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STRENGTHENING EMS IN MALAWI: PILOTING WORLD HEALTH ORGANIZATION BASIC EMERGENCY CARE FOR PREHOSPITAL PROVIDERS IN ZOMBA, MALAWI

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ABSTRACT

Background: Malawi has no country-wide emergency medical services, with prehospital care majorly provided by laypersons. Transport is typically provided by private car or taxi with less than 2% of emergency patients receiving transport by ambulance. Zomba Private Ambulances is currently the only private ambulance group operating in south-eastern Malawi. Despite not having formal prehospital provider education in Malawi, Zomba Private Ambulances makes use of mid-level care practitioners, nurses, and first-aid-only providers to provide prehospital care. This study examined the use of an existing emergency training course to educate prehospital providers in Zomba, Malawi.

Methodology: This study used a pilot study, consisting of an educational intervention trial conducted in Zomba, Malawi. Prehospital providers from Zomba Private Ambulances underwent training in WHO Basic Emergency Care including lectures and skills workshops led by an emergency medicine registrar. Participants completed a pre- and post-course survey and assessment measuring demographic information and knowledge and confidence of basic emergency skills.

Results: 9 total prehospital providers underwent training, consisting of nurses, mid-levels, and providers with first-aid-only. Overall confidence increased significantly after completing the course (83.3 to 96.8% confidence). Knowledge retention varied across participant training levels (post-course scores being: mid-levels 80%, nurses 73%, and first-aid-only 42.6%). Overall, providers displayed increased knowledge post-course, however, post-course knowledge varied amongst domains (e.g., trauma, altered mental status, shock). Barriers to training were identified including lack of transport, other occupational responsibilities, and lack of understanding of course applicability for first-aid-only providers.

Conclusion: Using education tools such as WHO BEC assists in the knowledge and confidence of prehospital providers in Malawi. Further studies are required to assess the retention of knowledge and effective use in the field. Additional training should be more easily accessible to improve prehospital triage in Malawi. The expansion of prehospital care in Malawi should utilize contextually relevant training.

INTRODUCTION

Not unique to other Sub-Saharan African (SSA) countries, Malawi faces challenges with various development outcomes including emergency and prehospital care (World Bank 2022, Department of Economic and Social Affairs 2022, Healthdata.org, Kayambankadzanja et. al 2020, Sonenthal et. al 2022). With a population of 20 million people, Malawi is limited in providing comprehensive emergency care due to many factors, including, but not limited to, economic factors, large rural areas, and broadening burdens of disease (BOD) (World Bank 2022). While Malawian BOD were historically due to communicable diseases, increasing noncommunicable diseases have created increasing healthcare challenges (Healthdata.org, Sonenthal et. al 2022). Additionally, most Malawians live a median distance of 6km from any healthcare facility (Global Burden of Disease Profile 2022). Given the challenges affecting Malawian health, a robust emergency and prehospital system is required to provide comprehensive and timely care (Sonenthal et. al 2022).

Many SSA countries have either no, or immature, prehospital services, in addition to limited contextually relevant evidence-based prehospital guidelines (Malherbe et. al 2021, Mould-Millman et. al 2017). Malawi has no country-wide, nationally-run, emergency response, and prehospital care is majorly provided by laypersons, with the transport of patients typically provided by private car or taxi (Kayambankadzanja et. al 2020, Sonenthal et. al 2022, Sheikh et. al 2021). A 2020 longitudinal survey exploring prehospital care provided to victims of road traffic accidents with injuries brought to Queen Elizabeth Central Hospital (QECH) in Blantyre, Malawi, found that only 2% of victims brought to the hospital were by ambulance (Sheikh et. al 2021).

Given the limited prehospital care available in Malawi, organizations and private institutions have implemented measures to fill the void (Sheikh et. al 2021, Mills et. al 2023). Zomba Private Ambulances (ZPA) in Zomba, Malawi is currently the only private ambulance group operating in south-eastern Malawi (Mills et. al 2023, Makunganya 2023). Despite not having a formal prehospital provider education tract in Malawi, ZPA makes use of clinical assistants, nurses, and laypersons with first-aid-only training to fill the role of prehospital providers (Mills et. al 2023, Makunganya 2023). Despite successes in growing their organization, improvement in prehospital care requires providers to have prehospital-specific training in addition to prehospital-specific tools.

The World Health Organization (WHO) created an open course titled Basic Emergency Care (BEC) aimed at teaching basic emergency skills to healthcare providers in low- and middle-income settings (WHO Basic Emergency Care 2018, Broccoli et. al 2021). BEC has been implemented in multiple sub-Saharan African countries, including Malawi (Broccoli et. al 2021, Khongo et. al 2023). A 2013 Study performed by Broccoli et. al in Zambia demonstrated improved knowledge of confidence of physicians, mid-level providers, and nurses. In Malawi, a 2023 study conducted in the Neno district demonstrated similar results including improved knowledge and confidence of mid-level providers and nurses following completion of WHO BEC. BEC utilizes the ABCDE method, in addition to teaching approaches to trauma, difficulty in breathing, shock, altered mental status, and handover (WHO Basic Emergency Care 2018). See Appendix 1 for a summary of WHO BEC didactic content. BEC was designed for in-hospital care and no relevant prehospital tools exist for the sub-Saharan African context. This study aimed to explore the feasibili-

ty of using WHO BEC to improve knowledge and confidence of prehospital providers in Zomba, Malawi.

