Effectiveness of Foundation Course on Skills Training (BLS, BMW & Hand washing) among First-Year MBBS Students

Basanti Kumari Pathi1, Kumudini Panigrahi2, Alpana Mishra3, Nirmala Poddar4

1, 2, 4 Department of Microbiology, Kalinga Institute of Medical Sciences, KIIT Deemed to be University, Bhubaneswar, Odisha, India. 3 Department of Community Medicine, Kalinga Institute of Medical Sciences, KIIT Deemed to be University, Bhubaneswar, Odisha, India.

ABSTRACT

BACKGROUND
The foundation course (FC) will provide a sound foundation for understanding the MBBS course. The fresh undergraduate (UG) should be aware of some basic safety principles like basic life support (BLS), biomedical waste management (BMW) & hand hygiene (HH). We wanted to access the student’s knowledge about BLS, BMW & HH skills after four months of FC and their perception of the skills module of FC.

METHODS
A cross-sectional observational study was conducted in the Department of Microbiology, KIMS, Bhubaneswar. After four months of completing the FC, the individual student was assessed for the knowledge domain of BLS, BMW & HH by multiple-choice questions and feedback from students was taken.

RESULTS
Out of 150, 99 (66 %) students responded to MCQs of BLS, BMW & HH and 120 (80 %) students gave feedback to the FC. A consensus measure expressed in percentage was obtained for each item. Most of the students acquired 60-70 % of the marks. The mean, median & mode of BLS, BMW & HH were 7.23, 7 & 7; 7.94, 8 & 8; 6, 6 & 7. 75 % of students said that skill training during FC was helpful for better patient care.

CONCLUSIONS
BLS, BMW & HH are the essential skills; students should have a basic idea about these skills, which help them in clinical posting after years. Accounting for the feedback of students regarding the FC can be modified.

KEY WORDS
Foundation Course (FC), Basic Life Support (BLS), Biomedical Waste Management (BMW), Hand Hygiene (HH)
Medical Education in India is introducing a "Competency-based undergraduate curriculum" for the Indian Medical Graduate (IMG). This document aims to facilitate institutions and faculty in implementing an FC of one month at the beginning of the MBBS course. It will sensitize the fresh medical student with the required knowledge and skills to assist him/her in acclimatizing to the new professional environment.

They would be his/her milieu for a life-long career in the medical profession. While the institutions are following the general guidelines, local changes can depend on the context and requirements. The training is intense and demands exceptional commitment, resilience and lifelong learning. The fresh UG should be aware of some basic safety principles and trained in basic skills that are mandatory before they enter patient care areas. Different skill modules proposed by NMC are 2.1: First aid, 2.2: BLS, 2.3: Universal Precaution, 2.4: Waste management, 2.5: Immunization and 2.6: Documentation.

In 2009, the World Health Organization (WHO) highlighted preset guidelines known as the "Five Moments for Hand Hygiene." The MBBS students shall know of five golden moments for HH. Alcohol-based hand sanitizers are the recommended products for HH when hands are not visibly soiled. Typically, 3 mL to 5 mL in the palm, rubbing vigorously, ensuring that all surfaces on both hands get covered, and about 20 seconds is required for all surfaces to dry completely.

BMW is any waste produced during the diagnosis, treatment, or immunization of human or animal research activities about that or in the production or testing of biological or in health camps. It follows the cradle to a grave approach, characterization, quantification, segregation, storage, transport, and treatment of BMW.

At least the healthcare professionals and individuals in the community should know how to perform BLS as they often encounter such situations. Health care professionals can be competent to resuscitate from their first posting. In the United States, BLS training has been recommended for all health care professionals since 1966, especially for those involved in resuscitation.

Objectives of the Study
To access the student’s knowledge about BLS, BMW & HH skills after six months of FC and their perception of skills training in the FC.

Methods
This was a cross-sectional observational study conducted in the Department of Microbiology, Kalinga Institute of Medical Sciences, Bhubaneswar, Odisha, India. It admits 150 students every year and holds a good record of the academic performance profile. The study participants were all students joining the first-year Bachelor of Surgery and Bachelor of Medicine (MBBS) UG course (n=150). Students attending the FC were included in the study and those students who joined but not attended the FC were excluded from the study.

The newly joined students of 2019 underwent a one-month intensive FC organized by faculty members of KIMS. It was a well-planned course according to NMC guidelines. After six months, this study was conducted to know the students' knowledge about skill acquisition like BLS, BMW, and HH & also the perception of students about the skill modules of the newly added one-month foundation course after getting approval from Institutional research and ethical committee clearance with reference no: KIIT/KIMS/IEC/215/2020.

