



Concerns Shared by Individuals with Concussion:

A Mixed Methods Analysis of the
Concussion Subreddit

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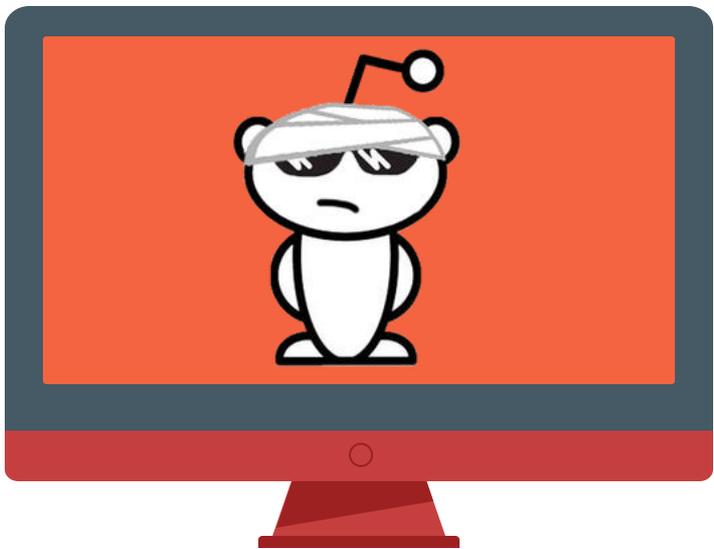
ICCDC Quarterly Meeting 01/28/2022



I suffered a concussion Saturday...

Went to the ER later. EKG, blood tests, CT, and it was ruled a mild concussion and I was discharged with instructions to follow up with my pcp and the concussion clinic in town (who i found out can't take me because medicaid).

I went to see my pcp 2 days later, like the ER told me to. Reported worst headache of my life, dizziness, vertigo, confusion, tinnitus you guys know how it goes. She made it seem like it was ridiculous that I was even there, or that the ER wanted me to follow up with the concussion clinic, because **this is my first bad concussion, and I'm not an athlete.**



01

Introduction

Concussion Facts

- About 1.6 to 3.8 million *sports and recreation-related* concussions occur in the United States (Centers for Disease Control and Prevention., 2007)
- Higher actual incidence (Taylor et al., 2017)
 - **Non-sports injuries:** falls and hits to the head
 - Those did not seek medical care at the time of injury
- **More non-sports injuries** in adults and children (Beck et al., 2019; Patel & Ahmed, 2020), but less research and support

Education in Concussion Prevention & Recovery

+ Timely and tailored education about concussion (Mittenberg et al., 1996)

| Low awareness
of risk behavior

| Lack of
information
about expected
symptomatology
and resolution

| Confusion over
facilitators
during recovery
(Snell et al., 2020)

Study Purposes

To describe
Risk Factors for
non-sports
concussion

To characterize
concerns and
experiences among
concussion
subgroups

To understand *Care-*
Seeking Behaviors
after injury



02 Methods

Study Design

Mixed Method Design (N=1975)

Quantitative: Natural Language Processing
+
Qualitative: Content Analysis

Data Source

Title and body of posts created between 12/16/2013 and 7/27/2020 were extracted from the “r/concussion” subreddit

Exclusion Criteria

- Did not include any text in the body of the post (e.g., memes, images)
- Only shared technical information (e.g., research advisement)
- Discussed moderate to severe traumatic brain injuries or other neurological disorders

Natural Language Processing

Sentiment Analysis

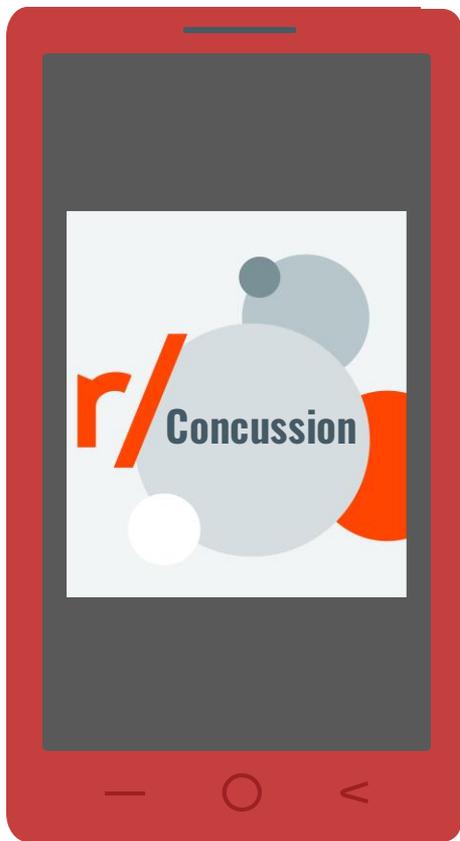
- Valence Aware Dictionary and sEntiment Reasoner (VADER)
- Compound score
 - $\geq .05$ Positive
 - $\leq -.05$ Negative
 - $-0.05 \sim 0.05$ Neutral

