Applying Theory of Planned Behavior to Predict Nurses' Intention and Volunteering to Care for SARS Patients in Southern Taiwan

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Severe acute respiratory syndrome (SARS) spread worldwide after an outbreak in Guangdong Province, China, in mid-November 2002. Health care workers were at highest risk of infection. The purpose of this study, which was based on Ajzen's theory of planned behavior (TPB), was to determine the extent to which personal attitudes, subjective norms, and perceived control influence nurses' intention and volunteering to care for SARS patients. After the SARS outbreak, a total of 750 staff nurses (response rate 90%) at one hospital completed a questionnaire assessing their intention to provide care to SARS patients. Overall, 42.7% of nurses had a positive intention to provide care to SARS patients, and 25.4% of nurses would volunteer to care for SARS patients. Four factors explaining 35% of the variance in nurses' intention to care for SARS patients were self-efficacy ($\beta = 0.39$, $p < 0.001$), attitude ($\beta = 0.25$, $p < 0.001$), years of working in the study hospital ($\beta = -0.15$, $p < 0.001$), and receiving resources from the hospital ($\beta = 0.13$, $p < 0.001$). Two factors explaining 15% of the variance in nurses' volunteering to care for SARS patients were intention ($\beta = 0.31$, $p < 0.001$) and attitude ($\beta = 0.15$, $p < 0.001$). The final model shows that the variables of the TPB contributed significantly to the explanation of a portion of variance in nurses' intention and volunteering to care for SARS patients. The results are helpful for human resources managers facing a new contagious disease.

Key Words: SARS, theory of planned behavior, Taiwan
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Severe acute respiratory syndrome (SARS) is the first severe and transmissible disease to emerge in the 21st century. SARS, a novel corona virus (SARS-CoV)-associated communicable respiratory disease, spread worldwide after an outbreak in Guangdong Province, China, in mid-November 2002. As of August 7, 2003, a total of 8,422 suspected and/or probable SARS cases had been reported to the World Health Organization (WHO) from 29 countries [1]. A total of 908 SARS cases were fatal, primarily in China, Hong Kong, Taiwan, Canada, Singapore, and Vietnam, with only eight deaths occurring in other countries [1].

In Taiwan, the first SARS case was identified on March 14, 2003, in a traveler from Guangdong Province, China [2]. Beginning with the recognition of the first SARS case, the Taiwan Department of Health (DOH) formed a SARS advisory committee and implemented a framework for SARS control, including isolation of suspected and probable SARS patients, use of personal protective equipment for health care workers and visitors, and quarantine of contacts of known SARS patients [3]. During the period from March 14 to April 21, 2003, only 28 probable SARS cases were reported. In early April, the WHO changed

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Taiwan's designation from an "affected area" to an "area with limited local transmission", as a result of Taiwan's success in SARS control during this period. However, on April 22, 2003, the Taiwan DOH was notified of seven cases of SARS among health care workers at a large municipal hospital in Taipei. Beginning in mid-April, unrecognized cases of SARS led to a large nosocomial cluster and subsequent SARS-associated transmission to other hospitals and community settings [2]. In response to the growing SARS epidemic, additional measures were taken to limit nosocomial and community transmission of SARS, including more widespread use of quarantine, building negative-pressure isolation rooms, aggressive airport and border surveillance, and intensive infection-control training for health care workers. As of July 9, 2003, a total of 671 probable SARS cases had been reported in Taiwan. After fighting against the SARS epidemic for 4 months, Taiwan was removed from the WHO's list of SARS-affected countries on July 5, 2003 [4].

Health care workers are at particularly high risk of infection because of their close contact with patients, involvement in medical procedures, and handling of excreta [5]. Health care workers, especially those involved in procedures generating aerosols, accounted for 21% of all worldwide SARS cases, ranging from 3% of reported probable cases in the USA (1/33 cases) to 43% in Canada (108/251 cases) [6]. In Taiwan, of the 131,132 persons who were quarantined during the SARS epidemic, health care workers exposed to a SARS patient formed the largest group (133, 0.10%) with suspected or probable SARS diagnosed subsequently [4]. Although nosocomial transmission of SARS was well documented, several infection-control procedures were implemented, and polymerase chain reaction tests were available in Taiwan. The extensive outbreak within health care facilities in Taiwan underscores the urgent need for prompt implementation of, and education of all health care workers in all facilities about, appropriate infection-control procedures.

