Combating multiple levels of suffering: Sociocultural and social neuroscientific approaches to pain disparities

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Overview

• Background
  – The problem of pain
  – Disparities in pain

• Definition of diversity science (of pain disparities)

• Examples from our work

• Future Directions
The Problem of Pain

Population Health

CDC 2012; IOM 2011; IPRCC 2015

Individual Quality of Life

What's my pain level?
I only have two types of pain: tolerable or intolerable.

Pain Prevalence

Million Americans

Chronic Pain
Diabetes
CHD
Stroke
Cancer

Pain Cost

Billion Dollars

Chronic Pain
Diabetes
CHD
Cancer

Disability

Causes of Disability(%)
Pain Disparities

Pain Treatment/Management

Disparities in Pain Care

Bias in Pain Treatment

Across the lifespan and regardless of socioeconomic status, blacks are less likely than whites to receive analgesic medication for pain. Primary care providers are more likely to underestimate pain intensity in blacks than in other sociodemographic groups.

Compared with white patients, black patients were more likely to have:
- more referrals for substance abuse assessment
- fewer referrals to a pain specialist
- increased drug urine tests

Socioeconomic Status

People with incomes below poverty level are more likely to report pain.

During ER visits, opioids were prescribed more frequently to patients with the highest socioeconomic status.

Access to Care

Pharmacies located in minority neighborhoods are less likely to carry sufficient prescription analgesics than those located in white neighborhoods.

Impoverished individuals and minorities are more likely to be uninsured or underinsured than non-minorities and people with greater incomes.

Reduced access to health care in general, and specialty care in particular, contributes to pain disparities, with racial and ethnic minorities and the poor having decreased access to care.

Physiological Pain Sensitivity

Pain Threshold Tolerance

- White
- Hispanic
- Black

C. Campbell combined databases (figure); meta-analyses: Rahim-Williams et al., 2012; Kim et al., 2017

IPRCC 2015; NPC/NINDS; Campbell & Edwards, 2012
Why disparities?

Pain Treatment/Management

Physiological Pain Sensitivity

the drug seeking patient
Diversity Science | Pain Disparities

• Pain disparities are not “natural” (genetic/biological)
  – lived experiences, historical beliefs, systematic bias, and systemic barriers

• Or “neutral”
  – multiple and multifaceted manifestations

• Sources work to reinforce one another
  – pain facilitation

• psychological and physiological pain processes

“…Significant social distinctions…are not simply natural, neutral, or abstract. Instead they are created and recreated in the process of everyday social interactions that are grounded in historically derived ideas and beliefs about difference and in a set of practices and institutions that reflect these ideas and beliefs and that therefore shape psychological experience and behavior.”
– Plaut, 2010
How do we measure pain?

• **Self-report**
  – Subjective experience of pain
    • Individual differences
  – Subject to perceiver/clinician interpretation
    • Vulnerable to the affects of bias (Tait & Chibnall, 1997; van Ryn & Burke, 2000)

  
  0 1 2 3 4 5 6 7 8 9 10
  No Pain  Worst Pain
  Imaginable

• **Psychophysical Pain Testing / Quantitative Sensory Testing**
  – Standardized stimuli in the laboratory
    • Control nociceptive input
    • Allows for the study of individual differences
  – Dynamic and static pain paradigms
    • Pain sensitivity, sensitization, modulation
Psychophysical Pain Testing

Thermal Pain Threshold and Intensity

Mechanical Temporal Summation/Sensitization
How do we measure pain?

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• Pain Neuroimaging
  – Brain mechanisms underlying pain
  – Brain changes as a consequence of pain
• Explicit stereotypes/heuristics
• Implicit biases
• Mistrust/Suspicion
• ...
• Self report and static pain ratings & Lifetime racial discrimination
  – Self reported back pain frequency in middle aged African Americans (Edwards, 2008)
  – Self reported bodily pain in African American veterans (Burgess et al., 2009)
  – Heat pain tolerance in African American (not White) patients with knee OA (Goodin et al., 2013)

  – Static pain ratings in healthy African American (not White) volunteers (Mathur et al., unpublished data)
Social/contextual modulation of pain

- Perceived similarity, interpersonal trust
  - Heat pain ratings (Losin et al., 2017)

- Also empathic brain response (Mathur et al., 2010 & 2012)
CNS response to pain is associated with social exclusion

