

Fun and Games in Reviewing Neonatal Emergency Care

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Abstract:

Objective: To develop a game-based review instrument for use by newborn caregivers in preparing for emergency situations.

Design: One hundred and one test questions covering pathophysiology, resuscitation, and medications were developed. The questions then underwent expert and peer review, psychometric testing for content validity and test-retest reliability, and a game trial.

Analysis: The needs of adult learners are different from those of other learners. The gaming format uses knowledge gained through experience and provides an avenue for validating knowledge and sharing experiences. This format has been found effective for review and reinforcement of facts. Twelve nurses participated in a trial game and completed a written evaluation using a Likert scale.

Conclusion: The Neonatal Emergency Trivia Game is an effective tool for reviewing material related to neonatal emergency care decisions. Additional testing with a larger group would strengthen validity and reliability data.

Article:

Emergency situations require rapid processing of information and action. The amount of time it takes a health care provider to assess an infant, develop an appropriate plan of action, and implement that plan may mean the difference between life and death for the infant. It is therefore imperative that every individual involved in the care of newborn infants have the knowledge, skills, and confidence to respond quickly and appropriately in emergency situations.

Approximately 3.5 million babies are born each year in the United States; only 6 percent require life-support measures in the delivery room or nursery. Therefore, keeping up to date is a challenge for the busy health care provider. Lectures can be boring; both novice and proficient staff members may begrudge setting aside scarce time to attend a continuing education offering. Planning educational programs that are interesting and challenging and that meet the needs of health care providers with varying experience levels is a difficult task for health care educators. This article reports the development of a Neonatal Emergency Trivia Game that can be used with various types of health care providers to review information on resuscitation of the newborn.

REVIEW OF LITERATURE

Although educators have used gaming for centuries as a method of teaching and learning, only in the past few years has it been used in nursing education. Games have been found to provide an important bridge between theory and practice.² According to Joos, gaming enhances motivation and increases interest in the subject because it places the participant in an active learning role that encourages critical thinking, problem solving, and decision making.³

In the past, inexperienced nurses have been expected to gain most of their knowledge and skills on the job.² However, an emergency situation is not the best time for teaching and learning. Gaming may be especially useful for teaching emergency care because the stress that surrounds an emergency situation can be mimicked by gaming and simulations without the negative consequences of wrong decisions.² The positive results of gaming are enhanced by a safe environment in which decisions can be made in an atmosphere that is nonthreatening and conducive to learning.³ Thus, the safe and nonhazardous environment found with gaming makes it an effective tool for reviewing emergency care procedures.⁴

The game format has been used to teach new nurse managers to make staffing decisions,² teach mandatory safety classes,⁵ review CPR for certification,⁶ orient nurses and unit clerks to hospital policy and procedures,^{7,8} teach epidemiology to nursing students,⁹ orient military personnel for disaster training,¹⁰ teach pediatric concepts to nursing students,¹¹ teach patients information about diabetes,¹² teach critical care nurses about renal concepts,¹³ and review safety procedures and isolation protocols.¹⁴ However, to date, the literature has not reported games as a tool used to teach health care professionals to provide emergency care to the newborn.

CONCEPTUAL FRAMEWORK

Adult Learning Theory

Gaming enhances learning by addressing the needs of the adult learner.⁴ To address these needs, educators need a good understanding of adult learning theory. Knowles and associates identified five basic assumptions of adult learning theory: (1) Through maturation, an individual's self-concept moves from the role of a dependent learner to that of a self-directed learner. (2) Adults possess a wealth of knowledge they have accumulated through years of experience. (3) Adults become ready to learn when they identify a need in some area of their personal or professional lives. (4) Adults are stimulated to learn by the need to perform a task, solve a problem, or live a more satisfying life. (5) Adults are generally internally motivated to learn. Knowles encourages the use of experiential methods, such as problem-solving projects, simulation exercises, and group discussions, to utilize the vast experiences of learners.¹⁵

Gaming

Gaming is an effective tool that can be utilized to teach information to various learners in different situations.¹⁶ However, games are not suitable for presenting all types of materials. Games do not lend themselves to the delivery of large amounts of information over short periods of time.³ Games have been found to be a very effective method of reviewing material and reinforcing facts.¹⁶

Gaming utilizes the knowledge gained through individual experiences and enhances motivation by providing an avenue for validating personal knowledge and sharing experiences with peers. Participants are able to address learning needs that are relevant to their individual practice as

they interact in small-group discussions to solve simulated problems. Gaming is a very effective tool that can be used to present educational material to adult learners in a manner that addresses their learning needs.

METHODOLOGY

Instrument Development

The first step in developing the Neonatal Emergency Trivia Game was to formulate questions pertinent to neonatal emergency care. Three main categories of questions were identified for the Neonatal Emergency Trivia Game: pathophysiology, medications, and resuscitation.

Approximately 100 questions and answers were developed from information gathered from a variety of sources.^{1,17-21}

Panel of Experts. A panel made up of three neonatologists and a neonatal clinical nurse specialist reviewed the questions for clarity, accuracy of information, and to ensure that important issues related to neonatal emergency care decisions had been addressed. Each panel member was given a copy of all the game questions. The panel gave feedback by writing their comments and suggested changes on the questions. The developer used these comments to delete or revise questions. No feedback from one reviewer contradicted that of another reviewer. While the questions were under development, the American Medical Association published new standards of care related to neonatal resuscitation. The questions were revised to reflect those changes and resubmitted to the panel of experts for review. The review process was repeated. The revision of each question was at the developer's prerogative. Questions were changed to reflect the suggestions made by the experts, assuring a first level of content validity.

