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Sudden cardiac arrest preparedness in African football: evidence from Cameroon and implications for global sport

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ABSTRACT

Objective Sudden cardiac arrest (SCA) remains the leading cause of sport-related death worldwide, yet survival outcomes in Africa are critically poor. We conducted a formative assessment of the knowledge, attitudes and practices of professional football stakeholders in Cameroon as a model for identifying system-level gaps in SCA preparedness in low-resource sport settings.

Methods We conducted a cross-sectional survey during the 2024/2025 season across five pre-competition medical centres in Cameroon. Eligible participants were players, referees, coaches and physiotherapists from Elite 1, Elite 2 and the Female Super League who had two or more seasons of professional experience. A validated questionnaire, adapted from international guidelines, was used to assess sociodemographic data, knowledge, attitudes and practices. Data were analysed descriptively with subgroup comparisons using SPSS V.20.

Results A total of 745 participants were enrolled: 536 players, 90 referees, 84 coaches and 35 physiotherapists. Most (66.4%) demonstrated poor knowledge of SCA, only 12% reported confidence in cardiopulmonary resuscitation (CPR) or automated external defibrillator (AED) use and referees showed the lowest preparedness scores despite their critical first-responder role. While one-third expressed positive attitudes, self-reported barriers to providing CPR included fear of harm (66.3%) and legal concerns (78.3%). Only 33.4% reported good practices, with significant gaps in AED access, CPR training and emergency action plan awareness.

Conclusion This assessment identified critical gaps in SCA preparedness in Cameroonian football, exposing gaps that likely extend across Africa and similar environments. Compulsory CPR/AED training, AED availability and enforceable emergency action plans are urgently needed to align African football with international best practice and strengthen the survival chain.

WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ Sudden cardiac arrest (SCA) is the leading cause of sport-related death worldwide.
- ⇒ Survival rates exceed 80% in well-resourced leagues with compulsory cardiopulmonary resuscitation (CPR)/automated external defibrillator (AED) training and universal defibrillator access.
- ⇒ Data on SCA preparedness in African or other low-resource football settings are scarce.

WHAT THIS STUDY ADDS

- ⇒ In a survey of 745 stakeholders across Cameroon's professional leagues, two-thirds demonstrated poor knowledge of SCA and less than 12% reported confidence in CPR or AED use.
- ⇒ Referees who are critical first responders on the pitch showed the lowest preparedness.
- ⇒ Structural deficiencies were widespread: limited AED availability, poor CPR training uptake and low awareness of emergency action plans.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ Our findings highlight the urgent need for compulsory CPR/AED training, enforceable emergency action plans and universal AED access across Cameroon football.
- ⇒ This study provides evidence to support the Confédération Africaine de Football, FIFA and national federations in mandating minimum SCA preparedness standards in all competitions.
- ⇒ Our results inform scalable models for improving athlete safety in other low-resource sporting environments worldwide.

INTRODUCTION

Sudden cardiac death (SCD) in athletes occurs when an active individual, who in the previous 6 hours, had no known health problems, dies suddenly within 1 hour of the onset of symptoms, with no trauma during or after exercise.¹ The European Society of Cardiology defines sudden cardiac arrest (SCA) as an unexpected collapse of cardiac origin requiring cardiopulmonary resuscitation (CPR)

and/or defibrillation, regardless of the outcome.² SCA is the leading cause of sport-related deaths in competitive athletes.^{3,4}

Globally, the incidence of SCD in athletes is estimated at 2.3 per 100 000 annually,⁵ with risk markedly higher in males and black athletes.^{6–8} In the USA, an 11% rate of SCD following exercise was reported.⁹ Football-related sudden death rates are notably high in several countries, accounting for 13% of 820 sports-related deaths in France,¹⁰ 9.7% in Germany, 21.3% in Spain¹¹ and 41.8% in Italy.⁴ Cameroon has about 1300 professional footballers,



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yet data on SCA incidence in African football remain scarce and under-reported.

