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The Psychological Impact of the SARS Epidemic on Hospital Employees in China: Exposure, Risk Perception, and Altruistic Acceptance of Risk

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Abstract

Objective—We examined the psychological impact of the 2003 outbreak of severe acute respiratory syndrome (SARS) on hospital employees in Beijing, China.

Methods—In 2006, randomly selected employees (n = 549) of a hospital in Beijing were surveyed concerning their exposure to the 2003 SARS outbreak, and the ways in which the outbreak had affected their mental health.

Results—About 10% of the respondents had experienced high levels of posttraumatic stress (PTS) symptoms since the SARS outbreak. Respondents who had been quarantined, or worked in high-risk locations such as SARS wards, or had friends or close relatives who contracted SARS, were 2 to 3 times more likely to have high PTS symptom levels, than those without these exposures. Respondents' perceptions of SARS-related risks were significantly positively associated with PTS symptom levels and partially mediated the effects of exposure. Altruistic acceptance of work-related risks was negatively related to PTS levels.

Conclusions—The psychological impact of stressful events related to an infectious disease outbreak may be mediated by peoples' perceptions of those events; altruism may help to protect some health care workers against these negative impacts.

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Keywords

severe acute respiratory syndrome; health care workers; posttraumatic stress; infectious disease outbreak; China

In the 21st century, the world is being challenged not only by new infectious diseases such as SARS and avian influenza but also by bioterrorism. No country is immune to an outbreak of a highly infectious disease. There is an urgent need to understand the possible psychosocial impacts of an outbreak of an easily transmitted, rapidly spreading infectious disease. The 2003 SARS outbreak has provided us with a unique opportunity to explore these impacts.[1]

The SARS epidemic, with its rapid spread and high mortality rate, caused considerable panic and anxiety around the world,[2–5] eventually affecting more than 25 countries. Health care workers had a higher rate of SARS infection than any other group, representing more than 20% of all the people who contracted SARS. More cases of SARS occurred in China than in any other country,[4] and Beijing was among the most heavily affected cities in the world.

Previous studies have assessed symptoms of SARS-related PTS in groups of health care workers and other hospital employees in Canada,[6–9] Hong Kong,[10,11] Taiwan,[2,12] and Singapore.[13] To our knowledge, however, no previous study has systematically assessed the PTS symptoms of health care workers in mainland China, where two-thirds of the world's SARS cases occurred.

The literature has documented that perceived risk levels related to an event are affected by the unfamiliarity and perceived uncontrollability of the hazards involved, and that these perceptions in turn affect a person's likelihood for developing PTSD.[14–16] The mental health impact of the Beijing SARS outbreak would, then, be expected to be relatively high, given its initially very high levels of unfamiliarity and uncontrollability. Given that traumatic exposures of longer duration have been found to be more strongly related to PTSD than briefer exposures,[17] the months-long period during which hospital employees in Beijing continued to be exposed to the dangers of the outbreak[18] could also have increased its mental health impact, in comparison to disasters where exposures to danger have been briefer. However, people do differ in their perceptions of the same situation.

Measures of perception-related reactions to SARS outbreaks, such as levels of fear of SARS or having a sense of increased social isolation and (or) increased job stress related to SARS,[19,20] have previously been found to be associated with PTS symptom levels.[19–21] However, these studies did not control for objective measures of outbreak exposures, and thus could not assess the impact of differences in a person's way of perceiving similar events, on the relation between level of exposure to SARS and severity of PTS symptoms.