METHODS

Overarching Methods

This study examines the feasibility of utilizing an established emergency training tool, WHO BEC, to improve knowledge and confidence in emergency skills of prehospital providers in Malawi by measuring recruitment, acceptability, adherence, and engagement. A pilot study was chosen given the small sample size and virtual lack of previous reporting of prehospital emergency knowledge and confidence in Malawi. The CONSORT extension for pilot studies was used in the reporting of this study. This study was approved by the Malawi National Health Sciences Research Committee (24/02/4362).

Setting

The city of Zomba is in southern Malawi and has a population of 90,000, of which an estimated 60% of Zomba residents live in informal settlements (UN Habitat 2011). The city's largest healthcare facility is a tertiary hospital, Zomba Central Hospital (UN Habitat 2011). Study recruitment was carried out by contacting all ZPA prehospital providers via WhatsApp. The training on BEC was delivered at Zomba Private Ambulances headquarters in Zomba, Malawi in February 2024.

Participants and Sample Size

In contrast to typical efficacy trial studies, pilot studies do not perform sample size calculation or hypothesis testing and instead analyze the feasibility and acceptability of a study approach to be used in a larger-scale study. Invitation to participate in this study was offered to all ZPA prehospital providers who met eligibility criteria. Eligibility criteria included age greater than 18 years and prehospital provider employed by ZPA. Prehospital providers were defined as any person routinely providing formal prehospital care including doctors, nurses, mid-level providers (e.g., non-physician clinical assistants, midwives), paramedics, emergency medical technicians, and first-aid-only providers. Informed written consent was obtained from all providers.

Interventions and Course Structure

Successfully enrolled participants completed a pre-course survey and assessment, including demographic information and confidence and knowledge of basic emergency care (see Appendix 2 for demographics and survey and see Appendix 3 for knowledge assessment). Confidence was assessed by a 5-point Likert-scale with "strongly agree" equaling 100% confidence in performing, identifying, and discussing various emergency presentations and skills. The knowledge portion of the assessment utilized the validated BEC assessment. No blinding was done and all participants then received lectures by an emergency medicine registrar on basic emergency skills using the WHO BEC modules including the ABCDE and SAMPLE approach, approach to trauma, approach to difficulty in breathing, approach to altered mental status (AMS), and approach to shock (see Appendix 1 for a summary of modules). Following the completion of lectures, participants received hands-on training on all skills outlined by the BEC course. Following

lectures and skills training, participants completed the survey and assessment again for post-course assessment of confidence and knowledge of basic emergency care.

Data Collection and Analysis

Demographic information, confidence surveys, and knowledge assessments were collected on paper forms, deidentified, and entered into a password-protected Google Drive. Pre- and post-course confidence responses were converted into numerical values with "strongly agree" responses considered 100% confident. Simple descriptive statistics were used to describe the data using STATA. Despite being a pilot study to assess feasibility, testing for normality was performed (Shapiro Wilk $p>0.05$) and parametric and non-parametric testing was performed where appropriate. Pre- and post-course confidence responses and mean module and overall scores were compared by training level (i.e., nurses, mid-levels, first-aid-only providers) using differences in means. Additionally, relationships between confidence and knowledge were assessed by calculating differences in means by groups.

RESULTS

Demographics

A total of nine participants were enrolled and completed the course. 4 (44%) of the participants were nurses, 3 (33%) had no formal medical qualification and had only a first-aid certificate, and 2 (22%) were mid-levels (consisting of a clinical assistant student and a non-physician anesthetist). Prior formal prehospital training (e.g. paramedic, emergency care technician, intermediate life support) was reported by none of the participants. Participants reported 2.7 mean years of experience providing prehospital care with providers, with first-aid-only reporting an average of 2.5 years of experience and nurses and mid-levels both averaged 2.8 years of experience. None of the participants had ever completed WHO BEC. See Table 1 for a summary of the experience of all providers.

	Formal Prehospital Training	Mean Years of Prehospital Experience	Previous Complete WHO BEC
All (n=9)	0 (0%)	2.7	0 (0%)
Nurses (n=4)	0 (0%)	2.8	0 (0%)
First aid only (n=3)	0 (0%)	2.5	0 (0%)
Mid-levels (n=2)	0 (0%)	2.8	0 (0%)

Table 1. Summary of experience of prehospital providers at Zomba Private Ambulances.

Confidence in Prehospital Skills

Testing for normality of confidence scores was not satisfied (Shapiro Wilk test $p<0.05$) and nonparametric testing was utilized for analysis of confidence. A Wilcoxon signed-rank test was conducted and revealed a statistically significant ($p < 0.01$) difference in pre-course median (Mdn = 89) and post-course median (Mdn = 99) confidence levels ($z = 2.668$).

