

# A University Community Project on Basic Life Support and First Aid Training

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## Abstract

**Introductions:** The importance of Basic Life Support (BLS) and First Aid (FA) training for non-healthcare professionals has been increasingly recognised. Evidence has shown that early bystander cardiopulmonary resuscitation is essential for survival from out-of-hospital cardiac arrest. Medical students from Universiti Brunei Darussalam (UBD) established a community group called 'On The Scene' (OTS) providing BLS and FA training. In addition, we also assess the awareness, knowledge and inclination of the university community in performing BLS and FA, through pre- and post-intervention questionnaires. **Materials and Methods:** Interactive training sessions teaching BLS and FA with mass-media dissemination were carried out in three target areas – UBD, a local high school and the city centre. Subjects from UBD were invited by email to participate in the interactive sessions while subjects from a local school and public through social media. Pre- and post-interactive questionnaire were done during the training session held in UBD only. The effectiveness of these sessions was assessed using pre- and post-intervention questionnaire. **Results:** There was a significant increase in the mean BLS and knowledge scores from 7.12 (95% CI: 6.24, 8.00) to 16.1 (95% CI: 15.67, 16.53), and FA knowledge scores from 5.94 (95% CI: 5.58, 6.30) to 6.18 (95% CI: 5.89, 6.47) ( $p < 0.0001$ ), with the mean total scores from 13.06 (50.2%) to 22.28 (85.7%). The mean confidence scores also showed significant improvements for BLS from 3.34 (95% CI: 3.14, 3.54) to 3.79 (95% CI: 3.58, 4.00) post-intervention, while the FA confidence score increased from 3.57 (95% CI: 3.34, 3.80) to 4.00 (95% CI: 3.80, 4.20) ( $p < 0.0001$ ). **Conclusion:** *On The Scene* successfully conducted BLS and FA training sessions to targeted audiences including the public. The interventions have shown to be effective in improving knowledge and confidence scores on BLS and FA amongst participants, along with increased public awareness through social media mass dissemination.

**Keywords:** Community; Intervention; Basic cardiac life support; First Aid; University

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**INTRODUCTION**

The majority of people who experience an out-of-hospital cardiac arrest do not receive effective resuscitation within the key time frame of 3–5 minutes after onset, lowering their chances of survival.<sup>1</sup> Cardiopulmonary resuscitation (CPR) has advanced from being a clinical practice to a life-saving technique, however, only a small percentage of the public attempt it.<sup>2,3</sup> Factors such as perceived incapability, fear of legal liability, and infection from mouth-to-mouth ventilation may prevent bystanders from performing CPR.<sup>4,5</sup>

An important component of Basic Life Support (BLS) includes the use of an automated external defibrillator (AED) device, which delivers a shock that temporarily halts all abnormal electrical activity, such as ventricular fibrillation (VF) and pulseless ventricular tachycardia (pVT). This allows the heart's intrinsic pacemaker to potentially resume normal electrical activity, leading to the return of spontaneous circulation (ROSC).<sup>6,7</sup> Despite its increased installations, there are multiple barriers to effective AED use. Therefore, increasing knowledge and confidence in CPR and AED usage are crucial as it is associated with improved survival.<sup>7,8</sup>

First aid (FA) is the treatment of any injury or sudden illness prior to the arrival of professional medical assistance.<sup>9</sup> A study on domestic injuries revealed that cuts were the most prevalent (36.1%) followed by burns (30.1%), fractures (21.6%), and choking (9.6%).<sup>10</sup> A study among university athletes reported that sprains and fractures were the most prevalent.<sup>11</sup> Meanwhile, in Brunei, open wounds accounted for about 51.1% of all non-fatal occupational injuries, followed by internal injuries (20.2%) and fractures (15.5%).<sup>12</sup> A Red Cross survey observed that about 59% of out-of-hospital deaths would have been prevented if FA had been performed in the first few minutes of the incident.<sup>13</sup>

*On The Scene's* community project was centered in Universiti Brunei Darussalam (UBD) to equip university students with BLS and FA skills, university staff who would be the primary contacts for most commonly encountered emergency situations within the university, as well as high school students as requested by the school. Members of the general public were also included in the training to maximise the group's community outreach and improve BLS and FA practices

within the population. Therefore, the main aim of this project was to educate and equip students and staff from UBD as well as the general public with competent skills in BLS and FA by raising awareness and evaluate the knowledge and willingness of the university community including students and staff in BLS and FA. These were assessed using pre- and post-intervention questionnaires to evaluate effectiveness of the intervention provided.

