Comparison of effectiveness of class lecture versus workshop-based teaching of basic life support on acquiring practice skills among the health care providers

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ABSTRACT

Background: Basic life support (BLS) is an integral part of emergency medical care. Studies have shown poor knowledge of it among health care providers who are usually taught BLS by lecture-based teachings in classes.

Objectives: This study is designed to assess the effectiveness of class lecture versus workshop-based teaching of BLS on acquiring the practice skills on mannequin.

Methods: After ethical approval and informed consent from the participants, the present study was conducted among the health care providers. Participants were grouped in lecture-based class teaching and workshop-based teaching. They were then asked to practice BLS on mannequin (Resusci Anne with QCPR) and evaluated as per performance parameters based on American Heart Association BLS. Statistical analyses are done by Fisher’s exact t-test using GraphPad INSTAT software and P < 0.05 is taken as significant.

Results: There were 55 participants in lecture-based teaching and 50 in workshop-based teaching group. There is no statistical difference in recognition of arrest, checking pulse, and starting chest compression (P > 0.05). Though more than 83% of lecture-based teaching group has started chest compression as compared 96% of workshop group; only 49% of the participants of lecture-based group performed quality chest compression as compared to 82% of other group (P = 0.0005). The workshop group also performed better bag mask ventilation and defibrillation (P < 0.0001).

Conclusion: Workshop-based BLS teaching is more effective and lecture-based class teaching better is replaced in medical education curriculum.

Key Words: Basic life support, basic life support practice, basic life support workshop, cardiopulmonary resuscitation, health care provider

INTRODUCTION

Basic life support (BLS)/cardiopulmonary resuscitation (CPR) is a part of emergency medical care, and timely provision of it can even save a precious life. BLS includes recognition of signs of sudden cardiac arrest, heart attack, stroke, and foreign-body airway obstruction, as well as performing CPR and defibrillation with an automated external defibrillator.¹¹
It is very important for every person in the community to know about BLS as quality BLS can save lives and improve the overall quality of community health. Health care professionals and trainees are invariably expected to know about it, as they frequently face life-threatening situations in their daily practices. However, low confidence among medical students in performing BLS has been reported from even developed country like Europe. Poor training (of BLS) among undergraduate medical students has been reported from UK and Poland. Inadequate knowledge of BLS has also been reported from Switzerland and Pakistan. Data from India also suggests that the awareness of BLS among students, doctors, and nurses of medical, dental, and homeopathy is very poor. Such a poor result of knowledge may partly be due to ineffective methods of teaching BLS to the health care providers. Therefore, we designed the present study to assess the effectiveness of class lecture versus workshop-based teaching of BLS on acquiring practice skills of BLS and tested on an advanced mannequin.

METHODS

The present study is a case–control prospective study which was conducted after approval from the Institute Ethical Committee. Informed consents from the participants (health care providers and medical students) were taken for the study. We devised this study with an absolute error of 5% (confidence limit 95%). With 55 participants in control (lecture-based class teaching) and 50 participants in case (workshop-based) group with a hypothesized exposure of hands-on mannequin in lecture-based group of 20% and case group as 80% which gave a power of 100% for this study. Participants of both groups were taught BLS as planned and then asked to practice BLS on mannequin (Resusci Anne with QCPR from Leardal Medical, Norway) and were evaluated as per performance parameters based on American Heart Association BLS. Statistical tests to analysis the data are done using INSTAT software (GraphPad Software, Inc, La Zolla, CA, USA) and $P < 0.05$ is considered as significant.

RESULTS

Approximately, 120 candidates were approached for the study and 105 of them consented and completed the practice on mannequin. Of these candidates, 55 were in lecture-based class teaching groups and 50 were in workshop-based teaching group. 75–90% of the participants of both groups performed well in recognition of arrest, checking pulse, and starting chest compression. Though the workshop group performed better (in terms of percentage scale) but the difference is not statistically significant ($P > 0.05$). More than 83% of lecture-based teaching group has started chest compression as compared 96% of workshop group but only 49% of the participants of lecture-based group performed quality chest compression as compared to 82% of other group, and the difference is extremely significant ($P = 0.0005$). The workshop group also performed better bag-mask ventilation (BMV), mouth to mouth breathing, switching role, and defibrillation ($P < 0.0001$). Observation also revealed that workshop group participants were less hesitant in performing BLS on mannequin as compared to lecture-based class teaching group. The results of Fisher’s exact $t$-test are summarized in Table 1. Comparing the percent of participants who practiced different practice parameters correctly [Table 2] shows that the mean percent of participants of workshop group (82.67) performed far better than lecture-based class teaching group (55.96), and the difference is very significant ($P = 0.003$).

