

# EXPLORATORY ANALYSIS OF SENTIMENTS OF PATIENTS UNDERGOING CHRONIC COUGH TREATMENT

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## ABSTRACT

Chronic cough is not only one of the leading causes of seeking healthcare all over the world but also a huge emotional drain on the affected patient population. In this study, we used 24-hour cough recordings to analyze the intervening conversations for sentiment analyses to better diagnose, guide, and manage treatment in such patients. After IRB approval, we surveyed a cough clinic and randomly selected four subjects from the MACS-1 & 2 trials (NCT05110144, NCT05120934) with active cough complaints using relevant ICD-10 codes. Subjects were given and instructed to wear a device to record cough for 24 hours and the recordings were collected at weeks 0, 4, 8, and 12 of the treatment. The collected data was preprocessed to eliminate sections with no data (sleep, silence) and the number of coughs was counted. Google search API calls were used to transcribe the audio files and NLTK's VADER analyzer was used to classify sentiments on a scale of 0 to 1. Finally, average scores were calculated and plotted over a graph to interpret any trends. 12 weeks of cough treatment had varied results on the four subjects. We categorized the exhibited sentiments into negative, neutral, positive, and compound and noted that they also showed no general trends. Among these, the compound sentiment displayed the most erratic patterns, and the obtained results could not generate a steady trend. Further studies are required with a large cohort to collect data over a longer duration to accurately analyze the sentiments associated with chronic cough.

**Keywords**—Natural Language Toolkit (NLTK), sentiment analysis, Valence Aware Dictionary, and sentiment Reasoner (VADER), chronic cough

## INTRODUCTION

Cough is an integral part of our essential defense mechanisms [1], but chronic cough (cough > 8 weeks) is responsible for impairing the quality of life and increasing morbidity in the general population [2]. Earlier, the cough was presumed to be a symptom rather than a disease occurring due to various underlying pathologies such as asthma, gastroesophageal reflux disease, or rhinitis [3] but now, it is believed to be a syndrome with its own pathophysiology characterized by neuronal hypersensitivity, central or peripheral sensitization, and paradoxical vocal fold movement that affects 10-12% of the population. [4,5,7] A study done by Meltzer et al showed a 5% prevalence of chronic cough in the United States with a higher prevalence in women [6].

Each cough occurs due to the stimulation of a complex reflex arc that can be triggered by a physical (touch) or chemical (heat/cold) stimulus. The initial approach to a patient with chronic