

Original Research
**Subjective Symptoms Related to Suicide Risk
in Japanese Male Police Officers**

Kouichi Yoshimasu, M.D.^{1, ✉}, **Jin Fukumoto, M.D.**¹, **Shigeki Takemura, M.D.**¹,
Maki Shiozaki, R.N.^{1,2}, **Hiroichi Yamamoto, M.D.**³, and **Kazuhisa Miyashita, M.D.**¹

¹Department of Hygiene, School of Medicine, Wakayama Medical University

²Welfare Section, Headquarters of the Wakayama Prefectural Police

³Osaka Occupational Health Service Center, Japan Industrial Safety and Health Association

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Abstract: The purpose of the present study is to evaluate the association between self-reported physical and mental symptoms and suicide risk in Japanese male police officers. Subjects were 1685 such officers in one prefectural police organization. A brief structured diagnostic psychiatric interview, the Mini-International Neuropsychiatric Interview (M.I.N.I.), elicited the basic symptoms of major depressive disorder (MDD), dysthymia, and post traumatic stress disorder (PTSD) as well as the level of suicide risk. Information regarding self-reported physical symptoms was obtained from a checklist used in an annual health checkup. Suicide risk was evaluated by the six relevant questions in the M.I.N.I. Logistic regression analysis was used to calculate odds ratios and 95% confidence intervals. All basic (screening) mental symptoms related to MDD, dysthymia, and PTSD as well as diagnoses of those disorders were statistically significantly associated with an increased suicide risk, except for experiences of traumatic events and a diagnosis of PTSD (due to no subjects with PTSD). Among somatic symptoms, headache, a sense of constriction in the throat, and abdominal pain were significantly associated with an increased suicide risk. Furthermore, palpitation and several gastrointestinal symptoms such as pain at evacuation, abdominal pain, and diarrhea were strongly associated with a moderate or high suicide risk, even after adjusting for MDD and PTSD symptoms. In addition to mental symptoms of depression and PTSD, several somatic symptoms, especially those related to digestive organs, should be noted as possible precursors of a police officer's suicide risk.

Keywords: epidemiology, Japanese police officer, subjective symptoms, suicide

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Although the suicide rates of police officers were reported to be no higher than those of general populations (Hem, Berg, & Ekeberg, 2001; Marzuk et al., 2002), policemen are in general more likely to be exposed to various psychosocial stressors such as adverse life events occasionally leading to serious suicidal acts. A recent US epidemiological study showed that the prevalence of suicidal ideation significantly increased among policemen with higher levels of post-traumatic stress disorder (PTSD)

symptoms together with increasing hours on shift work (Violanti et al., 2008).

Although suicide prevention including some psychiatric evaluations is a serious concern in police organization, it should be noted that police officers generally tend to worry that psychiatric evaluations can result in job sanctions, missed promotions, or stigmatization (Marzuk et al., 2002). A Norwegian study suggested that many police officers tended not to seek help for their psychological problems but instead to present their symptoms as somatic pain, even when their level of mental distress was high (Berg et al., 2006). In this regard, it should be noted that abundant evidence has been accumulated regarding the relationship between suicide risk and

✉ Kouichi Yoshimasu, M.D.
Department of Hygiene, School of Medicine
Wakayama Medical University
811-1 Kimiidera, Wakayama 641-0012
Japan
Tel: (+81) 73-441-0646
Fax: (+81) 73-441-0646
E-mail: kyoshi@wakayama-med.ac.jp

chronic abdominal pain or irritable bowel syndrome (IBS) (Miller, Hopkins, & Whorwell, 2004; Spiegel, Schoenfeld, & Naliboff, 2007), or headache (Wang et al., 2007, 2009; Woolley et al., 2008). Furthermore, general fatigue and difficulty breathing have been reported to be associated with suicidal ideation in Japanese patients visiting a psychosomatic clinic (Yoshimasu et al., 2009). Therefore, such symptoms are supposed to be related to suicide risk especially in police officers, since they generally harbor a strong prejudice against mental disorders (Royle, Keenan, & Farrell, 2009).

