

EMOTIONAL EXHAUSTION AND STATE ANGER IN NURSES WHO WORKED DURING THE SARS OUTBREAK: THE ROLE OF PERCEIVED THREAT AND ORGANIZATIONAL SUPPORT

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ABSTRACT

The present study tests a psychosocial model of factors predicting emotional exhaustion and state anger in 333 nurses who worked during the severe acute respiratory syndrome (SARS) outbreak. Predictors included working conditions, feedback, risk of contracting SARS, and perceived organizational support. Results of path analysis revealed that working conditions contributed significantly to an increase in perceived SARS threat, which led to increased emotional exhaustion and state anger. Positive feedback was directly and positively related to organizational support. Higher levels of organizational support predicted lower perceived SARS threat, emotional exhaustion, and state anger. Implications for health-care providers are discussed.

In the period between November 1, 2002, and July 31, 2003, Severe Acute Respiratory Syndrome (SARS), a contagious illness caused by a recently identified form of the coronavirus, infected approximately 8,100 people worldwide and resulted in almost 800 deaths (World Health Organization, 2003). The SARS outbreak was distinct from other pathogenic outbreaks because of its disproportionately high levels of infection in health-care workers, particularly in nurses (McDonald et al., 2004). This makes sense given that nurses spent greater amounts of time in environments where SARS exposure was high, such as hospitals and clinics, and had closer proximal contact with infected patients and their respiratory fluids (Maunder et al., 2003). Respiratory droplets were the primary means by which SARS was spread (Peng, Wong, Bevan, & Gardam, 2003). Thus, to nurses at the time, this logically suggested that greater contact with infected patients increased one's risk of contracting SARS. This

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relationship is evidenced in studies which have found that nurses' fear and uncertainty related to their perceived risk of SARS contagion, which we call *perceived SARS threat*, was positively related to contact with patients with confirmed or probable SARS (Chen, Yang, Yen, & Wu, 2005; Grace, Hershenfield, Robertson, & Stewart, 2004; Maunder et al., 2003, 2004; Tam, Pang, Lam, & Chiu, 2004).

Levels of perceived SARS threat were also highly related to nurses' experiences of quarantining, a period of enforced isolation that was commonly employed by health-care agencies to prevent the spread of SARS (Hawryluck et al., 2004; Robertson, Hershenfield, Grace, & Stewart, 2004). As a precautionary measure, nurses who showed symptoms of SARS were either fully quarantined, which involved being restricted to an isolated environment (e.g., home, hospital) for a given period of about 10 days, or partially quarantined (e.g., ordered to wear protective equipment at all times but not confined to an isolated environment; Hawryluck et al., 2004; Robertson et al., 2004). In many cases, health-care workers were required to work throughout the duration of their quarantines. Although it was widely accepted as an appropriate measure to contain SARS, quarantining contributed to nurses experiencing several negative psychosocial outcomes (Blendon, Benson, DesRoches, Raleigh, & Taylor-Clark, 2004). In both Canadian and Chinese samples, nurses who were quarantined reported higher levels of perceived SARS threat than nurses who were not quarantined (Ho, Kwong-Lo, Mak, & Wong, 2005; Robertson et al., 2004). Similar to contact with SARS patients, quarantining implied vulnerability to contagion. Thus, to nurses at the time, being quarantined suggested that they had potentially been exposed to a fatal health risk. Consistent with this logic, the SARS research shows that nurses who were quarantined reported greater levels of anger, frustration, perceived stigmatization, and loss of control (Robertson et al., 2004); post traumatic stress disorder and depression (Hawryluck et al., 2004); and avoidance behavior, anxiety, social isolation, interpersonal rejection, and fear of infecting others (Bai et al., 2004; Maunder et al., 2003, 2004; Nickell et al., 2004).