The SARS epidemic tested the dedication of the health care profession and challenged the ethical values and morals of professionals. It is ethically and professionally unacceptable for health care professionals to refuse to treat or care for a patient with a fatal disease. This is inculcated through hospital practice and training programs throughout the world [7]. However, during the period of the SARS epidemic in Taiwan, probably due to a lack of knowledge regarding SARS transmission, fear of the SARS outbreak, and pressure from family members, or the lack of adequate personal protective equipment provided by hospitals, many physicians and nurses resigned, resulting in a shortage of staff in many hospitals [8]. To increase health professionals' ability and willingness to provide quality care to SARS patients and affirm their ethical duty to care for the sick, it is important for health care administrators to develop and deploy procedures to maximize the safety of frontline nurses. Therefore, there is an urgent need to investigate the predictors of nurses' intention and volunteering to care for SARS patients, so that these can be applied to design sequential continuing education programs to improve nurses' confidence in caring for patients in future emerging infectious disease epidemics.

The theory of planned behavior (TPB; Figure 1) [9] was chosen as the conceptual framework for this study because it seemed more appropriate for situations where individuals do not perceive themselves as having complete control over their behavior [10], as might occur in nurses' intentions and volunteering to care for SARS patients. The TPB is based on the assumptions that human beings are rational, make systematic use of available information, and consider the implications of their actions before engaging in a behavior. The stronger a person's intention to perform a behavior, the more likely the person will perform that behavior.

The TPB postulates that the immediate cause of a planned behavior is intention to perform the behavior. Behavioral intention is predicted directly by three conceptual components: personal attitude reflecting a person's belief about a particular behavior and his or her evaluation of those beliefs; subjective norms reflecting a person's beliefs about the expectations of significant others regarding performance of particular behaviors and the person's motivation to comply

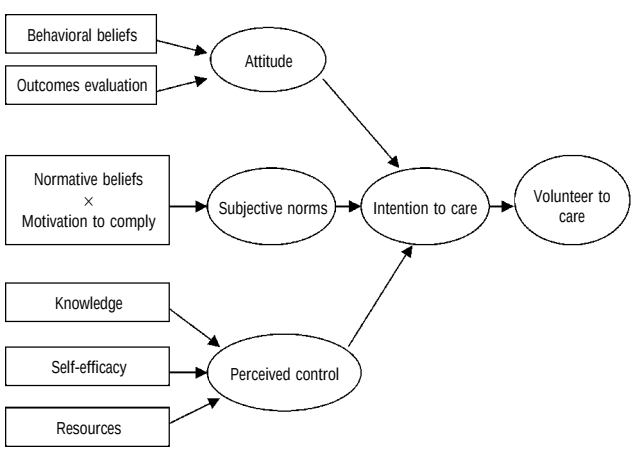

Figure 1. *Theoretical model of nurses' intention and volunteering to care for severe acute respiratory syndrome patients based on the theory of planned behavior.*

with their significant others; and perceived control reflecting a person's belief about the ease or difficulty of performing particular behaviors and relating to a person's past experience, resources, opportunities, and barriers to performing the behavior. In health professionals' behaviors, the TPB has successfully predicted health care workers' glove use [11], nurses' adherence to hand hygiene recommendations [12], and nurses' intention to assess patients' pain [13] or to administer opioids for pain relief [14].

The purposes of this study were to describe the nature of nurses' attitudes, subjective norms, and perceived control associated with their intention and volunteering to care for SARS patients, and to determine the extent to which personal attitudes, subjective norms, and perceptions of behavioral control influence nurses' intention and volunteering to care for SARS patients.

In this study, according to Ajzen's TPB [9,10], nurses' attitudes toward SARS patients (behavioral beliefs and outcome evaluation), the influence of nurses' subjective norms (normative beliefs × motivation to comply), and nurses perceived behavioral control (knowledge, self-efficacy, and resources) were conceptualized as directly related to their intention to care for SARS patients. Nurses' intentions were then sequentially related to volunteering to care for SARS patients (Figure 1).

METHODS

Design and sample

A cross-sectional correlational design was used in this study. The setting was a 1,200-bed medical center in southern Taiwan. During mid-April to May 2003, the study hospital encountered an emergent SARS epidemic, which was linked to the initial outbreak at a municipal hospital in Taipei, and later to a health care worker cluster and several sporadic community cases at a 2,300-bed private hospital in southern Taiwan. By July 9, a total of 67 suspected SARS cases (including 12 portable cases and 17 fatal cases) had been reported in the study hospital. During the outbreaks, the hospital implemented intensive infection-control procedures to avoid nosocomial transmission of SARS. All staff were instructed to put on gowns, gloves, caps, and masks in a designated area. Goggles and visors were worn during direct patient care, especially for aerosol-generating procedures such as suction or intubations. Hand-washing procedure was strictly enforced for anyone after contact with patients or their body fluids. Fortunately, none of the health care workers at the study hospital were infected with SARS.

