ORIGINAL RESEARCH

EFFECTS OF BASIC LIFE SUPPORT TRAINING AMONG NON-MEDICAL UNIVERSITY STAFF IN GHANA

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Prah James Kojo[1*], Afrifa Alex Darteh[2], Antwi Eugene Kweku[2], Ninfah Seth Yeboah[2], Ghansah Augustus[2], Annor Akua Fremah[3]

[1]Department of Community Medicine, School of Medical Sciences, University of Cape Coast
[2]Department of Anaesthesia, University of Cape Coast Hospital, University of Cape Coast
[3]St. John Ambulance, Ghana

***Correspondence:** Prah J. Kojo; **Email:** james.prah@ucc.edu.gh

Abstract

Background: Timely bystander intervention during cardiac emergencies significantly improves survival, yet Basic Life Support (BLS) knowledge and readiness remain low among non-medical populations. Universities are dynamic environments where non-clinical staff may become first responders in emergencies. This study assessed BLS knowledge, attitudes, and practices (KAP) among non-medical staff at the University of Cape Coast (UCC), evaluated the impact of a structured BLS training, and identified predictors of knowledge improvement.

Methods: A quasi-experimental pre-post design was employed among 309 randomly selected non-health staff. Participants completed a validated KAP questionnaire and a 10-item BLS knowledge test before and after a four-hour instructor-led training session. Data were analyzed using t-tests, ANOVA, Pearson correlation, and multiple linear regression.

Results: The mean pre-test score was 5.18 (SD = 2.03), rising significantly to 9.34 (SD = 1.17) post-training ($p < .001$). Knowledge gains were consistent across age and sex. Pre-test performance negatively correlated with age ($r = -0.113$, $p = .047$), but this association was not observed post-training. Regression analysis revealed that pre-test score ($\beta = -0.73$, $p < .001$) and belonging to the "Others" staff category ($\beta = -1.64$, $p < .001$) significantly predicted lower gain scores. All participants endorsed the importance of BLS training, though barriers like lack of knowledge and fear of causing harm persisted.

Conclusion: BLS training significantly improved knowledge across all staff categories. Institutionalizing BLS education, particularly with tailored approaches for lower-literacy groups, could strengthen emergency preparedness in university settings.

Keywords: Basic Life Support, university staff, training effectiveness, emergency preparedness, CPR, KAP study

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INTRODUCTION

Cardiopulmonary arrest is a critical emergency event that requires immediate and effective intervention to save lives.

INTRODUCTION

Basic Life Support (BLS) is a foundational emergency procedure that includes recognition of sudden cardiac arrest, calling for help, and initiating high-quality chest compressions and ventilation. Despite its importance, studies have consistently shown low levels of awareness, skill retention, and proper practices related to BLS among non-clinical populations. Several studies highlight low baseline awareness and confidence in performing BLS among non-health professionals. Alsabri et al.[1] conducted a systematic review across Arab countries, finding that while awareness of CPR and BLS was moderately high, practical skill levels were critically low. Training interventions have shown significant improvements in BLS KAP, especially when paired with practical demonstrations. [2] Wan Jusoh and Yahaya demonstrated a significant increase in BLS knowledge and performance post-intervention among Malaysian university students using a modified BLS module. [3]

While much of the existing literature has focused on university students, few studies examine BLS knowledge, attitudes, and practices among university staff. Given the University of Cape Coast (UCC)'s large staff population and the potential for emergency situations on campus, assessing the current level of knowledge, attitude, and practices (KAP) related to BLS is crucial. University campuses are public spaces where medical emergencies, including cardiac arrests, can occur unpredictably. Given the limited on-the-spot availability of medical staff, non-medical employees are often first responders in such situations. Their preparedness to initiate Basic Life Support (BLS) can significantly influence survival outcomes. This study's focus on non-medical staff is both strategic and impactful, as it aims to bridge a critical gap in emergency readiness at institutional levels. By targeting non-medical personnel, the study aims to evaluate preparedness among those least likely to have formal emergency response training yet most likely to be present in typical campus settings where cardiac arrest or similar emergencies may occur. Furthermore, training interventions followed by pre- and post-assessments provide a structured method to evaluate the effectiveness of educational programs.

This study explores the baseline KAP on BLS among non-medical UCC staff, conducts a BLS training session, and assesses knowledge changes by analyzing pre- and post-test scores.

METHODS

Study Design

This study employed a quasi-experimental pre-post intervention design to assess knowledge, attitudes, and practices (KAP) related to Basic Life Support (BLS) among non-medical university staff. A single-arm intervention was used, with participants serving as their own controls. Quantitative data were collected before and immediately after a standardized BLS training session.

