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Lissette Bauza
South Miami Hospital, LissetteBa@baptisthealth.net

Yarelys Garcia
South Miami Hospital, YarelysGa@baptisthealth.net

Ada Jalice
Homestead Hopsital, adaj@baptisthealth.net

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

Lissette Bauza Pharm.D., Yarelys Garcia BSN, Pharm.D., Ada S. Jalice BSHS, Pharm.D., BCPS

South Miami Hospital — BAPTIST HEALTH SOUTH FLORIDA

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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 agree 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.

- Email sent via general distribution group inviting all SMH pharmacists to be a part of the research study (including the purpose of the study, dates, times, location of the training, and a copy of the informed consent sheet)

Educational Training Session Day:

- Participants were informed on the voluntary nature of the study
- Randomized packets (informed consent sheet, index card containing a three digit code number, and pre-training assessment and survey) were distributed

- 15-20 minutes were allowed to complete the pre-training assessments and surveys
- Participants were instructed to write down the three digit code number on their assessment and survey upon completion
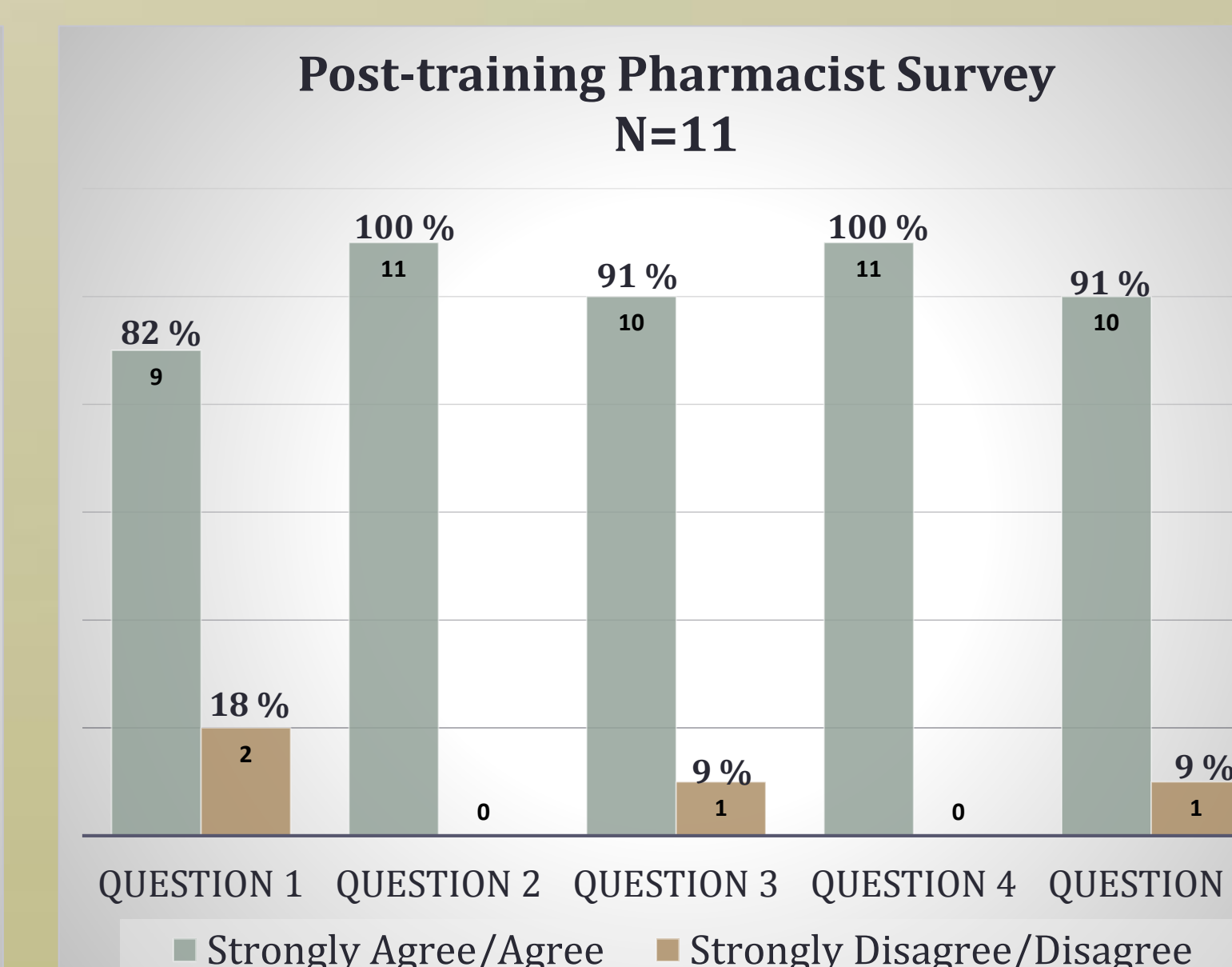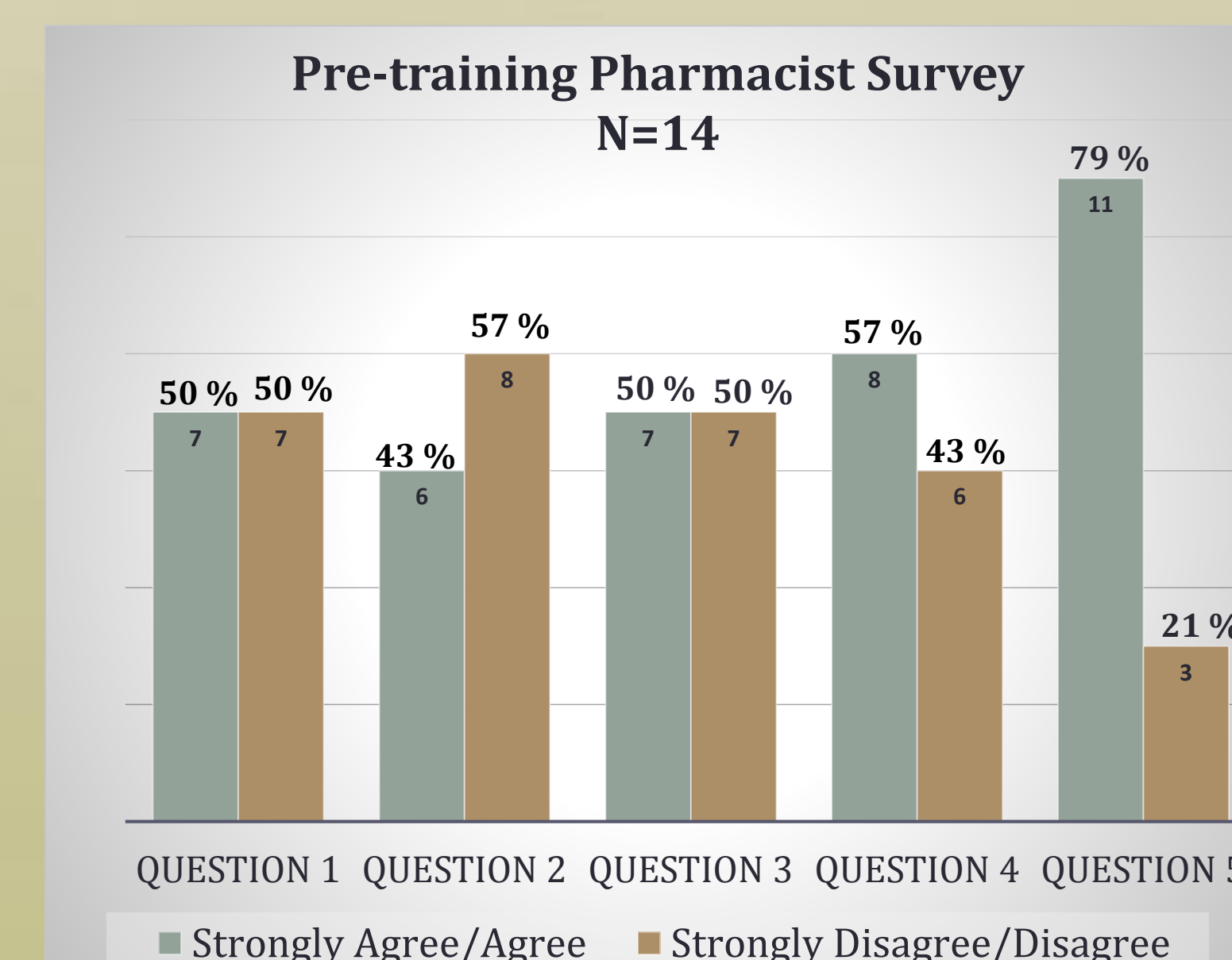- Participants sat in for the educational training session

