Assessing AI in Pediatric Dentistry: Accuracy and Parents' Perceptions of ChatGPT for Oral Health Guidance

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INTRODUCTION

- While artificial intelligence (AI) chatbots present both challenges and benefits in scientific fields, to our knowledge, no previous studies have examined the accuracy and potential of ChatGPT as an educational and anticipatory guidance tool in pediatric dentistry.

Purposes of this study:
- **To evaluate ChatGPT's accuracy in providing accurate oral health information aligned with the 2024 AAPD *Reference Manual***
- **To assess its perceived effectiveness in anticipatory guidance and improving parents' understanding of proper oral health practices for their children**

STUDY DESIGN AND METHODS

Hypothesis:
1. ChatGPT provides accurate information on pediatric oral health topics, including perinatal and infant oral care, fluoride, caries, oral habits, dietary recommendations, and trauma, in alignment with *AAPD 2024 Reference Manual*.
2. ChatGPT improves parents' understanding of pediatric oral health concepts through effective anticipatory guidance.

Phase 1: Accuracy Evaluation
- 31 true/false questions created using the 2024 AAPD Reference Manual as the gold standard
- Researcher 1 selected guidelines, developed questions with both straightforward statements and intentional inaccuracies, and entered them into ChatGPT-4o.
- Researcher 2 replicated the process for validation.

Phase 2: Parental Perceived Usefulness Survey
- 27 parents of children (ages 6 months-12 years) at the UTHSCSA Graduate Pediatric Dental Clinic completed an 11-item Likert scale questionnaire before and after using ChatGPT-4o for their children's dental-related questions.
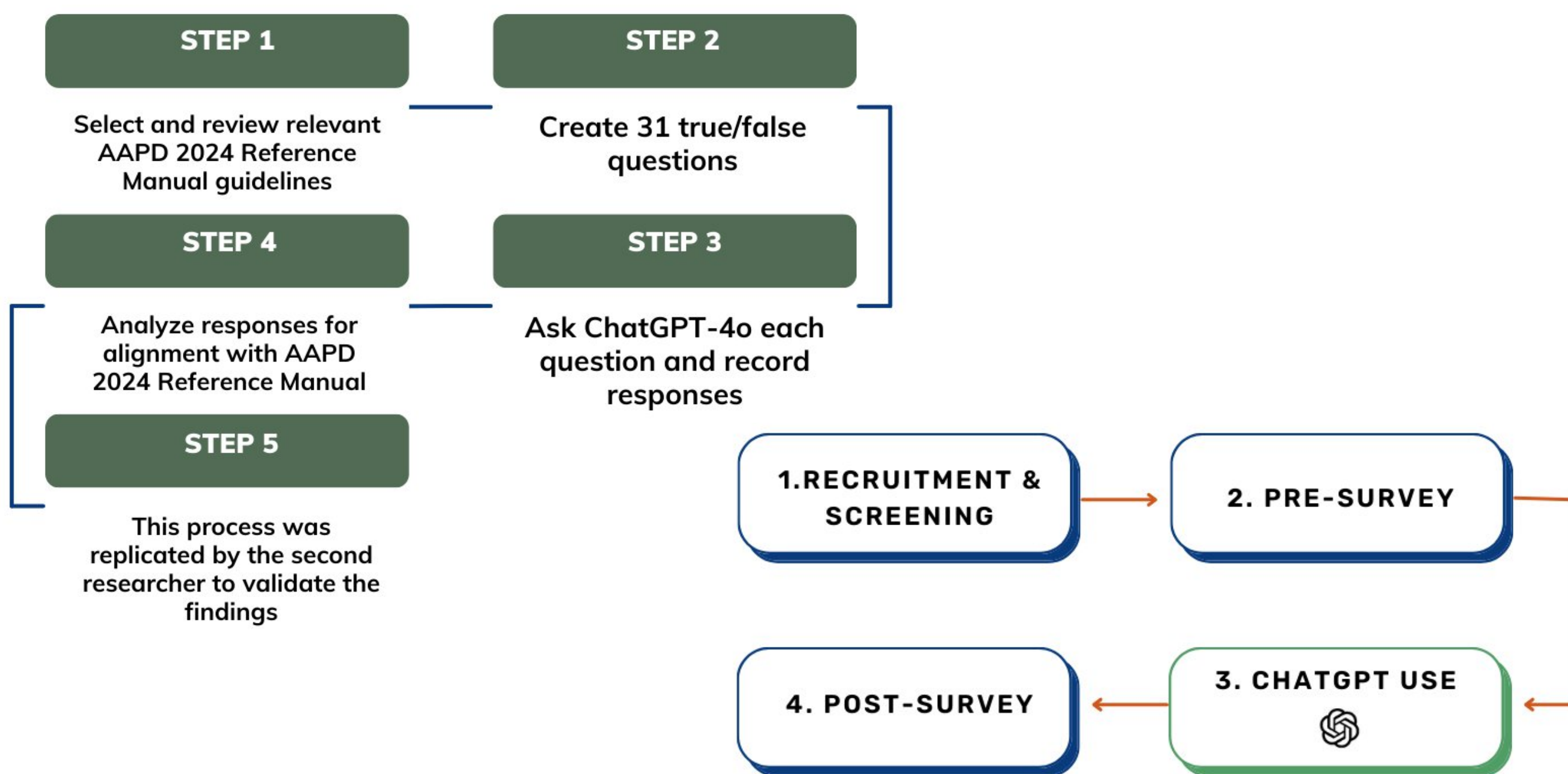
STEP 1
Select and review relevant AAPD 2024 Reference Manual guidelines