In addition, Japanese are generally more likely than Westerners to share a strong prejudice against mental disorders or suicidal ideation (Griffiths et al., 2006), and to suppress their emotions accordingly, a finding also partially supported by the World Mental Health Japan Survey showing a lower prevalence of mood and anxiety disorders in Japan than in US or Europe (Kawakami et al., 2008). In this connection, there has been evidence showing that culture influences symptom formation or organization into syndromes (Escobar & Gureje, 2007; Kirmayer & Sartorius, 2007).

These facts suggest that Japanese police officers prone to suicide risk may be likely to transform their mental conflicts into somatic symptoms, since they are less reluctant to express such symptoms compared with mental ones. Reporting somatic symptoms was also considered to be a useful indicator of job stress among Japanese office workers (Nomura et al., 2007). Although numerous studies have reported a significant association between a major depressive disorder (MDD), dysthymia, as well as PTSD, and the incidence of suicide (Sher, 2008; Panagioti, Gooding, & Tarrier, 2009; Witte et al., 2009), such an association in the case of Japanese police officers should be reconsidered; thus while the context of above-mentioned viewpoints focused on Japanese cultural characteristics, those characteristics peculiar to police organizations also must be taken into account.

Thus, the purpose of the present study is to evaluate the association between various subjective mental and physical symptoms and the suicide risk among Japanese policemen. That involves establishing the key contributing elements that might aid in discovering suicidal signs in the pre-clinical or primary care stage by extracting key symptoms associated with suicide risk in those police officers. To our knowledge, this is the first study to investigate that issue in a Japanese police organization.

Methods

Subjects

Our subjects were 2399 employees at 18 stations of one prefectural police organization in the Kinki area of Japan who underwent annual health checkups from May to July 2008. The number of officers in this police organization 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. All police stations in that prefecture were included in the present survey. The investigators encouraged all employees to enroll in the study, 2100 of whom (87.5%) agreed to participate in an interview survey regarding mental disorders. Among those who agreed, 89 female police officers and 293 clerical workers who were not uniformed personnel were excluded. Female officers were excluded because their suicide rates are negligible in Japan (Community Safety Planning Division, Community Safety Bureau, National Police Agency, Japan, 2009). This left 1718 male police officers as eligible subjects. Finally, those with missing values regarding suicide risk were excluded, leaving 1685 policemen remaining for the analysis. There was no significant difference in age between those excluded and those remaining (44.2 vs. 40.9, $P = 0.12$).

Psychiatric structured interview

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 the general interview, or reviews of the instrument sections. Furthermore, the first author checked the interviewers and corrected them as the need arose during the interview sessions so that the interview could be appropriately conducted. The M.I.N.I. deals with 17 Axis I mental disorders based on the standard of a 12-month prevalence of 0.5% or more (Sheehan et al., 1998), among which we chose MDD, dysthymia, and PTSD as candidate disorders strongly associated with an increasing suicide risk to policemen. The screening questions essential for the diagnoses of these disorders were put to all subjects. If their mental symptoms satisfied those questions, more detailed questions were used to arrive at a final diagnosis of each disorder.

Suicide Risk

The suicide risk of each police officer 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 suicide 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 suicide 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 M.I.N.I. 5.0.0 (January 1, 2004).

Thus, a total score of 33 showed the maximum points for suicide risk. All questions included in the M.I.N.I. were coded as two categories according to the respondents' yes/ no answers. The calculated score reflected the severity of the present suicide risk of each police officer. The severity of the suicide risk was divided into three strata in the analyses based on this total score; i.e., none (0), low (1-5), and moderate (6-9) or high (10+) (Table 1).

Medical examination

An annual health examination for all employees in the prefectural police organization 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 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 22 current physical symptoms, including those of the respiratory, cardiovascular, or digestive organs, and one mental symptom addressing problems of agitation or anxiety. Based on the information from this checklist, any associations between self-reported physical symptoms and suicide risk were assessed.

This checklist was a ready-made system review suitable for use in routine physical checkups developed by an organization responsible for the health examinations, and was designed in accordance with one proposed by the Japanese Ministry of Health, Labor and Welfare. It also covered two questions about anxiety-related mental and somatic symptoms and one question about general somatic symptoms from the Hamilton Depression Rating Scale (HAM-D17) (Hamilton, 1967). In addition,

some questions were also considered to reflect the symptoms of somatoform autonomic dysfunction, which might be related to depressive symptoms. The severities of those symptoms were divided into two simple categories, i.e., present or absent, according to the corresponding responses of each police officer.

