The Elephant In The Room: Understanding The Role Of Mental Health In Perioperative Medicine

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ROLES OF THE MENTAL HEALTH PROFESSIONAL IN PERIOPERATIVE SETTINGS

Surgery

- Assessing capacity for consent
- Pre-op assessment & intervention
- Pain management
- Delirium management
- Post-op assessment & intervention
Surgery
Surgery

Pre-Operative
- Mental Disorder
- State Anxiety/Distress

Post-Operative
- Acute Distress / Mental Health Condition
- Incident or Worsening of Mental Disorder
THE IMPACT OF MENTAL DISORDERS ON PERIOPERATIVE OUTCOMES: SYSTEMATIC REVIEWS

**Bariatric**
- 27 studies (focused primarily on depression + BED)
- Pre-operative mental health conditions prevalent
- Mixed findings w/no clear evidence of impact on weight loss

Dawes et al., 2016

**Coronary Artery Bypass**
- 7 studies on depression
- Increased risk for all cause mortality

Stenman et al., 2016

**Breast Cancer**
- 12 studies (primarily depression and anxiety)
- Largely inconclusive
- Anxiety linked with pain
- Distress linked to chronic pain

McCowat et al., 2019
The impact of mental disorders on perioperative outcomes: Systematic reviews on arthroplasty

**Shoulder**
- 6 studies focused on mental disorders (primarily depression)
  - Greater perioperative complications (e.g., delirium, anemia, LOS) and poorer functional recovery
  - Vajapey et al., 2019

**Total Knee**
- 7 studies focused on anxiety & depression
  - Poorer patient reported pain and functioning
  - Lungu et al., 2016

**Total Knee or Hip**
- 13 studies on mental well-being (anxiety, depression, fatigue, vigor, state mental health)
  - Significant for functional recovery for TKA but not hip
  - Bletterman et al., 2018
OBSERVATIONS

- Orthopedic surgeries most widely studied

- Preoperative mental health condition primarily examined = depression; mental health is variably and not often clearly defined

- Results dependent on outcome being evaluated
  - What about outcome oriented systematic reviews?

Dadgostar et al., 2017: Pre-operative depression on acute post-operative pain

- Sig heterogeneity = no meta-analysis
- 18 studies = 8 (1314 patients) significant effect on post-op pain; 10 (1226 patients) no effect
  - Differences do not relate to surgery type
## Trait versus State Anxiety / Distress

### State Anxiety
- Psychological and physiological transient reactions
- Dependent on both a person’s trait anxiety and situation
- The psychological state is directly linked to the stressor (e.g., anxiety related to surgery)

### Trait Anxiety
- Pervasive predisposition to react in many situations in a particular way (anxious way)
  - High trait anxiety → ↑ state anxiety across variable circumstances
- Cognitive and attentional biases
ASSESSMENT

• State Trait Anxiety Inventory most widely used

• Support for Amsterdam Preoperative Anxiety and Information Scale (Moerman, 1996)
  • Specific to surgery and anesthesia

• Pre-operative Intrusive Thoughts Inventory (PITI; Crockott et al., 2007)
  • Subscales: pre-occupation, outcome concerns, being unconscious, loss of control, dependence on others, and pain and discomfort

• Physiological measures utilized (e.g., BP and heart rate)

CORRELATES

Table 1. Risk factors for preoperative anxiety

- Female Sex
- Pre-existing psychiatric disorders
- Pre-existing medical conditions
- Uncertainty about procedure outcomes
- Loss of independence and privacy
- Fear of recovery and death
- History of smoking

WHY DOES PRE-OPERATIVE STATE ANXIETY/DISTRESS MATTER?

- Mavros et al., 2011 (systematic review): Do psychological variables affect early surgical recovery?
  - Yes!
  - 16 studies: 15/16 reported at least one adverse outcome related to pre-operative psychological variable
WHY DOES PRE-OPERATIVE STATE ANXIETY/DISTRESS MATTER?

