate suicidal ideation and suicide attempts, we used items that were drawn from the SUPRE-MISS community survey undertaken by the World Health Organization (Bertolote *et al.*, 2005). For suicidal ideation, respondents were asked “Have you ever seriously thought about committing suicide in your life?” and those who answered “Yes (within the past year)” or “Yes (more than a year ago)” were categorized as having suicidal ideation; other potential answers included “No” and “I do not want to answer”. For suicide attempts, we asked, “Have you ever attempted suicide?” and those who circled “Yes” were categorized as having a lifetime history of suicide attempts;

other potential response options were “No” and “I do not want to answer”.

We used an original item to assess psychological resistance to obtaining help. Respondents were asked, “Do you think it is embarrassing to talk to someone or ask for help when you have a problem or feel stressed?” From the four response options provided, those who answered “I think so” or “I somewhat think so” were classified as having psychological resistance to obtaining help. Hereafter in the text when we refer to the prevalence of psychological resistance to obtaining help and depressive symptoms, it is in relation to their point prevalence whereas for suicide ideation and attempts it refers to the lifetime prevalence of these phenomena.

GENDER NORMS (INDEPENDENT VARIABLE)

Gender norms were measured through two dimensions: (i) respondents’ perceptions of community gender norms and (ii) respondents’ gender role attitudes. Both were evaluated at the individual level. To address gender norms as a social construct, we asked the same questions to all participants (Miani *et al.*, 2021).

Respondents’ perceptions of the community gender norms were quantified by their answers to a question about the gender-differentiating language used by people in their immediate environment: “We would like to ask you about the people around you. Do you think people in your area often use language that creates distinctions between men and women, like ‘You should/should not do XXX, because you are a man/woman?’” Those who answered “I think so” or “I somewhat think so” were classified as perceiving the community gender norms as restrictive. Those who answered “I somewhat do not think so” or “I do not think so” were classified as perceiving the community gender norms as not restrictive.

Respondents’ gender role attitudes were assessed through their responses to the following three statements: (1) “If mothers have jobs, it will have a

negative impact on their children before they enter elementary school." (2) *"It is primarily a man's role to work outside the home."* (3) *"It is primarily a woman's role to raise children and look after the home."* For each question, responses of *"I agree"* or *"I somewhat agree"* were scored as 1, and *"I somewhat disagree"* or *"I disagree"* were scored as 0. Using factor analysis, we then divided the binary categories for these three questions into two groups: those with conventional gender role attitudes and those without. Cronbach's alpha for the three items was 0.71.

COVARIATES

We included each respondent's age (65–69, 70–74, 75–79, and 80 and above) and marital status (married/cohabiting, being widowed, divorced, single, or other) as potential confounding factors in the relationship between gender norms and mental health outcomes (Yan *et al.*, 2011). Models were also adjusted for the fixed effect of the residential municipality. In addition, we also adjusted the analysis for education (>9 years or ≤ 9 years) and equalized household income (high, middle, and low), as gender norms interact with various social determinants of health to shape social position (Heise *et al.*, 2019).

Statistical analysis

Individuals were excluded if they had missing data on gender norm items ($n = 1995$) or residential municipality ($n = 9$). In addition, individuals who were missing data for each mental health outcome were also excluded. Specifically, $n = 533$ for psychological resistance to obtaining help, $n = 3387$ for depressive symptoms, $n = 107$ for suicidal ideation, and $n = 112$ for suicide attempts. In other words, the number of persons excluded from each analysis was 2537 (9.8% of the original total) for psychological resistance to obtaining help, 5391 (20.8%) for depressive symptoms, 2111 (8.1%) for suicidal ideation, 2116 (8.2%) for suicide attempts. We included participants with missing data (for marital status, education, and income) in the model by creating "missing" variable categories and using them in the analysis as dummy variables.

