Assessment of pharmacist competency during cardiopulmonary arrest code participation in a community hospital

Lissette Bauza  
*South Miami Hospital, LissetteBa@baptisthealth.net*

Yarelys Garcia  
*South Miami Hospital, YarelysGa@baptisthealth.net*

Ada Jalice  
*Homestead Hospital, adaj@baptisthealth.net*

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BACKGROUND

- Pharmacist participation during adult advanced cardiovascular life support (ACLS) results in decreased hospital mortality, and reduces adverse events. The inclusion of pharmacists in cardiopulmonary resuscitation (CPR) teams, also known as code blue teams, may lead to increased compliance with ACLS guidelines.1,2
- A survey found that 89% of participating pharmacists felt that ACLS training would better prepare them for code blue team participation and 53% of pharmacists strongly agreed that they should have ACLS certification before participating in a code blue team.3
- At our institution, pharmacists play an important role as code blue team members. We offer in-house response training and provide the opportunity to acquire ACLS certification. This study was conducted in order to assess our pharmacists’ knowledge and comfort level with code blue response and to examine if establishing an annual competency program would be a beneficial process to bridge knowledge gaps and boost code blue participation comfort levels.

OBJECTIVES

- Identify gaps in knowledge about medication indications, doses, where to find medications in crash carts, and medication preparation.
- Assess pharmacists’ comfort level about cardiopulmonary arrest code participation.
- Evaluate the effectiveness of administering a competency program in order to bridge knowledge gaps and boost code participation comfort levels.

METHODS

- This pilot study was approved by the Baptist Health South Florida Institutional Review Board.
- The study consisted of two components:
  1. Pre-training competency assessment and survey plus an educational training session
  2. Post-training competency assessment and survey
- All South Miami Hospital (SMH) pharmacists who volunteered to participate were included in the study. Authors directly involved in the study were excluded.

RESULTS

<table>
<thead>
<tr>
<th>Competency Assessment</th>
<th>Number Correct</th>
<th>Pre-training N=14</th>
<th>Post-training N=13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Which medication is usually administered first during a code blue cardiopulmonary arrest situation?</td>
<td>13</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>2. Epinephrine should be administered every ________ minutes?</td>
<td>12</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>3. Which antiarrhythmic medication should be administered first in case of supraventricular Tachycardia or Ventricular Fibrillation that is unresponsive to shock delivery, CPR, and vasopressors?</td>
<td>13</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>4. What is the recommended second dose of Adenosine during a pulseless Ventricular Tachycardia or Ventricular Fibrillation event that is unresponsive to shock delivery, CPR, and vasopressors?</td>
<td>11</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>5. The only two shockable rhythms are:</td>
<td>11</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>6. What is the recommended dose of IV push Epinephrine?</td>
<td>12</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>7. In the case of supraventricular tachycardia with a pulse, what is the maximum total dose of Atropine IV that can be given?</td>
<td>9</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>8. Amiodarone 150 mg/3 mL (50 mg/mL) Vials can be found in the tray of the crash cart.</td>
<td>11</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>9. Epinephrine 1 mg/10 mL (0.1 mg/mL) SYRINGES can be found in the tray of the crash cart.</td>
<td>11</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>10. A. Norepinephrine 4 mg/4 mL (1 mg/mL) Vials can be found in the tray of the crash cart.</td>
<td>11</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11. Sodium Bicarbonate can be found in the tray of the crash cart.</td>
<td>11</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>12. To give an Epinephrine drip with a concentration of 4 mg/250 mL, draw out ____ mL from the Epinephrine 30 mg/30mL (1 mg/mL) Multi-dose vial and inject into a 250 mL ______ bag.</td>
<td>14</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>13. To give a standard Norepinephrine drip with a concentration of 1 mg/250 mL, draw out ____ mL from the Norepinephrine 4 mg/4 mL (1 mg/mL) Vials and inject into a 250 mL ______ bag.</td>
<td>14</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>14. In a standard Norepinephrine drip with a concentration of 1 mg/250 mL, total of ____ mL vials will be used.</td>
<td>14</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>15. To give a standard Norepinephrine drip with a concentration of 1 mg/250 mL, you will need a ____ syringe.</td>
<td>14</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>16. The standard concentration for a dopamine drip is ____ mg/mL Vials and inject into a 250 mL ______ bag.</td>
<td>13</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Group Average</td>
<td>11.9</td>
<td>12.15</td>
<td></td>
</tr>
<tr>
<td>Total Correct</td>
<td>230</td>
<td>243</td>
<td></td>
</tr>
</tbody>
</table>

Comfort Survey Questions

1. Overall, I feel comfortable responding to adult code blue alerts.
2. I have good understanding of which medications should be used under specific scenarios.
3. I feel comfortable providing dose recommendations during a code blue situation.
4. I feel comfortable locating medications in the crash cart.
5. I feel comfortable drawing up medications and preparing IV admixtures during code situations.

DISCUSSION

- Forty four percent (44 %) of pharmacists that participated had 0 -< 1 year of experience with code blue response, 28 % of pharmacists had 1-3 years of experience, 13% had 4-6 years of experience, and 15% had more than 6 years of experience.
- Knowledge gaps found dealt mainly with some of the ACLS recommendations and with the location of medications within the crash carts. After the educational training session, there was an overall five (5) point increase in the total number of correctly answered questions for the competency assessment.
- There was a four (4) and seven (7) point increase in the total number of correctly answered questions that pertained to ACLS recommendations and the location of medications within the crash cart, respectively.
- Prior to the training 43 % of pharmacists felt that they had good understanding of the indications for certain medications, 57 % expressed that they felt comfortable locating medications in the crash cart, and 50 % expressed feeling comfortable responding to code blue alerts. Post-training, those results improved to 100 %, 100 %, and 82 %, respectively.
- Results indicate an improvement in the knowledge base of several aspects of the competency assessment and an increase in the comfort level of the participants with regards to all of the survey questions.
- Limitations include small sample size; due to the voluntary nature of the study only half of our pharmacists participated.
- Not all participants had the opportunity to contribute to the post-training session and not all of the pre-training survey responders filled out a post-training survey.
- This study may be enhanced by providing an interactive opportunity to open up a crash cart and practice drawing up medications.

CONCLUSIONS

- Although SMH pharmacists are provided the opportunity to obtain ACLS certification, it may be beneficial to provide a pharmacist-specific training that pertains to the code blue response process within our institution.
- The reported data suggest that providing a code blue competency followed by an educational training session as a yearly refresher may be a beneficial process in bridging potential knowledge gaps.

REFERENCES


DISCLOSURES

- Authors of this presentation have the following concerning possible financial or personal relationships with commercial entities that may have direct or indirect interest in the subject matter of this presentation:
  - Lissette Bauza: Nothing to disclose
  - Yarelys Garcia: Nothing to disclose
  - Ada S. Jalice: Nothing to disclose