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Psychosocial and coping responses within the community health care setting towards a national outbreak of an infectious disease

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Abstract

Objective: The psychological and coping responses of the noninfected community towards infectious disease outbreaks are relatively understudied. This cross-sectional study sought to determine the prevalence of severe acute respiratory syndrome (SARS)-related psychiatric and posttraumatic morbidities and associated coping styles within the general population visiting community health care services. **Methods:** It was conducted on individuals attending community polyclinics in Singapore within the first week of July 2003, 16 weeks after the first national outbreak of SARS. The General Health Questionnaire-28, Impact of Event Scale-Revised, and Brief COPE were used to determine the prevalence rates of psychiatric and posttraumatic morbidities and employed coping strategies respectively. **Results:** The overall response rate was 78.0%. Of the 415 community health care setting respondents, we found significant rates of SARS-related psychiatric (22.9%) and posttraumatic morbidities (25.8%). The

presence of psychiatric morbidity was associated with the presence of high level of posttraumatic symptoms [adjusted odds ratio (OR) 2.26, 95% confidence interval (CI) 1.24–4.13, P=.008]. Psychiatric morbidity was further associated with being seen at fever stations (adjusted OR 1.90, 95% CI 1.08–3.34, P=.026), younger age (adjusted OR 0.97, 95% CI 0.94–0.98, P=.021), increased self blame (adjusted OR 1.67, 95% CI 1.22–2.28, P=.001), less substance use (adjusted OR 0.74, 95% CI 0.56–0.98, P=.034) and posttraumatic morbidity was associated with increased use of denial (adjusted OR 1.31, 95% CI 1.04–1.67, P=.024), and planning (adjusted OR 1.51, 95% CI 1.16–1.95, P=.002) as coping measures. **Conclusion:** These findings could potentially inform the development of practical community mental health programs for future infectious disease outbreaks.

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Introduction

Recent years in the 21st century have witnessed a number of challenges to social order and community stability in the realm of major infectious disease outbreaks. These infectious diseases outbreaks include the severe acute respiratory syndrome (SARS) and that which may potentially occur in

the future, such as the avian influenza [1,2]. Psychosocial responses towards such infectious disease outbreaks are variable and can range from feelings of anxiety, a sense of shame, failure or weakness of the individual and society [3], and an underestimation of likelihood of survival, an overestimation of likelihood of infection [4] to a sudden flight from the outbreak [5], an excessive and inappropriate adoption of precautionary measures, as well as an increased demand for health care services in a time of shortage [6]. A better understanding of the psychological and coping responses within the noninfected community towards infectious disease outbreaks are important for several

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reasons. First, high prevalences of psychological morbidities have been documented in individuals exposed directly or vicariously to life threatening situations [7,8]. Second, such psychological morbidities occurring in a substantial proportion of the community can impact on the daily functioning of these affected individuals with immediate social and economic consequences such as lost job productivity and financial hardship [1]. Third, situation-specific coping strategies may mitigate and moderate the nature and impact of these psychosocial responses [9–11]. Fourth, better safeguarding of the psychological wellbeing of the community with practical mental health programs is crucial as it would help to prevent or ameliorate any disruption of health care delivery in the community during such outbreaks [12].

To the best of our knowledge, most of the research on the psychological responses to infectious disease outbreaks were conducted on either affected individuals such as in the case of HIV/AIDS [13], health care workers working to combat the illness such as in the case of SARS [14,15], and survivors of SARS [16]. Data regarding the psychological impact on the larger noninfected community are needed in order to understand the full psychosocial dimension of such disease outbreaks. Hence, using the SARS as an example of a major new emerging infectious disease of the 21st century, we aimed to: (1) determine the prevalence of psychiatric and post-traumatic morbidities within the non-infected population visiting community health care services and (2) evaluate the differences in associated factors and coping styles between those with and without these psychological morbidities.