DISCUSSION

There is no doubt that theoretical knowledge is a determining factor of a successful CPR and attitude plays a great role, especially for starting the BLS procedure. BLS techniques are also very simple. Various studies have shown that the health care providers or students who have received teaching or training in the class have significantly higher score of knowledge and practice of BLS as compared to untrained. However, it has also been found that a significant proportion of class trained health care provider/students still have below-average knowledge and practice scores. This is probably because that the practical performance needs both theoretical knowledge as well as psychomotor skills. The satisfactory acquisition of theoretical knowledge during the lecture-based class teaching does not necessarily indicate a good performance of psychomotor skills during CPR in the real world. The present study also supports this finding. Though more than 83% participants of lecture-based class teaching group started

| Practice parameters accessed | Workshop ($n = 50$) | Lecture ($n = 55$) | RR (95% CI) | Two-tailed ($P$) |
|------------------------------|---------------------|-------------------|-------------|-----------------|
| Recognition of arrest        | 42                  | 41                | 1.12 (0.92-1.37) | 0.33            |
| Asking help                  | 39                  | 31                | 1.38 (1.05-1.82) | 0.02            |
| Pulse check                  | 46                  | 47                | 1.07 (0.93-1.23) | 0.36            |
| Starting chest compression   | 48                  | 46                | 1.14 (1.00-1.30) | 0.055           |
| Quality chest compression    | 41                  | 27                | 1.67 (1.23-2.25) | 0.0005          |
| Bag mask ventilation         | 43                  | 23                | 2.05 (1.47-2.86) | <0.0001         |
| Mouth to mouth ventilation   | 34                  | 21                | 1.78 (1.21-2.62) | 0.003           |
| Switching role               | 41                  | 29                | 1.55 (1.17-2.06) | 0.001           |
| Defibrillator use            | 38                  | 12                | 3.48 (2.06-5.88) | <0.0001         |

RR: Relative risk, CI: Confidence interval
Table 2: Result of unpaired t-test comparing the percentage of participants of both groups who performed practice parameters correctly

| Practice parameters accessed | Workshop (%) | Workshop mean (SD) | Lecture (%) | Lecture mean (SD) | P (t) |
|-----------------------------|-------------|-------------------|-------------|------------------|------|
| Recognition of arrest       | 84          | 82.67 (8.36)      | 74.55       | 55.96 (21.57)    | 0.003 (3.46 with 16 degree freedom) |
| Asking help                 | 78          | 56.36             | 56.36       | 41.82            |      |
| Pulse check                 | 92          | 85.45             | 85.45       |                  |      |
| Starting chest compression  | 96          | 83.67             | 83.67       |                  |      |
| Quality chest compression   | 82          | 49.1              | 49.1        |                  |      |
| Bag-mask ventilation        | 86          | 41.82             | 41.82       |                  |      |
| Mouth to mouth ventilation  | 68          | 38.18             | 38.18       |                  |      |
| Switching role              | 82          | 52.73             | 52.73       |                  |      |
| Defibrillator use           | 76          | 21.82             | 21.82       |                  |      |

SD: Standard deviation

chest compressions (with increased hesitancy), only less than half could perform quality chest compressions. The practice parameters which were more related to psychomotor skills (e.g., mouth to mouth breathing, BMV, quality chest compressions, defibrillation, etc.) were not acquired by many of the class-based teaching groups as compared to workshop group. The standard deviation of lecture-based class teaching was very high (21.37) as compared to workshop group (8.36), which also indicates that the learning/acquiring BLS knowledge and practice skills were far more consistent in workshop group as compared to the other.

With the established benefit of CPR, many of the developed countries have already recommended BLS training even for high school students nearly a decade ago. However, many developing countries including India still does not have any such recommendations and guidelines even for medical education/teaching institutes or colleges. Though many of the Indian medical, nursing, and paramedical institutes have started teaching this essential training in classes, many students (probably most of them) might not even have hands-on practice before they become graduates. On the other hand, it has also been seen that acquisition of knowledge is highest immediately after training which subsequently reduces.

The present study is limited by the fact that, it is a case–control study without randomization. Bias related to participants’ allocation, and baseline knowledge could not be denied. However, the power of the study is very good, and statistical significance shown by P value is extremely significant in many practice parameters (especially psychomotor related) indicates that the conclusion arrived at would unlikely have been much different if data were from randomized participants. The other short come of this study is that the complete performance of all the sequences of BLS (recognition to compression, airway, breathing, and defibrillation) was not evaluated at one time. The study accessed the practiced skill immediately after training is unlikely to predict their actual performance at bedside later on. The performance of all the steps or sequences at one time and a later date is likely to be lower than the practice performance found in this study.

CONCLUSION

Practice skills of BLS/CPR are poorly acquired by class-based teaching. Workshop-based BLS teaching is far more effective especially in practice parameters where psychomotor skills are predominant determinants. Lecture-based class teaching better is replaced in medical education and curriculum.

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Conflicts of interest

There are no conflicts of interest.

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