Assessment of Chinese Nursing Students Perception in Cardiopulmonary Preparedness: An Observation Descriptive Study

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Original Research Article

ABSTRACT

The aim of the study was to assesses the preparedness of Chinese Nursing students in cardiopulmonary resuscitation from selected sections of Weifang University of Science and Technology. This assessment entails the identification of the preparedness of Weifang University of Science and Technology nursing students to perform Basic life Support in Cardiopulmonary Resuscitation when needed in the university, community, and hospital setting.

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Aim: The primary aim of this research was to assess the perception of Chinese nursing students on basic life support. The specific objective of this study was to evaluate the level of Chinese Nursing students when it comes to Cardiopulmonary Resuscitation preparedness in order to determine their capability during emergency situations. This study was focused on 309 Chinese Nursing students from various levels of education at Weifang University of Science and Technology, a provincial public undergraduate and tertiary vocational college in Weifang, Shandong, China.

Scope and Limitation of the Study: This study focused on the preparedness of Chinese nursing students to perform Cardiopulmonary Resuscitation. The study was conducted at Weifang University of Science and Technology focusing on 309 Chinese Nursing students from different levels of education such as Associate Degree, Bachelor's, Master's Degree, and PhD degrees.

Research Design: The researchers used descriptive nonparametric and Qualtrics online survey tools to assess the perception of the respondents on critical steps on basic life support critical steps and whether it is important or not important. Online perceived "Performance Evaluation Tool" was used to assess respondents' perceived performance on Critical Steps of Basic Life Support in Cardiopulmonary Resuscitation.

Results: Mainstream of the Chinese nursing students perceived can perform the critical steps of Cardiopulmonary Resuscitation with a mean score of 97.31 percent while the ones who cannot perform is 2.69 percent.

Conclusion: Chinese nursing students' preparedness is essential in emergent Basic Life Support - Cardiopulmonary Resuscitation. The mean score for parameters on critical step perceived can perform with a score of 97.31 percent. This high percentage of perceived performance can help the chance of survival and this perception can strengthen the Chinese students to do their task in emergency situations.

1. INTRODUCTION

Cardiopulmonary resuscitation (CPR) is the most important and critical step in rescuing patients with cardiac arrest. It should be done immediately because it provides a 90% survival chance, especially in Out of Hospital Cardiac Arrest (OHCA). Out-of-hospital cardiac arrest (OHCA) is a major public health problem worldwide [1]. In China, more than 230 million people have cardiovascular disease, and 550,000 individuals experience cardiac arrest every year [2]. In China, the survival rate of OHCA is less than 1% [3,4,5,6,7]. Research has shown that bystander CPR improves survival rates for OHCA [8,9]. However, the rate of bystander CPR in several large and medium-sized cities in China is only 4.5% [10].

In the rapidly developing healthcare field, nursing students play a crucial role in shaping the future of patient care. Nursing students must be able to initiate and perform effective CPR when they start their careers in nursing [11,12]. The lack of sufficient knowledge on this intervention further intensifies the recommendation to support the advocacy for more Chinese Nursing Students to learn CPR.

This study aims to assess the current state of knowledge, skills, and attitudes among nursing students at Weifang University of Science and Technology regarding cardiopulmonary preparedness. By evaluating their self-perceived readiness, we aim to identify potential gaps in education and training that may exist. The findings of this research will be instrumental in enhancing the curriculum, improving educational strategies, and elevating the quality of care that these future nursing professionals can provide.

1.1 Objective

The specific objective of this study was to evaluate the level of Chinese nursing students' performance when it comes to Cardiopulmonary Resuscitation preparedness to determine their capability in basic life support during emergencies.

The study was focused on 309 Chinese nursing students from various levels of education at Weifang University of Science and Technology, a provincial public undergraduate and tertiary vocational college in Weifang, Shandong, China.

The result of this study can give recommendations for policy directives on BLS

development based on the study result. The scope of this study focused on Chinese Nursing students from various levels of education, and they were assessed based on their perception of the critical steps of basic life support, specifically in Cardiopulmonary Resuscitation during emergencies.

2. METHODS

2.1 Respondents of the Study

The research was conducted at Weifang Technology University focusing on 309 Chinese Nursing students from different levels of education like associate, bachelor, master's, and PhD Degrees. The Chinese students were chosen because of their various levels of education, and they are similar in their chosen professions.

