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Original Article

Nursing students' knowledge, willingness, and attitudes toward the first aid behavior as bystanders in traffic accident trauma: A cross-sectional survey

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ABSTRACT

Objectives: The purpose of the study was to investigate the nursing students' levels of the knowledge, willingness, and attitudes toward first aid behavior as bystanders in road traffic accident and the related factors.

Methods: A total of 475 nursing students were recruited by convenience choosing in Tianjin University of Traditional Chinese Medicine. The nursing students' self-efficacy, core self-evaluation, knowledge, willingness and attitudes toward first aid behavior as bystanders in traffic accidents were investigated with a self-designed questionnaire.

Results: The scores of knowledge, willingness, and attitudes toward first aid behavior in traffic accident trauma were 7.51 ± 1.93, 15.54 ± 5.03, and 7.73 ± 1.56, respectively. Students who once gained training of first aid showed lower levels of attitude toward first aid behavior than those untrained ($t = -2.345$, $P = 0.019$). It was found that self-efficacy was correlated to the knowledge ($r = 0.150$, $P < 0.001$), willingness ($r = 0.182$, $P < 0.004$) and attitudes toward behavior of the first aid ($r = 0.371$, $P < 0.001$) among nursing students. Core self-evaluation was correlated to knowledge ($r = 0.193$, $P < 0.001$) and attitudes toward behavior of the first aid ($r = 0.199$, $P < 0.001$).

Conclusions: The first aid knowledge among nursing students was not satisfactory. The study suggested that an unsustainable short first-aid training program may bring negative effects. Countermeasures should be taken to ensure both quality and continuity of first aid training. Meanwhile, more attention should be paid to improving the self-efficacy and core self-evaluation of the nursing students.

1. Introduction

The number of death due to road traffic accident traumas reaches up to 1.24 million every year. Thus, an average of one traffic accident happens every 0.5 min worldwide [1]. Approximately 50 million people are injured in traffic accidents [2]. In China, with the rapid development of economy and urbanization, road traffic crashes have also become a serious problem [3]. For example, in the first half year of 2014, 100,000 road traffic accidents occurred in China, which led to 30,000 deaths and resulted in the economic loss of up to 1.4 billion [1]. Statistics show that the cost of road traffic injuries is approximately 1%–2% of the gross national product in low- and middle-income countries, thereby causing serious economic burden to the society [4]. Road traffic accidents always lead to contusion, fracture, and open wounds, which can change rapidly with high morbidity and mortality [5]. Thus, timely prehospital emergency care, such as cardiopulmonary resuscitation (CPR) and fixation, is especially crucial for an injured person.

Timely treatment is crucial for patients with traffic accident traumas. However, the response time for ambulance services may delay the injury treatment, especially in rural areas. Even in developed countries with perfect emergency network, professional medical personnel find difficulty in rushing into the scene in the golden 10 min to provide first aid treatment in some special circumstances. DeRuyter et al. [6] indicated that the mean length of the call-to-care interval reaches up to 7.2 min. Meanwhile, Bakke et al. [7] found that only 31% of the first aid providers are health care workers. Bystanders administering first aid to an injured or a

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sick person before professional medical care effectively minimizes traffic-related mortality and morbidity. Thus, bystanders' first aid response determines the outcome [8]. Considering the improved public demand for emergency medical service, first aid must not only expand from the hospital emergency department to public places outside the hospital but should also be performed by either medical staff or nonmedical bystanders. Nonmedical responders must possess first aid knowledge and provide timely treatment. However, in China, prehospital training is yet to be popularized. A survey of nonmedical college students showed very low level of prehospital care knowledge [9]. Meanwhile, regardless of possessing first aid knowledge or not, these students do not perform prehospital treatment. The question on whether knowledge, attitude, or other factors influences this behavior should be answered.

