

Traumatic Brain Injury and risk for suicidal thoughts and behaviors

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Audience Question

What is your *primary* role within the VA?

Please select one:

- * Student, trainee, or fellow
- * Clinician
- * Researcher
- * Manager or policy-maker
- * Other

Agenda

- Overview of TBI and suicide
- Risk factors and protective factors with TBI patients
- Fluid vulnerability theory of suicide
- Recent findings regarding multiple TBIs & suicide risk
- Implications for clinical practice
- Discussion and questions

TBI and Suicide

TBI and Suicide

- First dedicated systematic review of suicidality and TBI (Simpson & Tate, 2007)
- Individuals with TBI **2.7 to 4 times** greater risk for suicide compared to general population (Teasdale & Engberg, 2001; Harris & Barraclough, 1997)
- Higher lifetime history of suicide attempts (8.1% TBI versus 1.9% general population) (Silver et al., 2001)

TBI and Suicide

- **Higher** levels of suicidal ideation in a large community survey in Australia (Anstey et al., 2004)
- Elevated rates in all of these studies were **significant** after adjusting for a range of covariates

TBI and Suicide

- Recent systematic review of current evidence of prevalence/ risk of suicide deaths, and suicidal ideation and attempts post-TBI (Bahraini et al., 2013).
- Review examined literature published from 2007 to 2012
- Out of 1,104 abstracts, 16 studies met inclusion criteria
- Review included information about the risk of bias for each study

Suicidal Ideation

Study	Sample	Sample Size	Injury Severity	Source of Ideation	Time Post-Injury	Prevalence of SI	Risk of Bias
Tsaousides et al 2011	US Civilian, 52% male, Age M (SD): 44.5 (15.2) yrs	N = 356 community dwelling, diverse	Mild: 37.6% Mod - Sev: 62.4%	SI item on BDI-II last 2 weeks	M (SD) = 5.9 (9.2) yrs	28.3%	LOW

(Bahraini et al., 2013)

Suicide Attempts

Study	Sample	Sample Size	TBI Severity	Source of Attempt	Time Post-Injury	Prevalence of SA	Risk of Bias
Breshears et al 2010	US Veteran, 97% male, Age M (SD): 30.3 (11.57)	n=154 archival data of TBI team evals	Mild: n=42; Mod: n=44; Sev: n=68	Medical record review, clinical determination of SA post-TBI	14 yrs	7.1%	Mod
Gutierrez et al 2008	US Veteran, 95% male, Age Med: 51, range 38-65 yrs	n=22 attended TBI team, archival data of all w psych IPU	Mild: n=1; Mod: n=11; Sev: n=10	Documented SA in psych discharge summaries post-TBI	median = 15 yrs	27.3%	Mod

(Bahraini et al., 2013)

Death by Suicide

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Study	Sample	Sample Size	TBI Severity	Observed Suicides	Reference Population	SMR or OR	Risk of Bias
Brenner et al 2011	US Veteran, 2001-2006	n=49,626 VHA users with TBI	Concussion: n=12,159 Contusion/ TIH: 39,623	n=105	5% random sample of VHA users without TBI, n=389,583	Overall: 1.55 (1.24, 1.92); Mild: 1.98 (1.39, 2.82); Mod - Sev : 1.34 (1.09, 1.64)	Low
Harrison-Felix et al 2009	US Civilian, 1961-2003	n=1678 TBI patients admitted to rehab hosp and survived >1 year	No LOC: n=129; <1 day: n=495; 2-7days: n=360; 8-129 days: n=568	n=10, n=3.39 expected	US Federal mortality rates by age, sex, race	Overall: 2.95 (1.42, 5.43)	Mod
Himanen et al 2011	Finland Civilian, 1950-1971	n=192 neuro referrals to univ hosp	Mild: n=65; Mod: n=68; Sev: n=53 Very Sev: n=5	3/75 deaths = 4.2%	General population	NR	Mod
Mainio et al 2007	Finland Civilian, 1988-2004	n=1877 general pop suicides in province	Concussion: n=83; Lesion: n=20	103/1877 = 5.5%	Subset of n=1877 suicides with no TBI	NA	Mod
Skopp et al 2012 (Bahraini et al., 2013)	US Military, 2001-2009	n=1764 suicides in US active military	Mild: n=97; Mod: n=25; Sev: n=5 Uncl: n=2	129/1764 = 7.3%	Random selection matched 4:1 to cases by multiple demographics	Mild (OR): 1.1 (0.88, 1.42), ns	Mod

TBI and Suicide

- Bahraini and colleagues (2013) systematic review found **new robust evidence** of the association between TBI and elevated risk for suicide
- Contributes to the debate about whether there is an elevated risk of suicide post-TBI, as some previous studies did not find a significant association

Risk & Protective Factors with TBI patients

Why is their an increased risk?