Topic Modeling

- Latent Dirichlet Allocation (LDA) models (Blei et al., 2003)
- Number of topics
- Coherencescore

Qualitative Content Analysis

- Subgroup comparison
 - Acute (within one month) vs. Chronic (over one month)
 - First vs. Multiple Concussions
- Care-Seeking experiences



03 Results

User Profile

Gender



29%



71%



Age

10-19



20-29



30-39



Injury Mechanism

Hit to head



Fall



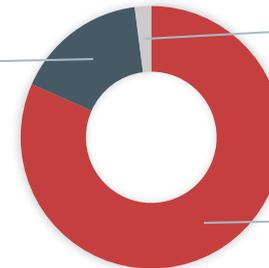
Other

(Motor Vehicle Accident, Assault, etc.)



Injury Place

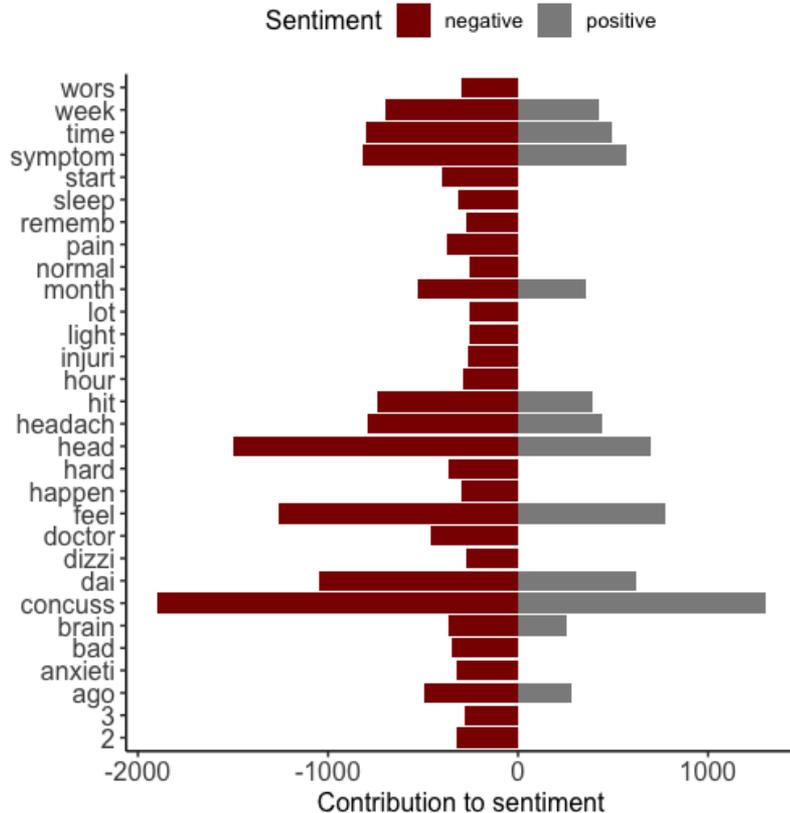
Gym
16%



Workplace
2%

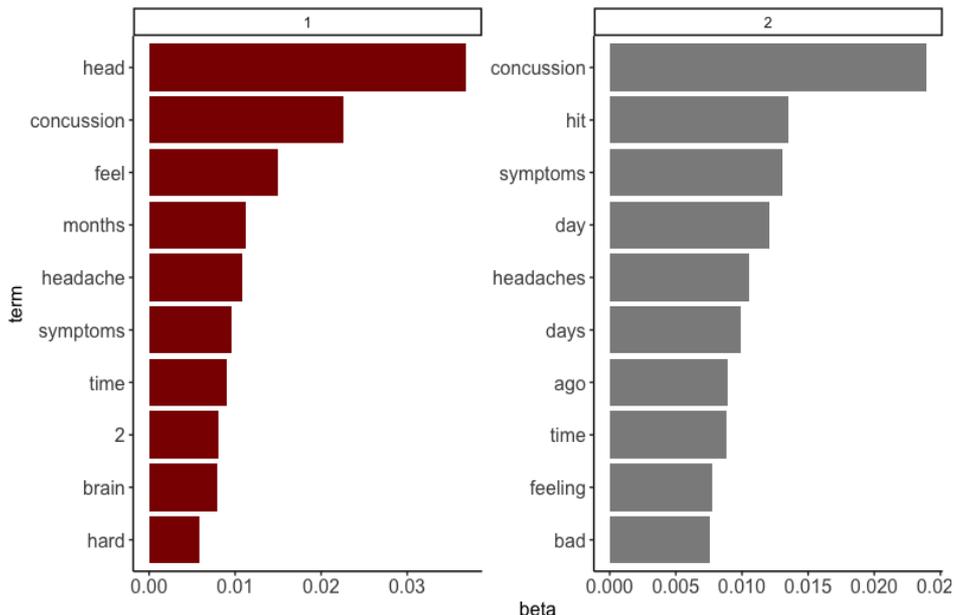
Home
82%

Sentiment Analysis



Shared Words	<ul style="list-style-type: none"> • Concussion, Brain, Head • Time related words: week, day, hour
Unique to Negative posts	<ul style="list-style-type: none"> • Symptoms: sleep, remember, dizzy, pain, light • Feeling: bad, anxiety • Doctor

Topic Modeling



Understanding Symptoms

“ I’m over 3 months since my concussion and still dealing with various symptoms... massively sensitive to sound now...I can't speak to anyone as their voice and my own is so loud... I feel even more dizzy than before. Has anyone else experienced this and if so how long did it last for?”

Managing Recovery

“ I was wondering if anyone on here has had experience with using psychedelics as a treatment for post concussion syndrome.”

Summary of Themes

Meta-themes	Subordinate Themes
Understanding Symptom	Suspected Concussion
	Persistent symptoms or overattributing
	Cumulative effects and potential late effects of concussion
Managing Recovery	Symptom management
	Recovery process
	Return-to-life and productivity
	Care-Seeking

Acute vs. Chronic Stage

Subordinate Themes	Acute	Chronic
Suspected concussion	<input checked="" type="checkbox"/>	
Persistent symptoms		<input checked="" type="checkbox"/>
Cumulative effects and potential late effects of concussion		<input checked="" type="checkbox"/>
