

## Purpose

Transcatheter aortic valve replacement (TAVR) is being increasingly performed to treat aortic stenosis not only for high-risk patients but also electively for younger, lower risk patients. Early detection of TAVR complications in catheterization labs and perianesthesia care units is crucial to patient survival. Preparation for these rare occurrences is imperative to the care of the anesthetized patient and nurses must be aware of the processes for early intervention. Structural Heart (SH) programs that lack a protocolized treatment plan have identified a high incidence for: misdiagnosis, lack of defined team roles, ineffective communication and delay in treatment.

A gap analysis demonstrated a need for didactic SH nursing education. A multimodal approach was applied in developing a staff education program to increase knowledge and optimized critical thinking skills in a safe environment.

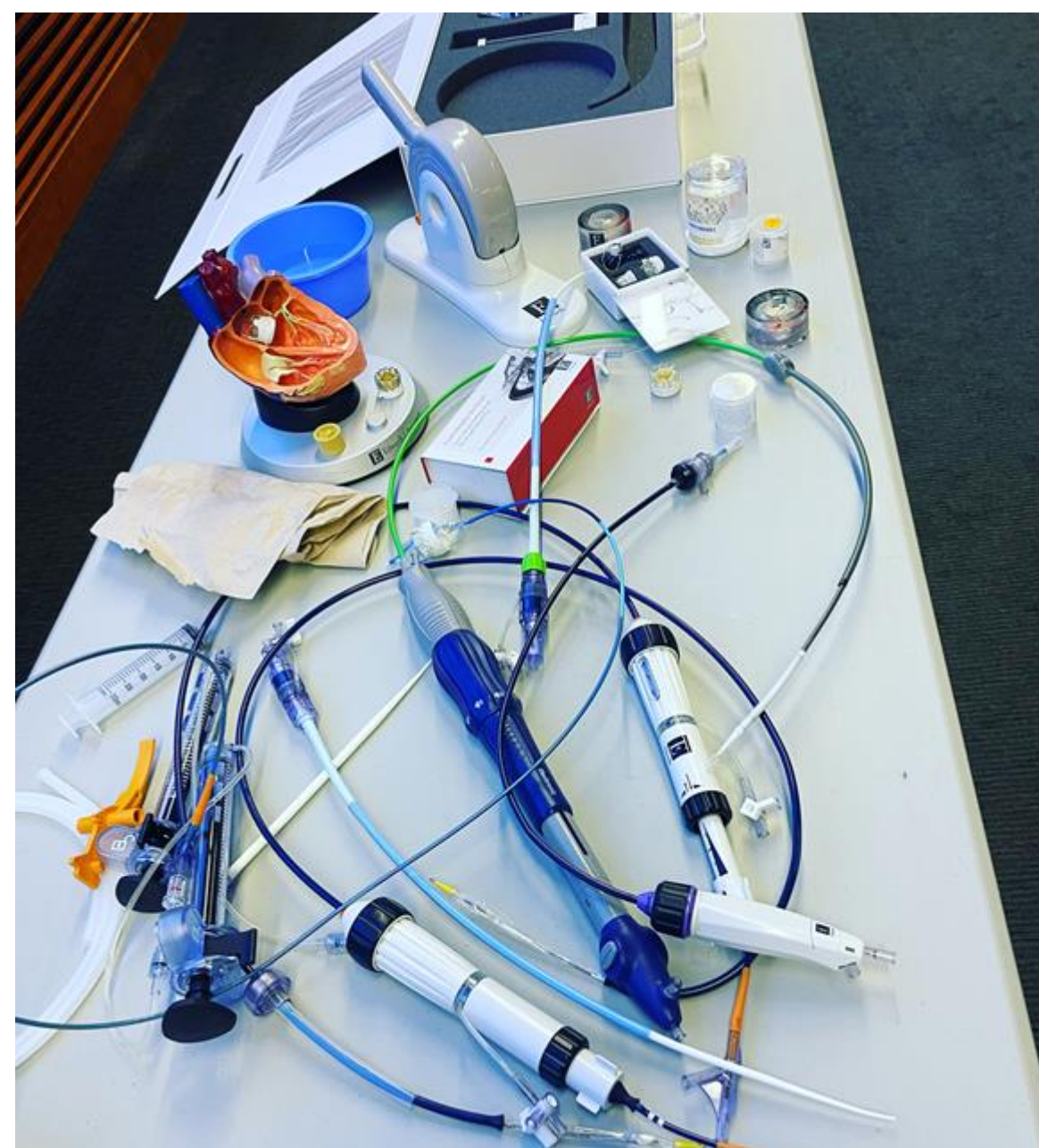


Figure a. Kinesthetic Learning Activity

## Methods

- **Setting-** Yale New Haven Hospital Heart and Vascular Center Cardiac Catheterization Lab (CCL) and Post-Anesthesia Care Unit (PACU).
- **Participants-** Nursing and technologist staff.
- **Intervention-** Education series consisting of content expert lecture, case study, simulation, virtual escape room, hands-on learning with equipment vendors.

