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(Abstract)

Contents

Impact of Community-Based Resuscitation Interventions on Bystander Cardiopulmonary Resuscitation and Survival Rates After Out-of-Hospital Cardiac Arrest: A Systematic Review and Meta-Analysis

Kayla Simmons[1], Sarah McIsaac[2], Aidan Goertzen[1], Robert Ohle[3]

1 Department of Undergraduate Medicine, Northern Ontario School of Medicine, Sudbury, Ontario, Canada.
2 Department of Critical Care, Department of Anesthesia, Northern Ontario School of Medicine, Sudbury, Ontario, Canada.
3 Department of Emergency Medicine, Health Sciences North Research Institute, Northern Ontario School of Medicine, Sudbury, Ontario, Canada.

Introduction: Out-of-hospital cardiac arrest (OHCA) is a leading cause of morbidity and mortality worldwide (1, 2). Approximately 350,000 OHCAs occur in the United States and 40,000 in Canada per annum (1, 3). Studies consistently find that early bystander cardiopulmonary resuscitation (B-CPR) enhances survival following OHCA (2). In response, community-based interventions targeting B-CPR rates have been implemented internationally (4, 5). The effects of these interventions are yet to be evaluated and synthesized collectively. Therefore, the objective of this study is to describe the effect of community-based interventions targeting resuscitation training or awareness on temporal B-CPR rates as well as survival following OHCA.

Methods: Ethics approval was not applicable as the study did not involve human or animal research. Medline/PubMed and Embase were searched from inception to July 2020 using a librarian assisted search strategy. Grey literature was hand-searched. Two reviewers independently conducted title and abstract screening, then selected publications for full text review according to predetermined inclusion criteria. Two reviewers completed data extraction and evaluated risk of bias using the Newcastle-Ottawa Scale. Cochrane's Review Manager 5.4 was used to conduct random effects meta-analyses on the primary outcome, B-CPR rates, and secondary outcomes: survival to hospital discharge, 30-day survival, and survival with a favourable neurological outcome following OHCA.

Results: The search identified a total of 2,304 records of which 122 underwent full text review; 12 were included for data extraction and final analyses. Included studies reported a total of 1,081,040 OHCAs across 11 countries. Median age of those experiencing OHCA ranged from 64 to 78 years. The most common interventions included community-based CPR training (n = 9), community-based AED training (n = 9), and dispatcher-assisted CPR (n = 8). The average quality assessment score was 5.5/8 on the Newcastle-Ottawa Scale. All 12 studies reported higher B-CPR rates post-intervention, increasing 19.5% on average. On meta-analysis, there was a significant difference in post-intervention B-CPR rates (n = 280,330; OR 2.63; 95% CI 1.96 to 3.53; I^2 = 99%; Figure 1.1). For secondary outcomes in the post-intervention period, survival following OHCA was significantly increased (n = 73,784; OR 1.68; 95% CI 1.19 to 2.36; I^2 = 96%; Figure 1.2), while survival with favourable neurological outcome was not significantly altered (n = 61,760; OR 1.16; 95% CI 0.79 to 1.71; I^2 = 96%; Figure 1.3).

Discussion: The findings of this systematic review and meta-analysis suggest that globally, community-based interventions targeting resuscitation training or awareness were associated with higher rates of B-CPR and survival following OHCA, while survival with a favourable neurological outcome was not significantly improved. As the provision of B-CPR is associated

with better outcomes following OHCA, additional research is required to elucidate these relationships and identify which community-based interventions are most effective.