- Dysfunction of frontal lobes and frontal-subcortical circuits often associated with aggression, impulsivity, and poor decision making (Dyer et al., 2006; Powell & Voeller, 2004).
- Mann et al (1999) found that lifetime, externally directed aggression and impulsivity distinguished past suicide attempters from non-attempters. This study resulted in evidence for a link between executive dysfunction and suicide risk.
- A study by Oguendo and colleagues (2004) found that having a TBI increased pre-existing risk factors (e.g., aggression) for self-harm behavior, which increases risk post-TBI.

Risk Factors for Suicide

- The presence of **substance misuse** was associated with increased risk in those with a history of TBI who died by suicide (Teasdale & Engberg, 2001)
- Individuals with comorbid post-injury histories of **psychiatric** and **emotional disturbance** and **substance abuse** were 21 times more likely to have made a post-TBI suicide attempt than those without such histories (Simpson & Tate, 2005)

Qualitative data- risk factors

- **Loss of self** after TBI associated with decreased sense of masculinity & increased sense of **burdensomeness**
(Brenner et al., 2009)
- **Cognitive difficulties** were “embarrassing and depressing.” Difficult to track warning signs, use coping skills, or consider alternatives to suicidal behavior
(Brenner et al., 2009)
- **Psychiatric and emotional disturbances** (depression, worthlessness, anger, hopelessness, burdensomeness)
(Brenner et al., 2009)

Qualitative data- protective factors

- Social support
- Sense of purpose and hopefulness regarding future
- Religion/ spirituality
- Employment/ volunteerism
- Mental health treatment (Brenner et al., 2009)

Risk Factors- mTBI

- (a) 133 military personnel and 4 civilian contractors referred to outpatient TBI clinic in Iraq and (b) 55 military personnel self-referred to outpatient mental health clinic in Iraq
- Evaluated the interpersonal-psychological theory of suicidal behaviors within these 2 samples
- In both samples, **perceived burdensomeness** demonstrated a significant relationship with suicidality above and beyond the effects of other risk factors for suicide
- **Acquired capability** was associated with suicidality, however only among TBI patients (Bryan, Clemans, & Hernandez, 2012)

Risk factors- mTBI

- 158 military personnel referred to an outpatient TBI clinic in Iraq; 135 (85.4%) had a diagnosis of mTBI
- Increased suicidality was significantly associated with **depression** and the interaction of **depression** with **posttraumatic stress disorder** symptoms
- Longer duration of loss of consciousness was associated with *decreased* likelihood for any suicidality (Bryan, Clemans, Hernandez, & Rudd, 2012)

Fluid vulnerability theory of suicide

Fluid vulnerability theory

Fundamental Assumptions:

- Baseline risk varies from individual to individual
- Baseline risk is determined by *static* factors
- Baseline risk is higher and endures longer for multiple attempters (2 or more attempts)
- Risk is elevated by aggravating factors
- Severity of risk is dependent on baseline level and severity of aggravating factors