**MATERIALS AND METHODS**

In this community project, the *On the Scene* team conducted four weekday sessions of BLS and FA training at UBD. Participants were recruited through mass university email and social media dissemination of event flyers. The participants then registered via *Google Forms* and limited slots provided on a first come first serve basis. Each session offered 32 slots, where a total of 71 participants (67 students and 4 staff) took part. The participants who met the following inclusion criteria were: 1) aged 18 or older, 2) UBD staff or students. Those excluded were students and staff of other universities and people with disabilities hindering their ability to perform CPR.

The intervention included five stations: 1) CPR, AED and choking; 2) Splinting for fractures; 3) Bandaging for bleeding; 4) Floor game designed to consolidate the information learnt; 5) Team dynamics - an activity designed to simulate an out of hospital emergency situation (e.g., fractures, bleeding, cardiac arrest, etc.)

The materials used for the training sessions and questionnaire were derived from both university curriculum and accredited American Heart Association (AHA) BLS courses while preserving the copyrights of the course's content, although most of the interactive activities were based on the group's original and novel ideas in order to make them more appealing to participants.

A scoping questionnaire assessing the "*knowledge, attitude and perceptions of Basic Life Support & First Aid amongst university community*" was first distributed to all UBD participants to gather the pre-intervention test scores. This questionnaire was only distributed to UBD participants for analysis. The questionnaire was based on the BLS Adult, Child & Infant Resuscitation Guidelines by the AHA, which included three sections:

sociodemographic factors, knowledge of BLS and FA, and Attitude and Perception towards BLS and FA.<sup>14</sup>

The maximum score for the questionnaire was 26 points (19 from BLS, 7 from FA), where achieving 84% was considered adequate, consistent with AHA’s criteria to ensure every participant is equipped with life-saving skills necessary during emergency situations. A 5-point Likert scale to assess the confidence level of participants in providing BLS and FA to strangers (score of 1 indicates the least confidence and 5 indicates strong confidence). The same questionnaire was given after completion of the training session to assess the intervention’s effectiveness.

Responses were entered in a spreadsheet (Google Inc., USA), coded, and analysed using R-Studio V2022.07.2+576 (RStudio, PBC, USA). One-way repeated measure ANOVA was used for analysis on outcomes of knowledge and confidence scores and a p-value of less than 0.05 in this study indicated statistical significance.

**RESULTS**

A total of 68 out of 71 participants who attended the sessions in UBD completed the pre- and post-questionnaires. The most prevalent age group was 18-21 years (72.1%) and dominated by females (82.4%). Most respondents were from the PAPRSB IHS (41.2%) and in their second year of study (38.2%). Almost all were not certified in BLS (98.5%) and FA (95.6%).

