**Background:**

With the rise of technological use in recent years, it has been easier for anyone to communicate their emotions and opinions regarding hot topics like COVID-19 on prominent social media sites like Twitter.

**Objective:**

The two goals of this study were to identify and analyse significant themes and topics related to vaccination-related tweets made by individuals , as well as to analyze trends in the emotions of the tweets from various themes and topics on a weekly basis.

**Methods:**

We conducted a study from April 25 to July 14, 2021, in which we looked for relevant trends in tweet subjects and sentiment scores, drawing on a number of studies studying COVID-19 vaccination-related tweets in English. We used data from a publicly accessible COVID-19 twitter data collection to create a data set comprising 17 million English-language COVID-19-related tweets written by individuals. We used guided latent Dirichlet allocation (LDA) to infer themes and topics underlying the tweets, then VADER (Valence Aware Dictionary and sEntiment Reasoner) sentiment analysis and BERT to compute sentiment scores and investigate weekly patterns (Bidirectional Encoder Representations from Transformers).

**Results:**

Topic modeling employing text mining produced ten topics, six of which were related to COVID-19 vaccination and four of which were related to the COVID-19 pandemic and sickness. 1158319 (23.19 percent) of the 4,995,569 tweets examined were about people encouraging people to get vaccinated, 728,480 (14.58 percent) were about geography and politics, 684829 (13.71 percent) were about the pandemic, 467408 (9.36 percent) were about healthcare workers, 460428 (9.22 percent) were about healthcare workers, and 436111 (873 percent) were about COVID-19 side effects. Average compound sentiment scores were found to be negative throughout the examined time period for the topics of spread and growth of cases, symptoms, racism, source of the outbreak, and political impact of COVID-19. In contrast, we saw a reversal of sentiments from negative to positive for prevention, impact on the economy and markets, government response, impact on the health care industry, and treatment and recovery. If we look at the proportion of tweets across, the sentiment of joy has the highest proportion. It could be due to the fact that vaccines were recently introduced and people across the world started getting positive hopes. This is also evident from the average sentiment across the weeks.

**Conclusion:**

Recognizing the trends in the emotions of the individuals pertaining to various topics related to the COVID-19 pandemic and vaccination might aid significant decision makers like the government and crucial organizations in understanding the emotions and opinions of the individuals in terms of getting vaccinated.