Pre-op Distress /Anxiety

• Anesthetic complications including difficult induction and higher dosage
  • Persistent pain
  • Nausea, discomfort, fatigue
  • Rates of delirium
  • Length of stay
  • Psychological disorders including PTSD

Post-Op

e.g., Kil et al., 2012; Mejdahl et al., 2015; Mitchell, 2011; Montgomery & Bovbjerg, 2004; Wada et al., 2019; Fox et al., 2013; El-Gabalawy et al., 2019
WHY DOES PRE-OPERATIVE STATE ANXIETY/DISTRESS MATTER?

Pre-op Distress /Anxiety

• Physical functioning
• Quality of life
• Satisfaction

Post-Op

e.g., Utrillas-Compaired et al., 2014; Tirault et al., 2010
HOW COMPROMISED MENTAL HEALTH LEADS TO POOR OUTCOMES: CBT HEALTH MODEL

**Physiological**
- Tachycardia
- Hypertension
- Elevated temperature
- Heightened pain sensitivity
- Increased inflammation
- Increased cortisol
- HPA axis dysregulation
- Increased anesthetic requirements

**Cognitive**
- Attentional & confirmatory biases
- Catastrophizing
- Maladaptive appraisals & attributions

**Emotional**
- Avoidance of health information
- Absence of engagement in health promotion
- Poor adherence to medication regimen
- Increases in maladaptive health behaviours to cope
- Increase sedative prescriptions pre-op

**Poor Post-Operative Outcomes**
Surgery

Pre-Operative

Mental Disorder

Acute Distress

Post-Operative

Acute Distress / Mental Health Condition

Incident or Worsening of Mental Disorder
POST-OPERATIVE TRAUMATIC STRESS

- DSM-5 PTSD = Traumatic stressor (criterion A) →
  - intrusion
  - avoidance
  - negative alterations in cognition and mood
  - arousal/reactivity
- Lifetime prevalence = 6.1%; past-year prevalence = 4.7% (Goldstein et al., 2016)
- PTS sx in post-operative period = 20% (El-Gabalawy et al., 2019)

Concerning given that PTSD is associated with compromised health (El-Gabalawy et al., 2011; El-Gabalawy et al., 2014; El-Gabalawy et al. 2018) and several health risk behaviors (Bilevicius et al., 2018; Braun et al., 2019; Mota et al., 2019; Sommer et al., 2018)
WHAT IS “CRITERION A” IN THE CONTEXT OF SURGERY?

Criterion A (DSM-5) = “Exposure to actual or threatened death, serious injury or sexual violence”; “A life threatening illness or debilitating condition is not necessarily considered a traumatic event. Medical incidents that qualify as traumatic events involve sudden, catastrophic events”

(APA, 2013)

Illness-induced PTSD: 6.5% of PTSD cases are illness-induced (El-Gabalawy et al., 2018) & presentation may differ from traditional conceptualizations (Edmondson 2014; Sommer et al., 2018)

Surgery itself is a independent predictor of PTSD (Whitlock et al., 2015) & 2/3 of individuals post-operatively endorse surgery as most traumatic experience (Sommer, Jacobsohn, Deschamps, Saha, Avidan & El-Gabalawy, unpublished)

Anesthetic awareness most well studied predictor of PTSD (Osterman et al., 2001) and ICU & related complications predict PTS (Davydow et al., 2008)
RISK FACTORS FOR POST-OPERATIVE TRAUMATIC STRESS

El-Gabalawy et al. (2019). Canadian Journal of Anesthesia
WHAT ACUTE PERIOPERATIVE PSYCHOLOGICAL EXPERIENCES PREDICT PTS?

• Sub-sample of ENGAGES-CANADA (prospective mixed surgical cohort; n = 254)
• Participants completed baseline (pre-op) measures, measures at discharge, and 30 day follow-up

El-Gabalawy, Sommer, ENGAGES-CANADA et al., unpublished
PART 2

prevention
Surgery

Mental Disorder

Acute Distress

Incident or Worsening of Mental Disorder

Acute Distress / Mental Health Condition

INTERVENTION
Surgery

Mental Health Symptoms

?
PSYCHOLOGICAL INTERVENTIONS WORK: WHY IS EVIDENCE WEAK PRE-OPERATIVELY?

