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Relationship between individual characteristics, neighborhood contexts, and help-seeking intentions for mental illness

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3 Relationship between individual characteristics, neighborhood contexts, and help-seeking
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5 intentions for mental illness
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3 **1 ABSTRACT**

4 Objective: Encouraging help-seeking for mental illness is essential for prevention of suicide.

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7 This study examined the relationship between individual characteristics, neighborhood
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10 contexts, and help-seeking intentions for mental illness for the purpose of elucidating the role
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12 of neighborhood in the help-seeking process.

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14 Design, setting, and participants: A cross-sectional web-based survey was conducted in June
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16
17 2014 among Japanese adults aged 20-59 years. Eligible respondents who did not have a
18
19 serious health condition were included in this study (n=3,308).

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21 Main outcome measures: Participants were asked how likely they would seek help from
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23 someone close to them (informal help) and medical professionals (formal help), respectively
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25 if they were suffering serious mental illness. Path analysis with structural equation modeling
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27 was performed to represent plausible connections between individual characteristics,
28
29 neighborhood contexts, and the informal and formal help-seeking intentions.

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31 Results: The acceptable fitting model indicated that those who had a tendency to consult
32
33 about everyday affairs were significantly more likely to express the informal help-seeking
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35 intention, which was directly associated with the formal help-seeking intention. Those living
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37 in a communicative neighborhood where neighbors say hello whenever they pass each other
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39 were significantly more likely to express both the informal and formal help-seeking intentions.

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41 Those living in a supportive neighborhood where neighbors work together to solve
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43 neighborhood problems were significantly more likely to express the informal help-seeking
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45 intention. Adequate health literacy was directly associated with both the informal and formal
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47 help-seeking intentions, along with having an indirect effect on the formal help-seeking
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49 intention through developed positive perception of professional help.

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51 Conclusion: The results of this study bear out the hypothesis that neighborhood context
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54 contributes to help-seeking intentions for mental illness. Living in a neighborhood with a
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26 communicative atmosphere and having adequate health literacy were acknowledged as
27 possible facilitating factors for both informal and formal help-seeking for mental illness.
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29 Strengths and limitations of this study

- 30 • Previous studies have revealed the individual factors that may inhibit or facilitate
31 help-seeking for mental illness, but less is known about the neighborhood factors. This
32 study represents the first attempt to elucidate multifactorial mechanisms for help-seeking
33 using structural equation modeling. Our final structural equation model illustrated the
34 pathways linking individual and neighborhood factors to informal and formal
35 help-seeking intentions and bore out the hypothesis that neighborhood context contributes
36 to help-seeking intentions for mental illness.
- 37 • The study design is cross-sectional and self-reported so we cannot reject the possibility of
38 reverse causation or common method bias. The study subjects may not be representative
39 of the general population. Further studies are needed to confirm the findings and refine the
40 model. Moreover, the relationship between help-seeking intentions and actual
41 help-seeking should be investigated in future.

43 INTRODUCTION

44 The World Health Organization published its first report on suicide prevention in 2014.[1]
45 According to the report, more than 800,000 people die by suicide every year. While the
46 reasons that people commit suicide vary widely, almost all suicide victims have any signs or
47 symptoms of mental illness at the time of their death. Unfortunately, people do not always
48 seek help when they suffer mental illness or have suicidal thoughts.[2,3] Encouraging
49 help-seeking for mental illness is essential for prevention of suicide.

50 A social ecological perspective acknowledges that health behavior is influenced by the
51 social environment.[4] While the proximal cause of health behavior lies within the individual
52 rather than in the social environment, changes in the social environment will produce changes
53 in individuals. Similarly to other health behaviors, help-seeking for mental illness is
54 considered to be determined through the interaction between individuals and their
55 environment.[2,3,5] Traditionally, public health strategies for encouraging help-seeking have
56 focused on modifying individual factors such as knowledge and skills. Once the factors in the
57 social environment that can affect help-seeking are identified, the focus of strategy will
58 broaden to include the environmental factors.

59 The social environment is a broad multidimensional concept that includes the groups to
60 which we belong, the neighborhoods in which we live, and the policies which we create to
61 order our lives.[6] Neighborhood is the next smallest social unit after family, in which
62 face-to-face interactions occur among members. Previous studies have revealed that
63 neighborhood context, or more specifically neighborhood social capital is associated with
64 health behaviors such as smoking, drinking, diet, and physical activity.[7] The impact of
65 neighborhood context on health behavior may be worth considering when developing public
66 health strategies for encouraging help-seeking. Unfortunately, to our knowledge, there have
67 been no studies that examined to what extent neighborhood context contributes to

68 help-seeking and what factors are responsible for the neighborhood effect. Little is known
69 about the role of neighborhood in the help-seeking process.

70 The aim of this study was to determine the relationship between individual characteristics,
71 neighborhood contexts, and help-seeking intentions for mental illness. Compared to previous
72 studies, this study examined a wider variety of factors that may affect help-seeking decision
73 making. Path analysis with structural equation modeling was performed to represent plausible
74 multifactorial mechanisms for help-seeking and elucidate the role of neighborhood in the
75 help-seeking process. We believe the findings of this study will provide a new direction for
76 public health strategies for encouraging help-seeking or suicide prevention policies.

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78 **METHODS**

79 **Subjects**

80 A cross-sectional web-based survey was conducted in June 2014 among Japanese adults
81 aged 20-59 years who lived in four prefectures of Chiba, Niigata, Nagano, and Fukuoka in
82 Japan. Medical professionals and students were excluded from recruitment because their
83 attitudes to help-seeking seem different in kind from ordinary people's ones. The study
84 protocol was approved by the ethics committee of the Jikei University School of Medicine
85 and has been conducted in accordance with the Ethical Guidelines for Epidemiological
86 Studies by the Japanese Government.

87 An online research company (INTAGE, INC., Tokyo, Japan) contracted to create web
88 questionnaire forms and collect anonymous responses (n=3200). The company has a
89 nationwide research panel of 1.2 million registrants. At the time of the survey, the registrants
90 aged 20-59 years who were not medical professionals or students and lived in the four
91 prefectures totaled 46,258 (20,071 males and 26,187 females). Recruitment e-mails were sent
92 to 8,721 eligible registrants who were randomly selected from each age/gender/prefecture

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3 93 stratum. Applicants for participation in the survey were accepted in the order of receipt until
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5 94 the number of participants reached the quotas (100 people for each age/gender/prefecture
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7 95 stratum). All participants voluntarily agreed to complete the survey. A total of 3,365 responses
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10 96 were obtained over 8 days of recruitment. Of these, 6 subjects reported having serious health
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12 97 conditions and 51 subjects provided incomplete or inconsistent answers to questions. The
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14 98 remaining 3,308 subjects were finally included in this study. Table 1 shows the characteristics
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16 99 of the study subjects.
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21 **Measures**

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23 102 The questionnaire asked about help-seeking intentions for mental illness, health status,
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25 103 exposure to mental illness, health literacy, belief about professional help, social network,
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27 104 attitudes to everyday affairs, and neighborhood context. The components of the questionnaire
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29 105 relevant to this study are detailed below.
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33 34 107 *Help-seeking intentions for mental illness*

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36 108 Participants were asked to rate how likely they would seek help from 1) someone close to
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38 109 them such as family, relatives, friends, and colleagues (informal sources) and 2) medical
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40 110 professionals (formal sources), respectively if they were suffering serious mental illness.
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43 111 Those who gave affirmative responses on a four-point scale (certainly yes/probably
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45 112 yes/probably no/certainly no) were counted as having informal and formal help-seeking
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47 113 intentions, respectively. Those who gave negative responses to both questions were counted
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49 114 as having no help-seeking intentions.
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52 53 54 116 *Health status*

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56 117 Participants were asked to report whether they had any chronic disease undergoing
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3 118 medical treatment. The list included hypertension, diabetes, dyslipidemia, stroke, heart trouble,
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5 119 renal failure, cancer, insomnia, depression, and others.
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9 121 *Exposure to mental illness*

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11 122 Participants were asked about their psychiatric history – whether they have the experience
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13 123 of consulting health professionals about their mental health. The Reported and Intended
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15 124 Behaviour Scale (RIBS)[8] were used to determine the extent of contact with people with
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17 125 mental illness. The first subscale consists of four questions about living with, working with,
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19 126 living nearby, and having a close friendship with people with mental illness, either at present
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21 127 or in the past. Those who answered ‘yes’ to at least one question were counted as having had
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23 128 contact with people with mental illness. Participants were also asked whether someone close
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25 129 to them was engaged in psychiatry.
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31 131 *Health literacy*

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33 132 The 14-item Health Literacy Scale (HLS-14)[9] was used to measure health literacy. The
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35 133 scale consists of 5 items for functional literacy, 5 items for communicative literacy, and 4
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37 134 items for critical literacy. Respondents choose one of five options in response to each
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39 135 statement. The scores on the items were summed up to give the HLS-14 score (range 14-70
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41 136 points) for each respondent. Higher scores indicate having better health literacy.
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47 138 *Belief about professional help*

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49 139 Referring to the questionnaires for the European Study of Epidemiology of Mental
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51 140 Disorders,[10] perceived effectiveness of professional help was measured using the following
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53 141 two questions: 1) of the people who see a professional for serious mental illness, what percent
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55 142 do you think are helped? (range 0-100%); 2) of those with serious mental illness who do not
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3 143 get professional help, what percent do you think get better even without it? (range 0-100%).
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5 144 The percentages on the two questions were subtracted (question 1 minus question 2) and then
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7 145 the answers were trichotomized into positive (1<%, better than no help), neutral (0%, equal to
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10 146 no help), and negative (<-1%, worse than no help). Participants were also asked whether they
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12 147 would be embarrassed if their friends knew they were getting professional help for mental
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14 148 illness.

