High Prevalence of Mental and Substance Use Disorders Among Out-Of-Hospital Sudden Unexpected Death Victims

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INTRODUCTION

- Mental and substance use disorders are important contributors to the global burden of disease[1]
- Individuals with mental and substance use disorders are at an increased risk for cardiovascular events and have a higher mortality rate compared to the general population [2]
- Adults with mental and substance use disorders are at an elevated risk for sudden cardiac death[3,4]
- Prevalence of mental and substance use disorders in sudden unexpected death victims has not been well defined

OBJECTIVE

To estimate the prevalence of mental and substance use disorders in all-cause out-of-hospital sudden unexpected death victims in Wake County, North Carolina.

METHODS

SUDDEN REGISTRY

- SUDDEN is a retrospective registry study that aims to identify potential risk factors associated with Out-of-Hospital Sudden Unexpected Death (OHSUD).
- From 03-2013 to 02-2015, all out-of-hospital deaths in Wake County, North Carolina (population 974,289) were screened to identify presumed OHSUD victims among free-living adults ages 18-64.
- Victims with a terminal disease or lethal toxicology levels were excluded.
- Three cardiologists adjudicated 408 victims into the final registry using data from post-mortem examinations reports, death certificates, and medical records.
- SUDDEN registry was subsequently categorized into World Health Organization (WHO) group and Non-WHO group based on whether or not they met the WHO criteria for timing of sudden cardiac death.
  - WHO criteria for timing of sudden cardiac death is defined as a witnessed death or an unwitnessed death occurring within 24 hours after the subject was last seen alive.

MENTAL HEALTH STUDY

- We reviewed medical examiner reports and medical records for a diagnosis of mental and substance use disorders including depression, anxiety, bipolar disorder, schizophrenia, and alcohol or substance abuse.
- Diagnosis of a mental or substance use disorder was considered as:

  Ever diagnosis: Present or past diagnosis from a medical record or a medical examiner report.

  Present diagnosis: Within 2 years of death. Obtained from medical records only.
- History of chronic conditions were obtained from medical examiner reports and medical records.

STATISTICAL ANALYSES

- Analysis was restricted to victims with an available medical record (N=276). Victims with no records and victims with only medical examiner report were excluded.
- Ever diagnosis proportions were calculated and compared to US adult population national estimates.
- Victim characteristics and chronic conditions were compared between those with and without an ever diagnosis. Chi- square test was used for statistical comparisons.
- Ever diagnosis proportions were compared between WHO and Non-WHO groups.

RESULTS

Ever Diagnosis:

- Of the 408 victims, 276 (68%) had a medical record.
- OHSUD victims with a mental or substance use disorder were of similar age, median (IQR): 56 (49, 60) and more likely to be females and whites compared to those without a disorder (Figure 2).
- 178 (64%; 95% CI: 54-70%) victims had at least one mental or substance use disorder (Table 1).
- Compared to US national estimates (Table 1):
  - SUDDEN registry recorded a higher proportion of depression, schizophrenia, bipolar disorder and alcohol or substance abuse.
  - Anxiety estimates were comparable.
- Diabetes (p=<0.05) and stroke was more common in victims with a mental or substance use disorder. Other chronic conditions were comparable in both groups (Figure 1).
- Of the victims with a medical record (N=276), 190 (69%) met the WHO timing criteria and 86 (31%) did not. Mental or substance use disorder proportions were comparable in both groups with no statistically significant difference (Table 2).

Present Diagnosis:

- 40% of the victims had a present diagnosis of a mental or substance use disorder.
- 17% of the victims had a present diagnosis of alcohol or substance abuse.