Other than exposure to SARS-related events, risk factors that have been found to be associated with the development of SARS-related PTS symptoms include some sociodemographic factors, such as female sex,[2] and a low income level.[2,22] For community members who were placed under precautionary quarantine in Toronto, duration of quarantine, and acquaintance with or exposure to someone who was hospitalized with SARS, predicted PTS symptom levels.[22] Little is known about which factors may be associated with protection against SARS-related PTS symptoms. Some previous studies have found that an altruistic intent to help is associated with resilience against PTSD.[23,24] Several survey studies have indicated that this quality is frequently to be found among health care workers.[25–27]

Given the possibility of a future flu pandemic, more systematic research is needed to improve understanding of the psychological impacts of infectious disease outbreaks, and related risk and protective factors. To address these gaps in the literature, this study examines levels of PTS symptoms among hospital employees relating to different types of SARS event exposures. We also examine the role of perception of SARS-related risks relating to exposure and to PTS symptoms. Finally, employees' current levels of fear of SARS, 3 years after their exposure to the SARS outbreak, are also assessed, as well as associated risk and protective factors. It is hoped that our findings will help to improve understanding of the psychological impact of exposure to an outbreak of a fast-spreading, life-threatening infectious disease, and strengthen preparations for responding to possible future outbreaks or pandemics of infectious diseases such as avian flu.

Methods

Sample

In 2006, a sample of 549 hospital employees was drawn from a major hospital in Beijing that had been affected by the 2003 SARS outbreak. Using hospital employee rosters, a stratified random sample was selected for recruitment into the study. The sample was stratified by profession (with 3 profession categories, that is, doctor, nurse, and administrative and [or] other hospital staff), by age group (34 years and younger, 35 to 55, and 56 and older), and, for the doctor and nurse categories, by high or low level of work exposure to SARS. (Doctors and nurses who had worked in units such as SARS wards, fever clinics, the department of infectious diseases, or the emergency room, where contact with SARS patients was frequent and intense, were classified as having had high work exposure.) The oldest age group (aged 56 years and older) was small and treated as a single sampling stratum. There were 11 resulting strata in the sample.

Doctors and nurses with high work exposure to the SARS outbreak were oversampled. Hospital employees aged 35 to 55 years were also oversampled, for reasons related to a second planned study of children whose parents were hospital employees and were exposed to these events. (However, our study focuses only on the hospital employees themselves.) The study's response rate was 83%. Participants completed a self-report questionnaire. To produce estimates representative of all of the hospital's staff, the weight for each stratum was generated as a reciprocal of the stratum-specific probability of being included in the study, multiplied by the ratio of sample size to population size. These weights were used in data analyses to obtain unbiased statistics.

This study was carried out in full compliance with the institutional review boards of the New York State Psychiatric Institute and the Beijing University of Chinese Medicine. Written informed consent was obtained from all participants prior to participation in the study.

Measures

Exposure to the SARS Outbreak

Hospital employees answered questions about their SARS outbreak event exposures, including work exposure, any quarantining, and having a friend or close relative who contracted SARS (relative or friend got SARS).

Work exposure was defined as working in a high-risk location, such as a SARS ward, fever clinic, infectious disease department, emergency room, pulmonary medicine department, or X-ray laboratory, between January and June of 2003.

Any quarantining was defined, based on 6 questionnaire items, as quarantined as a result of being diagnosed with SARS or suspected of having SARS, or as having had direct contact with SARS patients either at work, at home, or in other places.

Relative or friend got SARS was defined as having one or more family members or friends who developed SARS, and either died from or recovered from it.

For media exposure, 3 questions were asked concerning the amounts of exposure to coverage about the SARS outbreak the hospital employees had received, through 3 types of media (that is, television, websites, and other [radio, newspapers, or magazines]). A response reporting a lot of (compared with some or none) exposure, through any of the media categories, was counted as positive.

Other Exposure to Traumatic Events

Subjects were asked about exposure to potentially traumatic events prior to and following the SARS outbreak, including severe injury in violent circumstances, witnessing a death or serious injury of a close friend or family member, and living through a major disaster. This instrument was modified from a questionnaire used in trauma exposure surveys conducted in the United States.[28,29] Two variables, one for any pre-SARS exposure and one for any post-SARS exposure, were used in analyses.