State anger as a consequence of perceived SARS threat has received little attention in the quantitative literature but has been documented in qualitative, anecdotal accounts of nurses' experiences (Maunder et al., 2003; Mok, Chung, Chung, & Wong, 2005; Robertson et al., 2004). State anger is defined as "a psychobiological emotional state or condition marked by subjective feelings that vary in intensity from mild irritation or annoyance to intense fury and rage" (Spielberger, 1999, p. 1). In the organizational behaviour literature, state anger has been conceptualized as an indicator of distress that is thought to be exacerbated by increased workload, job deterioration, and erosion of the psychological contract (Greenglass & Burke, 2000; Greenglass, Burke, & Moore, 2003). State anger has been found to mediate the effects of workload on depression in nurses undergoing hospital downsizing (Greenglass et al., 2003). Other research has found that anger is positively related to depression, anxiety, neuroticism, and psychoticism (Polivy, 1981; Spielberger, 1999), as well as deleterious physiological outcomes such as cardiovascular disease and myocardial infarction (Chang, Ford, Meoni, Wang, & Klag, 2002). Given that the SARS outbreak was novel and raised levels of uncertainty in nurses, there is reason to expect that levels of state anger increased with greater levels of perceived SARS threat.

In contrast to anger, burnout is a well-known consequence for nurses who experience high levels of stress in the workplace (e.g., Bourbonnais, Brisson, Malenfant, & Vézina, 2005; Firth & Britton,

1989; Schaufeli & Greenglass, 2001). Burnout is a condition of fatigue and loss of desire for work that results from extended periods of work situations which are emotionally, physically, and psychologically demanding (Schaufeli & Greenglass, 2001). Research has shown that burnout predicts harmful psychological outcomes such as increased personal distress, somatization, anxiety, and depression (Greenglass, Burke, & Fiksenbaum, 2001; Schaufeli & Enzmann, 1998), behavioural/attitudinal outcomes such as increased absenteeism and turnover, and reduced levels of motivation, job performance, and organizational commitment (Leiter & Maslach, 1988; Wright & Cropanzano, 1998).

The burnout construct subsumes three components: emotional exhaustion, depersonalization, and personal accomplishment (Lee & Ashforth, 1990; Schaufeli & Enzmann, 1998). As it is presently understood, emotional exhaustion is widely regarded as the component that best characterizes the construct as a whole (Cropanzano, Rupp, & Byrne, 2003; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Maslach, Schaufeli, & Leiter, 2001). Conceptually, emotional exhaustion refers to chronic feelings of being overwhelmed and worn out because of one's work. In contrast, depersonalization and diminished personal accomplishment, which reflect increased callousness towards clients and decreased feelings of achievement, respectively, are more related to work strain (Cropanzano et al., 2003). The link between emotional exhaustion and burnout was supported empirically in a meta-analysis by Lee and Ashforth (1996), showing that emotional exhaustion correlated strongly ($\geq .50$) with job-stressor variables such as workload, role stress, role conflict, stressful events, and work pressure. These relationships were weaker in magnitude when correlated with depersonalization, and virtually disappeared in relation to personal accomplishment. Given that increased work stress predicts increased emotional exhaustion, it is reasonable to suggest that the additional work demands placed on nurses as a result of the SARS outbreak contributed to exacerbating existing levels of emotional exhaustion.