Participants were recruited from nurses working at the study hospital. Staff nurses and head nurses who provided direct patient care and who had been employed for at least 4 months were eligible. Of the 832 questionnaires administered to all eligible participants after the SARS epidemic from July to August 2003, a total of 750 were completed, giving a response rate of 90%. The 750 nurses participating in this study represented 71% of the total number of nurses working in the study hospital.

Measures

A questionnaire was developed to measure the constructs in the TPB, following Ajzen's guidelines for constructing a TPB questionnaire [15]. Table 1 lists the variables, final scale items, mean scores, and measures of reliability of each scale in the present study. The instrument was piloted with 30 staff nurses to determine the clarity of the questions, the effectiveness of instruction, the completeness of response sets, and the time required to complete the questionnaire. Six experts in the field of infectious disease, experienced SARS care nurses, nursing experts, and nosocomial infection control nurses, reviewed the questionnaire for content validity. Based on the pilot study and expert opinions, some changes were made to the questionnaire to increase the clarity of the items. All measures used a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), except for the SARS knowledge questionnaire that

Table 1. Descriptive statistics and reliability measures (N = 750)

Variable	No. of scale items	Score range	Mean score	SD	α
Attitudes	9	11–42	27.50	4.78	0.73
Subjective norms	8	4–76	33.28	10.26	0.72
Knowledge	18	4–18	13.93	1.89	0.60
Self-efficacy	4	4–20	11.38	2.98	0.77
Resources	9	9–45	36.23	4.89	0.88
Intention to care	8	8–40	27.67	5.56	0.96

SD = standard deviation.

was measured using a "yes" or "no" two-point scale. Negative items were reverse scored before the score for each scale was computed.

Nurses' attitudes towards caring for SARS patients were measured by their beliefs and evaluation of performing the behavior. There were nine items in the attitude scale. Each nurse's attitude score was calculated by the sum of the nine items. A higher score indicated a more positive attitude towards caring for SARS patients.

Subjective norms were measured by the nurses' normative beliefs in performing care for SARS patients while taking into consideration the expectations of their significant others (such as parents or parents-in-law, siblings, a spouse, boyfriend or girlfriend, their head nurse), and their motivation to comply with the expectations of their significant others. There were eight items in the subjective norms scale. Each nurse's subjective norms score was calculated by multiplying each normative belief score by the corresponding motivation to comply score, and then summing across the four products.

Perceived control, indicating nurses' perception of how easy or difficult it would be to care for SARS patients, was measured using three scales: SARS-related knowledge, self-efficacy, and the availability of institutional resources. The SARS knowledge questionnaire tested nurses' knowledge about SARS, including physiology, pathology, precautions in the workplace, and the specific skill requirements. It consisted of 18 items with "yes" or "no" response options. The summed score of the 18 items gave each nurse's knowledge score. The self-efficacy scale included five items, ranging from 1 (without confidence) to 5 (strongly confident), that measured nurses' confidence in their ability to care for SARS patients. The resources scale consisted of seven items that measured the availability to nurses of resources from the hospital to help them care for SARS patients.

Nurses' intentions to care for SARS patients were measured by their perception of whether they would like to care for a SARS patient in the following situations: being offered sufficient protective equipment, working in a ward with a negative-pressure isolation room, being provided with continuing education programs, working for a certain period in the isolation area, and special benefits. There were eight items in the intention scale, ranging from 1 (strongly didn't want to) to 5 (strongly will). Each nurse's intention score was calculated by the sum of the eight items.

Nurses' volunteering to care for SARS patients was measured with the question, "Have you ever volunteered to care for SARS patients?", which had a "yes" or "no" answer option.

Procedures

An introductory note that explained the purposes of the study was attached to each questionnaire. Three research nurses delivered the questionnaires to each unit in the study hospital. The head nurse in each unit screened the eligible registered nurses and invited them to fill out the questionnaire. Upon completion of the questionnaire, the nurses were requested to place the completed questionnaires in the envelopes and return them to the research nurses through the internal mail system of the study hospital.

