

# Self-Reported Symptoms Related to Depression and Suicidal Risk

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## 1. Introduction

Depression is often accompanied by a wide variety of somatic symptoms even when there is no evidence of any organic disorder that can cause such symptoms. Though the underlying mechanism still remains unclear, there are two assumptions explaining the associations between somatic symptoms and depression. One is that depression itself causes several somatic symptoms. That is, people with depression may express their mental conflicts in various somatic symptoms. This hypothesis could apply especially to those who have a vague feeling of stigma or prejudice against mental disorders, and who are reluctant to frankly express their mental symptoms. From another point of view, this might mean that some chronic somatic symptoms are magnified due to the person's depressive state. Another possible hypothesis is that those who have had chronic somatic symptoms of unknown origin, in other words, functional somatic symptoms, are likely to be depressed since they cannot always receive effective medical treatment for such symptoms.

Likewise, people at risk of suicide sometimes express somatic symptoms instead of obvious psychiatric symptoms, such as depressive moods, loss of interest, anxiety, or irritation. Since depression is strongly associated with suicidal risk, it may often be that those who do not show any signs of a depressive state suddenly attempt suicide, especially when they harbor strong feelings against expressing emotional conflicts of the kind described above. Therefore, general physicians should pay close attention to such suicide-related somatic symptoms as possible signs of suicide, and if necessary, take appropriate action, including referring such patients to a psychiatrist.

Previous epidemiological studies suggest that Japanese are generally more likely than Westerners to share a strong prejudice against mental disorders or suicidal ideation and to suppress their emotions and mental symptoms accordingly (Griffiths et al., 2006; Kawakami et al., 2008). Police officers are considered to have this tendency more strongly than the general population (Royle, Keenan, & Farrell, 2009). In such populations, some particular self-reported somatic symptoms may serve as an alternative for detecting depressive disorders or suicidal signs. Furthermore, if such people have a prejudice against mental

disorders, rather than visit a psychiatric clinic, they are more likely to visit a psychosomatic clinic of the kind that has become popular in Japan.

Although many studies have evaluated the associations between somatic symptoms and depression or suicidal risk (Smolderen et al., 2009; Spiegel, Schoenfeld & Naliboff, 2007; Wang et al., 2007, 2009; Yoon et al., 2011), few have evaluated gender differences of such symptoms (Silverstein, 1999, 2002). Likewise, few investigations have evaluated the associations between a wide range of somatic symptoms and depression in both general and clinical populations (Haug, Mykletun & Dahl, 2004; Simon et al., 1999). In one of these reports (Simon et al., 1999), Japanese patients were reported to show the lowest number of depression-related psychological and somatic symptoms among those of 14 countries at the primary care setting. Thus, Japanese cultural characteristics may exert some influence on the relationship between somatic symptoms and depression.

We have conducted a series of epidemiological studies regarding this issue using separate samples of new outpatients visiting a psychosomatic clinic, community residents, and a working population (male police officers). The purpose of the present study is to evaluate the associations among various subjective somatic symptoms and depression as well as the suicidal risk among Japanese clinical, community and working populations. That involves establishing the key contributing elements that might aid in discovering depressive/suicidal signs in the pre-clinical or primary care stage by extracting key somatic symptoms associated with such risk in those populations. Furthermore, focusing on the outpatients who have a major depressive disorder, we evaluated the gender differences in psychiatric symptoms related to suicidal ideation.

## 2. Methods

Three separate samples were included in the present study; i.e., new outpatients of a psychosomatic clinic, community dwellers aged 40 or older, and male police officers in one prefectural police organization. In previously published studies of outpatients (Sugahara et al., 2004; Yoshimasu et al., 2006, 2009), we used several psychological tests, such as State-Trait Anxiety Inventory (STAI) (Spielberger, 1972) or Zung's self-rating depression scale (SDS) (Zung, Richards & Short, 1965), for evaluating their mental and physical status. Since outpatients had too many mental and somatic symptoms, those related to depression or suicidal ideation were narrowed down by an appropriate statistical method (i.e., stepwise selection).

Annual health check-up data were available for the latter two samples (community dwellers and male police officers). In those samples, the relation between each symptom (both mental and somatic) and depression or suicidal risk was assessed. Because depressive symptoms were regarded as confounding factors between somatic symptoms and suicidal risk, we adjusted for depression in multivariate analyses when suicidal risk/ideation was used as an outcome variable.

