

## Nurses' perceptions of self-efficacy in cardiopulmonary resuscitation at a private hospital in Selangor.

Siew Eng Ho and Sok Ching Tee

**Introduction:** Nurses are obligated to respond competently in the event of cardiac arrest. Nurses could be hesitant to intervene due to low self-efficacy in their ability to manage cardiac arrest patients.

**Objective:** The objective of this study was to determine the level of nurses' perceived self-efficacy in cardiopulmonary resuscitation (CPR) at a private hospital in Kuala Lumpur.

**Method:** A cross-sectional descriptive study was conducted with 112 respondents who fulfilled the inclusion criteria. A 19 item questionnaire on Resuscitation Self-Efficacy Scale (RSES) was adapted and scored using a 5-point Likert scale.

**Results:** The total mean score and standard deviation of perceived self-efficacy score in resuscitation was ( $M = 77.68$ ;  $SD \pm 11.77$ ) which indicated a high degree of self-efficacy among nurses. There were significant differences between respondents' age groups with ( $t = -2.520$ ;  $p = 0.013$ ), unit of working ( $t = -4.086$ ;  $p = 0.001$ ), real experiences in resuscitation ( $t = 2.532$ ;  $p = 0.013$ ), and the number of participations in resuscitation ( $t = -6.668$ ;  $p = 0.001$ ) and nurses perceived self-efficacy in CPR. There were also significant differences between respondents' years of working experience with ( $F = 7.286$ ;  $p = 0.001$ ) and types of last resuscitation training ( $F = 7.088$ ;  $p = 0.001$ ). However, there was no significant difference between the nurses' time of their last resuscitation training ( $F = 1.225$ ;  $p = 0.298$ ) and the nurses perceived self-efficacy in CPR.

**Conclusion:** In conclusion, nurses were deemed to possess a high sense of self-efficacy in CPR. This study concluded that nurses' age groups, years of working experience, unit of working, real experiences in resuscitation and the number of participations in resuscitation and types of last resuscitation training are factors contributing towards self-efficacy in CPR performances. However, the time of last resuscitation training reported no significant difference towards nurses' perceived self-efficacy in CPR. Therefore, repetitive CPR and ACLS certification training are pivotal in order to strengthen nurse's self-

efficacy in resuscitation and team collaboration through training in this private hospital.

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*Key words:* Nurses, perception, self-efficacy, cardiopulmonary resuscitation

### Introduction

Nurses are obligated to respond competently in the event of cardiac arrest that affects thousands of individuals each year in both the before-hospital and in-hospital settings.<sup>1</sup> Effective and high-quality resuscitation performance is essential for nurses acting as the first responders in any cardiac emergencies. It requires a set of coordinated actions represented by the links in the Chain of Survival, and includes immediate recognition and activation, early cardiopulmonary resuscitation (CPR), rapid defibrillation, effective advanced life support and integrated post-cardiac arrest care.<sup>2</sup> When nurses are not delivering an optimum quality resuscitation, this may eventually result in an extended time to intervention and poor prognosis in the patients' chance of survival.<sup>3</sup> A study showed that resuscitation of the cardiac arrest victim is a highly complex task requiring coordination between various levels and disciplines of care providers.<sup>1</sup> Based on the complexity of this task, it should not be surprising that nurses are hesitant to intervene due to a low perception in self-efficacy to manage cardiac arrest patients. Therefore, solutions to improve care provided during resuscitation attempts must be multifaceted and targeted to the diverse number of care providers in achieving survival benefit.