Statistical analysis

Graphic analysis of scatter plots and histograms of studentized residuals between each independent variable with the dependent variable indicated that the assumptions of linearity and normality were not violated for analysis. Pearson correlation coefficients were calculated to summarize the linear relationships among the main TPB constructs: attitude, subjective norms, perceived behavioral control, intention to care, and volunteering to care (Table 2). Multiple regression coefficients were used to identify the best set of predictors for the two dependent variables of intention and volunteering to care for SARS patients. Regression coefficients and R2 statistics were considered significant when p was 0.05 or less. Path analysis, a statistical technique with stepwise multiple regressions,

Table 2. Correlation matrix for the study variables in the theory of planned behavior (N = 750)

	Volunteering to care	Intention to care	Attitudes	Subjective norms	Knowledge	Self-efficacy
Intention to care	0.37*					
Attitudes	0.27*	0.41*				
Subjective norms	0.12*	0.22*	0.26*			
Knowledge	–0.10	0.09†	0.12†	0.04		
Self-efficacy	0.25*	0.49*	0.42*	0.28*	0.16*	
Resources	0.07†	0.21*	0.10*	–0.01	0.06	0.16*

*$p \leq 0.01$; †$p < 0.05$.

was used to estimate the magnitude of the associations between the variables hypothesized in the theoretical framework (Figure 1).

Results

Demographics

Of the 750 nurses who completed the questionnaire, most were female, single, less than 35 years old, and had less than 10 years of professional experience as registered nurses. Ages ranged from 21.3 to 61 years, with a mean of 30.3 ± 6.4 years. The vast majority of respondents were staff nurses (96.4%, n = 723), with only 27 head nurses (3.6%). About half of the nurses (49.6%) had experience in providing care to patients with infectious disease (e.g. tuberculosis, HIV/AIDS), and 26% had cared for patients who were diagnosed with suspected and/or probable SARS at the study hospital. Forty-five percent (n = 338) of nurses reported that they or their family members had been discriminated against during the SARS epidemic because they worked at the hospital (Table 3).

Table 3. Demographic characteristics (N = 750)

Gender, *n* (%)	
Female	745 (99.3)
Male	5 (0.7)
Level of education, *n* (%)	
Associate degree	467 (62.3)
Bachelor's degree	273 (36.4)
Master's degree or higher	10 (1.3)
Marital status, *n* (%)	
Single	474 (63.2)
Married	253 (33.7)
Divorced/widowed	23 (3.1)
Job title, *n* (%)	
Head nurse	27 (3.6)
Staff nurse	723 (96.4)
Department, *n* (%)	
ICU/ER	217 (28.9)
General ward	360 (43.0)
Other	173 (23.1)
Experience of caring for patients with infectious diseases, *n* (%)	
Yes	372 (49.6)
No	378 (50.4)
Experience of caring for SARS patients, *n* (%)	
Yes	196 (26.1)
No	554 (73.9)
Participating in SARS-related continuing education, *n* (%)	
Yes	732 (97.6)
No	18 (2.4)
Age, mean ± SD (range)	30.3 ± 6.4 yr (21–61 yr)
Mean length of service in study hospital, mean ± SD (range)	8.1 ± 6.2 yr (0.5–50 yr)

ICU = intensive care unit; ER = emergency room; SARS = severe acute respiratory syndrome; SD = standard deviation.

Nurses' attitudes, subjective norms, and perceived control

Correlations among the TPB main constructs were positive (Table 2). Nurses' knowledge about SARS, attitudes, subjective norms, self-efficacy, and resources were all significantly positively correlated with their intentions to care for SARS patients. Nurses' attitudes, subjective norms, self-efficacy, and resources were significantly correlated with their volunteering behavior to care for SARS patients. Knowledge was the only variable not significantly correlated with nurses' volunteering behaviors.

Overall, 74.5% of nurses agreed that caring for SARS patients was their professional obligation. The mean scores of nurses' attitude towards caring for SARS patients was 27.5 ± 4.78, indicating a positive attitude. Independent t tests were applied to compare attitudes, subjective norms, and perceived control towards caring for SARS patients between staff nurses and head nurses. These showed that head nurses expressed more positive attitudes towards caring for SARS patients (t = 4.42, p < 0.001), perceived higher subjective norms (t = 2.31, p = 0.021), had greater SARS knowledge (t = 4.64, p < 0.001), and received more resources and information from the hospital (t = 2.16, p = 0.031) than staff nurses (Table 4). To compare the score of each scale between nurses who had cared for patients with other infectious diseases with nurses who had not, t tests were conducted. Study findings showed that nurses who had experience of caring for patients with other infectious diseases (e.g. HIV or TB) had greater SARS knowledge (t = –2.78, p = 0.006) and higher self-efficacy to care for SARS patients (t = –4.90, p < 0.001) than nurses who had no experience of caring for patients with other infectious diseases (Table 4). In addition, nurses who had cared for SARS patients during the SARS epidemic had greater SARS knowledge (t = –3.40, p = 0.001) and higher self-efficacy to care for SARS patients (t = –4.92, p < 0.001) than nurses who had no experience of caring for SARS patients (Table 4).