We also examined the gender differences of somatic symptoms related to suicidal ideation in outpatients visiting the psychosomatic clinic. Furthermore, focusing on the patients who have a major depressive disorder, the gender differences in psychiatric symptoms related to suicidal ideation were evaluated. Those studies were generally approved by the institutional review boards of each corresponding institution.

## **2.1 Outpatients visiting a psychosomatic clinic**

A total of 914 consecutive new patients had check-ups at the Department of Psychosomatic Medicine in a university hospital in the Kyushu area of Japan during the period from June 2000 to March 2001. The Department usually treats primary cases with psychosomatic disorders or mild psychiatric disorders. Patients with psychotic diseases such as schizophrenia or severe depression are not treated in the Department. Those with such disorders are rather treated in the Department of Neuropsychiatry, which is distinct from the Department of Psychosomatic Medicine. In the first stage, an admitting physician interviewed the outpatients. After the interview, the patients were assigned a separate physician (physician in charge). Both the admitting physician and the physician in charge diagnosed each patient independently based on the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV) (American Psychiatric Association, 1994; Japanese edition, 1996).

### **2.1.1 Diagnosis of depression**

Patients were diagnosed with depression if both the admitting physician and the physician in charge confirmed that their symptoms met the diagnostic criteria of major depressive disorder based on the DSM-IV. A total of 335 patients were diagnosed with depression according to those criteria. If both physicians did not diagnose the patients with a major depressive disorder, they were classified in a non-depression group ( $n = 423$ ). The remaining patients ( $n = 156$ ) were excluded from the analysis since a definitive diagnosis of a major depressive disorder could not be obtained.

### **2.1.2 Assessment of suicidal ideation**

The patients were requested to answer questions based on the Kyudai Medical Index (KMI), Kyushu University's original medical index (Matsuoka, 1990), which was developed as a modification of the Cornell Medical Index Health Questionnaire for rapid screening. Each patient was requested to choose between dichotomous answers (yes/no), and to reveal their true intentions with a guarantee of confidentiality. They were also requested to give intuitive responses since prolonged thinking might confuse them. The question regarding suicidal ideation was included in the KMI that asked: "Do you often think you want to die?" If the patients answered "yes," they were regarded as having suicidal ideation. McNemar's test did not reveal any significant differences between this question and the corresponding suicide-related question included in the SDS (data not shown). After patients with missing data of suicidal ideation were excluded, 820 (304 men and 516 women) remained in the analyses.

### **2.1.3 Assessment of somatic symptoms**

KMI includes questions for 45 subjective somatic symptoms (two concerning menstruation were added for women). The patients confirmed the presence of each symptom by yes/no answers to the corresponding questions. At the same time, they were asked to note the three symptoms that were causing them the most distress, and how long they had been suffering from these symptoms, since information regarding chief complaints is important in clinical setting. The three most distressing symptoms were checked with the original health

questionnaire, and were also later identified by the admitting physician at the first interview.

#### **2.1.4 Statistical analysis**

In our analyses of the associations between somatic symptoms and depression, those somatic symptoms identified as the three most distressing ones were used. Since some of the three most distressing symptoms were psychiatric, we also evaluated the associations between those symptoms and depression. Somatic symptoms included in the KMI were used in the analyses for associations between those somatic symptoms and suicidal ideation. In the multivariate logistic regression models, depression and suicidal ideation were used as outcome variables, while somatic symptoms were used as the explanatory variables. A stepwise method was applied to narrow down the somatic symptoms that were significantly associated with depression or suicidal ideation. The number of subjects included in the regression models varied according to each calculating algorithm due to the missing values of the relevant factors to be adjusted for. In addition, the gender differences in psychiatric symptoms related to suicidal ideation were assessed in patients with major depressive disorders by logistic regression analysis using the stepwise method. In this analysis, the candidates' psychiatric symptoms considered to be related to suicidal ideation were chosen from the KMI.

#### **2.2 Community dwellers**

Town A (total population, approximately 8000) and Town B (total population, approximately 7000) are both located in the middle of Wakayama Prefecture, the Kinki area in Japan. To detect lifestyle-related diseases such as metabolic syndrome, those towns provided an annual health check-up program for self-employed community dwellers and their family members aged 40-74 years. In 2008, a total of 3656 people aged 40-74 years were eligible for the annual health check-up program, and 686 underwent a health check-up from May through August. Among those, 452 agreed to participate in the study.