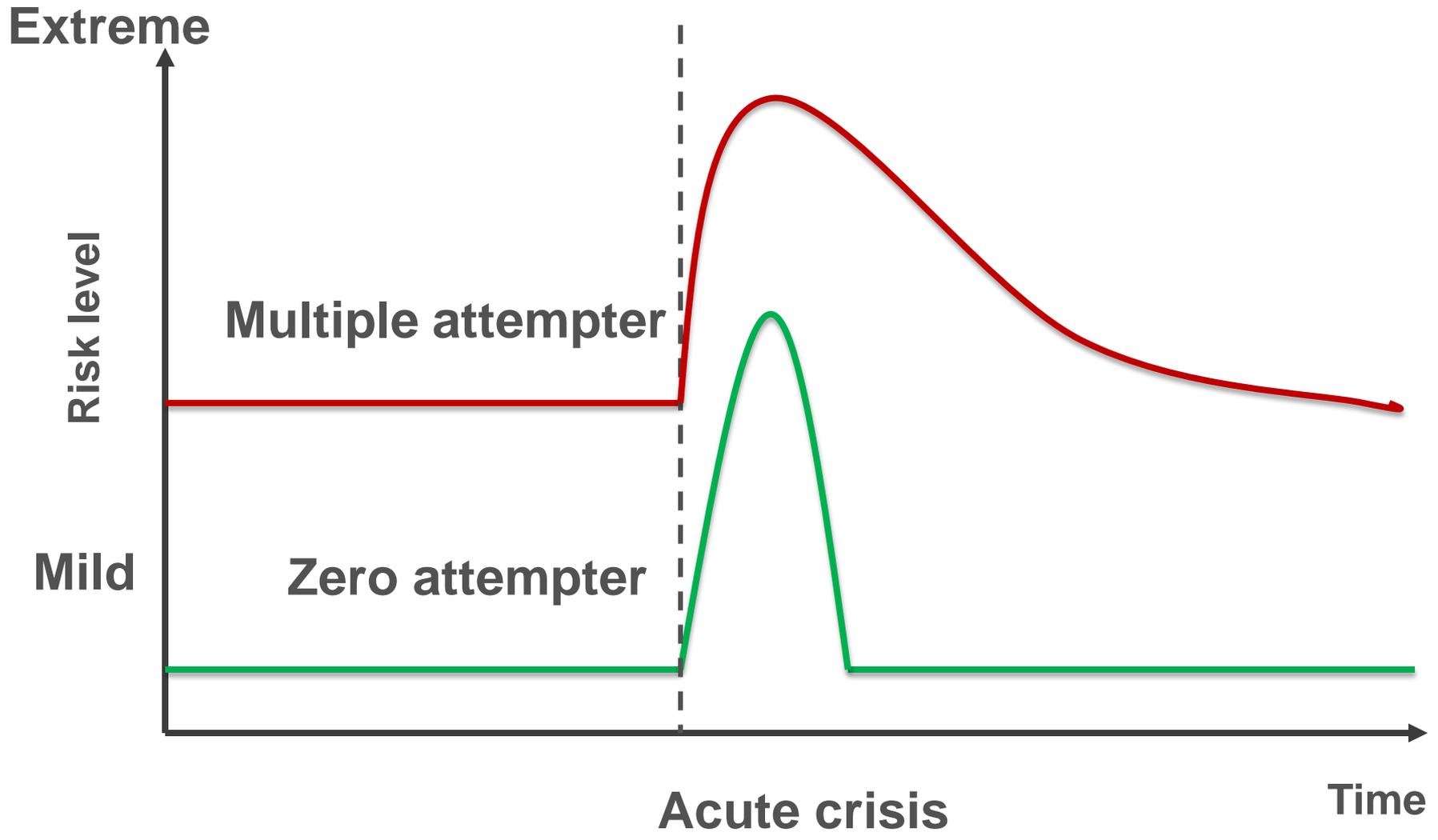
(Rudd, 2006)

Fluid vulnerability theory

Fundamental Assumptions (cont'd):

- Risk is elevated by aggravating factors for limited periods of time (hours, days, weeks), and resolves when risk factors are effectively targeted
- Risk returns to baseline level only
- Risk is reduced by protective factors
- Multiple attempters have fewer available protective factors (support, interpersonal resources, coping/problem-solving skills, etc.)

(Rudd, 2006)



Predispositions
Prior suicide attempts
Abuse history
Impulsivity
Genetic vulnerabilities



Trigger
Job loss
Relationship problem
Financial stress

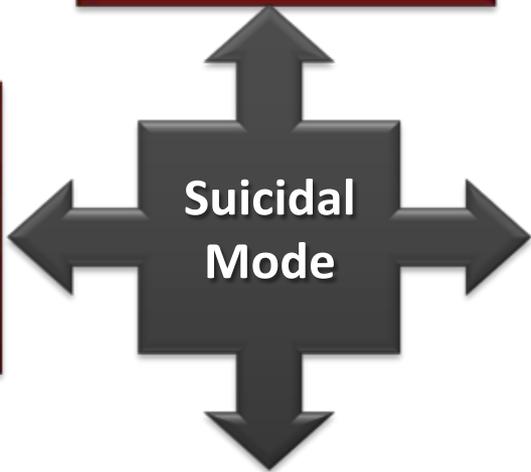


Behavior
Substance abuse
Social withdrawal
Nonsuicidal self-injury
Rehearsal behaviors

Cognition
"I'm a terrible person."
"I'm a burden on others."
"I can never be forgiven."
"I can't take this anymore."
"Things will never get better."

