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The relevance of psychosocial variables and working conditions in predicting nurses' coping strategies during the SARS crisis: An online questionnaire survey

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Abstract

Objectives: The purpose of this investigation was to examine the relationship between psychosocial variables and working conditions, and nurses' coping methods and distress in response to the severe acute respiratory syndrome (SARS) crisis in Canada.

Participants and procedure: The sample consisted of 333 nurses (315 women, 18 men) who completed an Internet-mediated questionnaire that was posted on the Registered Nurses' Association of Ontario (RNAO) website between March and May 2004. The questionnaire was restricted to respondents who had to authenticate their RNAO membership with a valid username and password before accessing the questionnaire. This served a dual purpose: to ensure that only RNAO nurses completed the questionnaire and thereby safeguarding the generalizability of the findings; and second, to prevent any one nurse from contributing more than once to the overall sample.

Results: Correlational analysis yielded several significant relationships between psychosocial variables and working conditions, and the traditional correlates of burnout and stress. Three multiple regression analysis revealed that the model we evolved—including higher levels of vigor, organizational support, and trust in equipment/infection control initiative; and lower levels of contact with SARS patients, and time spent in quarantine—predicted to lower levels of avoidance behavior, emotional exhaustion, and state anger.

Conclusions: By employing models of stress and burnout that combine psychosocial variables and working conditions, researchers can account for significant amounts of variance in outcomes related to burnout. These findings highlight the importance of vigor and perceived organizational support in predicting nurses' symptoms of burnout. For healthcare administrators, this means that a likely strategy for assuaging the negative outcomes of stress should address nurses' psychosocial concerns and the working conditions that they face during novel times of crisis.

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Keywords: SARS; Coping; Psychosocial; Working conditions; Internet research

What is already known about the topic?

- Potential exposure to SARS contagion is related to nurses experiencing greater fear, uncertainty, and stress in the workplace.

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- Perceived organizational support and vigor are negatively related to stress and burnout in nurses.

What this paper adds

- A model that predicts to symptoms of burnout in nurses by combining psychosocial variables and working conditions as predictors.
- A tenable procedure for using an Internet-mediated questionnaire that counterbalances the main disadvantages of Internet research.

1. Introduction

Over the last decade there has been an increased awareness of the possibility of pandemics and their potentially devastating effects. The most recent illustration of this can be found in the “Spanish” influenza that swept the world between 1918 and 1919 and killed an estimated 40 million people: that is more than the total number of soldiers killed in World War I (Oxford et al., 2002). More recently, with the advent of SARS in 2003, public awareness has been increased about our collective vulnerability to pandemics. In particular, the 2003 severe acute respiratory syndrome (SARS) crisis had a profound impact on healthcare providers in Canada. Nurses, physicians, technicians, and aides all played a role in the struggle against SARS; however, nurses were predominant in this group. Though little risk of infection was posed to the general public, nurses were particularly vulnerable because of the proximal closeness of patient–nurse interactions, direct contact with respiratory fluids of infected patients, and inadequacy of protective gear (Hall et al., 2003; Maunder et al., 2003). Greater stress levels due to increased interactions with patients have also been associated with increased emotional exhaustion and depersonalization in nurses, which are key symptoms of burnout (Büssing and Glaser, 1999).

Integral to the nurses concerns was their level of trust in the effectiveness of protective equipment (e.g., masks, gloves) and disease control initiatives (e.g., quarantining) in controlling the spread of SARS. Robertson et al. (2004) found that nurses frequently reported their concerns about infection control but nevertheless, expressed their willingness to implement these procedures and continue working. In this regard, many nurses and healthcare providers reported that quarantining, one of the most common procedures used to control SARS, was necessary in order to protect others from infection (Robertson et al., 2004). On the other hand, when subjected to quarantine themselves, and especially when given little informational support by their

respective healthcare institutions, workers reported feeling greater levels of stress, fear, frustration, stigmatization, and avoidance of others (Bai et al., 2004; Robertson et al., 2004).

