The Trauma Survivors Outcomes & Support (TSOS) Pragmatic Trial Targeting PTSD and Comorbidity: Design and Early Implementation

Douglas Zatzick, MD
Professor Department of Psychiatry
&
Doyanne Darnell, PhD
Assistant Professor Department of Psychiatry

Harborview Level I Trauma Center
University of Washington School of Medicine

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Trauma Survivors Outcomes & Support (TSOS)

Trauma Surgery Core
Gregory Jurkovich
Erik Van Eaton
Ron Maier
David Hoyt
Trauma Survivors Outcomes & Support (TSOS)

Biostatistics Core
Patrick Heagerty
Joan Russo
Jin Wang
Bryan Comstock
Trauma Survivors Outcomes & Support (TSOS)

Other Collaborators
Doyanne Darnell (Behavioral Interventions)
Larry Palinkas (Implementation Science)
Lauren Whiteside (Emergency Medicine)
Overview

A. TSOS Effectiveness-Implementation Hybrid Pragmatic Design
   1) PRECIS scoring – high and low marks
   2) Building towards pragmatic trial generalizable knowledge

B. TSOS Early Implementation
   1) Aims
   2) Recruitment & Follow-up
   3) Milestones & Challenges

C. Lessons Learned
   1) Developing pragmatic behavioral interventions that target multiple comorbid conditions
   2) Acute care pragmatic trials may include more intensive follow-up evaluations beyond routine visits
   3) TSOS effectiveness-Implementation hybrid design informs data sharing that simultaneously targets treatment effectiveness & national trauma center practice change considerations
Overview: TSOS Effectiveness-Implementation Hybrid Pragmatic Trial Framework

Zatzick Russo Darnell Chambers Palinkas Van Eaton Wang Ingraham Guiney Heagerty Comstock Whiteside & Jurkovich: Submitted for Publication Implementation Science
Overview: PRECIS Pragmatic Trial Domains & the TSOS Study - High Marks

- Broad site, provider and patient eligibility criteria, multiple comorbidities
- Intervention flexibly delivered
- Full range of providers included
- Comparison intervention - usual care
- Primary outcome objectively measured
- Intent to treat primary outcome analysis
Overview: PRECIS Domains & TSOS Trial - Lower Marks

- Provider behavioral intervention fidelity assessment requires adjudication
- Greater intensity of outcome assessment given no single acute care administrative data base
Overview: Global Approach

• Work inductively from TSOS “lessons learned” to more generalizable knowledge regarding pragmatic trials

• Integration of pragmatic trial and implementation science conceptual frameworks
TSOS Study Aims & Progress
PTSD & Other Mental Health/Substance Disorders Among Randomly Selected Harborview Emergency/Trauma Surgery Patients (N=878)

Zatzick Donovan Dunn Russo Wang Jurkovich et al JSAT 2012
TSOS UH3 Aims

1) Conduct pragmatic trial
2) Understand trial implementation
3) Dissemination of results through American College of Surgeons policy
TSOS Hypotheses: Aim 1

• The intervention group when compared to the control group will demonstrate:
  1) ↓ PTSD symptoms (primary hypothesis)
  2) ↓ Depressive symptoms
  3) ↓ Suicidal ideation
  4) ↓ Alcohol use problems
  5) Improved post-injury physical function

• Exploration of intervention effects in patients with/without chronic medical conditions & TBI
TSOS Study Design

- Cluster randomized trial
- 24 US trauma centers
- 40 patients per site (960 patients total)
- Baseline PTSD & comorbidity assessment at trauma center
- 3, 6 and 12 month follow-up interview assessments
TSOS US Level I Trauma Center Sites (N = 24)
Stepped Wedge Design

- Sites recruit control & intervention
- 24 sites randomized to 4 waves
- Begin with control recruitment
- Turn on intervention midway
Stepped Wedge Cluster Randomized Trial Design and Timeline

- - - - - Unexposed to intervention (n=480 patients)

Exposed to intervention (n=480 patients)

Follow-up period

Accrual period

Wave 1

n=8  n=32

Wave 2

n=16  n=24

Wave 3

n=24  n=16

Wave 4

n=32  n=8

6 trauma centers/wave

Q1   Q2   Q3   Q4      Q1  Q2     Q3  Q4       Q1  Q2      Q3   Q4         Q1    Q2    Q3    Q4         Q1   Q2   Q3    Q4

Year 1                          Year 2                          Year 3                              Year 4


Jan. 1 2016                          Feb. 1 2018

Year 5                          Year 6

July 2018                          July 2019
Recruitment Update

• 14 sites ≥ 1 patient recruited
• 6 additional sites with automated recruitment workbook data transfer
• 4 sites regulatory delays
  - 2 IRB re-review
  - 1 Centralized IRB coordination
  - 1 Indemnity review
Patients Screened N=865

Not Eligible n=420
- Discharged before approach  n=243
- Cognitive impairment n=80
- Non-English speaking  n=36
- Prisoner/Legal n=14
- Self-inflicted injury n=12
- Acute psychiatric issue n=11
- < 2 contacts, no follow-up n=9
- Non-injury admit n=8
- Deceased  n=5
- Other n=2

Screen Out (< 3 Risk Factors) n=173

Discharge before Consent n=29

Patients Approached n=243

Pending n=72

Refuse n=80

Patients Evaluated with PTSD Checklist n=91

PTSD Checklist <35 n=43

Patients Randomized PTSD Checklist ≥35 n=48
TSOS Recruited Patients (3-30-16)