Statistical analysis

Logistic regression analysis was used to obtain odds ratios (ORs) and 95% confidence intervals (CIs). The dependent variable in that analysis was suicide risk, which was divided into two further categories according to the total score of the corresponding questions included in the M.I.N.I. Subjects with a score of zero were regarded as the referent group showing no symptoms of suicide risk, while those scoring more than zero were regarded as running some level of suicide risk. At the same time, for incorporating the severity of the suicide risk into the analysis, we compared subjects with moderate or high suicide risk and those with low suicide risk separately to those with no suicide risk. In these analyses, subjects with a low suicide risk and those with moderate or high suicide risk were not included, respectively. Trends of ORs (low vs. moderate or high suicide risk) were also assessed in a regression model using the presence of each somatic symptom as an outcome variable.

First, the associations between suicide risk and each of the basic psychiatric symptoms of MDD, dysthymia, and PTSD as well as those final diagnoses were evaluated. The association between suicide risk and a final diagnosis of PTSD could not be evaluated since there were no subjects with the latter. The screening questions dealing with essential symptoms for the diagnosis of relevant mental disorders were used for the analysis. Such questions were related to symptoms of a loss of interest and a depressive mood for MDD, a chronic depressive state for dysthymia, lifetime experiences of traumatic events, a visible reaction of shivering during or following those events and, when such reactions occurred, flashbacks of those events within the last month for PTSD. Each symptom was regarded as positive for respondents who answered 'yes' to the corresponding questions. Next, the association between suicide risk and physical symptoms was also evaluated. The above-mentioned 22 physical symptoms were ascertained using a self-reported checklist. As with the analyses of psychiatric symptoms, each physical symptom was regarded as positive if the subjects reported experiencing such a symptom. The independent variables were indicator variables representing the categories of each psychiatric or physical symptom, and were all divided into two categories, i.e., positive or negative.

Table 1. Distributions of Positive Screening Symptoms, Final Diagnoses and Severity of Suicide Risk in Male Police Officers (n = 1685)

| Mental disorders | Positive screening symptoms n (% of total) ^a | Final diagnosis n (% of total) |
|---------------------------------------|--|-----------------------------------|
| Major depressive disorder (MDD) | 42 (2.49) | 16 (0.95) |
| Dysthymia ^b | 6 (0.36) | 3 (0.18) |
| Post traumatic stress disorder (PTSD) | 13 (0.77) | 0 (-) |

| Severity of suicide risk (points) | Number of participants n (% of total) |
|-----------------------------------|--|
| None (0) | 1642 (97.4) |
| Low (1-5) | 24 (1.42) |
| Moderate (6-9) | 15 (0.89) |
| High (10+) | 4 (0.24) |

^aDiagnosis was based on criteria ascertained by stem questions in the M.I.N.I.

^bn = 1666, since subjects with current major depressive disorder were not evaluated for dysthymia.

In the first analysis, age-adjusted regression models were developed for evaluating the association between each mental symptom and suicide risk. Because the mental symptoms related to depression and PTSD might act as possible confounding factors in the association between somatic symptoms and suicide risk, a second logistic regression analysis for somatic symptoms was conducted comprising the following steps, i.e., unadjusted and adjusted models for age, MDD, and PTSD. Because the number of subjects with a final diagnosis of MDD was extremely few and there were no subjects with PTSD, the presence of basic symptoms (screening symptoms which are indispensable for a diagnosis of MDD or PTSD) was adjusted for. Age was also divided into two categories, <41 or 41+, since two peaks of age distribution were observed at a dividing line of 41 years of age.

The ORs and their 95% CIs were obtained from the corresponding logistic regression coefficients and their standard errors. Each OR showed how many times the subjects answering 'yes' to the question were likely to have been affected by suicide risk compared to those answering 'no'. *P*-values (two-sided) less than 0.05 were considered statistically significant. We also compared the scores of suicide risk by an analysis of variance in accordance with the number of somatic symptoms, i.e., no symptoms (53.2%), one or two symptoms (32.8%), and three or more symptoms (14.0%). Spearman's rank correlation coefficient between the number of somatic symptoms and the total score of suicide risk was also calculated. All computations were performed using the SAS software package, version 9.1.3 (SAS Institute, Inc., Cary, NC, USA).