Preliminary studies are in general agreement that SARS added novel psychosocial stressors to the lives of healthcare workers. Lee-Bagglely et al. (2004) investigated empathetic responding, wishful thinking, and support seeking on coping behaviors related to perceptions of SARS. The authors posted an online questionnaire that attracted an international sample that included healthcare workers, engineers, office workers, and students. Multivariate analysis indicated that greater empathetic responding predicted significantly less avoidance behavior and significantly more preventive behavior; whereas, wishful thinking predicted only greater levels of avoidance behavior, which is less effective for coping with a perceived threat. Support seeking was not related to coping behavior (Lee-Bagglely et al., 2004).

Gan et al. (2004) investigated the relationship between coping flexibility and behavioral reactions in two categories of stressful events: daily stressful events, as depicted in 10 ordinary scenarios, and SARS-related stressful events, as depicted in 10 hypothetical scenarios which students perceived as threatening. In their sample of Peking University undergraduate students, their findings revealed that students who regarded their stressful events as controllable applied problem-focused coping strategies (i.e., a good coping strategy-situation fit); whereas students who perceived SARS-related events as uncontrollable applied emotion-focused and problem-focused coping strategies interchangeably. Gan et al. (2004) concluded that compared to daily stressful events, students responded to SARS stressful events: (1) with a significantly diminished ability to assess situational controllability and (2) by applying significantly poorer and more inconsistent strategy-situation coping methods.

Given that the research base on SARS is still relatively sparse, the extensive literature on stress, coping, and burnout is useful in understanding the impact that SARS had on nurses. Because nurses make up approximately 17% of the participants used in studies of burnout and occupational stress (see Schaufeli and Enzmann, 1998), we can generalize to some extent that the findings from this considerable body of research applies to nurses’ reactions to SARS. In particular, research on nurses’ reactions to hospital restructuring and downsizing has value because similar to the SARS crisis, these precarious times are novel, engender fear and uncertainty about the future, and are widely recognized as highly stressful for nurses (Begley, 1998). In longitudinal studies, researchers have consistently found an important role for organizational support in assuaging the effects of stressful events. Nurses’ low

perceptions of organizational support have been associated with low job satisfaction (Armstrong-Stassen, 2004; Siu, 2002), high psychological distress, high perceived-stress (Fisher, 1985), high absenteeism, high turnover (Begley, 1998), and increased burnout (Eisenberger et al., 1986; Firth and Britton, 1989; Siu, 2002). In cross-sectional studies, researchers have found evidence that low organizational support, in the form of high workload and increased time pressure, predicts increased emotional exhaustion, cynicism, hostility, anxiety, depression, somatization, work–family conflict, and feelings of powerlessness (Burke and Greenglass, 2001; Escot et al., 2001; Greenglass and Burke, 2000; Greenglass et al., 2001). Astoundingly, 97% of the sample in Escot et al. (2001) reported needing more psychological support from their employers. Thus, generalizing from these findings, it is reasonable to suggest that nurses' stress reactions to SARS and their perceived organizational support are strongly related.

Research efforts have also recently focused on the role of vigor as a mediator between psychosocial variables and the traditional components of burnout (i.e., emotional exhaustion, professional efficacy, and cynicism; Schaufeli et al., 2002). Defined as “high levels of energy, mental resilience, stamina, and persistence when problems arise,” vigor is conceptualized as incompatible with burnout (Greenglass, 2004, p. 81). A recent study by Greenglass et al. (2001) supported this relationship, finding that greater levels of proactive coping, professional efficacy, and organizational commitment predicted to higher levels of vigor, which then predicted to lower levels of emotional exhaustion and cynicism. That is, vigor was negatively related to emotional exhaustion and cynicism, which supports the notion that vigor is incompatible with burnout (Greenglass et al., 2005).

Combined, these studies attest to the considerable impact that psychosocial variables and working conditions have on nurses' subjective experiences of stress during periods of occupational crisis and uncertainty. The purpose of this investigation was to examine the relationship between psychosocial variables and working conditions, and nurses' subjective experiences of SARS stress. We hypothesized that greater vigor, organizational support, and trust in equipment/infection control, and less contact with SARS patients and time spent in quarantine, would predict to lower levels of emotional exhaustion, state anger, and avoidance behavior.