Nurses play a pivotal role in performing multi-faceted tasks throughout the resuscitation process between recognition and post-cardiac arrest care. The common problems encountered during resuscitation are delay in initiating cardiopulmonary resuscitation (CPR), performing ineffective CPR, and uncertainty in the activation of the code blue procedure in a hospital.<sup>4,5</sup>

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The under-preparedness of nurses responding to a resuscitation event may result in an extended time to intervention, and consequently a decrease in chance of survival among patients. Nurses prompting interventions with effective and efficient self-efficacy during resuscitation would enable sustaining the patient's survival to the next phase of patient care. Self-efficacy in resuscitation is defined as a judgment of perceived capability to organize and execute the process of care during resuscitation.<sup>6</sup> According to Pike & O'Donnell,<sup>7</sup> nurses may not be ready for the resuscitation procedures due to lack of resuscitation training, thus attention should be paid to the early recognition and management in order to provide competent resuscitation care. Therefore effective resuscitation training is needed to ensure a high-quality resuscitation performance.

Previous studies have identified that nurses' socio-demographic data such as age, unit of working, and working experience can influence their self-efficacy in performing CPR.<sup>8,9</sup> In addition, time of the last resuscitation training was found to be crucial for a nurse's self-efficacy in performing CPR. Resuscitation self-efficacy is described as a nurse's perceptions or beliefs about their capabilities to organize and execute competent resuscitation care.<sup>10</sup> Perceived self-efficacy in resuscitation is therefore of great importance because it affects the quality of CPR performed on a patient. Previous studies indicated that nurses who had a high level of self-efficacy demonstrate effective chest compression skills.<sup>8</sup> Delaying even a few minutes in cardiopulmonary resuscitation (CPR) will significantly affect patient outcomes.<sup>8,11</sup>

In the U.S., a total of 24% of the survival-to-discharge rate for patients who experienced in-hospital cardiac arrest was reported.<sup>12</sup> In fact, studies revealed that the survival rate statistics vary among countries; for example, Korea (19%), Australia (18%) and UK (10%).<sup>13</sup> Some nurses have been found to have limited confidence and are fearful to initiate CPR on patients.<sup>4</sup> To date, limited studies have been conducted on nurses' perception of self-efficacy in cardiopulmonary resuscitation in

Malaysia. In a recent hospital audit, researchers were informed that nurses were not confident in the activation of code blue, and demonstrated inadequate quality of CPR. Self-efficacy is needed to achieve successful clinical performance and competency among nurses.<sup>7</sup> Therefore, understanding the perceived self-efficacy in resuscitation among nurses should not be neglected. The purpose of this study was first, to determine the level of perceived self-efficacy in CPR, and second, to identify the association between socio-demographic data and the level of perceived self-efficacy in CPR among nurses at a private hospital in Selangor.

## Materials and Methods

### Design

A descriptive cross-sectional design study was conducted from April to June 2017 at a private hospital in Selangor. This hospital is a multi-disciplinary hospital with 108 beds, and employs approximately 130 registered nurses. A convenience sampling of 120 respondents was recruited; 112 respondents (93.3%) had successfully completed the questionnaire.

### Data collection and instruments

The research instrument consists of the socio-demographic data (age, years of working experience, unit of working and information on resuscitation training experiences, time since last resuscitation training, and real resuscitation experience) of the respondents. A 19-item self-rate on Resuscitation Self-Efficacy Scale (RSES)<sup>8</sup> with four component structures termed: recognition (4-item); responding and rescuing (9-item); recording (3-item); and reporting and debriefing (3-item) was adapted and modified with permission. A 5-point Likert scale ranging from 1= least confident, 2 = less confident, 3 = neutral, 4=confident, and 5=very confident was used. A total perceived self-efficacy score of more than 63 is considered good, score between 32-62 rate is fair, and less than 31 is poor. A higher total score indicates a stronger participant's belief in

resuscitation self-efficacy. The questionnaire was piloted and a Cronbach Alpha of 0.70 was obtained. Thus, the items were considered to have a relatively high internal consistency and reliability.