A Poisson regression model with robust standard errors was used to calculate prevalence ratios (PRs) with 95% confidence intervals (CIs) for the mental health outcomes. The PRs are (1) for those who perceived the community gender norms as restrictive compared to those without such perceptions and (2) for those with conventional gender role attitudes compared to those without such attitudes. By checking the goodness-of-fit statistics, we were able to confirm that it was appropriate to use Poisson regression for the analysis. All analyses were

stratified by sex as gender norms can have different effects on men and women (Weber *et al.*, 2019). We first conducted an age-adjusted univariable analysis (Model 1), followed by a multivariable analysis that incorporated the following variables: respondents' perception of the community gender norms, respondents' gender role attitudes, age, education, income, marital status, and residential municipality (Model 2). To assess whether the effect of perceptions of community gender norms differed by respondents' gender role attitudes, we included an interaction term between the two dimensions of gender norms in the analysis (Model 3). As a sensitivity analysis for the interaction analysis, we also stratified the model by the gender norms, which incorporated the variables used in Model 2. We performed all analyses for each outcome and compared the results across outcomes. Statistical analyses were conducted using STATA/MP 17.0 (StataCorp, LLC, College Station, Texas, USA). The level of statistical significance was $p < 0.05$.

Results

Data were analyzed from men and women living in 61 municipalities in Japan. The final sample size was: 11,202 men and 12,198 women for psychological resistance to obtaining help, 10,242 men and 10,304 women for depressive symptoms, 11,411 men and 12,415 women for suicidal ideation, and 11,406 men and 12,415 women for suicide attempts. The prevalence of psychological resistance to obtaining help was higher in men than in women (26.3% for men and 17.8% for women). Descriptive statistics of the study participants by sex showed that the prevalence of all mental health outcomes was higher among both men and women who perceived community gender norms as restrictive compared to those without such perceptions (Tables 1 and 2). Similarly, the prevalence of all outcomes was higher among men and women with conventional gender role attitudes compared to those without such attitudes (Tables 1 and 2).

Community gender norms tended to be perceived as more restrictive by women than by men but were generally similar for men and women in relation to age, income, education, and marital status (Supplementary Table 1). Younger adults, those who were married/cohabiting, and single women perceived community gender norms as being more restrictive. Perceptions did not vary by education or income. On the other hand, men tended to have more conventional gender role attitudes than women (Supplementary Table 2). Attitudes were more conventional among both men and women who were older, were married/cohabiting

Table 1. Descriptive statistics of the study participants with the prevalence of mental health outcomes: men

	PSYCHOLOGICAL RESISTANCE TO OBTAINING HELP		DEPRESSIVE SYMPTOMS		SUICIDAL IDEATION		SUICIDE ATTEMPTS	
	NUMBER OF PARTICIPANTS (PREVALENCE OF OUTCOMES ^a (%))							
Sample size (overall prevalence)	11,202	(26.3)	10,242	(18.6)	11,411	(4.4)	11,406	(2.2)
Age								
65–69	2680	(23.5)	2548	(17.0)	2714	(6.1)	2714	(2.7)
70–74	3353	(25.6)	3131	(17.8)	3405	(4.6)	3402	(2.5)
75–79	2694	(26.6)	2422	(18.0)	2751	(3.5)	2752	(1.6)
≥ 80	2475	(30.1)	2141	(22.2)	2541	(3.3)	2538	(2.1)
Education								
>9 years	8408	(24.9)	7801	(16.5)	8545	(4.2)	8543	(2.0)
≤ 9 years	2564	(30.3)	2242	(25.7)	2628	(4.9)	2626	(2.6)
Missing	230	(32.2)	199	(18.1)	238	(7.6)	237	(4.2)
Equivalised household income tertile (10,000 yen/year)								
High (247.5–1300)	5051	(24.3)	4753	(12.4)	5117	(4.3)	5113	(2.0)
Middle (159.1–246.0)	3087	(26.6)	2820	(19.8)	3140	(4.0)	3143	(1.8)
Low (9.4–158.8)	2238	(30.3)	1974	(31.4)	2305	(5.5)	2306	(3.6)
Missing	826	(27.0)	695	(19.6)	849	(3.7)	844	(1.8)
Marital status								
Married/cohabiting	9418	(26.2)	8636	(16.2)	9576	(3.8)	9573	(1.8)
Widowed	789	(25.6)	701	(28.0)	816	(6.3)	815	(3.3)
Divorced	391	(23.5)	357	(37.5)	404	(11.1)	403	(6.9)
Single	392	(27.8)	362	(34.5)	393	(7.9)	395	(4.6)
Other	83	(38.6)	73	(35.6)	85	(4.7)	85	(2.4)
Missing	129	(31.8)	113	(20.4)	137	(6.6)	135	(3.0)
Respondents' perceptions of community gender norms								
Not perceiving the community gender norms as restrictive	9940	(25.0)	9091	(17.3)	10,116	(4.2)	10,112	(2.1)
Perceiving the community gender norms as restrictive	1262	(36.5)	1151	(28.8)	1295	(5.9)	1294	(3.2)
Respondents' gender role attitudes								
Without conventional gender role attitudes	5048	(18.5)	4596	(15.4)	5141	(3.9)	5142	(2.0)
With conventional gender role attitudes	6154	(32.7)	5646	(21.1)	6270	(4.9)	6264	(2.4)