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Social network

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21 151 The abbreviated Lubben Social Network Scale (LSNS-6)[11,12] was used to measure
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23 152 social network. The scale consists of 3 items for family ties and 3 items for friendship ties.
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25 153 Respondents choose one of six options in response to each statement. The scores on the items
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27 154 were summed up to give the LSNS-6 score (range 6-36 points) for each respondent. Higher
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29 155 scores indicate having greater ties to family and friends.
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Attitudes to everyday affairs

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36 158 Participants were asked to rate how likely they would talk with someone close to them
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38 159 about the problem that brought stress and distress into their everyday lives. The question was
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40 160 derived from the Comprehensive Survey of Living Conditions (one of the statistical surveys
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42 161 by the Japanese Government). Those who gave affirmative responses on a four-point scale
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44 162 (certainly yes/probably yes/probably no/certainly no) were considered as having a tendency to
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46 163 consult about everyday affairs. Participants were also asked whether they felt reluctant to get
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48 164 help from others.
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Neighborhood context

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56 167 A variety of measures of neighborhood context have been proposed, but none of them is
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3 168 recommended as a gold standard. Neighborhood is characterized as a geographically localized
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5 169 community often with face-to-face interactions among members. Referring to the
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7 170 questionnaire for the Health Survey of People Affected by the Great East Japan
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10 171 Earthquake,[13] four specific features of neighborhood context relevant to neighborhood
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12 172 social capital were assessed using the following statements, respectively: 1) neighbors say
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14 173 hello whenever they pass each other (communicativeness); 2) neighbors trust in each other
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16 174 (trustfulness); 3) neighbors help each other (helpfulness); and 4) neighbors work together to
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18 175 solve neighborhood problems (cooperativeness). Respondents choose one of five options
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20 176 (strongly agree/agree/not sure/disagree/strongly disagree) in response to each statement. The
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22 177 internal consistency was adequate (Cronbach $\alpha=0.87$). For analysis, the responses were
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24 178 dichotomized into positive (strongly agree/agree) and negative (not sure/disagree/strongly
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26 179 disagree).

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31 181 **Statistical Analysis**

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34 182 The percentages of subjects who expressed the help-seeking intentions were compared
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36 183 using chi-square test. Significant variables on the univariate analysis were incorporated into a
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38 184 multiple logistic regression model to identify individual and neighborhood factors
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40 185 independently associated with the help-seeking intentions. Adjusted odds ratios (ORs) and
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42 186 95% confidence intervals (CIs) were calculated from the models.

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45 187 Path analysis with structural equation modeling was performed to test a hypothesis model
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47 188 linking individual and neighborhood factors to the help-seeking intentions for mental illness
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49 189 (Figure 1). In case of serious mental illness, formal (professional) help must be the best way
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51 190 to solve the problem. The formal help-seeking intention was therefore placed in the structural
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53 191 equation model as the outcome variable. On the basis of previous studies[5,14,15,16], the
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55 192 informal help-seeking intention was assumed to bring the formal help-seeking intention.
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3 193 Besides sociodemographics, significant predictors derived from the multiple logistic
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5 194 regression analysis were placed in position according to the most plausible hypothesis. The
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7 195 strength of the relationship between two variables was estimated as a standardized regression
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10 196 weight (i.e. path coefficient, β). While there are no established guidelines regarding sample
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12 197 size requirements for structural equation modeling, a generally accepted rule of thumb is that
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14 198 the minimum sample size should ideally be 20 times the number of variables in the
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16 199 model.[17] The model generated in this study consisted of 14 variables and thus the final
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18 200 sample of 3,308 was sufficient for path analysis. Model fitness was assessed by goodness of
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20 201 fit index (GFI), adjusted goodness of fit index (AGFI), and root mean square error of
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22 202 approximation (RMSEA). For GFI and AGFI, a value of >0.9 indicates a good fit, and for
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24 203 RMSEA, a value of <0.08 is considered to be acceptable.[18] The initial model was improved
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26 204 by trimming paths with non-significant contributions. The final model consisted of paths with
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28 205 a path coefficient of >0.05 or <-0.05 ($p<0.05$).

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32 206 All statistical analyses except for the path analysis were performed using SAS ver.9.4
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34 207 software (SAS Institute, Cary, NC). The path analysis was performed using IBM SPSS Amos
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36 208 ver.22.0 (IBM Corp, Armonk, NY). Significant levels were set at $p<0.05$.

37 38 39 40 210 **RESULTS**

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43 211 Table 2 shows the percentages of subjects who expressed the help-seeking intentions for
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45 212 mental illness. Of the 3308 subjects, 67.7% ($n=2241$) and 75.6% ($n=2500$) reported that they
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47 213 would seek help from informal and formal sources, respectively in case of serious mental
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49 214 illness. The majority ($n=1938$, 58.6%) expressed both the informal and formal help-seeking
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51 215 intentions. All the individual (a, b, c, d) and neighborhood (e) factors showed significant
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53 216 associations with either or both of the informal and formal help-seeking intentions in
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55 217 univariate analyses. Contrary to theoretical expectations, the help-seeking intentions were

218 more frequently observed in those who reported embarrassment toward professional help.

219 This factor was considered irrelevant and removed from further analysis.

220 Table 3 shows the results of multiple logistic regression analysis. The following 3
221 individual and 1 neighborhood factors were significantly associated with both the informal
222 and formal help-seeking intentions: contact with people with mental illness, health literacy,
223 perceived effectiveness of professional help, tendency to consult about everyday affairs, and
224 communicative neighborhood. Besides these, marital status, social network, and cooperative
225 neighborhood were significantly associated with the informal help-seeking intention, while
226 health status and psychiatric history were significantly associated with the formal
227 help-seeking intention. The highest ORs for the informal and formal help-seeking intentions
228 were found in tendency to consult about everyday affairs (OR 5.21) and perceived
229 effectiveness of professional help (OR 2.16), respectively.

230 Figure 2 shows the results of path analysis. After trimming paths with non-significant
231 contributions, the final model resulted in a better fit to the data (GFI 0.946; AGFI 0.918;
232 RMSEA 0.072, 90%CI:0.068-0.075). The informal help-seeking intention had the greatest
233 direct effect on the formal help-seeking intention. Besides this, psychiatric history, health
234 literacy, perceived effectiveness of professional help, and communicative neighborhood had a
235 direct effect on the formal help-seeking intention. Tendency to consult about everyday affairs
236 and cooperative neighborhood had an indirect effect on the formal help-seeking intention
237 through its effect on the informal help-seeking intention.

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239 **DISCUSSION**

240 Causal effect of neighborhood context, or neighborhood effect, has been reported on
241 various health outcomes including mental illness, whereas the methodology for estimating
242 neighborhood effects, including definitions of neighborhood, measures of neighborhood

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3 243 context, and analytical models, varies widely across studies.[19,20] In the absence of
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5 244 established methodology, this study examined four specific features of neighborhood context
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7 245 relevant to neighborhood social capital and their associations with help-seeking intentions for
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9 246 mental illness. A number of studies have been conducted to identify the individual factors that
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11 247 may inhibit or facilitate help-seeking for mental illness, but less is known about the
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13 248 neighborhood factors. Moreover, to date, there have been few attempts to elucidate
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15 249 multifactorial mechanisms for help-seeking using structural equation modeling. This is the
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17 250 first study that illustrated the pathways linking individual and neighborhood factors to
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19 251 informal and formal help-seeking intentions and bore out the hypothesis that neighborhood
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21 252 context contributes to help-seeking intentions for mental illness.

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25 253 The final structural equation model (Figure 2) along with the results of multiple logistic
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27 254 regression analysis revealed the individual and neighborhood factors that may directly or
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29 255 indirectly affect help-seeking decision making. The neighborhood factors showed a relatively
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31 256 modest but significant effect compared to the individual factors. These results support the
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33 257 expectation that neighborhood context, or more specifically neighborhood social capital may
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35 258 exert influence on help-seeking for mental illness as it does on other health behaviors.[7]
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37 259 Moreover, the significant positive effect of communicative neighborhood seems to confirm
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39 260 the power of daily interactions with weak ties.[21] People who often interact with weak ties
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41 261 are more likely to have a sense of belonging and thus less likely to hesitate to seek help from
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43 262 people around them. Creating a neighborhood with a communicative atmosphere may be
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45 263 worth considering as a possible public health strategy for encouraging help-seeking.