Methods

Community health care delivery system

Situated in South-East Asia, Singapore is an island state with a population of 4 million comprising of three major ethnic groups, Chinese (76.8%), Malay (14.0%), Indian (7.8%) and 1.4% of other ethnicity. In Singapore, there is a dual system of health care delivery. The public system is managed by the Government whereas the private system is provided by the private hospitals and general practitioners. The primary health care services are delivered at the public outpatient polyclinics and the private clinics of medical practitioners. The National Healthcare Group Polyclinics (NHGP), one of the two public primary health care delivery networks, runs a total of nine polyclinics in the whole island state of Singapore. Each polyclinic serves as a one-stop community health care center that provides comprehensive outpatient medical care, immunization, health screening and education, follow-up of patients discharged from hospitals, investigative facilities, and pharmacy services.

Chronology of the local SARS outbreak and measures adopted

In November 2002, there were initial reports of cases of highly contagious and severe atypical pneumonia of unknown cause from Guangdong Province in China. In late February 2003, this condition was termed severe acute respiratory syndrome (SARS) by the US Centers for Disease Control and Prevention which also provided a clinical case definition [17]. This potentially fatal condition was reported to be caused by the SARS-associated coronavirus and is characterised by both an atypical pneumonia and efficient droplet transmission [18]. Locally, the largest outbreak of SARS began in mid March 2003 and was traced to a traveler returning from Hong Kong [19]. In Singapore, a total of 238 individuals were infected with SARS, with an overall third highest case fatality rate of 13.9%: behind Canada (251 infected; 17.1% case fatality rate) and China and Hong Kong Special Administrative Region (1755 infected; 17.0% case fatality rate) but above Taiwan (346 infected, 10.7% case fatality rate) [20].

At the primary health care level, infection control measures that were rapidly implemented included the use of the personal protective equipment amongst the health care workers attending to patients including those presenting with a febrile illness, regular temperature monitoring, filling of health declaration forms, regular audit of infection control measures, and the setting up of fever stations to isolate and manage individuals with any febrile condition within the polyclinics [21]. The operation of the fever stations at the polyclinics was terminated on August 1, 2003.

Study population and design

This cross-sectional study about the psychological impact of SARS on the general population visiting these community primary health care centers was conducted within the first week of July 2003. This study was thus conducted in the context of ongoing epidemic but in the presence of falling incidence of new cases. Few days prior to the study, a notification was conveyed via an electronic mail from the NHGP headquarters to the directors of primary health care centers involved in the study. Subsequently, the study instrument was administered on consecutive patients visiting these community health care centers. Inclusion criteria included English-speaking subjects and provision of written, informed consent. Of the 532 eligible individuals approached, 415 agreed to participate giving a response rate of 78.0%. There were no significant differences in the age and gender between participants versus nonparticipants.

Rating instruments

The study instrument was a structured questionnaire which comprised of 3 main outcome rating scales and a section on sociodemographic details including sex, age, marital status, and living arrangements. The participants had all been instructed to rate their symptoms and coping measures based on their experiences specifically with respect to SARS akin to similar methods used in other studies

[16,32]. Additional open-ended questions were asked of the participants which pertained to their major concerns about SARS and major sources of help.

Three main outcome measures were used: (a) the degree of SARS-related psychiatric morbidity in the preceding few weeks was evaluated by the 28-item General Health Questionnaire (GHQ-28) [22]. The 28 items can be grouped into 4 subscales: somatic, anxiety, social dysfunction and depression subscales. Suitable for identifying minor psychiatric disorder in community samples, this measure allows "caseness" to be determined by means of a total score. Using the conventional GHQ binary scoring method (range 0–28), a total GHQ score of 5 and above is indicative of a case of "psychiatric morbidity" [23]. (b) The SARS-related posttraumatic morbidity was determined by the Impact of Events Scale-Revised (IES-R) [24], a 22-item scale which measured the extent to which the respondents were distressed by the SARS-related symptoms of intrusion, avoidance and hyperarousal as experienced in the past week using a 5-point rating scale on a range of 0–4. Two scores were calculated from the IES-R, namely, a continuous score (total and subscales) and a dichotomous category of high versus low level of posttraumatic symptoms [25]. When calculating the dichotomous scores, symptoms were considered present if the respondents reported that they have been at least moderately distressed by the symptoms in the prior week (score of 2 on a scale of 0–4) [26]. Post traumatic morbidity was determined by using the *Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition* criteria for posttraumatic stress disorder (>1 re-experiencing symptoms, >3 avoidance symptoms, and >2 arousal symptoms) [27]. Subjects fulfilling these cutoffs were classified as having a high level of posttraumatic stress symptoms. (c) Coping was assessed using the Brief COPE questionnaire [28]. It comprises 28 items and can be grouped into14 coping strategies (two items per strategy) used in response to a particular stressor: self distraction, active coping, denial, substance use, emotional support seeking, instrumental support seeking, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame. Participants were asked to indicate on a four-point scale, ranging from 1 (I haven't been doing this at all) to 4 (I have been doing this a lot), how often they used each strategy to cope with SARS-related stress symptoms.