- Frequency of lifetime experiences of ostracism (Carter, Nanavaty, Carter-Sowell, Mathur, unpublished)
- Acute experience of ostracism (Carter, Nanavaty, Carter-Sowell, Mathur, unpublished)
Pain disparities in cortical processing

• Neuroimaging of racial disparities in CNS response
  – African American, relative to White American participants
    • enhanced MCC, ACC, R pINS, and R DLPFC activations during pain
Social/contextual modulation of pain

- CNS response to pain is associated with social experiences
  - Lifetime experiences of discrimination

- Positive correlation, whole sample
- Negative correlation, whole sample
- Negative correlation, African American ps

Mathur et al., in prep
Diversity Science | Pain Disparities

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57% of African Americans said discrimination happens “often” or “very often” in interactions with White physicians (Malat & Hamilton, 2006)

- Salient to patients
- \( \Rightarrow \downarrow \) in patient-physician relationships and patient health
- May influence pain?
Discrimination in Clinical Contexts

• Sickle Cell Disease

• Severe episodic and chronic pain
  – High levels of daily pain
  – Preference for home management
  – Under-treatment of pain
  – Frequent interaction with the health care system

• Discrimination
  – Poor interpersonal treatment in most health care settings

Smith et al., 2008; Brousseau et al., 2010; Maxwell et al., 1999
Discrimination in Clinical Contexts

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• Discrimination
  – Poor interpersonal treatment in most health care settings
  – “Difficult patient” stigma → biased discriminatory treatment
  – Despite broad impact across ethnicities and nationalities, In the US largely associated with African Americans
    • Many patients and providers believe that race affects treatment and pain management
  – Patients often perceived as drug-seeking as addicts
    • Severe undermanaged pain → behaviors that are misperceived as being characteristic of drug-abuse

Smith et al., 2008; Brousseau et al., 2010; Maxwell et al., 1999; Bediako et al., 2007; Nelson & Hackman, 2013; Elander et al., 2003 & 2006
Discrimination from Health Care Providers and Pain in Sickle Cell Disease

Mathur et al., 2016, *Clinical Journal of Pain*
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– Plaut, 2010
• Racial biases in treatment recommendations (reviews: Campbell & Edwards, 2012; IPRCC 2015)

• Likely contributors to disparities in pain management
  – Explicit beliefs, stereotypes, heuristics
    o “Drug seeking” (Burgess et al., 2006; Elander et al., 2006)
    o Perceived hardship & resilience to pain (Hoffman & Trawalter, 2016; Hoffman et al., 2016)
  – Implicit biases
    o General implicit bias (IAT) among clinicians (Green et al., 2007; Sabin et al., 2009)
    o Subjective nature of pain (Balsa & McGuire, 2003; Dovidio & Fiske, 2012)
    o Pain-specific implicit biases?
Implicit biases in pain perception

Mathur et al., 2014, *Journal of Pain*
Racial Group Membership and Pain Perception

Mathur et al., 2014, Journal of Pain
Cody is a sophomore at Texas A&M. He has pain in his lower back. He tells you that he thinks he hurt it lifting a heavy cooler earlier that day. He seems to be otherwise healthy, but tells you on a scale from 0 to 10, he would rate his pain an 8.

How much pain do you think Cody is in?

Jesus is a sophomore at Texas A&M. He has pain in his lower back. He tells you that he thinks he hurt it lifting a heavy cooler earlier that day. He seems to be otherwise healthy, but tells you on a scale from 0 to 10, he would rate his pain an 8.

How much pain do you think Jesus is in?
Racial Group Membership and Pain Perception

Mathur et al., in prep

Stimuli adapted from Avenanti et al., 2010
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Future Directions

• Big Dreams
  – ↓ suffering
    • Individual suffering in context
  – Structural
    • Hospital System, Medical Model
  – Upstream causes/contexts
    • Inequality in lived conditions
      – e.g., structural barriers & harms/violence, deprivation, exclusion, poverty, safety, investment, opportunity
  – Change our questions
    • Dominant frameworks, structures, perspectives, assumptions
Future Directions

• Big Dreams

• Closer at Hand (current & next steps)
  – Expanding definition of pain
    • Context (historical, personal experience, real-time interactions)
      – → physiology/biology of pain
      – → provision of pain treatment
    • “Objectivity”
  – Patient-provider relationship
  – Interventions to empower patients suffering from multiple levels of pain
  – Resilience
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  - https://psychology.tamu.edu/diversity-science/