Variance in overall pre-course confidence was observed between training levels, with mid-levels reporting 91.5% confidence, nurses reporting 86.3% confidence, and providers with first-aid-only reported 74.0% pre-course confidence. It was observed that all participants had increased post-course confidence with mean post-course confidence in providing basic emergency skills of 96.8%, with a mean difference of 13.4%. Post-course confidence also varied by training levels with mid-levels reporting 100% confidence, nurses reporting 99.3% confidence, and providers with first-aid-only reporting 91.3% confidence.

By component, confidence in assessing and managing ABCDEs (95.6%) had the highest overall pre-course confidence, trailed by difficulty in breathing (88.9%), shock (86.7%), trauma (84.4%), and AMS (75.6%). Post-course assessment and management confidence by topic was generally high with mean differences being 4.4% for ABCDEs, 8.9% for difficulty in breathing 11.1% for trauma, 6.7% for shock, and 17.8% being altered mental status.

Pre-course confidence in discussing topics with colleagues was generally lower than reported assessment and management confidence, with discussing ABCDE confidence being 97.8%, trauma being 82.2%, difficulty in breathing being 77.8%, shock being 77.8%, and AMS being 64.4%. Participants reported generally high post-course confidence in discussing topics with colleagues with mean differences being 2.2% for ABCDE, 15.5% for trauma, 17.8% for difficulty in breathing, 17.8% for shock, and 31.1 for AMS. See Table 2 for pre- and post-course confidence.

Knowledge

Despite being a small sample size, assumption for normality was satisfied for knowledge assessments (Shapiro Wilk test $p>0.05$). Paired sample t-testing was used to compare pre- and post-course knowledge means. Overall knowledge measured improved from 61.3% (95% CI: 49.8%-72.8%) to 64.4% (95% CI: 50.5%-78.4%).

Pre-course knowledge score measured overall was 61.3% with variance by topic with ABCDE being 48.9%, trauma being 77.8%, difficulty in breathing being 73.3%, shock being 60%, and AMS being 46.7%. Post-course knowledge score measured overall was 64.4% with variance by topic with ABCDE being 64.4% (MD 3.1%), trauma being 73.3% (MD -4.4%), difficulty in breathing being 77.8% (MD 4.4%), shock being 71.1% (MD 11.1%), and AMS being 46.7% (MD 0%).

Observations

During the course, observations were made regarding feasibility and challenges. Recruitment was widely successful with many ZPA employees being easily recruited, however, challenges included tardiness and other occupational responsibilities. Multiple participants arrived one to two hours after the course was set to begin. This delayed the course to be started, limiting dedicated lectures and skills time. Many participants reported lack of transport as the cause of their tardiness. Additionally, multiple other participants left early due to other responsibilities, such as working in the local hospital. Engagement in the course was high despite a lack of pre-course knowledge and training. Adherence to the training may be limited given that BEC was designed for healthcare

	(n = 9)			Nurses (n = 4)		Providers with first-aid-only (n = 3)		Mid-levels (n = 2)	
	Pre-course	Post-course	Mean Diff (SE)	Pre-course	Post-course	Pre-course	Post-course	Pre-course	Post-course
Overall confidence with basic emergency skills	83.3	96.8	13.4 (4.0)	86.3	99.3	74.0	91.3	91.5	100.0
Confidence assessing ABCDE	95.6	100.0	4.4 (2.9)	95.0	100.0	100.0	100.0	90.0	100.0
Confidence assessing and managing trauma	84.4	95.6	11.1 (7.5)	90.0	100.0	86.7	93.3	60.0	100.0
Confidence assessing and managing breathing difficulty	88.9	97.8	8.9 (3.5)	90.0	100.0	86.6	93.3	90.0	100.0
Confidence assessing and managing shock	86.7	93.3	6.7 (6.7)	85.0	95.0	93.3	86.7	80.0	100.0
Confidence assessing and managing altered mental status	75.6	93.3	17.8 (7.0)	85.0	100.0	73.3	80.0	60.0	100.0
Confidence discussing ABCDE with colleagues	97.8	100.0	2.2 (2.2)	95.0	100.0	100.0	100.0	100.0	100.0
Confidence discussing trauma with colleagues	82.2	97.8	15.5 (5.9)	90.0	100.0	100	93.4	40.0	100
Confidence discussing breathing complications with colleagues	77.8	95.6	17.8 (8.4)	90.0	100.0	93.3	86.6	30.0	100.0
Confidence discussing shock with colleagues	77.8	95.6	17.8 (8.4)	85.0	100.0	86.7	100.0	30.0	100.0
Confidence discussing altered mental status with colleagues	64.4	96.6	31.1 (8.8)	75.0	100.0	86.7	86.7	10.0	100

Table 2. Confidence using basic emergency care of prehospital providers at Zomba Private Ambulances.

