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Knowledge and Skill Retention in First-Year MBBS Students After Basic Life Support Training: A One-Year Longitudinal Study.

Sonia Kochhar[1], Navneh Samagh[2*], Jyoti Sharma[2], Amandeep Kaur[3] and Madhur Verma[4]

Abstract

Background The Indian National Medical Council has incorporated the Basic Life Support (BLS) course in the foundation course of the undergraduate (MBBS) medical curriculum. However, medical teachers raise concerns about how training would affect the retention of Basic Life Support (BLS) abilities in the longer run. So, the current study assesses the knowledge and retention of BLS skills among first-year MBBS students over one year.

Methods We included one hundred first-year MBBS students in our study who were trained for BLS, including theory, demonstrations and hands-on training using mannequins. Theoretical knowledge was assessed using pre-test and post-test questionnaires. At the same time, the skills were evaluated using Directly Observed Procedural Skills (DOPS) scores before, just after the training session, and again after one month, six months, and one year. Course feedback was also taken from the students after completing the sessions.

Results There was a statistically significant difference between pre-and post-test knowledge scores, indicating that training improved their knowledge. ($p < 0.001$) There was also a statistically significant difference between pre-and post-test skills using DOPS ($p < 0.001$). There was no significant difference in the score when DOPS was conducted at one month, but a significant decrease in their skills was seen at six months and one year when compared with the Post Skill Score. ($P < 0.001$)

Conclusions The first-year medical students' knowledge and skills were enhanced by BLS training coupled with practical sessions. Such waning skills necessitate repeating the training at periodic intervals to reinform retention of skills acquired during BLS training.

Keywords Basic Life Support, Directly observed procedural skills, MBBS students

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Introduction

The global burden due to cardiovascular disease (CVD) related morbidity and mortality is escalating around the world. Global death counts due to CVD increased from 12.4 million in 1990 to 19.8 million in 2022, with India being the second highest contributor to such deaths [1, 2]. Of all CVD causes, acute coronary events like sudden cardiac arrest continue to be a leading cause and are defined as the abrupt loss of heart function. After a cardiac arrest, it only takes four minutes of stopped blood flow to the brain to cause damage which becomes irreversible after seven minutes. It requires immediate high-quality cardiopulmonary resuscitation (CPR) to maintain blood flow to organs until advanced care is available. A high proportion of cardiac arrest-related mortality is attributed to delays in getting appropriate help. Survival from cardiac arrest largely depends on how quickly CPR is started and the quality of CPR given. People who receive effective CPR are 2–3 times more likely to survive. Therefore, CPR forms the core of any Basic Life Support training (BLS), which is designed primarily for healthcare workers and/or first responders, like police officers and firefighters [3]. However, the CPR results have been found to vary by the rescuer characteristics (untrained versus trained), patient's age (adults, children, and infants) [3, 5) and the site of CPR.(in versus out of the hospital) [4, 5]. The survival rates in out-of-hospital cardiac arrest cases can vary between 1.4 and 23%, while in-hospital cases can be between 7 and 24% [6, 7].

Such data suggest that rates can be high even with dedicated human resources. Therefore, it is imperative that medical graduates are skilled enough to administer BLS appropriately. Several studies reveal that medical and paramedical students, residents, practising doctors and nurses are unaware of these crucial life-saving skills [8–12]. Realising the importance of this skill, the National Medical Council (NMC), India, in 2019 incorporated BLS training during the foundation course in the MBBS (Bachelor of Medicine and Bachelor of Surgery) curriculum [13]. NMC emphasised that besides teaching, it is equally essential to constantly update medical students' knowledge, reinforce their skills, and periodically assess their knowledge to ensure they stay proficient in this life-saving skill [14–16].

