



RESEARCH ARTICLE

ANALYSIS OF AN OPINION ON LOW VERSUS HIGH FIDELITY SIMULATION AMONG NURSING STUDENTS

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ABSTRACT

Background of the study: The increasing amount of medical error has become a disturbing atmosphere, whether or not it is evident or harmful to the patient. The reason behind is due to an association with inexperienced physicians and nurses, this is why Knowledge acquisition and skills maintenance are important in bringing down the error. Traditionally this is taught by using low fidelity mannequins, but due to a technological advancement it has move towards high fidelity mannequins, which allows for repetitive practices, utilizing different scenarios with various levels of difficulty.

Aim: To find out the opinions on low versus high fidelity simulation among the nursing students.

Material and method: A non-experimental (Comparative research design) was conducted at selected nursing colleges, 50 nursing student were exposed on both low and high fidelity simulators in the skills laboratory after which a self-report technique was implied using 5 point Likert scale for obtaining the opinions from nursing students. The reliability of the tool was done using cronbach's alpha and found to be 0.784.

Result: The study revealed that the Low fidelity opinion mean score (11.82 ± 1.18) which is 58.04% and high fidelity opinion mean score (17.71 ± 1.424) which is 88.58%. The unpaired 't' test showed differences in opinion on Low fidelity simulation and high fidelity simulation among nursing students (**t value = 29.358**). Chi square test also revealed that there was no significant association between opinion score and socio demographic variables like age and gender. However a significant association was found between the opinion score and demographic variables like previous training and workshop, which were ($\chi^2 = 7.64$ and 4.80) respectively.

Conclusion: The study concluded that, High fidelity simulation is more effective than the low fidelity simulation according to the opinions of the nursing students.

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INTRODUCTION

Medical education has undergone significant changes all over the world. One of the reasons for the changes is in regard for the patient's safety (Abdulmohsen H. Al-Elq, 2010) With cases of medical negligence and errors on the rise, Medical simulation was introduced to allow an acquisition of clinical skills through deliberate practices in order to avoid medical error (https://en.wikipedia.org/wiki/Medical_error), Traditionally this is taught by using low fidelity mannequins, but due to a technological advancement it has move towards high fidelity mannequins, this technological advancements have given way to new pedagogies to enhance the clinical experiences of a nursing education. A large body of research

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shows that simulation is incredibly effective as a teaching methodology and can contribute to both better patient outcomes and a culture of safety among nursing staff. It has proved to reduce risks to patients, increase patient safety, reduce health care costs in the long run and improve learner's competence and confidence, Hence, medical simulation has proven to be the key assistant to ascertain a core competencies. However, the question is which is better: low fidelity or high fidelity simulation? There has been a controversial debate on this topic of which one is more effective. The proliferation of high fidelity simulation into the nursing curriculum has added many challenges. Although embraced by a technology-savvy, different generations do not always share the same comfort levels for these advancements (Susan Harrison Kelly, 2008). Hence, the purpose of this study was to compare nursing student's perceptions on low fidelity simulation versus high fidelity simulation. It is to explore on how do students perceive

the value of differences in using low fidelity simulation and high-fidelity simulation in their learning? A non-experimental comparative research design was employed for the study and the the hypothesis of the study were

H₀: There is no significant difference between low and high fidelity simulation opinion among nursing students.

H_{0.1}: There is significant difference between low and high fidelity simulation opinion among nursing students.

H₁: There is no significant association between selected demographic variables and opinion of nursing students on low fidelity simulation and high fidelity simulation.

H_{1.1}: There is significant association between selected demographic variables and opinion of the nursing students on low fidelity simulation and high fidelity simulation

MATERIALS AND METHODS

A non-experimental (comparative research design) was used for this study as its objective is to find the opinions on low versus high fidelity simulation among the nursing students. Sample of 50 nursing students were selected for conducting the study at selected nursing college, Pune city. Purposive sampling technique was used for selecting the samples. Then nursing students were exposed to both low and high fidelity simulation by performing a selected clinical skills (i.e.) CPR, rate & rhythm of respiratory system, auscultation of various normal and abnormal heart and lungs sounds and tracheostomy suctioning followed by post-test using an opinion based Likert scale with a survey scale of 5 points. The scoring of the opinion based Likert scale are (1-30) =Very poor, (31-60) =Poor, (61-90) = Average, (91-120) = Good, (121-150) = Excellent.

RESULTS

The data of the study was analysed using descriptive and inferential statistics.