A study conducted in Cameroon showed an incidence of 1.7 cases per 100 000 athletes per year in a population of recreational athletes.¹² Despite global advances in football medicine addressing SCA, Africa continues to report the poorest survival outcomes.¹³ However, very few studies have investigated the awareness and practices of key stakeholders in African football. Given the profound impact of SCA on players, teams and communities, we conducted a formative assessment of awareness and current practices regarding SCA prevention and emergency response among football stakeholders in Cameroon, as a model for understanding preparedness gaps in African and other low-resource sporting contexts.

METHODS

Study design and setting

This cross-sectional observational study was conducted between June 2024 and July 2025. Data were collected at five pre-competition medical assessment centres in Cameroon. In the three professional football leagues, stadium medical officers are assigned by the national football association on match days; however, their presence and availability are not consistently guaranteed across venues. The study focused on stakeholders who are reliably present pitch-side to reflect real-world emergency preparedness in this setting. This study was designed as a formative assessment to map preparedness gaps and barriers, rather than to evaluate individual clinical competence. The study was designed, conducted and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies.

Participants and sampling

A consecutive sampling approach was used: all players, referees, coaches and physiotherapists with ≥ 2 years of professional experience attending pre-competition medical assessments at five centres (July 2024–March 2025) were invited to participate. Therefore, no a priori sample size calculation was performed. Team physicians were not intentionally excluded; however, fewer than five professional clubs reported having a licensed team physician who was not present during the study period. Data were collected using a validated, self-administered questionnaire developed using a structured, guideline-informed approach. Questionnaire items were derived from key recommendations, previously published tools and educational priorities outlined in international guidelines from the European Society of Cardiology, the American Heart Association and the FIFA Medical Assessment and Research Centre, aiming to capture core domains of SCA preparedness relevant to football settings, including recognition, emergency response and system readiness. Different response scales were used according to the conceptual domain assessed. Attitude items employed a 5-point Likert scale (strongly disagree to strongly agree) to capture gradations in perception, confidence and hesitation, which are inherently subjective constructs requiring greater response sensitivity. Practice items used a 3-point Likert scale (always, sometimes, never) to reflect the frequency of reported behaviours and exposure to emergency preparedness measures, where fewer response options improve clarity and interpretability. Knowledge items were assessed using binary response options (correct/incorrect or 'I don't know') to minimise guessing and facilitate objective scoring. This domain-specific scaling approach is consistent with established knowledge–attitude–practice survey

methodology and was chosen to enhance construct validity and interpretability.

Sociodemographic data included age, sex, role, league, region of origin and secondary profession. Knowledge of SCA was assessed using 13 items on risk factors, recognition, emergency response, CPR and automated external defibrillator (AED) use, scored as correct (1) or incorrect/'I don't know' (0). Total scores (0–13) were expressed as percentages and classified using Bloom's criteria as poor (<60%), inadequate (60%–80%) or good (>80%).¹⁴

Attitudes were assessed with 12 questions on a 5-point Likert scale (1=strongly disagree, 5=strongly agree), with reverse coding for negative items so higher scores reflected more positive attitudes. Scores (12–60) were converted to percentages; $\geq 80\%$ ($\geq 48/60$) indicated a positive attitude.¹⁴ Internal consistency was acceptable (Cronbach's $\alpha=0.767$).

Practices were assessed with nine items on screening, AED access, emergency planning, ambulance availability, medical staff, CPR training and field response, rated on a 3-point Likert scale (always=3, sometimes=2, never=1). Weighted means were categorised as good (2.34–3.00), inadequate (1.67–2.33) or poor (1.00–1.66).

Statistical analysis

Data were analysed using SPSS V20.0. Descriptive statistics are reported as absolute frequencies and percentages for categorical variables and mean $\pm$ SD for continuous variables. Subgroup analyses were performed by sex, professional role (player, referee, coach, physiotherapist) and league (Elite 1, Elite 2, Female Super League). Results are summarised using tables.

Equity, diversity and inclusion statement

All eligible participants, regardless of gender, race, ethnicity, disability or socioeconomic background, were included.

Public involvement statement

A few players, referees, physiotherapists and local football medical officers contributed to the questionnaire's design; coaches were not directly involved. Results will be shared with all stakeholder groups.