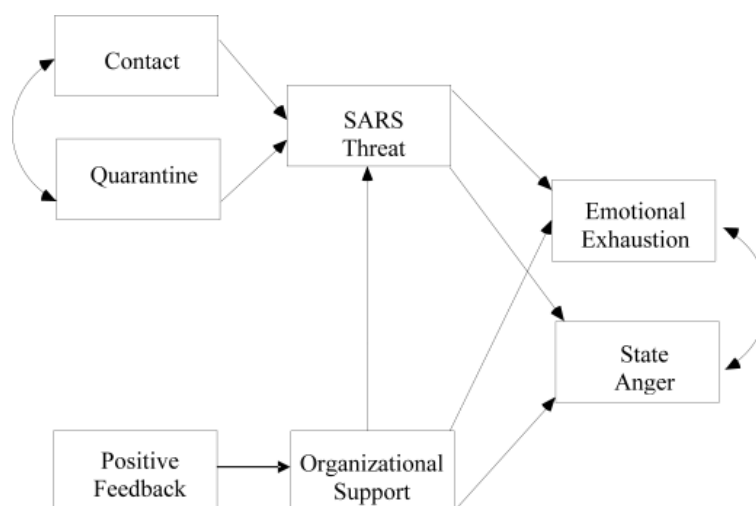
Perceived organizational support has been identified in the SARS and organizational behaviour literatures as negatively related to burnout (Rhoades & Eisenberger, 2002; Tam et al., 2004). Several forms of organizational support have been differentiated. For example, informational support consists of disseminating information to employees, whereas emotional support includes listening and having empathy for employees. Studies involving Chinese university students have shown that a lack of information about SARS hindered their ability to apply appropriate coping strategies (Cheng & Cheung, 2005; Gan, Liu, & Zhang, 2004). Tam et al. (2004) found that inadequate levels of emotional support, in the form of counseling, predicted psychological morbidity and distress in 652 frontline health-care workers. In a separate study that used a series of unstructured interviews, Maunder et al. (2003) found that psychiatric staff assigned to work with patients often stayed to talk and listen to health-care workers' concerns about SARS. These health-care workers felt well equipped, maximally protected, and well supported by their hospital. Similarly, in studies of nurses undergoing periods of hospital downsizing, low levels of organizational support predicted greater levels of stress, psychological distress, anger, absenteeism, turnover, and burnout (Begley, 1998; Eisenberger, Huntington, Hutchison, & Sowa, 1986; Firth & Britton, 1989), and lower levels of job satisfaction (Armstrong-Stassen, 2004; Siu, 2002). Given that the threat of the unknown was a persistent concern for nurses and was related to high levels of distress (Chua et al., 2004; Maunder et al., 2003, 2004), we suggest that organizational support played a role in mitigating these concerns.

Greater amounts of positive feedback have been shown to increase employee perceptions of organizational support (Hutchison & Garstka, 1996), and rates of preventive behaviours such as wearing gloves when working with HIV/AIDS patients (DeVries, Burnette, & Redmon, 1991). There is a substantial body of evidence that indicates that positive feedback is related to increased job satisfaction, organizational commitment, motivation to improve, and reduced role ambiguity and vulnerability to burnout (Ilgen, Fisher, & Taylor, 1979; Pousette, Jacobsson, Thylefors, & Hwang, 2003; Russell, Altmaier, & Van Velzen, 1987). In contrast, negative feedback is related to negative work attitudes and unwillingness to change behaviours. Negative feedback is also more likely to be dismissed by recipients as inaccurate and biased than positive types of feedback (Fedor, Eder, & Buckley, 1989; Ilgen et al., 1979). Thus, we generalize from these findings that positive feedback was a contributing factor to nurses' perceptions of organizational support and, subsequently, to their psychosocial outcomes.

THE PRESENT STUDY

The purpose of the present study is to investigate the role of perceived SARS threat and organizational support in predicting emotional exhaustion and state anger, and the role of organizational support in reducing the negative influence of perceived SARS threat on burnout. Based on findings from previous research, we propose a model where working conditions—contact and quarantine—predict greater levels of perceived SARS threat, and positive feedback predicts higher levels of organizational support. Greater levels of perceived SARS threat predict increased levels of emotional exhaustion and state anger, whereas greater organizational support predicts lower levels of emotional exhaustion and state anger, and relates negatively to perceived SARS threat (see Figure 1).

Figure 1
Psychosocial Factors Predicting Emotional Exhaustion and State Anger: Theoretical Model



METHOD

Participants

The sample consisted of 333 nurses (315 women, 18 men)¹ working in the province of Ontario, Canada. The majority of the participants were registered nurses (96.1%). Slightly more than three quarters of the nurses were employed full-time (76.3%) and had worked for only one other health-care organization prior to the SARS outbreak (76.6%). Nurses ranged in age from 20 to 65 years old, with a mean age of 43.79 years ($SD = 9.97$). The sample consisted of predominately staff nurses (48.9%) working in a variety of nursing areas. The three most frequently reported nursing areas were public or community health (17.4%), medical or surgical (10.8%), and pediatrics (8.4%; see Table 1). About one quarter of the sample (23.4%) reported having direct contact with SARS patients. Although only 1.8% had been diagnosed with suspected or probable SARS, 16.2% had been restricted to some form of quarantine.