Ethical considerations

All participating policemen gave written informed consent to take part in the study after a detailed explanation by the interviewers. The protocol of the current study was approved by the Research Ethics Committee of Wakayama Medical University.

Results

The mean age (SD) of the subjects was 40.9 (12.2). Those showing 'any' signs of suicide risk as assessed by the M.I.N.I. numbered 43 (2.6%). The percentages of police officers who met the basic diagnostic criteria of MDD, dysthymia, and PTSD as well as of the final diagnosis of these disorders, and the distributions of the 43 police officers showing a suicide risk, are presented in Table 1. Approximately 2.5% of the officers met the screening criteria, while only 0.95% met the final diagnostic criteria of MDD. In fact, 56% of police officers designated as having suicide risk were estimated to actually have a low level of such risk. The percentage of police officers with lifetime suicide attempts was 1.4%, which was similar to that of the general male population in Japan (1.7%) (Ono et al., 2008).

Table 2 shows age-adjusted ORs of basic symptoms of MDD, dysthymia and PTSD as well as final diagnoses of those disorders on any, low, and moderate or high suicide risk. Both depressive mood and loss of interest as well as a final diagnosis of MDD were statistically significantly associated with a more than 10-fold increased suicide risk (any). A chronic depressive state of dysthymia was also strongly associated with increased suicide risk (any), though the range of CI was extremely wide due to the low number of subjects exhibiting such a symptom. Basic symptoms of PTSD such as shivering in reaction to traumatic events or flashbacks of such traumatic events were also statistically significantly associated with an increased suicide risk, while just occasionally experiencing such events showed no substantial association with suicide risk.

The associations between these mental symptoms/disorders and low suicide risk was attenuated compared to 'any' suicide risk, while those between mental symptoms/disorders and moderate or high suicide risk were higher, a finding also supported by statistically significant trends of ORs, except for only occasional experiences of traumatic events.

Table 2. Odds Ratios and 95% Confidence Intervals of MDD, Dysthymia, and PTSD on Suicide Risk.

| Diagnoses and symptoms | Suicide Risk | | | | | | P for trend ^d |
|--|------------------|------------|-----------------|------------|-----------------|------------|--------------------------|
| | Any | | low | | moderate / high | | |
| | OR ^a | 95% CI | OR ^b | 95% CI | OR ^c | 95% CI | |
| Major depressive disorder (MDD) | 18.7 | 6.1-56.6 | 6.1 | 0.8-49.7 | 38.3 | 10.9-135.1 | <0.0001 |
| Depressive mood during prior two weeks | 14.2 | 5.3-37.9 | 8.0 | 1.8-36.5 | 23.4 | 7.0-77.8 | <0.0001 |
| Loss of interest during prior two weeks | 13.5 | 5.4-33.5 | 6.3 | 1.4-28.3 | 24.7 | 8.2-74.5 | <0.0001 |
| Dysthymia | 21.3 | 1.9-241.0 | 35.6 | 3.1-409.9 | NC | — | 0.074 |
| Chronic depressive mood over prior two years | 49.2 | 9.5- 254.9 | 88.3 | 16.4-474.6 | NC | — | 0.0004 |
| Post traumatic stress disorder (PTSD) | NC | — | NC | — | NC | — | — |
| Experiences of traumatic events | 0.9 | 0.5-1.7 | 0.7 | 0.3-1.6 | 1.4 | 0.5-3.9 | 0.90 |
| Shivering reaction to traumatic events | 2.2 ^e | 1.0-4.8 | 1.9 | 0.7-5.7 | 2.6 | 0.8-7.9 | 0.045 |
| Flashback of traumatic events within prior month | 6.2 | 1.3-30.0 | NC | — | 20.2 | 3.6-112.0 | 0.0021 |

Note. OR = odds ratio (adjusted for age); CI = confidence interval; NC = not calculated due to small number. ORs and CIs of the symptoms are shown regardless of final diagnoses of the disorders. Participants with missing responses due to refusing or quitting the following questions in accordance with the interview rule of the M.I.N.I. were deleted. If the subjects did not have experiences of both traumatic events and shivering reaction to such events, the interview for flashback was not conducted. Precise figures of respondents with each question are stated as follows.