RESULTS

Sociodemographic characteristics

A total of 745 football stakeholders participated: 536 players, 90 referees, 84 coaches and 35 physiotherapists. By league, 370 (49.7%) were from Elite 1, 163 (21.9%) from Elite 2 and 207 (27.8%) from the Female Super League. Most participants were male, 535 (71.8%), while female participants were 210 (28.2%). The mean age was 25.0 ± 7.9 years (range 15–60), with players averaging 22.0 ± 3.7 years and coaches 40.0 ± 9.6 years. Overall, 257 (34.5%) participants reported another professional activity alongside football.

Knowledge of SCA

Over two-thirds of participants, 495 (66.4%), demonstrated poor knowledge and 228 (30.6%) inadequate knowledge; only 22 (3.0%) achieved a good score. While many recognised that SCA can occur during football and that cardiac causes predominate, critical gaps were evident: 443 (59.5%) recognised a non-contact fall as presumptive SCA, only 91 (12.2%) knew the correct chest compression rate and just 12.2% reported knowing how to use an AED. Awareness of risk factors, such as playing with fever, was also limited (25.2%).

Table 1 Proportion of participants with good knowledge of sudden cardiac arrest (n=745)

Question	Good knowledge n (%)
(1) Sudden cardiac arrest can occur during or within an hour after football activity in an apparently healthy individual	494 (66.3)
(2) The most common cause of sudden cardiac arrest in footballers is a heart-related condition	563 (75.6)
(3) A footballer who collapses on the field without any contact should be considered as a sudden cardiac arrest until proven otherwise	443 (59.5)
(4) Pre-participation medical screening can help detect risk factors that may lead to sudden cardiac arrest	353 (47.4)
(5) It is possible for a football player to suffer a cardiac arrest during training or a match	188 (25.2)
(6) A person in cardiac arrest may have abnormal breathing, such as gasping or no breathing at all	91 (12.2)
(7) A player who is unconscious and unresponsive may be experiencing cardiac arrest and needs to be assessed immediately	293 (39.3)
(8) Seizure-like movements (convulsions) can occur during sudden cardiac arrest	494 (66.3)
(9) In case of suspected cardiac arrest on the pitch, I should call for help immediately before starting CPR	563 (75.6)
(10) CPR (chest compressions) should begin immediately after identifying signs of cardiac arrest	443 (59.5)
(11) I know how to properly place the pads of an automated external defibrillator (AED) on a footballer	353 (47.4)
(12) Playing football while having a fever or viral infection can increase the risk of cardiac complications	188 (25.2)
(13) The recommended rate for chest compressions during CPR is 100–120 compressions per minute	91 (12.2)

CPR, cardiopulmonary resuscitation.

Knowledge gaps in life-saving skills were striking. While physiotherapists showed better awareness of SCA causes and the need for chest compressions (>90%), only 10 (28.6%) knew correct AED pad placement or compression rate (100–120/min). Correct knowledge of the recommended CPR chest compression rate was reported by just 22 (26.2%) coaches and 97 (18.1%) players. AED knowledge was limited across all groups: only 10 (17.9%) coaches, 61 (11.4%) players and 6 (5.6%) referees knew how to use one. Although nearly half of referees recognised the need to call emergency services (47.8%), they still ranked lowest in overall preparedness. Awareness of risks, such as playing with fever or viral illness, was also poor: 28.6% of physiotherapists, 17.9% of coaches and 11.4% of players identified this correctly (table 1).

Attitudes towards SCA

The mean attitude score was 43.4 ± 7.6 (72.4%), yet only one in three participants (31.3%) had a positive attitude. Most participants recognised a personal responsibility to intervene during cardiac emergencies and supported the need for regular CPR training. However, important barriers remained: two-thirds feared causing harm if they performed CPR incorrectly, nearly 80% hesitated due to potential legal consequences, and fewer than half felt confident using an AED. Thus, while willingness to act exists, fear, legal uncertainty and limited confidence in life-saving skills undermine effective preparedness. Positive attitudes were more common among physiotherapists 19 (54.3%) and coaches 35 (41.7%) than among referees 31 (34.4%) and players 148 (27.6%). Differences by league were modest, with slightly higher positivity in the Female Super League (71/207, 34.3%)