During-Outbreak Perceptions of SARS-Related Risks

Ten questionnaire items were used to assess hospital employees' perceptions, during the 2003 outbreak, of the SARS-related risks they had been facing; the items were adapted from those used in a previous study assessing the psychological impact of SARS on hospital employees in Taiwan.[2] Nine of these items addressed employees' during-outbreak perceptions of a SARS-related threat: "I believed that my job was putting me at great risk"; "I felt extra stress at work"; "I was afraid of falling ill with SARS"; "I felt I had little control over whether I would get infected or not"; "I thought I would be unlikely to survive if I were to get SARS"; "I thought about resigning because of SARS"; "I was afraid I would pass SARS on to others"; "My family and friends were worried that they might get infected through me"; and "People avoided my family because of my work."[2] The positive responses on these items were counted to produce a Perceived SARS-Related Risk Scale score (ranging from 0 to 9, with an internal consistency of 0.71, by Cronbach's alpha). We used the 10th item, "Because I wanted to help the SARS patients, I was willing to accept the risks involved," separately, as a measure of altruistic acceptance of risk.

The Psychological Impact of the SARS Outbreak

The IES-R,[30] a self-report measure assessing subjective distress resulting from a traumatic life event, was adapted for use in this study, to assess PTS symptoms experienced by subjects at any time during the 3-year period following the SARS outbreak. The IES-R has 22 items, each with a Likert rating scale from 0 to 4. The total score has a range of 0 to 88. The IES-R has been translated into, and validated in, Chinese[2,31,32]; a score of 20 or more was interpreted here—as suggested by previous studies of populations affected by traumatic events[22,33]—to indicate a high level of PTS symptoms. Hospital employees were also asked about experiencing these PTS symptoms in the month prior to the interview; this information was used in examining the persistence of PTS symptoms.

Current Fear of SARS

Three questions were used to assess subjects' current fear of SARS at the time of the interview: "Thinking about SARS makes me feel anxious"; "I feel tense when I think about the threat of SARS"; "I feel quite anxious about the possibility of another outbreak of

SARS." These questions were adapted from Snell's questionnaire regarding fear of AIDS,[34] and use a Likert scale ranging from 1 (not at all) to 5 (very). The mean score from these 3 items (range 1 to 5) had an internal consistency (Cronbach's alpha) of 0.70.

Demographics

Information about subjects' age, sex, marital status, educational level, and family income was also obtained in the survey.

Analyses

Descriptive analyses were conducted to examine the characteristics of the sample. Bivariate analyses were then carried out to identify factors associated with high PTS symptom levels. Logistic regression analyses were subsequently conducted in 3 steps, with the outcome variable being a high level of PTS symptoms. In Model 1, 3 variables measuring exposure to the SARS outbreak (exposure at work, any quarantining, and relative or friend got SARS) were entered into the equation, along with sociodemographic variables, and prior exposure to trauma, as control variables. In Model 2, perceived level of SARS risk was added into the model. In Model 3, altruistic acceptance of risk was added. The 3 steps were intended to help us to assess the possible mediating effects of perceived risk and of altruistic acceptance.

Finally, a multiple linear regression analysis was conducted to examine the factors affecting employees' current fear of another SARS outbreak. Because stratification had been used in the selection of the sample, appropriate weights were created to be used in all the analyses.

Results

Descriptive and Bivariate Analyses

The first column of Table 1 shows the characteristics of the total sample. About three-fourths of the sample were women; 47% were aged between 36 and 50 years; 19% were aged 50 years or older.

Among the 549 hospital employees, about 25% reported having worked in locations where contact with SARS patients was common; 19% had been quarantined either at work or at home during the SARS outbreak, and 9% reported that a friend, or close relative had contracted SARS (and either died or recovered).

