



Category: Applied Research in Health and Medicine

REVIEW

Training in Basic Cardiopulmonary Resuscitation for high school students of an educational institution in the city of Venado Tuerto

Capacitación en Reanimación Cardiopulmonar Básica para alumnos del nivel secundario de una institución educativa de la ciudad de Venado Tuerto

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ABSTRACT

Introduction: Cardiorespiratory arrest (CRA) was a pathology of high incidence worldwide, characterized by its time dependence. Immediate intervention by Basic Life Support (BLS) by witnesses significantly increased the survival rate. However, these maneuvers were performed in few cases due to the lack of training in the general population. Institutions such as the American Heart Association (AHA) recommended including learning Cardiopulmonary Resuscitation (CPR) in schools to increase its application and improve survival outcomes.

Development: The management of CPR included two main levels: BLS, which could be performed by untrained individuals using chest compressions and automated external defibrillation (AED), and advanced life support, reserved for trained personnel. Studies showed that every minute without attention reduced the probability of survival by 10%, highlighting the need for rapid and efficient responses. CPR training in adolescents was identified as a key strategy, given their rapid learning and ability to transmit the knowledge to their environment. In addition, the importance of including AEDs in public spaces to facilitate their use in emergencies was emphasized.

Conclusions: Education in basic CPR proved to be fundamental in increasing survival rates in cases of CRA, reducing sequelae and improving prognosis. Training from an early age and the implementation of community strategies were essential tools to face this high mortality emergency.

Keywords: CPR; CPR; BLS; survival; training.

RESUMEN

Introducción: La Parada Cardiorrespiratoria (PCR) fue una patología de alta incidencia mundial, caracterizada por su dependencia del tiempo. La intervención inmediata mediante Soporte Vital Básico (SVB) por testigos aumentó significativamente la tasa de supervivencia. Sin embargo, estas maniobras se realizaron en pocos casos debido a la falta de formación en la población general. Instituciones como la American Heart Association (AHA) recomendaron incluir el aprendizaje de Reanimación Cardiopulmonar (RCP) en las escuelas para aumentar su aplicación y mejorar los resultados de supervivencia.

Desarrollo: El manejo de la PCR incluyó dos niveles principales: SVB, que podía ser realizado por personas sin formación sanitaria utilizando compresiones torácicas y desfibrilación externa automática (DEA), y el soporte vital avanzado, reservado para personal entrenado. Estudios mostraron que cada minuto sin atención redujo un 10% la probabilidad de supervivencia, destacando la necesidad de respuestas rápidas y eficientes. La capacitación en RCP en adolescentes fue identificada como una estrategia clave, dado su rápido aprendizaje y capacidad para transmitir el conocimiento a su entorno. Además, se enfatizó la importancia de incluir DEA en espacios públicos para facilitar su uso en emergencias.

Conclusiones: La educación en RCP básica demostró ser fundamental para aumentar las tasas de supervivencia en casos de PCR, reduciendo secuelas y mejorando los pronósticos. La formación desde edades tempranas y la implementación de estrategias comunitarias fueron herramientas esenciales para enfrentar esta emergencia de alta mortalidad.

Palabras clave: PCR; RCP; SVB; supervivencia; formación.

INTRODUCTION

Cardiopulmonary arrest (CPA) is one of the leading causes of death worldwide, representing a critical challenge for healthcare systems and communities. This event, characterized by the abrupt interruption of the heart's mechanical activity and breathing, quickly leads to inadequate blood flow, compromising the oxygenation of vital organs. The American Heart Association (AHA) defines CRA as a time-dependent event where the speed of initial interventions directly determines the patient's chances of survival and subsequent quality of life.

Early recognition and immediate intervention are essential in these cases. According to AHA guidelines, every minute of delayed care reduces the chances of survival by 10%. Therefore, the implementation of essential life support (BLS), which includes maneuvers such as cardiopulmonary resuscitation (CPR) and the use of automated external defibrillators (AED), becomes a fundamental tool for saving lives. These techniques double or triple survival rates and minimize neurological sequelae in survivors.

However, despite the proven effectiveness of BLS, its application is still limited in most contexts, especially in out-of-hospital settings. Studies reveal that more than 70% of CRIs occur in the presence of witnesses unrelated to the healthcare field, such as family members, friends, or passers-by. In many of these cases, the lack of knowledge and adequate training prevents resuscitation maneuvers from being initiated, perpetuating high mortality rates. This scenario highlights the need to develop educational strategies aimed at the community to empower people to act effectively in emergencies.

