Comparing Two Simulation Modalities to Develop Decision Making Skills Among Undergraduate Nursing Students

Authors: Burcu Dogan[a]; Prof Natalie Pattison[a,c,d]; Prof Guillaume Alinier[a,b];

[a] School of Health and Social Work, University of Hertfordshire, Hatfield, Hertfordshire, [b] Hamad Medical Corporation Ambulance Service, Doha, Qatar, [c] Florence Nightingale Foundation, London, [d] East & North Herts NHS Trust, Stevenage

E-mail: b.dogan@herts.ac.uk

REPUBLIC OF TURKEY
MINISTRY OF NATIONAL EDUCATION

INTRODUCTION

The most effective and commonly used simulation modalities are mannequin (MBS) and simulated patient-based simulation (SPBS). With the technological developments and ease with which these technologies are used in many institutions, simulation is now viewed as an essential part of the current nursing curriculum and other healthcare educational programmes.[1–3]

Full-scale simulation (FSS) has not only been used for technical skill development but also for non-technical skill enhancement (Picture 1). It is argued that FSS improves problem-solving skills[4,3,5], critical thinking skills[6,7,3], communication skills[8], and decision-making skills[3,9,10].

Picture 1: Representation of a MBS session

However, many institutions cannot accommodate or afford a full-scale simulation laboratory because of the prohibitive equipment and centre (sim lab) costs, and lack of trained staff[11]. A cheaper but effective interactive teaching strategy is therefore needed, at least for some common learning objectives[4,5]. It is argued that mental simulation can be effective for skills rehearsal[6] and that visual representation can stimulate cognitive ability[7]. A teaching strategy, which we call Visually Enhanced Mental Simulation (VEMS)[12], as it uses mental simulation and visual elements, will be tested for teaching cognitive skills such as clinical judgement & decision-making skills[8]. It could be proven to be an alternative approach to FSS.

Picture 2: Representation of the patient in a VEMS session

VEMS is a combination of mental simulation and think-aloud with external representations of a patient and the treatments applied by the participants (Picture 2). It differs from the mental simulation which occurs in the minds of participants individually and in isolation, because in VEMS they are expected to collectively verbalise their thinking and actions, including equipment setting and communication with the patient. Visual representations such as a laminated patient poster and equipment cards (IV catheter, IV fluid, ECG monitor and so on) are used to visually support the cognitive activity and minimise reliance on imagination[13]. The decisions and interventions made by the participants are noted on a whiteboard by a facilitator with the indicated time, and participants are expected to interact with the poster by placing the equipment cards they use while verbalising their actions and communicating with the patient poster.

INTRODUCTION cont.

The facilitator verbalises the patient's voice and provides the physiological parameters on the whiteboard when measured or requested by participants, and places the equipment cards on the poster if this is not done by the participants. If the case includes other actors, another facilitator takes that acting part. Overall, they facilitate the case scenario but do not guide the participants, as is the case in a full-scale immersive simulation scenario. Scenarios prepared for MBS or SPBS can be used for VEMS and they are similarly followed by a debriefing session [12].

RESEARCH AIMS & QUESTIONS

- Compare the effectiveness of VEMS with MBS on the decision-making skills of nursing students.
- Assess the effectiveness of VEMS in developing students' decision-making skills.
- Assess and compare students' perception of MBS and VEMS activities.

- Is VEMS as effective as MBS in terms of developing decision-making skills?
- How does VEMS differ from MBS in terms of students' evaluation of the simulation activity?