2. Method

2.1. Participants

The sample consisted of 333 Canadian nurses (mean age = 43.79, *SD* = 9.97), primarily women (95%), who worked in healthcare facilities during the SARS crisis of

2003. The majority of the sample identified themselves as full-time (76%) registered nurses (96%) who worked for only one other healthcare organization prior to the SARS outbreak (77%). The sample constituted a wide breadth of nursing roles, such as staff nurses (51%), managers (18%), and educators (8%), and included diverse nursing areas such as public health (17%), surgical (12%), pediatrics (8%), and emergency (8%).

2.2. Procedure

Data for this study was collected using an Internet-mediated questionnaire. Internet-mediated questionnaires represent a new and rapidly growing data collection tool in the social sciences. It affords researchers the ability to study unique phenomena that are otherwise difficult or impossible to study, and can tap into the experiences of larger specialized groups of people at lower cost to the researcher than other methods (Buchanan and Smith, 1999; Hewson, 2003; Kraut et al., 2004). Thus far, research on its psychometric properties has shown that online questionnaires are commensurate to paper-and-pencil formats in terms of reliability and internal validity (Buchanan and Smith, 1999; Hewson, 2003; Kraut et al., 2004). The main disadvantage of Internet-mediated research is that the samples it generates are self-selected; and therefore, potentially biased (Kraut et al., 2004). In general, it is difficult to ascertain whether Internet samples are representative of the group a researcher wishes to study. This puts into question the generalizability of a study's findings. Furthermore, because of the lack of physical interactivity between respondents and researchers, researchers cannot easily verify an individual's status or the veracity of their responses (Buchanan and Smith, 1999).

We attempted to minimize these disadvantages by following the subsequent procedure. In order to generate a representative sample, our partners in this project, the Registered Nurses' Association of Ontario (RNAO) encouraged all of its members to participate in the study via a posting on its website between March and May 2004. In this posting, the RNAO conveyed to its members the importance of generating knowledge about nurses' reactions to SARS and asked nurses to complete an online questionnaire about their SARS working experiences. Upon trying to access the questionnaire, nurses were prompted to authenticate their membership with their RNAO username and password. By posting the SARS questionnaire in a restricted area of the website, it is reasonable to assume that all of the respondents who completed the questionnaire were members of the RNAO, i.e., Ontarian nurses. After authenticating, nurses were led to an informed consent web page that asked nurses to read a description of the study, detailing the risks and benefits of participating, as well as thoroughly addressing issues of confidentiality

and their anonymity in the sample. Once a nurse reached the bottom of this page, they were given the option of continuing on to the SARS questionnaire by clicking on an icon at the bottom of the page that read, “I consent to participate.” Otherwise, nurses could decline to participate and leave the website. The questionnaire itself took approximately 30 min to complete and consisted of items that tapped psychosocial issues, the quality of their working conditions, and demographics. The last item on the questionnaire asked nurses to generate a random and unique six-digit numerical code. The purpose of this was to enable us to match nurses’ responses to this questionnaire with their responses to any follow-up questionnaires.

2.3. Measures

The three dependent measures (criteria) for this investigation were two outcome variables, emotional exhaustion and state anger, and one coping behavior variable, avoidance behavior. The five independent measures (predictors) were three psychosocial variables, vigor, organizational support, and trust in equipment/infection control initiatives; and two working conditions variables, contact with SARS patients, and time spent in quarantine.

Emotional exhaustion was assessed using the emotional exhaustion subscale of the Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli et al., 1996). Research has shown that the emotional exhaustion scale to have good internal consistency ($\alpha = .90$; Schaufeli et al., 1996) and construct validity across occupational groups and national samples (Schutte et al., 2000). It consists of five items that range from 0 = *never* to 6 = *always/everyday*. Items tapped feelings of being drained, used up, tired, strained, and burned out because of work. High scores indicate high levels of emotional exhaustion. A sample item is, “I felt emotionally drained from my work.”

State anger was assessed using an adapted version of the state anger subscale of the State-Trait Anger Expression Inventory (STAXI; Spielberger and Sydeman, 1994). Psychometric properties of the state anger subscale are good (Spielberger and Sydeman, 1994). It consists of seven items, ranging from 1 = *not at all* to 4 = *very much so*, that covered feelings such as fury and irritation. High scores indicate high state anger. A sample item is, “I felt angry.”