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49 264 In the multiple logistic regression analysis, the highest ORs for the informal and formal
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51 265 help intentions were found in tendency to consult about everyday affairs and perceived
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53 266 effectiveness of professional help, respectively. In the path analysis, tendency to consult about
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55 267 everyday affairs and health literacy were represented as a key player in help-seeking decision

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3 268 making. Tendency to consult about everyday affairs seems to depend largely on personality,
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5 269 so that it may be difficult to achieve drastic changes in this factor using a public health
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7 270 approach. In contrast, health literacy skills can be developed through community-based
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9 271 educational outreach.[22] Improved health literacy will contribute to a better understanding of
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11 272 the effectiveness of professional help, which will increase the probability of formal
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13 273 help-seeking.[10] Developing health literacy skills may be worth considering as another
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15 274 possible public health strategy for encouraging help-seeking.

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18 275 The multiple logistic regression analysis showed no significant association between
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20 276 sociodemographics and the help-seeking intentions, except between marital status and the
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22 277 informal help-seeking intention. Meanwhile, the path analysis showed that male gender, older
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24 278 age, unmarried status, lower education, and lower income were associated with decreased
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26 279 likelihoods of help-seeking intentions through their effects on tendency to consult about
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28 280 everyday affairs and health literacy. More attention should be paid to these high-risk groups
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30 281 when implementing public health strategies for encouraging help-seeking.

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34 282 This study provides the first step toward understanding the role of neighborhood in the
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36 283 help-seeking process. On the contrary, it has a number of potential limitations. First, the study
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38 284 subjects were recruited from a nationwide panel of an online research company. Although we
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40 285 confirmed that the distribution of HLS-14 scores in the study subjects was quite similar to that
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42 286 obtained from our previous paper-based survey in Japanese healthcare facilities,[23] the
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44 287 selection bias may have influenced the results to some extent. Second, the help-seeking
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46 288 intentions were assessed on the assumption that the respondents themselves were suffering
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48 289 serious mental illness. Previous studies suggested that the probability of formal help-seeking
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50 290 for mental illness depends on severity of illness.[16,24,25] The percentages of informal and
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52 291 formal help-seeking intentions and the magnitude of individual and neighborhood factors may
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54 292 vary with different severity assumptions. Third, although the final structural equation model
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3 293 revealed an acceptable fit to the data, it still leaves room for further improvement. The method
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5 294 of measuring neighborhood context was based on an official health survey,[13] but its validity
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7 295 has not been fully confirmed. Neighborhood physical environments such as population
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9 296 density and healthcare resources, which can affect mental health,[20] were not included in the
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11 297 analysis. Fourth, the study design is cross-sectional and self-reported so we cannot reject the
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13 298 possibility of reverse causation or common method bias. Further studies are needed to provide
14
15 299 definitive evidence for the role of neighborhood in the help-seeking process and elucidate in
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17 300 more detail multifactorial mechanisms for help-seeking. Moreover, the relationship between
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19 301 help-seeking intentions and actual help-seeking should be investigated in future.
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302

303 **Conclusion**

304 Help-seeking intentions for mental illness were directly associated with neighborhood
305 context as well as individual characteristics. Especially note that living in a communicative
306 neighborhood and having adequate health literacy were acknowledged as possible facilitating
307 factors for both informal and formal help-seeking for mental illness. The effectiveness of
308 efforts to increase help-seeking may be limited if only interventions targeted to individual
309 factors are implemented. It may be worth attempting to incorporate community-based
310 interventions for creating a neighborhood with a communicative atmosphere and those for
311 developing health literacy skills into public health strategies for encouraging help-seeking or
312 suicide prevention policies.

Contributors

MS was responsible for the design and conduct of the study, the collection, analysis, and interpretation of data, and the writing of the article. TY and HS contributed to the data interpretation and discussion of the implications of this work.

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Competing interests

The authors have read and understood BMJ policy on declaration of interests and declare that they have no competing interests.

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Table 1 Characteristics of the study subjects

		N	
Gender	Male	1621	49.0%
	Female	1687	51.0%
Age	20–29 years	797	24.1%
	30–39	842	25.5%
	40–49	837	25.3%
	50–59	832	25.2%
Education	High school	1066	32.2%
	Junior college/vocational school	905	27.4%
	University/graduate school	1337	40.4%
Marital status	Married	1960	59.3%
	Unmarried	1184	35.8%
	Divorced/widowed	164	5.0%
Household	One person	464	14.0%
	More than two people	2844	86.0%
Occupation	No occupation	770	23.3%
	Temporary or part-time job	560	16.9%
	Full-time job	1978	59.8%
Household income	<2.0 million yen †	363	11.0%
	2.0–3.9 million	777	23.5%
	4.0–5.9 million	937	28.3%
	6.0–7.9 million	618	18.7%
	8.0–9.9 million	347	10.5%
Health status	10.0+ million	266	8.0%
	No disease	2449	73.6%
	Any disease	879	26.4%

† One million yen was about 10,000 U.S. dollars at the time of the survey.

(b) Health status and exposure to mental illness

		N	Informal sources		Formal sources			
Health status	No disease	2449	1666	68.0%	0.829	1786	72.9%	<0.001
	Any disease	879	400	45.5%		714	81.2%	
Psychiatric history	No	2689	1821	67.7%	0.949	1983	73.7%	<0.001
	Yes	619	420	67.9%		517	83.5%	
Contact with people with mental illness	No	2006	1260	62.8%	<0.001	1421	70.8%	<0.001
	Yes	1302	981	75.3%		1079	82.9%	
Familiar people engaged in psychiatry	No	3157	2125	67.3%	0.015	2382	75.5%	0.452
	Yes	151	116	76.8%		118	78.1%	

(c) Health literacy and belief about professional help

		N	Informal sources		Formal sources			
Health literacy (HLS-14)	Low	1853	1097	59.2%	<0.001	1243	67.1%	<0.001
	High	1455	1144	78.6%		1257	86.4%	
Embarrassment toward professional help	No	1644	1033	62.8%	<0.001	1133	68.9%	<0.001
	Yes	1664	1208	72.6%		1367	82.2%	
Perceived effectiveness of professional help	Negative	287	165	57.5%	<0.001	160	55.7%	<0.001
	Neutral	869	495	57.0%		533	61.3%	
	Positive	2152	1581	73.5%		1807	84.0%	

(d) Social network and attitudes to everyday affairs

		N	Informal sources		Formal sources			
Social network (LSNS-6)	Low	1891	1120	59.2%	<0.001	1360	71.9%	<0.001
	High	1417	1121	79.1%		1140	80.5%	
Tendency to consult about everyday affairs	No	1675	817	48.8%	<0.001	1152	68.8%	<0.001
	Yes	1633	1424	87.2%		1348	82.5%	
Reluctance to get help	No	1713	1220	71.2%	<0.001	1273	74.3%	0.080
	Yes	1595	1021	64.0%		1227	76.9%	

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(e) Neighborhood context

		N	Informal sources		Formal sources			
Communicative neighborhood	No	1221	675	55.3%	<0.001	770	63.1%	<0.001
	Yes	2087	1566	75.0%		1730	82.9%	
Trustful neighborhood	No	2550	1651	64.7%	<0.001	1870	73.3%	<0.001
	Yes	758	590	77.8%		630	83.1%	
Helpful neighborhood	No	2311	1448	62.7%	<0.001	1657	71.7%	<0.001
	Yes	997	793	79.5%		843	84.6%	
Cooperative neighborhood	No	2045	1227	60.0%	<0.001	1434	70.1%	<0.001
	Yes	1263	1014	80.3%		1066	84.4%	

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Table 3 Logistic regression predicting help seeking intentions for mental illness

		Informal sources			Formal sources		
		OR	95%CI		OR	95%CI	
Gender	Female	1.18	0.98	1.43	0.98	0.81	1.20
Age	plus 10 years	0.92	0.84	1.01	1.08	0.98	1.19
Education	High school	0.92	0.76	1.11	0.86	0.71	1.04
Marital status	Unmarried	0.77	0.61	0.96	0.90	0.71	1.13
	Divorced/widowed	0.60	0.40	0.91	0.89	0.57	1.41
Household	One person	1.05	0.80	1.38	0.80	0.60	1.05
Occupation	No occupation	1.14	0.90	1.44	0.85	0.67	1.07
Household income	plus 2 million yen	1.03	0.96	1.10	1.05	0.98	1.13
Health status	Any disease	0.94	0.77	1.16	1.52	1.20	1.92
Psychiatric history	Yes	0.99	0.79	1.26	1.66	1.27	2.17
Contact with people with mental illness	Yes	1.39	1.15	1.68	1.27	1.05	1.55
Familiar people engaged in psychiatry	Yes	1.03	0.66	1.61	0.80	0.51	1.24
Health literacy (HLS-14)	plus 1 point	1.06	1.04	1.07	1.07	1.06	1.09
Perceived effectiveness of professional help	Positive	1.43	1.26	1.62	2.16	1.90	2.45
Social network (LSNS-6)	plus 1 point	1.04	1.02	1.06	1.02	0.99	1.03
Tendency to consult about everyday affairs	Yes	5.21	4.31	6.30	1.66	1.37	2.02
Reluctance to get help	No	1.26	1.06	1.50	0.78	0.65	0.93
Communicative neighborhood	Yes	1.30	1.06	1.58	1.78	1.45	2.18
Trustful neighborhood	Yes	0.91	0.68	1.21	0.91	0.67	1.24
Helpful neighborhood	Yes	1.17	0.88	1.56	1.18	0.87	1.61
Cooperative neighborhood	Yes	1.50	1.18	1.89	1.22	0.96	1.56

OR: adjusted odds ratio, CI: confidence interval

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Figure 1 Relationship between individual and neighborhood factors and help seeking intentions for mental illness (hypothesis model)

Figure 2 Path diagram for help seeking intentions for mental illness

Rectangles were observed variables. Ellipses were latent variables. Values on the single-headed arrows were standardized regression weights.