Overall, 48 (70.6%) of the participants were inter-

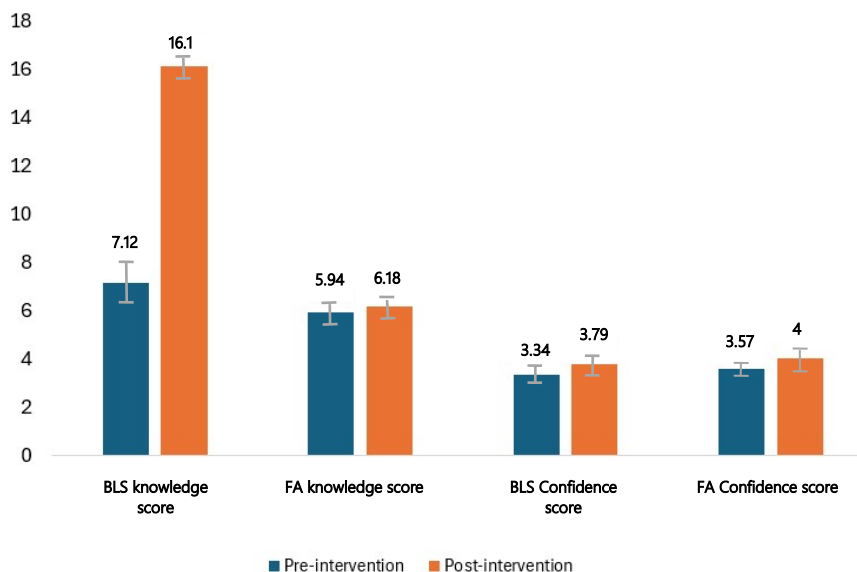
sted to learn BLS and FA skills and 27 wanted to save a life during emergencies (39.7%). Reasons for not joining any prior training were also inquired, and most answered that they “haven’t had the chance to do so”. Meanwhile, a majority (89.7%) of participants stated the main barrier in providing BLS and FA was fear of causing death to the casualty or causing injury (e.g., fracture of ribs).

Prior to the training, the pre-intervention questionnaire revealed a mean knowledge score of  $13.06 \pm 3.43$ , with 97.1% of participants scoring below 84%, indicating inadequate knowledge according to AHA criteria.

Following the intervention, there was a statistically significant increase in the mean BLS knowledge score from 7.12 (95% CI: 6.24, 8.00) to 16.1 (95% CI: 15.67, 16.53), and the FA knowledge scores increased from 5.94 (95% CI: 5.58, 6.30) to 6.18 (95% CI: 5.89, 6.47) ( $p < 0.0001$ ). 85.7% of participants reached an adequate score post-intervention, with a mean of  $22.28 \pm 1.87$  as **Figure 1**. The mean confidence score for BLS of participants showed a statistically significant increase from 3.34 (95% CI: 3.14, 3.54) to 3.79 (95% CI: 3.58, 4.00) post-intervention, while the FA confidence score increased from 3.57 (95% CI: 3.34, 3.80) to 4.00 (95% CI: 3.80, 4.20) ( $p < 0.0001$ ).

Overall, 85.7% of participants reached an adequate score post-intervention, with a mean of  $22.28 \pm 1.87$ , compared to a pre-intervention mean of 13.06 (50.2%) (**Figure 2**).

A 5-point Likert scale was used to assess the confidence level of participants in providing BLS and FA to

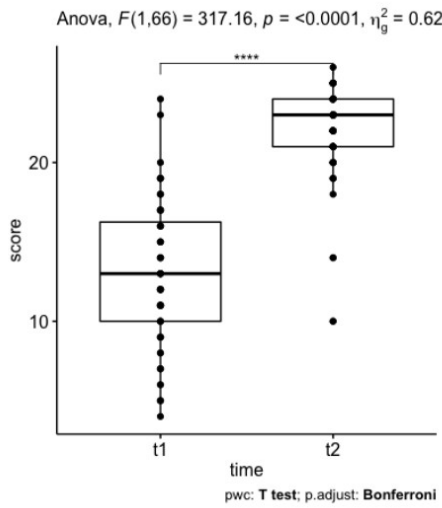


**Figure 1: Mean knowledge and confidence scores pre- and post-intervention.**

**DISCUSSION**

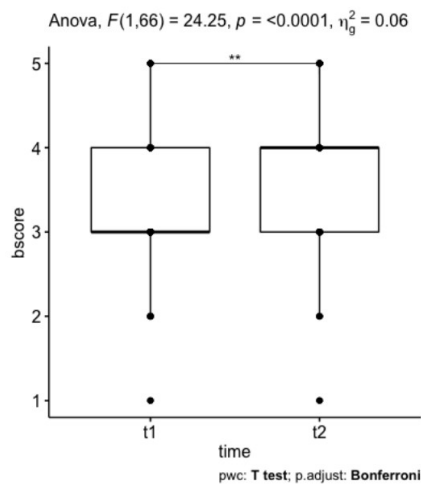
Overall, the community project managed to deliver training sessions to participants to UBD, local school and the public, while also assessing the UBD participants knowledge of BLS and FA, and showed marked improvement in knowledge. This is similar to a study that showed significant improvement in knowledge on FA immediately after training.<sup>15</sup> In this study, the median score obtained from the questionnaire increased from 17 to 26, while our study demonstrated an increase in FA knowledge score from 5.94 to 6.18.<sup>15</sup>

