First suicide attempts in youth
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Learning objectives:
• Briefly review the current state of suicide research in youth
• Examine findings from a cohort of youth followed from their first suicide attempt coming to medical attention over a period of 25 years
• Consider the implications of these epidemiological findings for present management and future work with suicidal youth
Discussion frame

What we ARE examining:
- Suicide = The act of intentionally taking one's own life
- Suicide attempt = An act of non-lethal self-harm with intent to die
- Index suicide attempt (IA) = First suicide attempt presenting to medical attention

What we're NOT examining:
- Medically unreported attempts
- Non-suicidal self-injury

Defining youth
- No universally accepted definitions for “young people”, “youth” or “adolescence” exist
- Definitions vary based on:
  - Chronology/legal
  - Physical Characteristics
  - Cognitive Development
- Studies use up to age 25
  - CDC typically classifies “young people ages 10-24”
  - United Nations/WHO goes up as high as 25th birthday

Why is suicidal behavior important?
- Dunedin Multidisciplinary Health and Development Cohort examined for effects of early suicide attempts
- Tracked cohort of youth who had made a suicide attempt through age 24 (n=91)
- Compared to age matched controls who had not attempted through age 24 (N=946)
Suicidal behavior and long-term morbidity

- Suicide attempters vs. non-attempters were **more likely to have:**
  - Mental health problems
  - Violent behaviors
  - Medical burden
  - Long term welfare and unemployment

- Persistent wide ranging problems in those who made suicide attempts in their youth

(Goldman-Mellor et al. 2014)

Suicide rates rising across the United States

https://www.cdc.gov/vitalsigns/suicide/infographic.html

Suicide mortality in US 10-24 year olds

- Second most common cause of death
- 6159 suicides in 2016 (13.7% of all suicides)

Suicide Rates have increased between 1999-2017:

- **Females:**
  - 10-14: 0.5 → 1.7 per 100,000
  - 15-24: 3.0 → 5.8 per 100,000
- **Males:**
  - 10-14: 1.9 → 3.3 per 100,000
  - 15-24: 16.8 → 22.7 per 100,000

https://www.cdc.gov/nchs/products/databriefs/db330.htm
Suicide attempts in youth

- Suicidal behaviors commonly begin in second decade of life
- Suicide attempt prevalence peaks in mid-adolescence
- Prevalence of suicidal ideation, plans, attempts: 12.1%, 4.0% and 4.1% respectively

(Bolger et al., 1989, Shaffer et al., 1996, Kessler et al., 2001, Nock et al., 2013)

Suicide attempt as a risk factor for suicide

- Recurrent suicidal behavior increases likelihood of completed suicide
- Suicide attempt history most important risk factor for further attempts
- Suicide attempt history best predictor of future completed suicide
- Poorly understood relationship between attempts and completed suicide:
  - 50-200 attempts/completed suicide in youth

(Bridge, Goldstein & Brent, 2006; Lewinsohn et al., 1994; Beautrais, 2004; Shaffer et al., 1996; Husain, 1990; Goldstein et al., 2002; Shain, 2016)

Convenience samples limit accuracy of suicide research

- Frequently use convenience samples accrued by:
  - Attempt method, where they presented, where they were admitted
  - Arbitrary point in presentation
- Therefore, suicide rates are underestimated:
  - Subjects not accrued from index suicide attempt
  - Subjects completing suicide on first attempt are usually excluded from studies
- What if we tracked mortality from first attempt presenting for medical care?
  - Include first attempt completions and follow survivors
  - Calculate prevalence of completed suicides
Suicide Attempt as a Risk Factor for Completed Suicide: Even More Lethal Than We Knew


Olmsted County Study Design

- Track mortality from index attempt
  - Include first attempt completed suicides
  - Follow survivors of first attempts
- Calculate prevalence of completed suicides
- Consider temporal relationship between first attempt survival and eventual completed suicide

Rochester Epidemiology Project (REP)

- Olmsted County isolated population served by a discrete number of care centers
- REP contains complete medical records and autopsy reports for all Olmsted County patients since the 1960s
- Results are broadly generalizable nationally
Methods

• Retrospective-prospective cohort of Olmsted County residents making first suicide attempt coming to medical attention (IA) between 1/1/1986 & 12/31/2007 (22 yrs)
• REP queried electronically for patients with HICDA diagnostic codes consistent with suicide attempt during study period
  • Search terms: SI, SA, self-injurious behavior
• Medical records of potential cases eyes-on searched for IAs:
  • SAs made during study period
   • AND no evidence of SAs prior to study period
• National Death Index queried for deaths of study subjects between 1/1/1986 & 1/1/2011 (range of f/u 0-25 yrs)