Various studies have demonstrated a significant improvement in post-test scores compared to pretest scores after administering BLS training to students [17–20]. However, there is limited literature on the retention of these skills over their undergraduate course tenure, and that necessitates interventions, such as frequent re-enforcements to maintain their skill levels. However, a bibliometric study by Danis F et al. on global productivity and publication trends in CPR found a paucity of scientific articles on CPR skills and related teaching interventions from India [21]. The incorporation of BLS training during the foundation course in the MBBS curriculum by NMC is one of the major reforms in Indian medical education with benefits beyond figures. We should make every attempt to support such steps to have an impact, which can be later scaled up to include other necessary life-saving skills and ultimately have more efficient human resources for the healthcare sector. With this background, we aim to see the lasting impact of the BLS training in the foundation course of MBBS students on their knowledge and skills and its retention over one year. The specific objectives were to compare the knowledge and skills of such students before and after the BLS training and assess the long-term retention of such skills after a year of the training.

Methodology

Study design and duration

It was a longitudinal study done over a period of 1 year between March 2021 and March 2022.

Study setting

The study was done in a tertiary care medical institute in North India.

Study population

The study population included the students of the 1st year of MBBS. The inclusion criteria were all first-year students enrolled in the MBBS curriculum at our tertiary level medical college who were willing for BLS training. The students who had previously taken BLS training were excluded from the study. After fulfilment of the inclusion and exclusion criteria, 100 students were enrolled in the study.

Study tool

A pre-and post-test questionnaire was prepared following an extensive review of the available literature and referring to the American Heart Association (AHA) 2015 guidelines.[3] Ten questions were selected by consulting AHA-certified BLS instructors to test the cognitive domain of BLS (Supplementary material 1). The questionnaire was sent to 6 experts for content validation. Based on their responses, an item-level content validity index (I-CVI), a scale-level content validity index based on the average method (S-CVI/Ave) and a scale-level content validity index based on the universal agreement method (S-CVI/UA) were calculated. The I-CVI, S-CVI/Ave and S-CVI/UA were 0.95, 0.95 and 0.80, respectively, which was considered satisfactory, implying that the questionnaire had achieved a satisfactory level of content validity. The procedural skills of performing BLS on mannequins were assessed using the Directly Observed Procedural Skills assessment (DOPS) scales. A

BLS score based on the components of the performance checklist was devised and used to assess their BLS performance (Supplementary material 2). The checklist comprised eight steps, and each step was ranked as sufficient, partially sufficient, or insufficient by the instructors. The sufficient response was given a score of one, the partially sufficient response a score of two and the insufficient response a score of three, respectively. The minimum score was 8, and the maximum score was 24. Lower scores thus indicated better BLS skills. Each step addressed vital skills to be tested, such as establishing scene safety, assessing patient responsiveness, activating the emergency response system, correct hand placement for compressions and positioning, correct rate of compressions, allowing for complete recoil of the chest between compressions, airway opening appropriately and delivering 2 breaths with visible chest rise. The scale's scoring systems were discussed by certified BLS instructors during a face-to-face meeting. Cronbach's alpha coefficient (0.812) was calculated to determine the internal consistency and reliability of the DOPS scoring system.

Study protocol

As a part of the MBBS sensitisation program, the demographic (age, gender) and anthropometric characteristics (height and weight) of the participating students were noted, and written informed consent was obtained from the students after detailing the purpose of the study. A few students were below 18 years of age, so an assent was obtained from the academic head of the institute. The training was preceded by an assessment of student's baseline knowledge of BLS using a pre-test questionnaire. Subsequently, a pre-training skill test using Directly Observed Procedural Skills (DOPS) was then conducted based on the demonstration, and a total Pre-skill Score was noted. This was followed by a theory lecture on BLS and a practical demonstration using a mannequin (Half body Electronic CPR Mankin Model NS 372 Nuvvo, Singapore) by certified BLS instructors. Within the demonstration, particular emphasis was given to high-quality CPR, including the position, depth, rate, complete chest recoil and sustainment of uninterrupted chest compressions. This was followed by individualised hands-on BLS training of these students by instructors in small groups of five or six during the following week.

After completion of the hands-on BLS training, post-skill scores were tested using DOPS. At the end of the session, the students were reassessed for their knowledge of BLS using a post-test questionnaire (Fig. 1). BLS Classroom Course Evaluation feedback was collected from students with questions based on the course content and skill mastery (Supplementary material 3). The assessment of students using DOPS was repeated at one month (Post 1 month Skill Score), six months (Post 6-month Skill Score) and one year after their initial training. (Post 1-year Skill Score) The students were in second-year MBBS at the time of this post-1-year evaluation.