Section-I Demographic Distribution of samples

Table 1. Distribution of samples according to demographic data (N=50)

S.No.	Demographic variables	Frequency (f)	Percentage %
1	Gender		
	•male	13	26%
	•female	37	74%
	Total	50	100%
2	Age		
	•18-25 years	42	84%
	•26-30 years	6	12%
	•30-35 years	0	0%
	•36 years & above	2	4%
	Total	50	100%
3	Education		
	•B.Sc (N)	41	82%
	•Post. Basic BSc (N)	9	18%
	Total	50	100%
4	previous training in any skills laboratory		
	•yes	18	36%
	•no	32	64%
	Total	50	100%
5	Any skills or simulation workshop attended		
	•yes	5	10%
	•no	45	90%
	Total	50	100%

Section II: Distribution of nursing students in relations to opinion on low versus high fidelity

Area wise comparison of mean, SD and mean % of low fidelity simulation score among nursing students

Table 2. (N=50)

SN	Area	Maximum score	low fidelity simulation score		
			Mean	SD	Mean %
1	Perceptions	75	3.19	1.46	63.49
2	Procedures	45	2.55	0.91	49.2
3	Self-evaluation	20	2.99	1.19	61.1
4	Scenario	10	3.09	1.17	58.4
Total		150	11.82	1.18	58.04

Distribution of mean, SD and mean % score of low fidelity simulation is (11.82 ± 1.18) which is 58.04% of maximum score. This shows that nursing students had poor opinion on low fidelity simulation.

Area wise comparison of mean, SD and mean % of high fidelity simulation score among nursing students

Table 3. (N=50)

SN	Area	Maximum score	High fidelity simulation score		
			Mean	SD	Mean %
1	Perceptions	75	4.084	1.095	81.68
2	Procedures	45	4.66	1.627	93.24
3	Self-evaluation	20	4.57	1.489	91.4
4	Scenario	10	4.4	1.44	88
Total		150	17.71	1.424	88.58

Distribution of mean, SD and mean % of high fidelity simulation is (17.71 ± 1.424) which is 88.58% of maximum score. This shows that nursing students had good opinion on high fidelity simulation.

Section III: Comparison of the nursing students opinion on low and high fidelity simulation

Comparison of the nursing student's opinion on low and high fidelity simulation shows the effectiveness by (30.54%). As the high fidelity opinion mean % (88.5%) shows that the nursing student's had higher score than the low fidelity opinion mean score (58.04%).

Section IV: To assess the significant difference of various aspects of Low fidelity opinion and high fidelity opinion. Hypothesis testing was done using unpaired 't' test and chi-square test.

Unpaired 't' value was calculated to analyze the difference in Low fidelity simulation opinion and high fidelity simulation opinion of nursing students on different aspect and Highly significant difference was found between them where, (t value = 29.358) and (P value = ≤0.001). Hence the stated null hypothesis is rejected. Chi square values were calculated and The findings revealed that there was no significant association between opinion score and socio demographic variables like age and gender ($\chi^2=0.68$ and 0.98) However a significant association was found between the opinion score and

demographic variables like previous training and workshop which were ($\chi^2 = 7.64$ and 4.80) respectively.

DISCUSSION

From the findings of the study, the overall mean score of opinion on low fidelity simulation is (11.82 ± 1.18) and mean score of opinion on high fidelity simulation is (17.71 ± 1.424). This showed that high fidelity simulation is more effective than the low fidelity simulation and thus null hypothesis was rejected as highly significant difference was found between them, the overall table value is ('t' value = 29.358) and ('P' value ≤ 0.001). In a similar study on the topic "Comparison and evaluation of the effectiveness of simulation training for shoulder dystocia management by using high fidelity mannequin and traditional method" was done by Crofts *et al.* 140 participants (45 doctors, 95 midwives) were selected randomly for training with a high-fidelity and (traditional) low-fidelity mannequins and a Performance was assessed pre and post training, using a video, All training was associated with improved performance ($P = .002$), however Training with the high-fidelity mannequin was associated with a higher successful delivery rate than training with traditional devices. A related study was conducted on Comparison of high- and low equipment fidelity during paediatric simulation team training, by Meurling *et al* in Sweden. Out of 34 teams ($n = 17$) used low-fidelity model and another 17 used high-fidelity paediatric simulator. The teams' clinical performances during the scenarios were measured as well as the trainers were monitored regarding frequency of their interventions, mental strain and flow of experience. The frequency of trainers interventions ($p < 0.001$) and perceived mental strain ($p < 0.001$) was lower when trainees used a high-fidelity simulator but their flow of experience was higher ($p = 0.004$) when using high-fidelity simulator (Meurling, 2014).

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