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Performance of Simulated External Chest Compressions (ECC) in Healthcare Professionals

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Introduction

External chest compression (ECC) is a crucial component of cardiopulmonary resuscitation (CPR) for reversal of cardiac arrest.

Objectives

The primary aim of this project is to explore the effectiveness of simulated ECC performed by healthcare professionals at the bed-mount kneeling and standing positions.

Methodology

A prospective, quasi-randomized controlled observational study was adopted. Healthcare professionals of both genders with CPR training experience were invited to participate in the study. The quality of 5-min chest wall compressions in either kneeling or standing position was measured by SkillReporter ResusciAnne® and a force platform. Data recorded during the 5-minute performance was analyzed using repeated measures of ANOVA with Bonferroni adjustment. Data between male and female subjects were compared using independent t-tests.

Result

Forty healthcare professionals (20 males and 20 females) completed the study. The mean rate of compression for all 40 subjects during the 5-minute ECC at the kneeling and standing positions were 119 ± 11 /min and 116 ± 15 /min, which met the international recommendation for effective ECC. A significant reduction in compression depth by 5.4% (in kneeling) and 5.6% (in standing) were however observed after the first minute of compression; the compression depth further dropped by 26.9% (in kneeling) and 27% (in standing) at the final fifth minute. Comparison of the performance between male and female healthcare professionals showed that the mean compression depth performed by female subjects fell below the minimal required standard of 38 mm at 92 sec (~ 1½ minutes) after the procedure; male subjects maintained a significantly longer duration of effective compression than female subjects in both the kneeling and standing position (169 ± 106 sec for males

and 52 ± 30 sec for females; $p < 0.05$).This study confirms that quality of a simulated ECC provided by rescuers commenced to decline at one minute and fell below the recommended international standards within the first 2 minutes into the procedure. Data from this study suggests that it is necessary for the ECC procedure to be alternated between male rescuers every 2 minutes and 1.5 minutes between female rescuers. This study also recommends that a kneeling position should be adopted whenever possible during a CPR procedure.