

## Basic Life Support Training by Simulation: Qualitative Study about Medical Students' Experiences

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### How to cite this article:

C Vasantha Kalyani, Kusum K Rohilla/ Basic Life Support Training by Simulation: Qualitative Study about Medical Students' Experiences/RFP Journal of Hospital Administration. 2021;5(2):41-47.

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**Received on:** 04/01/2022

**Accepted on:** 11/01/2022

### Abstract

**Background:** Basic life support is a basic procedure which every health professional or even an ordinary man must know. Various modes of basic life support training have been used, in which simulation based training is one of the advanced methods. Literature search evident that, a little information is available regarding subjective experience of learners when they got basic life support training by simulation method.

**Objective:** The aim of present study was to explore medical student's experiences when they underwent basic life support training by simulation technique.

**Methods:** This was a qualitative study, in which 24 medical students were interviewed after their Basic life support training with an open ended questionnaire. The researchers explored medical students' experiences with simulation based on basic life support training. Collected data was analysed by using a phenomenological approach.

**Results:** The results showed medical students' experience with simulation based basic life support training mainly included five categories. (1) Focused training (2) Easily focused (3) Practice in group is beneficial (4) No diversion from training (5) No focus loss when passive in group. We interpreted medical students' experience and compared it with other research findings and the risk and benefits of using simulation based training in learning were explored.

**Conclusions:** Simulation based basic life support training beneficial aspects will confirmed new avenue for this method. Create a well-established and good learning environment to get maximum participation. Take regular feedback to check students are in active mode. Use of simulation based basic life support training may contribute to novice methods of teaching learning methods that can improve their clinical performance further.

**Keywords:** Basic Life Support Training; Simulation; Qualitative; Medical Students; Experience; Cardiopulmonary Resuscitation.

### Introduction

Medical students or doctors require some necessary skills while taking care of their patients. It's an obligation also, to provide optimal treatment and safety for each patient.<sup>1</sup> Medical students' training

programs should be systematically to inculcate various skills in them.<sup>2</sup> Simulation is the best technique to amplify real time experiences under controlled situation.<sup>3</sup> Simulation based training is helpful to improve knowledge, skill and attitude of health professionals where patients protect is prime

responsibility.<sup>4,5</sup> It also provide a platform where ethical mitigate, practical dilemmas and tensions resolved during medical students training.<sup>6</sup>

Various research supports the use of simulation based Basic life support (BLS) training in medicine.<sup>7-9</sup> BLS training is usually performed by a task trainer under the supervision of an instructor, which mainly focuses on an individual's psychomotor skills. By using a qualitative research approach, we can explore new knowledge about simulation based training, which further contributes to rapidly developing knowledge for simulation. The aim of present study was to explore medical student's experiences who took simulations based on basic life support training.

## Methods

This present study was a qualitative study. After obtaining ethical approval from the Institute Ethical Committee (AIIMS/IEC/20/694), All India Institute of Medical Sciences, Rishikesh (India). In this present study, 24 first year medical students were recruited. Inclusion criteria mainly include previous Basic life support training within 15 days in Advance Center of Continuous Professional Department (CPD), All India Institute of Medical Sciences, Rishikesh. Exclusion criteria for the study was any student who had previously real time experience of basic life support. During focus group discussion, medical students were invited to share their experiences regarding simulation based basic life support training.

Written informed consent was obtained from each study participant and their confidentiality was maintained. 24 medical students who were enrolled in this study got simulation based on basic life support training. After two weeks of their training, they were follow up as informants.

Training modules for simulation based on basic life support include two scenarios. First scenario in which a teacher in classroom collapsed because of cardiac arrest and there students witnessed this event and took action i.e. circulatory arrest diagnosed and BLS started as per American heart association (AHA) guidelines.<sup>10</sup> Following AHA guidelines, call for help after confirming cardiac arrest, start early Cardiopulmonary Resuscitation (CPR) and relieve rescuers to maintain the effectiveness of chest compressions. The second scenario occurred outside of their school building, where one of their close friends collapsed. Each participant had to perform again call for help after confirming cardiac arrest, start early CPR and

relieve rescuers for effective chest compressions. In addition, they have to make phone calls to 911, give brief reports of patients and guide paramedics to the victim. Both scenarios run for 5-6 minutes each. After each scenario, instructor re-assembled all participants for oral feedback. Feedback mainly focused on how to coordinate their activities in the resuscitation team and adherence to the CPR algorithm.