	All Participants (n = 9)				
	Pre-course	Post-course	Mean Difference	Test Statistic (t)	p Value
Overall score	61.3	64.4	3.1	1.05	0.162
ABCDE component score	48.9	56.6	7.7	1.04	0.166
Trauma component score	77.8	73.3	- 4.4	-1.00	0.827
Difficulty breathing component score	73.3	77.8	4.4	0.61	0.279
Shock component score	60	71.1	11.1	1.89	0.048
Altered mental status component	46.7	46.7	0	0.00	0.500

Table 3. Knowledge of basic emergency care by medical qualification of prehospital providers at Zomba Private Ambulances.

professionals, and the content may have been above the current knowledge level of the first-aid-only providers.

DISCUSSION

Use of WHO BEC led to increased overall knowledge for prehospital providers at ZPA, however, testing for statistical significance across all variables was limited given the small sample size. When analyzed by training level (e.g., nurses, mid-levels, and first-aid-only) variance was observed. First-aid-only providers consistently scored lower than

	All Participants (n = 9)				
	Pre-course	Post-course	Mean Difference	Test Statistic (t)	p Value
Overall score	61.3	64.4	3.1	1.05	0.162
Nurses (n = 4)	69.0	73.0	4.0	0.78	0.495
Providers with First Aid only (n = 3)	44.0	42.6	-1.33	-0.23	0.840
Midlevels (n = 2)	72.0	80.0	8.0	-	-

Table 4. Knowledge of basic emergency care by training level of prehospital providers at Zomba Private Ambulances.

nurses and mid-levels, which was to be expected given that WHO BEC was designed for healthcare workers such as nurses and doctors. Given that first-aid-only providers do not have formal training as healthcare workers, it was to be expected that the course may be above their current level of understanding. Increased confidence was observed across the board following completion of the course. However, a gap between knowledge and confidence was observed, with all respondents reporting nearly complete confidence (average overall post-course confidence of 96.8%) despite an overall post-course knowledge measurement of 64.4%. This gap is disconcerting, as providers may have a false sense of security in performing emergency skills, while their knowledge of basic emergency skills remains limited.

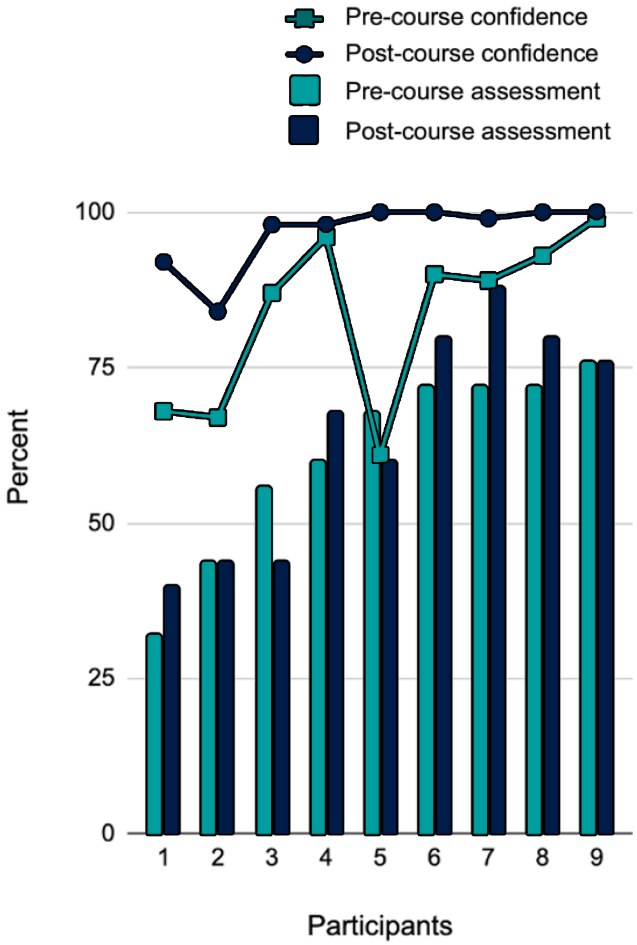

Figure 1. Pre- and post- course knowledge of basic emergency care versus confidence.

Further research and future studies aimed at assessing the retention of knowledge and confidence over time would be useful to evaluate the sustainability and longevity of prehospital providers at ZPA who underwent WHO BEC training. Furthermore, the evaluation of how training translates to patient care and patient outcomes would be useful in informing future training and implementation of prehospital care in Malawi. Additionally, the unforeseen barriers to course completion such as tardiness, other occupational responsibilities, and limited pre-course contextual knowledge are valuable in planning for future training. Future studies would benefit from using interviews and focus groups to facilitate the capture of qualitative data, which would enhance understanding of didactic needs, experiences of participants, and perceptions of the training.