All the three outcome measures were chosen as they were self-reported scales, easy to administer, and widely used in studies to evaluate psychiatric morbidity and posttraumatic stress [25,29]. Participation in the survey was voluntary and the study was approved by the institutional research and ethics committee.

Statistical analysis

Data was analysed using SPSS-PC version 11.0 (SPSS, Chicago, IL, USA). Normality of quantitative data was checked using the Kolmogorov–Smirnov 1 sample test.

Differences between groups were tested by *t* test and Mann–Whitney *U* test for normal and non-normal continuous variables respectively and chi-square test or Fisher's Exact test for categorical variables whenever appropriate. Correlations for normally distributed data were made with Pearson's *r*, and non-normally distributed data were correlated with a rank method (Spearman's r_s). Multiple logistic regression analyses were carried out to determine the significant factors associated with two outcome variables (psychiatric morbidity and post-traumatic morbidity). Covariates entered in the multivariate logistic regression models included age, marital status, psychiatric, or posttraumatic "caseness," consultation at fever stations, and the 14 coping strategies). A *P* value <.05 (two-tailed) was taken to indicate statistical significance.

Results

Sociodemographic profile (Table 1)

Overall, the mean age (S.D.) of the participants was 36.6 (13.9) years, and 246 (59.3%) were males. In terms of ethnicity, 219 (52.8%) patients were Chinese, 90 (21.7%) were Malay, 83 (20.0%) were Indian and 23 (5.5%) belonged to other ethnic groups. More than half of the respondents were married (*n*=237, 57.1%), 160 (38.6%) were single, and 18 (4.3%) patients either divorced or separated. In terms of living arrangement, there was a preponderance of the individuals living with someone (*n*=385, 92.8%) rather than alone (*n*=30, 7.2%). In terms of reasons for consultation at the community polyclinics, the majority were symptoms related to upper respiratory tract infections (*n*=317, 76.4%), with others related to medical reviews of hypertension (*n*=40, 9.6%), hyperlipidemia (*n*=27, 6.5%), diabetes (*n*=25, 6.0%), ischemic heart disease (*n*=5, 1.2%), and stroke (*n*=1, 0.24%).

Direct Exposure to fever stations

Two hundred individuals (48.2%) were examined in the fever stations during the SARS outbreak. Table 1 also showed the comparisons in terms of sociodemographic variables and outcome measures between individuals seen at fever versus nonfever stations.

Psychiatric morbidity and coping

Psychiatric morbidity was reported in 95 (22.9%) participants. "Caseness" of psychiatric morbidity were associated with a high level of posttraumatic stress symptoms as well as higher IES-R mean subscale scores across the three domains (Table 2). The total GHQ scores were also correlated with the IES-R total (r_s=0.34, *P*<.001) and mean intrusion (r_s=0.35, *P*<.001), avoidance (r_s= 0.28, *P*<.001), and hyperarousal (r_s=0.37, *P*<.001) subscale scores. Participants with psychiatric morbidity used all coping measures within Brief COPE more frequently