Table 2 Positive attitudes and perceived barriers to sudden cardiac arrest response (n=745)

Statement	Positive attitudes n (%)
Q1 I feel ready to intervene in a cardiac emergency during a match	397 (53.3)
Q2 I believe chest compressions should be continued until professional help arrives or the player shows clear signs of recovery	453 (60.8)
Q3 Even though I am not a healthcare professional, I believe I can help save a life during cardiac arrest	444 (59.6)
Q4 I believe opening the airway before chest compressions is an important step	460 (61.7)
Q5 I worry that performing CPR incorrectly might harm the player*	494 (66.3)
Q6 I feel confident placing AED pads on a player in cardiac arrest	313 (42.0)
Q7 I feel confident starting compressions even if the player is gasping or convulsing	403 (54.1)
Q8 I feel it is my responsibility to intervene if a player collapses and shows signs of cardiac arrest	554 (74.4)
Q9 I sometimes hesitate to perform CPR or use an AED due to fear of being held legally responsible if something goes wrong*	583 (78.3)
Q10 I feel confident in my ability to perform chest compressions effectively in a real emergency	600 (80.5)
Q11 I believe it is important to undergo CPR training every season, even if my federation or team does not offer it	519 (69.7)
Q12 I believe using an AED is safe and simple enough for non-medical personnel	310 (41.6)

*Items where endorsement reflects a barrier (fear/hesitation).
AED, automated external defibrillator; CPR, cardiopulmonary resuscitation.

and Elite 2 (56/168, 33.3%) compared with Elite 1 (106/370, 28.6%) (table 2).

Practices regarding SCA prevention and emergency response

The overall practice score was 2.12 ± 0.43 , with only 249 (33.4%) participants demonstrating good practices, 308 (41.4%) inadequate practices and 188 (25.2%) poor practices. Preventive measures were relatively strong, with most undergoing pre-season medical screening and family/personal history review, but emergency preparedness was weak. Fewer than two in five participants were aware of an emergency action plan, fewer than one in five routinely checked AED location was available, and annual CPR training was the lowest-scoring indicator. On-field response was also hesitant, with many participants being unwilling to intervene without referee permission, reflecting hesitation even in urgent scenarios. AED availability at matches was very low (1.70).

Clear subgroup differences were observed. Coaches reported the best practices (mean 2.22; 45.2% good), followed by players (2.12; 33.8%) and physiotherapists (2.09; 28.6%). Referees scored lowest (2.01; 22.2%), a critical concern given their authority to grant pitch access and proximity to emergencies. Men reported higher preparedness than women (35.9% vs 27.1%). By competition level, Elite 1 participants performed slightly better (2.15; 36.2% good) than Elite 2 (2.11; 32.7%) and the Female Super League (2.08; 29.0%) (table 3).

Overall, the findings highlight a striking imbalance: while preventive measures such as pre-season medical screening are common, on-field emergency readiness is weak. AED availability is rare, CPR training rates are the lowest of all measures and awareness of emergency action plans is limited. This mismatch leaves players vulnerable at the very moment when rapid action determines survival.

Table 3 Practices related to sudden cardiac arrest prevention and emergency preparedness (n=745)

Statement	Mean	SD	Practice
(1) I undergo medical and cardiac screening each season before competition	2.73	0.56	Good
(2) I check the location of the AED before each match	1.84	0.77	Inadequate
(3) I am aware of the emergency action plan for cardiac arrest during each match	1.89	0.84	Inadequate
(4) Before each match, I confirm the availability of emergency transportation (ambulance)	2.04	0.85	Inadequate
(5) I check the presence and position of the stadium medical doctors before each match	2.25	0.8	Inadequate
(6) During pre-participation screening, the physician reviews my personal and family medical history	2.51	0.72	Good
(7) An AED was available on the field at every match during the past season	1.7	0.79	Inadequate
(8) In case of cardiac arrest, I would enter the field without waiting for referee permission	2.01	0.86	Inadequate
(9) I attend CPR training every year	1.64	0.77	Poor

AED, automated external defibrillator; CPR, cardiopulmonary resuscitation.

