Title:
Using a Bluetooth Connected Stethoscope: New Technology Teaching Auscultatory Skills in Nursing Students

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Session Title:
Effective Teaching Tools
Slot:
I 08: Monday, 30 October 2017: 3:45 PM-4:30 PM
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3:45 PM

Keywords:
Bluetooth Stethoscope, Clinical and Technology

References:
Please note that while I understand the need for recent references less than five years old, the technology associated with this presentation is new (approximately one year) and there is no published research yet. The study I completed is the first one conducted with nurses. Other studies are underway with medical students. These references support the need for improved approaches in teaching auscultatory skills.


Abstract Summary:
This presentation demonstrates a Bluetooth connected stethoscope used in a study focused on teaching auscultatory skills. The stethoscope allows wireless connectivity to mobile devices with a host of features for playback and listening of heart, lung, and other body sounds; it is a game changer for nursing educators!

Learning Activity:

<table>
<thead>
<tr>
<th>LEARNING OBJECTIVES</th>
<th>EXPANDED CONTENT OUTLINE</th>
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<tbody>
<tr>
<td>The learner will be able to discuss features of the Eko Stethoscope</td>
<td>The Eko stethoscope has a variety of functions that make it a useful tool for teaching auscultation. The following features of the Eko will be discussed: It allows the learner to</td>
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The learner will be able to evaluate the utility of the Eko stethoscope in nursing education

Implementation of the Eko stethoscope into a pre-licensure nursing program via a research study will be discussed. Results of the study will be explored and feedback from faculty and students will be included.

Abstract Text:

Auscultation skills are vital in comprehensive patient assessment and identification of heart, lung, and other body sounds. Recognition of problematic sounds can lead to timely nursing interventions that can significantly limit poor patient outcomes.

A study was conducted to measure whether accuracy and proficiency of auscultatory skills in pre-licensure nurses changed with the use of a Bluetooth connected stethoscope. Students recognition of normal and abnormal heart and lung sounds was assessed prior to using the stethoscopes, and reassessed after eight weeks using the stethoscope in the clinical setting and reviewing heart and lung sounds that were recorded using the stethoscopes.

While the significance of the research process must not be underestimated, the purpose of this presentation is to discuss this new technology and its inherent value for enhance the education of nurses from entry level to advanced practice.

The stethoscope is one of the most important tools for listening to heart, lung, and other body sounds. In the past 100 years the mechanical structure of the stethoscope has changed very little (Fayssoil, 2009), and it has remained only as good as the ears it is used with. But that is about to change. The FDA approved stethoscope is the first of its kind to bring together Bluetooth connectivity, mobile applications, visual representation of sounds, real time streaming, sound amplification, and sound recording to allow enhanced playback and listening for heart, lung, and other body sounds.

To suggest that teaching auscultation of body sounds is challenging is an understatement. How does a learner understand what they are hearing without having the faculty hear the sound simultaneously? Currently, students and faculty use a double-headed stethoscope in order for learners to receive feedback about a given sound. With one diaphragm and two headsets, there is close, almost uncomfortable physical proximity between the student, the faculty, and the patient. Sound quality is diminished as the sound must travel up four tubes to the student’s and faculty’s ears, and faculty must be present with each and every student, at each and every patient assessment, in order to know what the student is hearing. In the clinical practice laboratory this is difficult, while in the acute care setting, where applied learning takes place, it is almost impossible. This scenario creates difficulty with accurate assessment of clinical outcomes. March, Bedynek, and Chizner (2005) conducted a study that found that “real-time instructor feedback during a patient auscultation can improve students’ diagnostic proficiency.
by up to 200%” (p. 1443). The authors went on to note “high student to patient ratio and the difficulty of simultaneous listening has made this point-of-care feedback nearly impossible”. The ability to learn from recordings of heart and lung sounds can lead to significant improvement in auscultation skills. Butter, McGaghie, Cohen, Kaye, and Wayne (2010) conducted a study that demonstrated that after repetitively studying heart and lung sounds, learners demonstrated an increase in average proficiency for auscultation skills from a score of 25% to 70%.

The complex nature of patients means that nurses must have a multifaceted, flexible, and dynamic assessment skill set in order to identify at risk patients. The Quality, Safety, and Education for Nurses Initiative (QSEN) has identified three key areas related to the safety of patients for pre-licensure nurses.

- Demonstrate effective use of technology and standardized practices that support safety and quality
- Demonstrate effective use of strategies to reduce risk of harm to self or others
- Use appropriate strategies to reduce reliance on memory

The use of a Bluetooth connected stethoscope in learning to appropriately identify normal and abnormal heart, lung, or other body sounds, fully supports QSEN patient safety skills. Moreover, increased accuracy and proficiency in recognizing abnormal heart and lung sounds can assist with operationalizing interventions to prevent patient decline. Failure to rescue is defined as the “inability of clinicians to save a patient’s life by timely diagnosis and treatment when a complication develops” (Gephart, McGrath, & Effken, 2011, p. 275). Patients can show signs of impending deterioration in cardiac, respiratory, or neurologic status as much as 72 hours before a cardiopulmonary arrest. When nurses do not recognize these warning signs, they may fail to take appropriate action to stabilize a patient. Ongoing auscultation and documentation of cardiac rhythm, heart, and lung sounds can help divert patients from a poor medical outcome.

The advancement of mobile and wireless technologies is transforming the face of healthcare. In the US alone, the mobile health (mHealth) market is predicted to grow at a rate of 33 % annually. Widespread adoption of mHealth technologies has led to 90% of health care providers believing that mobile devices and apps can be used to engage patients, provide better services, and save money (Allied Market Research, 2014). Devices such as the Eko stethoscope further enhance patient care by allowing integration of recorded sounds directly into the electronic health record (EHR). Using the Eko stethoscope, nurses will be able to definitively document sounds for each patient that can be listened to by all members of the healthcare team. Guess work on whether a patient has experienced a specific rhythm, heart, or lung sound will be removed, and healthcare providers can take necessary action because there is clear documentation of cardiac or pulmonary issues.

The Bluetooth connected stethoscope has a variety of functions that make it a useful tool for teaching auscultation. The device

- allows the learner to adjust volume while listening to heart, lung, or other body sounds
- connects with a mobile device to display a visual waveform of the sound
- connects with a mobile device to allow recording of heart, lung, or other body sounds
- is FDA approved and has HIPAA compliant recording and storage of sounds on mobile devices
- has real time streaming of sounds to a mobile device for listening and feedback by instructors or peers
- allows recorded sounds to be sent to an electronic library where sounds can later be retrieved