Statistical analysis

Statistical analysis was done using (Statistical Package for the Social Science) SPSS 21 version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows. Data was described in terms of range, mean±standard deviation, frequencies, and relative frequencies (percentages) as appropriate. The normality distribution of the data was determined using the Kolmogorov-Smirnov test. The parametric and non-parametric data were compared using a paired t-test and Wilcoxon rank test for independent samples. A p-value less than 0.05 was considered statistically significant.

Ethics and consent

The study was conducted after obtaining approval from the Institutional Ethical Committee of AIIMS, Bathinda was taken (IEC No. IEC-01/2020-049 dated 30/1/2021).

Results

This study included 100 first-year MBBS students. None of the students were excluded from the study. There were 54 males (54%) and 46 females (46%) (Fig. 2). The mean age was 19.9±1.20 years, with no significant difference between the mean age of either gender ($p=0.45$). The mean height was 168.2±8.91 cms, and the mean weight was 62.9±10.54 kgs. The mean BMI was 22.1±2.68 Kg/m^2.

There was a statistically significant improvement in the mean post-test score (7.5±1.11) compared to the mean pre-test score (3.7±1.65) of the students. ($p<0.001$). (Fig. 2) There was also a statistically significant improvement in the mean total Post-Skill Score as assessed by DOPS (13.0±2.65) when compared with the mean total pre-skill Score (22.9±1.02) ($p<0.001$). (Lower scores implied better skills) (Fig. 3). The mean total post 1 month Skill Score (13.68±2.62) was comparable to the mean total post skill score (13.0±2.65) among the students. ($p>0.05$). There was a significant deterioration of BLS skills among the students at 6 months, as assessed by the mean total post-6-month Skill Score (17.0±2.68) compared to the mean total Post-Skill Score. ($p<0.001$). There was also a significant further deterioration of BLS skills among the students at 1years as assessed by mean total post-1 year Skill Score (20.9±2.56) when as assessed by mean total post-1 year Skill Score (20.9±2.56) compared to the mean total Post-Skill Score. ($p<0.001$). There was a significant increase in the mean total post-6-month Skill Score and mean total post-1-year Skill score