STUDY DESIGN

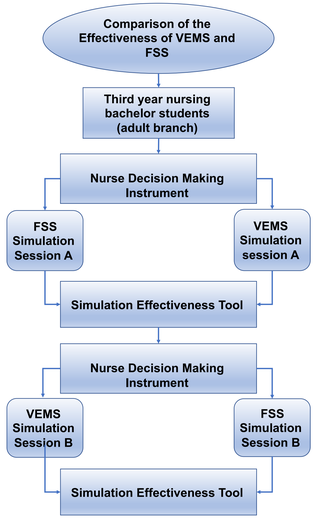

Figure 1: Representation of the study design

METHODS

- This research was conducted as a pilot of a Cluster Randomised Trial. The study was designed as a quasi-experimental crossover design.
- Ethical approval was been obtained via the University of Hertfordshire Ethics Committees with Delegated Authority (Ref: HSK/PGR/UH/03692).
- 36 Adult nursing students consented to participate in the pilot study. 24 of them successfully completed the study by returning the required questionnaires.
- In the first phase of the study, 20 students participated in the VEMS session and 16 students underwent the FSS session
- After after cross-over 10 students participated in the FSS session whereas 14 students attended the VEMS class.
- Nurse Decision Making Instrument (NDMI)[14] used as a pre- and post-test and applied before each session to evaluate decision-making skills of students.
- Simulation Effectiveness Tool-Modified (SET-M)[15] used after each simulation session to evaluate students' perception on two different simulation modalities.

RESULTS

Demographics of the students:

- 33 female and 3 male students participated in the pilot study
  - White British: 12
  - Black African: 18
  - Asian background: 6
- All students had previous simulation experience.

Item Reliability Cronbach's α score:

- Pre-NDMI is α=0.92
- Post-test NDMI is α =0.95
- SET-M for the first scenario is α =0.92
- SET-M for the second scenario is α =0.82

Decision-Making Skills Evaluation:

- No significant difference in the pre-test NDMI score
  - Mean score for FSS is 67.38
  - Mean score for VEMS is 68.10 out of 120 (p>0.05).

First Intervention Type	VEMS	FSS	p-value
Pre-test result of NDMI (mean) (n=36)	2.8377 (SD=0.129)	2.8079 (SD=0.163)	0.546
Post-test result of NDMI (mean) (n=24)	2.9018 (SD=0.098)	2.8743 (SD=0.185)	0.642
the p-value for pre/post-test differences for VEMS and MBS	p= 0.657		

Table1: Means score for the NDMI.

For the post-test results of the NDMI with both groups, although there is a very similar increase observed for both groups (Figure 1), it is not statistically significant (Table 1).

RESULTS cont.

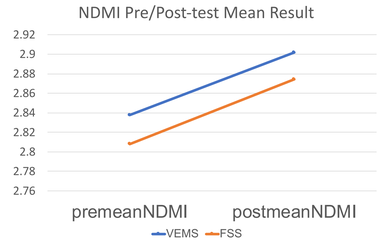

Figure 2: Pre/Post-test mean result of the NDMI for the VEMS and FSS groups of students

Simulation Effectiveness Tool Evaluation:

- SET-M score for the first simulation session:
  - VEMS 40.71 (SD=9.62)
  - FSS 47.34 (SD=5.93) p<0.05

- SET-M score for the second scenario, no significant differences were observed between FSS and VEMS (p>0.05) (Table 2).

Simulation Type	VEMS	FSS	p-value
SET-M Means score for the first scenario (n=36)	2.142 (SD=0.506)	2.492 (SD=0.312)	p= 0.02
Set-M means score for the second scenario (n=24)	2.615 (SD=0.182)	2.632 (SD= 0.353)	p= 0.89

Table 2: SET-M score for VEMS and FSS sessions.

CONCLUSION

It is argued that the FSS session has a positive effect on decision- making skills[3,9,10]. Although not statistically significant in tis pilot study, FSS and VEMS resulted in a similar slight increase in decision-making skills performance according to the NDMI. VEMS could be a useful method to train nursing students' decision-making skills.

For the first simulation session, VEMS rated lower than FSS whereas for the second simulation session, students rated VEMS nearly equally to FSS. This teaching approach being new for the facilitators, they may have become more at ease during the second session. This issue was also indicated by the students in the open-ending question. For the main study with a larger student sample, a guiding manual and full-training needs to be provided for VEMS facilitators with feedback on their facilitation of the pilot VEMS sessions in order to increase the effectiveness of the session

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