SIMULATION TRAINING FOR NURSING STUDENTS FOR LUNG AND CARDIAC AUSCULTATION

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DISCLOSURES

Conflict of Interest

• Müzeyyen Arslan (Asst. Prof., Turgut Ozal University School of Nursing) reports no conflict of interest
• Julia Greenawalt (INACSL Conference Administrator & Nurse Planner) reports no conflict of interest
• Leann Horsley (INACSL Lead Nurse Planner) reports no conflict of interest
FIRST ACQUAINTANCE WITH INACSL CONGRESS

6 days on the road

Participation in one day.
Simulation is a transformational tool for nurse educators as they strive to develop students who are skilled in critical thinking, communication and psychomotor skills. Simulation is a key link in this process because it allows faculty to create laboratory environments that replicate actual clinical scenarios [1].
“Tell me, and I will forget. Show me, and I may remember. Involve me, and I will understand.” — Chinese Proverb
The use of simulation as an educational tool is becoming increasingly prevalent in nursing education, and a variety of simulators are utilized. Nursing education consists of classroom lectures and clinical instruction, and the ultimate goal of nursing education is to promote the application of theoretical knowledge to clinical practice [3, 4].
In a study by Bremmer and coworkers, it has been found that training on computer simulators improved the confidence of students’ physical consultation skills (61%) and the students stated that computer simulator training must be a part of nursing training (68%) since it provided an excellent learning experience (91%) [8]. Even more effective results were obtained from similar training with medical students [8, 9]. Thus, simulation training makes a positive contribution to nursing and medical students’ training.
Accurate reproduction of realistic lung and cardiac sounds can affect the quality and outcome of learning and/or evaluation in simulation events. Mannequin simulators may be helpful, as they offer the student a patient-like situation in which cardiac and lung sounds and murmurs can be related to the localization on the thorax and apex of the different auscultation foci.
This study was planned to determine the effects of this simulation-assisted learning on the improvement of cardiac and lung auscultation for nursing students.
The aim of this study was to evaluate the effects of simulation training in nursing students on the skill of lungs and cardiac auscultation.
METHODS

Design: This study used a experimental design with a two-group pretest/post-test with training over time to examine the effects of the education program with simulation on the knowledge and skill levels of cardiac and lung auscultation.
SAMPLE AND SETTING

The majority (85%) of the sophomore students at Turgut Ozal University Nursing School joined the study (n=70). These students are divided into intervention and control groups (35 participants in each group) according to their grade point average (GPA) using stratifying method. The students were randomized and assigned anonymously, based on their GPA (groups A and B). The study consisted of two parts, an initial instruction and assessment and a final assessment two months later.
DATA COLLECTION

Researchers collected a pretest score and three post-test scores to determine the change in knowledge and skill levels in cardiac and lung auscultation. Each test was conducted in a classroom of the Nursing School. Immediately after the pretest, the nursing students attended the lecture-based training program.

The intervention group trained with simulators while the control group received conventional theoretical training. After the lectures, the participants received the first post-test. The test was the same as the pretest. All 70 participants took the first post-test. Two months later, all of them took a second post-test to examine their retention of knowledge in cardiac and lung auscultation.
EK 3: Gönüllü Katılım (Deney Grubu Bilgilendirilmiş Onam) Formu

HEMESİRELİK ÖĞRENCİLERİNDE SİMÜLASYON EĞİTİMİNİN AKCIĞER VE Kalp Sesleri DİNLEME BECERİSİ ÜZERİNE ETKISI

 Araştırmacının Daveti:


Katılımcının Beyanç:


İmzalı bu belgenin bir kopyasını bana veriniz.

Katılımcı
Ad-Soyad: ______________________________
Adres: ______________________________
Tel: ______________________________
Tarih: ______________________________
İmzalı: _______________________________

Katalım ile gürüşen araştırmacı
Ad-Soyad: ______________________________
Adres: ______________________________
Tel: ______________________________
Tarih: ______________________________
İmzalı: _______________________________
EK 4.1. Sosyodemografik Özellikler

Öğrenicinin Adı – Soyadı:

Yaşı:

Sınıf:

GNO (Genel not ortalaması):

1) Oskültasyon hakkında bir bilginiz var mı?
   a) Evet       b) Hayır

2) Akciğer oskültasyonu hakkında bir eğitim aldınız mı?
   a) Evet       b) Hayır

3) Kalp oskültasyonu hakkında bir eğitim aldınız mı?
   a) Evet       b) Hayır
6) Solumun seslerinin şiddeti hangi durumlararda artar?
   I. Tükürül (bronşal solunumเสื้อ)
   II. Adolaksis
   III. Eneksikülüm
   IV. Plevrada sıvı hava toplanması
   a) LI
   b) LII
   c) LIII-LIV
   d) LIII-LIV

7) Hava an, sıvı an veya benzeri nedenlerden dolayı daralın havyallarından geçen akanı veya sesine benzeren seve ad verilir?
   a) Wheezing
   b) Raller
   c) Rünküt
   d) Stridor

