

Racial Disparities in Patient Perspectives Surrounding Epidural Anesthesia in Labor: A Sentiment Analysis of X (formerly Twitter) Tweets Using Artificial Intelligence (ChatGPT)

Shawn Ohazuruike¹, Kiana Cruz¹, Michael Block², MD, Mark Schlesinger, MD Antonia F. Oladipo³, MD, MSCI

1. Hackensack Meridian School of Medicine 2. Hackensack University Medical Center, Department of Anesthesia, 3. Hackensack University Medical Center, Department of Obstetrics and Gynecology,

BACKGROUND

- Women of color are more likely to die in childbirth compared to other racial groups. the maternal mortality rate for non-Hispanic Black women is 69.9 deaths per 100,000 live births, compared to 26.6 deaths per 100,000 live births for non-Hispanic White women.
- Research shows that social media significantly influences medical opinions and health decisions, impacting areas from medication choices to vaccine perceptions with 84% of adults aged 18 to 29 report using social media.
- The perception and sentiments of pain in childbirth is heavily influenced by social media.

OBJECTIVE

This study aims to characterize the perspectives on epidural anesthesia in labor among X tweets, with a focus on how sentiment varies by user race.

METHODS

ChatGPT assessed 500 English- language tweets from 10/20/2023 to 12/31/2023 containing keywords 'labor' & 'epidural' for emotional content utilizing a likert scale and an emotion classification model.

The query was used:

“For each individual tweet, provide a Emotional polarity score based on their experience with epidurals in labor from 1 to 10 (1 being the post negative experience and 10 being the most positive experience)” For each tweet provide three emotions associated with each tweet.”

METHODS/RESULTS

Data Collection

Searched for tweets containing “epidural” and “labor” from 1/1/2023 to 12/31/2023.

Analyzed the first 500 tweets in reverse chronological order.

Data Categorization

Classified tweets by Creator Type: Mothers/Expectant Mothers, Healthcare Professionals, Advocates/Educators, Entertainment/Humor.

Further categorized by Post Type: Personal Experiences, Pregnancy Journey Updates, Memes/Humor, Advocacy/Awareness.

Recorded user race as White or Non-White based on profile photos.

Sentiment Analysis

Used ChatGPT to score each tweet’s emotional sentiment (1-10 Likert scale) and identify three associated emotions.

Statistical Analysis

Calculated mean polarity scores.

Compared groups (Creator Type, Race) with Kruskal-Wallis and Wilcoxon tests.

Used Chi-Squared Tests to examine tweet type by race association.

Table 1: Example Tweets with corresponding Likert Polarity Score and Associated Emotions according to ChatGPT

Tweet	Likert Polarity Score	Emotion
“I was in labor for 21 hours with my daughter and 18 with my son. I almost passed out from exhaustion with both of them. I got the epidural when I was at an 8 with both of them and it was because I just wanted to sleep, I was crying because I was so tired from just the pain.”	3	exhausted, sleep deprived, overwhelmed
“Going through labor. My first caused labor pains so painful, I couldn't get a word in until I got an epidural. Second not so bad and the third.. we'll see!”	4	challenging, hopeful, ambiguous
“I really gave birth without an epidural after being in labor from Thursday to Sunday...I was really wild for that.”	7	Bold, adventurous, confident

