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Population-based Post-crisis Psychological Distress: An Example From the SARS Outbreak in Taiwan

Eugene Yu-Chang Peng[1,2], **Ming-Been Lee**[3], **Shang-Ta Tsai**[4], **Chih-Chien Yang**[5], **Donald Edward Morisky**[6], **Liang-Ting Tsai**[5], **Ya-Ling Weng**[2], and **Shu-Yu Lyu**[2,*]

[1]Department of Community Medicine, Taipei City Hospital, Ren-Ai Branch,

[2]School of Public Health, Taipei Medical University,

[3]Department of Psychiatry, National Taiwan University Hospital,

[4]Division of General Surgery, Department of Surgery, Taiwan Adventist Hospital, Taipei,

[5]Graduate School of Educational Measurement and Statistics, National Taichung University, Taichung, Taiwan;

[6]Department of Community Health Sciences, School of Public Health, University of California at Los Angeles, Los Angeles, CA, USA.

Abstract

Background/Purpose—As a result of the severe acute respiratory syndrome (SARS) pandemic, the World Health Organization placed Taiwan on the travel alert list from May 21 to July 5, 2003. The aim of this study was to explore the post-crisis psychological distress among residents in Taiwan after the SARS epidemic.

Methods—The target population consisted of a nationwide representative sample of residents aged ≥ 18 years. Data were collected using computer assisted telephone interview systems by stratified random sampling according to geographic area. The survey (n = 1278) was conducted in November 2003, about 4 months after resolution of the SARS crisis in Taiwan. The maximum deviation of sampling error at the 95% confidence level was ± 2.74%. Psychological distress was measured by a question related to subject's changes in perception of life, plus the five-item Brief Symptom Rating Scale. Multivariate logistic regression was used to examine the correlation of psychological distress.

Results—About 9.2% of the participants reported that their perceptions of life became more pessimistic following the SARS crisis. The prevalence of psychiatric morbidity was 11.7%. Major predictors of higher levels of pessimism after the SARS epidemic included demographic factors, perception of SARS and pre-paredness, knowing people or having personal experiences of SARS-related discrimination, and individual worries and psychiatric morbidity. The correlates of symptomatic cases, as indicated by the five-item Brief Symptom Rating Scale, included age ≥ 50 years, senior high school graduate, and worries about recurrence of SARS.

Conclusion—Psychological distress was significantly correlated with demographic factors and perception regarding the SARS epidemic. It is suggested that marketing of mental health education should be segmented according to age and education level, which should enhance crisis communication for newly emerging infectious diseases among community populations.

[*]**Correspondence to:** School of Public Health, Taipei Medical University, 250 Wu-Hsing Street, Taipei 11031, Taiwan. sylyu@tmu.edu.tw .

Keywords

post-crisis; psychiatric morbidity; psychological distress; severe acute respiratory syndrome

Severe acute respiratory syndrome (SARS) was the first serious new emerging infectious disease (EID) in the 21st century,[1] and the worldwide medical, social and economic impacts were severe.

Communication about the risk of infectious diseases and the psychological effects of microbial threats has become an important public health issue in recent years.[2-4] Notably, the uncertainty and rapid spread of the SARS pandemic increased the worldwide media coverage.[5,6] It also heightened the anxiety and fear of the SARS outbreak.[7]

Nosocomial infection was a major route of transmission for the SARS outbreak in Taiwan.[8,9] A number of studies on the psychological impact of the SARS outbreak in Taiwan have focused on the psychiatric morbidity of hospital staff,[10-14] for example, post-traumatic stress disorder,[10,15] and decreased utilization of medical services.[16-18] Relatively few researchers have conducted studies related to the psychological responses of SARS among the general population.[7,19]

Mental health plays an important role in managing new EIDs like SARS. The fear of SARS could increase panic[7] and lead to social stigmatization.[20-23] In particular, effective crisis communication is important to mitigate the fear of new EIDs. The challenge of communication about the risk of EIDs was one of the lessons learned from the experience of SARS.[24]

As new diseases have been emerging at an un-precedented rate, it is vital to maintain continued vigilance by delivering the most accurate information successfully and unambiguously.[24] Research on the post-crisis response merits further discussion of the pre-crisis preparedness for the emergence of the next new disease.

This study aimed to explore post-crisis psychological distress and the perception and preparedness for possible SARS recurrence among residents after the epidemic. This study is intended to contribute to the scarce literature on the psychological impact of SARS, and could also provide important reflections and implications for the unpredictable EID outbreaks like influenza A (H1N1 and H5N1).