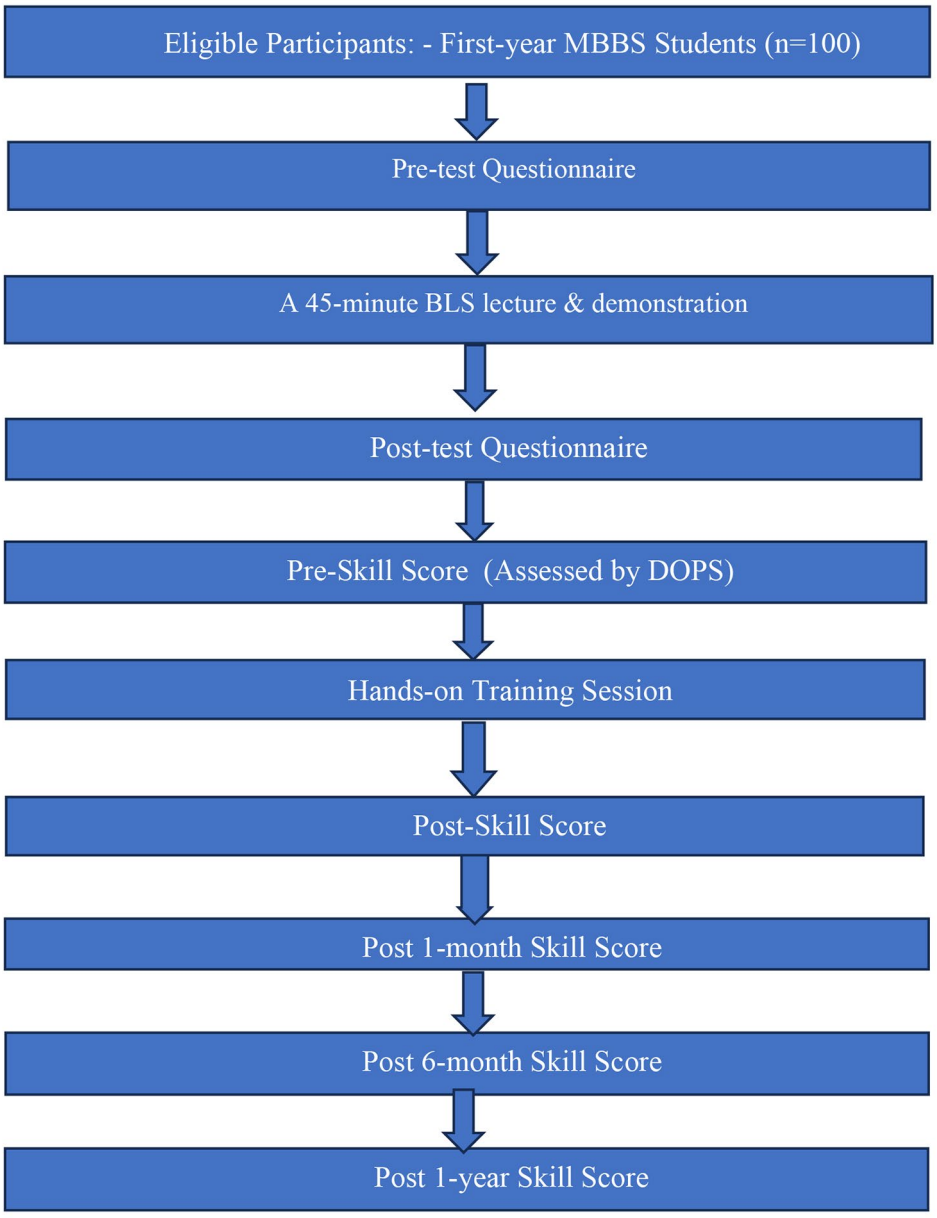

Fig. 1 Data collection process

compared to the mean total Post-1-month Skill score. ($p < 0.001$) (Fig. 3).

A detailed analysis of the eight vital skills that were assessed using DOPS on mannequins was done and students with sufficient skills at each time point was evaluated. (Table 1)

1. **Establish Scene Safety**: There was a significant increase in the number of students performing the skill sufficiently between the Pre-skill score assessment and post-1-month skill score assessment (P1 = 0.001), post-skill score assessment and post-1-month skill score assessment (P2 = 0.001), Pre-skill score and post 6-month skill score assessment (P3 = 0.001), Post- skill score and post 6-month skill score assessment (P4 = 0.001) and Pre-skill score and post 1-year skill score assessment (P5 = 0.001). There was an increase in the number of students who could perform the skill sufficiently during post 1-year skill score assessment compared to Post- skill score but it was not statistically significant. (P6 = 0.065)
2. Assess patient responsiveness followed by pulse check and breathing within 10 s: There was a significant increase in the number of students performing the skill sufficiently between Pre-skill score assessment and post-1-month skill score

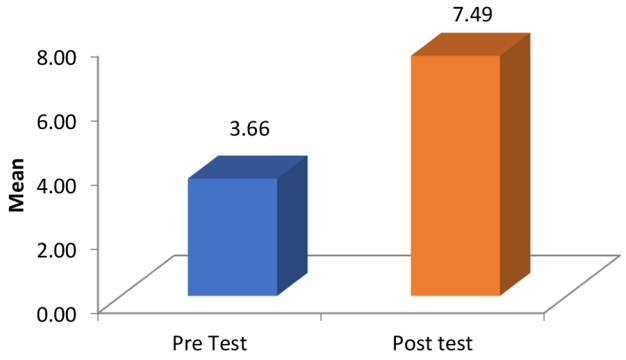

Fig. 2 Comparison of mean Pre-test and Post-test scores among study participants

assessment ($P^1 = 0.001$), Pre-skill score and post-6-month skill score assessment ($P^3 = 0.001$) and Pre-skill score and post 1-year skill score assessment ($P^5 = 0.001$). There was an increase in the number of students who could perform the skill sufficiently at 1-month and 6-month assessments compared to post-skill scores, but this was not statistically significant. There was a decrease in the number of students who could perform the skill sufficiently at 1 year compared to the post-skill score, but it was not statistically significant. ($P^6 = 0.126$)