BEC was not created for prehospital providers and contextually relevant and appropriate prehospital training courses should be readily available. While BEC remains a

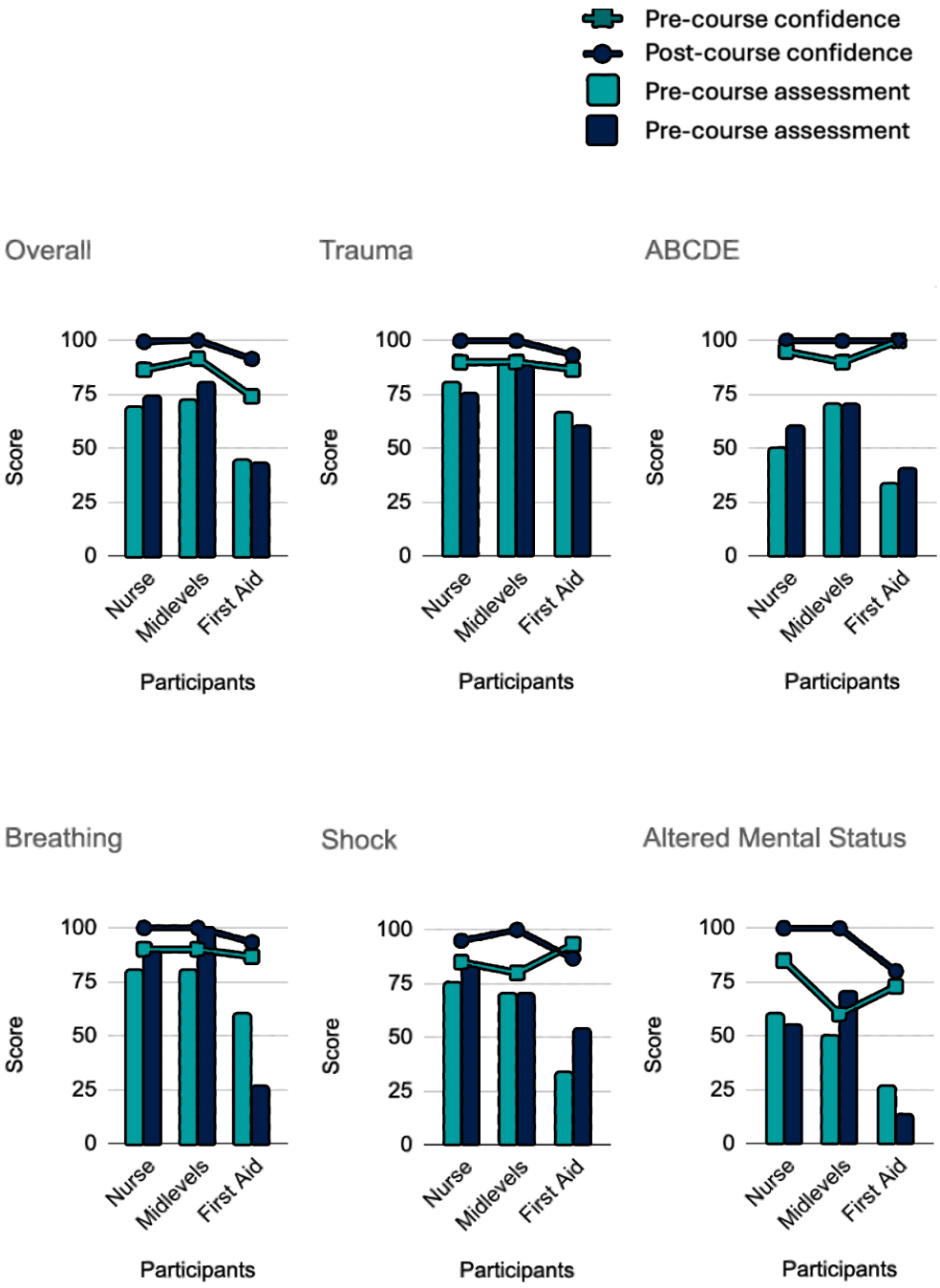

Figure 2. Pre- and post- course knowledge of basic emergency care versus confidence by training level of prehospital providers.

useful tool in providing emergency skills training for healthcare workers, BEC was not designed to be a prehospital tool. Having validated tools which are aimed at teaching prehospital skills to providers in resource-constrained settings is required to improve knowledge, confidence, and prehospital outcomes in countries like Malawi. Specifically, these tools could prioritize basic life support principals to maximize educational impact, minimizing overly complicated practices reserved for nurses, mid-levels, doctors, etc.

Furthermore, steps should be taken by the Malawian government to define the role of prehospital providers to ensure the appropriate training of prehospital providers within the country.

Strengths and Limitations

Given the themes observed, clear strengths and limitations were observed using WHO BEC to improve prehospital knowledge and confidence of prehospital providers. The assessment questions included in the WHO BEC course allowed for easy assessment of knowledge. Using confidence-based questions allowed for comparison between the knowledge-confidence gap of providers. As a pilot study, a descriptive approach allowed for the identification of major themes when using BEC to teach emergency skills to prehospital providers including improved knowledge and confidence in addition to barriers.

Limitations of the study include the pilot study's small sample size which limits the use of inferential statistical analysis. While descriptive statistics helped give valuable insight regarding feasibility, subsequent studies would benefit from a larger sample size with more rigorous statistical testing including interval and hypothesis testing. While pre- and post-course surveys are convenient for rapid assessment of knowledge and confidence, limitations exist including potential response bias. Participants may have provided answers that they believe researchers desired in addition to the possible inflation of responses and over-confidence. Additionally, pre- and post-course surveys typically only measure short-term changes in knowledge and confidence and fail to capture long-term behavior changes. Furthermore, self-reported confidence may fail to reflect actual competency, nuanced insights, or real-world applications.