Methods

Participants and data collection

In 2003, the prevalence of SARS in Taiwan was the third highest in the world, following China and Hong Kong. The first probable case of SARS in Taiwan was found on March 14, 2003. The World Health Organization added Taiwan to the travel alert list from May 21 to July 4, 2003.

From November 26 to 28, 2003, (about 4 months after Taiwan was removed from the list of SARS-affected countries), a telephone survey was conducted to recruit nationwide representative samples of the population aged ≥ 18 years. Data were collected via a computer-assisted telephone interview system using random digital dialing and by stratified random sampling according to geographic area. The interviews were conducted from 18:20 to 22:00 hours on week-days. Every eligible household was contacted up to three times to conduct the interview. After 593 respondents refused to participate, a total of 1278 participants were recruited, which gave an overall response rate of 68%. The maximum

deviation of sampling error at the 95% confidence level was ± 2.74%. The average time spent for an interview was 8 minutes and 41 seconds.

Measures

This survey was implemented by using a structured questionnaire that included the four domains described below.

Demographic information—Participants' demographic characteristics, such as age, sex, education level, and residential area were included.

Perceptions and attitudes towards SARS—There were several aspects of perceptions and attitudes towards SARS designed into the study, including: perceived severity of SARS; perception of the survival rate of SARS patients; the belief that some measure of control (such as wearing a protective mask and frequently washing hands) could reduce the possibility of contracting SARS; worry about recurrence of SARS in the coming autumn/winter; whether participants had confidence in the government's capability to manage a SARS recurrence; and whether people with SARS or human immunodeficiency virus/acute immunodeficiency diseases (HIV/AIDS) would be more stigmatized. Most of the response options allowed various levels of choice but were dichotomized in data analyses according to previous studies. For instance, perception regarding severity of SARS was measured by a single question: "How would you rate the degree of severity regarding SARS?" Response options were: very serious, serious, fair, and not serious. In addition, participants were asked about the SARS survival rate: "What percentage of SARS patients will survive according to the current medical technology?" The answer options varied from < 50% to > 90%.

Behavior and SARS-related experiences—Participants were asked about their experiences in 2003 and their level of preparedness for a SARS recurrence. The SARS-related experiences included: (1) whether the respondents, neighbors, or relatives had ever been quarantined; (2) whether they had received SARS-related health education information from the media in the 2 weeks prior to the survey, and what health message they wished to learn from the media reports; and (3) whether they (or their friends or relatives) had ever encountered SARS-related discrimination. The experience of discrimination was probed as an open-ended question.

Psychological distress—Psychological distress was measured by a single question related to participant's change in perception of life plus the five-item Brief Symptom Rating Scale (BSRS-5). Participants were asked: "How have you changed your perception of life after the SARS crisis resolution?" Answer options were: became more optimistic, became more pessimistic, and remained the same.

The BSRS-5 comprised five symptom items, namely: feeling tense or keyed up (anxiety); feeling blue (depression); feeling easily annoyed or irritated (hostility); feeling inferior to others (inferiority); and trouble falling asleep (insomnia); which were derived from the 50-item BSRS.[25] This instrument has satisfactory reliability and validity and is widely used to measure psychiatric morbidity in medical settings and community samples.[25-27]

Based on a five point Likert-type scale from "not at all" (score 0) to "extremely" (score 4), participants were asked to indicate how much discomfort they experienced that was caused by a particular symptom in the past week (including the current day). The sum of the scores across the five items represented the total score of the BSRS-5 and ranged from 0 to 20. The higher the score, the higher the psychological distress level. A cutoff score of ≥ 6 was considered as a BRSR-5-defined psychiatric case.[25]

Statistical analyses

Descriptive statistical analysis was conducted to illustrate the demographic and other selected characteristics of the respondents. A reliability test was used to check internal consistency of the BSRS-5. The prevalence of each item from the BSRS-5 was indicated by combining the percentage of “quite a bit” and “extremely” responses. Multiple logistic regression was used to identify statistically significant associations between psychological distress and selected characteristics, while controlling for potential confounders. The estimates of the strength of associations were demonstrated by the odds ratio (OR) with 95% confidence interval (CI). A *p* value of less than 0.05 was considered statistically significant. The study sample was weighted according to age, sex and residential geographic strata to allow generalization to national population estimates. Data were analyzed using SPSS version 12.0 (SPSS Inc., Chicago, IL, USA).

Results

Demographic and selected characteristics of the study population are shown in Table 1. Participants’ ages ranged from 18 to 89 years old, with an average age of 41.6 (standard deviation = 16.6) years. The majority of the participants (62.4%) were senior high school graduates or below, 49.7% were female, and 28.2% lived in Taipei city/county, which was the most serious SARS-affected area. Among the participants, 81.1% perceived SARS to be a serious disease, 59.9% worried about the recurrence of SARS, and 70.0% had confidence in the government’s capability to manage SARS recurrence.