Values on the double-headed arrows were correlation coefficients. Model fitness: GFI 0.946; AGFI 0.918; RMSEA 0.072 (90%CI:0.068-0.075)

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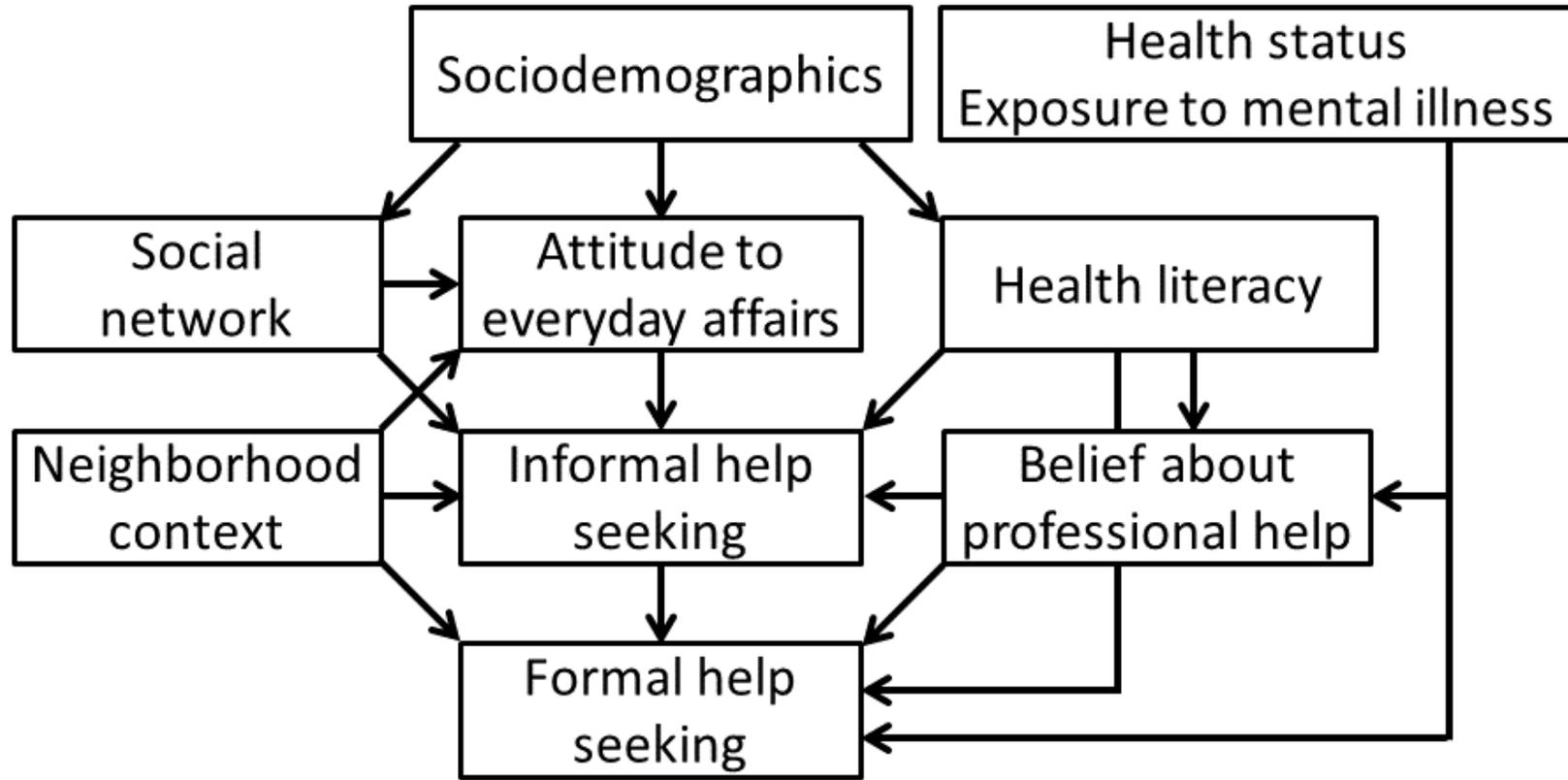


Figure 1

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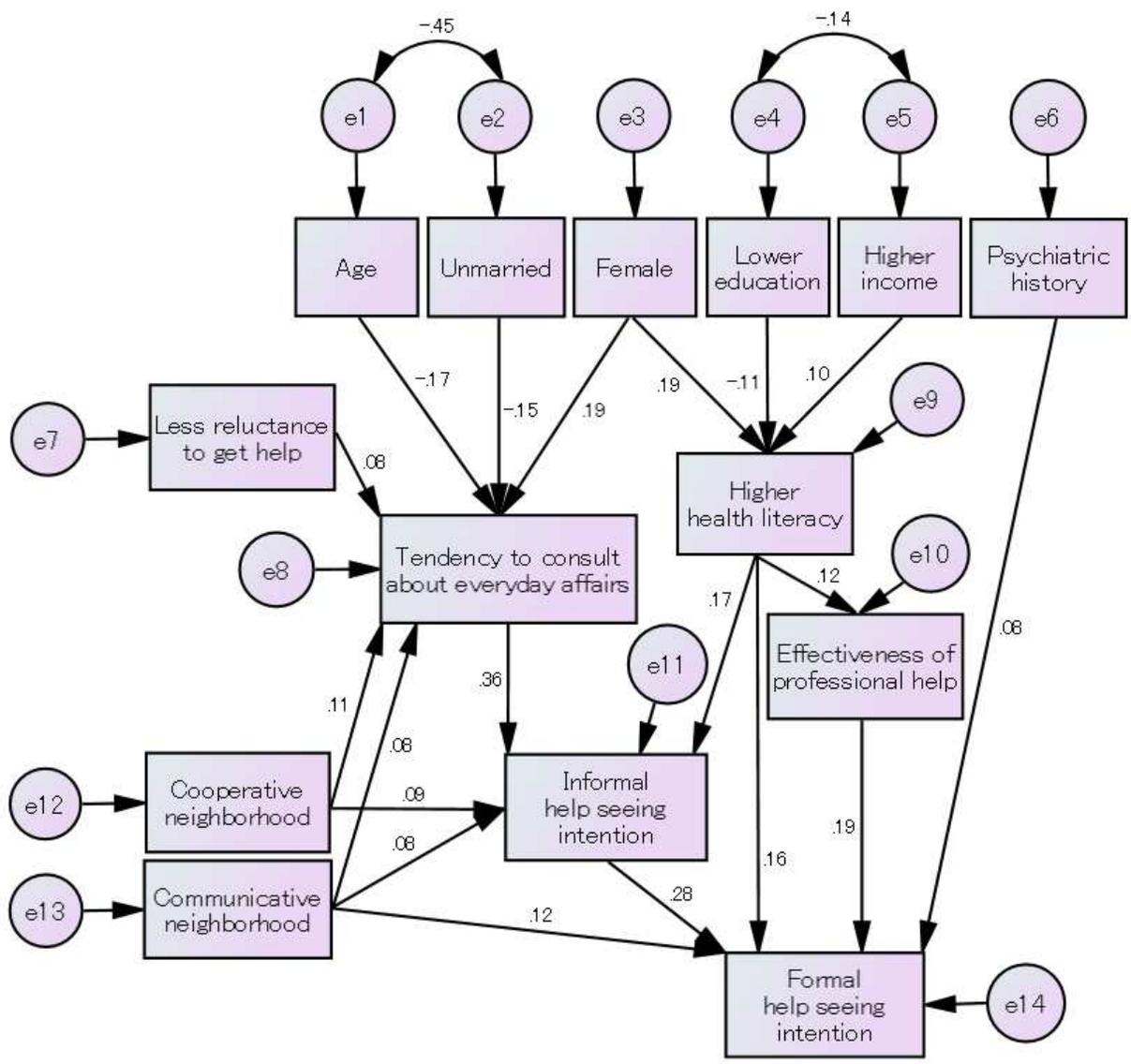


Figure 2

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Relationship between individual characteristics, neighborhood contexts, and help-seeking intentions for mental illness

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3 Relationship between individual characteristics, neighborhood contexts, and help-seeking
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5 intentions for mental illness
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3 **1 ABSTRACT**

4 Objective: Encouraging help-seeking for mental illness is essential for prevention of suicide.

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7 This study examined the relationship between individual characteristics, neighborhood
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9 contexts, and help-seeking intentions for mental illness for the purpose of elucidating the role
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11 of neighborhood in the help-seeking process.