It has been demonstrated in another study that participants felt remarkably confident in applying their learned skills post-intervention, which can be seen in our study as well, in which the confidence level scored by our participants increased after taking part in the BLS and FA training. In contrast to our study where we compared pre- and post-intervention confidence levels, the previously mentioned study only took into account post-intervention perception of their confidence levels.<sup>16</sup> A previous study demonstrated that, despite a limited theoretical understanding, the majority of students were highly motivated to learn CPR. Furthermore, no significant difference in baseline knowledge was observed between participants with and without prior BLS certification. In contrast, our study did not account for prior certification when evaluating pre-intervention knowledge as the majority of our participants lacked certification in BLS or FA. Despite this, consistent with the findings of the aforementioned study, most participants expressed a strong interest in acquiring BLS and FA skills. In this study, those with



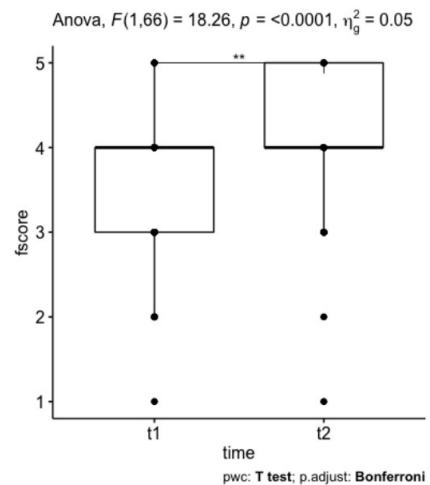
**Figure 2: Total mean scores before and after the intervention.**

strangers (score of 1 indicates the least confidence and 5 indicates strong confidence) where the mean confidence score for BLS of participants showed a statistically significant increase from 3.34 (95% CI: 3.14, 3.54) to 3.79 (95% CI: 3.58, 4.00) post-intervention, while the FA confidence score increased from 3.57 (95% CI: 3.34, 3.80) to 4.00 (95% CI: 3.80, 4.20) ( $p<0.0001$ ) (**Figures 3 & 4**). Meanwhile, the majority of the participants agreed that BLS be made compulsory (89.7%) with a higher percentage for FA (91.1%).



\*Normal distribution of data is not assumed.

**Figure 3: Participants' confidence scores in BLS\*.**



\*Normal distribution of data is not assumed.

**Figure 4: Participants' confidence scores in FA\*.**

no BLS training, 63/63 (100%), were interested in gaining more skills and knowledge of BLS with a subset also indicating a willingness to intervene in emergency situations.<sup>17</sup>

Research revealed that only half of bystanders witnessing a cardiac arrest called for help and performed CPR.<sup>20</sup> A study in Japan found that only less than 5% of the population actually conducted CPR.<sup>3</sup> Following our interventions, participants were encouraged to confidently administer CPR in emergencies, armed with life-saving skills even without formal certification, highlighting the positive impact of CPR training on public willingness to act.

Most of our participants had not undergone prior training in BLS and FA because they "haven't had the chance" or "never thought of it nor considered it." This observation aligns with another study.<sup>21</sup> Furthermore, literature has suggested that financial constraints and lack of knowledge often deter individuals from joining CPR training.<sup>22</sup> Hence, interventions conducted by the *On The Scene Team* did not incur any costs to participants, eliminating this financial barrier.