Table 1
Canadian Nurses' Area and Role during the SARS Crisis ($N = 333$)

Area and role	<i>n</i>	%
Nursing area		
Emergency	25	7.5
Intensive care	25	7.5
Long-term care/Geriatrics	22	6.6
Medical/Surgical	36	10.8
Mental health	23	6.8
Obstetrics	12	3.6
Operating/Recovery	7	2.1
Pediatrics	28	8.4
Public health/Community health	58	17.4
Other	97	29.1
Nursing role		
Staff nurse	163	48.9
Case manager	17	5.1
Manager	44	13.2
Educator	27	8.1
Other	82	24.6

Measures

Contact and quarantine. To assess nurses' working conditions during the SARS outbreak, two single item measures were created for this study. The first item measured contact: "Did you or do you work directly with SARS patients?" (1 = *yes* and 2 = *no*). The second item assessed the time they spent in quarantine ("Have you ever been placed in quarantine?"), using a 3-point response scale (1 = *no*, 2 = *working quarantine*, and 3 = *full quarantine*).

Perceived SARS threat. Three items were developed to assess the extent to which nurses worried about contracting SARS. These items were rated on a 4-point scale, from 1 = *not at all* to 4 = *a great deal*. A sample item is “SARS was threatening my health.” A higher score reflects greater perceived threat due to SARS.

Positive feedback. Performance feedback from doctors, patients, coworkers, and health-care organizations was assessed using four items; each item was rated on a 4-point scale (1 = *no feedback*, 2 = *positive feedback*, 3 = *neutral feedback*, and 4 = *negative feedback*). Only ratings on positive feedback were used in this study. Positive feedback consisted of the total number of items on which nurses reported receiving positive feedback. Thus, a nurse’s score could range from 0 to 4, with greater values indicating greater levels of positive feedback.

Organizational support. Organizational support was assessed using an adapted version of Eisenberger et al.’s (1986) Survey of Perceived Organizational Support (SPOS). This 5-item scale asked nurses to rate the extent to which they received global support (1 item), informational support (3 items), and emotional support (1 item) regarding SARS from both the hospital and their supervisors. A sample item is “The hospital provided in-service sessions, bulletins, and lecture rounds to inform and educate the nursing staff about SARS.” Responses were coded on a 5-point scale that ranged from 1 = *strongly agree* to 5 = *strongly disagree*; therefore, low scores indicate higher levels of perceived organizational support.

Emotional exhaustion. Emotional exhaustion was assessed using the emotional exhaustion subscale of the Maslach Burnout Inventory—General Survey (MBI-GS; Schaufeli, Leiter, Maslach, & Jackson, 1996). This subscale consists of five items which assessed feelings of being emotionally overextended and drained by one’s work. Response alternatives ranged from 0 = *never* to 6 = *always/everyday*. A sample item is “I felt tired when I got up in the morning and had to face another day on the job.” High scores indicate high levels of emotional exhaustion. Psychometric properties for the emotional exhaustion subscale have been well established. Estimates of the scale’s internal consistency are acceptable ($\alpha = .90$; Schaufeli et al., 1996) and its construct validity has been demonstrated across occupational groups and national samples (Schutte, Toppinen, Kalimo, & Schaufeli, 2000).

State anger. An adapted version of the state anger subscale of the State-Trait Anger Expression Inventory (STAXI; Spielberger & Sydeman, 1994) was used to measure how nurses felt about working as a nurse during the SARS outbreak. Each of the seven items was rated on a scale ranging from 1 = *not at all* to 4 = *very much so*. A sample item is “I was furious.” High scores indicate high levels of state anger. The original measure of the STAXI has acceptable psychometric properties (Spielberger & Sydeman, 1994).

Procedure

Data were collected between March and May 2004, using an anonymous, self-report questionnaire. After obtaining institutional approval, the survey was administered online using a link from a professional registered nurses’ website. From the nurses’ website, nurses had to click on the “members

only” section and log-on using a valid member’s username and password. This method ensured the integrity of the nursing sample before accessing the SARS questionnaire. Nurses were then asked to read an informed consent page and to indicate if they agreed to participate by clicking on an icon at the bottom of the page that read “I consent to participate.” Upon giving their informed consent, participants were directed to the questionnaire.