^a The point prevalence is shown for psychological resistance to obtaining help and depressive symptoms. The lifetime prevalence is shown for suicide ideation and attempts.

or were widowed, and with a shorter length of education. No differences were observed for income.

Age-adjusted univariable models showed that respondents' perceptions of restrictive community gender norms were detrimentally associated with all mental health outcomes in both men and women (Model 1, Supplementary Tables 3–10). Similar associations were observed in the multivariable analyses, with slight changes in the PRs (Model 2, Supplementary Tables 3–10). The final model showed that men who perceived the community gender norms as restrictive had a 1.4–2.2 times higher prevalence of mental health outcomes than those without such perceptions. Specifically, for psychological resistance to obtaining help: PR: 1.36

[95% CI: 1.13, 1.65]; for depressive symptoms: 1.85 [1.54, 2.23]; for suicidal ideation: 1.99 [1.34, 2.96]; for suicide attempts: 2.15 [1.22, 3.80] (Fig. 2 and Model 3, Supplementary Tables 3–6). Women who perceived the community gender norms as restrictive had a 1.4–2.6 times higher prevalence for the mental health outcomes than those without such perceptions. For psychological resistance to obtaining help: PR: 1.39 [95% CI: 1.17, 1.65]; for having depressive symptoms: 1.80 [1.55, 2.10]; for suicidal ideation: 2.13 [1.65, 2.74]; for suicide attempts: 2.62 [1.78, 3.87] (Fig. 2 and Model 3, Supplementary Tables 7–10). Respondents' restrictive perceptions of community gender norms were more strongly associated with suicidal behaviors than psychological

Table 2. Descriptive statistics of the study participants with the prevalence of mental health outcomes: women

	PSYCHOLOGICAL RESISTANCE TO OBTAINING HELP		DEPRESSIVE SYMPTOMS		SUICIDAL IDEATION		SUICIDE ATTEMPTS	
	NUMBER OF PARTICIPANTS (PREVALENCE OF OUTCOMES ^a (%))							
Sample size (overall prevalence)	12,198	(17.8)	10,304	(17.3)	12,415	(5.1)	12,415	(2.2)
Age								
65-69	2904	(13.6)	2568	(16.0)	2936	(7.2)	2939	(3.1)
70-74	3680	(16.5)	3175	(16.8)	3726	(5.0)	3732	(2.3)
75-79	3043	(19.6)	2535	(16.8)	3113	(4.3)	3110	(1.7)
≥ 80	2571	(22.5)	2026	(20.5)	2640	(3.9)	2634	(1.8)
Education								
>9 years	8731	(16.1)	7517	(16.0)	8871	(5.1)	8870	(2.0)
≤ 9 years	3168	(22.8)	2576	(20.8)	3228	(5.2)	3227	(2.9)
Missing	299	(16.7)	211	(23.7)	316	(6.3)	318	(2.5)
Equivalised household income tertile (10,000 yen/year)								
High (247.5–1300)	4453	(15.3)	3948	(12.1)	4509	(4.6)	4515	(1.8)
Middle (159.1–246.0)	2869	(16.6)	2473	(18.3)	2900	(5.1)	2894	(2.2)
Low (9.4–158.8)	3028	(22.4)	2516	(24.3)	3097	(6.3)	3095	(3.1)
Missing	1848	(18.3)	1367	(17.8)	1909	(4.5)	1911	(1.8)
Marital status								
Married/cohabiting	7578	(17.7)	6508	(15.4)	7704	(4.5)	7703	(1.9)
Widowed	3401	(18.0)	2805	(19.5)	3477	(4.6)	3472	(2.1)
Divorced	649	(18.6)	560	(24.8)	656	(12.2)	654	(5.5)
Single	347	(12.1)	284	(21.1)	349	(9.2)	354	(3.4)
Other	65	(20.0)	48	(31.3)	66	(6.1)	67	(6.0)
Missing	158	(29.1)	99	(21.2)	163	(8.6)	165	(5.5)
Respondents' perceptions of community gender norms								
Not perceiving the community gender norms as restrictive	10,575	(16.7)	8933	(15.9)	10,775	(4.4)	10,773	(1.9)
Perceiving the community gender norms as restrictive	1623	(24.9)	1371	(26.6)	1640	(9.7)	1642	(4.4)
Respondents' gender role attitudes								
Without conventional gender role attitudes	6540	(13.7)	5534	(14.7)	6647	(4.8)	6642	(2.0)
With conventional gender role attitudes	5658	(22.5)	4770	(20.4)	5768	(5.4)	5773	(2.4)

