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Emergency Preparedness for Sudden Cardiac Arrest in Amateur Athletic Union Basketball Teams: An Opportunity to Improve Outcomes in Higher Risk Athletes

Zadan Mason,* Andrew M. Watson, MD, MS,† and Jonathan A. Drezner, MD‡

Abstract

Objective: To examine sudden cardiac arrest (SCA) awareness and emergency preparedness for SCA in Amateur Athletic Union (AAU) youth basketball teams. **Design:** Cross-sectional survey of AAU coaches and administrators. **Setting:** Random sampling of AAU club teams across the United States. **Participants:** AAU club coaches and/or administrators. **Interventions:** Electronic survey (Qualtrics) accessed online and by cell phone. Each coach/administrator was invited to participate via email up to 3 times, spaced approximately 5 days apart. **Main Outcome Measures:** Established and practiced emergency action plan (EAP), cardiopulmonary resuscitation (CPR) training, and automated external defibrillator (AED) access. **Results:** A total of 53/449 (12%) respondents completed the survey. Only 6% of responding AAU clubs had a written EAP and practiced it on an annual basis. Only 35% of clubs required CPR training for their coaches. Automated external defibrillator were available at practices and games in only 45% and 35% of AAU clubs, respectively. Over 50% of clubs did not have an affiliated athletic trainer or medical director. **Conclusion:** The vast majority of AAU clubs in this study lack proper emergency preparedness for SCA. Given male basketball players are at highest risk of SCA compared with other young athlete populations, urgent interventions are needed to improve awareness, standardize training, establish EAPs, and ensure access to AEDs in AAU clubs.

Key Words: sudden cardiac arrest, AEDs, athletes, basketball, club sports, youth sports

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INTRODUCTION

Sudden cardiac arrest (SCA) is the leading cause of death in young athletes during sports and exercise.[1,2] In the event of SCA, time to defibrillation is crucial with survival rates decreasing 10% for every minute defibrillation is delayed.[3] Survival in exercise-related SCA in young competitive athletes across the United States is approximately 48%, but increases to 89% when an on-site automated external defibrillator (AED) is used.[4,5] Although the presence of an AED is critical to survival, it is not sufficient. An emergency action plan (EAP) is also needed to ensure potential responders are taught to recognize SCA, trained in cardiopulmonary resuscitation (CPR) and AED use, and aware of AED locations.

Although the presence of AEDs in high schools has increased, less progress has been made to ensure EAPs are appropriately structured, disseminated, and reviewed by school staff. For example, CPR training of appropriate school personnel, and compliance with American Heart Association guidelines, remains low.[6] The development of EAPs and the availability of AEDs for community-based youth sports is even less clear. Approximately 50% of high school athletes also participate in club sports outside of school programs.[7] Youth club coaches are likely the responsible adult in the case of an emergency but may be less equipped than high school coaches where an athletic trainer is more likely to be present.

Epidemiologic studies demonstrate that Black male basketball players are at highest risk of SCA compared with athletes in other sports.[1,2] Recent evidence indicates adolescent male basketball players with SCA are more likely to have a fatal outcome if the arrest occurs during a club-sponsored versus a school-sponsored event.[8] Specifically, survival from SCA in adolescent male basketball players was lower for cases occurring at club-sponsored events versus school-sponsored events (38.5% vs 70.6% $P = 0.04$), with lower rates of bystander CPR (53.9% vs 91.2%; $P = 0.004$) and AED use (30.8% vs 79.4%; $P = 0.002$).[8] The purpose of this study was to examine SCA awareness and emergency preparedness for SCA in Amateur Athletic Union (AAU) youth basketball teams.

METHODS

This study is a cross-sectional survey of AAU coaches and administrators. The survey was reviewed by a group of AAU

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*From the *University School of Milwaukee, Milwaukee, Wisconsin; †Department of Orthopedics & Rehabilitation, University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin; and ‡Department of Family Medicine and Center for Sports Cardiology, University of Washington, Seattle, Washington.*

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Corresponding Author: Jonathan A. Drezner, MD, Center for Sports Cardiology, University of Washington, Box 354060, Seattle, WA 98195 (jdrezner@uw.edu).