Taken together, the results reveal critical gaps across knowledge, attitudes and practices. Most stakeholders lacked essential life-saving skills and confidence, only one in three demonstrated positive attitudes or good practices, and barriers such as fear of harm, legal concerns and limited AED/CPR preparedness persist. Addressing these deficits through compulsory CPR/AED training, referee-focused education and enforceable emergency action plans is essential to strengthen the survival chain in Cameroonian football and provide a scalable model for athlete safety in other low-resource sporting environments worldwide.

DISCUSSION

This study is the first formative comprehensive assessment of knowledge, attitudes and practices regarding SCA among African professional football stakeholders using a validated, guideline-based tool. Its large and diverse sample strengthens generalisability, and the findings have relevance beyond Cameroon. Using Cameroon as a model, we identified critical gaps in the survival chain that reflect challenges faced across African and other similar sport settings. Critical gaps in basic emergency preparedness were observed: fewer than one in three demonstrated positive attitudes or good practices, while over two-thirds showed limited exposure to CPR and AED knowledge consistent with basic life support training. These gaps expose a fragile survival chain that likely contributes to persistently poor SCA outcomes across Africa.

Sociodemographic characteristics

This study assessed 745 stakeholders from all three professional leagues in Cameroon, including 28.2% women, reflecting the rising prominence of women's football in Africa and their increasing engagement in sports research. This aligns with global initiatives to close the sex data gap in sports medicine, suggesting that barriers lie more with researchers than with player engagement.^{15 16}

The age profile of Cameroonian players (mean 22.0±3.7 years) and coaches (40.0±9.6 years) is consistent with African leagues but differs from those in Europe, where players often debut later (25–28 years) due to longer development in structured academies and coaches are older (≥45 years) due to

licensing requirements.^{17 18} Over one-third of participants (257; 34.5%) reported secondary employment, reflecting the fragile professional status of football in Cameroon. Similar patterns are seen across Africa and other low-resource regions where insecure contracts and low financial security limit time for training and emergency preparedness.¹⁹ In contrast, players in well-resourced leagues benefit from full-time contracts, medical insurance and structured support, enabling greater focus on safety. These structural disparities help explain the survival gap between African and European football, highlighting the need for global reforms to ensure athlete safety is not determined by resources.

Knowledge regarding SCA

This study reveals critical gaps, with over two-thirds of participants demonstrating poor knowledge, and only 3% achieved a 'good' score. While many recognised that SCA can occur in apparently healthy athletes and that cardiac causes predominate, far fewer identified non-contact collapse as SCA on the pitch or that a player undergoing SCA may still have abnormal breathing. Most concerning, only 12.2% reported correct knowledge of chest compression rates and AED use. Comparable deficits have been reported elsewhere in Africa, such as Nigeria,²⁰ and even in parts of Europe: in German amateur football, 30% of clubs lacked CPR-trained staff and only 10% had emergency plans.²¹ In contrast, professional leagues in Europe and North America mandate universal AED access, CPR/AED training and structured emergency planning, with survival rates exceeding 80%.²² Again, these structural differences help explain further the survival gap between well-resourced and low-resource leagues worldwide.

Subgroup analysis showed physiotherapists had greater awareness of causes and the need for compressions, yet fewer than one in three knew correct AED pad placement or compression rates. Coaches and players performed similarly poorly, while referees, though more aware of the need to call assistance before CPR, had the lowest AED proficiency. These gaps are critical, as referees and coaches often serve as first responders in the absence of medical staff in low-resource settings. Addressing these disparities, mandatory CPR/AED training, targeted education for referees and coaches, and stronger federation policy enforcement are urgent priorities. However, these findings should be interpreted as reflecting gaps in training exposure and system readiness rather than an assessment of professional-level medical knowledge among lay stakeholders.