Table 1: Mental and substance use disorders in SUDDEN registry compared to the US adult population national estimates

	SUDDEN registry # (N=276)		US adult population national estimates[5]
	No.	%	%
Depression, Anxiety, Bipolar Disorder, Schizophrenia, or Alcohol or Substance abuse	178	64%	----
Depression, Anxiety, Bipolar disorder, Schizophrenia	146	53 %	----
Depression	112	41 %	17 %
Anxiety	100	36 %	30 %
Bipolar Disorder*	25	13 %	4 %
Schizophrenia*	17	6 %	1 %
Alcohol or Substance abuse	109	39 %	15 %
Alcohol Abuse	77	28 %	29 %
Substance Abuse	75	27 %	10 %
2+ mental health conditions	109	39 %	----
Alcohol or Substance abuse + a mental health disorder	77	28 %	----

Victims with an ever diagnosis of a mental or substance use disorder.
* 11 victims had a diagnosis of bipolar disorder and schizophrenia.

Figure 1: Chronic conditions in OHSUD victims compared between those with and without an ever diagnosis of a mental or substance use disorder

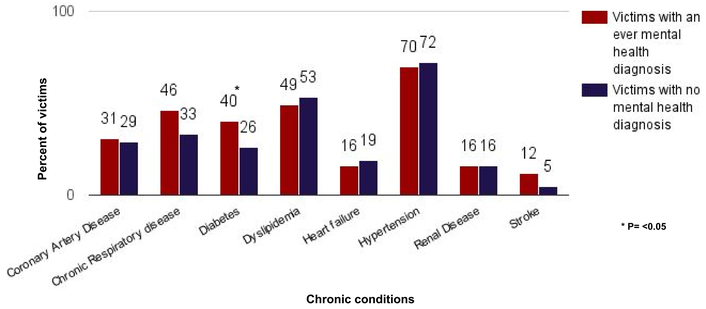

Figure 2: OHSUD victim characteristics compared between those with and without an ever diagnosis of a mental or substance use disorder

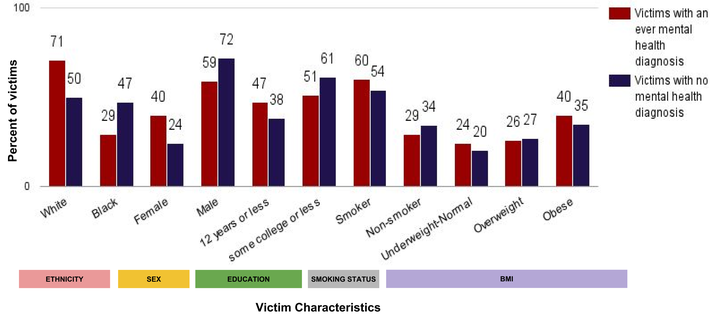

Table 2: Ever diagnosis of a mental or substance use disorder in OHSUD victims compared in WHO and Non-WHO groups

	WHO group (N=190)	Non-WHO group (N=86)
Depression, Anxiety, Bipolar Disorder, Schizophrenia, or Alcohol or Substance abuse	126 (66%)	52 (60%)
Depression	79 (42%)	33 (38%)
Anxiety	76 (40%)	24 (28%)
Bipolar Disorder	25 (13%)	10 (12%)
Schizophrenia	9 (5%)	8 (9%)
Alcohol or Substance abuse	77 (41%)	32 (37%)

CONCLUSION

- More than half of out-of-hospital sudden unexpected death victims had a mental or substance use disorder. Some chronic conditions were also common in these victims.
- Mental and substance use disorders were more likely in white and female and who did not complete college.
- Mental and substance use disorders could be a potential barrier to effective prevention and treatment of underlying chronic conditions. Therefore, mental and substance use disorders are important risk factors to be considered for interventions targeted at reducing the burden of out-of hospital sudden unexpected deaths.

LIMITATIONS

US adult population estimates (as referenced) used for comparison (Table 1) were based on surveys rather than diagnoses from records as the proportions from OHSUD victims were. This could potentially overestimate the national estimates and therefore underestimate the difference between SUDDEN registry proportions and US adult population estimates.

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DISCLOSURES

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- Ethics approval The SUDDEN project was reviewed by the Office of Human Research Ethics at UNC. The study was reviewed in accordance with federal regulations governing human subjects research (45 CFR 46, 45 CFR 164(HIPAA), 21 CFR 50 and 56 (FDA) and 40 CFR 26 (EPA)) and has been approved by the UNC IRB (study # 14-2036).