- 91 Consented
- 43 Screen out: PTSD Checklist < 35
- 48 Screen in: PTSD Checklist ≥ 35
- 48 Screen in April 1, 2016 Milestone
Major Challenge: Variability in Site Recruitment Rates

• Some sites rapid: wish to complete control recruitment all in one period
• Some sites slower may not complete recruitment of controls before switching on intervention
• Scientific tension between stepped wedge design integrity & site implementation flexibility
• Initial solution
  - 4 minimum patients per period
  - 12 maximum patients per period
UH3 Participant Follow-up
(As of 3-30-16)

48 Randomized Participants

44 Potentially Contactable (92%)
  40 Contact established
  4 Likely to contact

4 Unable to Follow (8%)
  1 Withdrawn
  3 Difficult to reach
TSOS Intervention
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Zatzick Donovan Dunn Russo Wang Jurkovich et al JSAT 2012
PTSD & Comorbidity and the Multiple Chronic Condition Framework

- Mental health comorbidity: PTSD, depression and occult suicidal ideation (25-40%)
- Alcohol use problems (25%)
- Other substance use problems: Stimulants, opiates, benzodiazepines, MJ (20%)
- Chronic pain (10-20%)
- Traumatic Brain Injury (40-50%)
- Pre-injury chronic medical conditions (>50%)
TSOS Effectiveness-Implementation Hybrid Pragmatic Trial Framework

RE-AIM Evaluation Framework [35]

Clinical Trial Frameworks & Classic Theory [27, 36, 39-43]

Diffusion of Innovations

Adoption
Assessment of trauma center site adoption status
Innovators, laggards, other sites excluded

Effectiveness
Effectiveness – Implementation Hybrid Pragmatic Trial

Implementation
Stepped Wedge Cluster Randomized Trial
Control Recruitment Begins → Intervention Left On Promoting Sustainable Implementation

Maintenance
Diffusion of Innovations → Targets National Trauma Center Adoption

Robust Sustainable Implementation Systems [37-38]

Multiple Comorbid Conditions
- PTSD
- Depression
- Suicidal ideation
- Alcohol use problems
- Drug use problems
- Traumatic brain injury
- Chronic medical conditions

Critical Intervention Elements
- Care management
- Motivational interviewing
- Cognitive behavioral therapy elements
- Medications
- Primary care linkage

Barriers and implementation lessons learned from fielding of the trial

American College of Surgeons policy summit targeting PTSD and comorbidity guidelines

Policy ACS/COT Context

Time
2011
May ACS/COT Policy Summit

2014
ACS/COT PTSD Practice Guideline

2019
Protocol Supported ACS/COT Policy Summit
Stepped Collaborative Care: Readily Implementable Elements

- **Step I**: Empathic Engagement – Care Coordination – Trauma Center – Outpatient – Primary Care Linkage
- **Step II**: Medications – PTSD & Comorbidity
- **Step III**: Behavioral Intervention: Motivational Interview & Cognitive Behavioral Therapy Elements
- **Step IV**: Specialty Referral
- **Step V**: Community Integration

Time
Behavioral Interventions: Lessons Learned from Prior NIAAA funded Pragmatic Trial (DO-SBIS)

- Alcohol mandate and ACS/COT trainings
- 20 trauma centers in trial
- 878 alcohol Motivational interviewing (MI) targeting alcohol
- Front-line trauma providers trained in alcohol brief int.
- Variability in skills assessed with standardized patients
- Trained providers ↑ MI skills
- Sites with trained providers had greater effectiveness in reducing alcohol use

Darnell Dunn Atkins & Zatzick JSAT 2015
Behavioral Interventions: UH2 Pilot & UH3 Implementation

- Extension of behavioral intervention to PTSD & comorbidity
- Motivational interviewing targets alcohol
- Behavioral activation targets PTSD and depression
- Front-line trauma center providers trained
- Fidelity again assessed with standardized patients
Lessons Learned: Behavioral Interventions

- PRECIS criteria: more than minimal adjudication to assess provider fidelity
- Implementation science: ACS/COT stakeholder partnership could support feasibly implemented fidelity evaluation
Lessons Learned Acute Care Pragmatic Trial Follow-up Beyond Routine Visits - TSOS

- TSOS trial 24 centers, 19 states
- No single administrative data base tracks patients over time
- 3, 6, 12 month follow-up interviews required
- Interviews are not part of trauma center routine follow-up
Acute Care Pragmatic Trial Follow-up Beyond Routine Visits: Comprehensive Post-Acute Stroke Services Study (COMPASS)

- PCORI pragmatic trial
- Pamela Duncan, PhD PI
- Stroke survivors in acute care hospitals across North Carolina
- Primary outcome: PROs
  - Stroke impact scale PRO post-discharge
  - Caregiver strain also assessed
  - Readmissions and mortality also tracked
Lessons Learned: Implementation Science, Stepped Wedge Designs, & Data Sharing

• Stated aim of TSOS is to generate knowledge for American College of Surgeons policy
• All 24 sites will have intervention “turned on” at the end of the trial
• Decision to leave intervention turned on temporally occurs months before composite 24 site results published
Stepped Wedge Cluster Randomized Trial Design and Timeline

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Year 1                          Year 2                          Year 3                              Year 4

Year 5

July 2014

July 2015

Jan. 1 2016

Feb. 1 2018

June 2016

July 2017

July 2018

July 2019
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• Sites integral part of study team academic products and will participate in publications
Summary

• TSOS is being rolled out nationally
• Milestones achieved
• Challenges exist
• Multiple lessons learned that can facilitate knowledge generation at the interface of pragmatic trials and implementation science