Avoidance behavior was assessed with six items that assessed issues such as minimizing direct contact with patients, missing work, and refusing patient assignments, which were developed for the purposes of the present investigation. Ratings were from 1 = *not at all* to 4 = *a great deal*, i.e., high scores indicate high levels of avoidance behavior. A sample item is, “I refused or declined shifts offered to me.”

Vigor ($\alpha = .68$ – $.80$) was measured using a modified six-item scale ranging from 0 = *never* to 6 = *always/everyday*. The original scale has been shown to be both a highly reliable and valid measure of the vigor construct (see Schaufeli et al., 2002). The modified items used in this study were adapted to query nurses’ levels of energy, resiliency, and perceived strength while working during the SARS outbreak. High scores indicate high levels of vigor. A sample item is, “When I was working, I could continue for very long periods at a time.”

Organizational support was adapted from the Survey of Perceived Organizational Support (SPOS; Eisenberger et al., 1986). The original scale has demonstrated good reliability ($\alpha = .97$; Eisenberger et al., 1986) and validity characteristics (Rhoades and Eisenberger, 2002). It consists of five items ranging from 1 = *strongly agree* to 5 = *strongly disagree*, which queried nurses about the availability and dissemination of SARS information from their healthcare employers. Low scores indicate high levels of organizational support. A sample item is, “The hospital provided useful, accurate and timely information about SARS to its nursing staff.”

Trust in equipment/infection control was measured using a four-item scale ranging from 0 = *never* to 6 = *always/everyday*. These four items were developed for the purposes of this study. High scores indicate high levels of trust. A sample item is, “The equipment and garments provided to nurses by the hospital were effective in protecting them from infection.”

Contact with SARS patients was assessed with a single item developed for this study; “Did you or do you work directly with SARS patients,” 1 = *yes* and 2 = *no*, i.e., low scores indicate greater direct contact with SARS patients.

For the single item measuring quarantine, nurses responded to whether they spent any time in quarantine as a result of their work. On a three-point scale, 1 = *no*, 2 = *working quarantine*, and 3 = *full quarantine*, higher scores indicate higher levels of quarantine. The single item, “Have you ever been placed in quarantine,” was developed for the purposes of this study.

3. Results

Correlations among the variables, descriptive statistics, and Cronbach’s alpha coefficients are presented in Table 1. Alpha coefficients derived from this study ranged between .60 (trust) and .96 (emotional exhaustion), most of which exceeded acceptable levels of internal consistency.

As expected, emotional exhaustion was significantly and positively correlated to state anger, avoidance behavior, contact with SARS patients, and time spent in quarantine. Negative relationships were found between emotional exhaustion and vigor, organizational

Table 1
Pearson product–moment correlations, descriptive statistics, and alpha coefficients ($N = 333$)

Measure	1	2	3	4	5	6	7	8
1. EXHAUST	—							
2. STATEANG	.47***	—						
3. AVOIDBEH	.26***	.33***	—					
4. VIGOR	-.44***	-.36***	-.38***	—				
5. ORGSUP ^a	.22***	.36***	.34***	-.28***	—			
6. TRUST	-.28***	-.30***	-.19***	.35***	-.38***	—		
7. CONT ^b	-.21***	-.18**	-.12	.12*	-.11	-.05	—	
8. QUAR	.21***	.23***	.30***	-.22***	.06	-.02	-.29***	—
<i>Descriptive statistics</i>								
Mean	4.00	1.72	1.29	4.02	2.82	2.59	1.77	1.25
SD	1.85	.77	0.50	1.15	1.05	1.21	.42	.60
# of items	5	7	6	6	5	4	1	1
Range	0–6	1–4	1–4	0–6	1–5	0–6	1–2	1–3
Alpha	.96	.92	.80	.85	.89	.60	—	—

Note: * $p < .05$; ** $p < .01$; and *** $p < .001$.

^aLow scores indicate greater organizational support.

^bLow scores indicate greater contact.