Statistical Analysis

SPSS 12.0 was used to analyze the data (SPSS, 2003). Descriptive statistics, zero-order correlations, and estimates of internal consistency were calculated for all of the variables used in the study. Path analysis using structural equation modeling (SEM) was then employed to explore the relationships among perceived SARS threat, organizational support, emotional exhaustion, and state anger (see Figure 1). This method allows multiple predictions to be evaluated in a single analysis. The statistical package AMOS version 5.0 (Arbuckle, 2003) was used to provide path coefficients and tests of the overall goodness of fit of the model. Maximum likelihood was used as the estimation procedure. Although AMOS uses the full information maximum likelihood (FIML) estimation when data are missing at random, it is difficult to calculate certain fit indices for the model (e.g., Goodness of Fit Index; GFI), and modification indices cannot be specified. Consequently, analysis was conducted only on cases without missing data.

Several authors have recommended that multiple fit indices be reviewed in evaluating the fit of the model (Jaccard & Wan, 1996; Kline, 1998). This study employed six fit statistics: the χ^2 goodness of fit statistic (the larger the probability associated with the χ^2 goodness of fit statistic, the better the fit of the model to the data); the ratio of chi-square to degrees of freedom of the model (this should not be larger than 3.0); the comparative fit index (CFI), which should be .90 or higher; an adjusted goodness of fit index (AGFI), which should be larger than .90; the Tucker-Lewis Index (TLI), which should be larger than .90; and the root mean square error of approximation (RMSEA), for which values less than .05 correspond to “good” fit and values less than .08 correspond to “acceptable” fit (Browne & Cudeck, 1993).

RESULTS

Table 2 displays descriptive statistics, zero-order correlations, and Cronbach alpha coefficients (i.e., estimates of internal consistency) for the variables included in the study. All Cronbach alphas exceeded the traditional criterion of .70 (Nunnally, 1978). Noting that contact with SARS patients was coded such that higher values indicated no contact, nurses who had contact with SARS patients also reported spending more time in quarantine, perceived more positive feedback, reported higher levels of perceived SARS threat, and experienced higher levels of emotional exhaustion and state anger. Time spent in quarantine was positively related to emotional exhaustion and state anger. Positive feedback was significantly and positively related to perceived organizational support. Noting that perceived organizational support was coded such that higher values indicated lower levels of support, nurses that reported lower levels of support also reported increased levels of perceived SARS threat, emotional

exhaustion, and state anger. Higher levels of perceived SARS threat were related to higher levels of emotional exhaustion and state anger. Emotional exhaustion was positively related to state anger.

Table 2
Descriptive Statistics, Zero-Order Correlations, and Cronbach Alphas for Study Variables ($N = 333$)

Variable	1	2	3	4	5	6	7
1. Contact ^a	—						
2. Quarantine	-.29**	—					
3. Positive feedback	-.13*	.04	—				
4. Organizational support ^b	-.11	.06	-.19**	—			
5. Perceived SARS threat	-.26**	.32**	.04	.24**	—		
6. Emotional exhaustion	-.21**	.21**	-.03	.22**	.47**	—	
7. State anger	-.18**	.23**	-.04	.36**	.48**	.47**	—
<i>M</i>	1.77	1.25	2.07	2.82	2.35	4.00	1.72
<i>SD</i>	0.42	0.60	1.26	1.05	0.89	1.85	0.77
α	—	—	—	.89	.79	.96	.92

Note. α = Cronbach alpha.

^aLow scores indicate greater contact. ^bLow scores indicate greater organizational support.