^aAny suicide risk. n = 1666 for dysthymia, 1684 for shivering reaction, 723 for flashback.

^bLow suicide risk. n = 1651 for dysthymia, 1665 for shivering reaction, 714 for flashback.

^cModerate / high suicide risk. n = 1643 for dysthymia, 1660 for shivering reaction, 709 for flashback.

^dLow vs. moderate / high suicide risk.

^ep < .05.

Table 3. Unadjusted and Adjusted Odds Ratios and 95% Confidence Intervals of Somatic Symptoms on Suicide Risk (N=1685)

| Somatic Symptoms | n (%) | Suicide risk (unadjusted) | | | | Suicide risk (adjusted) | | | |
|-----------------------------------|------------|-----------------------------|--------------------------|-----------------------------|--------------------------|----------------------------|-----------------------------|-----------------------------|--------------------------|
| | | any | low | moderate / high | P for trend ^d | any | low | moderate / high | P for trend ^d |
| | | OR (95% CI) ^a | OR (95% CI) ^b | OR (95% CI) ^c | | OR (95% CI) ^a | OR (95% CI) ^b | OR (95% CI) ^c | |
| Easily fatigued | 243 (14.4) | 1.4 (0.6-3.0) | 1.2 (0.4-3.5) | 1.6 (0.5-4.9) | 0.38 | 0.8 (0.3-1.9) | 0.9 (0.3-2.8) | 0.6 (0.2-2.3) | 0.54 |
| Feeling feverish | 26 (1.5) | NC | NC | NC | — | NC | NC | NC | — |
| Headache | 107 (6.4) | 4.2 (1.9-8.9) | 1.4 (0.3-6.2) | 9.2 (3.5-23.9) | <0.0001 | 2.7 (1.2-6.4) | 1.0 (0.2-4.6) | 6.1 (2.0-18.4) | 0.0046 |
| Palpitations | 53 (3.1) | 3.3 (1.1-9.7) | NC | 8.7 (2.8-27.1) | 0.0017 | 2.5 (0.8-7.9) | NC | 6.6 (1.9-23.7) | 0.033 |
| Chest pain during exercise | 39 (2.3) | 3.3 (1.0-11.3) ^e | 1.9 (0.3-14.8) | 5.3 (1.2-23.6) | 0.027 | 1.6 (0.4-6.2) | 1.2 (0.1-10.3) | 1.8 (0.3-9.6) | 0.51 |
| Irregular pulse | 43 (2.6) | 0.9 (0.1-6.7) | NC | 2.1 (0.3-16.2) | 0.79 | 0.5 (0.1-4.0) | NC | 1.0 (0.1-8.2) | 0.57 |
| Dizziness | 58 (3.4) | 3.0 (1.0-8.7) ^f | 4.2 (1.2-14.5) | 1.6 (0.2-12.5) | 0.13 | 2.1 (0.6-6.9) | 3.6 (1.0-13.1) ^f | 0.4 (0.03-6.5) | 0.42 |
| Tinnitus | 126 (7.5) | 0.6 (0.1-2.5) | NC | 1.4 (0.3-6.3) | 0.81 | 0.5 (0.1-2.1) | NC | 1.3 (0.3-6.2) | 0.58 |
| Continuous coughing or phlegm | 108 (6.4) | 0.7 (0.2-3.0) | 0.6 (0.1-4.7) | 0.8 (0.1-6.1) | 0.69 | 0.8 (0.2-3.6) | 0.7 (0.1-5.0) | 1.1 (0.1-8.6) | 0.93 |
| Feeling of constriction in throat | 80 (4.7) | 3.4 (1.4-8.4) | 0.9 (0.1-6.9) | 7.6 (2.7-21.9) | 0.0006 | 2.7 (1.0-6.9) ^f | 0.7 (0.1-5.7) | 6.0 (1.9-18.7) | 0.013 |