CPR knowledge among college students was extensively studied previously. However, investigations on their attitudes to provide first aid as bystanders are lacking and show conflicting results. Hung et al. [10] found that most college students show willingness to perform CPR, whereas Lu et al. [11] indicated that university students are unwilling to perform CPR unless the victims are their family or friends. Factors influencing the attitudes of the respondents include their specialty, gender, technique, and victim's status. The general population generally lacks first aid knowledge and may be afraid that they would be responsible for the patient's life if they provided first aid. However, nursing students who will become medical staff in the future are different from the general population. Nursing students are an important group to provide first aid care and basic life support, such as CPR, to those injured in traffic accidents as bystanders. Therefore, we determined the levels of the knowledge, willingness, and attitudes among nursing students toward first aid behavior in road traffic accident.

Bandura's self-efficacy theory is often applied in studies on human motivation, attitude, and behavior [12–14]. Self-efficacy can influence how people feel, think, and behave in different situations. According to this theory, self-efficacy is the most significant predictor of behavioral intentions; hence, it is closely related to one's belief, attitude, and behavior [14]. People with higher self-efficacy are more confident in performing a specific behavior than those with lower self-efficacy [14]. Meanwhile, some studies showed that self-evaluation is related to motivation and performance [15]. Therefore, we investigated whether self-efficacy and -evaluation are related to the knowledge, willingness, and attitudes toward first aid behavior.

2. Methods

2.1. Participants

A total of 475 nursing students were recruited by convenience choosing in Tianjin University of Traditional Chinese Medicine. The inclusion criteria for participants included the following: (1) nursing students in Tianjin University of Traditional Chinese Medicine and (2) those aged $\geq$18 years old. Participants can stop participating from the study any time.

2.2. Instruments

Structured questionnaires were used to investigate the knowledge, willingness, and attitudes of nursing students toward behavior and related factors. The questionnaires containing sociodemographic questions included the following: the knowledge, willingness, and behavior questionnaire; the general self-efficacy scale; and the core self-evaluation scale.

Sociodemographic questions were designed by the researchers. The sociodemographic information of nursing students, including gender, if they are class leaders or not, and whether or not they received first aid training, was investigated.

The knowledge, willingness, and attitude toward behavior questionnaire was self-designed to evaluate the knowledge, willingness, and attitude behavior of the students toward first aid in trauma caused by traffic accidents. The questionnaire consisted of three sections, that is, knowledge, willingness, and attitudes toward first aid behavior. The knowledge section contained 15 items on knowledge regarding first aid, with 1 point for every right answer and 0 point for every wrong answer. The willingness section included 7 items, each of which was scored ranging from 1 to 4. The attitudes toward behavior section included 3 questions and scored ranging from 1 to 3. The total scores of the knowledge, willingness, and attitude sections were 15, 28, and 9, respectively. The Delphi method was used to design the questionnaire. On the basis of the enquiry of 5 experts, we found that the level content validity index was in the range of 0.800–1.000. The scale-level content validity index was 0.992. According to preinvestigation, the Cronbach's α coefficients of the knowledge, willingness, and attitude sections were 0.809, 0.528, and 0.691, respectively.

The general self-efficacy scale was used to assess self-efficacy. Self-efficacy refers to one's confidence to accomplish various tasks. For example, "I can always manage to solve difficult problems if I try hard enough." The scale included 10 items, each of which was scored ranging from 1 to 4 (1 = not at all true, 2 = hardly true, 3 = moderately true, and 4 = exactly true). The total score of the scale was the sum of each item. The general self-efficacy scale was designed by Schwarzer et al. [16] and is widely used worldwide. This scale was translated into Chinese by Wang et al. [17]. The internal consistency coefficient and retest reliability of the Chinese version are 0.87 and 0.83, respectively. The validity of the Chinese version is also freely acceptable [17].