Approximately 76.6% of the participants reported having received SARS-related health education information from the media in the past 2 weeks. Notably, based on multiple responses, the major issues about which the participants wished to learn more from the media were: (1) SARS symptoms and places to seek help (48.0%); (2) updated international SARS epidemic data (46.7%); (3) the government’s preparedness and updated policies for a SARS resurgence (42.1%); (4) the most recent SARS research (29.4%); (5) management of SARS-related emotional disturbance (19.8%); and (6) advocacy for preventing SARS infection (18.0%).

Although 89.7% of the participants agreed with the statement that some measure of personal control (such as wearing a protective mask) could reduce the possibility of contracting SARS, 61.2% had prepared for self-protection, and 10.4% of the participants reported that they themselves or their relatives and neighbors had been quarantined.

Furthermore, 69.9% of the participants considered that a person with HIV/AIDS would be more stigmatized than one with SARS. Approximately 9.2% of the participants reported that they had become more pessimistic as a result of the SARS outbreak, and the prevalence of psychiatric morbidity was judged to be 11.7%. The prevalence of BSRS items in the BSRS-5 defined case group was distributed as follows: the highest prevalence was for sleep disturbance (4.2%), followed by anxiety (3.2%), depression (3.0%), inferiority (2.9%), and hostility (2.3%). The BSRS-5 demonstrated satisfactory internal consistency in the present samples (α=0.82).

A total of 124 (9.7%) participants reported that they or their relatives/friends had encountered SARS-related discrimination. The three leading causes of discrimination were having suspect SARS-related symptoms such as cough or fever (54.0%), having been quarantined at home (13.7%), and having family members who worked as medical staff (8.1%).

Table 2 displays how BSRS-5-defined cases are associated with being 50–59 years of age (OR = 0.50, 95% CI = 0.27–0.94), or ≥ 60 years of age (OR = 0.40, 95% CI = 0.19–0.83), a high-school graduate (OR = 1.80, 95% CI = 1.07–3.02), and worried about the recurrence of SARS (OR = 1.48, 95% CI = 1.02–2.16).

Results of the multivariate analysis for factors associated with becoming more pessimistic after the SARS crisis are presented in Table 3. Factors related to becoming more pessimistic included: (1) aged at least 60 years (OR = 2.52, 95% CI = 1.09–5.82); (2) senior-high-school graduate (OR = 2.13, 95% CI = 1.23–3.68); (3) worried about the recurrence of SARS (OR = 3.50, 95% CI = 2.29–5.38); (4) perception that < 50% of SARS patients would survive (OR = 1.61, 95% CI = 1.04–2.50); (5) perception of SARS as a serious disease (OR = 3.42, 95% CI = 1.14–10.21); (6) disagreement that preparedness decreases the possibility of contracting SARS (OR = 2.76, 95% CI = 1.57–4.85); (7) experience of SARS-related discrimination for self, relatives or friends (OR = 2.05, 95% CI = 1.10–3.82); and (8) BSRS-5-defined psychiatric morbidity (OR = 3.23, 95% CI = 1.96–5.33).

Discussion

The timing of the present study was approximately 4 months after the resolution of the SARS crisis in Taiwan, and 1 year after the first SARS case worldwide (November 2002). Hence, nearly 80% of the participants reported having received SARS-related health education information from the media in the past 2 weeks prior to the time of the telephone survey. However, only 64% of the participants in this study held the belief that current medical technology could prolong the lives of patients suffering from SARS. This is in contrast to the actual fatality rate of SARS patients in Taiwan, which was 10.7%.[28] Such a discrepancy between the true and perceived fatality rate might be due to a public risk perception that is based more on rumors and anecdotes than scientific evidence. A recent study has shown that the perceived threat, vulnerability and response efficacy for SARS varied between countries in Europe and Asia.[29]

A total of 668 probable SARS cases were diagnosed between March 14 and July 30, 2003 in Taiwan.[30] The impact of the epidemic on the country's medical and social system was tremendous. Fear was widespread. For example, despite the fact that none of the probable SARS cases were discovered in the communities of indigenous peoples (2% of Taiwan's population are Austronesian aborigines, mostly living in remote mountains), 42.6–50.9% of indigenous community residents reported that their daily life was affected by the SARS epidemic.[31]

The prevalence of BSRS-5-defined psychiatric morbidity in our study population was found to be 11.7%. As expected, this was lower than that of hospital staff, with psychiatric morbidity among hospital workers ranging from 18 to 57%, depending on their level of involvement with SARS patients, and with the highest prevalence in hospitals that had nosocomial transmission of SARS.[12] The post-crisis prevalence (11.7%) in 2003 was higher than the prevalence in the general population (8.8%) after 2003,[32] but considerably lower than that of HIV-infected prison inmates (46.1%).[33] It is very likely that negative life events also influence BSRS scores. These findings suggest the need to enhance mental health services during and after EID crises.