8) Aşağıda belirtilen hangi normal solunum sesine diğer adlar?
   a) raller
   b) stridor
   c) wheezing
   d) Raller

9) Akciger dölmemesi ve raller ağızda durumlar dan hangisi veya hangilerinin varlığından duyulur?
   I. Bronşit
   II. Enexisikülüm
   III. Plevral sıvı hava toplanması
   IV. Akciger patolojisi
   a) LI
   b) LII
   c) LIII-LIV
   d) Hepsisi

10) Aşağıdakilerden hangisinde bulunur?
    a) Inspirasyon eksikliğinde pire daha ahlaf
    b) Solumunun temel kası diyaframdır.
c) Inspirasyon işlemi kayıpsızdan daha uzun sürer
d) Hiperventilasyon sonucu derinliği ve hızını artırmaktadır.

11) Aşağıdakilerden hangisi hava yollarının sekretnin düğünlerle oluşuyor?
   a) wheezing
   b) stridor
   c) bronşiyal
   d) raller

EK 4. 3. KALP OSKULTASYONU BİLGI FORMU

1- I Pulumonik Alın
2- II Aortik Alın
3- III Trüküspit Alın
4- IV Mitral Alın

Yukarıdakilerden hangileri oskülasyonalarıdır?
   a) I-II
   b) I-IV
   c) II-III
   d) I-II-III-IV

2- Aşağıdaki normal kalp sesidir?
   a) S3
   b) S4
   c) S1
   d) PDA
   e) VSD

3- Aşağıdaki anormal kalp sesidir?
   a) S1
   b) S2

4- S3 sesinin riti mi nashılır?
   a) dee-luh-dub
   b) luh-duh-des
   c) luh
   d) lub

5- S1 sesi hangi kapakların kapanma sesidir?
   a) Trüküspit ve mitral kapak
   b) Aortik ve Pulumonik kapak
   c) Mitral ve Aortik kapak
   d) Atriyal kapak

6- Hangi ses kalp yetersizliğinin erken bulgusudur?
   a) S1
   b) S2
   c) ASD
   d) S3

7- VSD ile ilgili aşağıdaki doğru durudur?
   a) Atriumlar arasındaki cerrahinin doğru tahmin yapmasıdır.
   b) Sistolik üfürümü neden otlar.
   c) Pansistolik üfürümü neden otlar.

8- Mitral Stenoz üfürümüyle ilgili aşağıdaki doğru ifade kılar?
   a) Kan sol ven traksiyonun daralmalar kapasiteleri zor geçer.
   b) Üfürüm düstürelen sonuçlarına doğru ışıdır.
   c) Atriumlar arasındaki cerrahinin doğru tahmin yapmasıdır.
### EK 5. AKCIğer VE KALP OŞKÜLTASYONU BECERİ TESTİ

#### EK 5.1. KALP OŞKÜLTASYONU BECERİ TESTİ

<table>
<thead>
<tr>
<th>Kalp sesleri</th>
<th>Yeterli</th>
<th>Yetersiz</th>
<th>Yeterli</th>
<th>Yetersiz</th>
<th>Yeterli</th>
<th>Yetersiz</th>
</tr>
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<tbody>
<tr>
<td>$5_1$</td>
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<td>$5_2$</td>
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<tr>
<td>ASO</td>
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<tr>
<td>AKUT PERYÄRDIKT</td>
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</tr>
</tbody>
</table>

#### EK 5.2. AKCIğer OŞKÜLTASYONU BECERİ TESTİ

<table>
<thead>
<tr>
<th>İÇERİK ÖNCESİ</th>
<th>İÇERİK SONRASI</th>
<th>8 HAFTA SONRASI</th>
</tr>
</thead>
<tbody>
<tr>
<td>$AC$ sesleri</td>
<td>Yeterli</td>
<td>Yetersiz</td>
</tr>
<tr>
<td>NORMAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHEELEDING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRIDOR</td>
<td></td>
<td></td>
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<tr>
<td>INÇERAL</td>
<td></td>
<td></td>
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<tr>
<td>ORTA RAL</td>
<td></td>
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<tr>
<td>KABA RAL</td>
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</tbody>
</table>
DATA ANALYSIS

Data were analyzed using SPSS version 21.0 for Windows. The level of significance was set at \( p = 0.05 \) for all tests. When comparing the performance of students from pretest to posttest, within group differences were analyzed using the paired ttest. Performance of simulation-trained students at post-test was compared with performance of traditionally-trained students using the Mann-Whitney U test.
ETHICAL CONSIDERATION

The Ethical Committee of the Faculty of Medicine of the University of Turgut Ozal approved this study.

Consent forms were signed in line with the principle of volunteerism before the sessions were initiated.

