Functional Impairment is Associated with Long-Term Life Satisfaction in Veterans with mTBI

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FUNCTIONAL IMPAIRMENT IS ASSOCIATED WITH LONG-TERM LIFE SATISFACTION IN VETERANS WITH MTBI
MILD TRAUMATIC BRAIN INJURY

The American Congress of Rehabilitation Medicine (ACRM, 1993) defines mTBI as a traumatically induced physiological disruption of brain function, including the head being struck, the head striking an object, and the brain undergoing an acceleration/deceleration movement (whiplash), as manifested by at least one of the following:

1. any period of loss of consciousness
2. any loss of memory for events immediately before or after the accident
3. any alteration in mental state at the time of the accident (e.g., feeling dazed, disoriented, or confused)
4. focal neurological deficit(s) that may or may not be transient

But where the severity of the injury does not exceed the following:

- loss of consciousness of approximately 30 minutes or less
- after 30 minutes, an initial Glasgow Coma Scale (GCS) of 13–15
- posttraumatic amnesia (PTA) not greater than 24 hours
Mild Traumatic Brain Injury (mTBI) the signature wound of the post 9/11 era

MTBI suppresses:
1. Life satisfaction
2. Typical activities of life

‘Functional Impairment’
   - Degree of impairment may also facilitate life satisfaction
   - Non-traditional target for treatment programs, beyond mental health
THE PRESENT PROJECT

Goal:
• To examine the association between functional impairment related to mTBI and life satisfaction among a sample of veterans

Hypotheses:
• Milder functional impairment is associated with higher life satisfaction
• Functional impairment is more strongly associated with life satisfaction than socio-demographics or mental health variables
• Functional impairment uniquely and substantially contributes to life satisfaction above all other covariates
METHOD: PARTICIPANTS

1,019 veterans with mTBI
All received outpatient treatment
- Between 2015 to 2020
- In the Polytrauma Rehabilitation Center (PRC), at the Polytrauma System of Care at the South Texas Healthcare System, housed in the Audie Murphy Memorial Hospital, under the Veterans Health Administration (VHA), San Antonio, TX
METHOD: VARIABLES AND ANALYSIS

Outcome of Interest: **Life satisfaction**

Covariates:
- **Socio-demographics**
- **Mental Health Distress:**
  - Disruption from affective symptoms
  - Post-traumatic stress symptoms
- **Functional impairment**

Procedure & Analysis: Using SPSS and Mplus . . .
- Simple linear regression: assessed **Life Satisfaction** regressed on each variable *individually*
- Stepwise multiple regression: modeled incremental and combined effects of variables on **Life Satisfaction**
RESULTS
OUTCOME VARIABLE: LIFE SATISFACTION

Satisfaction With Life Scale, **SWLS**

Possible scores range from 5 to 35; \( \alpha = .87 \)

Mean score = 17.2 (SD = 7.5)

The average veteran self-evaluated in the *slightly dissatisfied* range (Diener et al., 1985)
FACTORS

Variable description and simple linear relationships between each variable and SWLS
SOCIO-DEMOGRAPHICS

Sex

In general men and women report similar SWLS, ns
Men (0) $M=17.1$ ($SD=7.5$)
Women (1) $M=18.2$ ($SD=7.8$)

SWLS regressed on Sex

$r=.045$ ns
$R^2=.002$ ns

Women reported life satisfaction scores on average about 1.1 points higher than their male counterparts, but sex was not significant in a simple linear regression.
SOCIO-DEMOGRAPHICS

Age
Mean age=39.6 years old ($SD=9.5$ years)
Age at time of assessment ranged from 22 to 78 years

SWLS regressed on Age
$r=.001$ ns
$R^2=.000$ ns
When evaluated by itself, age was not a significant predictor of SWLS.
Years of Service
Veterans averaged approximately 13.0 years of service ($SD=7.9$ years) before separating
Length of service ranged from 1 to 39 years

**SWLS** regressed on **Years in Service**

$r=.180$ ($p<.001$)

$R^2=.033$ (3% variance in **SWLS** explained)

**Individuals who served longer reported higher life satisfaction (mild positive)**
Neurobehavioral Symptoms Checklist *Affective* Subscale, NSI-Affective (NSI-Aff)

Mean score = 16.8 ($SD=5.4$), $\alpha=.87$

Average score is in the **borderline clinical** to **clinical range** (normed on service members with mTBI).