3. Activate emergency response (Call for help/AED): There was a significant increase in the number of students performing the skill sufficiently between Pre-skill score assessment and post-1-month skill score assessment ($P^1 = 0.001$), Pre-skill score and post-6-month skill score assessment ($P^3 = 0.001$) and Pre-skill score and post 1-year skill score assessment ($P^5 = 0.001$). There was an increase in the number of students who could perform the skill sufficiently at 1-month and 6-month assessments as compared to post-skill scores, but this was not statistically significant. There was a significant decrease in the number of students who could perform the skill sufficiently in 1 year compared to the post-skill score. ($P^6 = 0.028$)
4. Correct CPR hand placement and positioning: There was a significant increase in the number of students performing the skill sufficiently between Pre-skill score assessment and post-1-month skill score assessment ($P^1 = 0.001$), Pre-skill score and post-6-month skill score assessment ($P^3 = 0.001$) and Pre-skill score and post 1-year skill score assessment ($P^5 = 0.001$). There was an increase in the number of students who could perform the skill sufficiently at 1-month and 6-month assessments compared to post-skill scores, but this was not statistically significant. There was a significant decrease in the number of students who could perform the skill sufficiently in 1 year as compared to the skill score. ($P^6 = 0.001$)
5. Correct CPR rate (between 100–120/minute and depth (2 inches): There was a significant increase in the number of students performing the skill sufficiently between Pre-skill score assessment and post-1-month skill score assessment ($P^1 = 0.001$), Pre-skill score and post-6-month skill score assessment ($P^3 = 0.001$) and Pre-skill score and post 1-year skill score assessment ($P^5 = 0.001$). There was an increase in the number of students who could perform the skill sufficiently at 1-month and 6-month assessments compared to post-skill scores, but this was not statistically significant. There was a significant decrease in the number of students

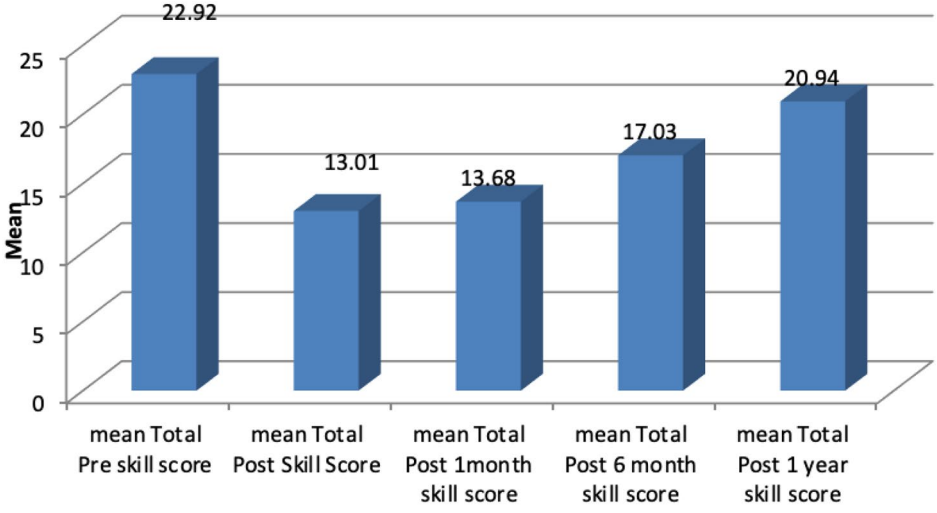

Fig. 3 Comparison of mean total Pre skill score, mean total Post Skill score, mean total post-1-month skill score, mean total post-6-month skill score and mean total post-1-year skill score of the study participants

Table 1 Comparison of the number of students with sufficient skills as assessed using DOPS during pre-skill score assessment, post-skill score assessment, post-1 month, 6-month and 1-year skill score assessment