Attitudes and barriers

Only one in three participants showed a positive attitude toward SCA response, underscoring that knowledge alone is insufficient. Most recognised a personal responsibility to intervene and endorsed the need for CPR training, yet psychological and structural barriers dominated: two-thirds feared causing harm, nearly 80% hesitated due to legal concerns, and fewer than half felt confident using an AED. Similar fears and legal uncertainties are among the most cited barriers to bystander CPR globally, in both high-income and low-resource settings.^{23 24} In African football, where Good Samaritan protections are inconsistently enforced, these concerns may be amplified. Fewer than half expressed confidence in AED use, suggesting that without repeated hands-on training, reluctance to deploy AEDs may persist even when available, especially in settings where Good Samaritan laws are not friendly. In the Cameroonian context, the Samaritan law states that whoever fails to render assistance to a person in danger of death or grievous harm, whether by his own

endeavours or by calling for help, where such assistance involves no risk to himself or to any other person, shall be punished with imprisonment for from 1 month to 3 years or with fine of from 20 000 to 1 million francs, or with both such imprisonment and fine.²⁵ Meanwhile, unintentional harm is punishable under Cameroon law; but it is unclear what may happen if someone assists a victim and causes unintentional harm.

Subgroup analysis showed more positive attitudes among physiotherapists and coaches compared with referees and players. This gap is concerning, as referees' authority to grant field access can critically delay or enable emergency response. Low confidence at this level likely contributes to survival disparities in African football.

Overall, addressing knowledge deficits alone is insufficient. Psychosocial and structural barriers must also be tackled through culturally tailored training, simulation-based learning and enabling legal frameworks. Regular refresher courses and mandatory emergency drills within league regulations could build confidence, reduce hesitation and normalise immediate action. These attitudinal responses represent perceived readiness and barriers to action, rather than objective measures of emergency performance, and are influenced by legal, cultural and contextual factors.

Practices and emergency response

Preparedness practices revealed the most urgent gaps. Although pre-participation screening was widely adopted, in-game readiness was poor: fewer than two in five stakeholders knew of an emergency action plan, consistently checked AED availability or location, and AEDs were absent at most matches. Annual CPR training adherence was the lowest of all indicators, highlighting a severe capacity gap in life-saving skills. Similar deficits have been documented across African football and in amateur European clubs.²¹ Our findings differ from professional leagues in Europe and North America, which mandate AED coverage, structured emergency plans and annual CPR/AED training, explaining survival rates exceeding 80%, contrary to the African context. Inconsistent stadium medical coverage was remarkable, together with the irregular presence of team physicians in domestic professional football, which has important implications for SCA response. In domestic professional football competitions, the national football association assigns stadium medical officers to be present on match days; they are expected to ensure the availability of basic emergency medical equipment, including an AED. However, our findings indicate that implementation of these requirements is inconsistent across venues and competitions. AED availability at match venues is not systematically verified, and compliance varies substantially. During training sessions, structured medical supervision is uncommon, and AEDs are typically not available on site. In many matches, early recognition and initial life-saving actions are likely to depend on non-medical stakeholders who are consistently pitch-side, including referees, coaches, physiotherapists and players. Reliance on physician-dependent emergency models in similar settings is therefore unrealistic and may contribute to delays in recognition, initiation of CPR and defibrillation. These findings highlight the need for a context-specific approach to emergency preparedness that prioritises universal CPR/AED training and enforceable emergency action plans, rather than assuming the routine availability of specialised medical staff.

Subgroup analysis identified referees as the weakest link in the survival chain, despite their critical role in granting field access during emergencies. Coaches demonstrated relatively better

practices, indicating that they may be effective targets for structured CPR/AED training and advocacy initiatives.

Recent findings from the FIFA cardiac screening survey indicate that cardiac screening is recommended or mandated by 81% of FIFA member associations globally, with regional variation in screening practices for elite football. This survey suggests that differences likely reflect disparities in financial resources and access to trained medical professionals.²⁶ However, while our findings reflect this widespread screening, our findings also illustrate that screening alone is insufficient if not accompanied by robust emergency preparedness. The contrast between the broad implementation of cardiac screening and the limited emergency response capacity highlights a critical gap in the continuum of athlete protection, particularly in low-resource football settings.