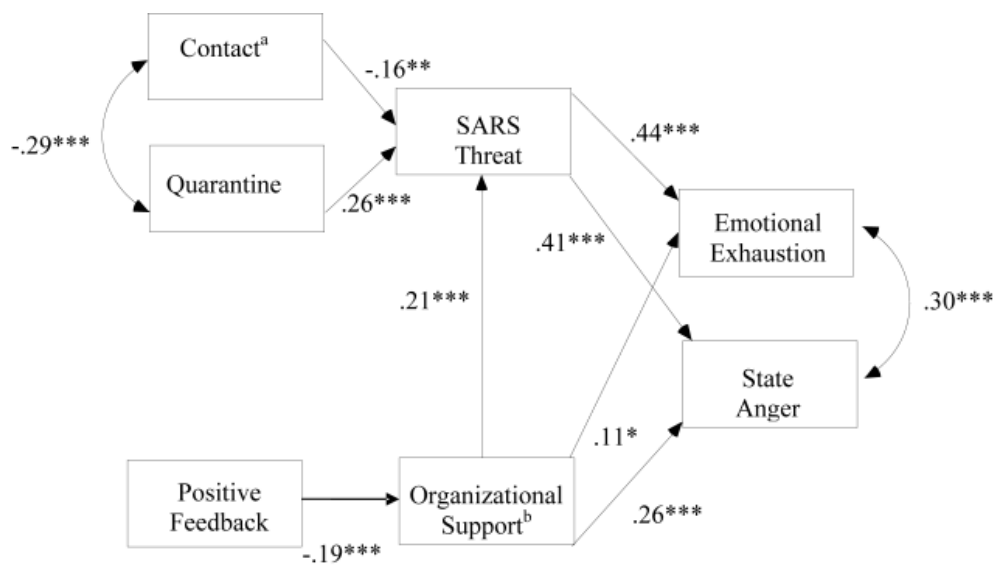
* $p < .05$. ** $p < .001$.

The suitability for SEM analysis was confirmed by the presence of intercorrelations in the data ($\chi^2 [21] = 359.406, p < .001$). In the current study, the χ^2 goodness of fit statistic was significant ($\chi^2 [11] = 20.882, p = .035$). Although the objective is to attain a small, nonsignificant chi-square, this fit index is sensitive to sample size; that is, if the sample size is large (e.g., > 200), the chi-square statistic may be significant (Marsh, Balla, & McDonald, 1988). Several researchers have suggested dividing the chi-square by the numbers of degrees of freedom (e.g., Wheaton, Muthén, Alwin, & Summers, 1977). A rule of thumb is that if this ratio is less than two, it is considered well fitted; it is considered acceptable if it is less than three (Carmines & McIver, 1981; Kline, 1998). The ratio of degrees of freedom to chi-square in the present study was 1.898, indicating support for the theoretical model. Other fit indices, GFI (.983), AGFI (.957), CFI (.971), and TLI (.944) were highly satisfactory. The root mean error of approximation (RMSEA = .052) also indicated a good fit of the model to the data. No post hoc modifications were indicated.

Figure 2 presents the standardized parameter estimates for the paths in the model. As indicated in this figure, all the structural paths were significant. Contact with SARS patients and time spent in quarantine were significant predictors of perceived SARS threat ($\beta = -.16$ and $\beta = .26$, respectively). That is, nurses who reported contact with patients and spent time in quarantine also reported greater levels of perceived SARS threat. Positive feedback was related to higher perceived organizational support ($\beta = -.19$). The more nurses reported getting positive feedback, the more organizational support they perceived. As hypothesized, lower perceived organizational support was related to greater perceived SARS threat ($\beta = .21$). Perceived SARS threat, in turn, predicted increased feelings of

emotional exhaustion ($\beta = .44$) and state anger ($\beta = .41$). Also as predicted, lower perceived organizational support was related to increased feelings of emotional exhaustion ($\beta = .11$) and state anger ($\beta = .26$). The model explained 4% of the variance in perceived levels of organizational support, 16% of the variance in perceived SARS threat, 23% of the variance in emotional exhaustion, and 28% of the variance in state anger.

Figure 2
Psychosocial Factors Predicting Emotional Exhaustion and State Anger:
Standardized Parameter Estimates



Note. ^aLow scores indicate greater contact. ^bLow scores indicate greater organizational support.
 * $p < .05$. ** $p < .01$. *** $p < .001$.