After two weeks of their simulation based BLS training, a group discussion approach was used using semi structured interview questions. (Table 1) In group discussion, a group consists of a total of eight participants each along with one moderator. The main aim of this group discussion was to explore participants' experience with BLS training. Interview data was recorded on audio record and the discussion lasted for 50 to 65 minutes. Each participant was encouraged to respond freely. The moderator was to pose questions and highlight inconsistency. Data saturation was achieved after three focus group discussions with 24 participants.

**Table 1:** Focus Group Discussion Interview Questions.

Theme	Questions
	Key question: How is simulation based BLS training (technique, group dynamics/interaction with others, and engagement)
Technique	<ul style="list-style-type: none"> <li>• What were your thoughts during the training?</li> <li>• How simple or difficult was it to give effective BLS?</li> <li>• Did you have some "flow" moments? If so, how often and how much?</li> </ul>
Engagement	<ul style="list-style-type: none"> <li>• What were your thoughts and feelings during the training?</li> <li>• What was your level of engagement?</li> <li>• What made you (or didn't make you) unengaged?</li> <li>• What would be needed to increase your level of participation?</li> </ul>
Group dynamics	<ul style="list-style-type: none"> <li>• What was it like to function as part of a group?</li> <li>• How important did your group's peers play in completing the task?</li> </ul>
Effect on knowledge and skills	<ul style="list-style-type: none"> <li>• Do you believe BLS you practised in simulated environment would impact how you react in a real-life emergency medical situation?</li> <li>• Did the training teach you anything? What are you talking about?</li> </ul>
Interface regarding simulation based BLS	<ul style="list-style-type: none"> <li>• What was it like to be portrayed and behave in a simulated world?</li> <li>• Did it make a difference if you had previously behaved in a simulated world? How do you do it?</li> <li>• How did you find using this training tool? List the most significant advantages and disadvantages.</li> </ul>

A similar type of approach was used in a qualitative study by describing phenomenon with description generation by use of theories and models. The aim of present study was to get experience of CPR training among medical students in simulation mode.<sup>11</sup> In our study, Data transcriptions were doing back and forth direction by reading by two independently researchers (KKR, CVK). Audio materials were transcribed in verbatim and validation of data was again compared by recording and transcripts. (KKR, CVK) Themes were extracted from data and which were then converted into codes. All codes were redefined once again and combined conclusions were drawn from it. At the end, categories were extracted. Discussions and negotiations took place between two authors (KKR, CVK) to ensure quality in the ongoing phase of grouping, structuring, drawing interpretation and decontextualized the contents. Group discussion was conducted in Hindi and then its quotes were translated to English by authors.

**Results**

**Table 2:** Biodemographic of the participants (n=24)

Variables	Options	Frequency (%)
Age	Mean ±SD (20.5 ±2.05)	
Gender	Male	18 (75)
	Female	06 (25)
Residence	Rural	05(20)
	Urban	19 (80)
Grades in 12th Class (%)	71 to 80	14 (58)
	81 to 90	08 (34)
	More than 90	02 (08)
Any experience of simulation based training	Yes	04 (16)
	No	20 (84)

**Quantitative Data on Mental Strain, Concentration and Self-Efficacy**

Before and after Simulation based BLS training medical student's mental strain and concentration level assessed by validated instruments<sup>12</sup> and self efficacy level were used by 5 point validated scale. Mental strain was moderate level and stable during training (mean±SD=34/100±15 during 1st scenario; mean±SD=30/100±06 during 2nd scenario) and concentration level was very high (mean±SD=70/100±05 during 1st scenario; mean±SD=75/100±04 during 2nd scenario).

Self efficacy level was high before simulation based BLS training (mean±SD=5.2/7±0.9) and increased after simulation based BLS training (mean±SD=6.4/7±0.4; P<.001). This theoretical triangulation for quantitative data was further carried out by qualitative analysis too.

**Qualitative Analysis**

Five categories end assessments were evolved from qualitative information: (1) Focused training (2) Easily focused (3) Practice in group is beneficial (4) No diversion from training (5) No focus loss when passive in group.