Table 1
Sociodemographic and outcome characteristics of participants

Characteristic	Overall (n=415)	Fever stations (n=200)	Non-fever stations (n=215)	P[†]
Sex, n (%)				
Male	246 (59.3)	128 (64.0)	118 (54.9)	.07
Female	169 (40.7)	72 (36.0)	97 (45.1)	
Age, mean (S.D.), y	36.6 (13.9)	33.4 (13.1)	39.5 (13.9)	<.001 [§]
Ethnicity, n (%)				
Chinese	219 (52.8)	89 (44.5)	130 (60.5)	.003
Malay	90 (21.7)	54 (27.0)	36 (16.7)	
Indian	83 (20.0)	41 (20.5)	42 (19.5)	
Others	23 (5.5)	16 (8.0)	7 (3.3)	
Marital Status, n (%)				
Single	160 (38.6)	92 (46.0)	160 (38.5)	.008
Separated/divorces/widowed	18 (4.3)	7 (3.5)	11 (4.2)	
Married	237 (57.1)	101(50.5)	136 (63.3)	
Living arrangements, n (%)				
Lives alone	30 (7.2)	17 (8.5)	13 (6.0)	.35
Lives with others	385 (92.8)	183 (91.5)	202 (94.0)	
GHQ-28 total >5, n (%)	95 (22.9)	53 (26.5)	42 (19.5)	.10
GHQ-28 Total score	2.99 (4.50)	3.40 (4.90)	2.61 (4.26)	.08
GHQ-28 Somatic	0.99 (1.64)	1.30 (1.90)	0.72 (1.30)	<.001 [§]
GHQ-28 Anxiety	0.86 (1.63)	0.98 (1.72)	0.76 (1.54)	.18 [§]
GHQ-28 Social Dysfunction	0.71 (1.40)	0.76 (1.47)	0.66 (1.34)	.45 [§]
GHQ-28 Depression	0.42 (1.17)	0.37 (1.16)	0.47 (1.17)	.34 [§]
High-level posttraumatic stress symptoms, n (%)	107 (25.8)	50 (25.0)	57 (26.5)	.74
IES-R Intrusion	0.62 (0.66)	0.53 (0.64)	0.70 (0.68)	.012 [§]
IES-R Avoidance	0.71 (0.74)	0.65 (0.69)	0.76 (0.78)	.11 [§]
IES Hyperarousal	0.51 (0.63)	0.49 (0.63)	0.52 (0.64)	.64 [§]
Brief COPE total, mean (S.D.)	45.6 (16.4)	43.4 (15.9)	47.6 (16.5)	.009 [§]

Comparison of participants seen at fever versus non fever stations.

[†] P values derived from χ^2 test unless otherwise noted.

[§] P values derived from Mann-Whitney test.

compared to those without psychiatric morbidity. On multi-variate analysis, being seen at fever stations, younger age, a high level of posttraumatic stress symptoms, and the use of self-blame and less use of substance as coping measures were associated with psychiatric morbidity (Table 2).

Post-traumatic morbidity and coping

Posttraumatic morbidity was found in 107 (25.8%) respondents. A high level of posttraumatic stress symptoms was associated with more frequent use of all specific coping strategies compared to a low level of posttraumatic stress symptoms. On multivariate analysis, high levels of posttraumatic stress symptoms were associated with "caseness" of psychiatric morbidity, increased use of denial, and planning as means of coping (Table 3).

Major concerns and sources of help

There were 250 and 255 responses to the open-ended questions on the major concerns regarding the SARS outbreak and sources of help, respectively. Table 4 summarized the three most frequent responses to the two questions in each of the biological, psychological, and social domains. When the three major concerns (losing control of spread of SARS, fear of contracting SARS, health concerns

about family) were combined and analyzed as a group, psychiatric morbidity was significantly associated with these major concerns [OR 1.97 [1.1–3.6], P=.04) compared to the other concerns within Table 4. Posttraumatic morbidity was not associated with the three major concerns as a group.

Discussion

This study highlighted a few important findings. First, we found significant rates of SARS-related psychiatric and posttraumatic morbidities (22.9% and 25.8% respectively) in the subjects visiting our community primary health care centers, about 16 weeks after the first local outbreak of SARS. Second, the presence of psychiatric morbidity was associated with a high level of posttraumatic symptoms. Third, psychiatric morbidity was further associated with being seen at fever stations, younger age, increased self blame, and less substance use, and posttraumatic morbidity was associated with increased use of denial and planning as coping measures.