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14 Design, setting, and participants: A cross-sectional web-based survey was conducted in June
15
16 2014 among Japanese adults aged 20-59 years. Eligible respondents who did not have a
17
18 serious health condition were included in this study (n=3,308).

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21 Main outcome measures: Participants were asked how likely they would seek help from
22
23 someone close to them (informal help) and medical professionals (formal help), respectively
24
25 if they were suffering serious mental illness. Path analysis with structural equation modeling
26
27 was performed to represent plausible connections between individual characteristics,
28
29 neighborhood contexts, and the informal and formal help-seeking intentions.

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32 Results: The acceptable fitting model indicated that those who had a tendency to consult
33
34 about everyday affairs were significantly more likely to express the informal help-seeking
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36 intention, which was directly associated with the formal help-seeking intention. Those living
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38 in a communicative neighborhood where neighbors say hello whenever they pass each other
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40 were significantly more likely to express both the informal and formal help-seeking intentions.

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43 Those living in a supportive neighborhood where neighbors work together to solve
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45 neighborhood problems were significantly more likely to express the informal help-seeking
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47 intention. Adequate health literacy was directly associated with both the informal and formal
48
49 help-seeking intentions, along with having an indirect effect on the formal help-seeking
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51 intention through developed positive perception of professional help.

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54 Conclusion: The results of this study bear out the hypothesis that neighborhood context
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56 contributes to help-seeking intentions for mental illness. Living in a neighborhood with a
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26 communicative atmosphere and having adequate health literacy were acknowledged as
27 possible facilitating factors for both informal and formal help-seeking for mental illness.
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3 29 **Strengths and limitations of this study**
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- 5 30 • Previous studies have revealed the individual factors that may inhibit or facilitate
6
7 31 help-seeking for mental illness, but less is known about the neighborhood factors. This
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9 32 study represents the first attempt to elucidate multifactorial mechanisms for help-seeking
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11 33 using structural equation modeling. Our final structural equation model illustrated the
12
13 34 pathways linking individual and neighborhood factors to informal and formal
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15 35 help-seeking intentions and bore out the hypothesis that neighborhood context contributes
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17 36 to help-seeking intentions for mental illness.
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20 37 • The study design is cross-sectional and self-reported so we cannot reject the possibility of
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22 38 reverse causation or common method bias. The study subjects seem not to be
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24 39 representative of the general population. Further studies are needed to confirm the
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26 40 findings and refine the model. Moreover, the relationship between help-seeking intentions
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28 41 and actual help-seeking should be investigated in future.
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43 INTRODUCTION

44 The World Health Organization published its first report on suicide prevention in 2014.[1]
45 According to the report, more than 800,000 people die by suicide every year. While the
46 reasons that people commit suicide vary widely, almost all suicide victims have signs or
47 symptoms of mental illness at the time of their death. Unfortunately, people do not always
48 seek help when they suffer mental illness or have suicidal thoughts.[2,3] Encouraging
49 help-seeking for mental illness is essential for prevention of suicide.

50 A social ecological perspective acknowledges that health behavior is influenced by the
51 social environment.[4] While the proximal cause of health behavior lies within the individual
52 rather than in the social environment, changes in the social environment will produce changes
53 in individuals. Similarly to other health behaviors, help-seeking for mental illness is
54 considered to be determined through the interaction between individuals and their
55 environment.[2,3,5] Traditionally, public health strategies for encouraging help-seeking have
56 focused on modifying individual factors such as knowledge and skills. Once the factors in the
57 social environment that can affect help-seeking are identified, the focus of strategy will
58 broaden to include the environmental factors.

59 The social environment is a broad multidimensional concept that includes the groups to
60 which we belong, the neighborhoods in which we live, and the policies which we create to
61 order our lives.[6] Neighborhood is the next smallest social unit after family, in which
62 face-to-face interactions occur among members. Previous studies have revealed that
63 neighborhood context, or more specifically neighborhood social capital is associated with
64 health behaviors such as smoking, drinking, diet, and physical activity.[7] The impact of
65 neighborhood context on health behavior may be worth considering when developing public
66 health strategies for encouraging help-seeking. Unfortunately, to our knowledge, there have
67 been no studies that examined to what extent neighborhood context contributes to

68 help-seeking and what factors are responsible for the neighborhood effect. Little is known
69 about the role of neighborhood in the help-seeking process.

70 The aim of this study was to determine the relationship between individual characteristics,
71 neighborhood contexts, and help-seeking intentions for mental illness. On the basis of review
72 of literature, we created a hypothesis model linking individual and neighborhood factors to
73 informal and formal help-seeking intentions to represent plausible multifactorial mechanisms
74 for help-seeking (Figure 1). Compared to previous studies, this study examined a wider
75 variety of factors that may affect help-seeking decision making. Path analysis with structural
76 equation modeling was performed to test the hypothesis model and elucidate the role of
77 neighborhood in the help-seeking process. We believe the findings of this study will provide a
78 new direction for public health strategies for encouraging help-seeking or suicide prevention
79 policies.

81 **METHODS**

82 **Subjects**

83 A cross-sectional web-based survey was conducted in June 2014 among Japanese adults
84 aged 20-59 years who lived in four prefectures of Chiba, Niigata, Nagano, and Fukuoka in
85 Japan. Medical professionals and students were excluded from recruitment because their
86 attitudes to help-seeking seem different in kind from ordinary people's ones. The study
87 protocol was approved by the ethics committee of the Jikei University School of Medicine
88 and has been conducted in accordance with the Ethical Guidelines for Epidemiological
89 Studies by the Japanese Government.

90 An online research company (INTAGE, INC., Tokyo, Japan) contracted to create web
91 questionnaire forms and collect anonymous responses (n=3200). The company has a
92 nationwide research panel of 1.2 million registrants. At the time of the survey, the registrants

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3 93 aged 20-59 years who were not medical professionals or students and lived in the four
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5 94 prefectures totaled 46,258 (20,071 males and 26,187 females). Recruitment e-mails were sent
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7 95 to 8,721 eligible registrants who were randomly selected from each age/gender/prefecture
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9 96 stratum. Applicants for participation in the survey were accepted in the order of receipt until
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11 97 the number of participants reached the quotas (100 people for each age/gender/prefecture
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13 98 stratum). All participants voluntarily agreed to complete the survey. A total of 3,365 responses
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15 99 were obtained over 8 days of recruitment. Of these, 6 subjects reported having serious health
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17 100 conditions and 51 subjects provided incomplete or inconsistent answers to questions. The
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19 101 remaining 3,308 subjects were finally included in this study.

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23 102 Table 1 shows the characteristics of the study subjects. According to the 2010 national
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25 103 census,[8] the percentage of the Japanese population aged 20-59 years with university degrees
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27 104 was 21.9 %, considerably lower than that of this study (40.4%), whereas the percentages of
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29 105 married and employed population were 58.2% and 72.7%, respectively, almost equal to that of
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31 106 this study (59.3% and 76.7%, respectively).
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36 108 **Measures**

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38 109 The questionnaire asked about help-seeking intentions for mental illness, medical
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40 110 condition, exposure to mental illness, health literacy, belief about professional help, social
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42 111 network, attitudes to everyday affairs, and neighborhood context. The components of the
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44 112 questionnaire relevant to this study are detailed below.
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49 114 *Help-seeking intentions for mental illness*

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51 115 In the absence of a gold standard, the most commonly used methodology was used for
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53 116 measuring help-seeking intentions in this study.[9] Participants were asked to rate how likely
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55 117 they would seek help from 1) someone close to them such as family, relatives, friends, and
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3 118 colleagues (informal sources) and 2) medical professionals (formal sources), respectively if
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5 119 they were suffering serious mental illness. Those who gave affirmative responses on a
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7 120 four-point scale (certainly yes/probably yes/probably no/certainly no) were counted as having
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9 121 informal and formal help-seeking intentions, respectively. Those who gave negative responses
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11 122 to both questions were counted as having no help-seeking intentions.
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14 15 16 124 *Medical condition*

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18 125 Participants were asked to report whether they had any chronic disease undergoing
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20 126 medical treatment. The list included hypertension, diabetes, dyslipidemia, stroke, heart trouble,
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22 127 renal failure, cancer, insomnia, depression, and others.
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25 26 27 129 *Exposure to mental illness*

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29 130 Participants were asked about their psychiatric history – whether they have the experience
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31 131 of consulting health professionals about their mental health. The Reported and Intended
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33 132 Behaviour Scale (RIBS)[10] were used to determine the extent of contact with people with
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35 133 mental illness. The first subscale consists of four questions about living with, working with,
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37 134 living nearby, and having a close friendship with people with mental illness, either at present
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39 135 or in the past. Those who answered ‘yes’ to at least one question were counted as having had
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41 136 contact with people with mental illness. Participants were also asked whether someone close
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43 137 to them was engaged in psychiatry.
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46 47 48 49 139 *Health literacy*