The core self-evaluation scale was applied to evaluate the core self-evaluations of the participants. Core self-evaluations refer to people's perceptions about their overall worth and capability. The scale included 10 items, each of which was scored ranging from 1 to 5. The total score was calculated as the sum of all items, and high scores reflected high core self-evaluation levels. The core self-evaluation scale was designed by Judge et al. [18] and translated into Chinese by Du et al. [19]. The scale displayed a unitary factor structure. The Cronbach's α coefficient and the test–retest reliability value of this scale were 0.83 and 0.82, respectively. The core self-evaluation scale is also proven to be a reliable and valid measure that is freely used in China [19].

2.3. Data collection

At the beginning of the study, the researchers informed the participants of the objective of the study and guaranteed that the research was anonymous. Then, informed consents were obtained from the participants. The students filled out the questionnaire on their own. Approximately 20 min were spent on filling out the questionnaires. After completing the investigation, the questionnaires were immediately collected. The researchers checked the quality of the questionnaires on the spot. If some items were left unanswered in the questionnaires, then the subjects were asked to complete them.

2.4. Data analysis

SPSS® Version 16.0 (SPSS Inc, Chicago, IL, USA) was used to analyze the data. The statistical significance was defined as $P < 0.05$. The results were expressed as mean $\pm$ standard deviation or frequency (percentage). Independent t-tests, ANOVAs, and Pearson's correlation tests were used to analyze the relationships among first

aid knowledge, willingness, and attitudes toward behavior in traffic accident trauma and related factors, respectively.

3. Results

3.1. Characteristics and the knowledge, willingness, and attitudes of participants toward first aid behavior in traffic accident trauma and related factors

A total of 475 nursing students in Tianjin University of Traditional Chinese Medicine were recruited. Approximately 26.9% of these students were male, 51.5% were trained in first aid, and 22.9% were class leaders. Students in different year levels, i.e. during their first to forth year in college accounted for 22.7%, 23.2%, 32.0%, and 22.1%, respectively. The knowledge, willingness, and attitudes of participants toward first aid behavior in traffic accident trauma were 7.51 ± 1.92, 15.54 ± 5.03, and 7.73 ± 1.56, respectively. Approximately 51.5% of the total knowledge score of the students was >9. The self-efficacy and core self-evaluation scores of the participants were 25.13 ± 4.62 and 32.16 ± 4.36, respectively. The characteristics of the sample are shown in Table 1.

3.2. Relationship between knowledge of first aid and related factors

Independent *t*-test revealed that students trained in first aid ($t = -2.491$, $P = 0.013$) and female students ($t = -3.006$, $P = 0.003$) possessed high first aid knowledge score. ANOVA showed differences in knowledge of students from first year to forth year ($F = 4.431$, $P = 0.004$; Table 2). Pearson's correlation found that nursing students' self-efficacy ($r = 0.150$, $P < 0.001$) and core self-evaluation ($r = 0.193$, $P < 0.001$) were positively correlated with their first aid knowledge in traffic accident trauma (Table 3).

3.3. Relationships between willingness of first aid and related factors

Independent *t*-test revealed no differences in the level of willingness of students of different gender ($t = -1.053$, $P = 0.293$) and year level ($F = 1.843$, $P = 0.138$). Students who were trained in first aid exhibited more willingness than those untrained ($t = 2.886$, $P = 0.004$; Table 3.). Pearson's correlation indicated that nursing students' self-efficacy was positively correlated with their willingness of performing first aid in traffic accident trauma ($r = 0.182$, $P < 0.004$), whereas core self-evaluation was unrelated with willingness ($r = 0.44$, $P = 0.338$; Table 3).

3.4. Relationship between attitude toward behavior of first aid and related factors

The independent *t*-test revealed that students trained in first aid ($t = -2.345$, $P = 0.019$) expressed lower levels of attitude toward first aid behavior than those untrained. The levels of behavior between male and female were indifferent ($t = -0.082$, $P = 0.935$). The factor ANOVA showed differences in students of different year level ($F = 8.349$, $P < 0.001$; Table 2). Pearson's correlation indicated that nursing students' self-efficacy ($r = 0.371$, $P < 0.001$) and core self-evaluation ($r = 0.199$, $P < 0.001$) were positively associated with their attitude towards first aid behavior in traffic accident trauma (Table 3).