The rate of psychiatric morbidity (22.9%) in this study was higher compared with our baseline population prevalence rate of 16.6% (using GHQ-28) in our previous National Mental Health Survey [30]. However, the rate was comparable with that (20.6%) found in medical staff working

Table 2
Sociodemographic and outcome factors between participants with and without psychiatric morbidity

Factor	Psychiatric morbidity present (GHQ-28 total >5) (n=95)		Psychiatric morbidity absent (GHQ-28 total <5) (n=320)		Univariate analysis	Multivariate analysis	
	n	%	n	%	P[†]	Adjusted OR P	P
Male	54	56.80	192	60.00	.64	1.63 (0.93–2.84)	.086
Married	42	44.20	195	60.90	.005	0.12 (0.33–1.14)	.124
Seen at fever stations	53	55.80	147	45.90	.10	1.90 (1.08–3.34)	.026
High level posttraumatic stress	44	46.30	63	19.70	<.001	2.26 (1.24–4.13)	.008
	Mean	S.D.	Mean	S.D.	P[§]		
Age, y	32.41	12.78	37.80	13.95	.001	0.97 (0.94–0.98)	.021
IES-R Intrusion	0.97	0.75	0.51	0.60	<.001	–	–
IES	1.10	0.83	0.59	0.67	<.001	–	–
IES	0.88	0.70	0.40	0.57	<.001	–	–
Brief COPE total	54.54	15.48	42.93	15.66	<.001	–	–
Self-distraction	3.99	1.58	3.13	1.49	<.001	0.98 (0.76–1.26)	.87
Active coping	4.64	1.83	3.50	1.75	<.001	1.24 (0.99–1.57)	.06
Denial	3.57	1.62	2.64	1.29	<.001	1.20 (0.94–1.52)	.15
Substance use	2.80	1.44	2.32	1.11	<.003	0.74 (0.56–0.98)	.034
Emotional support use	4.06	1.71	3.07	1.51	<.001	1.14 (0.89–1.47)	.30
Instrumental support use	4.08	1.78	3.08	1.64	<.001	0.97 (0.75–1.26)	.84
Behavioral disengagement	3.18	1.62	2.53	1.19	<.001	0.90 (0.70–1.18)	.45
Venting	3.67	1.66	2.70	1.30	<.001	1.17 (0.88–1.57)	.28
Positive reframing	4.45	1.76	3.49	1.70	<.001	0.97 (0.75–1.26)	.83
Planning	4.42	1.72	3.34	1.59	<.001	1.11 (0.84–1.46)	.46
Humor	3.20	1.45	2.73	1.40	.005	0.84 (0.66–1.06)	.14
Acceptance	5.09	1.79	4.43	2.09	.003	0.99 (0.82–1.20)	.93
Religion	4.16	2.01	3.63	2.03	.026	0.84 (0.69–1.02)	.08
Self-blame	3.21	1.59	2.34	1.01	<.001	1.67 (1.22–2.28)	.001

[†] P values derived from χ^2 test.
[§] P values derived from Mann–Whitney test.

within the same primary health care setting [31] and was consistent with the range of found rates of SARS-related psychiatric morbidity (ranging from 18.8% to 75.3% using GHQ) assessed in health care workers working within the hospitals [32,33] as well as survivors of SARS [16]. On the other hand, the rate of posttraumatic morbidity (25.8%) was considerably higher than that (9.4%) found in the medical staff from the same community health care setting [31] but seemed consistent with the rate of posttraumatic morbidity found in other studies (ranging from 17.7% to 33.0% using IES) of medical staff working within hospital units and dealing with infectious disease (322 [34]). Some caveats for the significant rates of psychiatric and post traumatic morbidities could relate to the fact that some of the participants who visited primary health care centers may be self-selected or worried well and who were more predisposed to the development of psychological morbidity either before or after visiting the clinics or an interaction of the above factors. Individuals with psychiatric comorbidity measured higher on the three IES-R subscale scores of intrusion, hyperarousal, and avoidance and those with a high level of posttraumatic stress measured higher on the four GHQ subscale scores of somatic symptoms, anxiety, depression, and social dysfunction, indicating the extent of

psychological impact involving all areas ascertained using the scales and not limited to certain domains. This is in agreement with previous reports which have also documented high levels of anxiety, depression amongst survivors of SARS (35%) [35], quarantined individuals (31%) [36], and nurses (38.5%) [34]. Additionally, previous studies had found that associated higher stress levels, depression, and anxiety symptoms tend to persist over time within health care workers [37] and survivors of SARS [16]. The psychological and behavioral responses of these individuals may relate to differences in the appraisal and interpretation of major concerns such as a sense of losing control of the situation, contracting SARS in public, as well as its effects on the wellbeing of family members (Table 4) [38,39]. This has negative impact on the social functioning of the individuals as evidenced by the lower scores on the same affected domain in GHQ, thus underlining the need to address the community psychosocial responses in any situation-specific mental health program related to an infectious disease outbreak.