All study participants gave informed oral consent before eligibility screening and informed written consent before the baseline interview and randomization.
Average age of students who joined the study has been found as 20.5 years (±2.3 years), and average GPA was 2.5 points (Table 1). Knowledge scores for lung and cardiac auscultation for both groups of nursing students were compared before and after the simulation training period. Cardiac and lung auscultation knowledge scores improved statistically significantly in both intervention and control groups (p<0.05) (Tables 2 and 3). Lung and cardiac auscultation skill points were compared in both the intervention and control groups after training. The skill scores increased in both groups right after training and two months after training. (Fig. 1, Fig.2). No statistical difference was observed in the rate of the scores (p>0.05).
TABLE 17.1. DISTRIBUTION OF AGE AND GRADE POINT AVERAGES OF PARTICIPANTS

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>n</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>72</td>
<td>20.54</td>
<td>2.379</td>
<td>19</td>
<td>34</td>
</tr>
<tr>
<td>GPA</td>
<td>72</td>
<td>2.52</td>
<td>0.465</td>
<td>1.65</td>
<td>3.83</td>
</tr>
</tbody>
</table>

* Grade point average (GPA)
TABLE 17.2. COMPARISON OF LUNG AUSCULTATION DATA SCORES FOR INTERVENTION AND CONTROL GROUPS BEFORE AND AFTER TRAINING

<table>
<thead>
<tr>
<th></th>
<th>Lung auscultation data score</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>z</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n=35</td>
<td>before training</td>
<td>6.22</td>
<td>1.456</td>
<td>3</td>
<td>9</td>
<td>-1.970</td>
<td>0.049</td>
</tr>
<tr>
<td></td>
<td>after training</td>
<td>6.81</td>
<td>1.283</td>
<td>4</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n=35</td>
<td>before training</td>
<td>5.56</td>
<td>1.054</td>
<td>3</td>
<td>8</td>
<td>-2.639</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>after training</td>
<td>6.33</td>
<td>1.531</td>
<td>3</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE 17.3. COMPARISON OF CARDIAC AUSCULTATION DATA SCORES FOR INTERVENTION AND CONTROL GROUPS BEFORE AND AFTER TRAINING.

<table>
<thead>
<tr>
<th></th>
<th>Cardiac auscultation data score</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n=35</td>
<td>before training</td>
<td>6.12</td>
<td>1.355</td>
<td>2</td>
<td>9</td>
<td>-3.967</td>
<td>0.000</td>
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<tr>
<td></td>
<td>after training</td>
<td>7.50</td>
<td>0.941</td>
<td>5</td>
<td>9</td>
<td></td>
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<tr>
<td>Control</td>
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</tr>
<tr>
<td>n=35</td>
<td>before training</td>
<td>5.89</td>
<td>1.430</td>
<td>2</td>
<td>8</td>
<td>-3.607</td>
<td>0.000</td>
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<tr>
<td></td>
<td>after training</td>
<td>7.00</td>
<td>1.146</td>
<td>4</td>
<td>9</td>
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</tr>
</tbody>
</table>
FIGURE 17.1. Lung auscultation skills scores of groups

FIGURE 17.2. Cardiac auscultation skills scores of groups
DISCUSSION

Cardiac and lung auscultation are core clinical skills.

This study was conducted on 70 sophomores in the Department of Nursing at the Turgut Ozal University.

There was no significant difference in age or GPA scores between groups.

After the simulation training period, cardiac and lung auscultation knowledge scores had improved statistically significantly in both groups (p<0.05).

Although the increase in the skill score was greater in the intervention group, this difference was not statistically significant, perhaps due to a relatively small sampling size.

Thus, our findings show that a curriculum featuring simulation technology improved the knowledge of nursing students but the simulation technology did not confer an advantage over the traditional training.
In the reviewed studies, simulation was not statistically outscored by traditional methods in any of these areas. Possible explanations could be the limited knowledge base and experience level of novice students [1].

In the studies where simulation scored equivalent to traditional methods, faculty still tended to react positively. Findings from a literature review affirm the effectiveness of simulation as an educational tool [1].
There are studies explaining the effectiveness of simulation training. In the study by Butt et al. [10] a simulation-based mastery learning program dramatically improved cardiac auscultation skills in medical students.

Two studies involving psychomotor skill demonstrated an increase in skill performance after simulation application [11,12].

Simulation has also been shown to be effective in learning and in facilitating the transfer of theoretical knowledge to clinical settings [13].
The first mannequin simulator (Harvey) was shown to improve the clinical skills of senior year medical students when compared with a control group [14]. Results of a few recent studies indicate that in addition to the traditional training curriculum program, simulation technology is a valuable tool that helps in improving (and maintaining) the quality of physical examination skills [15-17].
CONCLUSIONS

Cardiac and lung auscultation curriculum consisting of designed practice with simulator resulted in improved assessment of simulated cardiac and lung sounds, but this improvement was not significantly better than that seen following training with traditional methods.

Results from this and other studies have shown that simulation was as effective as traditional methods in cognitive gains, skills development, and self confidence ratings. Overall, simulation can be accepted as an effective way of laboratory teaching in fundamental courses.
REFERENCES


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Thank you for your patience.
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