About 10% ($n = 55$) of the employees reported having had high levels of PTS symptoms (that is, an IES-R score of 20 or more) at some time during the 3-year period following their exposure to the 2003 SARS outbreak. The IES-R scores in this sample ranged from 0 to 57, with a mean of 8.7. The results of the bivariate analysis (Table 1) indicate that, among the sociodemographic factors, high PTS symptom levels since the 2003 SARS outbreak were associated only with age, with those under 50 years of age more likely to have a high symptom level. Regarding event exposures, work exposure, any quarantining during the outbreak, and relative or friend got SARS were all strongly associated with high PTS symptom levels. Among the group with high PTS symptoms, nearly one-half (46.9%) had worked in locations where staff had high levels of exposure to SARS patients, while less than one-quarter of those with low PTS symptoms (22.1%) had worked in those areas. The other types of exposure examined (that is, exposure to media coverage of the SARS outbreak, and exposure to other traumatic events either before or after the SARS outbreak), were not associated with level of PTS symptoms. Hospital employees reporting high levels of PTS symptoms also reported significantly higher during-outbreak perceived SARS-related risk levels, as well as higher levels of current fear of SARS. The group with low PTS

symptom levels were somewhat more likely than those with high symptom levels to report during-outbreak altruistic acceptance of SARS-related risks.

Factors Related to PTS Symptom Levels

To further elucidate the relation among outbreak event exposures, risk perception, and level of PTS symptoms, logistic regression analyses were conducted (Table 2). In Model 1, with age, sex, family income, educational level, and prior exposure to other traumatic events controlled for, all 3 of the assessed exposure variables retained their significant relations with high PTS symptom levels; the adjusted odds ratios were 2.1 for work exposure, 2.1 for any quarantining, and 3.1 for relative or friend got SARS. In Model 2, when perceived risk during the SARS outbreak was added into the regression equation, the associations between PTS symptoms and 2 of the exposure variables (work exposure and any quarantining) diminished, suggesting that risk perception may partially mediate the effects of direct outbreak exposure on PTS symptom levels. However, the impact of a relative or friend contracting SARS remained significant in Model 2. Finally, in Model 3 altruistic acceptance of risk was added in, and found to have an independent protective effect against high PTS symptom levels.

Persistence of PTS Symptoms

It was found that among people who had had high levels of PTS symptoms during the 3-year period ($n = 55$), about 40% ($n = 22$) still had a high current PTS symptom level at the time of the interview. Persistently high PTS symptoms were significantly associated with being single (OR 11.9, 95% CI 2.5 to 56.7), and with low household income (OR 4.2, 95% CI 1.3 to 13.5). Levels of outbreak exposure did not significantly predict persistence of high PTS symptoms.

Factors Associated With Current Fear of a Future SARS Outbreak

A multiple regression analysis was conducted to examine factors associated with employees' current fear of a future SARS outbreak (Table 3). This scale has a range of 1 to 5; the mean score was 2.1, and the standard deviation was 0.86. Having a high educational level was associated with elevated fear of another SARS outbreak. Compared with employees who were divorced or separated, married hospital employees reported elevated fear of another SARS outbreak. Peoples' during-outbreak perceived levels of SARS risk and their PTS symptom levels were positively related with their current levels of fear. Conversely, altruistic acceptance of risk during the outbreak was negatively associated with current fear of SARS.

Discussion

This study examined the psychological impact of the 2003 SARS outbreak on hospital employees in Beijing during the 3-year period following the outbreak, taking into account several types of exposure to SARS, and other risk factors, as well as their perceived risk levels and attitudes toward their jobs. About 10% of the hospital employees had had high SARS-related PTS symptoms since the 2003 SARS outbreak.