Table 1
Characteristics of the nursing students.

Characteristics	*n*	Percentage (%)
Gender		
Male	128	26.9
Female	347	73.1
Received first aid training		
Yes	245	51.5
No	231	48.5
Year level		
First	108	22.7
Second	110	23.1
Third	152	31.9
Fourth	105	22.1

Table 2
Nursing students' self-efficacy, knowledge, willingness, and attitudes toward the first aid behavior as bystanders in road traffic accident (*Mean* ± *SD*).

Characteristics	Self-efficacy	Knowledge	Willingness	Attitude
Gender				
Male	25.45 ± 4.51	7.08 ± 1.89	15.14 ± 5.30	7.72 ± 1.61
Female	25.02 ± 4.66	7.67 ± 1.90	15.69 ± 4.93	7.73 ± 1.55
t	0.890	−3.006	−1.053	−0.082
P	0.374	0.003	0.293	0.935
Received first aid training				
Yes	25.55 ± 4.83	7.72 ± 1.99	16.18 ± 4.69	7.57 ± 1.62
No	24.70 ± 4.35	7.29 ± 1.81	14.86 ± 5.30	7.90 ± 1.49
t	−2.016	−2.491	−2.866	2.345
P	0.044	0.013	0.004	0.019
Year level				
First	24.75 ± 4.39	7.90 ± 1.98	14.57 ± 5.02	8.24 ± 1.31
Second	23.62 ± 5.02	6.99 ± 1.91	16.05 ± 5.11	7.26 ± 1.71
Third	25.60 ± 4.55	7.62 ± 1.76	15.78 ± 5.23	7.84 ± 1.46
Fourth	26.45 ± 4.03	7.50 ± 1.98	15.66 ± 4.58	7.52 ± 1.62
F	7.870	4.431	1.843	8.349
P	<0.001	0.004	0.138	<0.001

4. Discussion

In this study, we primarily evaluated the level of knowledge, willingness, and attitudes toward the first aid behavior among nursing students. The mean score of the first aid knowledge was 7.51 (1.92), which reflected poor knowledge mastery. Among the questions, “the ratio of CPR chest compression and ventilation” was least mastered, which may be due to the fact that first aid training and learning courses were provided in the freshman and junior year in our school, respectively. Within the time gap, most students had no opportunities to apply their knowledge; hence, the students have forgotten what they learning regarding first aid.

This survey indicated that core self-evaluation was closely related to knowledge and attitudes toward first aid behavior. This finding is similar to the result of by Erez et al. [15], showing that core self-evaluation was related to the motivation, goal setting, and performance of task activity. Core self-evaluation is a personality taxonomy reflecting the appraisal of people, events, and things relative to oneself [20]. Individuals with low self-evaluation are uncommitted to some tasks that they believe they cannot finish [15]. Therefore, measures should be taken to improve the level of core self-evaluations for nursing students to promote positive behavior toward first aid in traffic accident trauma.

In the present study, self-efficacy was positively correlated with knowledge, willingness, and attitudes toward first aid behavior. Self-efficacy considerably affects the performance [21]. Students with higher self-efficacy are more willing to learn knowledge than those with lower self-efficacy. According to Bandera's self-efficacy theory, self-efficacy is a predictor of behavior and influences decision-making. The higher the students' self-efficacy is, the more effort they will actively exert effort into tasks. People with higher self-efficacy are more likely to convert plan to specific actions and show more confidence in solving problems, overcoming difficulties, and reflecting a certain behavior than those with lower self-

Table 3
Correlation among nursing students' self-efficacy, core self-assessment, knowledge, willingness, and attitudes toward first aid behavior as bystanders in road traffic accident.