**Implementation:** This evidence-based multidisciplinary project aimed to improve recognition and intervention of TAVR complication protocols. Utilization of virtual escape rooms allows for subtle prompts in critical reasoning for the learner to protocolize the treatment plan for TAVR decompensation. Identifying clear roles and responsibilities in a virtual space creates effective team building, clear communication and ultimately improves patient outcomes as identified by pre and post intervention survey.

## Project Description

### Pre-education:

- **Staff survey** - Revealed knowledge gaps regarding the identification, disease process and appropriate interventions for TAVR management.
- **Content expert lecture** –Structural heart provider offered educational lecture catered to various procedural phases of care. Highlighting key features of TAVR care pathways in different settings created a controlled global approach.
- **Case study** - Reinforcement of response process was executed with case study following the lecture content. Communication of team roles and responsibilities solidified the problem, approach and solution of TAVR complication management.

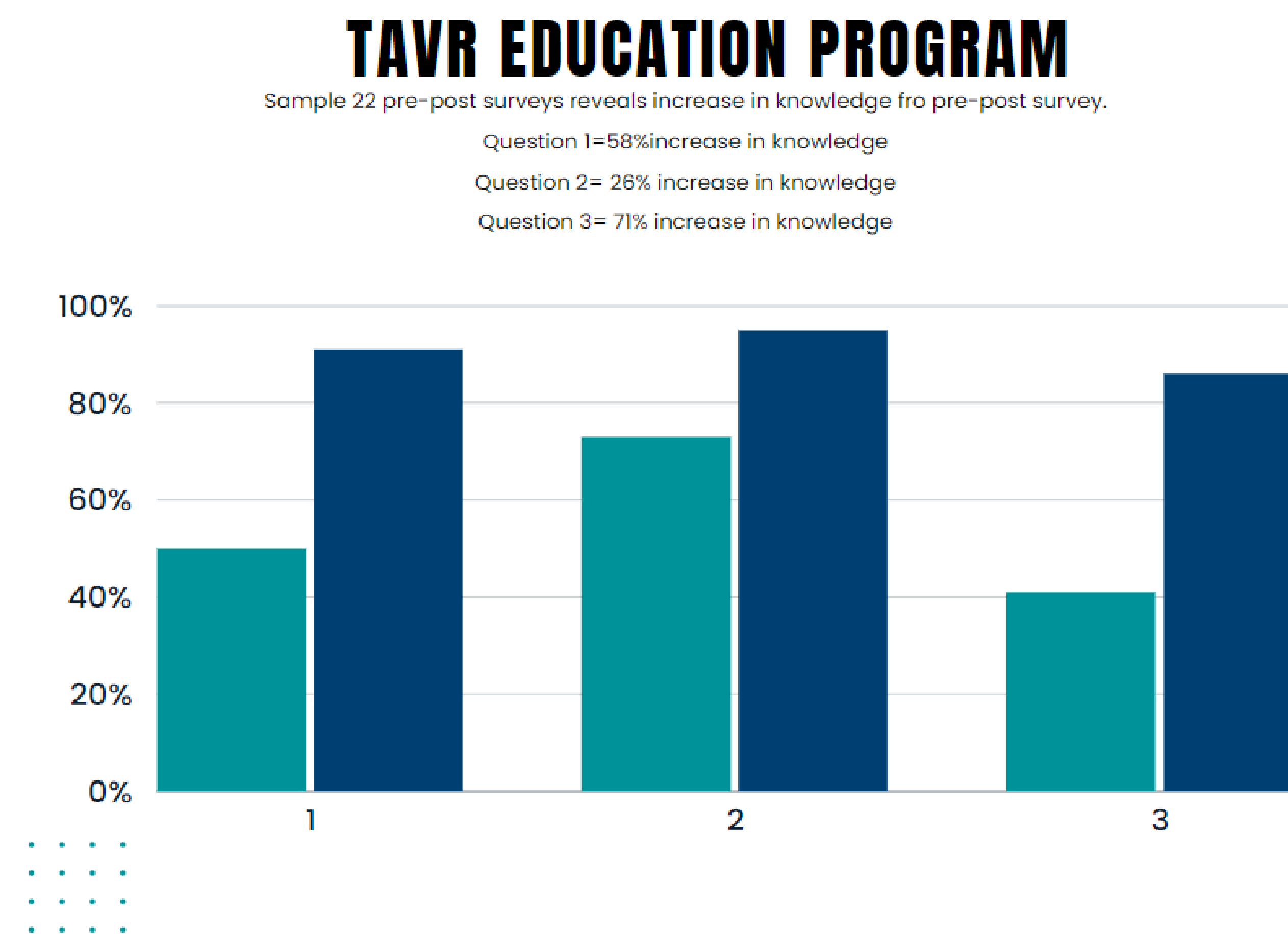
### Virtual escape room:

- With content base from lecture and case study, clinical staff participated in a virtual escape room. The escape room offered a series of subtle prompts which subconsciously created a nursing response process for TAVR decompensation. Professional development specialists optimized the TAVR response through confidence building with gamification tactics.

### Post-education:

- Survey revealed increase knowledge in the management of TAVR decompensation in procedural areas. Learners were able to quickly identify the treatment pathway for patients experiencing complications.