- 105 studies identified examining “psychological preparation” pre-op on short term post-op outcomes; patients aged 16+

- Pooling results: positive significant effects but low quality evidence
  - Heterogeneity in quality of intervention and implemented strategies unclear
  - Large variability in outcome measures
  - Large disparities in types of surgeries

**Conclusion:** Psychological preparation may be beneficial for particular outcomes but insufficient evidence and need for rigorous prospective trials

PRIMARY POST-OPERATIVE OUTCOMES: POWELL ET AL. 2016

- Pain Intensity
- Length of Stay
- Emotional (Affect)
- Behavioural (Functional) Recovery
Procedural information intervention: Information about the surgery

- Pain Intensity: 12
- Length of Stay: 19
- Emotional (Affect): 17
- Behavioural (Functional) Recovery: 0

Number of Studies
**Sensory information intervention:** Information about the experiential aspects of surgery

- **Pain Intensity:** 11 studies
- **Length of Stay:** 14 studies
- **Emotional (Affect):** 12 studies
- **Behavioural (Functional) Recovery:** 2 studies

*Number of Studies*
**Behavioural instruction intervention:** Teaching patients what to do to facilitate the procedure or recovery

- **Pain Intensity:** 21
- **Length of Stay:** 25
- **Emotional (Affect):** 13
- **Behavioural (Functional) Recovery:** 5

Number of Studies
**Cognitive interventions:** Aim to change maladaptive thinking (e.g., reframing)

- **Pain Intensity:** 6 studies
- **Length of Stay:** 9 studies
- **Emotional (Affect):** 5 studies
- **Behavioural (Functional) Recovery:** 3 studies

Number of Studies
Hypnosis: Hypnotic induction

- Pain Intensity: 0 studies
- Length of Stay: 1 study
- Emotional (Affect): 2 studies
- Behavioural (Functional) Recovery: 0 studies

Number of Studies
Emotion-focused interventions: enable the patient to identify, understand, and manage their feelings or emotions.
Relaxation interventions: Systematic instruction to reduce sympathetic arousal and reduce muscle tension
DOES PRE-OP MBSR IMPROVE POST-OP OUTCOMES IN TKA?

• Over 70,000 TKA surgeries performed annually in Canada costing the system >1 billion (CIHI, 2018)

• Discrepancy in poor outcomes (pain, dissatisfaction, functioning) in TKA compared to other arthroplasties

• Negative impact of psychological factors on post-op outcomes well established in arthroplasty (Khatib et al., 2015)

• Growing body of evidence supporting mental and physical benefits of MBSR (including chronic pain conditions)

Co-PI's: R El-Gabalawy & J Kornelsen
Co-Investigators: E Bohm, C Mackenzie, G Asmundson, H Macdonald
Personnel: E Bilevicius, J Sommer, R Roy, & G Logan
Funding: University of Manitoba Collaborative Research Grant
MBSR TRIAL

Randomization

MBSR
n = 26

TAU
n = 17

TKA Surgery

Baseline Measures
n = 22

6 week

Baseline Measures + Oxford Scale + Satisfaction
n = 20

6 month

Baseline Measures + Oxford Scale + Satisfaction
n = 20

1 year

Baseline Measures + Oxford Scale + Satisfaction
n = 13

Fatigue
Pain Interference
Pain Behaviour
Sleep Disturbance
Psychosocial Illness Impact
QOL
Anxiety
Depression
Pain Catastrophizing