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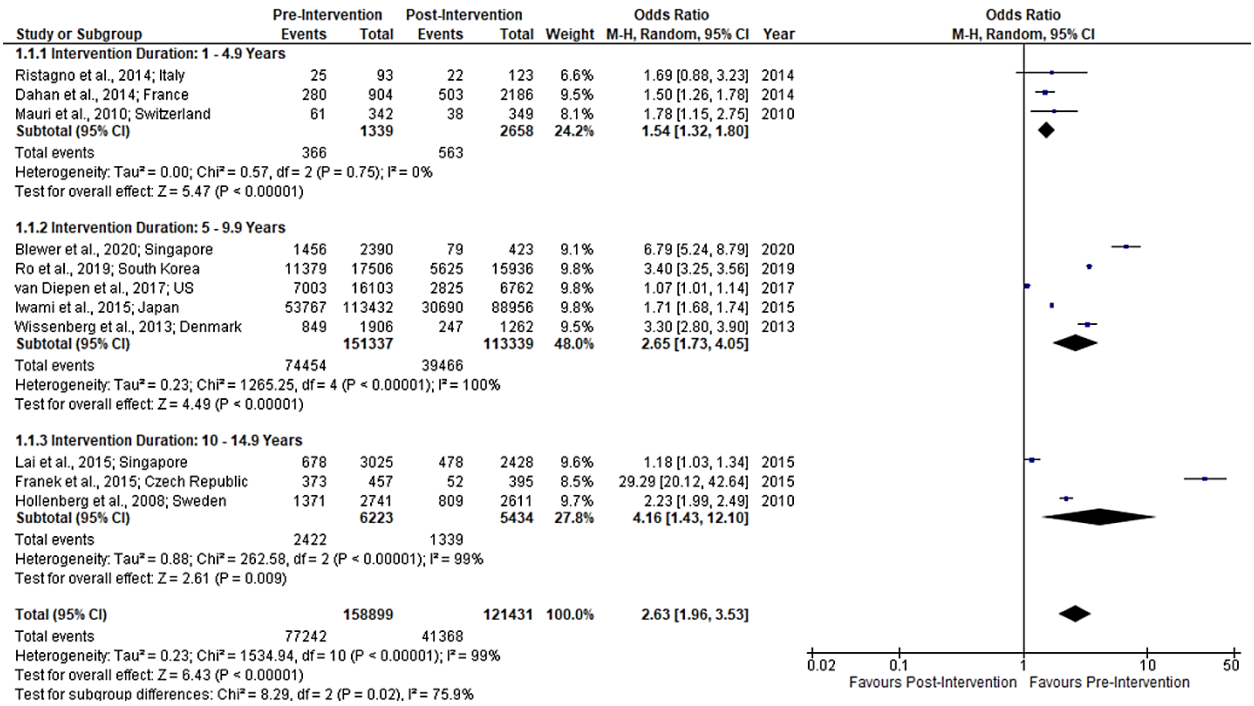

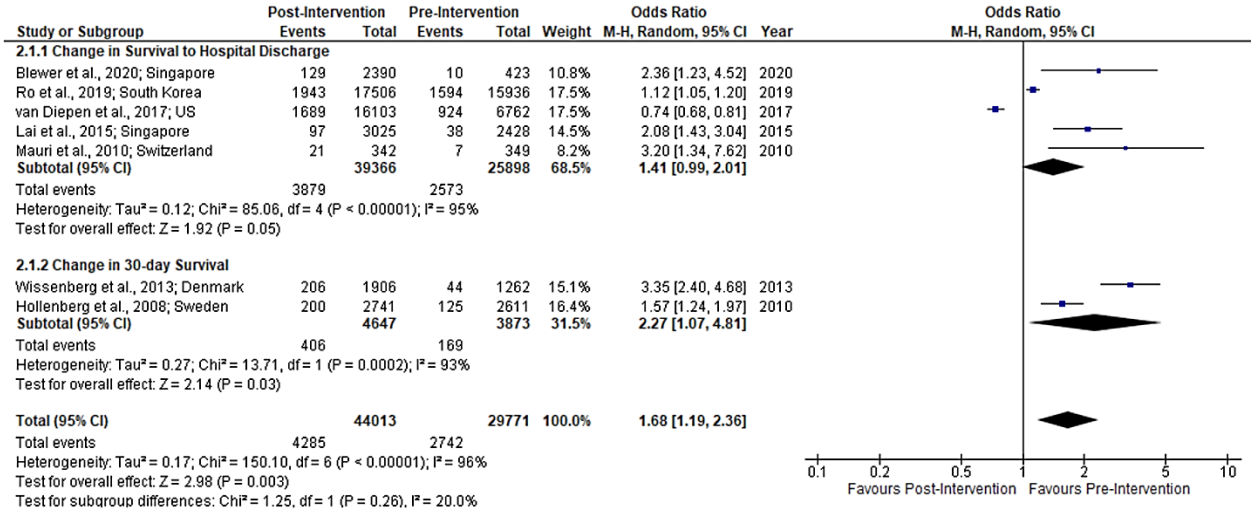

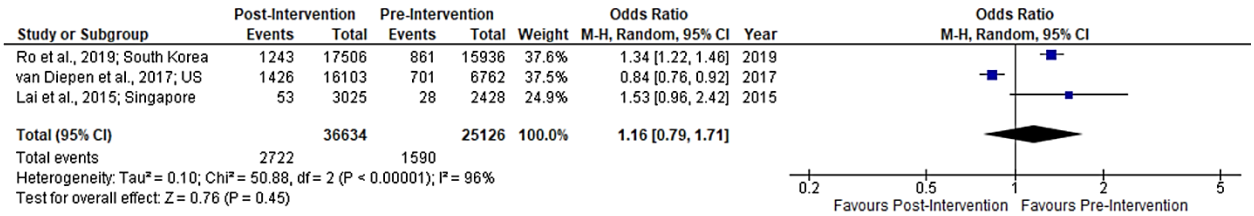

Figure 1. Forest plots illustrating the results of meta-analyses comparing the association between community-based interventions targeting resuscitation training or awareness and (1.1) rates of bystander cardiopulmonary resuscitation, (1.2) survival following OHCA (survival to hospital discharge and 30-day survival), and (1.3) survival with favourable neurological outcome