There were many factors associated with participants becoming more pessimistic after the SARS crisis resolution, especially ongoing concern about SARS recurrence. Several demographic factors were also associated with psychological distress, such as being a senior high school graduate. Participants aged ≥ 50 years were less likely to be BSRS-5-defined cases. However, those aged ≥ 60 years were more likely to become pessimistic after

resolution of the SARS crisis than were younger participants. This might have been due in part to the nature of the outcome variables measured. The five dimensions of the mental health status measured by the BSRS-5 did not include sadness. Adults aged ≥ 50 years might have better stress coping skills for health crises, whereas those aged ≥ 60 years could have felt sad because of this EID crisis, as well as personal aging status.

Based on the correlation of psychological distress found in the present study, it is suggested that marketing of mental health education should be segmented according to age and education level, which should greatly enhance crisis communication for new EIDs among community populations.

The stigmatization of SARS and AIDS has been noted,[34] yet AIDS received greater stigma than did SARS in Hong Kong.[35] Our study had a similar finding and it might have been due in part to the attributed cause of the disease, and fear about its contagious nature. The appearance of suspect SARS-related symptoms such as cough or fever was the leading issue for those participants who reported discrimination. There is a need to intervene and enhance the general public's resilience as well as prepare healthcare workers for future health crises.

In addition to policy issues and other required information regarding the SARS epidemic data, we observed that approximately 20% of the respondents reported their willingness to learn about how to manage SARS-related emotional disturbance, even after resolution of the SARS crisis. Dissemination of timely and accurate information is crucial to crisis communication. Yet, the post-crisis phase is likely to be the time for questioning the cause of the crisis, the appropriateness of responses, and attribution of responsibility.[36] In the era of emerging and reemerging threats of infectious diseases, mental health plays an important role in crisis management. To varying degrees, emotional support might play an integral role in helping frontline medical staff, people who are quarantined, and the general public, to cope with stress.

Taiwan was one of the most severely affected countries by SARS. The strength of the present study is that it was conducted during the immediate post-crisis phase of the initial SARS epidemic, as well as the pre-crisis phase of its resurgence. The findings provide population-based empirical data for post-crisis renewal[37] and implications to facilitate effective and targeted culture sensitive communication with stakeholders prior to the next EID health crisis.

Yet, several limitations of this study need to be taken into consideration. The cross-sectional design prevents us from making causal inferences and the direction of the identified effects is not clear. The lack of BSRS-5 scores before and during the SARS outbreak limited our ability to draw valid inferences from our data. It is also noteworthy that limited information exists with regard to the potential importance of life events in predicting psychiatric morbidity such as depression,[38] which warrants further exploration. The potential recall bias might be inevitable for certain elderly respondents. However, the fact that 76.6% of the respondents received SARS-related health education information from the media in the 2 weeks prior to the survey reduces this potential recall bias. Another potential selection bias is due to the 593 non-respondents. Yet, weighted samples were used in the analysis to ensure that the estimates reflected the general population. Finally, the bias associated with reliability of self-reporting could possibly be a limitation of this study.

In conclusion, the SARS outbreak in Taiwan had a great impact on the mental health status of the general public, even after the crisis had been resolved. Psychological distress was significantly correlated with demographic factors and perceptions regarding the SARS epidemic. It is suggested that effective risk communication and mental health interventions

for targeted segments of the population/stakeholders should be implemented during the post-crisis resolution stage, as well as during the pre-crisis stage for the next new EIDs.