##### **2.2.1 Assessment of depression and suicidal risk**

The Mini-International Neuropsychiatric Interview (M.I.N.I.), Japanese version 5.0.0 (2003) (Sheehan et al., 1998; Sheehan & Lecrubier, 2003), a conveniently structured tool designed to identify cases of mental disorder, was used for the present interview survey. The reliability and validity of the Japanese version of the M.I.N.I. were reported to be satisfactory (Otsubo et al., 2005). A total of nine interviewers, all of whom were licensed doctors or nurses, were enrolled as competent to conduct the interviews. The first author (KY), a psychiatrist, trained them in essential interview skills, including didactic sessions of a general interview, or reviews of the instrument sections. The first author also checked the interviewers and corrected them as the need arose during the sessions so that the interview could be appropriately conducted. Thus, the diagnosis of major depressive disorder was conducted according to the diagnostic criteria of DSM-IV.

The suicidal risk of each person was measured by six relevant items included in the M.I.N.I., five of which were concerned with suicidal thoughts or behaviors within the previous one-month, while one item dealt with lifetime experiences of suicidal attempts according to the

weighted value of each question; points 1, 2, 6, and 10 (comprising two questions) were allotted for each response to the former five questions, and point 4 was allotted to the last response regarding lifetime experiences of suicidal attempts. More concretely, they were: a wish to die (point 1), a desire to harm oneself (point 2), suicidal thoughts (point 6), having a suicide plan (point 10), suicide attempts (point 10) (all five of which were events occurring in the past month), and life-time suicide attempts (point 4). This scoring system is in accordance with the M.I.N.I. 5.0.0 (January 1, 2003). Thus, a total score of 33 showed the maximum points for suicidal risk. All questions included in the M.I.N.I. were coded as two categories according to the respondents' yes/no answers. Subjects who scored more than 0 were regarded as possibly having a suicidal risk.

### **2.2.2 Assessment of somatic symptoms**

An annual health examination for self-employed community dwellers in those towns was conducted during the period from May to July 2008. The health examination was comprised of several basic examinations and a doctor's check-up based on one's self-reported medical history and symptoms as confirmed by a self-administered questionnaire. The questionnaire included items regarding lifestyle factors, past and current illnesses as well as their current treatment status and self-reported symptoms. Because this health examination mainly focused on the secondary prevention of lifestyle-related diseases, a checklist included in the questionnaire for such symptoms contained a variety of 18 current physical symptoms, including those of the respiratory, cardiovascular, or digestive organs. Based on the information from this checklist, any associations between self-reported physical symptoms and depression as well as suicidal risk were assessed.

### **2.2.3 Statistical analysis**

Logistic regression analyses were conducted using depression and suicidal risk as outcome variables and somatic symptoms as explanatory variables. Age, sex, and two basic depressive symptoms that were used for the screening of major depressive disorders were controlled when suicidal risk was used as an outcome variable. Using logistic regression analysis, we also evaluated the associations between psychiatric symptoms of major depressive disorder as well as dysthymia and suicidal risk.

## **2.3 Male police officers**

A total of 2399 employees at 18 stations of one prefectural police organization in the Kinki area of Japan underwent annual health checkups from May to July 2008. The number of police officers amounted to approximately 1% of all Japanese police officers. However, the characteristics of each prefectural police organization in Japan are standardized and strictly controlled by the National Police Agency. Thus, our sample would be representative of the entire Japanese police organization. Of these, 2100 (87.5%) agreed to participate in the study. After excluding female police officers whose suicidal rate is negligibly few, and clerical workers that might impede the homogenous characteristic of the study sample, 1718 male police officers remained in the analyses. Further 33 officers with missing information regarding suicidal risk were excluded in the analyses for evaluating the associations between somatic symptoms and suicidal risk.

### **2.3.1 Assessments of depression and suicidal risk**

Assessments of depression and suicidal risk were conducted in the same manner as for community dwellers using M.I.N.I. as described above. Furthermore, assessments of post-traumatic stress disorders (PTSD) by M.I.N.I. were included for the police officers.