Emotion
Shame
Guilt
Anger
Anxiety
Depression

Physiology
Agitation
Sleep disturbance
Concentration problems
Physical pain



Multiple TBIs and Suicide Risk: Recent Findings

Sample Demographics

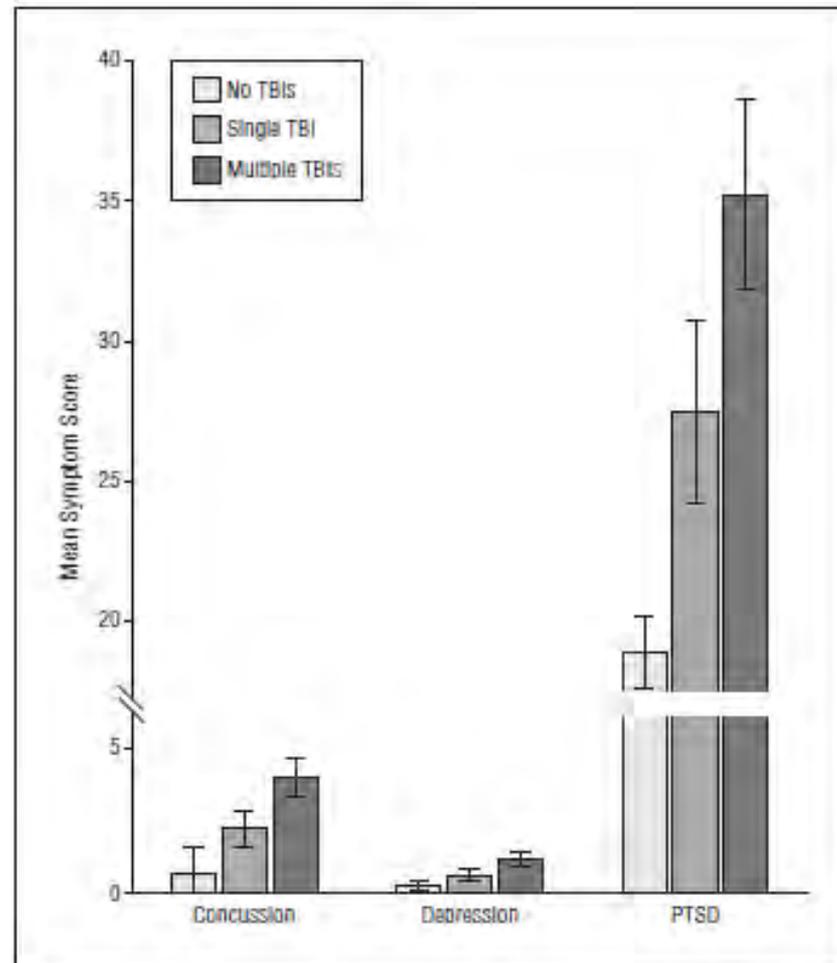
Table 1. Sample Descriptors^a

Descriptor	Value
Sex, No. (%)	
Male	150 (93.2)
Female	11 (6.8)
Race, No. (%)	
White	114 (70.8)
African American	25 (15.5)
Hispanic/Latino	15 (9.3)
Asian/Pacific Islander	4 (2.5)
Other	1 (0.6)
Missing	2 (1.2)
Branch of service, No. (%)	
Army	127 (78.9)
Air Force	22 (13.7)
Marines	8 (5.0)
Civilian	4 (2.5)
Rank, No. (%)	
E1-E4	89 (55.3)
E5-E6	50 (31.1)
E7-E9	9 (5.6)
Warrant officer	1 (0.6)
Officer	8 (5.0)
Age, mean (SD), y	27.4 (7.1)
Time in military, mean (SD), y	6.6 (5.5)
Prior deployments, mean (SD)	0.8 (1.1)
Scores, mean (SD)	
Depression subscale	0.9 (0.8)
PCL-M	30.8 (14.2)
Concussive symptoms	3.1 (2.8)
SBQ-R total score	3.5 (1.5)

Procedures

- Patients referred to outpatient TBI Clinic in Iraq for evaluation / treatment of suspected TBI
- Patients completed standardized intake procedures:
 - Self-report symptom and demographics measures
 - Self-report concussion symptoms and history
 - Clinical interview by psychologist
 - Physical examination by physician
 - Neurocognitive testing