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51 140 The 14-item Health Literacy Scale (HLS-14)[11] was used to measure health literacy. The
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53 141 scale consists of 5 items for functional literacy, 5 items for communicative literacy, and 4
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55 142 items for critical literacy. Respondents choose one of five options in response to each
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3 143 statement. The scores on the items were summed up to give the HLS-14 score (range 14-70
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5 144 points) for each respondent. Higher scores indicate having better health literacy.
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10 146 *Belief about professional help*

11 Referring to the questionnaires for the European Study of Epidemiology of Mental
12 Disorders,[12] perceived effectiveness of professional help was measured using the following
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14 148 Disordered,[12] perceived effectiveness of professional help was measured using the following
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16 149 two questions: 1) of the people who see a professional for serious mental illness, what percent
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18 150 do you think are helped? (range 0-100%); 2) of those with serious mental illness who do not
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20 151 get professional help, what percent do you think get better even without it? (range 0-100%).
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22 152 The percentages on the two questions were subtracted (question 1 minus question 2) and then
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24 153 the answers were trichotomized into positive (1<%, better than no help), neutral (0%, equal to
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26 154 no help), and negative (<-1%, worse than no help). Participants were also asked whether they
27
28 155 would be embarrassed if their friends knew they were getting professional help for mental
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30 156 illness.
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36 158 *Social network*

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38 159 The abbreviated Lubben Social Network Scale (LSNS-6)[13,14] was used to measure
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40 160 social network. The scale consists of 3 items for family ties and 3 items for friendship ties.
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42 161 Respondents choose one of six options in response to each statement. The scores on the items
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44 162 were summed up to give the LSNS-6 score (range 6-36 points) for each respondent. Higher
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46 163 scores indicate having greater ties to family and friends.
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52 165 *Attitudes to everyday affairs*

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54 166 Participants were asked to rate how likely they would talk with someone close to them
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56 167 about the problem that brought stress and distress into their everyday lives. The question was
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3 168 derived from the Comprehensive Survey of Living Conditions (one of the statistical surveys
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5 169 by the Japanese Government). Those who gave affirmative responses on a four-point scale
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7 170 (certainly yes/probably yes/probably no/certainly no) were considered as having a tendency to
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10 171 consult about everyday affairs. Participants were also asked whether they felt reluctant to get
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12 172 help from others.

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15 16 174 *Neighborhood context*

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18 175 A variety of measures of neighborhood context have been proposed, but none of them is
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20 176 recommended as a gold standard. Neighborhood is characterized as a geographically localized
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22 177 community often with face-to-face interactions among members. Referring to the
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24 178 questionnaire for the Health Survey of People Affected by the Great East Japan
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26 179 Earthquake,[15] four specific features of neighborhood context relevant to neighborhood
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28 180 social capital were assessed using the following statements, respectively: 1) neighbors say
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30 181 hello whenever they pass each other (communicativeness); 2) neighbors trust in each other
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32 182 (trustfulness); 3) neighbors help each other (helpfulness); and 4) neighbors work together to
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34 183 solve neighborhood problems (cooperativeness). Respondents choose one of five options
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36 184 (strongly agree/agree/not sure/disagree/strongly disagree) in response to each statement. The
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38 185 internal consistency was adequate (Cronbach $\alpha=0.87$). For analysis, the responses were
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40 186 dichotomized into positive (strongly agree/agree) and negative (not sure/disagree/strongly
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42 187 disagree).

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45 46 189 **Statistical Analysis**

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49 190 The percentages of subjects who expressed the help-seeking intentions were compared
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51 191 using chi-square test. Significant variables on the univariate analysis were incorporated into a
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53 192 multiple logistic regression model to identify individual and neighborhood factors
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3 193 independently associated with the help-seeking intentions. Adjusted odds ratios (ORs) and
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5 194 95% confidence intervals (CIs) were calculated from the models.
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7 195 Path analysis with structural equation modeling was performed to test the hypothesis
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9 196 model linking individual and neighborhood factors to help-seeking intentions for mental
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11 197 illness (Figure 1). In case of serious mental illness, formal (professional) help must be the best
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13 198 way to solve the problem. The formal help-seeking intention was therefore placed in the
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15 199 structural equation model as the outcome variable. On the basis of previous
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17 200 studies[5,16,17,18], the informal help-seeking intention was assumed to bring the formal
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19 201 help-seeking intention. Besides sociodemographics, significant predictors derived from the
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21 202 multiple logistic regression analysis were placed in position according to the most plausible
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23 203 hypothesis. The strength of the relationship between two variables was estimated as a
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25 204 standardized regression weight (i.e. path coefficient, β). While there are no established
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27 205 guidelines regarding sample size requirements for structural equation modeling, a generally
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29 206 accepted rule of thumb is that the minimum sample size should ideally be 20 times the
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31 207 number of variables in the model.[19] The model generated in this study consisted of 14
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33 208 variables and thus the final sample of 3,308 was sufficient for path analysis. Model fitness
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35 209 was assessed by goodness of fit index (GFI), adjusted goodness of fit index (AGFI), and root
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37 210 mean square error of approximation (RMSEA). For GFI and AGFI, a value of >0.9 indicates a
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39 211 good fit, and for RMSEA, a value of <0.08 is considered to be acceptable.[20] The initial
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41 212 model was improved by trimming paths with non-significant contributions. The final model
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43 213 consisted of paths with a path coefficient of >0.05 or <-0.05 ($p<0.05$).
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49 214 All statistical analyses except for the path analysis were performed using SAS ver.9.4
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51 215 software (SAS Institute, Cary, NC). The path analysis was performed using IBM SPSS Amos
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53 216 ver.22.0 (IBM Corp, Armonk, NY). Significant levels were set at $p<0.05$.
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218 RESULTS

219 Table 2 shows the percentages of subjects who expressed the help-seeking intentions for
220 mental illness. Of the 3308 subjects, 67.7% (n=2241) and 75.6% (n=2500) reported that they
221 would seek help from informal and formal sources, respectively in case of serious mental
222 illness. The majority (n=1938, 58.6%) expressed both the informal and formal help-seeking
223 intentions. All the individual (a, b, c, d) and neighborhood (e) factors showed significant
224 associations with either or both of the informal and formal help-seeking intentions in
225 univariate analyses. Contrary to theoretical expectations, the help-seeking intentions were
226 more frequently observed in those who reported embarrassment toward professional help.
227 This factor was considered irrelevant and removed from further analysis.

228 Table 3 shows the results of multiple logistic regression analysis. The following 3
229 individual and 1 neighborhood factors were significantly associated with both the informal
230 and formal help-seeking intentions: contact with people with mental illness, health literacy,
231 perceived effectiveness of professional help, tendency to consult about everyday affairs, and
232 communicative neighborhood. Besides these, marital status, social network, and cooperative
233 neighborhood were significantly associated with the informal help-seeking intention, while
234 medical condition and psychiatric history were significantly associated with the formal
235 help-seeking intention. The highest ORs for the informal and formal help-seeking intentions
236 were found in tendency to consult about everyday affairs (OR 5.21) and perceived
237 effectiveness of professional help (OR 2.16), respectively.

238 Figure 2 shows the results of path analysis. After trimming paths with non-significant
239 contributions, the final model resulted in a better fit to the data (GFI 0.946; AGFI 0.918;
240 RMSEA 0.072, 90%CI:0.068-0.075). The informal help-seeking intention had the greatest
241 direct effect on the formal help-seeking intention. Besides this, psychiatric history, health
242 literacy, perceived effectiveness of professional help, and communicative neighborhood had a

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3 243 direct effect on the formal help-seeking intention. Tendency to consult about everyday affairs
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5 244 and cooperative neighborhood had an indirect effect on the formal help-seeking intention
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11 247 **DISCUSSION**

14 248 Causal effect of neighborhood context, or neighborhood effect, has been reported on
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16 249 various health outcomes including mental illness, whereas the methodology for estimating
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18 250 neighborhood effects, including definitions of neighborhood, measures of neighborhood
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20 251 context, and analytical models, varies widely across studies.[21,22] In the absence of
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22 252 established methodology, this study examined four specific features of neighborhood context
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24 253 relevant to neighborhood social capital and their associations with help-seeking intentions for
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26 254 mental illness. A number of studies have been conducted to identify the individual factors that
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28 255 may inhibit or facilitate help-seeking for mental illness, but less is known about the
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30 256 neighborhood factors. Moreover, to date, there have been few attempts to elucidate
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32 257 multifactorial mechanisms for help-seeking using structural equation modeling. This is the
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34 258 first study that illustrated the pathways linking individual and neighborhood factors to
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36 259 informal and formal help-seeking intentions and bore out the hypothesis that neighborhood
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38 260 context contributes to help-seeking intentions for mental illness.