Identifying the cohort

• 17,288 Potential suicidal events
• 8,352 Individuals with actual suicide attempts
• 5,283 Olmsted county residents
• 1,490 verified index suicide attempts

Key findings:

• 1,490 IAs (M=555; F=935)
  • 81/1490 (5.4%) died by suicide overall
  • 48/81 (59.3%) died on index attempt
  • 27/33 (81.8%) survivors died by suicide within first year
  • 62/81 (76.5%) males –11.2% of males died by suicide
  • 19/81 (23.5%) females –2.0% of females died by suicide
  • Overall, 72.9% of IA deaths were by firearms
    • Compared to all other methods, OR =140 (95% CI=60-325)
Most index suicide attempts occur before age 25

***54.6% of first suicide attempts coming to medical attention occurred before age 25***

What about youth?

Identifying the youth subsample
Age distribution of suicide attempts (ages 10-24)

- Light Blue = Males
- Dark Blue = Females

Youth subsample
- Males represented 258/813 (31.7%)
- Females represented 555/813 (68.3%)
- 29/813 (3.6%) died by suicide
  - 28 of these deaths occurred before the age of 25
  - 20/28 (71.4%) of youth dying by suicide did so on IA

Suicide attempts in males
- Accounted for 23/29 (79.3%) of suicides:
  - Overall, 23/258 (8.9%) males died by suicide
- 16/23 (69.6%) died on IA
  - 6.2% male cohort died on IA
  - 2.9% male survivors died in subsequent attempt
Suicide attempts in females

- Accounted for 6/29 (20.7%) of suicides:
  - Overall, 6/555 (1.1%) of females died by suicide
- 4/6 (66.7%) died on IA:
  - 0.7% female cohort died on IA
  - 0.4% females survivors died in subsequent attempt

Suicide attempt methods

- Most common:
  - Medication overdose 480/813 (59.0%)

- Followed by:
  - Cutting or piercing 198/813 (24.4%)
  - Non-medication overdose 30/813 (3.7%)
  - Firearms 27/813 (3.3%)
  - Hanging 24/813 (3.0%)

Firearm lethality

- Accounting for 3.3% of IAs but...
- 85.0% dead on IA used a gun
- 82.8% of all completed suicides were with firearms
- Regardless of age or sex, compared to all other methods, guns imparted an OR=334 (75.6, >999; p<0.0001) of dying on index attempt
Young males, guns and suicides

- Males overwhelmingly used firearms:
  - 87% of all male suicides by guns
  - Overall, 7.8% of the male cohort died by firearms
- Males more likely to die on subsequent suicide attempt (OR=6.6, 95% CI=1.39-34.716; p<0.018)
  - 71.4% of male survivors who died on subsequent attempt used a gun

Kaplan-Meier curve corresponding to survival probability from completed suicide

- All females that died on subsequent attempt perished within a year
- 57.1% of males that died on subsequent attempt perished within six months of IA

Antecedents: psychiatric care history prior to IA

- Overall, 41.2% of all IAs had no prior psychiatric history
  - 68.6% were not on a psychiatric medication
  - 52.4% had no psychiatric diagnosis
- Lack of psychiatric history highest in the 10-14 year old group and lowest in 20-24 year old group
Methodological limitations

- Did not include attempts not presenting for medical care

  Overestimation of suicide rate?
  - Some attempts not severe enough to declare for medical care and/or attempter did not disclose to medical practitioner

  Underestimation of suicide rate?
  - Possible that some suicides are not coded as such
  - Recognition that this does happen in youth
  - Rolling enrollment with variable follow-up failed to capture all subsequent attempts in survivors

  (Hawton & Goldbourn, 1982; Lewinsohn, Rohde, & Seeley, 1994; Geaney and Hawton, 2007)

Methodological strengths

- First community study to show suicide risk in a naturalistic community cohort of youth:
  - Followed from first lifetime suicide attempt coming to medical care
  - Inclusive of all types of attempt methods
  - Inclusive of those dying on first attempt
  - No comparable study in youth

Rethinking the relationship between suicide attempts and suicide completion

- Suicide attempts in young people are serious:
  - 1 in 11 males in this cohort died by suicide
  - 1 in 16 male attempters died on IA
  - 1 in 93 females in this cohort died by suicide
  - 1 in 139 female attempters died on IA
  - Overall, 1 in 41 perished by suicide on IA