### **Ethical approval**

The research was approved by the Joint Committee of Research and Ethics of the International Medical University (IMU) (BN 1/2017: PR-11). The Director of Nursing of the private hospital in Selangor had granted her permission to conduct the study. The privacy and confidentiality of each respondent was maintained, and the respondents were given the right to withdraw from participating in the study.<sup>14</sup>

### **Data analysis techniques**

Data were analyzed using Statistical Package for Social Science (SPSS) version 22 and included descriptive statistics for demographic characteristics, independent t-test and analysis of variance (ANOVA) to analyze the associations between age, years of working experience, unit of working and information on resuscitation training experiences, time since last resuscitation training, and real resuscitation experience with the level of self-efficacy in cardiopulmonary resuscitation of the nurses.

### **Results**

A demographic profile of the respondents is presented in Table 1. The majority of the respondents, 72 (64.3%) were aged 21-30 years. Most of the respondents 57 (51%) had one to five years of working experiences period. A total of 54 respondents (48.2%) reported working in multi-disciplinary wards whilst 58 respondents (51.8%) were in the specialized units of this private hospital. Table 1 also showed the respondents' resuscitation training experiences and real resuscitation experiences. The majority of the respondents (58) (51.8%) had Basic Life Support (BLS) training, 33 (29.5%) respondents had in-house code blue training, 11 respondents (9.8%) had Advanced Cardiac Life Support (ACLS) while 10

other respondents (8.9%) had attended the Neonatal Resuscitation Program (NRP). With regards to the time of last resuscitation training course attended by respondents, the number of respondent with first six months was 85 (75.9%), for one year ago there were 20 respondents (17.9%) and for more than one year, there were 7 (6.3%) respondents. Majority of the respondents (101) (91.15%) reported that they had real experiences in resuscitation while 10 respondents (8.9%) did not have real experiences in resuscitation at the workplace. The number of participations in real resuscitation over a year indicated that for more than eleven scenarios, there were 21 respondents (18.8%) compared with 91 respondents (81.9%) for less than ten times.

**Table 1:** *The socio-demographic data and resuscitation training experiences and real resuscitation experiences of all respondents (n=112)*

| Characteristics                                | Variables                   | Respondents (n) (%) |
|--|-----------------------------|---------------------|
| Age  | 21 – 30 years               | 72 (64.3)           |
|  | 31 – 45 years               | 40 (35.7)           |
| Working experience                             | 1 – 5 years                 | 57 (51)             |
|  | 6 –10 years                 | 46 (41)             |
|  | ≥ 11 years                  | 9 (8)               |
| Unit of working                                | Multidiscipline wards       | 54 (48.2)           |
|  | Specialized units           | 58 (51.8)           |
| Types of last resuscitation training           | BLS                         | 58 (51.8)           |
|  | ACLS                        | 11 (9.8)            |
|  | NRP                         | 10 (8.9)            |
|  | In-house code blue training | 33 (29.5)           |
| Time of last resuscitation training            | 6 months ago                | 85 (75.9)           |
|  | 1 year ago                  | 20 (17.9)           |
|  | More than 1 year            | 7 (6.3)             |
| Real experiences in resuscitation              | Yes                         | 102 (91.1)          |
|  | No                          | 10 (8.9)            |
| Number of participations in real resuscitation | Less than 10 times          | 91 (81.2)           |
|  | More than 11times           | 21 (18.8)           |

Table 2 shows the total mean score (M) and standard deviation (SD) of Resuscitation Self-Efficacy Scale (RSES) towards perceived self-efficacy with responding and rescuing as the highest score (M=37.17; SD  $\pm$  5.67) followed by recognition attribute (M=17.96; SD  $\pm$  2.22); recording attribute (M=12.01; SD  $\pm$  2.42); and reporting and debriefing as the lowest score (M=10.54; SD  $\pm$  2.61). The respondents' total mean score of perceived self-efficacy score in resuscitation was (M=77.68; SD  $\pm$  11.77).