DISCUSSION

The purpose of the present study was to test a model examining the role of perceived SARS threat in predicting higher levels of emotional exhaustion and state anger in nurses. A further aim of the study was to examine the influence of organizational support in reducing perceived SARS threat, emotional exhaustion, and state anger. As previous studies have revealed, working conditions—direct contact with patients and time spent in quarantine—predicted increased levels of fear and uncertainty about SARS contagion, which we call perceived SARS threat (e.g., Maunder et al., 2003, 2004; Hawryluck et al., 2004; Robertson et al., 2004; Tam et al., 2004). As expected, contact and quarantine were positively correlated. Although the outcome of perceived SARS threat has received little attention in the literature, this study illustrates how greater levels of perceived SARS threat predict higher levels of emotional exhaustion and state anger.

The model used in this study highlights the central role of perceived organizational support in lessening the impact of perceived SARS threat on emotional exhaustion. Specifically, the organizational support measure used in this study tapped into levels of informational and emotional support that nurses received during the outbreak. The path to emotional exhaustion yielded a significant but modest negative relationship, indicating that informational and emotional support are important factors but may not be the ideal types of support that ameliorate the strain of workplace stressors. As previous research has shown, demanding work stressors such as increasing workloads and greater levels of work pressure are positively related to rates of emotional exhaustion, i.e., burnout (Lee & Ashforth, 1996). Maintaining and improving the quality of available informational and emotional support networks has value in that nurses may draw from these sources to help them cope with their stress. These support networks, however, do little to address the source of the stress itself. Instead, providing practical support to overworked nurses in the form of additional staff is likely a more appropriate strategy for alleviating work-related stress (Greenglass, Fiksenbaum, & Burke, 1996; Himle, Jayaratne, & Thyness, 1991; Lindorff, 2005). This makes intuitive sense given that emotional exhaustion is a construct defined by chronic fatigue precipitated by demanding work environments.

Anger has been associated with many psychological (e.g., Greenglass et al., 2003), physiological (e.g., Chang et al., 2002), and social outcomes (e.g., Deffenbacher, Oetting, Lynch, & Morris, 1996), and leads to increased frustration, job insecurity, and uncertainty about the future (Schaufeli & Greenglass, 2001). In this study, greater fear and uncertainty about SARS predicted higher levels of state anger, paralleling the above findings. Given that perceived SARS threat is driven in part by a lack of information, our measure of organizational support, which included items about informational support, related inversely to perceived SARS threat. As expected, greater positive feedback contributed to increased levels of organizational support. This path meets the consensus in the literature, which relates positive feedback to various positive occupational outcomes such as increased organizational commitment, job satisfaction, motivation to improve, and reduced role ambiguity (Ilgen et al., 1979; Pousette et al., 2003; Russell et al., 1987). These findings suggest that by providing positive feedback to nurses in times of uncertainty and crisis, employers may be able to bolster nurses' perceptions of organizational support, which in turn reduces levels of work-related anger.

There are some limitations of this study. First, the data were self-reported from a single source, which might introduce common method variance as an alternative explanation for the findings. However, Semmer, Zapf, and Greif (1996) have indicated that common method variance is not as problematic as one might expect in measuring stressor-strain relationships. Whereas self-report data overestimates the magnitude of relationships, observer data tends to underestimate "true" relationships. Although self-report and observer types of data tend to converge, Semmer et al. recommend using a multi-method approach to increase measurement precision. A second limitation is the small sample size relative to the population from which it was derived. At the time of the study, the association consisted of slightly over 20,000 active and retired nurses (RNAO, n.d.). Unfortunately, it was not possible to ascertain how many members logged on to the members-only section of the website during the data collection period. Moreover, many nurses worked in parts of Ontario that were not directly affected by the SARS outbreak, and possibly did not feel compelled to contribute to the survey. Given

these constraints, it is difficult to determine our response rate. Third, the cross-sectional design employed in this study does not allow for causal statements. Although our hypotheses were based on previous empirical literature, many of the relationships could be bidirectional. In addition, even though causal assumptions were made in the path analytic procedures, readers are cautioned that these do not provide a basis for drawing causal conclusions. We recommend that investigators interested in pursuing this line of research utilize multi-method and longitudinal designs in order to enhance our understanding of the direction of relationships that occur.