Nurses' intention and volunteering to care for SARS patients

One-fourth of participants (25.4%) said they would volunteer

Table 4. Difference between groups for each model variable (N = 750)

Variable	*n*	Mean	SD	SE	df	*t*
Comparison of job title and model variables						
Attitude						
Head nurse	27	55.56	3.84	0.74	742	4.42*
Staff nurse	717	51.41	4.82	0.18	29	5.45*
Subjective norms						
Head nurse	27	37.74	12.61	2.43	742	2.31†
Staff nurse	717	33.11	10.13	0.38	27	1.88†
Knowledge						
Head nurse	27	21.26	1.58	0.30	735	4.64*
Staff nurse	710	19.40	2.06	0.08	29	5.91*
Self-efficacy						
Head nurse	27	13.89	2.31	0.44	737	4.51*
Staff nurse	712	11.29	2.96	0.11	29	5.68*
Resources						
Head nurse	27	38.22	4.53	0.87	735	2.16†
Staff nurse	710	36.16	4.88	0.18	28	2.32†
Intention to care						
Head nurse	27	30.56	4.77	0.92	736	2.76*
Staff nurse	711	27.56	5.56	0.21	29	3.18*
Comparison of other infectious disease experience and model variables						
Attitude						
No	375	51.25	4.73	0.24	–1.74	741.00†
Yes	368	51.87	4.95	0.26	–1.74	737.96†
Knowledge						
No	374	19.28	2.03	0.10	–2.58	734.00*
Yes	362	19.67	2.11	0.11	–2.58	730.24*
Self-efficacy						
No	374	10.89	2.91	0.15	–4.59	736.00*
Yes	364	11.89	2.98	0.16	–4.59	734.10*
Intention to care						
No	372	26.92	5.38	0.28	–3.69	735.00*
Yes	365	28.42	5.64	0.30	–3.69	731.74*
Comparison of SARS experience and model variables						
Knowledge						
No	546	19.32	2.07	0.09	734	–3.15*
Yes	190	19.87	2.02	0.15	337	–3.19*
Self-efficacy						
No	548	11.07	2.94	0.13	736	–4.87*
Yes	190	12.27	2.92	0.21	332	–4.89*
Intention to care						
No	545	27.26	5.49	0.24	735	–3.44*
Yes	192	28.85	5.62	0.41	328	–3.40*

SD = standard deviation; SE = standard error; df = degrees of freedom; SARS = severe acute respiratory syndrome. *$p \leq 0.01$; †$p < 0.05$.

to be assigned to care for SARS patients, and 42.7% of nurses expressed a positive intention to care for SARS patients (Table 3). Nurses were asked to rank the priority of benefits to motivate their intention to care for SARS patients. Having adequate protective facilities or equipment was most important, followed by a workplace with negative-pressure isolation rooms, receiving continuing education, and updated information about the SARS epidemic, working for a certain period in the isolation area (≤ 1 month), and special vacations and compensation payments.

Path analysis was used to identify the strength of effects among the TPB construct variables that influenced nurses' intention and volunteering to care for SARS patients. The final model supported many relationships predicted by the

TPB (Figure 2), identifying significant paths using both statistical significance ($p < 0.05$) and substantive significant path coefficients. In multiple regression of intention on the proximal variables of the TPB, the variables of the TPB contributed significantly to the explanation of a portion of variance in intention. Knowledge did not contribute to the explanation of nurses' intention or volunteering to care for SARS patients.

Four predictors in this model explained 35% of the variance in nurses' intention to care for SARS patients. Self-efficacy was the most important variable, which explained 25% of the variance, followed by attitudes, which explained 6%; years of working in the hospital and resources explained an additional 2% (Table 5). Nurses' intention to care for SARS patients was highly correlated with their willingness to volunteer to care for SARS patients ($r = 0.37$, $p < 0.001$). Two predictors in this model explained 15% of the variance of nurses' volunteering to care for SARS patients. Nurses' intention explained 13% of the variance and nurses' attitudes explained an additional 2% (Table 5).