43 261 The final structural equation model (Figure 2) along with the results of multiple logistic
44
45 262 regression analysis revealed the individual and neighborhood factors that may directly or
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47 263 indirectly affect help-seeking decision making. The neighborhood factors showed a relatively
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49 264 modest but significant effect compared to the individual factors. These results support the
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51 265 expectation that neighborhood context, or more specifically neighborhood social capital may
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53 266 exert influence on help-seeking for mental illness as it does on other health behaviors.[7]
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55 267 Moreover, the significant positive effect of communicative neighborhood seems to confirm
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3 268 the power of daily interactions with weak ties.[23] People who often interact with weak ties
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5 269 are more likely to have a sense of belonging and thus less likely to hesitate to seek help from
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7 270 people around them. Creating a neighborhood with a communicative atmosphere may be
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9 271 worth considering as a possible public health strategy for encouraging help-seeking.

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11 272 In the multiple logistic regression analysis, the highest ORs for the informal and formal
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13 273 help intentions were found in tendency to consult about everyday affairs and perceived
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15 274 effectiveness of professional help, respectively. In the path analysis, tendency to consult about
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17 275 everyday affairs and health literacy were represented as a key player in help-seeking decision
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19 276 making. Tendency to consult about everyday affairs seems to depend largely on personality,
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21 277 so that it may be difficult to achieve drastic changes in this factor using a public health
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23 278 approach. In contrast, health literacy skills can be developed through community-based
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25 279 educational outreach.[24] Improved health literacy will contribute to a better understanding of
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27 280 the effectiveness of professional help, which will increase the probability of formal
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29 281 help-seeking.[12] Developing health literacy skills may be worth considering as another
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31 282 possible public health strategy for encouraging help-seeking.

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33 283 The multiple logistic regression analysis showed no significant association between
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35 284 sociodemographics and the help-seeking intentions, except between marital status and the
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37 285 informal help-seeking intention. Meanwhile, the path analysis showed that male gender, older
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39 286 age, unmarried status, lower education, and lower income were associated with decreased
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41 287 likelihoods of help-seeking intentions through their effects on tendency to consult about
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43 288 everyday affairs and health literacy. More attention should be paid to these high-risk groups
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45 289 when implementing public health strategies for encouraging help-seeking.

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47 290 This study provides the first step toward understanding the role of neighborhood in the
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49 291 help-seeking process; however, it has a number of potential limitations. First, the study
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51 292 subjects were recruited from a nationwide panel of an online research company. As described
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3 293 in the methods section, the study subjects included highly educated people twice as many as
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5 294 in the Japanese population. Although we confirmed that the distribution of HLS-14 scores in
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7 295 the study subjects was quite similar to that obtained from our previous paper-based survey in
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9 296 Japanese healthcare facilities,[25] the selection bias may have influenced the results to some
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11 297 extent. Second, the method of measuring help-seeking intentions was based on the most
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13 298 commonly used methodology,[9] but its validity has not been confirmed yet. Participants were
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15 299 asked to imagine themselves with serious mental illness and then report their help-seeking
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17 300 intentions. Because no detailed description was given, their answers depended on how they
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19 301 imagined the severity of the condition. Previous studies suggested that the probability of
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21 302 formal help-seeking for mental illness depends on severity of illness.[18,26,27] The
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23 303 percentages of informal and formal help-seeking intentions and the magnitude of individual
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25 304 and neighborhood factors may vary with different severity assumptions. Third, although the
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27 305 final structural equation model revealed an acceptable fit to the data, it still leaves room for
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29 306 further improvement. The HLS-14 and the LSNS-6 were validated in Japanese people,[11,14]
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31 307 but the other instruments used in the survey were not. Neighborhood physical environments
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33 308 such as population density and healthcare resources, which can affect mental health,[22] were
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35 309 not included in the analysis. Fourth, the study design is cross-sectional and self-reported so
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37 310 we cannot reject the possibility of reverse causation or common method bias. Further studies
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39 311 are needed to provide definitive evidence for the role of neighborhood in the help-seeking
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41 312 process and elucidate in more detail multifactorial mechanisms for help-seeking. Moreover,
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43 313 the relationship between help-seeking intentions and actual help-seeking should be
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45 314 investigated in future.
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316 Conclusion

317 Help-seeking intentions for mental illness were directly associated with neighborhood

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3 318 context as well as individual characteristics. Especially note that living in a communicative
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5 319 neighborhood and having adequate health literacy were acknowledged as possible facilitating
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7 320 factors for both informal and formal help-seeking for mental illness. The effectiveness of
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9 321 efforts to increase help-seeking may be limited if only interventions targeted to individual
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11 322 factors are implemented. It may be worth attempting to incorporate community-based
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13 323 interventions for creating a neighborhood with a communicative atmosphere and those for
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15 324 developing health literacy skills into public health strategies for encouraging help-seeking or
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18 325 suicide prevention policies.
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Contributors

MS was responsible for the design and conduct of the study, the collection, analysis, and interpretation of data, and the writing of the article. TY and HS contributed to the data interpretation and discussion of the implications of this work.

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Competing interests

The authors have read and understood BMJ policy on declaration of interests and declare that they have no competing interests.

Data Sharing

No additional data available.

Table 1 Characteristics of the study subjects

		N	
Gender	Male	1621	49.0%
	Female	1687	51.0%
Age	20–29 years	797	24.1%
	30–39	842	25.5%
	40–49	837	25.3%
	50–59	832	25.2%
Education	High school	1066	32.2%
	Junior college/vocational school	905	27.4%
	University/graduate school	1337	40.4%
Marital status	Married	1960	59.3%
	Unmarried	1184	35.8%
	Divorced/widowed	164	5.0%
Household	One person	464	14.0%
	More than two people	2844	86.0%
Occupation	No occupation	770	23.3%
	Temporary or part-time job	560	16.9%
	Full-time job	1978	59.8%
Household income	<2.0 million yen †	363	11.0%
	2.0–3.9 million	777	23.5%
	4.0–5.9 million	937	28.3%
	6.0–7.9 million	618	18.7%
	8.0–9.9 million	347	10.5%
Medical condition	10.0+ million	266	8.0%
	No disease	2449	73.6%
	Any disease	879	26.4%

† One million yen was about 10,000 U.S. dollars at the time of the survey.

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Table 2 Percentages of subjects who expressed help seeking intentions for mental illness

(a) Sociodemographics

		N	Informal sources		Formal sources			
Gender	Male	1621	967	59.7%	<0.001	1170	72.2%	<0.001
	Female	1687	1274	75.5%		1330	78.8%	
Age	20–29 years	797	530	66.5%	0.483	551	69.1%	<0.001
	30–39	842	584	69.4%		638	75.8%	
	40–49	837	574	68.6%		647	77.3%	
	50–59	832	553	66.5%		664	79.8%	
Education	High school	1066	682	64.0%	<0.001	765	71.8%	0.002
	Junior college/vocational school	905	651	71.9%		706	78.0%	
	University/graduate school	1337	908	67.9%		1029	77.0%	
Marital status	Married	1960	1448	73.9%	<0.001	1543	78.7%	<0.001
	Unmarried	1184	696	58.8%		829	70.0%	
	Divorced/widowed	164	97	59.1%		128	78.0%	
Household	One person	464	251	54.1%	<0.001	326	70.3%	0.004
	More than two people	2844	1990	70.0%		2174	76.4%	
Occupation	No occupation	770	576	74.8%	<0.001	594	77.1%	0.506
	Temporary or part-time job	560	389	69.5%		422	75.4%	
	Full-time job	1978	1276	64.5%		1484	75.0%	
Household income	<2.0 million yen †	363	207	57.0%	<0.001	243	66.9%	<0.001
	2.0–3.9 million	777	498	64.1%		569	73.2%	
	4.0–5.9 million	937	643	68.6%		697	74.4%	
	6.0–7.9 million	618	436	70.6%		490	79.3%	
	8.0–9.9 million	347	259	74.6%		280	80.7%	
	10.0+ million	266	198	74.4%		221	83.1%	

(b) Medical condition and exposure to mental illness

		N	Informal sources		Formal sources			
Medical condition	No disease	2449	1666	68.0%	0.829	1786	72.9%	<0.001
	Any disease	879	400	45.5%		714	81.2%	
Psychiatric history	No	2689	1821	67.7%	0.949	1983	73.7%	<0.001
	Yes	619	420	67.9%		517	83.5%	
Contact with people with mental illness	No	2006	1260	62.8%	<0.001	1421	70.8%	<0.001
	Yes	1302	981	75.3%		1079	82.9%	
Familiar people engaged in psychiatry	No	3157	2125	67.3%	0.015	2382	75.5%	0.452
	Yes	151	116	76.8%		118	78.1%	

(c) Health literacy and belief about professional help

		N	Informal sources		Formal sources			
Health literacy (HLS-14)	Low	1853	1097	59.2%	<0.001	1243	67.1%	<0.001
	High	1455	1144	78.6%		1257	86.4%	
Embarrassment toward professional help	No	1644	1033	62.8%	<0.001	1133	68.9%	<0.001
	Yes	1664	1208	72.6%		1367	82.2%	
Perceived effectiveness of professional help	Negative	287	165	57.5%	<0.001	160	55.7%	<0.001
	Neutral	869	495	57.0%		533	61.3%	
	Positive	2152	1581	73.5%		1807	84.0%	