Other limitations include the barriers mentioned by participants (tardiness, other occupational responsibilities, and lack of pre-course knowledge and training).

CONCLUSION

The use of WHO BEC, a validated emergency tool, is a feasible instrument to use for prehospital provider education and leads to improved knowledge and confidence. However, further studies should include larger sample sizes to improve statistical testing to minimize changes observed being due to chance. Gaps between knowledge and confidence exist and over-confident providers must be made aware of their actual knowledge and skill set. Gaps could be addressed by including more rigorous and frequent simulation-based assessments and practical and real-world assessments, ensuring subjects are aware of their scores. First-aid-only providers struggled to understand the complex materials which are aimed at nurses and doctors. The creation of validated prehospital-specific and contextually relevant tools aimed at teaching layperson and first-aid-only providers should be prioritized for improved training of prehospital providers in settings such as Malawi.

Finally, minimizing barriers could improve engagement and outcomes of future studies, including providing transport, multiple days of the course to accommodate various participants' schedules, and selection/development of tools which are relevant to all providers including first-aid only providers.

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APPENDIX 1 - WHO BEC DIDACTIC CONTENT OVERVIEW

The ABCDE and SAMPLE history approach

- Hazards that must be considered when approaching an ill or injured person;
  - Elements to approaching an ill or injured person safely
- Components of the systematic ABCDE approach to emergency patients;
  - Assess an airway
  - Explain when to use airway devices
  - Explain when advanced airway management is needed
  - Assess breathing;
  - Explain when to assist breathing;
- Assess fluid status (circulation)
  - Provide appropriate fluid resuscitation;
- Describe the critical ABCDE actions;
- List the elements of a SAMPLE history;
- Perform a relevant SAMPLE history.

Approach to Trauma

- ABCDE: Trauma primary survey
- DO: Important conditions to recognize and manage in the primary survey (signs, symptoms and management)
- ASK: Key history findings (SAMPLE history)
- CHECK: Trauma secondary survey
- DO: Important conditions to recognize and manage based on the history and secondary survey (Signs, symptoms and management)
- Special populations
- Trauma in pregnancy
- Special considerations in children
- Disposition considerations

Approach to difficulty in breathing

- Recognize signs of difficulty in breathing (DIB)
  - List the high-risk causes of difficulty in breathing
  - Perform critical actions for high-risk causes of difficulty in breathing.

Approach to shock

- Recognize signs of shock/poor perfusion
- Perform critical actions for patients with shock
- Assess fluid status
- Select appropriate fluid administration based on age, weight, and condition
- Recognize malnourishment, anaemia and burns and adjust fluid resuscitation.

Approach to altered mental status

- Recognize key history findings suggestive of different causes of altered mental status
- Recognize key physical findings suggestive of different causes of altered mental status
- List high-risk causes of altered mental status in adults and children;
- Perform critical actions for high-risk causes of altered mental status.

APPENDIX 2

Demographics

1. What is your gender identity?
   A. Male
   B. Female
   C. Non-binary
   D. Other _____
   E. Prefer not to answer
2. What healthcare qualification did you receive?
   A. Nurse
   B. Clinical Assistant/ Mid-level
   C. Doctor
   D. Paramedic
   E. Ambulance technician
   F. Other _____
3. Have you ever completed a prehospital certification? (examples; paramedic degree, ambulance technician diploma, first responder diploma)
   A. Yes; please specify _____
   B. No
4. How long have you been proving prehospital care formally?
   A. 0 – 6 months
   B. 6 – 12 months (1 year)
   C. 12- 18 months (1.5 years)
   D. 18 – 24 months (2 years)
   E. 24 – 30 months (2.5 years)
   F. 30 – 36 months (3 years)
   G. 36 – 42 months (3.5 years)
   H. 42 – 48 months (4 years)
   I. > 4 years; please specify time _____
5. Have you ever completed WHO's Basic Emergency Care Course?
   A. Yes; please specify when and where _____
   B. No

Confidence

1. I feel confident in my ability to assess the ABCDE's.
   A. Strongly agree
   B. Agree
   C. Neutral
   D. Disagree
   E. Strongly disagree
2. I feel confident in my ability to assess and manage a trauma patient.
   A. Strongly agree
   B. Agree
   C. Neutral
   D. Disagree
   E. Strongly disagree

3. I feel confident in my ability to assess and manage a patient with difficulty breathing.
   A. Strongly agree
   B. Agree
   C. Neutral
   D. Disagree
   E. Strongly disagree
4. I feel confident in my ability to identify and manage a patient in shock.
   A. Strongly agree
   B. Agree
   C. Neutral
   D. Disagree
   E. Strongly disagree
5. I feel confident in my ability to assess and manage a patient with altered mental status.
   A. Strongly agree
   B. Agree
   C. Neutral
   D. Disagree
   E. Strongly disagree
6. How likely are you to recommend this course to your colleague?
   A. Very likely
   B. Likely
   C. Neutral
   D. Unlikely
   E. Very unlikely
7. I feel this course benefitted me as a prehospital provider.
   A. Not at all
   B. Very little
   C. Somewhat
   D. To a great extent
8. This course has improved my ability to perform basic emergency skills as a prehospital provider.
   A. Not at all
   B. Very little
   C. Somewhat
   D. To a great extent