This study exposes a fragile survival chain in Cameroon football, characterised by limited access to training, resources and emergency systems required for effective basic life support response to SCA. Without universal AED access, compulsory CPR/AED training and enforceable emergency action plans, athletes remain at avoidable risk of death on the pitch. The absence of AEDs and lack of structured emergency plans represent the most urgent modifiable factors, given that early defibrillation is the single strongest predictor of SCA survival.²⁷ Cameroon provides a case study for the wider African and global low-resource sporting context, where urgent policy reform by federations, CAF and FIFA could transform survival outcomes and align athlete safety with international standards.

Research and policy implications

This study highlights a critical gap between preventive cardiovascular screening and emergency readiness in Cameroon football, reflecting under investment in survival-critical measures for SCA. While screening is widely implemented, the capacity to respond effectively to on-field cardiac emergencies remains inadequate.

Mandatory annual CPR and AED training for all football stakeholders, including players, coaches, referees and officials, should be embedded within licensing requirements, pre-season activities and tournament education programmes. Training should prioritise practical, scenario-based instruction to improve rapid recognition of collapse, initiation of chest compressions and early defibrillation.

Policy interventions should also address legal and psychological barriers to bystander intervention. Good Samaritan protections established by football bodies should reassure stakeholders acting during medical emergencies.

Universal AED availability at all domestic professional match and training venues should be established as a minimum safety standard. This may be facilitated through coordinated AED donation programmes to member associations, provision of AED trainers and mandatory verification of AED presence and functionality during routine pre-match safety checks by designated safety officials. Further, standardised and enforceable emergency action plans must be implemented and communicated to all stakeholders during technical meetings to ensure coordinated and timely response.

At a continental and global level, CAF and FIFA should mandate annual CPR/AED compliance reporting from member associations and provide targeted support to resource-limited regions through funding, equipment provision and training programmes.

Limitations

Despite its relevance, the cross-sectional design provides only a snapshot, limiting causal inference. The formative study design relied on self-reported data to identify preparedness gaps and barriers, and thus does not measure objective emergency performance, clinical competence or response quality during simulated scenarios. Some items relied on recall, introducing potential bias, and self-reported practices may overestimate or underestimate actual preparedness. Direct assessment of resuscitation skills was not undertaken. Preparedness may therefore be even lower than reported.

CONCLUSION

This study identified critical gaps in SCA preparedness in Cameroon football, exposing gaps that likely extend across Africa and similar environments. Compulsory CPR/AED training, AED availability and enforceable emergency action plans are urgently needed to align African football with international best practice and strengthen the survival chain for sport-related SCA.

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REFERENCES

- 1 Bille K, Figueiras D, Schamasch P, et al. Sudden cardiac death in athletes: the Lausanne Recommendations. *Eur J Cardiovasc Prev Rehabil* 2006;13:859–75.
- 2 Pelliccia A, Sharma S, Gati S, et al. 2020 ESC Guidelines on sports cardiology and exercise in patients with cardiovascular disease: The Task Force on sports cardiology

and exercise in patients with cardiovascular disease of the European Society of Cardiology (ESC). *Eur Heart J* 2020;42:17–96.