## Results



### Survey questions

- What is a normal aortic valve area (cm<sup>2</sup>)?
- What is the purpose of rapid ventricular pacing before valve deployment?
- What is the most common post-operative complication related to TAVR procedure?

- Staff completed pre and post surveys containing the same 3 questions, to evaluate the effectiveness of the educational program
- Professional Development Specialists interpreted the survey results post intervention and data revealed an increase in knowledge of participants post intervention.
- Staff reported a heightened level of awareness of common complications, leading to an increased confidence level in early detection and anticipation of interventions.

## The Virtual Classroom



Figure b. The procedural escape room



Figure c. The PACU recovery escape room

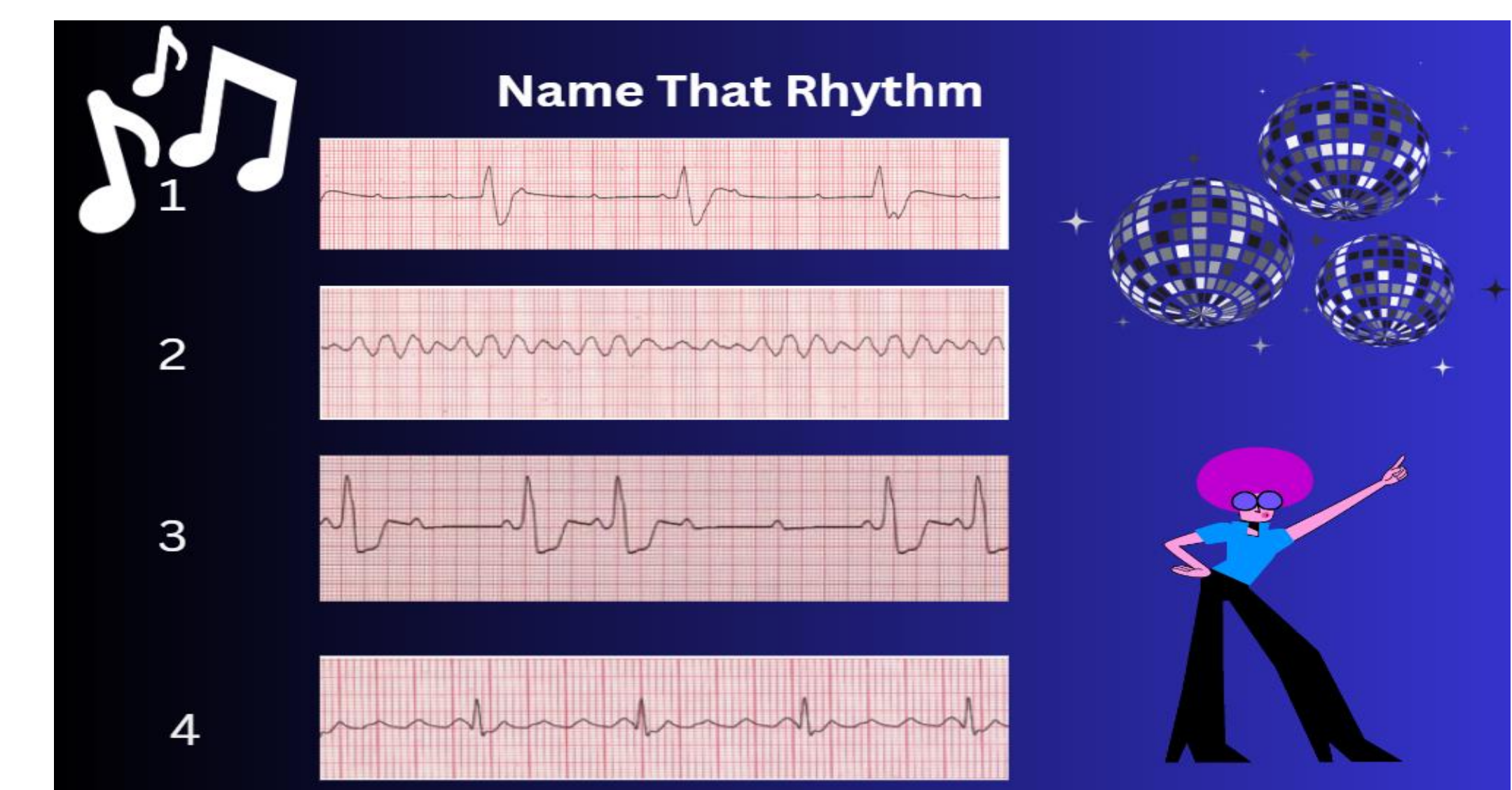


Figure d. Rhythm Interpretation Puzzle

## Discussion

Multi modal education, including both didactic and interactive content, increases confidence in the nursing process and provides participants an enhanced learning experience. Key learning components were reinforced in the virtual escape room after participants had received the didactic content and had the opportunity to participate in tactile learning with the demo equipment provided by the vendor representatives.

This approach resulted in increased knowledge and confidence for staff supporting patients undergoing the TAVR procedure, particularly in identifying and intervening during potentially dangerous complications.

**References Available Upon Request**