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Biography

Syed Ghazi Abbas, is a pre-dental researcher based in the UK, admitted to Dentistry at the Sze-ged University, commencing Sept.2026. His research sits at the intersection of dentistry, psychiatry, and AI; a niche developed in close collaboration with a Consultant Psychiatrist. His work on dental anxiety in children and culmination in the clinical framework (Screen–Match–Review pathway), earned third prize at the BPPA Conference and was accepted for oral presentation at EPA Annual Congress 2026 in Prague.

The Invisible Patient: How AI Misreads Neurodivergent Dental Communication and What This Means for Oral Health Equity

Abstract:

NLP sentiment analysis tools are increasingly deployed in dental settings for patient triage, feedback analysis, and clinical risk monitoring. Trained predominantly on neurotypical communication corpora, these tools may systematically misclassify the literal, concrete language characteristic of neurodivergent patients. No study has examined whether this bias operates in dental patient communication specifically. Twenty matched sentence pairs were constructed describing identical dental experiences across two registers. The neurodivergent register used literal, factual language with minimal hedging; the neurotypical register described the same experiences using emotional framing and evaluative commentary. Scenarios included routine checkup, local anaesthetic, tooth extraction, brace fitting, post-operative pain, and dental anxiety. Each pair was processed through four tools: VADER (rule-based), TextBlob (pattern-based), AFINN (lexicon-based), and Google Cloud Natural Language API (neural network). All four tools showed consistent directional bias: neurotypical dental communication received higher sentiment scores than neurodivergent communication describing identical experiences. The neural network tool showed the strongest directional consistency. Pairs describing dental anxiety and post-operative pain showed the largest divergence, with the neurodivergent register scored as neutral or negative despite communicating compliance and completed clinical interaction. NLP tools systematically misclassify dental patient communication when expressed in a neurodivergent register. Neurodivergent patients, who already face disproportionate barriers to dental care, risk further disadvantage from AI systems that classify their engagement as disengaged and their distress as absent. We propose behavioural validity as a mandatory evaluation criterion for any NLP tool in oral health settings: the capacity to interpret communication reliably across neurodivergent and neurotypical registers.