TBIs & Psychiatric Symptoms



Multiple TBIs and Suicide Risk

- Lifetime incidence suicide ideation ($\chi^2 = 9.524$, $p = .009$)
 - Zero TBIs: 0%
 - One TBI: 6.9%
 - Multiple TBIs: 21.7%
- Past year incidence suicide ideation ($\chi^2 = 5.276$, $p = .040$)
 - Zero TBIs: 0%
 - One TBI: 3.4%
 - Multiple TBIs: 12.0%

(Bryan & Clemans, 2013)

Multiple TBIs and Suicide Risk

Table 3. Results of Generalized Linear Regressions Predicting Suicidal Behaviors Questionnaire–Revised Total Score

Variable	Model 1		Model 2	
	β (SE)	P Value	β (SE)	P Value
TBI group	.214 (.098)^a	.03	-.105 (.164)	.52
Depression symptoms	.740 (.314)^a	.02	-.243 (.291)	.40
PTSD symptoms	-.007 (.010)	.44	-.007 (.010)	.46
Concussion symptoms	-.029 (.043)	.50	-.028 (.043)	.52
Depression \times TBI group ^b	---	---	.580 (.283)^a	.04

Abbreviations: PTSD, posttraumatic stress disorder; TBI, traumatic brain injury.

^aValues in bold indicate statistically significant coefficients.

^bInteraction between depression and TBI group.

Multiple TBIs and Suicide Risk

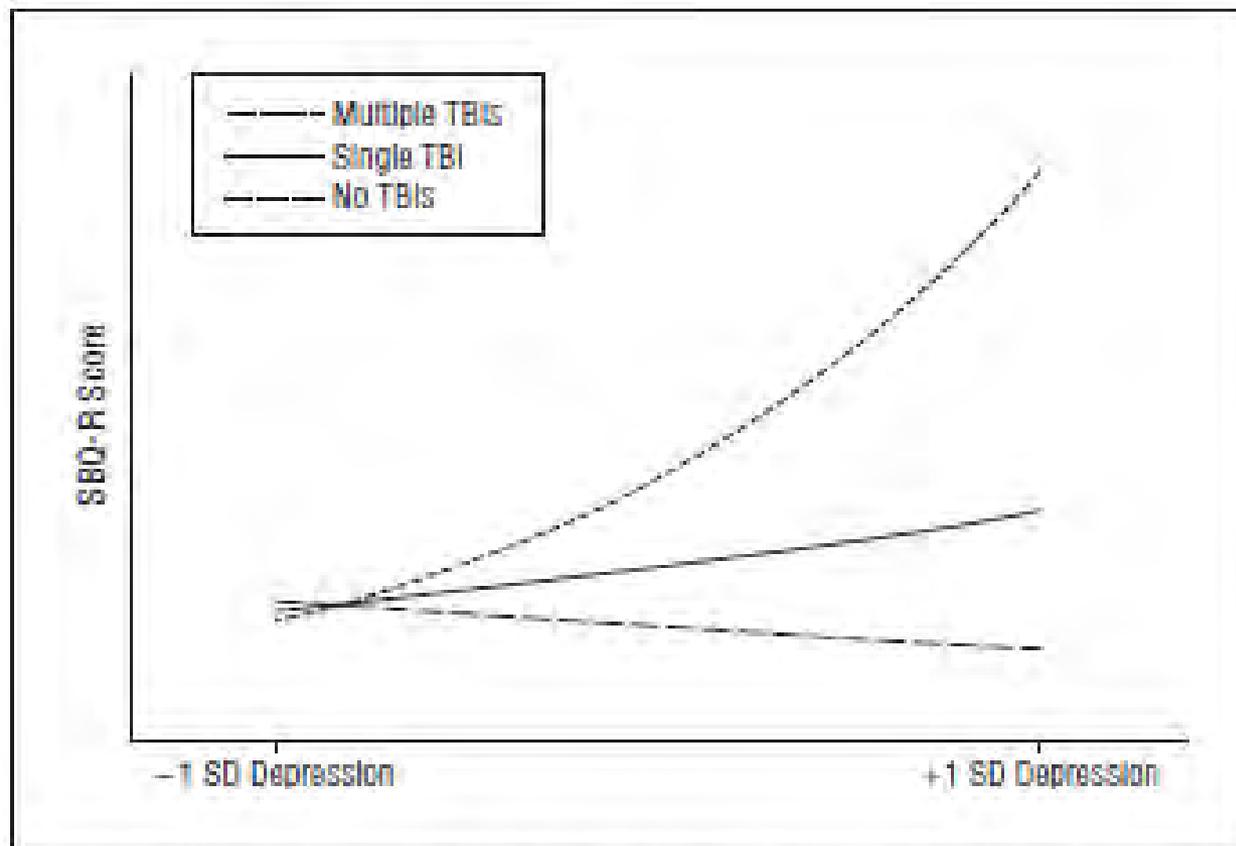
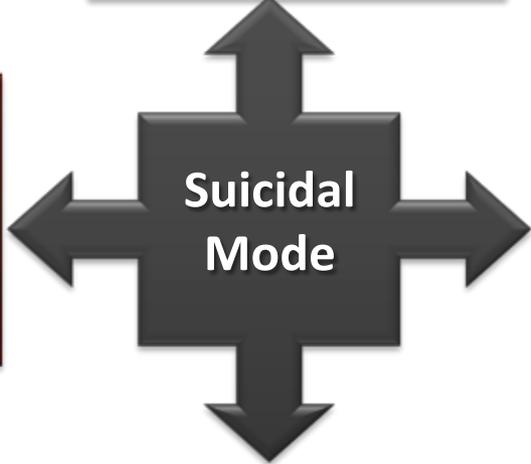
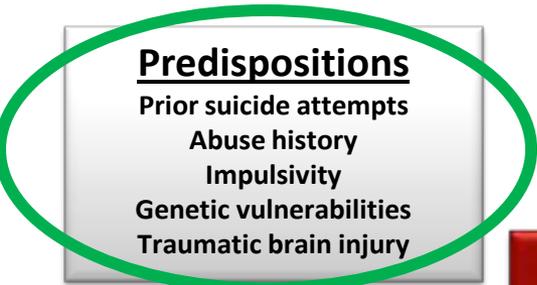