| Swelling | 51 (3.0) | 0.8 (0.1-5.6) | NC | 1.8 (0.2-13.5) | 0.94 | 0.7 (0.1-5.6) | NC | 1.8 (0.2-14.6) | 0.92 |
| Nausea | 19 (1.1) | 2.2 (0.3-16.5) | 3.9 (0.5-30.6) | NC | 0.77 | 0.9 (0.1-7.6) | 2.4 (0.3-21.7) | NC | 0.60 |
| Black stools | 12 (0.7) | 3.5 (0.4-28.0) | NC | 8.2 (1.0-67.2) ^f | 0.094 | 3.2 (0.4-27.7) | NC | 7.6 (0.7-79.9) | 0.37 |
| Pain or bleeding at evacuation | 47 (2.8) | 2.7 (0.8-9.1) | NC | 6.8 (1.9-24.2) | 0.016 | 2.6 (0.7-9.3) | NC | 7.4 (1.9-29.2) | 0.021 |
| Lumbago or arthralgia | 348 (20.7) | 0.9 (0.4-1.9) | 0.3 (0.1-1.5) | 1.8 (0.7-4.7) | 0.77 | 0.6 (0.3-1.4) | 0.3 (0.1-1.3) | 1.1 (0.4-3.2) | 0.51 |
| Itch or exanthem | 185 (11.0) | 0.6 (0.2-2.0) | 0.7 (0.2-3.1) | 0.4 (0.1-3.6) | 0.37 | 0.6 (0.2-1.9) | 0.7 (0.2-2.9) | 0.4 (0.1-3.3) | 0.33 |
| Thirst | 125 (7.4) | 0.6 (0.1-2.5) | NC | 1.5 (0.3-6.4) | 0.82 | 0.6 (0.1-2.4) | NC | 1.3 (0.3-6.0) | 0.65 |
| Frequent nocturnal urination | 88 (5.2) | 0.9 (0.2-3.7) | NC | 2.1 (0.5-9.4) | 0.73 | 0.4 (0.1-2.2) | NC | 0.9 (0.1-5.2) | 0.62 |
| Agitation or anxiety ^g | 92 (5.5) | 4.2 (1.9-9.4) | 1.7 (0.4-7.3) | 8.6 (3.2-23.1) | <0.0001 | 2.0 (0.8-5.2) | 1.0 (0.2-5.0) | 3.4 (1.0-11.3) ^f | 0.055 |
| Abdominal (gastrointestinal) pain | 84 (5.0) | 4.0 (1.7-9.2) | 1.8 (0.4-8.0) | 7.3 (2.5-20.7) | 0.0002 | 3.2 (1.3-7.8) | 1.8 (0.4-7.7) | 5.5 (1.8-16.9) | 0.0044 |
| Constipation | 91 (5.4) | 1.8 (0.6-5.2) | 1.6 (0.4-7.0) | 2.1 (0.5-9.2) | 0.24 | 1.7 (0.6-5.0) | 1.4 (0.3-6.2) | 2.1 (0.5-10.1) | 0.34 |
| Diarrhea | 172 (10.2) | 2.4 (1.1-5.1) | 0.4 (0.1-2.9) | 6.6 (2.6-16.6) | 0.0009 | 2.0 (0.9-4.5) | 0.4 (0.05-2.7) | 5.5 (2.0-14.8) | 0.0096 |
| Poor hearing | 109 (6.5) | 1.9 (0.8-5.0) | 2.1 (0.6-7.2) | 1.7 (0.4-7.6) | 0.23 | 1.6 (0.6-4.5) | 2.0 (0.6-7.1) | 1.0 (0.2-6.1) | 0.39 |

Note. OR = odds ratio; CI = confidence interval; NC = not calculated due to small number.

The adjusted models were controlled for basic (positive screening) symptoms of major depressive disorder, PTSD, and age.

^a Any suicide risk. n = 1685 for unadjusted, 1682 for adjusted.

^b Low suicide risk. n = 1666 for unadjusted, 1663 for adjusted.

^c Moderate / high suicide risk. n = 1661 for unadjusted, 1658 for adjusted.

^d Low vs. moderate / high suicide risk.

^e p = 0.052.

^f p < .05.