Previous studies of disaster survivors have found that over three-fourths of those having PTSD immediately after a disaster still have it about 1 year later.[35,36] Our findings suggest a persistence rate of 40% for high PTS symptom levels among hospital employees 3 years after the SARS outbreak. These findings contribute to our knowledge of the persistence of PTS symptoms among first responders to disasters. Studies have shown that when a person's PTSD symptoms persist for more than 6 months after an event, they are very likely to continue to persist over the long term.[37,38]

One of the strengths of this study is the examination of PTS symptom levels relating to various types of SARS-related event exposures. Our findings indicate that exposure to the SARS outbreak at work, being quarantined, and the death or illness of a relative or friend from SARS, each contributed independently to PTS symptom levels. Contrary to the findings of other studies of PTS following disaster situations, however, media exposure[39,40] and exposure to other traumatic events prior to or following the SARS outbreak[41,42] were not related to PTS here.

Another strength of this study is the relatively thorough examination of the relations of perceived risk and altruistic acceptance of risk, with high PTS symptom levels, as well as the relation of each of these variables with current fear of another SARS outbreak. Understanding these relations has implications for the planning of responses to possible future outbreaks of infectious disease. Our findings on the associations between employees' perceived levels of SARS-related risk and their PTS symptoms are similar to those of other studies.[19–21] Similar to Maunder et al's study[19] of Canadian health care workers, our study found that the impact of exposure to the outbreak through work on hospital employees' PTS might have been mediated by their perceptions of the related risks. However, for relative or friend got SARS, our results indicate that its positive relation with PTS symptoms was not mediated by perceived risk levels. This finding that having had a relative or friend contract SARS was, compared with other types of exposure to the outbreak, a more robust predictor of PTS symptom level, suggests a special characteristic of the psychosocial effects of infectious disease outbreaks, which may differentiate them from those of other disasters. During the SARS outbreak, people with family members or close friends who contracted SARS would have been at particularly high risk of contracting it themselves. While it may be true that, once awareness of the outbreak became widespread, people would have used face masks during social visits to friends and relatives, and perhaps even at home, nevertheless the heavy protective clothing and safety procedures routinely used to prevent virus transmission in hospitals would not have been used at home or on social visits. Thus, for hospital staff whose friends or relatives fell ill with SARS, the sense of danger—similar to the actual risk of becoming infected—might have been greater outside the hospital than inside.

Our study found that reported altruistic acceptance of risk was negatively related to PTS, even after controlling for levels of exposure and sociodemographic factors. This finding differs from that of Koh et al's[20] Singapore study, where a similar rate of reported acceptance of work-related risks was seen among hospital employees, but acceptance was not found to be related to PTS symptom levels. Our findings indicate a buffering effect of altruistic acceptance of risk on the development of PTSD.

Our study also explores factors associated with employees' current feelings about the possibility of a recurrence of SARS. Although a few years had passed since the outbreak, thoughts about SARS, and memories of its high level of contagiousness, initial unfamiliarity, and relatively high mortality rate, were still provoking fear among hospital employees, a group whose physical and psychological health are of particular importance to a society, especially when it is facing a disaster situation. Improving our understanding of employees' fears and the factors associated with those fears should be helpful to people involved in response planning for possible future outbreaks of infectious disease.

It was not surprising to find that high PTS symptom levels were positively associated with current levels of fear of another SARS outbreak. We also found more fear of a recurrence of SARS among women than men, consistent with the literature showing higher rates of anxiety in women.[43] Married hospital employees reported more current fear of SARS than those who were unmarried or divorced, perhaps indicating that having greater family

responsibilities increases a person's level of fear and worry related to an infectious disease outbreak. This finding is consistent with that of a study of health care workers in Toronto, which found concern for the health of oneself or one's family to be significantly higher among health care workers who were living with children.[44] Our finding that perceived risk level and altruistic acceptance of risk independently contribute (though in opposite directions) to hospital employees' fears of a recurrence of the SARS outbreak, regardless of sociodemographic background or PTS, is also of interest.