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TABLE 1. Emergency Preparedness for SCA in AAU Clubs

	Coaches Trained in CPR/AED	Club Requires CPR/AED Training for Coaches	Club has EAP	Club has an EAP and Practices It at Least Annually	Club Owns an AED
Yes	66% (33/53)	35% (17/49)	31% (15/49)	6% (3/49)	27% (13/48)
No	30% (16/53)	65% (32/49)	65% (32/49)	90% (44/49)	67% (32/48)
Do not know	4% (2/53)	0% (0/49)	4% (2/49)	4% (2/49)	6% (3/48)

coaches for language and ease of completion and conducted using an electronic format (Qualtrics) accessed online.

AAU programs were identified through 2 approaches. First, contact information for each team participating in the AAU World Championship Tournament in Orlando Florida (July 2021) was obtained from the AAU national office and stored in a confidential database. Second, an internet search of AAU basketball teams in each state was completed. The goal was to locate email contact information for 5 to 10 teams per state, starting with programs in the state capital and extending out geographically as needed. To encourage participation, a $100 gift card for every 10th participant was offered through a lottery system. Each coach/administrator was invited to participate via email up to 3 times. Descriptive statistics were used to analyze results.

Ethical Considerations

This study was approved by the Institutional Review Board at the University of Wisconsin-Madison.

RESULTS

A total of 449 AAU coaches or club directors were contacted, with 53 (12%) respondents from 25 states completing the survey. Fifteen percent of responding clubs had a written EAP, and only 6% of clubs reviewed and practiced their EAP on at least an annual basis (Table 1). Thirty percent of coaches and administrators are not trained in CPR, and 35% of clubs required CPR training of their coaching staff. Forty-five percent of clubs had an AED available at most practices, and 35% had an AED available at most games (Table 2).

Fifty percent of respondents identified SCA as the leading cause of sudden death in athletes during exercise, and 26% were aware that male basketball players are at highest risk of SCA. Although 81% of respondents appropriately identified "collapsed and unresponsive" as a sign of SCA, 68% identified "abnormal breathing" and 42% identified "seizure-activity" as potential signs of SCA (Table 3). Over 50% of clubs did not have an affiliated athletic trainer or medical director, although no significant difference in emergency planning, CPR training, or access to an AED was found in clubs with or without affiliation with a medical professional.

TABLE 2. Access to an AED

	AED On-Site for Practices	AED On-Site for Games
>75% of time	45% (21/47)	35% (17/49)
25%–75% of time	15% (7/47)	12% (6/49)
<25% of time	13% (6/47)	10% (5/49)
Do not know	28% (13/47)	43% (21/49)

TABLE 3. Identification of the Signs of SCA

Collapse/Unresponsive	81% (43/53)
Gasping/Abnormal breathing	68% (36/53)
Eyes open/Unresponsive	49% (26/53)
Seizure-like activity	42% (22/53)
Slurred speech*	37% (19/53)
I do not know	6% (3/53)

** Not a sign of SCA.*

DISCUSSION

Sudden cardiac arrest in young athletes is a survivable event if the right systems are in place. Expert recommendations state that every school, club, and sporting organization that sponsors athletic activities should have a written EAP for SCA.[9,10] The results of this study suggest many key requirements for SCA preparedness are significantly lacking for AAU clubs, including uniform CPR/AED training of coaches, consistent access to an AED at practice and game venues, and a written and practiced EAP. It is likely these deficiencies account for the lower survival rate found in male adolescent basketball players with SCA at an AAU event versus a school-sponsored event.[8]

Currently, 70% of states (36/50) require CPR/AED training of high school coaches (per ongoing surveillance by the Korey Stringer Institute: https://ksi.uconn.edu/). We are not aware of legislation that requires CPR/AED training specifically for community-based youth sports coaches. Best practice recommendations for cardiac emergency response planning for high school student-athletes have been available since 2007.[9,10] Despite this, emergency planning for SCA in athletes remains poor in many settings.

This study is limited by the small sample size and low response rate. However, potential selection and responder bias suggests that clubs more familiar with emergency planning for SCA may have been more likely to respond. Our results suggest that a lack of awareness of SCA risk in male basketball players and how to recognize SCA in young athletes may contribute to poor emergency preparedness in AAU clubs. Greater awareness through education and training may result in safer systems of care for athletes participating in club sports such as basketball. With no athletic trainer or other medical provider nearby, club coaches are most likely to be the responsible individual in case of a medical emergency. A greater emphasis on emergency planning for SCA among AAU clubs and coaches is urgently needed.

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