Table 2: Distribution of Likert Polarity Scores

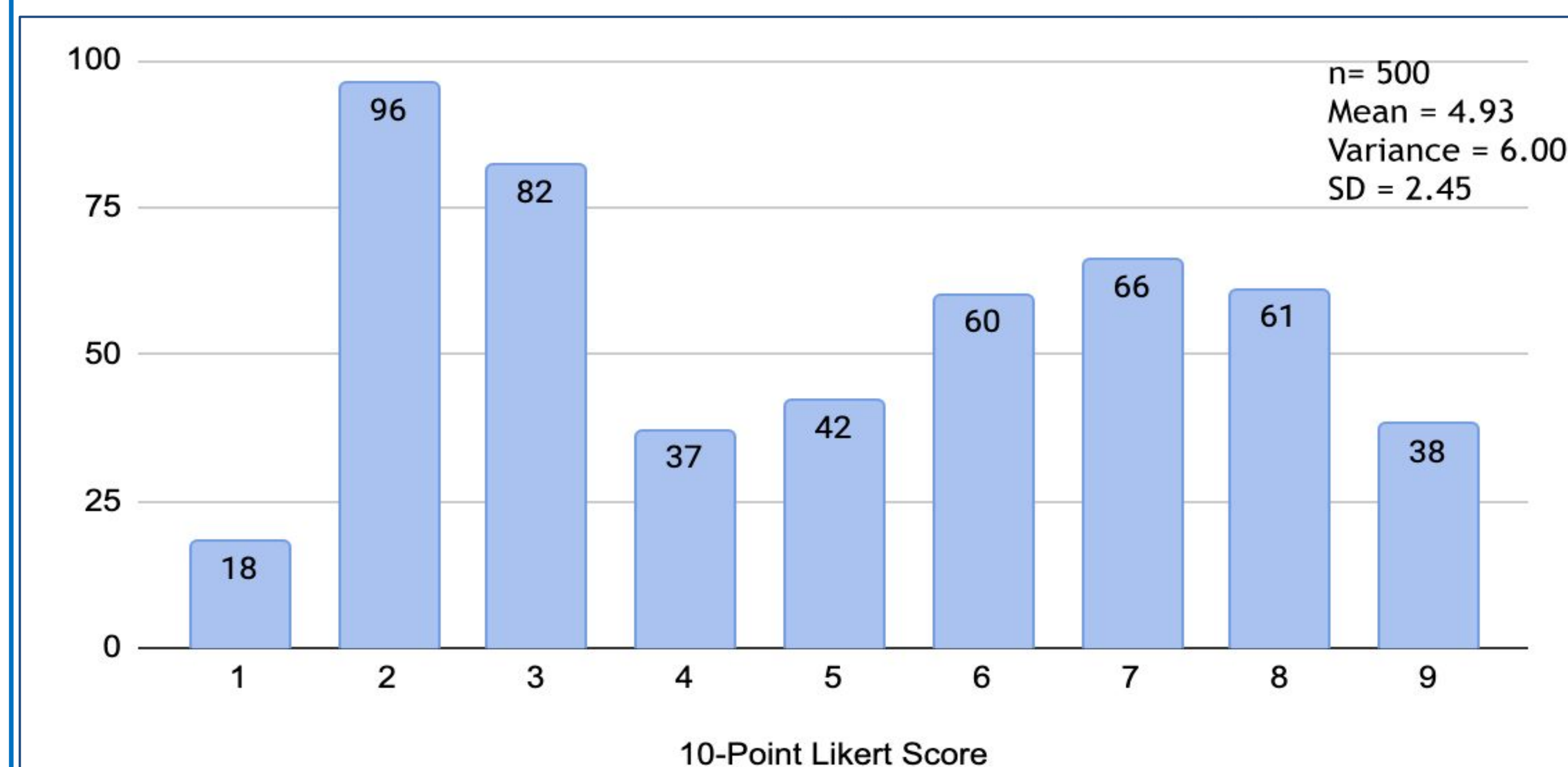


Table 3: Comparison of Likert scores between non-White and White

Characteristic	Overall, N=382 (100%)	Non-White, N=166 (43%)	White, N=216 (57%)	p-value
Likert.Polarity.Score.num				0.93 ¹
Mean (SD)	4.92 (2.44)	4.96 (2.46)	4.89 (2.42)	
Median (IQR)	5.00 (4.00)	5.00 (4.00)	4.00 (4.00)	
Minimum-Maximum	1.00-9.00	1.00-9.00	1.00-9.00	

¹ Wilcoxon rank sum test

Analysis of Association between type of tweets (positive/negative) and race (white/ non-white)

Positive tweets with overtly positive emotions occurred more often in white population, 54% (135 out of 252) than in non-white population 26% (58 out of 220) (Chi-squared test: $\chi^2(df=1) = 35.974$, $p<0.0001$)

CONCLUSIONS

- Likert polarity scores for sentiment towards epidurals show no significant difference between White and non-White users (White: 4.89, non-White: 4.96).
- A significant difference exists in the proportion of positive tweets between White and non-White users. White users posted positive tweets more frequently (54%) compared to non-White users (26%).
- When looking specifically within creator groups, advocates and educators posted largely negative tweets. This comes in contrast with both healthcare professionals and expectant mothers/mothers experiences who were more likely to describe positive experiences associated with relief. ($p<0.01$)

DISCUSSION

- Despite similar average scores, the White group has a higher proportion of tweets that are clearly positive (over half of their tweets).
- Providers must provide culturally competent care in order to address the differences in sentiment between expectant mothers in white vs non white populations
- It is imperative that healthcare providers understand the current public perception in order to impact patient approach surrounding labor pain management.
- AI tools such as ChatGPT increase efficiency of Tweet characterization.