Of note, psychiatric morbidity was associated with being seen at fever stations which may reinforce the sense of vulnerability and threat of infection, and this can interact with the younger age to produce more severe stress symptoms [40]. Our finding of an association of psychiatric

Table 3
Sociodemographic and outcome factors between participants with and without posttraumatic morbidity

Factor	Posttraumatic morbidity present (n=107)		Posttraumatic morbidity absent (n=308)		Univariate analysis	Multivariate analysis	
	n	%	n	%	$P^{\dagger}$	Adjusted OR	P
Male	68	63.80	178	57.80	.31	1.64 (0.93–2.87)	.086
Married	64	59.80	173	56.20	.57	1.40 (0.75–2.61)	.29
Seen at fever stations	50	46.70	150	48.70	.74	1.06 (0.61–1.84)	.85
GHQ-28 total $\geq$ 5	44	41.10	51	16.60	<.001	2.20 (1.19–4.06)	.011
	Mean	S.D.	Mean	S.D.	$P^{\S}$		
Age, y	35.76	13.79	36.83	13.90	.49	0.99 (0.97–1.02)	.79
GHQ-28 total	5.31	6.12	2.19	3.60	<.001	–	–
GHQ-28 somatic	1.63	1.98	0.78	1.45	<.001	–	–
GHQ-28 anxiety	1.63	2.04	0.60	1.37	<.001	–	–
GHQ-28 social dysfunction	1.19	1.81	0.54	1.18	<.001	–	–
GHQ-28 depression	0.87	1.77	0.27	0.81	<.001	–	–
Brief COPE total	56.84	14.38	41.68	15.15	<.001		
Self distraction	4.27	1.44	3.00	1.46	<.001	−1.20 (0.95–1.52)	.12
Active coping	4.79	1.70	3.40	1.73	<.001	1.03 (0.83–1.27)	.82
Denial	3.74	1.64	2.55	1.19	<.001	1.31 (1.04–1.67)	.024
Substance Use	2.84	1.47	2.29	1.07	<.001	0.97 (0.74–1.26)	.82
Emotional support use	4.10	1.68	3.01	1.49	<.001	0.93 (0.73–1.18)	.53
Instrumental support use	4.28	1.74	2.98	1.59	<.001	1.08 (0.85–1.38)	.52
Behavioural disengagement	3.18	1.53	2.51	1.21	<.001	0.84 (0.65–1.10)	.21
Venting	3.84	1.64	2.60	1.23	<.001	1.22 (0.92–1.60)	.17
Positive reframing	4.67	1.65	3.37	1.67	<.001	1.00 (0.79–1.28)	.97
Planning	4.79	1.57	3.17	1.51	<.001	−1.20 (0.95–1.52)	.002
Humor	3.28	1.52	2.68	1.36	<.001	1.51 (1.16–1.95)	.88
Acceptance	5.40	1.71	4.30	2.07	<.001	0.98 (0.79–1.23)	.79
Religion	4.55	1.90	3.47	2.01	<.001	0.98 (0.82–1.17)	.43
Self blame	3.09	1.45	2.35	1.07	<.001	0.93 (0.78–1.11)	.47

[†] P values derived from χ^2 test.
[§] P values derived from Mann–Whitney test.

morbidity with younger age is consistent with the results of our study on health care workers [31] as well as the study by Leung et al. [41] who found that greater anxiety was