- 3 Harmon KG, Asif IM, Maleszewski JJ, et al. Incidence, Cause, and Comparative Frequency of Sudden Cardiac Death in National Collegiate Athletic Association Athletes: A Decade in Review. *Circulation* 2015;132:10–9.
- 4 Maron BJ, Doerer JJ, Haas TS, et al. Sudden deaths in young competitive athletes: analysis of 1866 deaths in the United States, 1980–2006. *Circulation* 2009;119:1085–92.
- 5 Drezner JA, Chun J, Harmon KG, et al. Survival trends in the United States following exercise-related sudden cardiac arrest in the youth: 2000–2006. *Heart Rhythm* 2008;5:794–9.
- 6 La Gerche A, Baggish AL, Knuuti J, et al. Cardiac imaging and stress testing asymptomatic athletes to identify those at risk of sudden cardiac death. *JACC Cardiovasc Imaging* 2013;6:993–1007.
- 7 Harmon KG, Drezner JA, Wilson MG, et al. Incidence of sudden cardiac death in athletes: a state-of-the-art review. *Br J Sports Med* 2014;48:1185–92.
- 8 Drezner JA, Harmon KG, Marek JC. Incidence of sudden cardiac arrest in Minnesota high school student athletes: the limitations of catastrophic insurance claims. *J Am Coll Cardiol* 2014;63:1455–6.
- 9 Marijon E, Tafflet M, Celermajer DS, et al. Sports-related sudden death in the general population. *Circulation* 2011;124:672–81.
- 10 Turk EE, Riedel A, Püschel K. Natural and traumatic sports-related fatalities: a 10-year retrospective study. *Br J Sports Med* 2008;42:604–8.
- 11 Suárez-Mier MP, Aguilera B. Causes of sudden death during sports activities in Spain. *Rev Esp Cardiol* 2002;55:347–58.
- 12 Tchanana GMK, Ngantcha M, Yuyun MF, et al. Incidence of recreational sports-related sudden cardiac arrest in participants over age 12 in a general African population. *BMJ Open Sport Exerc Med* 2020;6:e000706.
- 13 Borjesson M, Dugmore D, Mellwig K-P, et al. Time for action regarding cardiovascular emergency care at sports arenas: a lesson from the Arena study. *Eur Heart J* 2010;31:1438–41.
- 14 Bloom BS. Learning for mastery. Instruction and curriculum. Regional education laboratory for the Carolinas and Virginia, topical papers and reprints, number 1. Regional Education Laboratory for the Carolinas and Virginia, Mutual Plaza (Chapel Hill and Duke Sts; 1968.
- 15 Emmonds S, Heyward O, Jones B. The Challenge of Applying and Undertaking Research in Female Sport. *Sports Med Open* 2019;5:51.
- 16 Cowley ES, Olenick AA, McNulty KL, et al. "Invisible Sportswomen": The Sex Data Gap in Sport and Exercise Science Research. *Women in Sport and Physical Activity Journal* 2021;29:146–51.
- 17 Poli R, Besson R, Ravenel L. Demographic analysis of professional football club coaches. 2022.
- 18 Relvas H, Littlewood M, Nesti M, et al. Organizational Structures and Working Practices in Elite European Professional Football Clubs: Understanding the Relationship between Youth and Professional Domains. *European Sport Management Quarterly* 2010;10:165–87.
- 19 Africa DP. *Football, and FIFA: politics, colonialism, and resistance*. Taylor & Francis, 2002.
- 20 Adeniyi AF, Ogumike OO, Ginika KC. Self-reported health profile of athletes in Ibadan, South-western Nigeria: Indications for conformity with pre-participation screening. *Afr J Phys Act Health Sci* 2012;18:487–98.
- 21 Egger F, Ukaj A, Meyer T. Emergency response planning for sudden cardiac arrest in amateur football clubs in Germany (federal state Saarland). *BMJ Open Sport Exerc Med* 2025;11:e002274.
- 22 Drezner JA, Peterson DF, Siebert DM, et al. Survival After Exercise-Related Sudden Cardiac Arrest in Young Athletes: Can We Do Better? *Sports Health* 2019;11:91–8.
- 23 Farquharson B, Dixon D, Williams B, et al. The psychological and behavioural factors associated with laypeople initiating CPR for out-of-hospital cardiac arrest: a systematic review. *BMC Cardiovasc Disord* 2023;23:19.
- 24 Anto-Ocrah M, Maxwell N, Cushman J, et al. Public knowledge and attitudes towards bystander cardiopulmonary resuscitation (CPR) in Ghana, West Africa. *Int J Emerg Med* 2020;13:29.
- 25 Republic of Cameroon. Penal code of Cameroon. Law no.2016/007 of 12 July 2016. Yaoundé Government of Cameroon; 2016. Available: <https://www.wipo.int/wipolex/en/text/404123>
- 26 Egger F, Serner A, Wilke CF, et al. Global cardiac screening practices among youth and adult football players: the FIFA cardiac screening survey. *Br J Sports Med* 2025;59:1410–7.
- 27 Perkins GD, Gräsner J-T, Semeraro F, et al. European Resuscitation Council Guidelines 2021: Executive summary. *Resuscitation* 2021;161:1–60.