The Weifang University of Science and Technology Research Ethics Review Board approved the research protocol. Before starting the study, the researchers seek approval and informed consent from the respondents.

Using Block Sampling, 309 respondents were selected from Weifang University of Science and Technology, with 98 Associate Degrees, 193 Bachelor's Degrees, 12 Master's Degrees, and 6 PhD. Degree. Inclusion age criteria ranges from 17 years old to 50 years old at the time of BLS assessment and at least associate degree level.

2.2 Tool of the Study

A Qualtrics online survey tool was used to assess the perceptions of the respondents regarding the critical steps in using the standard e-tool of the American Heart Association (AHA) for Cardiopulmonary Resuscitation. The survey sought to determine the importance of these steps. A second set of questionnaires based on AHA guidelines was used to measure the perceived performance of the respondents in carrying out the critical steps in Basic Life Support for Cardiopulmonary Resuscitation.

2.3 Data Gathering Procedure

The questionnaire method was the mode of data gathering with a quantitative approach. (1) The study was conducted at Weifang University of Science and Technology, a provincial public undergraduate and tertiary vocational college. (2) They answered the Online self-administered questionnaire to determine the Chinese Nursing Students' perception of critical steps in Cardiopulmonary Resuscitation.

2.4 Statistical Analysis

The study employed a Quantitative Descriptive nonparametric method design of the study. The data gathered from the Chinese nursing students were properly tabulated and summarized into tables to clarify and simplify the presentation of the data collected.

Percentage was used to describe the perception of Chinese nursing students on basic life support specifically in critical steps if it is important or not important. Percentage was also used to assess the perceived perception of the Chinese Nursing students if they can perform the CPR Critical Steps or not.

3. RESULTS AND DISCUSSION

Table 1 shows the Demographic Profile of the respondents in Weifang Technology University. The total respondents were 309 Chinese students at different levels of education. The most dominant gender was females, which constituted 196 or 63.4 percent followed by 101 or 32.7 percent males.

In Philippines, it is supported by 87.9% of nursing are women. Comparatively, female dominance in healthcare is not just a U.S. phenomenon. The results of a 2019 survey show that female nurses dominate healthcare in every country [13]. The feminization of nursing constitutes a significant barrier to men choosing to enter nursing and in part accounts for the dwindling numbers of men in the profession [14].

The most dominant age of respondents were between 22-25 years old, which constituted 169 or 54.7 percent followed by 19-21 years old, which constituted 113 or 36.6 respondents. The age range of 19 years old to 25 years old is dominant in student nurses.

The age range of student nurses typically falls between 19 and 25 due to various factors influencing their educational and career choices. Research on nursing education indicates a rising number of nursing graduates, potentially attracting younger individuals seeking opportunities for international migration [15].

The most dominant level of education was Bachelor Level of Education consisting of 193 or 62.5 percent followed by Associate Degree Level which constituted 98 or 31.7 percent. It was explained in the age range of 19 to 25 years old. These two age brackets are the most dominant level of education because it is college life in China. The associate degree Level in China starts at 18 years old to 21 years old, a three-year course while the Bachelor's Degree in China starts at 18 years old to 22 years old, a four-year course in China. This is the reason the most dominant at this level are the Bachelor and Associate Levels [16].

Table 1. Demographic Profile of the Respondents in Weifang Technology University, June 2024

N=309

Variables	Category	Number of Respondents	Percentage (%)
Gender	Male	101	32.7
	Female	196	63.4
	Transgender	6	1.9
	Bisexual	3	1
	lesbian	3	1
Age	Below18 years old	21	6.8
	19-21 years old	113	36.6
	22 - 25 years old	169	54.7
	26-29 years old.	6	1.9
Level of education	Associate degree	98	31.7
	Bachelor's Degree	193	62.5
	Master's Degree	12	3.9
	Ph.D. or higher	6	1.9

Table 2. Assessment of Chinese Nursing Students' Perception of the BLS Critical Steps on Cardiopulmonary Resuscitation if it is important or Not Important, June 2024