	Skills tested using DOPS	No of students with sufficient response during Pre-skill score assessment	No of students with sufficient response (post skill score assessment)	No of students with sufficient response (post 1 month skill score assessment)	No of students with sufficient response (post 6 months skill score assessment)	No of students with sufficient response (post 1 year skill score assessment)	P^1 (Preskill score and post 1 month skill score assessment)	P^2 (Post- skill score and post 1 month skill score assessment)	P^3 (Preskill score and post 6 month skill scor assessment)	P^4 (Post- skill score and post 6 month skill score assessment)	P^5 (Preskill score and post 1 year skill scor assessment)	P^6 (Post-skill score and post 1 year skill score assessment)
1	Establish Scene Safety	25	41	71	69	55	0.001*	0.001*	0.001*	0.001*	0.001*	0.065
2	Assess patient responsiveness (Check pulse and breathing- time taken not more than 10 s)	13	62	64	66	51	0.001*	0.839	0.001*	0.597	0.001*	0.126
3	Activate emergency response (Call for help/AED)	11	59	69	68	44	0.001*	0.163	0.001*	0.09	0.001*	0.028*
4	Correct CPR hand placement and positioning	8	67	70	67	15	0.001*	0.69	0.001*	0.10	0.001*	0.001*
5	Correct CPR rate (between 100–120/min) and depth (2 inches)	19	59	64	66	39	0.001*	0.487	0.001*	0.324	0.001*	0.005*
6	Allow for complete recoil of chest between compressions	7	63	65	60	21	0.001*	0.860	0.001*	0.755	0.001*	0.001*
7	Airway opened appropriately (head tilt, chin lift or jaw thrust)	12	50	69	63	41	0.001*	0.005*	0.001*	0.092	0.001*	0.243
8	Delivers 2 breaths (each over 1 s) with visible chest rise	13	40	62	62	40	0.001*	0.001*	0.001*	0.002*	0.001*	1.000

DOPS- Directly Observed Procedural Skills; *p*-value less than 0.05 was considered statistically significant

who could perform the skill sufficiently at 1 year compared to the post-skill score. ($P^6 = 0.005$)

6. Allow for complete recoil of the chest between compressions: There was a significant increase in the number of students performing the skill sufficiently between Pre-skill score assessment and post-1-month skill score assessment ($P^1 = 0.001$), Pre-skill score and post-6-month skill score assessment ($P^3 = 0.001$) and Pre-skill score and post 1-year skill score assessment ($P^5 = 0.001$). There was an increase in the number of students who could perform the skill sufficiently at 1-month and 6-month assessments compared to post-skill scores, but this was not statistically significant. There was a significant decrease in the number of students who could perform the skill sufficiently at 1 year compared to the post-skill score. ($P^6 = 0.001$)
7. Airway opened appropriately (head tilt, chin lift or jaw thrust): There was a significant increase in the number of students performing the skill sufficiently between the Preskill score assessment and post-1-month skill score assessment ($P^1 = 0.001$), post-skill score assessment and post-1-month skill score assessment ($P^2 = 0.001$), Pre-skill score and post 6-month skill score assessment ($P^3 = 0.001$), and Pre-skill score and post 1-year skill score assessment ($P^5 = 0.001$). There was a decrease in the number of students who could perform the skill sufficiently at 1 year compared to the post-skill score, but it was not statistically significant. ($P^6 = 0.243$)
8. Delivers two breaths (each over 1 second) with a visible chest rise: There was a significant increase in the number of students performing the skill sufficiently between the Pre-skill score assessment and post-1-month skill score assessment ($P^1 = 0.001$), post-skill score assessment and post-1-month skill score assessment ($P^2 = 0.001$), Pre-skill score and post 6-month skill score assessment ($P^3 = 0.001$), Post- skill score and post 6-month skill score assessment ($P^4 = 0.001$) and Pre-skill score and post 1-year skill score assessment ($P^5 = 0.001$). The number of students who could perform the skill sufficiently during the post-1-year skill score assessment remained the same as the Post-skill score. ($P^6 = 1.00$)

The BLS Classroom Course Evaluation feedback analysis for the instructor revealed that 98.9% of participants believed that the instructions were provided which helped skill tests, 94.3% consented that all questions were answered during the training session & 96.6% agreed that they were professional and courteous. Regarding the course content, 98.9% agreed that the course learning objectives were clear and well presented, 95.4% said that the equipment was clean and in good working condition, 94.3% agreed that the overall level of the course was appropriate; neither too hard nor too easy; while 51.7% graded the quality of videos and written material as good and another 39.1% graded as excellent. When asked about skill mastery, 93.1% said that the course prepared them successfully, 89.7%, another 85.1% admitted having said they would now respond to emergencies. Another 85.1% admitted that they had gained confidence to use the skills (Fig. 4).