(d) Social network and attitudes to everyday affairs

		N	Informal sources		Formal sources			
Social network (LSNS-6)	Low	1891	1120	59.2%	<0.001	1360	71.9%	<0.001
	High	1417	1121	79.1%		1140	80.5%	
Tendency to consult about everyday affairs	No	1675	817	48.8%	<0.001	1152	68.8%	<0.001
	Yes	1633	1424	87.2%		1348	82.5%	
Reluctance to get help	No	1713	1220	71.2%	<0.001	1273	74.3%	0.080
	Yes	1595	1021	64.0%		1227	76.9%	

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(e) Neighborhood context

		N	Informal sources			Formal sources		
Communicative neighborhood	No	1221	675	55.3%	<0.001	770	63.1%	<0.001
	Yes	2087	1566	75.0%		1730	82.9%	
Trustful neighborhood	No	2550	1651	64.7%	<0.001	1870	73.3%	<0.001
	Yes	758	590	77.8%		630	83.1%	
Helpful neighborhood	No	2311	1448	62.7%	<0.001	1657	71.7%	<0.001
	Yes	997	793	79.5%		843	84.6%	
Cooperative neighborhood	No	2045	1227	60.0%	<0.001	1434	70.1%	<0.001
	Yes	1263	1014	80.3%		1066	84.4%	

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Table 3 Logistic regression predicting help seeking intentions for mental illness

		Informal sources			Formal sources		
		OR		95%CI	OR		95%CI
Gender	Female	1.18		0.98 1.43	0.98		0.81 1.20
Age	plus 10 years	0.92		0.84 1.01	1.08		0.98 1.19
Education	High school	0.92		0.76 1.11	0.86		0.71 1.04
Marital status	Unmarried	0.77	*	0.61 0.96	0.90		0.71 1.13
	Divorced/widowed	0.60	*	0.40 0.91	0.89		0.57 1.41
Household	One person	1.05		0.80 1.38	0.80		0.60 1.05
Occupation	No occupation	1.14		0.90 1.44	0.85		0.67 1.07
Household income	plus 2 million yen	1.03		0.96 1.10	1.05		0.98 1.13
Medical condition	Any disease	0.94		0.77 1.16	1.52	***	1.20 1.92
Psychiatric history	Yes	0.99		0.79 1.26	1.66	***	1.27 2.17
Contact with people with mental illness	Yes	1.39	***	1.15 1.68	1.27	*	1.05 1.55
Familiar people engaged in psychiatry	Yes	1.03		0.66 1.61	0.80		0.51 1.24
Health literacy (HLS-14)	plus 1 point	1.06	***	1.04 1.07	1.07	***	1.06 1.09
Perceived effectiveness of professional help	Positive	1.43	***	1.26 1.62	2.16	***	1.90 2.45
Social network (LSNS-6)	plus 1 point	1.04	***	1.02 1.06	1.02		0.99 1.03
Tendency to consult about everyday affairs	Yes	5.21	***	4.31 6.30	1.66	***	1.37 2.02
Reluctance to get help	No	1.26	**	1.06 1.50	0.78	**	0.65 0.93
Communicative neighborhood	Yes	1.30	*	1.06 1.58	1.78	***	1.45 2.18
Trustful neighborhood	Yes	0.91		0.68 1.21	0.91		0.67 1.24
Helpful neighborhood	Yes	1.17		0.88 1.56	1.18		0.87 1.61
Cooperative neighborhood	Yes	1.50	***	1.18 1.89	1.22		0.96 1.56

OR: adjusted odds ratio, CI: confidence interval

* p<0.05, ** p<0.01, *** p<0.001

Figure legends

Figure 1 Relationship between individual and neighborhood factors and help seeking intentions for mental illness (hypothesis model)

Figure 2 Path diagram for help seeking intentions for mental illness

Rectangles were observed variables. Ellipses were latent variables. Values on the single-headed arrows were standardized regression weights. Values on the double-headed arrows were correlation coefficients. Model fitness: GFI 0.946; AGFI 0.918; RMSEA 0.072 (90%CI:0.068-0.075)

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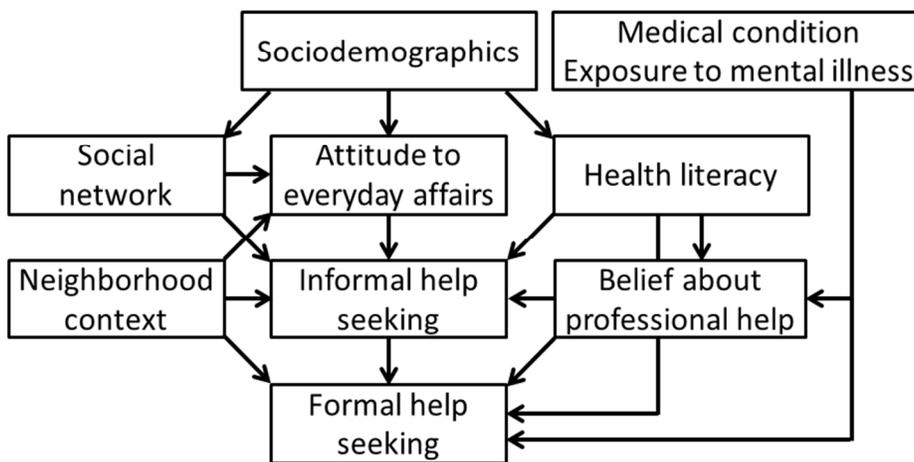
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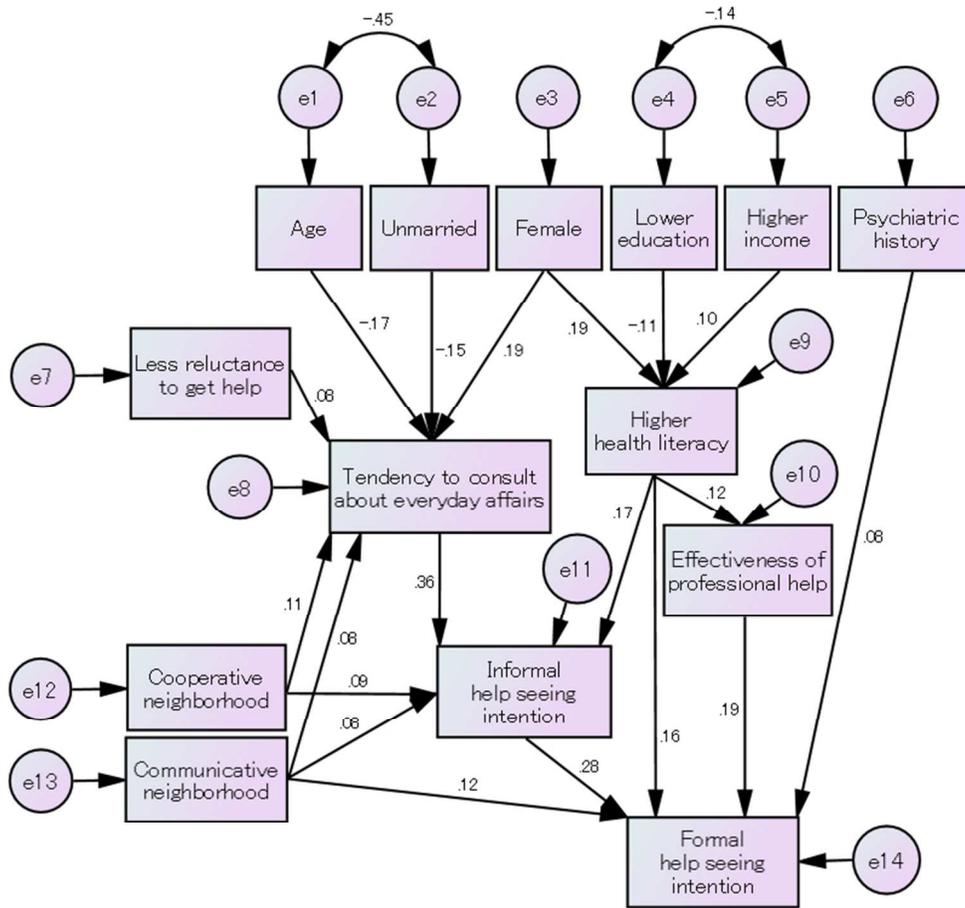
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STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1 ✓	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2 ✓	Explain the scientific background and rationale for the investigation being reported
Objectives	3 ✓	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4 ✓	Present key elements of study design early in the paper
Setting	5 ✓	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6 ✓	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants (b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case
Variables	7 ✓	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8* ✓	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9 ✓	Describe any efforts to address potential sources of bias
Study size	10 ✓	Explain how the study size was arrived at
Quantitative variables	11 ✓	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12 ✓	(a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy (e) Describe any sensitivity analyses

Continued on next page

Results		
Participants	13*✓	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram
Descriptive data	14*✓	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)
Outcome data	15*✓	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results	16✓	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17✓	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results	18✓	Summarise key results with reference to study objectives
Limitations	19✓	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20✓	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21✓	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22✓	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.