N=309

Steps perceive to be Important or Not Important	Important		Not Important	
	NO	%	NO	%
1. Check for responsiveness: Taps and shouts, Hey, hey; are you ok? Are you alright? (If the victim is unconscious step 2)	300	97.1	9	2.9
2. Shout for help.	303	98.1	6	1.9
3. Check for the pulse and check for breathing (5-10 secs but not more than 10 secs.) If the victim has a negative pulse and negative breathing proceed to step 4.	301	97.4	8	2.6
4. Tell someone to activate the Emergency Medical System and grab an AED. "Hey, you activate the EMS and grab an AED!"	295	95.5	14	4.5
5. Bare the patient's chest and locate the CPR hand position. (2 inches above the xiphoid process)	304	98.4	5	1.6
6. Delivers the first cycle of compressions at the correct rate (acceptable: 30 compressions/cycle)	303	98.1	6	1.9
7. Give 2 breaths (1 second each). Not used during the COVID-19 pandemic, just pause for 2-3 seconds then continue Chest Compression.	304	98.4	5	1.6
8. After 1 minute when the AED arrives, Turn the AED on, Place the machine beside the victim's head, and follow the voice prompt. After the shock……	305	98.7	4	1.3
9. Delivers the second cycle of compressions at the correct hand position (acceptable greater than 30 compressions)	305	98.7	4	1.3
10. After 2 minutes of CPR, assess the victim for Pulse and breathing, if the victim has pulse and breathing. Position the victim in a recovery position.	302	97.7	7	2.3
Mean		**97.81**		**2.19**

Table 3. Assessment of Chinese Nursing Students' Perception of the BLS Critical Steps of Cardiopulmonary Resuscitation if They Can Perform or Can't Perform, June 2024

N=309

Steps Perceived can Performed or cannot be Performed	Perform		Not Perform	
	NO	%	NO	%
1. Check for responsiveness: Taps and shouts, Hey, hey; are you ok? Are you alright? (If the victim is unconscious step 2)	300	97.1	9	2.9
2. Shout for help.	309	100	0	0
3. Check for the pulse and check for breathing (5-10 secs but not more than 10 secs.) If the victim has a negative pulse and negative breathing proceed to step 4.	300	97.1	9	2.9
4. Tell someone to activate the Emergency Medical System and grab an AED. "Hey, you activate the EMS and grab an AED!"	298	96.4	11	3.6
5. Bare the patient's chest and locate the CPR hand position. (2 inches above the xiphoid process)	302	97.7	7	2.3
6. Delivers the first cycle of compressions at the correct rate (acceptable: 30 compressions/cycle)	301	97.4	8	2.6
7. Give 2 breaths (1 second each). Not used during the COVID-19 pandemic, just pause for 2-3 seconds then continue Chest Compression.	300	97.1	9	2.9
8. After 1 minute when the AED arrives, Turn the AED on, Place the machine beside the victim's head, and Follow the voice prompt. After the shock……	300	97.1	9	2.9
9. Delivers the second cycle of compressions at the correct hand position (acceptable greater than 30 compressions)	297	96.1	12	3.9
10. After 2 minutes of CPR, assess the victim for Pulse and breathing, if the victim has pulse and breathing. Position the victim in a recovery position.	300	97.1	9	2.9
Mean		**97.31**		**2.69**

Table 2 shows the mean score of parameters for critical steps in Basic Life support of 97.81. The most important step is Step 8; After 1 minute when AED arrives, Turn the AED on, place the machine beside the victim's head, and follow the voice prompt. After the shock and step 9; Delivers a second cycle of compression at the correct hand position with a shared percentage of 98.7. Followed by step 5; Bares the patient's chest and locate the CPR position (2 inches above the xiphoid process) and step 7; give 2 breaths (1 second each) Not use during the Pandemic, just pause for 2 -3 seconds then continue Chest Compression with a shared percentage of 98.4. Lastly, the important steps are step 2; Shout for help, and step 6; Delivers of first cycle of compression at a correct rate with a shared percentage of 98.1.