**Table 2:** Respondents' perception of self-efficacy in cardiopulmonary resuscitation (n=112)

| Variables                | Mean $\pm$ (SD)                     |
|--------------------------|-------------------------------------|
| Recognition              | 17.96 $\pm$ 2.22                    |
| Responding and rescuing  | 37.17 $\pm$ 5.67                    |
| Recording                | 12.01 $\pm$ 2.42                    |
| Reporting and debriefing | 10.54 $\pm$ 2.61                    |
| <b>Total score</b>       | <b>77.68 <math>\pm</math> 11.77</b> |

Table 3 shows the association between respondents' age groups, unit of working, prior experiences in resuscitation and number of participation in real resuscitation with the level of nurses' self-efficacy in cardiopulmonary resuscitation. The respondents' age group of more than

31 years old indicated a significantly higher mean score (M=81.35; SD  $\pm$  9.99) than those less than 30 years old (M=75.64; SD  $\pm$  12.24). Respondents working in the specialized units reported a higher self-efficacy score (M = 80.55; SD  $\pm$  10.91) than those who worked in the multidisciplinary wards (M = 71.37; SD  $\pm$  11.24). Respondents who had real experiences in resuscitation had a higher self-efficacy score (M = 78.54; SD  $\pm$  11.76) than those who had no experience in resuscitation (M = 68.90; SD  $\pm$  7.81). The findings indicated clearly a remarkable difference in self-efficacy score between respondents who had less than 10 times participation in resuscitation and those who had dealt with more. Respondents who had encountered more than eleven times of participation in cardiopulmonary resuscitations over a year reported a higher self-efficacy score (M = 90.76; SD  $\pm$  6.96) than those who had dealt with less than ten times (M= 74.66; SD  $\pm$  10.53). There were significant differences between respondents' age groups with the level of nurses' self-efficacy in cardiopulmonary resuscitation (t = -2.520; p = 0.013); unit of working (t = -4.086; p = 0.001); real experiences in resuscitation (t = 2.532; p = 0.013); and number of participations in real resuscitation (t = -6.668; p = 0.001).

**Table 3:** Respondents' total mean score (M) and standard deviation (SD) of perceived self- efficacy in cardiopulmonary resuscitation with socio-demographic data (n=112).

| Variables  | Perceived self- efficacy                        |  |        |          |
|--|---|--|--------|----------|
|  | Mean $\pm$ SD                                   | t                                      | p      |          |
| Age  | Less than 30 years old<br>More than 31years old | 75.64 $\pm$ 12.24<br>81.35 $\pm$ 9.99  | -2.520 | 0.013*   |
| Unit of working                                      | Multidisciplinary wards<br>Specialized units    | 71.37 $\pm$ 11.24<br>80.55 $\pm$ 10.91 | -4.086 | <0.001** |
| Real experiences<br>in resuscitation                 | Yes<br>No                                       | 78.54 $\pm$ 11.76<br>68.90 $\pm$ 7.81  | 2.532  | 0.013*   |
| Number of<br>participations in real<br>resuscitation | Less than 10 times<br>More than 11times         | 74.66 $\pm$ 10.53<br>90.76 $\pm$ 6.96  | -6.668 | <0.001   |

\*Statistically significant p <0.05, \*\* p <0.000

Table 4 shows the respondents' association between years of working experience, the types and time of last resuscitation training with the level of nurses' self-efficacy in cardiopulmonary resuscitation. The respondents who had six to ten years of working experience scored the highest self-efficacy score ( $M = 82.04$ ;  $SD \pm 10.04$ ) and the lowest score was seen in those with less than five years of working experience ( $M = 73.75$ ;  $SD \pm 12.37$ ). The highest self-efficacy score respondents were deemed to be those who had attended ACLS ( $M = 90.55$ ;  $SD \pm 6.22$ ), followed by those who had attended in-house code blue training ( $M = 79.39$ ;  $SD \pm 11.52$ ), BLS ( $M = 75.05$ ;  $SD \pm 11.78$ ), and the lowest score was for NRP ( $M = 73.10$ ;  $SD \pm 5.82$ ). Respondents who attended resuscitation training 6 months ago scored the highest total mean self-efficacy score ( $M = 78.62$ ;  $SD \pm 12.58$ ), compared to those who had the last resuscitation training 1 year ago ( $M = 75.25$ ,  $SD \pm 7.55$ ) and more than 1 year ago ( $M = 73.14$ ,  $SD \pm 10.43$ ). There were significant differences between respondents' working experience ( $F=7.286$ ;  $p = 0.001$ ); and types of last resuscitation training ( $F=7.088$ ;  $p=0.001$ ). However, self-efficacy and time of

last resuscitation training produced a non-statistically significant relationship ( $F = 1.225$ ;  $p = 0.298$ ).