**SWLS** regressed on **NSI-Aff**

$r = -0.447$ ($p<.001$)

$R^2=.20$ (20% variance in **SWLS** explained)

**Individuals who experienced less neuro-affective disruption reported higher life satisfaction** (moderately strong inverse)
MENTAL HEALTH DISTRESS

PTSD Checklist – Military for DSM-IV, **PCL-M**

Mean score=58.4 (SD=14.8), possible score ranges from 17 to 85

The average scores are *consistent with PTSD* (VA National Center for PTSD, 2010)

**SWLS** regressed on **PCL-M**

$r= -.440 (p<.001)$

$R^2=.193$ (19% variance in **SWLS** explained)

Individuals who experienced fewer post traumatic symptoms reported higher life satisfaction (moderately strong inverse)
Mayo-Portland Adaptability Inventory-4 Participation Index, **M2PI**

Mean score = 12.6 (SD = 6.5), possible score ranges from 0 to 32; \( \alpha = .85 \)

Average scores were in the **moderately to severely impaired** range on scale normed for patients with ABI (Malek & Lezak, 2008)

**SWLS** regressed on **M2PI**

\( r = -.499 \) (\( p < .001 \))

\( R^2 = .249 \) (25% variance in **SWLS** explained)

**Individuals who reported milder impairments also reported higher life satisfaction (strong inverse)**
MODELS
To evaluate the incremental contribution of socio-demographic characteristics and mental health distress, as well as the unique contribution of functional impairment on life satisfaction, stepwise multiple linear regression was implemented.

1. Modeling the contribution of all socio-demographics
2. Modeling the combined contribution of socio-demographics and mental health distress
3. And a fully adjusted model, controlling for all previously modeled predictors plus functional impairment
MODEL 1: SOCIO-DEMOGRAPHICS ONLY

SWLS 5.0%

- Sex
- Age
- Years in Service

- M2PI
- PCL-M
- NSI-Affective

Sex accounted for 5% of the variance in SWLS. Years in service by itself explained 3% variance in SWLS. Age and years in service were significant partial model predictors.

- Age, while not significant alone, was a significant predictor when factored with years in service only.

Sex was not a significant model predictor.
MODEL 2: SOcio-demographics + Mental Health Distress

Accounted for 25.8% of variance

When Mental Health Distress variables were added to the model, an additional 20.8% of SWLS variance was explained

Sex became a significant predictor when it was factored with mental health distress variables

- Female veterans reported significantly higher life satisfaction than men, but only after controlling for mental health distress
**MODEL 3: SOCIO-DEMOGRAPHICS + MENTAL HEALTH DISTRESS + FUNCTIONAL IMPAIRMENT**

32.2% of total variance

**Functional impairment** strongest **SWLS** predictor

It uniquely accounted for 6.4% variance in **SWLS**

**Mental health** became a less salient influence on **life satisfaction** with **functional impairment** factored

**Years in service** emerged as the second strongest model predictor of **life satisfaction**
FUNCTIONAL IMPAIRMENT

After all covariates were factored, M2PI exerted the strongest, most negative influence on SWLS of any factor in the model. Among this sample of veterans, deficits in ability to live independently functional lives after neurotrauma appears to inhibit life satisfaction more than any other modeled variable.

Increasing functional autonomy alone may:

1. Improve veteran life satisfaction

But it could also...

2. Reduce disruption from neuro-affective distress
3. Help relieve frequency/severity of post traumatic symptoms
YEARS IN SERVICE

- **Years in service** was second strongest model predictor of life satisfaction.
- More years in service = higher perceived veteran life satisfaction.
  - Career goals? Identity/Self-worth? Patriotism?
- Simply retiring after 20 years may directly contribute to positive outcomes.
1. Veterans with mTBI need holistic, whole health interventional approaches that promote functional autonomy in addition to addressing mental health distress

2. Initiatives that allow service members with mTBI to remain in service longer should be considered case-by-case
Future Directions:

- Identify the specific functional impairments that can be ameliorated to impact on life satisfaction
  - Identify the specific impact of each functional area on life satisfaction: social networks, non-family friendships, ability to participate in recreational activities, etc...
- Identify changes in factors over time in longitudinal study
- Examine the influence of race/ethnicity
- Examine the influence of sex with a more representative Male/Female ratio

Limitations:

- Participants self-selected; results may not be generalizable to other mTBI groups or other groups of veterans
- The disproportionate male to female ratio may have limited generalizability
- Data was cross-sectional: no causality can be established or inferred
ANY QUESTIONS???
REFERENCES