MBSR
TKA PATIENTS ARE INTERESTED IN INTERVENTIONS

212 patients approached

113 declined (53%)
8 ineligible
91 randomized

43 participated
38 declined (42%)
10 other
<table>
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<tr>
<th>Demographic</th>
<th>MBSR</th>
<th>TAU</th>
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<tbody>
<tr>
<td>Sex</td>
<td>67.7% Female</td>
<td>80% Female</td>
</tr>
<tr>
<td>Age</td>
<td>66.9 Years</td>
<td>72.6 Years</td>
</tr>
<tr>
<td>Race</td>
<td>93.5% White</td>
<td>92.9% White</td>
</tr>
<tr>
<td>Marital Status</td>
<td>70% Married</td>
<td>66.7% Married</td>
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<tr>
<td>Education</td>
<td>66.7% College or Higher</td>
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<tr>
<td>Occupation</td>
<td>73.3% Retired</td>
<td>60% Retired</td>
</tr>
</tbody>
</table>
PRELIMINARY FINDINGS: PAIN RELATED OUTCOMES

Pain Interference

6 Months 1 Year

MBSR  TAU

Pain Catastrophizing

6 Months 1 Year

MBSR  TAU

PRE MBSR to PAC = non-significant

PRE MBSR to PAC

t = 3.057, mean diff = 6.57, p = 0.006
NON-BASELINE MEASURE RESULTS

Proportion of patients "very satisfied" with TKA

Oxford Functional Knee Score
MBSR TRIAL

Randomization

MBSR  n = 26

TKA Surgery

n = 10

1 hour qualitative interview

Reynolds, Sommer, Roy, Mackenzie, Kornelsen, & El-Gabalawy, in preparation
Impact of MBSR on Surgery Experiences

Facilitated Relaxation During Perioperative Period

Didn’t Impact Surgery

Mindfulness to Cope

Cope with Mobility Issues

Cope with Pain

Better Cope with Surgery Than Before

Increased Autonomy/ Confidence

Health Staff Noticed Impact

“I really believe its relaxed me. My mind and my body, and you know, psychologically as well… I always believed that the mind can fix you and this mindfulness did.”

“I think that this even gave me the courage to say I’m going to get out of this, I’m going to get better.”

 “…It kind of empowered me a bit, I guess, and made me feel like I could get through this. And I had the tools to do it.”

“I went for my checkup…and the doctor asked me to show him my flexibility and how well I was doing — well he was amazed.”

“It helped me so much and the doctor was even floored because your mind…you were concentrating on a focal point and you learn the technique and it got your mind a lot off the pain and onto something else.”

“Within a week and a half I gave up the painkillers that were prescribed…but I found that whenever there was almost a need for that, I used a meditative process.”

“When I was in the hospital, we got there that morning, I was really trying to calm myself down. It was scary…and the breathing I think really helped that.”

“I tried very hard to do that, I’m not sure if I was really successful. But at least there was that option to try and do that.”

“I really can’t honestly say that class really did a whole lot when you got home, because it’s just – it is what is, right.”

“Mindfulness to Cope

“Didn’t Impact Surgery

“I would go into my mindfulness and say “I will do this and I’ll be fine. I will deal with this and I will be fine.”

“I have no control, I was frozen…and I went into mindfulness. I was thinking of staying at the beach…listening to the waves…And I said it’s gonna pass; and then it did.”

“And I could do stuff that in my first surgery did not happen. So a positive attitude, mentally, and physically, it just all worked.”

“Mindfulness to Cope

“Cope with Mobility Issues

“Cope with Pain

“Health Staff Noticed Impact

“Increased Autonomy/ Confidence

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Dowsey et al. (2019)
• 45 to MBSR, 56 to TAU
• Measures: baseline, 3 and 12 months
• Significant improvements in pain and function at 12 months + global health
• 21.5% of intervention group withdrew from surgery following MBSR

Differences:
• Non–Canadian
• Patients with psychological distress
• Included both hip and knee
• Recruitment challenges
• No qualitative component
• 2 follow-ups instead of 3 and no pre-post assessment prior to surgery
PRE-OPERATIVE VIRTUAL REALITY

Awarded 2019 New Frontiers: $250,000 over 2 years
PI: El-Gabalawy
Co-I’s: Hebbard, Mutter, Mutch, Mota, Reynolds, Arora, Maples
Collaborators: Jacobsohn & Perrin
Student Involvement: Sommer & Grocott

Aim: To develop a novel preoperative immersive virtual reality platform for anxiety reduction among patients undergoing breast cancer surgery
How can we integrate education / information provision into a virtual reality platform?
If we can’t use real anesthetists/surgeons, why not use artificially intelligent avatar anesthetists/surgeons?

