

OBTAINING, FORMULATING, AND TABULATING THE ANTHROPOMETRIC DATA OF PARTICIPANTS AND THE RESPECTIVE RESULTS OF CPR MANEUVERS

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ABSTRACT

The widespread training of the population in cardiopulmonary resuscitation (CPR) techniques is of fundamental importance to reduce deaths from cardiac arrest. However, the proper dissemination of high-quality CPR is still underperformed in Brazil. This study aims to compare the quality of CPR maneuvers across different periods of the medical course through the development of a data collection and analysis instrument. The study population consisted of 116 students from three different periods at UniEVANGÉLICA. This was a cross-sectional analytical study. Participants provided their anthropometric data, received instructions on proper CPR technique from the researchers, and then performed the maneuver on a CPR manikin equipped with a sensor for evaluation. The results showed that performance was below average across all periods studied, though the eighth period students performed CPR the best. Participant weight and gender had a significant influence, with heavier and male participants performing higher-quality CPR. It was concluded that improvements are necessary in CPR teaching during medical training, emphasizing especially the correct depth of compressions.

Keywords: Cardiopulmonary Resuscitation; Cardiac Arrest; Academic Training.

INTRODUCTION

When the heart fails to pump blood adequately, causing an interruption of blood flow and absence of central pulse, the patient is in cardiac arrest (GONZALEZ et al., 2013). This condition results in almost total absence of cardiac output and low partial O₂ pressure, leading to metabolic decline in cells, especially neurons and cardiomyocytes. Rapid cell loss causes significant neurological and cardiac dysfunction, worsening with each minute without intervention (WYCKOFF et al., 2022). Cardiac arrest is thus classified as a critical medical emergency, highlighting the urgent need for immediate assistance.

The Brazilian Society of Cardiology (2020) estimates 200,000 cases of cardiac arrest annually in Brazil, with a survival rate of only 50%, depending on the return of spontaneous circulation and presence of a palpable central pulse. The incidence of out-of-hospital cardiac arrest is about 0.1–0.2 cases per 1,000 inhabitants per year. Survival to hospital discharge is approximately 10% for out-of-hospital cases and between 22% and 40% for in-hospital cases. High mortality associated with out-of-hospital cardiac arrest, which can reach 90%, underscores the need for effective

responses and proper training for both the public and health professionals (BRAZ et al., 2020).

The efficiency of chest compressions is detailed in the American Heart Association (AHA) guidelines. Small variations in compression execution can significantly reduce victim survival. Studies indicate that exceeding the recommended rate of 100–120 compressions per minute compromises chest recoil, which is essential to maintain cardiac output and blood pressure (LEE et al., 2014). Poorly controlled compression frequency and depth affect neurological and cardiac function, highlighting the importance of accurately measuring rescuer performance.

This study aims to compare CPR quality among students at different periods of the medical course to evaluate the progression of skills and effectiveness of resuscitation interventions throughout academic training.

METHODOLOGY

This cross-sectional analytical study evaluated CPR quality among medical students at Universidade Evangélica de Goiás – UniEVANGÉLICA. Compression frequency and depth were analyzed in three groups: 38 students from the first period, 38 from the fifth, and 39 from the eighth. Data collection included anthropometric measurements taken with a scale and measuring tape, and quantitative data on CPR performance obtained from sensors attached to American Heart Association CPR manikins (Resusci Anne QCPR model), which recorded compression depth and rate.

Participants were recruited during class intervals and, after providing consent, signed the Informed Consent Form (ICF). Anthropometric measurements and CPR maneuvers were conducted in private settings. Each CPR session lasted approximately 2 minutes, and data collection for anthropometrics took an additional 3 minutes, totaling about 5 minutes per participant.

PARTIAL RESULTS

Data analysis included participants from different medical course periods, comparing their performance with ideal CPR standards. Of 69 participants analyzed, 30 were from the first period, 15 from the fifth, and 24 from the eighth, representing the

three phases of the course. Gender distribution was balanced, with 29 men and 40 women. Anthropometric and CPR performance data were tabulated for analysis.

To assess CPR quality, an ideal 2-minute CPR cycle performed by a trained professional was used as a reference. Comparing participants' data with this standard revealed significant discrepancies in chest compression execution. Cross-correlation analysis indicated generally below-ideal performance, with cyclical variations in compression depth and amplitude, likely due to fatigue. Average depth decreased by 0.27 cm over the 2-minute cycle, indicating that initially low depth tended to persist. Despite variations in applied force, most participants maintained compression frequency within the recommended range.

Analysis of anthropometric data in relation to CPR quality revealed positive correlations between weight, height, and compression efficacy, with Pearson coefficients of 0.49 for weight and 0.42 for height. Age had a very low correlation (0.14), suggesting that within the studied age range, age had little influence on CPR quality. These results indicate that individuals with higher weight and height tend to perform more effective compressions, while BMI did not show a significant correlation.

Gender also influenced compression quality. Male participants performed significantly better than females, with a 34% difference in cross-correlation averages. This suggests a potential advantage for male rescuers in emergencies, though individual variability must be considered.

Comparing different course periods showed progressive improvement in compression quality as students advanced. ANOVA testing revealed a significant difference between first and eighth periods, with a 27% improvement in mean compression performance. However, even in the eighth period, mean compression depth remained below ideal, indicating the need for enhanced CPR training to ensure high-quality execution.

CONCLUSION

Comparative analysis of CPR quality among medical students at different course periods revealed significant skill progression over the training period. This evolution underscores the importance of practical training from early stages and continuous education throughout the medical career, essential to ensure that

physicians can provide high-quality emergency care at all practice stages. However, despite observed improvements, all subpopulations exhibited concerning performance, with mean compression depth below ideal even if frequency was adequate. These findings suggest that current CPR teaching methods may not be sufficient to guarantee proper execution. Therefore, training programs should emphasize not only correct compression rate but also optimal depth and precise technique.

ACKNOWLEDGMENTS

We thank Universidade Evangélica de Goiás – UniEVANGÉLICA for support and resources essential for the development of this research.

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