Table 4
Major concerns about SARS and sources of help

	Major concerns about SARS (% of responses)	Major sources of help (% of responses)
Biological	1. Losing control of the spread of SARS (45)	1. Good personal hygiene (41)
	2. Recurrence of SARS (10)	2. Information on SARS from the authorities (12)
	3. Hope for cure (5)	3. Good physical health (5)
Psychological	1. Fear of contracting SARS (15.7)	1. Religion/faith (15)
	2. Fear of effects on personal health (5)	2. Acceptance (5.3)
	3. Unpredictability (3)	3. Encouraged by the courage of health care workers (4.7)
Social	1. Health of family (11)	1. Support from friends and family (13)
	2. Impact of SARS on economy (2.8)	2. Avoidance of crowded places (2)
	3. Social responsibility and public education (2.5)	3. Social responsibility (2)

associated with younger age within the community. The relationship between psychiatric morbidity and younger age may be related to differences in coping styles within younger individuals including greater self blame as revealed by the multivariate analyses in Table 2. The use of self blame may reflect an underlying sense of frustration and guilt related to responsibility attribution and interpersonal reactions which can, in turn, contribute to psychiatric morbidity [42,43]. The less use of substance in our study is in line with a previous local study of coping responses of staff within an emergency room setting [32] but is contrary to the findings of some previous studies [44,45], which had noted increased substance use in individuals facing stress. Furthermore, subjects with psychiatric morbidity and posttraumatic stress symptoms employed different coping strategies. Individuals with posttraumatic morbidity tended to use denial and planning as coping measures. Denial may reduce the sense of powerlessness in the face of overwhelming stress and frustration, thus enhancing coping efficacy in the context of post traumatic morbidity [46]. Denial could also be a maladaptive coping strategy, hence predisposing individuals to develop post-traumatic symptoms. Alternatively, it is also possible that those with posttraumatic symptoms may be

inherently more predisposed to using denial as a coping measure in the first place. In addition, those individuals with posttraumatic morbidity may then actively plan about what to do and outline steps taken in order to deal with the outbreak.

Safeguarding the mental health of the community is as important as that of the medical staff since it can potentially affect the success of the delivery of health care within the community [12]. Access to appropriate psychological assistance in the community is important as the risk of future outbreaks remains real. These findings could potentially inform the formulation of much needed mental health awareness programs for the community who may face similar disease outbreaks in the future. Based on this data, the following points could be considered in the design of community mental health programs for infectious disease outbreaks: (1) understanding that most people cope well but at the same time to identify early those individuals who are at risk for psychological morbidities such as younger individuals and those who are being monitored at specific fever stations; (2) addressing the myriad of emotional responses that may be present such as anxiety, depression, somatic symptoms, fear of contagion, losing control, recurrence, concern about personal health, health of family and friends and hope for a cure, and understanding that these reactions may occur in the context of normal adaptive responses to stress; (3) access to and timely provision of practical information to the community regarding the disease outbreak in order to decrease uncertainty concerning the disease; (4) establishing and enhancing social support networks within subsectors of the community which can buffer against distress or negative psychological responses; (5) allowing time to foster adaptive coping strategies, whether problem-, emotion-, or meaning-focused, within the community.

There are several limitations of the study. First, this study was conducted on individuals seen at the community health care setting, and thus, the results may not necessarily generalize to all noninfected individuals seen at other private health care centers. Second, other factors that could potentially contribute to the complex psychosocial responses of an individual such as personality variables, cognitive appraisal mechanisms, and past trauma were not examined in this study. Third, it is possible that some of the participants who visited primary heath care centers may be self selected or worried well and who were more predisposed to the development of psychiatric morbidity. Fourth, recall bias can still be a potential confounder although measures had been taken during the recruitment process to minimize this as much as possible.

In conclusion, this study found significant rates of psychological morbidity in community health care settings responding to an infectious disease outbreak. The association with younger age and being seen at fever stations may allow better identification of individuals at risk of developing psychological morbidities. The relationship of different coping styles in those with psychological morbidity allows a better understanding of their use in these individuals. Further research is needed to validate and extend these findings in similar disease situations as well as outbreaks of other infectious diseases. This data, together with that of other studies, can hopefully inform the development of practical and responsive mental health programs for the community and emphasizes significant aspects including an understanding of normal coping mechanisms, addressing the myriad of emotions that may surface, enhancing social support, timely dissemination of information, and encouraging the development of adaptive coping strategies during such times.

Acknowledgments

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