Table 2

Standardized beta coefficients, t -statistics, and p -values for three linear multiple regression analyses, predicting avoidance behavior, emotional exhaustion, and state anger ($N = 333$)

IVs	Avoidance behavior			Emotional exhaustion			State anger		
	β	t	p	β	t	p	β	t	p
Vigor	-.27	-5.00	.000	-.34	-6.37	.000	-.20	-3.72	.000
Org-support ^a	.26	4.92	.000	.04	.83	.407	.24	4.45	.000
Trust	.01	.14	.893	-.15	-2.80	.005	-.14	-2.56	.011
Contact ^b	.01	.27	.788	-.15	-2.96	.003	-.09	-1.83	.068
Quarantine	.23	4.61	.000	.08	1.59	.113	.14	2.69	.008

^aLow scores indicate greater organizational support.

^bLow scores indicate greater contact.

support, and trust in equipment/infection control initiatives. State anger was positively correlated to avoidance behavior, contact with SARS patients, and greater time in quarantine; and negatively related to vigor, organizational support, and trust in equipment/infection control initiatives.

Engaging in avoidance coping behaviors was positively correlated to time spent in quarantine and negatively related to vigor, organizational support, and trust in equipment/infection control initiatives. Importantly, avoidance behavior was only marginally correlated to contact with SARS patients (i.e., $p < .10$). Thus, even when confronted with more contact with SARS patients and therefore, risk of infection, most nurses continued to implement disease control initiatives and kept working.

Three linear multiple regression analyses were performed with the criterion measures, emotional exhaus-

tion and state anger, as outcome variables, and avoidance behavior as a coping variable. Predictors were vigor, organizational support, and trust in equipment/infection control, contact with SARS patients, and time spent in quarantine. Given that three multiple regressions were performed, we adjusted our alpha level to $p = .017$ using the Bonferroni correction to control for Type I error.

Overall, the model accounted for 26% of the variance in avoidance behavior. Less time spent in quarantine predicted lower levels of avoidance behavior ($\beta = .23, p < .001$), whereas, higher levels of vigor ($\beta = -.27, p < .001$) and organizational support ($\beta = .26, p < .001$) predicted significantly less avoidance behavior (see Table 2). Note the variables trust and contact were not predictive of avoidance behavior. Although on their own, these variables were correlated to avoidance behavior at significant and marginally significant levels,

as shown in the correlation matrix in Table 1, the relationship between each of these variables and the criterion was washed out due to their relationships with the other predictor variables in the model. In other words, when levels of the other predictors in the model were kept constant, the efficacy of either trust or contact in predicting nurses' avoidance behavior was nullified.

Regarding the second criterion, the model accounted for 25% of the variance in nurses' reported emotional exhaustion. Findings showed that less contact with SARS patients predicted to lower levels of emotional exhaustion ($\beta = -.15, p = .003$); whereas, higher levels of vigor ($\beta = -.34, p < .001$) and greater trust in equipment/infection control initiatives ($\beta = -.15, p = .005$) predicted lower levels of emotional exhaustion (see Table 2). Organizational support and quarantine did not predict emotional exhaustion when controlling for levels of the other predictors in model.

Lastly, the model accounted for 25% of the variance in nurses' experience of state anger. Less time in quarantine predicted less state anger ($\beta = .14, p = .008$). Conversely, higher levels of organizational support ($\beta = .24, p < .001$), vigor ($\beta = -.20, p < .001$), and trust in equipment/infection control initiatives ($\beta = -.14, p = .011$) predicted lower levels of state anger (see Table 2). Contact with SARS patients was only marginally predictive of state anger when the other predictors in the model were held constant ($p = .068$). Similar to its relationship with avoidance behavior, the predictive value of contact to state anger was reduced when controlling for levels of other predictors in the model.

4. Discussion

The purpose of the present investigation was to examine the relationship between psychosocial variables and working conditions, and nurses' stress responses to the 2003 SARS crisis in Canada. Correlational analysis revealed several significant relationships, all of which were in the expected direction, largely corroborating patterns of findings in the burnout literature (e.g., anger correlated positively with emotional exhaustion, and negatively with vigor and organizational support; Begley, 1998; Eisenberger et al., 1986; Greenglass et al., 2001). The main finding of this study was that the model we evolved, including vigor, emotional exhaustion, trust, contact, and quarantine as predictors, explained significant amounts of variance in nurses' experiences of avoidance behavior, emotional exhaustion, and state anger. This demonstrates that regarding nurses' experiences of stress in the workplace, predictive value is increased by employing models which incorporate both psychosocial variables and working conditions.