**Focused Training:** Training learners specifically stated that they thought the simulated approach was a fair and excellent way to go through BLS protocol. Their main emphasis was on when and how BLS should be performed. The following representative quotes demonstrate their views of it as a cognitive training:

.....it forces you to change with each repetition... It feels like a great compliment you want to do it again and again. (Woman-22)

.....Yes, you think, you know, planning ahead in the simulation and being a step ahead, kind of.... (Man-24)

However, several comments suggested that the scenarios were realistic. Physical realism was present, with participants performing all aspects of the BLS procedure by hand. The participants also stated that, while mental stress level was modearte, it was comparable to a real life BLS/CPR situation, as evidenced by:

Okay, I feel like I know what we did, and I feel like I should train because it is so practical. (Woman-20)

...It is not, there is bit emotional strain at all; there may be some mental difficulty in that that you must think about, at least a little about, what you must do, but it is not, there is mild stress in that sense. (Man-18)

**Easily Focused:** Participants stated that in a simulation based approach, it is very easy to understand and remained focused throughout the complete session. It is an excellent way to understand BLS and CPR algorithms. Participant's quotes following views for it experience regarding training:

.....during training, I feel I am a part of this scenario. I was completely active during the whole simulation. (Woman-12)

There was no diversion I felt when I was doing whole drills. Best method to teach and person..... (Man-14)

**Practice in group is beneficial:** Participants in simulation based training simulations worked in two person groups. Training in group is more engaging. Two subgroups of this concept's strengths that came up regularly during the discussions:

In a group, practicing as a team activity, CPR is always performed in groups. In simulation-based training, trainees were able to engage in group activities that were similar to what they would encounter in the real world; they were able to interact, seek help, and make decisions. Some elements of BLS/CPR guidelines were simulated by team as:

It was great because as it was a new process to be done by me, but now I have to figure out who does it is, what and whether I should do it now or later and that was a huge improvement. I learn to cooperate in a team in a different way than when you do it alone, and then you're shocked when you join other people who are doing the same thing. What should I do now? You, on the other hand, learn how you can divide tasks and you can learn in a short time too. (Woman-22)

Yes, cooperation is essential and it is also where the most problems exist... The moderator asked, how did the preparation help? Yes, it's possible that it can't be conditioned any other way. (Man-14)

Training in group is engaging. Some participants quoted that this training improved their commitment and made it fruitful for them (for example, making it easier to suspend feelings of unreality and benefiting from input and encouragement from peers during training).

When I was kind of team leader, I liked what other team members told me, it was fine..... I'm sure it was a lot more enjoyable. (Man-10)

**No diversion from training:** The level of care they received during training was substantiated in the following discussion by all medical students who could demonstrate the interface to the simulation environment. Students with little to no experience with simulated environments were unsure of how to communicate in a simulated environment. Apart from the lack of familiarity, it was simple to monitor, and trainees felt more connected to what was happening in the simulated environment.

....Because, I haven't played simulated drills before, but I felt at ease with all phases i.e. how it works and where to look and...(Man-06)

I guess I was a little apprehensive about doing the first practice, so I took a more passive approach. I gained interest by doing repeated rehearsal..... (Woman-22)

**No focus loss when passive in group:** During simulation training, there was a lot of talk about feeling involved in the mission. During the discussion, there were many clear statements and suggestions about how to improve directedness in training. Throughout the training, medical students thought they were in an active mode. A popular experience suggested that the preparation became routine and less challenging after the inclusion of similar scenarios. Participants were engaged when there was a need for action, but when there was no need for action, they also paid attention. Trainee feels it was most tough mentally challenge and more concentrated, as shown by the following quotes:

... and it's interesting, I think it happened in same way in real world, what I learnt here. (Man-9)

....throughout the situation, I find it fascinating and engaging. (Man-8)

## Discussion

For all of the participants, using simulation-based BLS training was a new experience. Several advantages of this training tool that have been suggested in the literature (for example, the emphasis of the cognitive portion of the training and the added value of group practise) have also resurfaced in our five categories. Our findings, however, highlight other significant characteristics of scenario based BLS training as used in medical education.