Discussion

These findings showed that approximately half of the nurses reported a positive intention to care for SARS patients and one-fourth would volunteer to be assigned to care for SARS patients. In contrast to nurses' positive intention to care for SARS patients, when the HIV and AIDS epidemic was beginning nearly 20 years ago, previous studies conducted in Taiwan demonstrated that Taiwanese nurses' intention to care for AIDS patients was low [16]: 53.9% (139/258) of nurses would refuse to care for AIDS patients and 48.2% of them would quit their jobs if giving such care was mandatory [17]. Even after four nurses died of SARS in the early outbreaks in Taipei, the findings of this study highlight that nurses have not shown fear during the SARS epidemic, but have continued to commit themselves to providing the best care for patients with this life-threatening emergent disease.

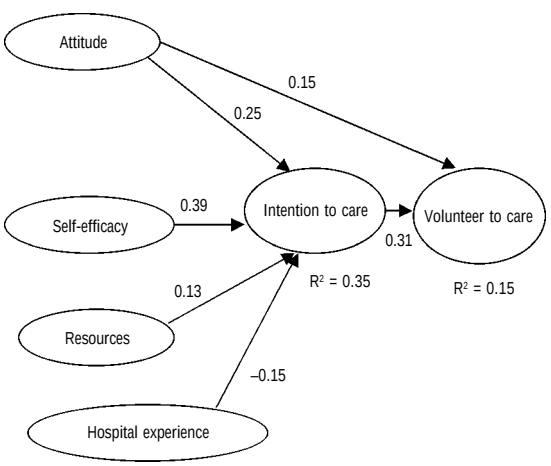

Figure 2. *Path analysis model of nurses' intention and volunteering to care for severe acute respiratory syndrome patients based on the theory of planned behavior.*

Progress in explaining and understanding nurses' intention and behavior to care for patients with life-threatening illnesses (e.g. AIDS, SARS) has been impeded by lack of a theoretical perspective. The TPB was selected as a theoretical framework for the study because it has been used successfully to understand other professional behaviors. As hypothesized, the present study supported that the key constructs of Ajzen's TPB contribute to predicting nurses' intention and volunteering to care for SARS patients. Nurses' intention to care for SARS patients was predicted by their attitudes, self-efficacy, and resources. Although these variables accounted for only 35% of the variance in nurses' intention to care for SARS patients, it is of considerable importance as evidence to support that the TPB can be applied to predict nurses' intention to care for SARS patients.

As in previous studies, perceived control was the strongest independent predictor of intention [11–14,18], while self-efficacy and availability of resources representing perceived control were important variables making an independent contribution to the prediction of nurses' intention to care for SARS patients. The study also showed that nurses' positive attitudes contributed significantly to the prediction of nurses' intention to care for SARS patients. These findings are consistent with those of previous studies examining the positive relationship between nurses' attitudes and willingness to care for AIDS patients [16–19]. In addition, nurses' intention and attitude were predictors of volunteering to care for SARS patients, and intention was the most important predictor, explaining 13% of the variance in nurses' volunteering to care for SARS patients. These findings partially support the TPB. Consistent with the TPB, nurses' intention is deemed to predict their volunteering behavior to care for SARS patients. However, in contrast to the TPB, the direct path from nurses' attitude to their volunteering behavior suggests that intention did not fully mediate the attitude–behavior relationship [11]. Further research is needed to clarify the direct or indirect path among main constructs, intention, and behaviors in the TPB.

Although knowledge is certainly necessary for safe nursing practice in an emergent epidemic, the results showed that SARS-related knowledge did not contribute significantly

Table 5. Regression analysis for each model variable (N = 750)

Dependent variable/predictor	Standardized coefficients	T	R^2 change	Model adjusted R^2	F
Intention to care					
(Constant)		4.559			
Self-efficacy	0.39	11.41*	0.25		
Attitudes	0.25	7.57*	0.06		
Working years	–0.15	–4.97*	0.019		
Resources	0.13	4.27*	0.017	0.35	93.32*
Volunteer to care					
(Constant)		–7.30			
Intention to care	0.31	8.13*	0.13		
Attitudes	0.15	3.75*	0.02	0.15	63.80*

*$p \leq 0.001$.