Study Setting

The study was conducted at the University of Cape Coast (UCC), a major public university located in Ghana's Central Region. With over 4,700 permanent staff across academic and administrative roles, UCC presents a high-risk institutional setting for unanticipated medical emergencies such as sudden cardiac arrest. The study specifically focused on non-health professional staff who are likely to be first responders in such emergencies.

Study Population and Sampling

The target population consisted of all permanent UCC staff, excluding health workers. Eligibility criteria included employment at UCC for a minimum of one year and willingness to provide informed consent. Using the Yamane formula for sample size determination with a 5% margin of error and a population of 4,776, the minimum sample size was 369 participants.

A multistage stratified random sampling technique was employed: the staff population was first stratified into four groups: Teaching Senior Members, Non-Teaching Senior Members, Senior Staff, and Junior Staff. Proportional allocation was applied to determine the sample size for each category. Participants were then randomly selected from a university staff list provided by the Directorate of Human Resources.

Intervention

Participants received a four-hour BLS training workshop in November 2025. The session was conducted by certified American Heart Association (AHA)-trained instructors. The training included a didactic lecture on BLS principles. Demonstrations of cardiopulmonary resuscitation (CPR)

and Automated External Defibrillator (AED) use and hands-on practice with manikins under supervision.

Data Collection Instruments

A structured, pre-validated KAP questionnaire was used, adapted from AHA-aligned training studies and contextualized for the Ghanaian university setting. The instrument included: Section A: Demographics (age, sex, prior BLS exposure). Section B: BLS Knowledge (10 scored multiple-choice and true/false items; total score range: 0–10). Section C: Attitudes toward BLS (Likert-scale items). Section D: Self-reported practices and experience with BLS

The same questionnaire was used pre- and post-intervention to assess changes in knowledge and shifts in attitude or intended behavior.

Data Collection Procedure

Participants first completed the KAP questionnaire and BLS knowledge pre-test. After completing the training, they immediately undertook a post-test using the same knowledge questions. The session also allowed participants to clarify misconceptions through interaction with instructors.

Data Management and Analysis

All data were anonymized, coded, and securely stored. Data were analyzed using SPSS version 26 and Microsoft Excel.

Descriptive Analysis

Categorical variables were summarized using frequencies and percentages. Continuous variables were reported as means ± standard deviations (SD). Participants were categorized as Lecturers, Administrators, or Others (including cleaners, messengers, artisans, etc.).

Inferential Analysis

Paired t-tests were used to compare pre- and post-test scores for normally distributed data. Pearson's correlation examined relationships between age and test scores. Independent t-tests assessed sex-based differences in knowledge gains. A multiple linear regression model was used to identify predictors of knowledge improvement (post-test minus pre-test score), including age, sex, and baseline score. Model assumptions were tested, including multicollinearity, residual normality, and homoscedasticity.

Ethical Considerations

Ethical clearance was obtained (CCTHERC/EC/2025/008). All participants provided informed consent. Confidentiality was maintained throughout the study, and participants were informed of their right to withdraw at any point without penalty.

RESULTS

Demographics

Even though 390 staff participated in the training, 309 completed both the pre- and post-training assessments. The mean age of participants was 41.68 years (SD = 9.06), ranging from 19 to 68 years. Participants were nearly evenly split by sex, with 161 females (52.1%) and 148 males (47.9%). Participants were categorized as Lecturers (n = 52), Administrators (n = 225), or Others (n = 32).

Basic Life Support Exposure

Only 18 (5.8%) participants reported ever receiving BLS training. All of them had it for more than 3 years before the survey.

Pre- and Post-Test Performance

The mean pre-test score was 5.18 (SD = 2.03), while the mean post-test score significantly increased to 9.34 (SD = 1.17). Table 1 shows the distribution of pre- and post-test scores by age and sex.

Table 1. Distribution of pre- and post-test scores according to age and sex of participants

Characteristic	Frequency	Pre-test Scores Mean (±SD)	Post-test Scores Mean (±SD)
Age (years)			
18 – 29	32	5.25 (1.68)	9.53 (0.91)
30 – 39	84	5.52 (2.19)	9.33 (1.15)
40 – 49	134	5.16 (1.95)	9.39 (1.09)
50 – 59	56	4.69 (2.02)	9.16 (1.39)
60 - 69	3	4.67 (3.51)	8.67 (2.30)
Sex			
Female	161	5.08 (2.07)	9.32 (1.17)
Male	148	5.29 (1.98)	9.36 (1.16)
Staff Category			
Administrators	225	5.27 (1.38)	9.52 (0.96)
Lecturers	52	6.00 (1.97)	9.81 (0.66)
Others	32	3.22 (2.00)	7.34 (1.21)

A paired t-test revealed this improvement was statistically significant, *t(308) = -45.34, p < 0.001*, indicating a robust effect of the BLS training intervention.