^aThe point prevalence is shown for psychological resistance to obtaining help and depressive symptoms. The lifetime prevalence is shown for suicide ideation and attempts.

resistance to obtaining help, whereas respondents' conventional gender role attitudes were more clearly associated with psychological resistance to obtaining help (Fig. 2).

Interaction effects were observed between respondents' perceptions of community gender norms and respondents' gender role attitudes (Fig. 3). For those men without conventional gender role attitudes, perceiving restrictive community gender norms was more markedly associated with depressive symptoms and suicidal behaviors compared to those with such attitudes, and this effect was statistically significant for suicidal ideation (the P interaction for depressive symptoms: 0.057; for suicidal ideation: 0.046; for suicide attempts: 0.255). Among women, a similar

effect modification was observed for depressive symptoms and suicide attempts, although the results were not statistically significant (the P interaction for depressive symptoms: 0.078; for suicide attempts: 0.321). Our sensitivity analyses showed that the results of the regression models when stratified by gender norms were similar to those obtained in the original models (Supplementary Tables 11 and 12).

Discussion

This study examined the association between perceptions of community gender norms and mental health outcomes, including psychological resistance to obtaining help, depressive symptoms, a

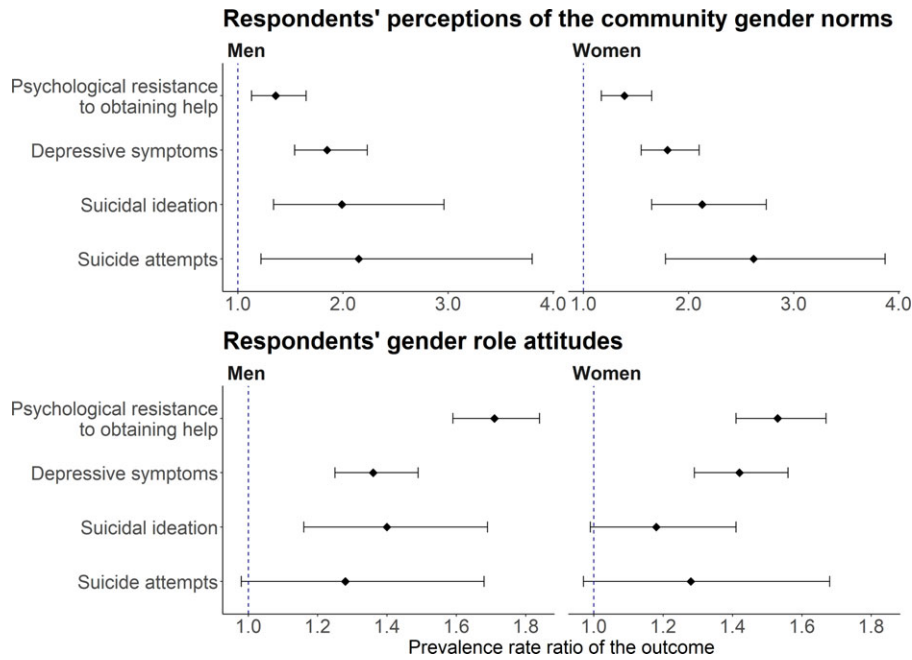