## Discussion

The greater the nurses' resuscitation self-efficacy in responding to emergency situation, the greater would be the expectation for consistently strong determinants and predictors of the level of accomplishment towards successful patient survival.<sup>4</sup> The findings of this study indicated that the nurses working in the private hospital have a relatively high sense of self-efficacy in CPR resuscitation. Congruently, Mäkinen et al. (2016; 2014)<sup>4,5</sup> stated that in Greece and Sweden, nurses' self-efficacy is associated with satisfactory performance of CPR skills, even though an effective resuscitation requires a combination of competencies in knowledge, technical and non-technical skills. However, several studies reported that there were gaps between recommendations from recommended guidelines and reality in CPR training, and the gap between training frequency and real resuscitation experience.<sup>15,16</sup>

**Table 4:** Respondents' total mean score (M) and standard deviation (SD) of nurses' perceived self- efficacy in cardiopulmonary resuscitation with socio-demographic data. (n=112)

| Characteristics                      | Variables                   | Perceived self-efficacy Mean $\pm$ (SD) | F     | p      |
|--------------------------------------|-----------------------------|---|-------|--------|
| Years of working experience          | 1 – 5 years                 | 73.75 $\pm$ 12.37                       | 7.286 | 0.001* |
|                                      | 6 – 10 years                | 82.04 $\pm$ 10.04                       |       |        |
|                                      | >11 years                   | 80.22 $\pm$ 5.48                        |       |        |
| Types of last resuscitation training | BLS                         | 75.05 $\pm$ 11.78                       | 7.088 | 0.001* |
|                                      | ACLS                        | 90.55 $\pm$ 6.22                        |       |        |
|                                      | NRP                         | 73.10 $\pm$ 5.82                        |       |        |
|                                      | In house blue code training | 79.39 $\pm$ 11.52                       |       |        |
| Time of last resuscitation training  | 6 months                    | 78.62 $\pm$ 12.58                       | 1.225 | 0.298  |
|                                      | 1 year ago                  | 75.25 $\pm$ 7.55                        |       |        |
|                                      | More than 1 year            | 73.14 $\pm$ 10.43                       |       |        |

\*Statistically significant  $p < 0.05$ , \*\*  $p < 0.001$

This study demonstrated that the age and the years of working experience have a significant association with self-efficacy in CPR of nurses. A similar study reported that seniority in terms of age and longer working experiences among nurses resulted in greater self-confidence and ability to manage family-witnessed resuscitation.<sup>17</sup> Work experience may increase nurses' self-efficacy as they become more comfortable in performing such clinical tasks.<sup>18</sup> This can also explain a higher level of self-confidence shown in nurses who have had a longer working experience in managing resuscitation. Other factors may be related to experiential learning and opportunities to perform resuscitation skill that will further strengthen the self-efficacy competencies over time among them. In contrast, a study by Twibell, et al. reported that there was no significant difference between working experience and perceived self-confidence in nurses when managing family-witnessed resuscitation.<sup>17</sup>

The present study indicates that ACLS certified nurses were most confident in their resuscitation skills than other respondents. Gary et al. reported similar findings in that nurses perceived a greater self-efficacy and competency in performing resuscitation skills following completion of the ACLS course.<sup>19</sup> It is pivotal to reinforce ACLS-certification training for nurses to be equipped in managing complex and critically or life-threateningly ill patients in a hospital. Hence, self-efficacy in CPR would enhance how nurses think, feel, motivate and act on the chain of survival in BLS resuscitation protocol.