### **2.3.2 Assessment of somatic symptoms**

As with community dwellers, annual health check-up data confirmed by self-administered questionnaires were used for the assessment of somatic symptoms. Since the secondary prevention of the lifestyle-related diseases was the main purpose of the health examination in both community dwellers and the workplace, this checklist included in the questionnaire also contained a variety of 22 current physical symptoms, including those of the respiratory, cardiovascular, or digestive organs.

### **2.3.3 Statistical analysis**

As in the previous two samples described above, logistic regression analyses were performed using depression and suicidal risk as the outcome variables and somatic symptoms as the explanatory variables. Age, two basic depressive and three PTSD symptoms that were used for the screening of major depressive disorder and PTSD, respectively, were controlled when suicidal risk was used as an outcome variable. We also evaluated the associations between psychiatric symptoms of major depressive disorder, PTSD as well as dysthymia, and suicidal risk by logistic regression analyses.

## **3. Results**

Several somatic symptoms were shown to be significantly associated with suicidal ideation or suicidal risk in the three populations, even after adjusting for depression and/or PTSD. Among outpatients, women showed a wider variety of somatic symptoms related to depression than men. Some differences among the outpatients were observed regarding somatic symptoms associated with depression between men and women.

In community dwellers and male police officers, the somatic symptoms significantly associated with the suicidal risk were limited. On the other hand, a variety of symptoms were significantly associated with depression in those populations.

### **3.1 Somatic symptoms associated with suicidal ideation in outpatients visiting a psychosomatic clinic**

Table 1 shows somatic symptoms significantly associated with suicidal ideation among the outpatients separately for men and women. Women showed a somewhat wider variety of somatic symptoms compared to men. There were no common symptoms significantly associated with suicidal ideation in either men or women.

### **3.2 Somatic symptoms associated with suicidal risk in community dwellers and male police officers**

Those somatic symptoms associated with suicidal risk in community dwellers and male police officers were shown in Table 2.

| Men ( <i>n</i> =177)                             | Women ( <i>n</i> =216)                   |
|--|--|
| <b>Somatic symptoms (OR, 95% CI)<sup>a</sup></b> |  |
| General fatigue (4.1, 1.0-16.3)                  | Lack of persistence (3.5, 1.6-8.1)       |
| Difficulty breathing (9.3, 2.6-33.4)             | Chest pain (2.6, 1.0-6.7)                |
|  | Edema (4.5, 1.8-11.1)                    |
|  | Tinnitus (3.8, 1.5-9.8)                  |
|  | Difficulty falling asleep (2.8, 1.3-6.1) |
|  | Frequent dreams (3.3, 1.2-8.9)           |

<sup>a</sup> Variables are selected using a stepwise method in simultaneously adjusted multivariate analyses. Adjusted for age and total score of a self-rating depression scale.

Table 1. Somatic symptoms significantly associated with suicidal ideation in outpatients visiting a university psychosomatic clinic in Japan (Yoshimasu et al., 2009).

| Community dwellers ( <i>n</i> =452) <sup>a</sup>     | Male police officers ( <i>n</i> =1685)                |
|--|---|
| <b>Somatic symptoms (OR, 95% CI)<sup>b</sup></b>     |   |
| Dysesthesia, arthralgia, and swelling (2.7, 1.1-6.5) | Headaches (2.7, 1.2-6.4)                              |
|  | Feelings of constriction in the throat (2.7, 1.0-6.9) |
|  | Abdominal pain (3.2, 1.3-7.8)                         |

<sup>a</sup> *n*=183 for men, 269 for women.

<sup>b</sup> Adjusted for sex, age, and basic symptoms of major depressive disorder for community dwellers; age and basic symptoms of major depressive disorder as well as post-traumatic stress disorder for male police officers.

Table 2. Somatic symptoms significantly associated with suicidal risk among community dwellers (Takemura et al., 2011) and male police officers in Japan (Yoshimasu et al., 2011).

Once mental symptoms of depression and/or PTSD were adjusted for, the somatic symptoms significantly associated with suicidal risk in those populations were diminished. Interestingly, pain-related symptoms were significantly associated with an increased suicidal risk in both community dwellers and police officers.