to either nurses' intention or volunteering to care for SARS patients. The weak association between knowledge and nurses' willingness to care for patients was shown in several AIDS-related studies [16,17,20]. In addition, the present study showed that nurses' subjective norms in terms of perceiving their significant others to support their caring for SARS patients was significantly correlated to their intention and volunteering to care for SARS patients. However, in a hierarchical regression analysis, subjective norms was excluded from the regression model after self-efficacy and attitude were added. A possible explanation for this is that nurses' confidence in providing care and positive attitude towards caring for SARS patients weigh higher than the perceived pressure from their family members. The study further investigated the relationship between nurses' age, years of professional experience, and years of working in the study hospital and their intention to care for SARS patients, and found that nurses who are novice, younger, and with less professional experience had a more positive intention to care for SARS patients. These results were consistent with a recent study that investigated 126 hospital nurses' willingness to provide care for SARS patients in six hospitals [8]. During the SARS epidemic, many nurses stayed away from home, fearing that they might spread the disease to their families and friends, and had not disclosed to their families that they had cared for SARS patients. Nurses' concerns about their family's safety were reflected in our findings that nurses who were single or did not live with their family members showed higher intention to care for SARS patients than those who were married or cohabitated with their families. Nurses who were young and novices expressed their empathy towards their colleagues who were married or had children at home, and volunteered to care for SARS patients for their colleagues. This information might help explain why the younger and novice nurses had more positive intention and volunteering to care for SARS patients.

Implications for practice and education

The recent SARS outbreaks have had a tremendous impact not only on the health of the public and health care facilities, but also on health care workers, in particular nurses. Long working hours and close contact with patients increases the risk of infection, which imposes enormous stress on nurses who provide direct care for SARS patients [21]. The study findings add insight for nurse administrators and educators to further develop strategies to increase nurses' intention and volunteering to care for patients with other new and potentially fatal contagious diseases, such as SARS or avian influenza. First, providing sufficient and adequate personal protective equipment, periodically announcing and routinely practicing infection control measures and protocols, and providing up-to-date continuing education for nurses may help to reinforce nurses' self-efficacy in caring for such patients. Second, enhancing positive attitude is much more important than merely increasing nurses' knowledge regarding the disease. Reinforcement of nurses' positive attitudes could be easily achieved by verbal expression of approval and support from nursing administrators, or substantial rewards such as special compensation payments could be used to encourage and acknowledge nurses for their efforts. Third, improving nurses' access to resources provided by hospitals is a key point to increase nurses' intention. Nurse administrators need to ensure that staff nurses obtain sufficient resources and psychologic support, and have the capability and capacity to respond properly to care for SARS patients or any future public emergencies of this kind. Fourth, it is crucial for nursing administrators to serve as nurse advocates to reflect the frontline nurses' voices and concerns in the

battle to contain diseases such as SARS, and build up direct communication channels between the hospital administration and staff nurses.

Conclusions

The study findings supported the TPB proposal that nurses' positive attitude, higher self-efficacy in providing care for SARS patients, and perceived increase in available resources enhanced their positive intention to care for SARS patients. Regression analysis revealed that knowledge was not a significant predictor of either nurses' intention or volunteering behavior. Furthermore, nurses' intention and attitude predicted their volunteering behavior to care for SARS patients. The study findings provide important insights for hospital administrators, nurse administrators, and educators about factors influencing nurses' intention and behavior of caring for patients with emergent infectious diseases. In general, providing sufficient and adequate personal protective equipment and periodic, up-to-date continuing education, reinforcing nurses' attitudes by verbal approval and substantial rewards, and improving access to resources might help to increase nurses' dedicated commitment to care for SARS patients.

Limitations and recommendations for further research

Certain limitations dictate caution in the generalization of these findings. First, the major weakness of this study was that other important variables influencing nurses' volunteering to care for SARS patients might not be included in the TPB. The factors affecting nurses' volunteering behavior to care for patients with life-threatening diseases seem to be more complex. That is, further studies with qualitative methods may be needed to explore nurses' intention and volunteering behavior to care for SARS patients. Second, the study participants were recruited from one hospital in southern Taiwan and most likely represented a majority of nurses' experience during the SARS epidemic in this hospital. However, the findings may not apply to hospitals outside this geographic area and generalizations of the findings are, thus, limited.