The perceived self-efficacy in cardiopulmonary resuscitation (CPR) has indicated that nurses who work in specialized units are more confident in resuscitation than those work in non-specialized units. A similar study by Passali et al. stated that nurses who work in emergency departments, intensive care units or anesthesiology departments are competent and confident in resuscitation skills and in the cardiac arrest team in a hospital.<sup>2</sup> A study by Porter et al. (2013) reported that nurses' exposure to a high-acuity clinical environment and complex equipment would enhance their confidence level, and eliminate negative emotions

such as nervousness, fear and worry.<sup>20</sup> This may explain a high confidence level of self-efficacy in cardiopulmonary resuscitation (CPR) among nurses who worked in specialized units as reflected in this private hospital in Kuala Lumpur.

Self-efficacy in CPR has a tendency to decline with a longer time period between resuscitation training sessions. Hopstock reported that hospital personnel had moderate self-confidence in CPR skills which decreased over time when the last training lapsed for more than 2 years.<sup>16</sup> Similar to another finding by Partiprajak and Thongpo<sup>21</sup>, the respondents in this study, scored the highest self-efficacy in CPR for a reported lapse time of last resuscitation training within six months. Conversely, Montgomery et al. found that nurses who have monthly CPR practice demonstrated a higher confidence level in CPR than those who did not have frequent CPR practice.<sup>22</sup> The reasons why nurses hesitate to initiate CPR may be due to anxiety and lack of confidence despite having undergone CPR training within the past 6 months.<sup>5</sup> Consequently, the reinforcement of CPR training would strengthen a nurse's skills and confidence level to perform CPR. A nurse's perception of good efficacy in CPR was noted among the respondents in this study. The role and responsibility of members in a resuscitation team include promoting inter-professional teamwork and resuscitation experience. Anxiety would affect the nurses' self-efficacy and functioning in resuscitation procedures. Having proper training and support would allay fear of causing harm to a patient and enhance the competency in performing the CPR among nurses.

In addition, nurses who had real experiences in resuscitation possessed a higher self-efficacy score than those who had no experience in resuscitation<sup>23</sup>. In this study, self-efficacy was significantly associated with the number of participations in real resuscitation. Nevertheless, the experience of managing cardiac arrest in real life may increase the confidence of performance, but this may not affirm the competence of those nurses nor assume them as high-performers in a clinical setting.<sup>24</sup>

This study has revealed that the more often nurses had to perform CPR, the better self-efficacy and more confident those nurses will be with CPR. However, only twenty-one respondents had participated in more than 11 real resuscitations over a year. This could be due to the fact that the private hospital chosen as a study site in this survey is a small community hospital, and does not admit critically ill patients with complex conditions. The rarity of patients with cardiac arrest and occasional occurrences of cardiac arrests in their work setting would also explain why the majority of nurses have few exposures to actual resuscitation.

### Conclusion

In conclusion, nurses were deemed to possess a high sense of self-efficacy in CPR. Factors related to the nurses' age groups, years of working experience, unit of working, real experiences in resuscitation, the number of participations in resuscitation and types of last resuscitation training contributed significantly towards a high score in the nurses' perceived self-efficacy in CPR. The time of last resuscitation training indicated no significant association between the perceived levels of nurses' self-efficacy in cardiopulmonary resuscitation. Therefore, repetitive CPR and ACLS certification training are pivotal in order to enhance the nurse's self-efficacy in resuscitation and team collaboration through training in this private hospital.

In addition, further studies are recommended to find out what other variables may lead to an increase or decrease in self-efficacy to perform CPR. A quasi-experimental study needs to be conducted to ascertain the outcomes of the CPR and ACLS certification training and inter-professional teamwork in a hospital.

A limitation of this study is the small sample size as well as the fact that the study was conducted in a small private hospital from one geographical location. Thus this limits the generalizability of the study findings among the practicing nurses in Malaysia.

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