### 3.3 Somatic symptoms associated with depression in outpatients visiting a psychosomatic clinic

Table 3 shows somatic symptoms significantly associated with depression in outpatients separately for men and women. Sleep disturbance, loss of appetite, and general fatigue were common symptoms associated with depression in both men and women. Diarrhea, excessive sweating, and weight loss were significantly associated with an increased risk of depression only in men, while headaches and dysesthesia were associated with such a risk only in women.

| Men ( <i>n</i> =259)                       | Women ( <i>n</i> =471)           |
|--|----------------------------------|
| Somatic symptoms (OR, 95% CI) <sup>a</sup> |                                  |
| Sleep disturbance (2.2, 1.2-4.2)           | Sleep disturbance (3.9, 2.4-6.2) |
| Loss of appetite (5.8, 1.8-18.3)           | Loss of appetite (5.4, 2.3-12.5) |
| General fatigue (5.0, 1.4-18.5)            | General fatigue (2.9, 1.3-6.7)   |
| Diarrhea (5.0, 1.7-14.5)                   | Headaches (3.4, 1.7-6.6)         |
| Excessive sweating (10.5, 1.9-57.6)        | Dysthesia (3.7, 1.1-12.7)        |
| Weight loss (5.1, 1.0-25.0)                |                                  |

<sup>a</sup> Variables are selected using a stepwise method in simultaneously adjusted multivariate analyses. Age was also adjusted for.

Table 3. Somatic symptoms significantly associated with depression in outpatients visiting a university psychosomatic clinic in Japan (Sugahara et al., 2004).

### 3.4 Somatic symptoms associated with depression in community dwellers and male police officers

Somatic symptoms significantly associated with depression in community dwellers and male police officers are shown in Table 4. A variety of somatic symptoms were significantly associated with depression in those samples. Fatigue and pain-related symptoms, such as headaches, abdominal pain, and chest pain, were commonly associated with depression in those populations. In contrast to the symptoms related to suicidal risk, police officers showed somewhat fewer somatic symptoms associated with depression.

| Community dwellers ( <i>n</i> =452) <sup>a</sup>                            | Male police officers ( <i>n</i> =1718)            |
|---|---|
| Somatic symptoms (OR, 95% CI) <sup>b</sup>                                  |   |
| General fatigue (5.5, 1.4-21.3)   | Easily fatigued (5.6, 2.1-15.3)                   |
| Insomnia (4.9, 1.1-21.7)  | Headaches (9.0, 3.2-25.2)                         |
| Abdominal pain (20.3, 3.2-129)  | Chest pain during exercise (6.4, 1.4-29.4)        |
| Heavy stomach (6.3, 1.2-34.3)   | Dizziness (8.4, 2.6-27.4)                         |
| Nausea/heartburn (5.8, 1.1-31.4)  | Feeling of constriction in throat (4.4, 1.2-15.8) |
| Headache/heavy headedness/<br>eye strain/shoulder stiffness (5.2, 1.2-21.7) | Abdominal pain (4.1, 1.2-15.0)                    |
| Vertigo/ dizziness (45.6, 9.6-217)  |   |
| Palpitation/shortness of breath (12.5, 2.8-56.5)                            |   |
| Pain or constriction in the chest (11.0, 1.1-112)                           |   |
| Dysesthesia, arthralgia, and swelling (6.8, 1.6-28.1)                       |   |

<sup>a</sup> *n*=183 for men, 269 for women.

<sup>b</sup> Adjusted for sex and age for community dwellers and age for male police officers.

Table 4. Somatic symptoms significantly associated with depression in community dwellers (Takemura et al., 2011) and male police officers in Japan (unpublished data).



### 3.5 Gender differences in psychiatric symptoms related to suicidal ideation in outpatients with major depressive disorder

Psychiatric symptoms significantly associated with suicidal ideation in patients with major depressive disorder were shown separately for men and women in Table 5. Low perceived support from workplace or family members and depersonalization were significantly associated with suicidal ideation in men, whereas derealization, depressive mood, and state anxiety assessed by STAI were significantly associated with such ideation in women.

| Men ( <i>n</i> =66)                                  | Women ( <i>n</i> =133)          |
|--|---------------------------------|
| <b>Psychiatric symptoms (OR, 95% CI)<sup>a</sup></b> |                                 |
| Low perceived social/family support (13.2, 2.1-84.6) | Derealization (3.2, 1.4-7.4)    |
| Depersonalization (5.1, 1.5-17.6)                    | Depressive mood (4.9, 1.8-13.1) |
|  | State anxiety (4.2, 1.2-14.4)   |

<sup>a</sup> Variables are selected using a stepwise method in simultaneously adjusted multivariate analyses. Age was also adjusted for.