In FC, the BLS skills were taught by dividing 150 students into two groups of 75 each. A facilitator of each group had taken 3 hours session inclusive of a break. Initially introduction to BLS, its importance and the need was explained. After that, a demonstration with appropriate videos followed by hands-on training were given to students' skills like introducing them to the C-A-B algorithm, recognizing cardiac and respiratory arrest, pulse check, chest compression, and integrating all skills set into a single scenario. In FC, the HH skills were taught by engaging students into small groups with ten students & one faculty by an interactive demo class of one hour, demonstrating correct techniques of hand washing, hand rub, and steps of hand washing.

In BMW skill, the faculty took the interactive lecture for one hour about the definition of biomedical wastes, different types of waste generated in a health care facility, segregation, and disposal. Took permission from physiology HOD to conduct this study in their respective theory class without prior notice to students. Faculty members of the Microbiology department prepared a set of validated MCQs for BLS, BMW & HH for conducting this study with ten MCQs for each skill; each MCQ carried one mark for a total of ten marks, covering basic knowledge of BMW, BLS & HH.

With due permission, the MCQ examination was conducted. According to inclusion criteria, students who attended the FC were included in the study. The remaining students were asked to leave the hall and go to the library. The students present in the class were explained about the aim, procedure and importance of the study and were given the consent forms. Those students who gave their consent and attended the FC were given the MCQs of one skill, for example, HH, in one theory class. They were given 10 – 15 minutes to do the MCQs and then the answer sheets were collected. After that, the questions were discussed among students in an interactive manner. The entire procedure took around one hour. Similarly, MCQ examinations for BLS & BMW were done in two separate theory classes taking one hour each. The answer sheets were corrected, and scores were given according to the student’s performance. After that, analysis was done by using Top of Form.

To evaluate the student’s perception of the skill module of the FC, a validated questionnaire was prepared by medical education unit members of KIMS and given to them in the Google form. The questions were about the skill topics they like most, and any teaching-learning modifications they want, from the FC. The identity of the student was not disclosed in the Google form. Questions were asked as per the Likert scale: yes, no, do not know, or maybe. Some open-ended questions were also there to give their suggestions and feedback.
**Results**

Out of 150 students, 99 (66%) students were commonly present in three theory classes who fulfilled the inclusion criteria in which MCQ tests for BLS, BMW and HH were conducted & 120 (80%) students were given feedback about their perception of the skill module in different aspects of PC.

The percentage of students who responded to various knowledge domains of BMW is as follows; like the correct answer of the example of BMW & different processes of biomedical waste generation (by 98 % of students), BMW treatment and disposal methods (94.9 % students), and colour codes used in the segregation of BMW (90.9 % students). How hazardous materials like IV tubes, catheters, and tubing were discarded (85.9 % students), the benefits of waste treatment (79.8 % students), how the general waste was discarded in a hospital setting (61.6 % students), how the chemical waste liquids were discarded (52.5 % students) and knew about discarding sharp (47.5 % students).

**Table 1. Represents the Student’s Residual Memory of the Knowledge Domain of BMW**

<table>
<thead>
<tr>
<th>Number</th>
<th>Knowledge Domain of BMW</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Could correctly identify theBMW material from the given examples</td>
<td>97(98)</td>
</tr>
<tr>
<td>2</td>
<td>Could correctly identify the process of biomedical waste generation from the given examples</td>
<td>98</td>
</tr>
<tr>
<td>3</td>
<td>Could know the Key Methods of Medical Waste Treatment and Disposal</td>
<td>95</td>
</tr>
<tr>
<td>4</td>
<td>Could correctly identify the benefit of proper waste treatment</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>Could correctly know the colour code not used in segregation of biomedical Waste</td>
<td>91</td>
</tr>
<tr>
<td>6</td>
<td>Could correctly identify the colour of the dustbin in which wastes from general practitioners were discarded</td>
<td>62</td>
</tr>
<tr>
<td>7</td>
<td>Could correctly identify the colour of the dustbin in which hazardous materials like IV tubes, catheters, and tubing were discarded</td>
<td>86</td>
</tr>
<tr>
<td>8</td>
<td>Could correctly identify the coloured dustbin in which glass materials were discarded</td>
<td>81</td>
</tr>
<tr>
<td>9</td>
<td>Could correctly identify the coloured dustbin in which the chemical liquid wastes were discarded</td>
<td>52</td>
</tr>
<tr>
<td>10</td>
<td>Could correctly identify the coloured dustbin in which waste including metal sharps like needles, syringes with fixed needles, scalpels, and blades were discarded</td>
<td>48</td>
</tr>
</tbody>
</table>