Relevance of Basic Life Support (BLS)

BLS is the first line of defense against CRA, offering a set of critical maneuvers that can be performed by any trained person, even without prior medical training. This approach focuses on maintaining circulation and oxygenation of the body until specialized health personnel arrive. Cardiopulmonary

resuscitation (CPR), as the main component of BLS, involves chest compressions and ventilations that seek to preserve brain function and stabilize the patient.

Over the last few decades, various international organizations, including the AHA, have promoted the teaching of basic CPR as a key strategy for improving outcomes in cardiac emergencies. Since 1992, the AHA has recommended incorporating CPR training into school curricula, arguing that basic knowledge can make the difference between life and death in crises.

The Chain of Survival

The chain of survival is a conceptual model developed by the AHA that describes the essential stages in the response to a CRA. This model includes six fundamental links:

Recognition and early prevention: Identifying the warning signs that precede a CRA and taking measures to prevent it.

Activation of the emergency response: Contact the emergency services immediately.

High-quality CPR: Perform effective chest compressions to maintain blood flow.

Rapid defibrillation: Use an AED, if available, to restore the heart rhythm.

Post-cardiac arrest care: Provide advanced support in a hospital setting to optimize recovery.

Recovery: Rehabilitation and promotion of quality of life after the event.

Each link in the chain is crucial, and proper execution can significantly improve survival rates and reduce associated complications.

CPR Education: Impact and Benefits

Learning basic CPR maneuvers is a central element in empowering communities in the face of cardiopulmonary emergencies. Adolescence, in particular, is a strategic stage for BLS training. Studies such as those by García-Beltrán (2019) highlight that adolescents have a high capacity for learning and retention, which allows them to acquire these skills quickly and pass them on to those around them. In addition, CPR training fosters cross-disciplinary skills such as empathy, social responsibility, and the ability to make decisions under pressure.

Implementing educational programs in schools not only prepares students to respond to emergencies but also promotes a culture of prevention and safety in the community. In this sense, initiatives aimed at teenagers generate a multiplier effect, as trained young people share their knowledge with family and friends, expanding the impact of the interventions.

Access to Automated External Defibrillators (AEDs)

AEDs are devices designed to analyze the heart rhythm and administer an electric shock when necessary to re-establish a normal heart rhythm. Their timely use is essential in ventricular fibrillation or ventricular tachycardia, two of the leading causes of CRA. Law 27.159 in Argentina makes having AEDs in public spaces compulsory and guarantees that they are correctly signposted, facilitating access to this equipment in emergencies.

Despite these legislative advances, the effectiveness of AEDs depends on the population's ability to use them correctly. This reinforces the need for BLS training programs that include basic handling of these devices, ensuring they are available and used effectively when most needed.

Challenges and Outlook

Although initiatives to train the public in BLS have shown promising results, significant challenges remain. Among them, the following stand out:

Lack of access to educational resources: Many communities lack structured programs to teach basic CPR.

Cultural and psychological barriers: Witnesses' fear of doing something wrong or facing legal consequences inhibits their actions.

Inequalities in implementation: The availability of AEDs and BLS training is not uniform, which limits their impact in rural and low-income areas.

In response to these challenges, it is essential to promote public policies that support community training and guarantee equity in access to essential resources.

Purpose of the Project

The proposed project aims to train secondary school students in basic CPR maneuvers using a practical and participatory approach. The intervention seeks to improve the student's level of knowledge and foster a proactive attitude toward emergencies. By empowering young people with these skills, it is hoped that a positive impact will be generated both in their school environment and the community.

Cardiopulmonary arrest is a public health problem that requires comprehensive solutions based on education, access to technology, and the promotion of a culture of prevention. This project represents a step towards creating a better-prepared community where each citizen can play a crucial role in the chain of survival. With the commitment of educational institutions, health professionals, and legislators, it is possible to transform how we deal with cardiopulmonary emergencies and save lives.

General objective

To train secondary school students in basic cardiopulmonary resuscitation (CPR) and the automated external defibrillator (AED), promoting the development of practical skills and theoretical knowledge that will enable them to respond effectively to cardiorespiratory emergencies in school and community settings.