Figure 2. Prevalence ratios for the mental health outcomes with 95% confidence intervals (error bars) by sex: results of Poisson regression analyses that were adjusted for age, education, income, marital status, the fixed effect of each municipality, respondents' gender role attitudes or respondents' perceptions of the community gender norms, and an interaction term between the two dimensions of gender norms. The main effects of each gender norm on the outcomes are shown. The prevalence ratios are (1) for those who perceived the community gender norms as restrictive compared to those without such perceptions (shown in the upper figure) and (2) for those with conventional gender role attitudes compared to those without such attitudes (shown in the lower figure). The point prevalence is shown for psychological resistance to obtaining help and depressive symptoms. The lifetime prevalence is shown for suicidal ideation and attempts.

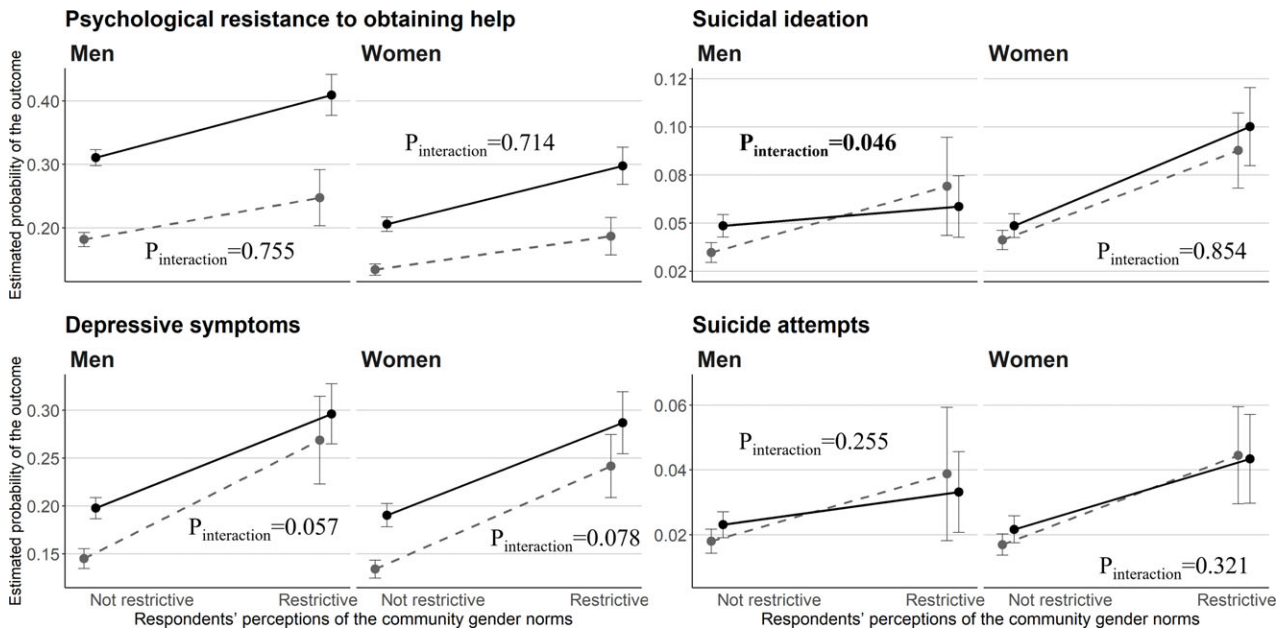


Figure 3. Estimated probability of psychological resistance to obtaining help, depressive symptoms, suicidal ideation, and suicide attempts with 95% confidence intervals (error bars) by sex: the interaction between respondents' perceptions of community gender norms and respondents' gender role attitudes. The estimates were derived from Poisson regression analyses adjusted for age, education, income, marital status, and the fixed effect of each municipality. The dotted line indicates those without conventional gender role attitudes and the solid line indicates those with such attitudes.