A Pearson correlation between pre-test and post-test scores yielded a strong positive association (r = 0.61, p < 0.001), suggesting that participants who performed well on the pre-test also tended to score higher on the post-test.

Association with Age

Age showed a weak but statistically significant negative correlation with pre-test scores (r = -0.113, p = 0.047), implying that older participants scored slightly lower before training. However, this association was not significant for post-test scores (r = -0.067, p = 0.239), suggesting that the training helped attenuate age-related performance differences.

When stratified by age group, a trend of increasing post-test scores across all age brackets was observed, with all age groups achieving mean post-test scores above 9.00.

Sex-Based Comparisons

There were no statistically significant differences in pre-test scores between males (M = 5.24, SD = 2.03) and females (M = 5.12, SD = 2.03), *t(307) = 0.91, p = 0.364*. Similarly, post-test scores did not differ significantly between males (M = 9.36, SD = 1.21) and females (M = 9.32, SD = 1.13), *t(307) = 0.31, p = 0.753*.

Category Comparisons

To test for associations between staff category and overall BLS knowledge, one-way ANOVA was performed separately for pre-test and post-test scores. There was a statistically significant difference in pre-test scores across categories, F(2, 306) = 22.04, p < .001, and in post-test scores, F(2, 306) = 81.79, p < .001.

Predictors of Knowledge Improvement

To explore predictors of improvement in BLS knowledge, a multiple linear regression was conducted with the gain score (post-test minus pre-test score) as the dependent variable. Predictors included age, sex, staff category, and pre-test score. The overall model was statistically significant, F(5, 303) = 189.3, p < .001, and explained approximately 76% of the variance in gain scores ($R^2 = 0.758$).

The pre-test score was a significant negative predictor (β = -0.73, p < .001), indicating that participants with lower baseline knowledge showed greater improvement. Belonging to the "Others" category was also a significant negative predictor (β = -1.64, p < .001) compared to Administrators. Sex, Age, and being in the Lecturer group were not significant predictors of gain score (all p > .05).

All regression assumptions were met. VIF values (<1.05) indicated no multicollinearity. Residuals were approximately normally distributed with slight left skew. The residual vs. fitted plot showed no heteroscedasticity, confirming constant error variance.

Attitudes and Practices

To assess participants' attitudes toward basic life support, they were asked, “Do you believe BLS training is important for all university staff?” All (100%) participants answered yes. When asked what their main concerns were regarding performing BLS, the majority, 248 (80.25%), indicated a lack of knowledge, 50 (16.18%) said they feared causing harm to the victim, whilst 11 (3.57%) participants were concerned about contracting infections.

To assess participants’ practices related to basic life support, the question “Have you ever encountered a situation where someone needed BLS at work or anywhere else, and did you attempt to provide BLS?” was asked. A significant number, 68 (22.0%), responded 'yes' to having encountered such a situation; however, none attempted to provide BLS at the time of the incident.

DISCUSSION

This study assessed the knowledge, attitudes, and practices (KAP) related to Basic Life Support (BLS) among non-medical staff at the University of Cape Coast and evaluated the impact of a structured training intervention. The findings clearly demonstrate a significant improvement in BLS knowledge following a single educational session, reinforcing evidence from previous studies that training interventions substantially enhance BLS capabilities among laypersons.

The statistically significant improvement in mean scores from pre-test (M = 5.18) to post-test (M = 9.34) aligns with prior research, which observed marked gains in BLS performance after training interventions. [3,4]The strong correlation between pre- and post-test scores (r = 0.61, p < 0.001) suggests that participants with higher baseline knowledge retained more post-training knowledge. Still, even those with lower initial scores benefited significantly. Notably, participants across all age groups achieved post-

test scores above 9.00, reflecting the broad effectiveness of the training across age demographics.

The weak negative correlation between age and pre-test performance (r = -0.113) suggests that older participants were less knowledgeable at baseline, likely due to generational gaps in exposure to emergency training. However, the disappearance of this correlation in the post-test underscores the leveling effect of targeted instruction.