The level of perceived disaster-related risk will be influenced by a person's level of awareness and knowledge related to the disaster. Government programs aimed at raising such knowledge and awareness influence peoples' perceptions, and may help a society to become better prepared, and be more in control of a disaster situation; however, such programs may also have detrimental effects, as a result of raising people's anxiety levels. More studies are needed to understand how levels of preparedness at the government or community level influence peoples' risk perceptions, and, in turn, their anxiety levels and general mental health status.

This study is limited by its cross-sectional nature; no causal relation between risk perception and PTS symptoms can be established. It is also limited by its use of a modified version of the available Chinese version of the IES-R to measure PTS. The IES-R measures levels of PTS symptoms, but is not diagnostic of PTSD itself. Also, because data collection for this study was conducted 3 years after the SARS outbreak, a modified version of the IES-R, with an altered time frame, was used. The study subjects' self-reports, regarding symptoms experienced during the past 3 years, were also subject to recall bias. Caution should be used in comparing our results with those of other studies that have either used the IES-R, or other measures of PTS symptoms.

However, the findings do provide valuable information for policy makers and mental health professionals worldwide regarding the psychological impact of an infectious disease outbreak, which may assist them in making preparations for possible future outbreaks of new diseases such as avian flu.

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Abbreviations used in this article

IES-R	Impact of Event Scale—Revised
PTS	posttraumatic stress
PTSD	posttraumatic stress disorder
SARS	severe acute respiratory syndrome

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Clinical Implications

- During the 3-year period following Beijing's SARS outbreak, relatively high levels of PTS symptoms were experienced by hospital employees who had been at high risk of contracting SARS.
- Altruistic acceptance of job-related risk may have protected some hospital employees against negative psychological outcomes following the SARS outbreak.
- A person's subjective perceptions regarding a situation of actual danger may affect their chances of developing PTS symptoms related to that situation.

Limitations

- Because the study was cross-sectional, no causal relation could be established between risk perception and PTS symptom level.
- Respondents' self-reports were subject to recall bias, particularly regarding symptoms of PTS experienced during the past 3 years.
- The instrument used to measure PTS in this study was adapted from the available Chinese version of the Impact of Event Scale—Revised, and was not diagnostic of PTS disorder.

Table 1

Bivariate associations between level of PTS symptoms and related factors (n = 549)

	High level of PTS symptoms[a]				
	Total (n = 549)	**No (n = 494)**	**Yes (n = 55)**	**OR (95% CI)**	***P***
Sex					
Female	76.5	76.4	77.8	1.09 (0.6–2.1)	0.81
Male	23.5	23.7	22.2	1.00	
Age, years					
≤35	33.8	32.8	41.9	5.08 (1.5–17.7)	0.01
36–50	47.1	46.5	52.9	4.54 (1.3–15.6)	0.02
>51	19.1	20.7	5.2	1.00	
Marital status					
Single	11.8	11.4	15.7	1.54 (0.7–3.4)	0.28
Divorced or separated	4.2	3.7	7.8	2.33 (0.8–7.0)	0.13
Married	84.0	84.9	76.5	1.00	
Education					
≤High school	35.0	35.1	33.8	0.94 (0.5–1.7)	0.85
>High school	65.0	64.9	66.2	1.00	
Household income, ¥					
<20 000	16.2	16.1	16.6	1.00	
20 000–39 999	27.4	28.1	20.8	0.73 (0.3–1.8)	0.50
40 000–69 999	31.2	31.5	29.0	0.91 (0.4–2.1)	0.83
≥70 000	25.2	24.3	33.6	1.37 (0.6–3.2)	0.46
Profession					
Doctor	20.7	20.6	21.5	1.00	
Nurse	37.6	36.7	45.3	1.18 (0.6–2.5)	0.65
Technician	22.1	22.1	22.7	0.99 (0.4–2.3)	0.97
Other[b]	19.6	20.6	10.6	0.49 (0.2–1.4)	0.18
Outbreak exposure measures					
High work exposure					
Yes	24.6	22.1	46.9	3.11 (1.8–5.5)	<0.001