^g Mental symptom, but included in the somatic questionnaire

The associations between physical symptoms and any suicide risk, presented as unadjusted and adjusted ORs, are shown in Table 3. In unadjusted models, headaches, palpitations, dizziness, a sense of constriction in the throat, abdominal pain, diarrhea, and agitation were statistically significantly associated with any increased suicide risk. However, once age and the basic symptoms of MDD and PTSD were adjusted for, only three symptoms (headache, abdominal pain, and a sense of constriction in the throat) were significantly associated with that risk. The associations between these symptoms and suicide risk grew much stronger, as shown by ORs of more than five when moderate or high suicide risk was used as an outcome (Table 3). Trends of the ORs (low vs. moderate or high suicide risk) were statistically significant for headaches, palpitations, a sense of constriction in the throat, pain or bleeding at evacuation, abdominal pain, and diarrhea. This suggested that the associations between suicide risk and somatic symptoms intensified in accordance with the severity of the suicide risk. On the other hand, there were no significant differences in the scores of suicide risk among the three groups with different numbers of somatic symptoms ($P=0.59$). Furthermore, there was no measurable correlation between the number of somatic symptoms and the severity of the suicide risk ($r=0.03$).

Discussion

A variety of self-reported symptoms might have reflected personal vulnerabilities in response to stressors, which could affect the severity of each person's suicide risk. Indeed, the fundamental psychiatric symptoms of MDD, dysthymia, and PTSD were shown to be strongly associated with suicide risk in the present study. Moreover, several physical symptoms, especially those related to the digestive organs, were strongly associated with an increased suicide risk with a significant 'dose-response' effect. These associations remained even after adjusting for the basic symptoms of MDD and PTSD.

Previous studies of police officer suicides have mainly focused on the following two elements; workplace trauma as a determinant of PTSD, and organizational stressors as a determinant of job stress (Stuart, 2008). Consequently, studies examining individual vulnerabilities have received scant attention. However, given that suicide might occur as a result of combined effects of those social and personal risk factors, it is clearly important that the physical or mental signs of suicide should be detected in each person as early as possible for the primary prevention of suicide, since such symptoms may provide useful markers for revealing suicide risk.

Regarding mental disorders, all the basic symptoms of MDD, dysthymia, and PTSD, as well as the final diagnoses of MDD and dysthymia were significantly or marginally significantly associated with any, low, and moderate or high suicide risk, except for experiences of traumatic events. This is plausible given that such experiences are themselves among the daily challenges faced by policemen. The psychological reaction to those events, i.e., a policeman's personal psychological vulnerability to such stressful events, should be considered as an important possible marker for detecting suicide risk. The purpose of the current interview was declared to be for study only and never affect the police officers' job evaluation so that they could readily confess their mental symptoms. However, the proportion of respondents who reported any mental symptoms including suicide risk was low. In this connection, two assumptions could be proposed. One is that the number of police officers with mental symptoms was actually few. The other is that there might be some officers who concealed their mental symptoms because of the above-mentioned prejudice against mental disorders. In that case, the observed associations between somatic symptoms and suicide risk might be underestimated if they reported their somatic symptoms only, which would result in attenuating the actual associations.

As for somatic symptoms, it was observed that headaches, abdominal pain, and a sense of constriction in the throat have remained significantly associated with any suicide risk, even after adjusting for the basic symptoms of MDD and PTSD. Headaches have been shown to be associated with suicide risk independently of depression (Woolley et al., 2008; Wang et al., 2009), which is consistent with the present findings. Furthermore, our previous research using clinical samples also showed that symptoms such as difficulty in breathing, which are connected with a sense of constriction in the throat, were associated with an increased risk of suicide ideation in male outpatients visiting a psychosomatic clinic (Yoshimasu et al., 2009). These findings highlight a very important fact, namely, that a suffocating feeling might be a noteworthy physical sign associated with suicide risk. Such a feeling may also include a sense of choking among those confronting difficult challenges. It is also worth noting that several gastrointestinal symptoms, including abdominal pain, were strongly associated with an increased suicide risk when a moderate or high suicide risk was used as an outcome variable, which is fairly consistent with previous findings (Miller, Hopkins, & Whorwell, 2004; Spiegel, Schoenfeld, & Naliboff, 2007). This implies that symptoms related to the digestive organs sensitive to psychological stressors might be indicative of suicide risk.