This study utilized the Internet for data collection, a relatively new method that is increasingly being used in psychological research. Detractors of Internet-Mediated Research (IMR) contend that the salient problems regarding IMR are that samples may not be representative of the larger population, reflecting sampling bias and, secondly, that because there is a proximal lack of interactivity between researcher and participants, researchers cannot be sure of the identity of the respondents and the authenticity of the results they contribute (see Kraut et al., 2004). Noting these concerns, our design was tailored to address these issues. First, to promote a representative sample, all registered and student nurses in Ontario were invited to complete the questionnaire on a nurses' professional website and participate in the study. A letter from the executive director of the nurses' association was posted on the website to endorse the study and encourage participation.

Addressing the second concern, we posted the questionnaire in an area of the website which only members with a valid username and password could access. Consequently, it is highly probable that the respondents of this study were members of the population we wished to sample. In addition to this measure, respondents were asked to generate a unique and anonymous six-digit identification code at the end of the questionnaire which could be used in follow-up studies to match respondents with their original surveys. This also allows researchers to assess whether respondents submit their questionnaire multiple times, for example by double clicking on a submit icon. In this study, after examination of these codes, we did not find any duplication in the respondent's codes. This indicates that all submissions were in all likelihood original and unique to different individuals. IMR is advantageous in that it is a convenient, cost-effective means of recruiting large numbers of participants in typical and specialized populations. Previous research has demonstrated that the validity of psychological instruments has not been compromised through administration in this medium, as compared to the standard paper-and-pencil formats (Buchanan, Johnson, & Goldberg, 2005; Buchanan & Smith, 1999; Kraut et al., 2004).

CONCLUSION

The results of the present study provide evidence that perceived SARS threat and organizational support were related to the experiences of nurses who worked during the outbreak. Given these findings, coupled with evidence that supportive organizations can increase commitment, job satisfaction, and positive mood, and reduce absenteeism and turnover (Rhoades & Eisenberger, 2002), organizations should create and maintain strong support networks to reduce the influence of stressors. To enhance the quality of results, investigators should cross-validate their findings and utilize forms of

measurement other than self-report such as behavioural observation, physiological change, and peer-report in the workplace and in the home. These forms of measurement were not feasible in this study due to the constraints of IMR.

Recently, there has been heightened international concern about pandemics such as the avian influenza (Ligon, 2005; Rassool, 2004). In the event of an extended and indefinite outbreak of avian flu, nurses would likely experience high levels of fear and uncertainty about avian contagion (i.e., *avian threat*). Results of this study show how greater levels of organizational support counteracted, in part, the path from perceived SARS threat to emotional exhaustion and state anger. It is reasonable to speculate that health-care organizations that develop their support systems further (e.g., disseminating information to nurses and offering them emotional support) will be better positioned to mitigate the deleterious outcomes associated with outbreaks such as SARS.

NOTE

1. The original sample consisted of 379 participants. Cases with incomplete data were deleted listwise, yielding a total of 333 respondents.

RÉSUMÉ

La présente étude examine un modèle psychosocial des facteurs prédisant l'épuisement émotionnel et l'état colérique chez 333 infirmiers et infirmières ayant travaillé pendant la crise du syndrome respiratoire aigüe sévère (SRAS). Les prédicteurs incluent les conditions de travail, la rétroaction, le risque de contracter le SRAS, ainsi que la perception de l'appui de l'organisation. Les résultats d'une analyse de dépendance ont révélé que les conditions de travail ont contribué de manière significative à une augmentation de la menace perçue de SRAS, qui, à son tour, mène à une augmentation de l'épuisement émotionnel et de l'état colérique. La rétroaction positive était directement et positivement liée à la perception de l'appui de l'organisation. Des niveaux élevés de cet appui prédisaient des niveaux inférieurs de la menace perçue de SRAS, de l'épuisement émotionnel et de l'état colérique. Les implications pour les professionnels et professionnelles de la santé sont discutés.

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