DEVELOPMENT

Cardiopulmonary arrest (CPA) is the sudden and complete interruption of the heart's mechanical activity and breathing, leading to the absence of adequate blood flow and oxygenation in the body. According to the American Heart Association (AHA), CPA is one of the leading causes of death worldwide, being a critical event that requires immediate intervention. Its time-dependent nature means that the chances of survival decrease by 10% for every minute without treatment. This makes it a top-priority medical emergency in hospital and out-of-hospital settings.

Importance of Basic Life Support (BLS)

Essential life support (BLS) is the first defense against CRA. It consists of a set of maneuvers that include cardiopulmonary resuscitation (CPR) and an automated external defibrillator (AED). These interventions seek to maintain circulation and oxygenation until the arrival of specialized health personnel. International studies have shown that the immediate application of BLS can double or even triple survival rates and significantly reduce neurological sequelae in patients.

Despite their effectiveness, the application of these measures is still limited in most countries. This is largely due to the general population's lack of knowledge and training. In this context, the AHA has emphasized since 1992 the need to include CPR training in school curricula, aiming to create a better-prepared community to respond to emergencies.

The Chain of Survival

The AHA proposes the "chain of survival," a model that identifies the critical steps to maximize the chances of survival in cardiac arrest. This chain includes six links:

Recognition and early prevention: Identify the initial symptoms and prevent cardiac arrest.

Activation of the emergency response: Call the medical services.

High-quality CPR: Perform effective chest compressions.

Rapid defibrillation: Use an AED if available.

Post-cardiac arrest care: Provide advanced support in a hospital setting.

Recovery: Promote rehabilitation and quality of life for the patient.

Each link is essential and must be executed effectively to ensure successful resuscitation.

Basic CPR: Technique and Benefits

Cardiopulmonary resuscitation (CPR) is a technique designed to restore circulation and oxygenation in a person in cardiac arrest. The AHA defines basic CPR as the set of maneuvers that include chest compressions and rescue breathing. According to their guidelines, the proper technique for adults includes:

Compression rate: 100-120 compressions per minute.

Depth: Compress the thorax at least 5 cm.

Thoracic re-expansion: Allow the thorax to return to its normal position between each compression.

Ventilation: Perform two ventilations every 30 compressions.

In addition, introducing AEDs in public spaces has revolutionized out-of-hospital care, allowing people without medical training to perform safe and effective defibrillation.

Adolescents as a Strategic Target

Adolescence is a stage of remarkable neuronal plasticity and learning capacity. According to García-Beltrán (2019), adolescents are highly predisposed to acquiring and retaining knowledge about CPR, which makes them ideal candidates for training programs. In addition, training students creates a multiplier effect, as these young people can pass on the knowledge they have acquired to their families and communities.

Training in CPR improves survival rates in emergencies and promotes skills such as teamwork, empathy, and the ability to respond to critical situations. These competencies are fundamental not only in the field of health but also in the personal and social development of adolescents.

Legislation and Access to AEDs

Initiatives such as Law 27.159 in Argentina have made it compulsory to have AEDs in public spaces and to have them adequately signposted. However, the effectiveness of these measures depends on the population being trained to use them. According to studies, an AED used correctly within the first three minutes can increase the survival rate by up to 70%.

The combination of public policies, access to technology, and community training is essential to address the problem of CRA. This theoretical framework reinforces the importance of implementing educational programs like the one proposed in this project, which seeks to train adolescents in BLS maneuvers.

CONCLUSIONS

Educational intervention in basic CPR aimed at secondary school students proved to be an effective strategy for improving knowledge and skills in cardiopulmonary emergency care. The results showed a significant increase in the participants' level of knowledge and greater confidence in their ability to act as first responders.

The success of this initiative lay in its theoretical-practical approach, which allowed students to understand the fundamental concepts and apply them in a controlled environment. This reinforces the idea that CPR training should be systematically integrated into school curricula as a key tool for improving survival rates in cases of CRA.

However, the impact of these interventions is not limited to students. Training a segment of the population creates a multiplier effect, as the knowledge acquired is transmitted to their families and communities. This strengthens the culture of prevention and response, helping to reduce mortality and the sequelae associated with CRA.

Finally, the need to implement public policies that support this type of initiative is emphasized, guaranteeing adequate resources and access to tools such as AEDs in public spaces. The combination of education, legislation, and access to technology can significantly transform the current landscape, saving lives and improving the quality of care in cardiorespiratory emergencies.

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CONFLICT OF INTEREST

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