References

1. *Severe Acute Respiratory Syndrome.* Geneva: World Health Organization, 2003:1–5.
2. Lee M, Chen C, Su I, et al. Severe acute respiratory syndrome–Taiwan, 2003. *MMWR Morb Mortal Wkly Rep* 2003;52:461–6.
3. Twu SJ, Chen TJ, Chen CJ, et al. Control measures for severe acute respiratory syndrome (SARS) in Taiwan. *Emerg Infect Dis* 2003;9:718–20.
4. Lee M, Chen C, Su I, et al. Use of quarantine to prevent transmission of severe acute respiratory syndrome–Taiwan, 2003. *MMWR Morb Mortal Wkly Rep* 2003;52:680–3.
5. Lee N, Sung JJ. Nosocomial transmission of SARS. *Curr Infect Dis Rep* 2003;5:473–6.
6. *Consensus Document on the Epidemiology of Severe Acute Respiratory Syndrome (SARS).* Geneva: Department of Communicable Disease Surveillance and Response, World Health Organization, 2003:14.
7. Emanuel EJ. The lessons of SARS. *Ann Intern Med* 2003;139: 589–91.
8. Tzeng HM. SARS infection control in Taiwan: investigation of nurses' professional obligation. *Outcomes Manag* 2003;7: 186–93.
9. Ajzen I. From intentions to actions: a theory of planned behavior. In: Kuhl J, Beckman J, eds. *Action-control: From Cognition to Behavior.* Heidelberg: Springer, 1985:11–39.
10. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process* 1991;50:179–211.
11. Levin PF. Test of the Fishbein and Ajzen models as predictors of health care workers' glove use. *Res Nurs Health* 1999;22: 295–307.
12. O'Boyle CA, Henly SJ, Larson E. Understanding adherence to hand hygiene recommendations: the theory of planned behavior. *Am J Infect Control* 2001;29:352–60.
13. Nash R, Edwards H, Nebauer M. Effect of attitudes, subjective norms and perceived control on nurses' intention to assess patients' pain. *J Adv Nurs* 1993;18:941–7.
14. Edwards HE, Nash RE, Najman JM, et al. Determinants of nurses' intention to administer opioids for pain relief. *Nurs Health Sci* 2001;3:149–59.
15. Ajzen I. *Constructing a TpB Questionnaire: Conceptual and Methodological Considerations.* September, 2002. From: http://www-unix.oit.umass.edu/~aizen/pdf/tpb.measurement.pdf [Date accessed: July 30, 2003.]
16. Tsai YF, Keller ML. Predictors of Taiwanese nurses' intention to care for patients who are HIV positive. *Clin Nurs Res* 1995; 4:442–64.
17. Yeh SM, Yuan HS, Ko YC. Factors related to the willingness of nurses to care for AIDS patients in Taiwan. *Kaohsiung J Med Sci* 1990;6:422–7.
18. DiIorio C. Neuroscience nurses' intentions to care for persons with HIV/AIDS. *J Neurosci Nurs* 1997;29:50–5.
19. Vermette L, Godin G. Nurses' intentions to provide home care: the impact of AIDS and homosexuality. *AIDS Care* 1996; 8:479–88.
20. Wang JF, Simoni PS, Paterson J. AIDS-related knowledge, fear, and behavioral change among nurses in Taiwan. *Public Health Nurs* 1993;10:257–62.
21. Chan S. Nurses fighting against severe acute respiratory syndrome (SARS) in Hong Kong. *J Nurs Scholarsh* 2003;35:209.

應用計畫行為理論預測護理人員照顧 SARS 病患之意願及行為

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2002 年底亞洲開始了世紀傳染病 — **SARS** 的風暴，直接照護的醫護人員成為被感染者，使醫護工作遭受到空前的壓力。本研究應用計畫行為理論（**Theory of Planned Behavior**）來探討護理人員的態度、主觀規範及自我感受行為，對其照顧 **SARS** 病患之意願及行為的影響。研究採用半結構式問卷，調查 **SARS** 期間在南部某醫院工作的護理人員照顧 **SARS** 病患意願及行為。有效問卷 **750** 份，回收率 **90%**。**42.7%** 的護理人員對於照顧 **SARS** 病患表現正向的態度，**25.4%** 的護理人員表示自願照顧 **SARS** 病患。照顧 **SARS** 病患之意願方面，自我效能（$\beta = 0.39$, $p < 0.001$）、態度（$\beta = 0.25$, $p < 0.001$）、年資（$\beta = -0.15$, $p < 0.001$）及資源的獲得（$\beta = 0.13$, $p < 0.001$）等變項達顯著差異，解釋 **35%** 的變異量。照顧 **SARS** 病患之行為方面，護理人員的意願（$\beta = 0.31$, $p < 0.001$）及態度（$\beta = 0.15$, $p < 0.001$）兩變項達顯著差異，解釋 **15%** 的變異量。本研究印証了計畫性行為理論，可用來預測護理人員照顧 **SARS** 病患之意願及行為的變項，提供護理主管面對新興傳染病時，人力資源管理重要的依據。

關鍵詞：SARS，計劃性行為理論，台灣

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