Table 5. Psychiatric symptoms significantly associated with suicidal ideation in outpatients with a major depressive disorder (Yoshimasu et al., 2006).

### 3.6 Associations between depressive symptoms and suicidal risk

Associations between depression-related psychiatric symptoms and suicidal risk were assessed among the community dwellers and male police officers using diagnostic criteria of DSM-IV described in the M.I.N.I. "Depressive mood" and "loss of interest" which are DSM-IV screening symptoms for major depressive disorder, were strongly associated with suicidal ideation in both community dwellers and male police officers (data not shown). Those two symptoms identified as the three most distressing ones were also found to be significantly or marginally significantly associated with depression in both male and female outpatients (data not shown). In addition, "chronic depressive mood," which is a DSM-IV screening symptom for dysthymia, was significantly associated with suicidal risk in male police officers (OR 49.2, 95% CI 9.5-254.9).

## 4. Discussion

### 4.1 Somatic symptoms associated with suicidal ideation or suicidal risk

In patients visiting a psychosomatic clinic, women showed a broader range of somatic symptoms related to suicidal ideation compared to men. Two of those were symptoms related to sleep disturbance. Together with other symptoms, such as feelings of edema and chest pain, which seemed to be related to autonomic ataxia, women are prone to express symptoms related to somatoform autonomic dysfunction defined by the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10), as possible signs of suicide.

Pain-related symptoms in clinical, community, and occupational samples, such as chest pain, headaches, abdominal pain, and arthralgia, were significantly associated with suicidal

ideation/risk even after adjusting for depression. These results suggest that pain-related symptoms should be regarded as critical signs of suicide even when the subjects show no obvious psychiatric symptoms of depression.

In a comparison between community dwellers and male police officers, it should be noted that community dwellers showed only one symptom associated with suicidal risk, while police officers had three somatic symptoms even after adjusting for the effect of depression. In contrast, more somatic symptoms associated with depression were observed in community dwellers compared to male police officers. These findings suggest a hypothesis that the associations between somatic symptoms and suicidal risk in community dwellers can be explained by the effects of depression. In other words, the somatic symptoms associated with suicidal risk in those people might be due to depression intervening between those somatic symptoms and suicidal risk.

On the other hand, three somatic symptoms remained significant after adjusting for depression in male police officers. In general, police officers are more likely to harbor a prejudice or stigma against mental disorders compared to the general population (Royle, Keenan, & Farrell, 2009) since they hate to be regarded as mentally as well as physically weak. Consequently, even if they had some suicide-related mental symptoms (i.e., depressive symptoms), such symptoms might be replaced by somatic ones that the police officers did not want to conceal. In another case, those somatic symptoms might be connected with "masked depression," which has somatic rather than mental symptoms, and which is also considered to be associated with suicidal risk (Sarai, 1994). As mentioned above, since police officers tend to suppress their mental problems, it is very likely that they may express somatic symptoms related to masked depression rather than mental symptoms, even when they are actually suffering from depression. In any case, it is clear that the relationship between somatic symptoms and suicidal risk in police officers could not be adequately explained by mental symptoms such as depression or post-traumatic stress disorder when compared to community dwellers.

#### **4.2 Somatic symptoms associated with depression**

Since outpatients had exhibited very miscellaneous somatic symptoms associated with depression, those symptoms were narrowed down by a stepwise method. Problems related to sleep, appetite, and general conditions were associated with depression in both men and women. Diarrhea and weight loss were significantly associated with depression in male patients, which suggests that they are vulnerable to such stressors related to the digestive organs. On the other hand, headaches remained significantly associated with depression in women. Thus, such symptoms might be useful for detecting depression at the primary care stage.

Community dwellers and male police officers often exhibited similar somatic symptoms associated with depression, many of which were pain-related, such as headaches, chest pain, and abdominal pain. Although we did not always confirm organic disorders among such people, pain-causing conditions such as stomach or duodenal ulcers were reported to be significantly associated with depression, and functional disability could, to a great extent, explain those associations (Stegmann et al., 2010). Such functional disability related to physical pain might pose a burden to mental conditions among those people.