Discussion

Cardiovascular disease is a major global concern and is known to cause sudden cardiac death in around 80% of the cases [22]. According to AHA, the use of correct CPR techniques increases the likelihood of survival of

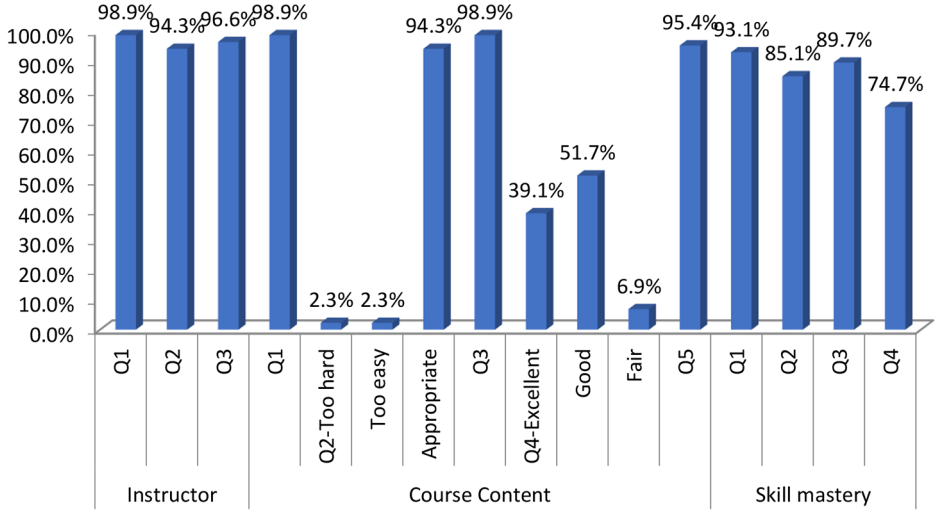

Fig. 4 Course feedback given by the study participants

cardiac arrest patients [23]. If CPR is not administered correctly and immediately after cardiac arrest, the victim begins to suffer irreversible brain damage as early as four minutes after the arrest [24]. Srimathi et al., in their study, concluded that the foundation course is a must for students enrolling in the MBBS program and that its implementation would aid medical students in gaining the fundamental knowledge, attitudes, and abilities that will enable them to practice medicine competently in the future [25]. Another study by Chandrasekaran et al. found that Indian Medical Undergraduates had insufficient knowledge and proficiency in performing cardiopulmonary resuscitation. They proposed that teaching CPR to first-year MBBS students could address this lack of competency [26]. Various studies have demonstrated that first-year MBBS students' understanding of CPR was insufficient and that their knowledge had improved due to the CPR workshop [17, 18]. Realising the importance of this skill, the NMC, India, in 2019, incorporated BLS training during the foundation course held soon after the students joined the MBBS course [13]. Various studies have been done since then to assess the impact of BLS training on undergraduate students during foundation courses. Certain interesting findings are emerging from our study, making it interesting for global audiences. We observed that the training significantly increased the students' understanding of CPR, as evidenced by significant improvement in the mean post-test score compared to the mean pre-test score of our students. ($p<0.001$). Manuel SA et al., in their study, also found that the mean post-test score was significantly better than the mean pre-test score in first-year medical undergraduates who were imparted BLS training as a lecture for 4 h followed by training and assessment on three skill stations. Additionally, there was a noticeable improvement in the students' self-reported post-training confidence regarding their knowledge and abilities related to performing CPR [19].