9. In your opinion, how challenging do you think each of the following may be for you?

	Not at all Challenging	Slightly Challenging	Moderately Challenging	Very Challenging	Extremely Challenging
Performing ABCDE assessment	☐	☐	☐	☐	☐
Assessing and managing a trauma patient	☐	☐	☐	☐	☐
Assessing and managing breathing complications	☐	☐	☐	☐	☐
Recognising and treating shock	☐	☐	☐	☐	☐
Assessing and managing altered mental status	☐	☐	☐	☐	☐
Performing successful handover to receiving providers	☐	☐	☐	☐	☐

10. Currently, how comfortable do you feel discussing the following topics with colleagues?

	Not at all Challenging	Slightly Challenging	Moderately Challenging	Very Challenging	Extremely Challenging
The ABCDE assessment	☐	☐	☐	☐	☐
Assessment and management of a trauma patient	☐	☐	☐	☐	☐
Assessment and management of breathing complications	☐	☐	☐	☐	☐
Recognising and treating shock	☐	☐	☐	☐	☐
Assessing and managing altered mental status	☐	☐	☐	☐	☐
Handover to receiving providers	☐	☐	☐	☐	☐

11. Currently, how comfortable do you feel discussing the following topics in the clinical environment?

	Not at all Challenging	Slightly Challenging	Moderately Challenging	Very Challenging	Extremely Challenging
The ABCDE assessment	☐	☐	☐	☐	☐
Assessment and management of a trauma patient	☐	☐	☐	☐	☐
Assessment and management of breathing complications	☐	☐	☐	☐	☐
Recognising and treating shock	☐	☐	☐	☐	☐
Assessing and managing altered mental status	☐	☐	☐	☐	☐
Handover to receiving providers	☐	☐	☐	☐	☐

APPENDIX 3 - WHO BECC ASSESSMENT

1. A mother brings in her 3-year-old child because of difficulty in breathing. On assessment, you hear loud, high-pitched sounds with breathing in. What is the most immediate concern?
   A. Severe infection
   B. Shock
   C. Asthma Attack
   D. Upper airway obstruction
2. An elderly woman fell at home. She had normal vital signs but complained of neck and knee pain prior to transport. During transport, she starts snoring and gurgling when taking a breath. What is the most appropriate method to immediately manage this problem?
   A. Placing her in the recovery position
   B. Administering salbutamol
   C. Jaw thrust
   D. Head tilt / chin lift
3. A 50-year-old man has collapsed in a store and you are called to assist him. He is unconscious, has a respiratory rate of four breaths per minute and a pulse of 100 beats per minute. The collapse was witnessed and there is no trauma. What is the best next step?
   A. Begin chest compressions
   B. Open the airway
   C. Begin bag- bag-valve-mask ventilations
   D. Check pupils
4. A 2-year-old boy is brought to you for being more sleepy than normal. He is unconscious. You open his airway, and insert an oropharyngeal airway. What is your next step?
   A. Check blood pressure
   B. Check AVPU scale
   C. Check glucose
   D. Check breathing
5. You are listening to the lungs of a 26-year-old man who has sudden onset chest pain and he is taking 30 breaths a minute. Which lung-sound finding is most suggestive of pneumothorax?
   A. Crackles on both sides
   B. Absent lung sounds on one side
   C. Stridor
   D. Wheezing on both sides
6. Which of the following is a component of the trauma primary survey?
   A. Examine the arms for any fractures
   B. Check the skin color and temperature
   C. Examine the ears for any drainage of blood or clear liquid
   D. Check skin pinch

7. You are assessing a man who was in a car crash. He is very confused, but the remainder of his primary survey is normal. How do you perform a SAMPLE history if the patient is too confused to answer your questions?
   A. You do not need to do a SAMPLE history in a trauma patient?
   B. Ask the patient repeatedly until he is able to answer
   C. Ask bystanders or family member for the information
   D. Assume that there is no important information
8. A 23-year-old man is carried in after diving head first into a river. He is speaking and his airway is open but he cannot walk or move his arms or legs. What is the first thing you must do?
   A. Place an IV line
   B. Examine him for other injuries
   C. Immobilize the cervical spine
   D. Give him a tetanus vaccination
9. You are evaluating a 21-year-old male who was in a motorcycle crash. He was thrown from the motorcycle and suffered injuries to his face, chest and legs. When you compress his pelvis, he screams in pain. His vital signs are: blood pressure 90/40 mmHg, heart rate 120 bpm, respiratory rate 25/min. What should be your next step?
   A. Place in a pelvic binder
   B. Administer tetanus vaccine
   C. Provide antibiotics
   D. Clean the abrasions with soap and water
10. A young woman has been brought in after an explosion. She has an open airway, a respiratory rate of 30/min, heart rate 125 bpm, blood pressure of 85/50 mmHg, has moist pale skin and she complains of abdominal pain. She has small wounds to her skin but there is no obvious bleeding. What would you do to manage this patient?
    A. Place two large-bore cannulae and give 1 litre of fluid
    B. Offer her a drink of water
    C. Check her temperature
    D. Provide antibiotics
11. You are evaluating a 34-year-old female complaining of difficulty in breathing, coughing, and fever for 3 days. Which of the following actions should you do first?
    A. Check blood pressure
    B. Administer antibiotics
    C. Start an IV
    D. Check the lung sounds
12. A 67-year-old man with a history of a heart attack is complaining of difficulty in breathing that is worse whenever he lies flat. His legs are both swollen, which has become worse in the past 2 weeks. What is the most likely cause of his difficulty in breathing?
    A. Heart failure
    B. Asthma
    C. Pneumothorax
    D. Pneumonia