In addition, it should be noted that vertigo or dizziness were significantly associated with depression in both community dwellers and police officers, while 95% confidence intervals were extremely wide due to the small number of subjects showing such symptoms. Mild vertigo or dizziness itself is generally not troublesome enough to lead people to consult a physician as long as those symptoms are not accompanied by other painful symptoms. Thus, the strong associations between those symptoms and depression observed in non-clinical populations have a very significant meaning. Namely, people with dizziness suffering from depression may not consult even a general practitioner, to say nothing of a psychiatrist, resulting in delaying the detection of their depression.

From another point of view, we could integrate all of those depression-related somatic symptoms into a somatoform autonomic dysfunction on the assumption that such people did not suffer from any organic diseases. In Japan, a diagnosis of "autonomic ataxia," which is a similar concept with somatoform autonomic dysfunction, is often used instead of depression even when the patients actually suffer from depression, since patients dislike such a diagnosis to be recorded on their medical certificates (Ohkuma, 2008). The present findings, however, suggest that using a diagnosis of somatoform autonomic dysfunction instead of depression is not necessarily wrong. Community dwellers and male police officers with a major depressive disorder were found to have somatic symptoms related to the somatoform autonomic dysfunction described in ICD-10.

As mentioned in the Introduction, Japanese patients at the primary care stage were shown to report fewer depression-related mental and somatic symptoms (e.g., sleep or appetite problems) compared to those in other countries (Simon et al., 1999). Therefore, significant associations between some somatic symptoms and a diagnosis of depression observed in the current samples are considered to have a significant meaning for detecting mood disorders at an early stage.

### **4.3 Gender differences in psychiatric symptoms related to suicidal ideation in outpatients with major depressive disorder**

By using KMI that includes a wide variety of somatic and psychiatric symptoms, we can evaluate the gender differences in psychiatric symptoms associated with suicidal ideation in patients with major depression. Symptoms related to emotions and one's identity were significantly associated with suicidal ideation in women, while depersonalization was associated with suicidal ideation in men. It should be noted that perceived low support from family or colleagues was significantly associated with suicidal ideation in men but not in women. This means that men with depression are more likely than women to seek help or support from those close to them. It is important to provide appropriate support for men with depression to prevent suicidal inclinations.

## **5. Limitations**

Three major limitations could be considered in the current sequence of studies. One is representative of the present samples. The clinical sample of outpatients could represent patients of Japanese psychosomatic clinics in other university hospitals, since the university hospital enrolled in the current study was one of only several such hospitals that had a psychosomatic clinic in Japan at the time of the survey. However, it is uncertain whether

those outpatients were representative of the psychosomatic clinics of general practitioners. We confirmed, however, that approximately half of them were walk-in patients, although new patients were to be referrals at the university hospital.

Any representatives of the other two samples were also somewhat problematic. Community dwellers were limited to those aged 40 or older and self-employed in a rural area, resulting in a dearth of information regarding young salaried workers. Furthermore, in such a small community, people are generally reluctant to speak about their mental problems since they worry about what their neighbors will think of them. This tendency is considered to be conspicuous among elderly people who have scant knowledge about mental disorders. Thus, our sample of the community dwellers is not always considered to represent the community population as a whole.

Police officers are also unique in the kind of jobs described above. Police organization is characterized by its hierarchical ethical system, and the police officers are constrained by strict rules and regulations. Topics regarding suicide are taboo within the organization. It is thought outrageous that police officers should commit suicide using their handgun, since such an action would lead to a loss of prestige for the police organization. In such an atmosphere, it is difficult for them to speak frankly about their mental conflict to one another. Given these constraints, it is unlikely that police officers are typical of other male salaried workers.

Another major limitation is the clinical usefulness of somatic symptoms that were found to be associated with depression or suicidal risk. That is, such symptoms are not always considered to show sufficient sensitivity and specificity for detecting depression or suicidal risk. In other words, those somatic symptoms are widespread, and could be encountered in ordinary lives and a variety of physical disorders. However, clinicians do not make diagnoses of depression nor predict suicide based only on somatic symptoms. They always integrate various kinds of information such as clinical history, life history, lifestyle, and family history. During the process of diagnosing patients, some somatic symptoms may be seen to play an important role for clinicians in predicting depression or suicidal risk, especially when patients exhibit no organic disorders or obvious mood problems. In our series of studies, several symptoms were shown to be strongly associated with depression or suicidal risk (odds ratio of five or more). Such symptoms could provide clues for detecting depression or suicidal risk.