One Week

- Participants were asked to complete a post-training assessment and survey
- Reminder given to write three digit code number on the assessment and survey

- Using the specified codes, pre-and post-assessment and surveys were matched for analysis. Competency data was reported as group averages; survey data was reported as totals and percentages

RESULTS

Competency Assessment

Questions	Number Correct Pre-training N=14	Number Correct Post-training N=13
1. Which medication is usually administered first during a code blue cardiopulmonary arrest situation?	13	13
2. Epinephrine should be administered every _____ minutes?	12	12
3. Which antiarrhythmic medication should be considered as first-line during a pulseless Ventricular Tachycardia or Ventricular Fibrillation event that is unresponsive to shock delivery, CPR, and vasopressors?	13	11
4. What is the recommended second dose of Amiodarone during a pulseless Ventricular Tachycardia or Ventricular Fibrillation event?	11	12
5. The only two shockable rhythms are:	11	10
6. What is the recommended dose of IV push Epinephrine?	12	13
7. In the case of supraventricular tachycardia with a pulse and wide QRS the recommended Adenosine dose should be _____ mg IV push followed by a _____ mL NS flush.	11	13
8. The only recommended medication for use in the setting of PEA or asystole is _____.	11	11
9. Which medication has been removed from the ACLS algorithm?	14	13
10. In the setting of bradycardia with a pulse, what is the maximum total dose of Atropine IV that can be given?	9	13
11. Epinephrine 1 mg/10 mL (0.1 mg/mL) Syringes can be found in the _____ tray of the crash cart.	11	13
12. Amiodarone 150 mg/3 mL (50 mg/mL) Vials can be found in the _____ tray of the crash cart.	9	13
13. Epinephrine 30 mg/30 mL (1 mg/mL) Multi-dose vial can be found in the _____ tray of the crash cart.	10	12
14. Norepinephrine 4 mg/4 mL (1 mg/mL) Vials can be found in the _____ tray of the crash cart.	11	10
15. Sodium Bicarbonate can be found in the _____ tray of the crash cart.	11	13
16. To mix an Epinephrine drip with a concentration of 4 mg/250 mL, draw out _____ from the Epinephrine 30 mg/30mL (1 mg/mL) Multi-dose vial and inject into a 250 mL _____ bag.	14	12
17. To mix a standard Norepinephrine drip with a concentration of 16 mg/250 mL, draw out _____ from the Norepinephrine 4 mg/4mL (1 mg/mL) Vials and inject into a 250 mL _____ bag.	14	12
18. To mix a standard Norepinephrine drip with a concentration of 16 mg/250 mL, a total of _____ vials will be used.	14	13
19. To mix a standard Norepinephrine drip with a concentration of 16 mg/250 mL, you will need a _____ syringe.	14	12
20. The standard concentration for a dopamine drip is _____ and can be found in the _____ drawer of the crash cart.	13	12
Group Average	**11.9**	**12.15**
Total Correct	**238**	**243**

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

Pre-training Pharmacist Survey N=14

	QUESTION 1	QUESTION 2	QUESTION 3	QUESTION 4	QUESTION 5
Strongly Agree/Agree	50% (7)	57% (8)	50% (7)	57% (8)	79% (11)
Strongly Disagree/Disagree	50% (7)	43% (6)	50% (7)	43% (6)	21% (3)

Post-training Pharmacist Survey N=11

	QUESTION 1	QUESTION 2	QUESTION 3	QUESTION 4	QUESTION 5
Strongly Agree/Agree	82% (9)	100% (11)	91% (10)	100% (11)	91% (10)
Strongly Disagree/Disagree	18% (2)	0	9% (1)	0	9% (1)

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 while the other 28 % had 4 years or more 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 in 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.

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DISCLOSURES

- Authors of this presentation have the following concerning possible financial or personal relationships with commercials 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