Symptom management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Recovery process	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Return-to-life and productivity		<input checked="" type="checkbox"/>
Care-seeking	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

First vs. Multiple Concussion

Subordinate Themes	First	Multiple
Suspected Concussion	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Persistent symptoms or overattributing		<input checked="" type="checkbox"/>
Cumulative effects and potential late effects of concussion		<input checked="" type="checkbox"/>
Symptom management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Recovery process	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Return-to-life and productivity		<input checked="" type="checkbox"/>
Care-Seeking	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Care-Seeking

New/Acute

“Knocked in jaw by mom. Should I go to the clinic or emergency?”

Chronic

“If I go back to my doctor and bring up the issues I'm having (mood issues, dizziness, headaches, etc) is there much they can do?”

Multiple

“Is there more I should be doing to advocate for or access specialized treatment?... Most of the people in my physio program don't have the history I do.”

Care-Seeking

Treatment Provider

Doctor

Chiropractor

Neurologist

Physiotherapist

Occupational therapist

Psychiatrist

Common Treatment

Treatment that target specific symptoms,
such as headache

Vision therapy

Vestibular rehab

Physical rehab

Mental therapy

Acupuncture

Care-Seeking

- General concerns of care seeking experiences
 - High cost
 - Neuroimaging and neuropsychological tests
 - Only diagnosis but no treatment
 - Little guidance on symptom management or recovery process
- Care wanted:
 - Neurology referral, doctor specializing in non-sport concussion



04 Discussion

Implications

Reduce
environmental
risks and
behaviors

Educational
needs shift post-
concussion

Consistent
follow-up of
medical care
and education

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