	High level of PTS symptoms[a]				
	Total (*n* = 549)	No (*n* = 494)	Yes (*n* = 55)	OR (95% CI)	*P*
No	75.4	77.9	53.1	1.00	
Any quarantining					
Yes	18.8	16.4	40.5	3.47 (1.9–6.2)	<0.001
No	81.2	83.6	59.5	1.00	
Relative or friend got SARS					
Yes	8.9	7.4	22.9	3.74 (1.8–7.6)	<0.001
No	91.1	92.6	77.1	1.00	
High media exposure					
Television					
Yes	78.6	79.2	73.6	0.73 (0.4–1.4)	0.33
No	21.4	20.8	26.4	1.00	
Websites					
Yes	23.3	22.6	29.0	1.40 (0.7–2.6)	0.30
No	76.7	77.4	71.0	1.00	
Other media					
Yes	60.2	60.4	58.5	0.92 (0.5–1.6)	0.79
No	39.8	39.6	41.5	1.00	
Other traumatic events					
Prior to SARS					
Yes	13.0	13.1	12.6	0.96 (0.4–2.2)	0.92
No	87.0	86.9	87.4	1.00	
Post-SARS					
Yes	5.5	5.9	1.7	0.28 (0.0–2.2)	
No	94.5	94.1	94.5	1.00	
During outbreak SARS-related perceptions					
Perceived risk level, mean (SD)[c]	3.7 (2.3)	3.5 (2.1)	5.6 (2.3)	2.73 (2.4–3.2)	<0.001
Altruistic acceptance					
Yes	65.8	67.2	53.4	0.56 (0.3–1.0)	0.004
No	34.2	32.6	46.6	1.00	
Current fear of SARS, mean (SD)[c]	2.1 (0.9)	2.0 (0.8)	3.0 (0.6)	3.58 (2.4–5.4)	<0.001

[a]Percentages, within the low and high PTS symptom level groups, falling into each category of each factor variable, are reported here.

[b]Includes administrative and housekeeping positions.

[c]Continuous variable. ORs reflect the difference in the dependent variable associated with a difference of one standard deviation in the independent variable.

Table 2

Logistic regression analysis of factors associated with PTS symptom[a]

Factor	Model 1 AOR (95% CI)	Model 2 AOR (95% CI)	Model 3 AOR (95% CI)
Event exposure			
Work exposure	2.09 (1.03–4.26)[b]	1.64 (0.78–3.42)	1.73 (0.82–3.64)
Any quarantining	2.09 (1.00–4.37)[b]	1.63 (0.75–3.52)	1.68 (0.77–3.66)
Relative or friend got SARS	3.08 (1.40–6.81)[c]	3.30 (1.43–7.66)[c]	3.44 (1.45–8.19)[c]
During-outbreak SARS-related perceptions			
Perceived risk level, continuous variable	n/a	2.40 (2.05–2.81)[d]	2.47 (2.10–2.90)[c]
Altruistic acceptance	n/a	n/a	0.47 (0.25–0.89)[b]

[a] In all models, age, sex, family income, education level, marital status, and any prior exposure are controlled for.

[b] $P < 0.05$;

[c] $P < 0.01$;

[d] $P < 0.001$

n/a = not applicable

Table 3

Multiple regression analysis of factors associated with current level of fear of SARS

Factors	Estimated regression coefficient	*P*
Sociodemographic factors		
Female	0.226	0.004
Age, years[a]		
≤35	−0.108	0.28
36–50	−0.072	0.42
Low educational level	−0.281	<0.001
Married	0.236	0.01
During outbreak SARS-related perceptions		
Perceived risk level	0.102	<0.001
Altruistic acceptance	−0.167	0.02
High PTS symptom level	0.797	<0.001

[a]People aged 51 years and older constitute the age group that is used as a reference group in the regression analyses.