Comparatively, the mean score on the critical step of Cardiopulmonary Resuscitation "not important" is 2.19 percent. The most perceived not important critical step in Cardiopulmonary Resuscitation is step 4; Tell someone to activate the Emergency Medical System and grab an AED. "Hey, you activate the EMS and grab an AED with a percentage of 4.5. Followed by step 1; Check for responsiveness: Taps and shouts, Hey, hey; are you ok? Are you alright? With a percentage of 2.9. Lastly, step 3; Check for the pulse and check for breathing (5-10 secs but not more than 10 secs.) with a percentage of 2.6

The most important step is Step 8; After 1 minute when the AED arrives, Turn the AED on, Place the machine beside the victim's head. This critical step is important and supported by 9 in 10 cardiac arrest victims who receive a shock from an AED in the first minute live [17]. It means the earlier application of AED the victim survived cardiac arrest. The step 9; which Delivers the second cycle of compression at the correct hand position with a shared percentage of 98.7 is also an important critical step in Cardio Pulmonary Resuscitation because your chance of survival while waiting for emergency medical services during a cardiac emergency decreases by 10% every minute without CPR [18].

Step 5; Bare the patient's chest and locate the CPR position (2 inches above the xyphoid process) and step 7; give 2 breaths (1 second each) Not use during the Pandemic, just pause for 2 -3 seconds then continue Chest Compression with a shared percentage of 98.4.

Bares the patient's chest and locating for CPR is important because there is growing evidence that open-chest cardiopulmonary resuscitation is superior to closed-chest cardiopulmonary resuscitation [19] but open chest is much more effective if cardiac arrest patients with non-trauma showed that open-chest cardiopulmonary resuscitation was associated with higher ROSC compared with closed-chest cardiopulmonary resuscitation (OR = 3.12 95%CI 1.23–7.91, P < 0.05) [20].

Rescue breathing is also important especially in the state of cardiac arrest with no idea how long they have been in this state, they likely need the rescue breathing [21] but there is also a study that said, providing two insufflations during pauses in mechanical chest compressions is mostly unsuccessful [22]. Whatever the result one must do high-quality compression to maintain the manual circulation that picks up the oxygen and distributes it to the brain and vital organs.

Table 3 shows the mean for parameters on critical step on Chest Pulmonary Resuscitation perceived can be performed is 97.31 percent. The most critical step perceived can perform is step 2; Shout for help with a percentage of 100. Followed by step 5; Bares patient's chest and locates CPR hand position. (2 inches above the xiphoid process) with a percentage of 97.7. Lastly, step 6; Delivers the first cycle of compressions at the correct rate (acceptable: 30 compressions/cycle) with a percentage of 97.4.

Comparatively, the mean score for parameters on critical step perceived cannot performed is 2.69 percent. The most step perceived cannot performed is step 9; which Delivers the second cycle of compressions at the correct hand position (acceptable greater than 30 compressions) with a percentage of 3.9. Followed by step 4; Tell someone to activate the Emergency Medical System and grab an AED. "Hey, you activate the EMS and grab an AED!" with a percentage of 3.6. Lastly, the step perceived cannot be performed is step 1; Check for responsiveness: Taps and shouts, "Are you alright, are you ok?" (If the victim is unconscious step 2), step 3; Check for the pulse and check for breathing (5-10 secs but not more than 10 secs.), step 7; Give 2 breaths (1 second each). Not used during the COVID-19 pandemic, just pause for 2-3 seconds then continue Chest Compression, step 8; After 1 minute when the AED arrives, Turn the AED on, Place the machine beside the

victim's head, Follow the voice prompt, and step 10; After 2 minutes of CPR, assess the victim for Pulse and breathing, if the victim has pulse and breathing. Position the victim in a recovery position with a shared score of 2.9 percent.

Mainstream the Chinese Nursing Students respondents perceived can perform the critical steps of Cardiopulmonary Resuscitation with a mean score of 97.31 percent while the perceived cannot perform is 2.69 percent.

The most important for Chinese Nursing Students on the critical steps in Basic Life Support in Cardiopulmonary Resuscitation is Step 2, Shout for Help with a score of 100 percent. It is by asking for help or shouting to attract their attention, but do not leave the casualty alone [23]. It is followed by Step 5; which Bares the patient's chest and locates CPR hand position with a score of 97.7 percent and Step 6; which Delivers the first cycle of compressions at the correct rate (acceptable: 30 compressions/cycle) with a percentage of 97.4. Proper hand position and compression are effective steps during cardiopulmonary resuscitation (CPR) that require depressing the anterior chest wall enough to compress the heart between the sternum and spine [24].