The proposed model, including psychosocial variables and working conditions as predictors, accounted for

26% of the variance in avoidance behavior, 25% in emotional exhaustion, and 25% of the variance in nurses' state anger. Of the psychosocial variables, vigor was the most influential, predicting to all three criterions. Organizational support was negatively related to avoidance behavior and state anger, while trust in equipment/infection control initiatives was negatively related to emotional exhaustion and state anger. Of the working conditions variables, greater spent time in quarantine was predictive of higher levels of avoidance behavior, and state anger, whereas greater contact with SARS patients was only predictive of greater emotional exhaustion. Importantly, these findings revealed that contact with SARS patients was not significantly predictive of avoidance behavior, as we hypothesized. Despite being marginally correlated, as shown in Table 1, multiple regression analysis showed that the relationship between contact and avoidance behavior was mediated through other important psychosocial and working conditions variables, such as vigor, organizational support, and time spent in quarantine. This is a positive finding because it suggests that the negative effects of contact can likely be lowered by improving perceived organizational support, promoting vigor as a proactive measure against stress, and paying special attention to nurses who are quarantined or isolated in times of crisis.

Interestingly, organizational support was not predictive of emotional exhaustion, which seems to contradict the consensus in the literature. It does, however, make intuitive sense when we consider that organizational support was measured with items about the availability of SARS information, whereas emotional exhaustion assessed feelings of being drained, used-up, and burnt out because of work. Thus, although organizational support, in the form of informational support has value, as indicated by its significant relationships to avoidance behavior and state anger, it does very little to alleviate emotional exhaustion which may be due to an over-bearing workload and increased pressure at work. In future investigations, researchers should be cognizant of the kind of social support that is being provided, and the type of outcome that is being assessed. In our case, we were concerned with tapping informational support as a means to lessening the SARS threat; consequently, it was logical to limit our variable to cover this facet of organizational support.

The Internet was used to collect data in this study. The Internet is a flexible and cost-effective medium for collecting data from large and specialized samples. Research to date has shown that Internet-mediated questionnaires have reliability and internal validity characteristics that are proportionate to traditional paper-and-pencil questionnaire formats (Buchanan and Smith, 1999; Kraut et al., 2004). However, the main barriers to its wider acceptance as a data collection tool

are the issues of sampling bias, affecting external validity, and the lack of interactivity between respondent and researcher, affecting the researcher's ability to authenticate an individual's responses (Kraut et al., 2004). In this study, we addressed these issues in the following ways. First, the questionnaire was posted on the nurses' website that encouraged their participation in the study and highlighted the importance of generating new knowledge about nurses' reactions to the SARS outbreak. Second, access to the questionnaire was restricted to Ontario nurses who belonged to a particular professional organization by requiring respondents provide a valid username and password before proceeding to the questionnaire itself. This ensured that only these nurses had access to the questionnaire, and moreover, that nurses could not contribute more than one questionnaire to the sample. Lastly, the confidentiality of nurses' responses was guaranteed on the pre-questionnaire informed consent web page. This was done to motivate nurses to respond more candidly to the questionnaire, which in turn would have increased the validity of our findings.

A limitation of this study was our use of cross-sectional self-report data which precluded attribution of causality. However, the inferences we have made with regard to the impact of SARS on nurses are consistent with longitudinal data in the area. The best evidence to indicate that these findings reflect important associations among the variables we studied is the strong corroboration between these findings and similar relationships found in the burnout and existing SARS literature.

In conclusion, the effective management of public health epidemics like SARS and future potentially devastating pandemics like the avian influenza should be a priority for health organizations (Rassool, 2004). The preparedness and efficacy of healthcare organizations to manage these crises over indefinite periods of time may mean the difference between minimal destructiveness of a disease running its course and catastrophic losses of life. Thus, by teaching nurses new working strategies that could help them prevent burnout, by making organizational supports congruent with nurses' specific needs, and by helping nurses reduce feelings of uncertainty and fear when these crises occur, healthcare organizations can increase the likelihood of optimal crisis management, and have the additional benefit of improving the lives of their employees, and the level of care they provide on a day-to-day basis.

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