history of suicidal ideation, and suicide attempts among older men and women in Japan. For both sexes, the prevalence of all outcomes was higher in the group who perceived the community gender norms as restrictive (i.e., people around them often used gender-differentiating language) even after adjusting for individuals' gender role attitudes and their sociodemographic characteristics. Furthermore, for those without conventional gender role attitudes, the perception of restrictive community gender norms was associated more with depressive symptoms and suicidal ideation when compared to those with such attitudes. The results of our analyses suggest that not only conformity to conventional masculine norms as previously reported (Ezeugwu and Ojedokun, 2020; Wong *et al.*, 2017; Seidler *et al.*, 2016) but also perceptions of dichotomous gender norms in a community can have a negative effect on the mental health of both men and women.

The findings of this study are novel in suggesting that community norms that are resistant to nonconventional gender conceptions might have a harmful effect on the mental health of residents through mechanisms that are separate from conformity to masculine norms. Although gender norms interact with various power distributions in society to shape social positions and health inequalities (Heise *et al.*, 2019), the results of our analysis changed little after adjusting for education and income. If an individual perceives himself/herself as belonging to a gender-dichotomous community, it can be speculated that trying to adapt to it might limit freedom and opportunities in various aspects of social life (e.g. hobby activities and friendships) and in this way also possibly impact negatively on well-being. Gender-differentiating language, as seen in the items used in this study to measure perceptions of community gender norms, does not necessarily imply offensive intentions on the part of the speaker, nor does it necessarily refer to the respondents themselves. However, as Diamond and Alley (2022) emphasize, even if no active harm is caused by others using such language, the objective experience of gendered norms in the community can lead to a lack of social trust (reliable social connection, inclusion, and protection). The chronic threat-vigilance arising from insufficient social trust may lead to negative long-term health effects among stigmatized individuals (Diamond and Alley, 2022); thus, this may be especially applicable for those who deviate from community gender norms. Although there is abundant research focused on how social relationships can affect health (Berkman, *et al.*, 2014), as yet, there has been comparatively little research on the effects of community gender norms on health. This is an important omission and urgent target for future research.

The potential effect of community gender norms on mental health was more evident among those individuals with less conventional gender role attitudes, compared to those with more conventional attitudes. The stigmatization hypothesis, which argues that individuals who deviate from traditional social norms are sanctioned by those around them (e.g. social exclusion), may provide a possible explanation for this phenomenon (Kalmijn and Uunk, 2007). According to national statistics, over the past few decades, the percentage of those who oppose conventional gender role attitudes has increased from 20% to around half of the Japanese general population (Gender Equality Bureau Cabinet Office, 2017). Given that Japan is the country with the largest percentage of its population aged 65 years and above (Scommegna, 2019), it is feasible that the gender norms of some older adults may have become more nontraditional over their life course. Therefore, some older adults may have an attitude that deviates markedly from the norms in their immediate surroundings and have to keep their own views hidden, or limit their own behaviors, in their interactions with friends and neighbors. Indeed, research among groups that can also experience conflict with surrounding gender norms (such as individuals who belong to the LGBTQ community) has also highlighted how this can result in worse mental health (Hoy-Ellis, 2021; Wienke, *et al.*, 2021).

It is worth emphasizing that this study measured individuals' "perceptions" of community gender norms rather than the actual norms of the community. Importantly, this perception of others' attitudes can be discrepant with actual norms. It is possible that people privately reject gender norms yet publicly conform to such norms to avoid negative labeling as a norm violator. However, an observer may misunderstand this normative behavior as being caused by internal attitudes (Jones and Harris, 1967). As this observer now believes that others agree with the norm, he or she feels strong social pressure to behave in accordance with these norms even if he or she privately rejects them. As a result, norms can be sustained even if no one privately agrees with them, based on a mutual misunderstanding. This cycling process is called pluralistic ignorance (Allport, 1924; Prentice and Miller, 1993). The finding that the perception of community gender norms was associated with mental health independent of gender role attitudes suggests that the effect of community gender norms on mental health may be (at least in part) caused by this process.