- Greater than the commonly reported death to attempt ratio of 1 in 50 to 1 in 200 quoted in the literature

  (Husain, 1990; Goldbourn et al., 2002; Shain, 2016)
First attempt lethality

- Rough equivalence in overall IA death rates in males and females (69.6% in males; 66.7% in females)
- Psychological autopsies in young people:
  - Two studies observe split between males and females:
    - Marttunen et al. 1989 – 73% of males and 34% of females died on first attempt
    - Brent et al. 1999 – 63.1% of males and 38.1% of females died on first attempt
    - Shaffer et al., 1996 – reports 67% had no history of prior attempt but does not report sex differences

Not including index attempt underestimates odds of suicide completion

- 20/813 (2.5%) died on IA
- Whereas only 9/793 (1.1%) of IA survivors died in a subsequent suicide
- This observation holds true for males and females:
  - Male rate: 6.9% → 2.9%
  - Female rate: 0.7% → 0.4%
- Tracking suicide from IA is critical for showing true severity given lethality of index attempts

Youth IAs are more lethal than their elders

- All-age cohort index attempt completions: 59.2%
- Index attempt completions in <25: 71.4%
- Index attempt completions in >25: 52.8%
- Firearm usage in <25: 85.0%
- Firearm usage in >25: 64.3%
Deadliness of firearms in youth

- Our findings connect with the literature:
  - High firearm usage likely related to rural nature of cohort
  - Fontanella et al., 2015: suicide rates double for rural vs. urban youth partially attributable to guns?

- Household gun ownership:
  - Knopov et al. 2018: for each 10% increase in household gun ownership by state youth suicide increased by 26.9%

State suicide rates and gun ownership

Table 1: Average Youth Suicide Rates, Gun-Ownership Rates, and Suicide Rate Related Rates

Knopov et al., 2019

Master Clinician Review: Saving Holden Caulfield:
Suicide Prevention in Children and Adolescents

David A. Brent, MD

Objective: This is the second of a series of articles on adolescent suicide and mental health care. It discusses the relationship between mental health professionals and youth at risk for suicide, and suggests new therapies and effective approaches to prevent and treat adolescent suicide.

Method: These three elements comprise the first and only part of the larger article. The second part focuses on the assessment, treatment, and prevention of adolescent suicide. The third part discusses the relationship between mental health professionals and youth at risk for suicide.

Conclusion: These are meant, especially to provide strategies for the prevention and management of adolescent suicide behavior. Mental health professionals should seek to maximize contact with the clients who are at risk for suicide.

Keywords: youth, prevention, intervention.
Individual vs. population care
• Tension between individual care vs. population care
• Suicide prevention requires more than a clinician’s work with their patient
• Most advances in suicide prevention need to happen at primary and secondary prevention with populations

McKean and Bostwick, 2019 – JAACAP in press

Epidemiology can inform suicide prevention
• Primary prevention (reducing suicide risk factors in populations):
  • Maltreatment prevention
  • ACE (poverty, parental illness, incarceration, domestic violence)
• Secondary prevention (early detection in populations):
  • Primary care
  • Schools
  • Families

Firearms and means restriction: Needed at every level of prevention
• Needs to occur at primary, secondary and tertiary level prevention
• More than a psychiatrist’s responsibility
• More than primary care can handle
• Others need to be involved:
  • Communities?
  • Government/legislative?
  • Role for manufacturers and retailers?
What can you do about means restriction?

- Screen for firearms access in all youth
  - Vital when patient has a history of attempting suicide
  - Securing/removing guns from home
- Don’t assume that other people have had this conversation
- Don’t assume that the information is static
  - Family and patient concern often wanes when the crisis passes → reevaluate
- Recall: IA survivors that perished in subsequent attempt → ~70% used firearms

Summary

- 71.4% of youth dying by suicide did so on IA, this is 18.6 percentage points higher than for those 25 and older in the original all-age cohort
- Firearms play disproportionate role in lethality – responsible for 85.0% IA deaths
- For about 40%, the IA was their first mental health encounter

Conclusions

- With most youth perishing on IA, suicide prevention efforts that target attempt survivors are too late for the majority of youth who die by suicide
- Future prevention strategies in American youth must move beyond the clinician’s office:
  - Identify and target youth prior to first attempt
  - Means restriction of guns is vital for reducing completed suicides
Questions/Discussion