**Table 2. Percentage of Students’ Acquisition of Knowledge about BLS**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Knowledge Domain of BLS</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Could correctly identify which artery is assessed in adults for patients not breathing</td>
<td>83</td>
</tr>
<tr>
<td>2</td>
<td>Could correctly identify which artery is assessed in child and infant for not breathing</td>
<td>82</td>
</tr>
<tr>
<td>3</td>
<td>Could correctly know the duration of assessing the patient not breathing to start CPR</td>
<td>85</td>
</tr>
<tr>
<td>4</td>
<td>Could correctly know the number of chest compressions done per minute</td>
<td>85</td>
</tr>
<tr>
<td>5</td>
<td>Could correctly identify the ratio of chest compression versus rescue breath</td>
<td>88</td>
</tr>
<tr>
<td>6</td>
<td>Could correctly know the duration of time after reasessing the pulse of patients</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>Could correctly identify where the mouth-to-mouth technique is recommended</td>
<td>71</td>
</tr>
<tr>
<td>8</td>
<td>Could correctly identify where the mouth-to-mouth technique is recommended</td>
<td>71</td>
</tr>
<tr>
<td>9</td>
<td>Could correctly identify at which point to stop the BLS protocol</td>
<td>76</td>
</tr>
<tr>
<td>10</td>
<td>Could correctly identify the components of BLS</td>
<td>100</td>
</tr>
</tbody>
</table>

**Figure 1.**

Participants knowledge was 89 % good (scoring > 80 %) & 11 % average (scoring < 80 %) for BMW skill, 76 % good & 24 % average for BLS and 54 % good & 46 % average for HH skill training. (Fig-2)
A predesigned validated questionnaire was used for the study to assess the effectiveness of skill training (BMW, BLS & HH). Also, the perception of students towards skill training in FC was taken.

Every student (98%) knew the different types of BMW generated in hospitals. Most of the students (>80%) knew different biomedical waste treatment and disposal methods, and different colour codes used in the segregation of BMW according to standard protocol. Students had poor knowledge regarding disposal of waste sharp, chemical wastes and general medical practitioners’ waste. The average score obtained by students was 7.94 (mean), the most frequent score obtained was eight (mode), and the 50th percentile of the BMW skill was eight (median).[9-11]

According to the Centre for Disease Control and Prevention (CDC), HH is the single most important practice in reducing the transmission of infection in the healthcare setting.[12,13] Despite this evidence, studies have repeatedly shown that the importance of hygiene has not been adequately recognized amongst healthcare professionals, and compliance remains low.

In this study, most of the students (90%) knew that hand washing is the most effective method of preventing transmission of infection in hospitals. Students had poor compliance regarding HH before touching a patient & before a procedure. 94% of students knew about HH after a procedure or body fluid exposure. They had average compliance regarding HH after touching a patient and after touching the patient’s surroundings. 73% and 66% of students responded correctly to how long hand washing should be done and which substance is used for hand rub. 61% of students knew the steps of hand washing, and 54.5% of them knew that May 5 is celebrated as hand hygiene day. The average score obtained by students was six (mean), the most frequent score obtained was six (mode) and the 50th percentile was seven (median). These findings are similar to those observed by other researchers.[14–18]

Health professionals should have sound CPR/ BLS knowledge and skills, but there is a significant problem retaining skills and outdated information.[19] This study was to explore the present understanding of first professional medical students of our college about BLS/CPR. This study revealed that the students had adequate knowledge of BLS. More than 80% of students knew which artery was assessed in adult patients for not breathing, how long to evaluate the patient not breathing to start CPR and the ratio of chest compression versus rescue breath. The average score obtained by students was 7.23 (mean), the most frequent score obtained was seven (mode) and the 50th percentile was seven (median). A minimal number of studies were conducted on the knowledge domain of BLS for UG students.[20]

In this study, participants’ compliance with knowledge about BMW & BLS was more than HH skills. 89% of students secured >80% scores in BLS, 76% of students in BLS compared to 54% students in HH.

In this study, most students liked ethics, basic life support, hand hygiene class, Odia language class, and Bhubaneswar local trip. Some students liked time management, and interacting with first-year MBBS teachers. Some other students liked holistic approach, communication skills, yoga class, and history of medicine and surgery. Most of the students responded that the drawbacks of the FC were, too lengthy, some topics were wearisome, and more practical and interactive classes were required. Some students told that there were no flaws in the FC. The maximum students’ response to modification of FC was that it should be 15 days or less. Very few students said that it should be extended to 40 days. Some students said it could be modified such as morning (9 am-12 noon) for FC and afternoon (1 pm-5 pm) for proper MBBS course. Similar findings were found in different studies by various researchers.[21–24]

**Recommendation**

Regular training of skill modules like BLS, BMW and HH at the interval of 6 months should be conducted, and more practical
exposure to the skills under supervision will strengthen them adequately.

CONCLUSIONS

The FC should help the students acquire different skills and knowledge before entering the patient care area. The students have some knowledge about the BLS, BMW, and HH skills, but it is reinforcement that will help to apply them in clinical posting and real-life scenarios.

REFERENCES