Panel of Health Care Providers. A convenience sample of ten nurses who work in a Level III intensive care nursery was selected to review the questions for content validity. They reviewed questions for clarity and relevance to their practice. Questions were further clarified based on the panel's suggestions, and questions that were consistently identified as "too picky" or not relevant were reviewed. The final decision to delete or change the questions was the developer's. On completion of this review, 101 questions and answers for the Neonatal Emergency Trivia Game were finalized.

Reliability

Test-retest reliability was assured by having nurses working in a single Level III neonatal intensive care unit and currently certified in neonatal resuscitation participate in the activity. The site and participants for this activity differed from those used for the validity study. Ten nurses volunteered to participate in the test-retest reliability activity. Each was asked to complete a written test composed of all the questions in the game without referring to other sources or individuals for assistance. The participants were not given any feedback or additional education regarding the testing activity. The nurses were asked to take the same test again two weeks later. Seven of the ten nurses completed the test-retest activity. (Failure of three earlier participants to complete the activity was due to misplaced tests.) The test-retest reliability for the Neonatal Emergency Trivia Game was $r = .76$, a moderate to strong relationship. The mean score from both rounds of testing was only 73. This relatively low score, reflecting the day-to-day working

knowledge of these nurses, may be additional evidence for the need for frequent classes designed to review neonatal emergency care.

Game Rules

A facilitator is needed to organize and lead the gaming activity. The facilitator divides the group into two teams. Efforts should be made to balance the teams as closely as possible according to number, profession, years of experience, and participants' practice areas. The facilitator also explains to the group the time frame and directions for the game. Team 1 plays Team 2.

The game begins with each team rolling a die numbered from one to six. The team with the highest roll receives the first question and rolls to determine the category of question it will receive. Each category is assigned to specific numbers on the die. A roll of one or two yields a pathophysiology question, three or four yields a resuscitation question, and five or six yields a medication question. The facilitator then reads aloud a question from the corresponding category. The team has two minutes to discuss the question and agree on an answer. The facilitator keeps track of time for each question and determines if the response is correct by reading the answer to the question given on the card. Five points are given for each correct answer. The facilitator serves as the scorekeeper for both teams.

Questions alternate between teams. If a correct answer is given, the next question goes to the other team. If an incorrect answer is given, the opposing team has an opportunity to gain extra points. It is given one minute to discuss the question and decide on an answer. The next question is then directed to the team that had the extra-point opportunity, regardless of whether its answer to the extra-point question was correct or incorrect. The team with the most points at the end of the game wins. The facilitator should set aside time at the end of the game for a debriefing period to discuss any questions or concerns that may arise during the course of the game. The source and answer for each question are listed on its card to assist with the debriefing period.

Game Validity

Format. A card game format was chosen to review neonatal resuscitation material. The questions were divided into three categories and typed on color-coded index cards, with one question, answer, and source per card. The questions were clearly stated in one to four sentences. The amount of information required to answer each question varied from one to two words to a short sentence.

- Sample Question 1: Epinephrine becomes inactivated when mixed with what other medication often used in resuscitation?
- Answer: Sodium bicarbonate.²⁰
- Sample Question 2: What condition should you suspect when a newborn infant experiences dyspnea and cyanosis that increase when his mouth is closed?
- Answer: Bilateral choanal atresia.²⁰
- Sample Question 3: You are doing chest compressions while another person is ventilating the infant. Should you temporarily stop compressions while they give a breath? Answer: Yes.¹

Trial Game. To determine the applicability of the questions to the gaming process, the game was played at a regional obstetrical review conference. Conference content included the transition from fetal to newborn life, thermoregulation, respiratory distress, assessment, and resuscitation of the newborn. The game was played at the end of the day to review and reinforce knowledge and to demonstrate the application of information to practice. Twelve nurses with practice areas in labor/delivery, newborn nursery, public health, and education participated in the gaming process.

Trial Game Evaluation. All 12 participants were asked to complete an evaluation of the gaming process. Eleven of the 12 evaluations were returned. Participants responded to five questions by choosing a number on a Likert scale, with 1 being a negative response and 5 being very favorable. The five questions were: (1) Were the instructions for the game clear? (2) Were the questions applicable to your work setting? (3) Did you find the game to be a helpful review? (4) How would you rate reviewing material via the gaming process in comparison to lecture/video presentations? (5) Would you recommend this game to other health care providers who care for newborn infants as a method of reviewing neonatal emergency care decisions? The mean scores ranged from 4.8 on questions 1 and 2 to 4.2 on question 4. All questions had a mode of 5, except for question 4, which had a mode of 4.

DISCUSSION

The Neonatal Emergency Trivia Game was found to be a very effective tool for reviewing material related to neonatal emergency care decisions. The game was evaluated positively. Uses for the game are far-reaching. It can be played in virtually any setting, requires minimal setup time, can be played in large or small groups, and can be used repeatedly as a means for reviewing neonatal emergency care decisions. The questions can also be used informally between staff members or individually during slow periods or breaks as a means of refreshing participants on appropriate neonatal resuscitation decisions. The game is designed for all health care providers who care for newborns. Therefore, hospitals having labor and delivery services or an intensive care nursery may find the game a very helpful tool for staff continuing education.

Initial psychometric testing indicates that the Neonatal Emergency Trivia Game has content validity and test-retest reliability. However, additional testing with a larger group would strengthen validity and reliability scores. The game was found to be valid based on its success in a conference setting.

Providing opportunities for staff members to gain information related to neonatal resuscitation is a difficult task for health educators, but keeping that information fresh in their minds so it can be retrieved in emergency situations is an even bigger challenge. This game is designed to assist those who work with neonates in reviewing resuscitation of the newborn.

Adult learners' needs differ from those of other students. Educators must be creative to meet the learning needs of this population. Gaming is one method that can be used.

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