Cardiac causes are an overestimated underlying cause of out-of-hospital sudden unexpected death

J. Chigbu, BA[1]; J. Maradey, MD[1]; B. Simpson, MD[2]; A. Nwosu, MD, MPH[1]; Feng-Chang Lin, PhD[3]; Lauren Bolger, BS[1]; Irion Pursell, RN[1]; Ross J. Simpson Jr., MD, PhD[1]

[1]*The University of North Carolina at Chapel Hill Cardiology, NC, USA;*
[2] *East Carolina Brody School of Medicine, NC, USA;* [3]*The North Carolina Translational & Clinical Sciences Institute, NC, USA**

Purpose

- Current literature estimates nearly 75% of all sudden deaths have cardiac aetiology, and most prevention strategies target cardiac risk factors.
- Time restrictive definitions of out-of-hospital sudden unexpected death (OHSUD) and unreliable death certificate data may lead to overestimates of the prevalence of cardiac causes, diverting prevention efforts.
- This study takes an epidemiological approach to better define OHSUD and understand its underlying aetiologies in order to improve prevention strategies.

Methods

- SUDDEN is a population-based study of OHSUD victims ages 18 to 64 in Wake county, North Carolina.
- Over 12 months, 1138 Wake County Emergency Medical Services referrals were screened using medical records, medical examiner reports, and death certificates, identifying 187 OHSUD cases.
- Three board-certified cardiologists independently adjudicated these cases and determined the underlying cause of death. There were no restrictions on the timing of death for inclusion. The electronic death certificates were compared to the adjudicators' underlying cause of death.
- Cases were analysed according to World Health Organization (WHO) criteria for sudden unexpected death. WHO criteria are defined as sudden death either witnessed, or un-witnessed occurring no more than 24 hours after the subject was last seen alive and free of symptoms. The Non-WHO group consisted of subjects who did not meet the WHO criteria.

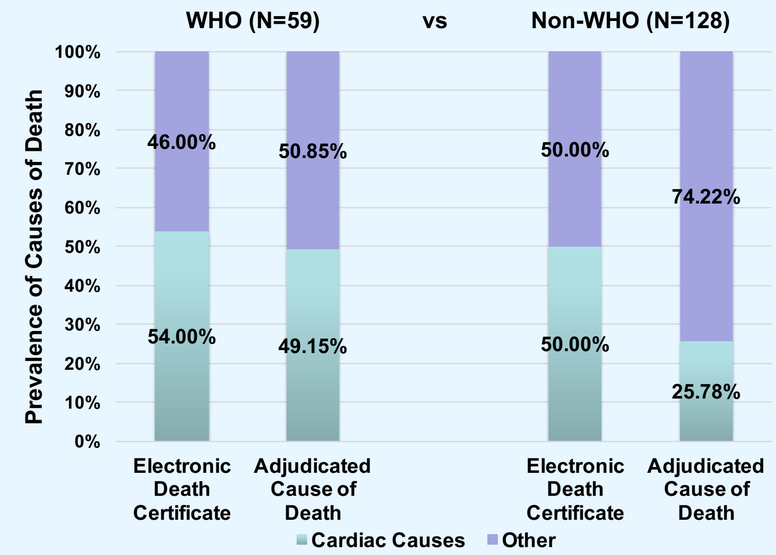
Results

- The cohort was 62% male, 60% Caucasian, 60% unmarried, and 82% > age 45.
- Compared to death certificates, adjudication resulted in a lower rate of cardiac causes of death for all cases (51.34% vs 33.16%, p<0.001). The concordance between electronic death certificates and adjudicators was fair, the kappa statistic of agreement reaching 0.22 (95% CI, 0.09 to 0.35).
- Adjudicated cause of death was cardiac in 25.78% of the Non-WHO cases, compared to 49.15% of cases defined by WHO criteria (p= 0.002).
- Using only death certificate cause of death, 50% of Non-WHO cases were cardiac in origin, compared with 54% in the WHO restricted cohort (p=0.638).

Table 1. Demographics of SUDDEN Cohort N=187

SUDDEN Demographics		Cases, N,(%)
Gender	Male	117 (63%)
	Female	70 (37%)
Race	White	114 (61%)
	Non-White	73 (39%)
Age	18-30	5 (2%)
	31-43	24 (13%)
	44-56	76 (41%)
	57-64	82 (44%)
Martial Status	Married	72 (39%)
	Unmarried	111(59%)
	Unknown	4(2%)
WHO Criteria	WHO	59 (32%)
	Non-WHO	128 (68%)
Cardiac Cause of Death	Electronic Death Certificate	96 (51.34%)
	Adjudicated Cause of Death	62 (33.16%)

Figure 1. Underlying Causes of Death Determined by Source and OHSUD Criteria



Causes of Death by Source

Conclusions

- In middle-aged out-of-hospital sudden unexpected death victims, death certificates and time-limiting definitions may overestimate the prevalence of cardiovascular disease as the underlying cause of death.
- Overestimating a cardiac cause of death may potentially divert necessary resources and prevention efforts from other important causes of death.

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