Comparatively, the mean score for parameters on critical step perceived cannot be performed is 2.69 percent compared to the mean score for parameters on critical step perceived can be performed with a score of 97.31 percent. But survival rate of out-of-hospital cardiac arrest is less than 1% in China (compared with 12% in the United States) [25]. Specifically, the implementation rate for bystander CPR in China is low (4.5% in 8 large and medium-sized cities around China, 11.4% in Beijing, and 4.2% in Shanghai, vs 46.1% in the United States, 29% in Canada, 46%-73% in Sweden, 32.2% in Japan, and 21.2% in Australia) [26]. The quality is also poor, which is reflected by the low survival rates following bystander CPR in China. It means there is a low survival rate in China by bystanders compared to the perceived performance by the Chinese Nursing Students with a score of 97.31. It is needed to review the critical steps on how to do it and should assess the trainees on the actual performance on the critical steps of Cardiopulmonary Resuscitation to see the actual results of performance.

In order to achieve these positive outcomes, it is crucial for nursing students to develop a deep understanding of the practical application of Cardio Pulmonary Resuscitation. This can be attained through hands-on CPR training rather than merely assuming they can perform it. Proficient and effective CPR skills among students will greatly benefit not only their academic and community but also their households, where Cardiac Arrest incidents are common. The students' proficiency in CPR would significantly contribute to the welfare of the community and the government as a whole.

4. CONCLUSION

It's crucial to highlight the significance of Chinese nursing students' readiness in Basic Life Support - Cardiopulmonary Resuscitation (BLS-CPR) during emergencies. With an impressive average score of 97.31 percent for the perceived ability to execute critical steps, there's a high likelihood of positively impacting survival rates. This perception can significantly boost the confidence and competence of Chinese students in responding to emergency situations. Additionally, evaluating the actual performance of Chinese students in CPR scenarios is vital to ensure their preparedness. One effective method is by assessing the BLS capability of household members in the community [27-29], considering that the majority of cardiac arrest incidents occur in domestic or community settings [27-29].

5. RECOMMENDATION:

Education:

1. It is essential for the College of Nursing to integrate updated Cardiopulmonary Resuscitation (CPR) training into their curriculum for the students, ensuring that they are equipped with the necessary life-saving skills.
2. The Dean of the College of Nursing should take the initiative to establish a dedicated team responsible for conducting annual CPR training for the faculty, fostering a culture of preparedness and safety within the institution.
3. The CPR training team can play a pivotal role in both training the students and serving as faculty for this critical nursing subject, thereby ensuring a comprehensive and hands-on learning experience.

4. It is imperative that the University management allocates resources to finance regular training updates for the CPR team, enabling them to stay abreast of the latest advancements in CPR every two to three years.

Clinical:

1. The hospital Management needs to proactively establish a specialized CPR training team to spearhead the implementation of life-saving techniques across the clinical setting.
2. The CPR team should lead the charge in training newly hired staff nurses, empowering them to deliver optimal patient care during resuscitation procedures and emergencies.
3. Implementing a structured annual update training program for existing staff nurses, facilitated by the CPR team, will ensure the seamless integration of new life-saving approaches and best practices.
4. It is crucial for the CPR team to participate in accreditation agency updates, maintaining a strong commitment to upholding the highest standards of CPR proficiency and knowledge.

Community:

1. It is imperative for community barangays to establish dedicated CPR teams, ensuring that there is a rapid and effective response to cardiac emergencies within the community.
2. These teams must demonstrate a consistent commitment to enhancing their cognitive and CPR skills through regular training, underscoring the importance of continuous improvement and readiness.
3. Collaboration with nearby hospitals and accrediting agencies will provide the CPR teams with valuable updates and insights, fostering a network of support and knowledge sharing.
4. Emphasizing strong communication channels with hospitals during incidents or mass casualty situations will be instrumental in ensuring a coordinated and effective response to emergency scenarios.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

CONSENT AND ETHICAL APPROVAL

The Weifang University of Science and Technology Research Ethics Review Board approved the research protocol. Before starting the study, the researchers seek approval and writren consent from the respondents.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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