Variables	Self-efficacy	Core self-assessment	Knowledge	Willingness	Attitude
Self-efficacy	–	–	–	–	–
Core self-assessment	0.196*	–	–	–	–
Knowledge	0.150*	0.193*	–	–	–
Willingness	0.182*	0.044	0.063	–	–
Attitude	0.371*	0.199*	0.283*	0.202*	–

Note:*$P < 0.001$.

efficiency [21]. In the present study, nursing students with higher self-efficacy show more confidence in rendering first aid in traffic accident trauma than those with lower self-efficacy. By contrast, the mean score of the nursing students' self-efficacy was 25.13, which was lower than the general score and is expected to improve. Thus, assisting nursing students to develop confidence toward first aid may ultimately affect their first aid behavior.

In this study, first and third year nursing students showed higher levels of attitude toward first aid behavior than those of second year and forth year possibly because first aid training and learning course were conducted in first and third year students in our school, respectively. Immediately after learning first aid, students were confident in providing first aid. Hung et al. [10] also found that students avoided performing CPR mainly due to lack of confidence because they have forgotten what they learned. He et al. [22] reviewed previous studies on first aid training for children and lay people and found that first aid training can improve knowledge and skills. Through first aid training, the knowledge and skills toward traffic accident trauma will be improved and consolidated. Therefore, good knowledge mastery can improve the behavior. In the present study, the nursing students who possessed more knowledge were more confident when they encountered traffic accident trauma as bystanders than those possessing lesser knowledge. Thus, first aid training should be a long process to strengthen memory. Regular and refresher training should be implemented in the future.

Students who received first aid training exhibited lower score of attitudes toward first aid behavior than that of the untrained ones. This result is inconsistent with the study of Bakke et al. [7], which showed that individuals with first aid training can also offer good first aid care. This result was observed possibly because nursing students exhibited poor knowledge mastery despite receiving first aid training. This result may be due to the fact that we acquired information from the participants whether they had received relevant training, but we did not ask when they received training. Meanwhile, the quality of training may be excessively low and lacked continuity. This observation indicated that training quality should be improved. Meanwhile, after training, the students may realize the risks of improper rescue to the injured person; thus, students worry about possibly hurting the injured person. This reaction make the students excessively cautious to do anything [23]. Chew et al. [24] also found that dental students, despite knowing how to perform CPR, did not translate their knowledge into CPR practice. Therefore, the learner should be infused with positive attitudes toward first aid, and the training quality should also be improved [25].

5. Limitations

This study possessed some limitations that need to be considered. First, the study was a cross-sectional study, which cannot determine the exact causal relationship. The study also aimed to explore the relationships among self-efficacy, core self-evaluation, knowledge, willingness, and attitudes toward first aid behavior. Other factors unconsidered in this study may still be present. Future studies need to consider other factors, and intervention studies should be warranted.

6. Conclusion

The present study revealed that core self-evaluation was correlated with willingness and attitudes. Meanwhile, self-efficacy was correlated with knowledge, willingness, and attitudes towards first aid behavior in nursing students. Thus, some measures should be taken to improve self-efficacy and core self-evaluation. Meanwhile, short and unsustainable first aid training may result in negative effects. Other methods should be adopted to ensure both training quality and cycle to ultimately promote first aid behavior.

Conflicts of interest

Authors declare no conflict of interest that requires clarification.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijnss.2018.11.003.