13. There was a fire in a nearby house and a patient is brought to you with burned nasal hairs and shortness of breath. What should you do first?
    A. Give oxygen
    B. Give intramuscularr adrenaline
    C. Start an IV line
    D. Perform needle decompression
14. A 30-year-old woman was stung by a bee and now has difficulty in breathing, facial swelling, and a rash. She has a history of severe allergic reactions to bee stings. What medication should you give?
    A. Naloxone
    B. Benzodiazepine
    C. Adrenaline
    D. Aspirin
15. You are assessing a 10-year-old boy for difficulty in breathing. You notice that the skin on his fingertips and around his mouth has a blue color. What is this finding called?
    A. Retractions
    B. Nasal flaring
    C. Crepitus
    D. Cyanosis
16. A 7-year-old boy has had lethargy, vomiting and diarrhoea for the past 4 days. His vital signs are: blood pressure 80/40 mmHg, heart rate 140 beats per minute, respiratory rate 18 breaths per minute. The patient vomits when you try to give anything by mouth. What is your most immediate management?
    A. Start an IV line and give fluids
    B. Continue to attempt oral rehydration
    C. Place a nasogastric (NG) tube and hydrate through it
    D. Rapidly transfer to a referral hospital
17. You are taking care of a 28-year-old man who was shot in the abdomen. He is lethargic and the vital signs are as follows: blood pressure 80/40 mmHg, heart rate 130 beats per minute, respiratory rate 20 breaths per minute. There is heavy bleeding from the gunshot wound and the abdomen is rigid and tender. What is the first intervention you should give this patient?
    A. IV fluids
    B. Intraosseous line
    C. Surgery
    D. Adrenaline
18. A child that presents with sunken eyes, small amounts of dark urine, dry mucous membranes and abnormal skin pinch testing is most likely suffering from:
    A. Pneumonia
    B. Head injury
    C. Dehydration
    D. Hypoglycaemia

19. A 60-year-old man states he has been weak and dizzy for the past week. His vital signs are: blood pressure 90/50 mmHg, heart rate 125 beats per minute, respiratory rate 16 breaths per minute. His skin is cool and pale. He states that his stools have been black for the past 2 days. What is the most likely cause of his shock?
    A. Stomach bleeding
    B. Abdominal trauma
    C. Dehydration
    D. Severe infection
20. You are assessing a 23-year-old man who was stabbed in the chest. You expose the chest to find one stab wound in the right chest with minor bleeding. He is complaining of severe difficulty in breathing and there are no lung sounds on the right side. His neck veins are distended and his skin is cool and sweaty. His vital signs are: blood pressure 86/56 mmHg, heart rate 136 beats per minute, respiratory rate 28 breaths per minute. What is your next step?
    A. Chest tube placement
    B. Needle decompression
    C. Blood transfusion
    D. Start IV fluids
21. You are evaluating ABCDE on a 4-year-old boy who has a fever and a cough. He is not responding to you calling his name, but if you pinch the sole of his foot, he moans. What is his level on the AVPU scale?
    A. Alert
    B. Verbal
    C. Pain
    D. Unresponsive
22. A 37-year-old male is brought in by his wife with fever and confusion. She says since the fever began 3 days ago he has become increasingly confused. There has been no trauma. On examination you notice that his neck is stiff. What is the most likely cause of his altered mental status?
    A. Pneumonia
    B. Infection around the brain
    C. Stroke
    D. Drug use
23. A 46-year-old man comes in to check his blood pressure. His vital signs are: blood pressure 160/90, heart rate 120, respiratory rate 18, and blood glucose is 5 mmol/L. While you are examining him he has a seizure/convulsion. What treatment should you give?
    A. Benzodiazepine
    B. Glucose
    C. Antibiotics
    D. Naloxone
24. A 36-week pregnant woman is having a seizure/convulsion. She has a recent history of high blood pressure as well. What treatment should you give?
    A. Magnesium sulphate
    B. Glucose
    C. Nitroglycerin
    D. Nothing, the seizure/convulsion will stop on its own

25. You are assessing a 6-month-old infant and find a depressed fontanelle. What does this physical examination finding suggest?
    A. Infection in the brain
    B. Dehydration
    C. Pneumonia
    D. Hypoglycaemia