The most significant finding was the close association between the subjects' recorded levels of involvement and their level of activation and difficulty. One of the most widely believed advantages of using the simulated approach is the ability to involve participants and their belongingness.<sup>13-15</sup> Our findings back this up, as all participants expressed satisfaction with the experience and provided examples of their participation in the simulated training. This commitment could be a result of the teaching tool, but it could also be linked to the subject's seriousness and significance. The ability of this simulation based technique to generate granted interaction is an inherent feature of it.<sup>16, 17</sup>

Using our psychometric results, we found that after the first training scenario, mean concentration (a conceptually significant component of flow) tended

to increase. When these results are combined with the students' personal experiences, it's possible that this newer modality can be used as a strongly recommended teaching module for medical students.

As a result, they become more noticeable in the simulated world, and interaction in a simulated world could be more reliant on difficulty. The idea that a simulated world provides a rich atmosphere in which experience in the learning space improves our learning methods. Furthermore, the use of simulated tasks is not monotonous, which is one of the most important characteristics of a successful educational tool (engagement).

Peers in the simulated environment provided the majority of performance feedback, while a teacher in the real world provided immediate feedback during each scenario. Overall, the participants appreciated the input, but they requested more direct feedback inside the simulated environment. Active involvement, experimentation, and interaction are all features of simulation.<sup>18</sup>

Both cognitive and psychomotor abilities have been distinguished by training. Psychomotor skills training was mentioned by several trainees as a significant feature of simulation-based BLS training. Mental pressure was moderate to high during training, confirming that mental stress was seen as a practical aspect of simulation training. The high level of stress suggests that the training situation has become more organised and optimal. BLS practising in a stressful and dynamic setting, on the other hand, aids them in transferring to real world CPR situations. Discussions with the participants revealed that simulation possesses any practical property.

In medicine education, a common cause of suboptimal success and harm has been described as a lack of teamwork skills.<sup>19</sup> This issue appears to be present during CPR as well.<sup>20</sup> The participants seemed to value team emphasis, and development of an environment of mutual tasks and responsibilities seemed to be important for participation in the scenarios, according to our findings. Not only did the students agree that practising a team endeavour in a team environment was beneficial, but they also thought that training together was more enjoyable, empowering, and satisfying.

In two occasions, participants were trained in two simulation-based scenarios. Several participants acknowledged the rapid degradation of CPR skills and recommended that simulated training be used to repeat and retrain. For gaining in depth information, skills, and practise in CPR, distributed

training in the presence of a moderator is a very appealing choice.

### *Strengths and Limitation*

Since our informants was homogeneous group of first year medical student's, so it was difficult to extrapolate this research finding. From these results, we can conclude that simulation-based training programmes can be easily applied in medicine, where clinically novice learner can be trained in a simulated environment. The innovation and ability to demonstrate some characteristics of medical team training in simulated environments, as well as how it is experienced, are the study's strengths. To improve the credibility of our findings, we triangulated them with psychometric process variables and previous findings.<sup>21</sup>

Scenarios which were created, were related to BLS/ CPR, and simulation training environment was created specifically for this analysis, with several features similar to real-world scenarios. The aim of our study was to understand how simulated world team CPR training is experienced and completely achieved, despite the fact that it was planned for a large amount of data input.

There are a few flaws in this report. Our participants were 24 first year medical students who responded to an open request for volunteers. Including more informants may have resulted in more interactions and the discovery of new categories. Person subjectivity, team structure, and the learning situation in which the research is conducted all influence outcomes.

### **Conclusions**

Five categories, i.e. Focused training, Easily focused, Practice in group is beneficial, No diversion from training and No focus loss when passive in group illustrate the phenomenon of simulation based BLS training for medical student's. We recommend that scenario based simulation BLS training was conducted to address issues i.e. how actively trainee as involved during simulated methods, what are level of group interaction among themselves and feedback about whole training also. So, learning happens on all levels through simulation based BLS training.

### *Financial support and sponsorship*

The research did not support by any funding agency.

## Acknowledgments

We would like to show our gratitude to our nurses for participating in this study. We also would like to extend our gratitude to Advance Center of Continuous Professional Department (CPD) AIIMS, Rishikesh for providing facilities for this project.

*Conflicts of Interest:* None declared

**Authors' Contributions:** The study's creation and overall design were co-authored by all of the contributors. The interview guide was created by CVK and KKR who also chose qualitative approaches for data interpretation and analysis. KKR was in charge of data collection and community discussions. CVK and KKR were in charge of data collection, description, and triangulation. CVK and KKR helped with critical revisions after KKR drafted the manuscript. The final manuscript was read and accepted by all contributors.

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