Figure 2. Depression, suicide risk, and traumatic brain injury (TBI). Suicide risk as a function of the interaction between depression severity and TBI group. SBO-R indicates Suicidal Behaviors Questionnaire–Revised.

Limitations

- Limited information about past head injuries (e.g., no information about previous LOC)
- Data collected in combat zone
- Small clinical sample, predominantly male
- Cross-sectional data only



Clinical Implications

Clinical Implications

- Assess for substance misuse/abuse and psychiatric disorders (depression, PTSD) & increase access to mental health/substance abuse treatment (Brenner et, 2009)
- Assess for cognitive dysfunction and associated functional impairment (Brenner et al., 2009)
- Assess for suicide risk– suicide attempt history is the most reliable & robust predictor of current/ future suicidal behaviors (Bryan & Rudd, 2006)

Clinical Implications

- How long should clinicians assess for suicide risk for TBI patients? Answer is **forever!**

Why?

- TBI patients were followed for 15 years with no particular period of “greatest risk” identified (Teasdale & Engberg, 2001)
- The mean period of post-injury suicide attempts was 5 years (Simpson & Tate, 2002)

Clinical Implications

- Implement coping and compensatory strategies as part of treatment (Brenner et al., 2009)
- Initiate safety planning (Brenner et al., 2009)
- Utilize empirically-supported interventions for conditions associated with the acquired capability for suicide, such as prolonged exposure or cognitive processing therapy for PTSD as they can prevent the eventual onset or worsening of suicidal ideation (Bryan, Clemans, & Hernandez, in press)

Clinical Implications

- Directly work to reduce the Veterans' desire for suicide by targeting their maladaptive belief systems, including perceived burdensomeness and thwarted belongingness. (Rudd, 2012)
- Facilitate the use of religious/spiritual support, vocational/volunteer activities, social support, and family focused intervention (Brenner et al., 2009; Dausch & Saliman, 2009)

Clinical Implications

- Restriction of access to lethal means for suicide (e.g., firearms, medications) is another strategy designed to directly target the acquired capability for suicide.
- Engaging the Veteran and their friends/ family in assisting with the restriction of lethal means can significantly reduce the likelihood of an adverse outcome during a suicidal crisis (Bryan, Stone, & Rudd, 2012)

Suicide Risk Management Consultation Program



Suicide Risk Management
Consultation
Program

for those who work
with Veterans

 MIRECC
MIND BY DESIGN ALLIANCE NETWORK

1-866-948-7880
Call to Schedule a Consult

Discussion

Questions ?

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