On the other hand, a study on CPR barriers identified language and communication issues, lack of knowledge, and personal factors as common reasons.<sup>23</sup> Fear of legal repercussions and misconceptions of the Good Samaritan Laws was also perceived by the public.<sup>22</sup> During the interventions, the *On The Scene Team* successfully enhanced participants' confidence in the skills taught despite stated barriers, as evidenced by the improved post-intervention questionnaire confidence scores.

Some of the limitations identified by the project team included issues such as generalisability of results where the pre- and post-questionnaires were limited mainly to health sciences students. The study's participation was primarily skewed towards staff and students, likely because the training venue was more accessible to them. Despite opening registration to UBD staff and students equally, only 6% of participants comprised of staff. This may be attributed to a combination of factors which includes competing professional responsibilities, and logistical challenges during the event. Public response to the advertised training sessions was lower, potentially due to unfamiliarity with the venue, registration processes, or lack of interest. Furthermore, no evaluations were conducted among high school students or members of the general public, further limiting the applicability of the results. As for the training sessions that were designed to equip partic-

ipants with essential skills within the duration of two hours, this might have impacted skill retention<sup>24,25</sup> compared to the typical 180-minute CPR sessions.<sup>24,25</sup>

Unlike certified courses, this study did not employ objective assessments such as checklists for CPR and bandaging techniques to score participants' proficiency. Instead, the team provided direct observational feedback, correcting individual techniques to facilitate skill improvement. Despite the significant increase in knowledge scores on the post-intervention questionnaire, it is uncertain whether this translated to improved real-life practice skills. Future studies could assess skill performance using standardised measures before and after interventions to verify the effectiveness of the training. In addition, it would be insightful to conduct studies to compare the performances in knowledge scores between BLS-certified candidates with the candidates conducted in this training.

Overall, the community intervention sessions were effective in improving participant's knowledge, observed by the significant increase in knowledge score. A study found that despite students' lack of theoretical knowledge, majority were eager and motivated to learn CPR,<sup>15</sup> as observed in our participants and identified from the questionnaires. There is also the potential for extending BLS knowledge to lay people via a pyramidal teaching strategy utilising BLS-trained students.<sup>16</sup> *On The Scene* team utilised this pyramidal teaching strategy to deliver the interventions conducted in UBD. It is well-established that CPR training in universities has been extensively advocated as a sustainable strategy for educating the general public,<sup>15</sup> while recommending the training of first aiders in universities to reduce untimely deaths caused by accidents and other adversities.<sup>17</sup> Hence, our project focusing on the training of university staff and students may potentially extend the knowledge and skills to the general public including their families and peers.

## CONCLUSION

Following the interventions conducted by a team of medical students, there was a notable improvement in participants' knowledge, confidence scores, and their readiness to administer CPR in emergencies. Moving forward, it is imperative to educate the public on the critical importance of BLS and FA. Such community activity has been helpful in educating the university community hence ongoing community projects on teaching BLS and FA should be continued.

### Take Home Message

- Community-based BLS and FA training significantly improves knowledge and confidence among university participants.
- A significant portion of participants had never received formal BLS or FA training, highlighting a critical gap in preparedness within the university community.
- A majority of respondents believed BLS (89.7%) and FA (91.1%) should be compulsory knowledge.
- Fear of causing harm remains a key barrier to providing emergency aid, highlighting the need for confidence-building education.
- This initiative reflects the potential of universities to serve not only as educational institutions but also as platforms for public health promotion.

### Abbreviations

<b>BLS</b>	Basic life support
<b>FA</b>	First aid
<b>UBD</b>	Cerebrospinal fluid
<b>CPR</b>	Cardio pulmonary resuscitation
<b>AED</b>	Automated external defibrillator
<b>VF</b>	Ventricular fibrillation
<b>pVT</b>	Pulseless ventricular tachycardia
<b>ROSC</b>	Return of spontaneous circulation
<b>AHA</b>	American Heart Association

### Declarations

#### Ethical consideration

Ethical approval has been given by the Ethic committee of the IHS PAPRSB, UBD.

#### Disclosure and Conflict of Interest

The authors declare that they have no conflicts of interest and no financial disclosures relevant to this case report.

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