Last, although we assumed that our samples did not include severe organic disorders that might accompany painful somatic symptoms, we did not confirm this, especially in community dwellers and male police officers. Therefore, some of those somatic symptoms associated with mental adversity may directly stem from the organic disorders that produce those symptoms. This might be plausible in the community dwellers given relatively old age of them (mean age = 62.5). Indeed, somatic illness was reported to be one of the main predictors of depressive disorders in elderly people (Djernes, 2006). However, we think that our sample of community dwellers were generally healthy as the purpose of the annual health check-up was secondary prevention of the diseases, and those who had severe somatic disorders are considered not to have such a health check-up since they are usually followed by physicians in hospitals. Even if some of the community dwellers had severe organic disorders, we consider that the association of those

symptoms with depression or suicidal risk have important clinical implications for the early detection of a mental crisis.

## 6. Conclusions

It is quite natural to conclude that depressive psychiatric symptoms are associated with suicidal risk, a finding also observed in our samples. However, as shown in the findings from male police officers, some somatic symptoms were associated with suicidal risk independently of depressive symptoms. This indicates that people without any depressive signs might possibly commit suicide. In that sense, such somatic symptoms associated with suicidal risk may provide very useful markers for suicide prevention, which is why we described issues regarding suicidal risk ahead of depression.

In summary, there are two models regarding the relationships among somatic symptoms, depression, and suicidal risk (Fig. 1). Model A can be applied to community dwellers in which the associations between suicidal risk and somatic symptoms are explained by interactive effects between those symptoms. On the other hand, model B shows a typical pattern of police organization in which regulations rigidly constrain the police officers. In this model, at first glance, some somatic symptoms are directly connected with suicide independently of depression. However, there may also be latent effects of depression in this pattern (though they can not be necessarily confirmed).

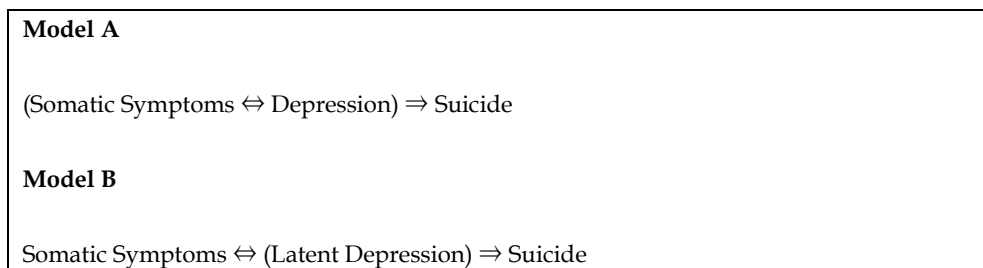


Fig. 1. Relationships among somatic symptoms, depression, and suicide: two models are assumed.

In model A, it would be appropriate to treat them together with somatic symptoms and depression for suicide prevention. In model B, it is difficult to readily understand the relation between somatic symptoms and suicidal risk. However, some of those somatic symptoms may provide critical signs of a potential suicidal risk, especially among those who are reluctant to frankly express their mental problems due to some kind of stigma or prejudice. Clinicians should pay close attention to such symptoms; for example, those shown in our police officers' sample, to prevent suicide among people at the primary care or pre-clinical stages.

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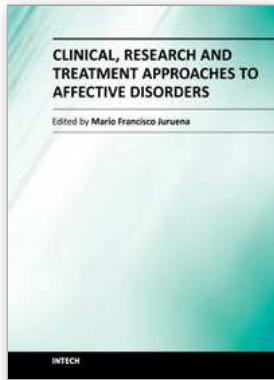
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## **Clinical, Research and Treatment Approaches to Affective Disorders**

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The causes, development and outcomes of disorders are determined by the relationship of psychological, social and cultural factors with biochemistry and physiology. Biochemistry and physiology are not disconnected and different from the rest of our experiences and life events. This system is based on current studies that report that the brain and its cognitive processes show a fantastic synchronization. Written by the foremost experts on Affective Disorders worldwide, this book is characterized by its innovative, refreshing, and highly sensitive perspective on current knowledge of diagnostic, neurobiology, early life stress and treatment of Mood Disorders. The authors share a deep understanding of unique challenges and difficulties involved in Affective Disorders, and have achieved a balance among clinical, research and new treatment approaches to Affective Disorders. The chapters are written in a comprehensive, easily readable, and highly accessible style, stimulating readers, clinicians and researchers.

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