Importantly, no statistically significant differences in scores were observed between male and female participants, indicating that the training was equally effective across sexes. This is consistent with Lee et al.[5] who found no significant sex-based differences in BLS learning outcomes among non-medical university students. The uniformity of the improvement underscores the inclusive effectiveness of standardized training interventions, regardless of demographic differences.

The finding that 68 participants (22.0%) had encountered a situation requiring Basic Life Support (BLS), is similar to the 18% found among non-health care workers in Arab countries,[1] emphasizing how common such situations occur. Attitudinally, the study revealed unanimous agreement on the importance of BLS training for all university staff. This consensus highlights a strong willingness to learn and engage with emergency preparedness programs, even among previously untrained individuals. However, the high proportion of participants (80.25%) citing a lack of knowledge as a barrier to performing BLS, and the complete absence of actual BLS attempts among those who had encountered relevant emergencies, reflect a persistent gap between positive attitudes and confident action. Fear of causing harm (16.18%) and infection (3.57%) were also noted, aligning with global literature that emphasizes psychological and safety-related deterrents to bystander CPR.[6,7]

These findings support the argument for integrating BLS education into institutional staff development programs. As university campuses are open and dynamic spaces, the likelihood of a medical emergency is non-trivial. Empowering non-medical staff with BLS training can effectively create a distributed network of first responders, improving out-of-hospital survival rates, a recommendation echoed in prior policy-oriented studies.[2,8]

The fact that only 5.8% of the 309 non-medical staff at the University of Cape Coast had ever undergone Basic Life Support (BLS) training and that all such training occurred more than three years prior highlights a significant gap in emergency preparedness. This finding is both revealing and concerning for several reasons: Despite working in a high-density public environment like a university campus where medical emergencies can occur without warning, less than 1 in 20 staff had been trained in BLS. This supports existing literature from low- and middle-income settings, where structured emergency preparedness among laypersons is generally underprioritized.[1] All prior trainings reported were older than 3 years, which is well beyond the recommended refresh period. According to international guidelines, including those from the American Heart Association, BLS certifications should be renewed at least every 2 years, as both knowledge and psychomotor skills begin to decline significantly within 6–12 months post-training. [9–11]The outdated nature of these few trainings suggests that even those exposed may no longer retain functional competency. The long lapse since prior training is not just an issue of compliance but one of clinical effectiveness. Skills such as chest compression depth, rate, and proper AED use require periodic hands-on reinforcement. Without ongoing exposure, both cognitive recall and confidence in executing BLS deteriorate, further reducing the likelihood of staff acting in real emergencies.

Participants in the "Others" staff category, such as cleaners, messengers, and artisans, demonstrated significantly lower gains in BLS knowledge post-training. This may reflect differences in baseline literacy and educational background, which can affect the ability to process and retain technical information. These findings suggest the need for tailored training approaches that incorporate simplified language, practical demonstrations, and smaller peer-group sessions to ensure equitable learning outcomes across all staff categories.

Limitations

The study has limitations that merit consideration. First, it focused solely on knowledge acquisition and did not assess practical skill retention through simulation or real-time assessment, which could provide a more holistic understanding of intervention impact. Second, the study was limited to a single institution, potentially restricting the generalizability of findings to other settings with different institutional cultures or demographic compositions. Third, the short-term nature of the post-test assessment prevents insight into long-term knowledge retention and behavioral change. Follow-up assessments after several months would be essential to evaluate knowledge decay and sustained readiness. Additionally, as with most Knowledge, Attitudes, and Practices (KAP) studies, there is a risk of social

desirability bias, where participants may respond in ways they perceive as favorable or expected, especially regarding attitudes and self-reported intentions to perform BLS.

Implications and Future Directions

The study's results justify the institutionalization of BLS training within occupational preparedness programs, particularly for non-medical staff who are likely to serve as first responders in campus emergencies. BLS training should be integrated into Human Resources onboarding protocols, ensuring that all new hires, especially non-clinical staff, receive standardized emergency response education as part of their induction. Future research should focus on longitudinal assessments to gauge knowledge retention, incorporate practical simulations to evaluate psychomotor skills, and consider comparative interventions (e.g., e-learning vs. instructor-led sessions). Additionally, exploring psychological barriers to BLS application may help refine training curricula to directly address fears and misconceptions.

CONCLUSION

This study contributes important localized evidence supporting the efficacy of BLS training among non-medical university staff. Given the significant knowledge gains and strong attitudinal support observed, institutional efforts to scale and sustain such interventions could substantially enhance campus-wide emergency responsiveness and overall public health resilience.

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