These findings suggest that such somatic symptoms should be regarded as critical somatic signs of suicide risk, and that policemen thus afflicted should be paid considerable attention as possible candidates for suicide in routine healthcare management, especially when they exhibit no obvious organic disease supporting their symptoms. Our current findings showed no significant associations between the number of somatic symptoms and suicide risk. This suggests that some specific physical symptoms might be useful markers of the suicide risk rather than a mere random number of symptoms.

Limitations

The current study includes several limitations. First, their job ranking, which could not be ascertained, might modify their ways of coping with stressors. However, job ranking was significantly correlated with age ($r = 0.64$), a factor included in the multivariate analyses in the present study. Second, the cross-sectional characteristics of the present survey make it difficult to interpret the relations of those physical symptoms to suicide risk. Police officers showing such symptoms might include both those who actually had organic dysfunctions underlying their symptoms as well as those whose mental conflicts produced some somatic symptoms even though they did not have any organic disorders. Our hypothesis depends on the latter cases since our subjects could basically execute their tasks, took no sick leave or absence from duty. However, further adjustments such as somatization disorders, and certain information for functional gastrointestinal disorders such as IBS are needed for a more thorough understanding of the underlying mechanism between somatic symptoms and suicide risk (Spiegel et al, 2007). In any event, however, such an association, once observed, has in itself important implications for the early detection of suicide risk regardless of any causal relationships arising from the presence of organic failures. Finally, personal information regarding demographic factors such as marital status could not be ascertained. However, we have already reported adverse marital status (divorce, separation, being bereaved or unmarried) to be associated with a relatively small increase in the risk of suicide compared to the psychopathologies such as depression or substance abuse (Yoshimasu et al, 2008). As for economic status, age could be used as an alternative variable of household income as well as job ranking, since a seniority-based wage system is still adopted in the police organization.

Apart from the above-mentioned methodological limitations, the current results should be interpreted with caution given that more than half the police officers showing suicide risk were those with a low degree of the risk as assessed by M.I.N.I. Observed ORs of two- or three-fold increased risks associated with those somatic symptoms suggested

that the mere presence of those symptoms might in itself be insufficient to detect suicidal candidates, since the sensitivity or specificity of those symptoms with suicide risk are not thought to be particularly high. This might, of course, be connected with police officers' tendencies to conceal psychological vulnerabilities such as suicidal ideation. However, it should be noted that some specific symptoms were strongly (more than five of OR) associated with a moderate or high suicide risk, despite the few police officers prone to such risks.

Although more than half of the police officers with suicide risk had low degree of the risk (1-5 points assessed by M.I.N.I.) and only 'dizziness' was significantly associated with such risk, we consider that those associations between somatic symptoms and any (including low) suicide risk are clinically important for predicting suicide for following reasons. That is, 'low' suicide risk means at least a wish to die (point 1) or a desire to harm oneself (point 2) within past one month or lifetime suicide attempt (point 4). In the former case, the somatic symptoms might represent a current suicide sign. In the latter case, it should be noted that the previous suicide attempt has been reported to be very strongly associated with an increased risk of completed suicide (approximately 16-fold increased risk) (Yoshimasu et al, 2008). Thus, those with 'low' suicide risk should be carefully monitored even though emergent interventions are not always necessary. As shown in the significant trends between somatic symptoms and the severity of suicide risk, some somatic symptoms could be useful markers for the tension of the suicide risk.

Conclusion

In summary, the present cross-sectional study demonstrated that the basic mental symptoms of MDD, dysthymia, and PTSD as well as the physical symptoms of headaches, palpitations, choking sensations in the throat, and several gastrointestinal symptoms might be significant signs of suicide risk in Japanese male police officers. Given that police officers are generally less likely to reveal their overt emotional conflicts, those with such chronic somatic symptoms should be regarded as a potential candidate group for suicide risk. Continuous monitoring and systematic management of their mental health status might prove effective methods for suicide prevention.

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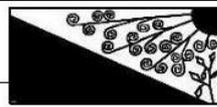
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Editorial Office
Dr. Nestor Kapusta
Medical University of Vienna
Department of Psychoanalysis and Psychotherapy
Waehringer Guertel 18-20
1090 Vienna, Austria
office@suicidology-online.com
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