We also observed a statistically significant difference between pre-and post-test skill test scores using DOPS. The post-1-month Skill Score total was comparable to the post-skill score. We found progressive deterioration in the post-skill score at 6 months and 1 year when compared with the Post Skill Score, and it was found to be statistically significant. There was also a significant decrease in the mean score seen at 6 months and 1 year compared with the Post 1 month Skill score. In a study by Saiyad SM et al., in first-year MBBS students, there was a significant improvement in the knowledge of students as shown by the results of the pre-questionnaire score(7.23 ± 1 97) and post-questionnaire (13.07 ± 1 49). ($p<0.0001$)When their skills were assessed using DOPS, 23.29% of students could complete all steps correctly in 1st attempt, 49.31% in 2nd attempt, and 27.4% required 3rd attempt to complete all steps correctly [20]. A study by Pande S et al. assessed how well first-year medical students retained the knowledge and skills imparted through BLS training. They found a significant increase in the mean post-test 1 score (conducted 1 week after training) compared to the mean pretest score (7.42 ± 1.10 vs. 3.42 ± 2.34). They also found that the mean post-test 2 score (conducted during 2nd year MBBS) was lower than that for post-test 1 but higher than the mean pretest score [17].

The scores progressively deteriorated, with the 1-year score slightly below the pre-skill score. We observed that among the eight skills assessed using DOPS, there was a significant decrease in the number of students who could perform the skill sufficiently at 1 year as compared to post-skill score for skills including activation of emergency response i: e, call for help/AED ($P^6=0.028$), correct CPR hand placement and positioning ($P^6=0.001$), correct CPR rate and depth (($P^6=0.005$) and allowing for complete recoil of the chest between compressions. ($P^6=0.001$), sing the need to reinforce these skills regularly throughout the MBBS curriculum.

DOPS was initially used to assess students' competencies in actual patients in natural clinical settings. However, studies have found that DOPS works well in undergraduate student´s skills in laboratory settings on mannequins [27]. This is especially important in our study population, comprised of newly joined undergraduate students, as well as the vital skills like BLS that we intend to impart, wherein real patient assessments in natural clinical settings would not be feasible because of the critical nature of the procedure.

Since undergraduate students have limited time in clinical postings and don't get to practice resuscitation skills during their undergraduate teaching period of 4.5 years, they need to re-enforce the BLS skills throughout their MBBS period at regular intervals. The significant deterioration of skills at 6 months emphasises the need for frequent BLS training followed by assessments for students to retain these life-saving skills as early as at 6 monthly intervals. We suggest that the BLS training and examination may be incorporated into every semester of the MBBS curriculum for improved retention of knowledge and skills, as it will directly improve patient outcomes. We must revise our recommendations so that they are no longer limited to BLS but a whole set of life-saving skills that should be identified in the medical education curriculum of every country so that they can reinforced from time to time through boot camp-like interventions to develop a breed of medical graduates who can be relied upon.

The strengths of our study are the use of validation tools in the preparation of pretest and post-test questionnaires as well as the Directly Observed Procedural Skills assessment (DOPS) scale. Secondly, the MBBS students

were longitudinally followed for over a year to assess skills retention. Thirdly, a detailed analysis of the eight vital skills assessed using DOPS on mannequins was done, and the percentage of students with sufficient skills at each time point was assessed. This gave us information about the most affected skills and those that required more attention and reinforcement. The limitation of our study is that we did not analyse the data based on the gender, height, weight, and BMI of the participants. Secondly, we did not incorporate open-ended questions in our questionnaire, which could have been used for qualitative analysis.

In conclusion, our study depicts a need for significant improvement in the knowledge and skills of first-year MBBS students after the BLS lecture and hands-on course, which persisted for one month. There was progressive skill deterioration at six months and one year, emphasising the need for frequent six-month BLS training sessions for these students.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12909-024-05922-0.

Supplement 1: Sample Questionnaire (Pretest and Post-test).

Supplement 2: Steps followed during Directly Observed Procedural Skills (DOPS).

Supplement 3: BLS Course Evaluation.

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Author contributions
S.K. and N.S. wrote the main manuscript text.J.S and A.K. prepared the Figs. 1-4S.K. ,N.S. and M.V. prepared the tables.N.S, J.K., A.K. prepared the questionnaire along with other experts. All authors reviewed the manuscript."

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Data availability
The datasets used and/or analysed in the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
This study was approved by the Institutional Ethical Committee of AIIMS, Bathinda (IEC No. IEC-01/2020-049 dated 30/1/2021).
Written informed consent was taken from all students willing to participate in the study.

Presentation at a meeting
Nil.

IEC No
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Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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