Our study has notable strengths. We used community-based data that was able to combine both gender-related perceptions and attitudes and mental health outcomes. Information was obtained from over twenty thousand older adults living in

municipalities of various sizes throughout Japan, and the study has high internal validity because of the sampling strategy used. The mechanisms we discuss in this paper linking gender norms and mental health outcomes might also be applicable in other populations. Our focus on the health impact of community gender norms may inspire further research since there is currently little evidence on this phenomenon (Matud *et al.*, 2020). Gender affects individuals' lives across all aspects of the life course (e.g. employment and subsequent networks (Cohn-Schwartz and Naegele, 2023)), and this study advances the understanding of its impact on mental health. This study also provides new evidence in terms of what factors, recently highlighted in the context of ageism (Ayalon and Cohn-Schwartz, 2022), can alter the health effects of discrimination.

Limitations of this study include the use of unvalidated items to measure gender norms and psychological resistance to obtaining help. We did not have items that enquired about the perceptions of unspoken community gender norms even though gender norms are generally understood as comprising both the spoken and unspoken rules of a society (Heise *et al.*, 2019; Weber *et al.*, 2019). The health effects of nonverbal norms should be assessed in future research. Furthermore, the data were self-reported, which could have resulted in social desirability bias being an issue due to the stigma associated with mental illness and also possibly because masculine norms idealize strength. In particular, this might have occurred in the reporting of the mental health outcomes, e.g. the word "seriously" in the suicidal ideation item might have discouraged respondents from reporting and could have led to this phenomenon being underestimated. In addition, the cross-sectional design of this study makes it difficult to determine the exact nature of the observed relationships. Specifically, it is possible that the findings may be biased by confounding such as general norm compliance, not just gender norms. In addition, we were unable to consider the potential effects of the participants' sexual orientation and gender identity because of the use of a dichotomous male/female sex variable that was based on governmental registry information (Kiely, *et al.*, 2019). It should also be noted that as our dataset was not representative of the entire Japanese population, the generalizability of the findings may be limited. Lastly, additional analyses showed that those who were excluded from the analysis were older, had a lower income and educational level, or did not provide valid responses for these items (data not shown). Given this, we cannot discount the possibility that this might have affected the results we obtained.

Conclusions

In both men and women, perceptions of restrictive gender norms in the community were associated with a higher prevalence of depressive symptoms and suicidal behavior, as well as psychological resistance to obtaining help. Our findings suggest that not only conformity to sex-specific norms but also community gender norms, as manifest in gender-differentiating language such as "You should/should not do XXX, because you are a man/woman" might also affect mental health. More research is now warranted on the potentially detrimental effects of community gender norms and their dynamics on mental health in order to develop effective public health responses to these phenomena. For example, it might be possible to address the potential lack of awareness of the diversity of views in the community by, e.g. holding workshops that enable residents to discuss issues such as gender norms with one another. In addition, the use of other tools, such as online mental health consultation systems, may help counteract the potentially detrimental impact of community norms by allowing individuals to discuss sensitive issues in private without having to worry about the opinions/reactions of other members of the community. As for approaches that deal with the fundamental causes, collaborative action involving citizens and public and private organizations to promote gender equality would be warranted.

Conflict of interest

None.

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Description of authors' roles

MK conceived the study idea and designed the study. NK helped to conceptualize and design the study. MO helped conduct the investigation. KK, TO, and NK played primary roles in the data collection and project administration. MK analyzed the data. KT, AS, and YK helped interpret the data. MK drafted the manuscript. AS, KT, YK, MO, TO, KK, and NK contributed to the writing of the manuscript. All authors read and approved the final version of the manuscript.

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Supplementary material

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Data sharing

The datasets used in this study are available from the corresponding author on reasonable request. All enquiries should be addressed to the data management committee via e-mail: dataadmin.ml@jages.net. All JAGES datasets have ethical or legal restrictions for public deposition due to the inclusion of sensitive information from the human participants. Following the regulations of local governments which cooperated in the survey, the JAGES data management committee has imposed restrictions upon the data.

Ethical statement

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. The JAGES was approved by the Ethics Committee at the National Center for Geriatrics and Gerontology (1274-2), Chiba University Faculty of Medicine (3442), and the Japan Agency for the Gerontological Evaluation Study (2019-01). All participants were asked for their written consent when they returned the questionnaire.

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