**Goals of platform:**

- Transport patient from holding area to OR (*exposure*)
- Prepare patient for induction (*exposure*)
- Patient can ask AI avatar questions about the environment or surgery (*education*)
Surgery
Hello,

I am one of the Nurse Clinicians with Anesthesia. I am based in the Pre-op Clinic and I am hoping you might be able to help us out.

Is there some sort of consensus regarding treatment considerations for patients with known PTSD pre, intra and post-op? I am finding a gap in the literature that I can access. I have also come across several patients in the past couple of weeks who have PTSD listed in their questionnaires and H&P's. Military service has been the commonality although we seem to be seeing an increase in the diagnosis in those outside of military personnel.

I am wondering if there is room for improvement in our care including specific pre-op questions about triggers, presentation of symptoms and preferred methods of re-orientation.

Historically, my practice was always to let patients know that they are safe when they are agitated in PARR as they wake up. Anecdotally that has been quite effective but that is hardly evidence-based and it would be great if we had an actual plan. Psych isn't my forte but are we doing all that we can?

Dr. Tamara Miller, our Site Lead for Anaesthesia and Peri-operative Medicine, agrees that we could use some input from the specialists. I also have a call out to the local Military Health Centre in an attempt to make contact with the DND's Surgical Program in Ottawa to see what their practice is. They likely have an advantage in that they will have access to more information about their patients than we get about ours.

Any guidance you can give us would be greatly appreciated. Thank you for your time.

• “I am finding a gap in the literature”
• “Come across several patients in the past couple of weeks who have PTSD….we seem to be seeing an increase in the diagnosis outside of military personnel”
• “Is there room for improvement in our care including specific pre-op questions about triggers, presentation of symptoms and preferred methods of re-orientation”
• “Are we doing all we can?”
TRAUMA (& MENTAL HEALTH) INFORMED PERIOPERATIVE MANAGEMENT

- Routine pre-operative screening
- Validation & empathy (“these feelings are understandable”)
- Accommodation (“how can I make your surgical experience easier?”) & shared decision making
- Appropriate referrals
- Communication
Patient awareness during critical medical events: communication is key

Renée El-Gabalawy, MA, PhD

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The following cases are based on real events with names changed and minor factual alterations to ensure patient privacy.

Case 1

Mary is a middle-aged patient who underwent an orthopedic procedure under spinal anesthesia. Mary’s level of consciousness during surgery was not discussed. surgery, the feeling of being unimportant, and fearing for her safety.

Case 2

John is a middle-aged patient who underwent emergency surgery related to gastrointestinal perforation. Afterwards, he went into septic shock and spent several weeks in the intensive care unit (ICU) where he experienced delirium.
HOW DO WE IMPROVE PATIENTS’ PERIOPERATIVE MENTAL HEALTH?

Patient

- Adaptive health behaviors
- Utilizing available supports

Provider

- Mental health informed care
- Enhancing communication

Public Health

- Mental health funding for research and practice

System

- Integration of mental health professionals in surgical areas
- Development of multidisciplinary teams across surgical areas
- Policies that directly or indirectly impact perioperative mental health (e.g., reducing wait times)
ACKNOWLEDGEMENTS

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  • Lab members: Jordana Sommer, Caitlin Blaney, Rachel Roy, Bronwen Grocott, Gagan Gill, Gabrielle Logan, Kayla Kilborn, Alicia Ling, Greg Wills

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  • University of Manitoba Collaborative Research Program
  • CIHR
  • New Frontiers in Research Fund
  • HSC Foundation
  • Department of Anesthesia Oversight Committee

• Collaborators & Mentors

Some members of the HATLab

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