References

[1] Si C, Yang F, Yongman Z. Highway traffic safety evaluation based on evidence fusion and extension matter-element model. Metall Min Ind 2015;3:136–44.
[2] Hyder AA, Paichadze N, Toroyan T, Peden MM. Monitoring the decade of action for global road safety 2011–2020: an update. Global Publ Health 2016;12(12):1–14.
[3] Wang CW, Chan CL. Estimated trends and patterns of road traffic fatalities in China, 2002-2012. Traffic Inj Prev 2016;17:164–9.
[4] Margie Peden RS, Sleet D, Mohan D, et al. World report on road traffic injury prevention. 2004. p. 1–34.
[5] Rus MD, Peek-Asa C, Baragan EA, Chereches RM, Mocean F. Epidemiology of road traffic injuries treated in a large Romanian emergency department in Tirgu-Mures between 2009 and 2010. Traffic Inj Prev 2015;16:835–41.
[6] DeRuyter NP, Husain S, Yin L, et al. The impact of first responder turnout and curb-to-care intervals on survival from out-of-hospital cardiac arrest. Resuscitation 2017;113:51–5.
[7] Bakke HK, Steinvik T, Eidissen SI, Gilbert M, Wisborg T. Bystander first aid in trauma - prevalence and quality: a prospective observational study. Acta Anaesthesiol Scand 2015;59:1187–93.
[8] Murad MK, Larsen S, Husum H. Prehospital trauma care reduces mortality. Ten-year results from a time-cohort and trauma audit study in Iraq. Scand J

Trauma Resuscitation Emerg Med 2012;20:13.
[9] Suzhen H, Jinlan C, Yan C. Cognition level on pre - hospital emergency for non - medical students in Ningbo and comparison on training effect. Nurs Rehabil 2017;16:326–9.
[10] Hung MSY, Chow MCM, Chu TTW, et al. College students knowledge and attitudes toward bystander cardiopulmonary resuscitation: a cross-sectional survey. Cogent Med 2017;4:1–12.
[11] Lu C, Jin Y, Meng F, et al. An exploration of attitudes toward bystander cardiopulmonary resuscitation in university students in Tianjin, China: a survey. Int Emerg Nurs 2016;24:28–34.
[12] Rollnick S, Heather N. The application of Bandura's self-efficacy theory to abstinence-oriented alcoholism treatment. Addict Behav 1982;7:243–50.
[13] Salanova M, Lorente L, Martinez IM. The dark and bright sides of self-efficacy in predicting learning, innovative and risky performances. Spanish J Psychol 2012;15:1123–32.
[14] Sheer VC. A meta-synthesis of health-related self-efficacy instrumentation: problems and suggestions. J Nurs Meas 2014;22:77–93.
[15] Erez A, Judge TA. Relationship of core self-evaluations to goal setting, motivation, and performance. J Appl Psychol 2001;86:1270–9.
[16] Schwarzer R, Born A. The assessment of optimistic self-beliefs: comparison of the Chinese, Indonesian, Japanese, and Korean versions of the general self-efficacy scale. Psychologia 1997;40:1–13.
[17] Wang CK, Hu ZF, Liu Y. Reliability and validity of the general self-efficacy scale. Appl Psychol 2001:37–40.
[18] Judge TA, Bono JE, Locke EA. Personality and job satisfaction: the mediating role of job characteristics. J Appl Psychol 2000;85:237–49.
[19] Du JZ, Zhang X, Zhao Y. Structural verification of core self-evaluation and its scale revision. Psychol Res 2012:54–60.
[20] Judge TA, Locke EA, Durham CC. The dispositional causes of job satisfaction: a core evaluations approach. Res Organ Behav 1997;19:151–88.
[21] Bandura A, Adams N. Analysis of self-efficacy theory of behavioral change. Cognit Ther Res 1977;1:287–310.
[22] He Z, Wynn P, Kendrick D. Non-resuscitative first-aid training for children and laypeople: a systematic review. Emerg Med J 2014;31:763–8.
[23] Cui L, Yinghui J, Wenjing M, Xiaotong S, Yunyun W. Students' attitudes towards cardiopulmonary resuscitation. Chin Nurs Edu 2014;11:554–7.
[24] Chew K, Yazid MNA, Kamarul BA. Translating knowledge to attitude: a survey on the perception of bystander cardiopulmonary resuscitation among dental students in universiti sains Malaysia and school teachers in kota bharu, kelantan. Med J Malaysia 2009;64:205–9.
[25] Breckwoldt J, Lingemann C, Wagner P. Resuscitation training for lay persons in first aid courses: transfer of knowledge, skills and attitude. Der Anaesthesist 2016;65:22–9.