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Table 1

Participants' characteristics and survey responses (n = 1278)

Variable	*n* (%)
Demographic characteristics	
Sex	
Male	643 (50.3)
Female	635 (49.7)
Age group*	
18–29	335 (26.5)
30–39	277 (21.9)
40–49	269 (21.2)
50–59	171 (13.5)
≥ 60	214 (16.9)
Education level*	
Junior high school or below	370 (29.2)
Senior high school	421 (33.2)
Junior college or above	476 (37.6)
Residential area	
Taipei city/county	360 (28.2)
Others	918 (71.8)
Perceptions and attitudes towards SARS	
SARS as serious disease	
Yes	1036 (81.1)
No	193 (15.1)
Don't know	49 (3.8)
Survival rate of SARS patients	
≥ 50%	818 (64.0)
< 50%†	460 (36.0)
Which disease receives more stigmatization	
SARS	109 (8.6)
HIV/AIDS	893 (69.9)
About the same†	276 (21.5)
Agreed that self measures of control can reduce SARS infection	1146 (89.7)
Worried about SARS recurrence in the coming autumn/winter	766 (59.9)
Confident of government's capability in managing SARS recurrence	895 (70.0)
Behaviors and SARS-related experiences	
Had received SARS-related education information	980 (76.6)
Prepared for SARS recurrence	782 (61.2)

Variable	*n* (%)
Self/relatives/neighbors ever been quarantined	133 (10.4)
Self/relatives/friends experienced SARS-related discrimination	124 (9.7)
Psychological distress	
Change in perception of life after SARS crisis resolution	
More optimistic	436 (34.1)
More pessimistic	117 (9.2)
About the same	725 (56.7)
BSRS-5 score*	
< 6	1095 (88.3)
≥ 6	145 (11.7)

*All missing cases were deleted;

†include “Don’t know”. SARS = Severe acute respiratory syndrome.

Table 2

Multiple logistic regression of five-item Brief Symptom Rating Scale-defined cases

Variable	OR (95% CI)	*p*
Being female	1.13 (0.78–1.64)	0.501
Age group (yr)*		
18–29	1.00 (reference)	
30–39	0.63 (0.36–1.10)	0.104
40–49	0.70 (0.41–1.21)	0.203
50–59	0.50 (0.27–0.94)	0.032
≥ 60	0.40 (0.19–0.83)	0.013
Education level*		
Junior high school or below	1.14 (0.73–1.77)	0.574
Senior high school	1.80 (1.07–3.02)	0.026
Junior college or above	1.00 (reference)	
Perceived SARS as serious		
Yes	1.27 (0.54–2.98)	0.592
Don’t know	0.69 (0.38–1.24)	0.217
No	1.00 (reference)	
Perceived survival rate of SARS patients < 50%	0.86 (0.58–1.29)	0.470
Worried about SARS recurrence in the coming autumn/winter	1.48 (1.02–2.16)	0.045
Confident in government’s capability in managing SARS recurrence	1.37 (0.92–2.03)	0.119
Disagreed that self measures of control can reduce SARS infection	1.04 (0.57–1.89)	0.901
Not prepared for SARS recurrence	0.91 (0.62–1.33)	0.602
Self/relatives/neighbors ever been quarantined	1.60 (0.95–2.71)	0.078
Self/relatives/friends experienced SARS-related discrimination	1.38 (0.80–2.39)	0.244

*All missing cases were deleted. OR = Odds ratio; CI = confidence interval; SARS = severe acute respiratory syndrome.

Table 3

Multiple logistic regression of perceiving more pessimistic after the severe acute respiratory syndrome crisis resolution

Variable	OR (95% CI)	*p*
Being female	1.32 (0.86–2.03)	0.209
Age group*		
18–29	1.00 (reference)	
30–39	0.92 (0.42–2.01)	0.831
40–49	1.03 (0.49–2.18)	0.945
50–59	1.64 (0.76–3.52)	0.206
≥ 60	2.52 (1.09–5.82)	0.030
Education level*		
Junior high school or below	1.50 (0.79–2.84)	0.219
Senior high school	2.13 (1.23–3.68)	0.007
Junior college or above	1.00 (reference)	
Perceive SARS as serious		
Yes	3.42 (1.14–10.21)	0.028
Don’t know	0.37 (0.03–4.16)	0.418
No	1.00 (reference)	
Perceived survival rate of SARS patients <50%	1.61 (1.04–2.50)	0.033
Worried about SARS recurrence in the coming autumn/winter	3.50 (2.29–5.38)	< 0.001
Confident in government’s capability in managing SARS recurrence	1.16 (0.73–1.85)	0.535
Disagreed that self measure of control can reduce SARS infection	2.76 (1.57–4.85)	< 0.001
Not prepared for SARS recurrence	1.01 (0.64–1.59)	0.967
Self/relatives/neighbors ever been quarantined	1.04 (0.54–2.01)	0.912
Self/relatives/friends experienced SARS-related discrimination	2.05 (1.10–3.82)	0.024
BSRS-5 score ≥ 6	3.23 (1.96–5.33)	< 0.001

*All missing cases were deleted. OR = Odds ratio; CI = confidence interval; SARS = severe acute respiratory syndrome; BSRS-5 = five-item Brief Symptom Rating Scale.