STEP 2
Create 31 true/false questions

STEP 3
Ask ChatGPT-4o each question and record responses

STEP 4
Analyze responses for alignment with AAPD 2024 Reference Manual

STEP 5
This process was replicated by the second researcher to validate the findings

1. RECRUITMENT & SCREENING → 2. PRE-SURVEY → 3. CHATGPT USE → 4. POST-SURVEY

Figure 1: Study Procedures for Phase 1 and 2

RESULTS

Phase 1: ChatGPT achieved a 100% accurate rate in responding to all 31 questions across various pediatric dental topics including perinatal and infant oral health care, fluoride, caries, oral habits, dietary recommendations, and trauma.
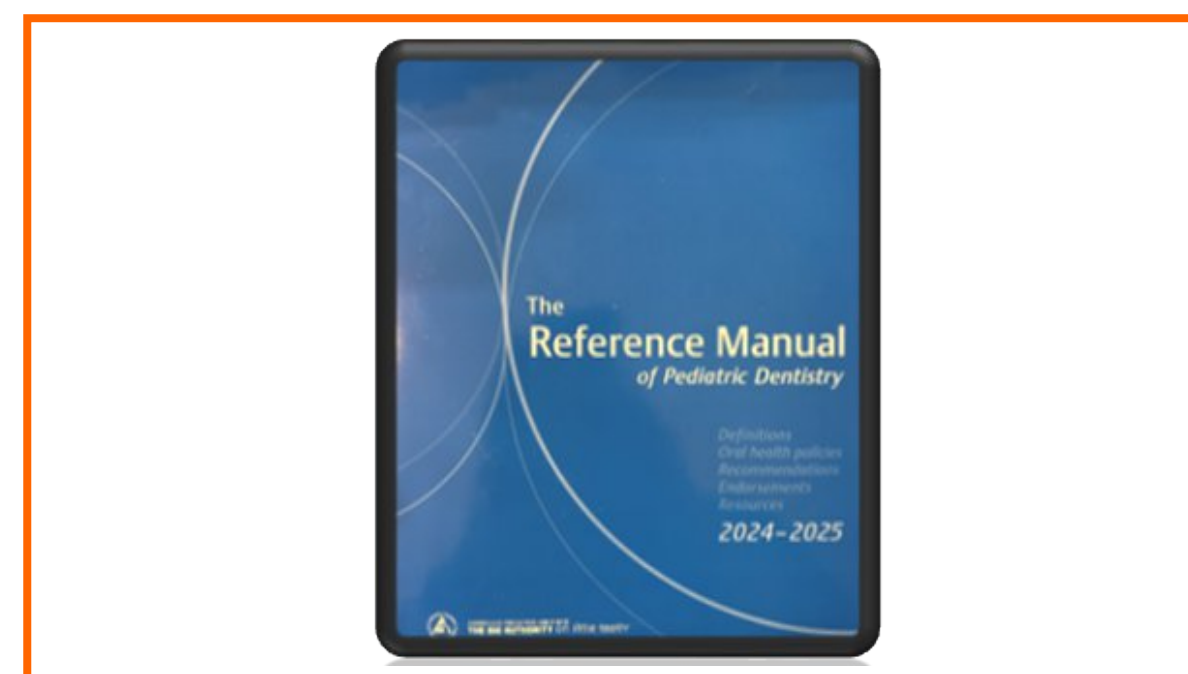

VS.

ChatGPT 100%

Figure 2: 2024 AAPD Reference Manual   **Chat GPT-4o Accuracy Rate**

Phase 2:
The graphs display survey responses comparing pre- and post-ChatGPT usage in four key areas:
1. Clarity of information provided by ChatGPT
2. Helpfulness in improving dental hygiene practices
3. Likelihood of recommending ChatGPT for dental health information
4. Likelihood of following up ChatGPT's advice with a professional checkup

Key observations:
- **Exceeded expectations on clarity**. Most respondents reported greater clarity than expected, with a significant increase in "very clear" ratings.
- **More helpful than expected**. More respondents found ChatGPT "extremely helpful" and "very helpful" after using it.
- **Increased recommendation rate**. More participants indicated they'd likely recommend ChatGPT.
- **Reported increase in follow-up intent**. Following ChatGPT usage, participants showed a higher inclination to seek professional checkups.
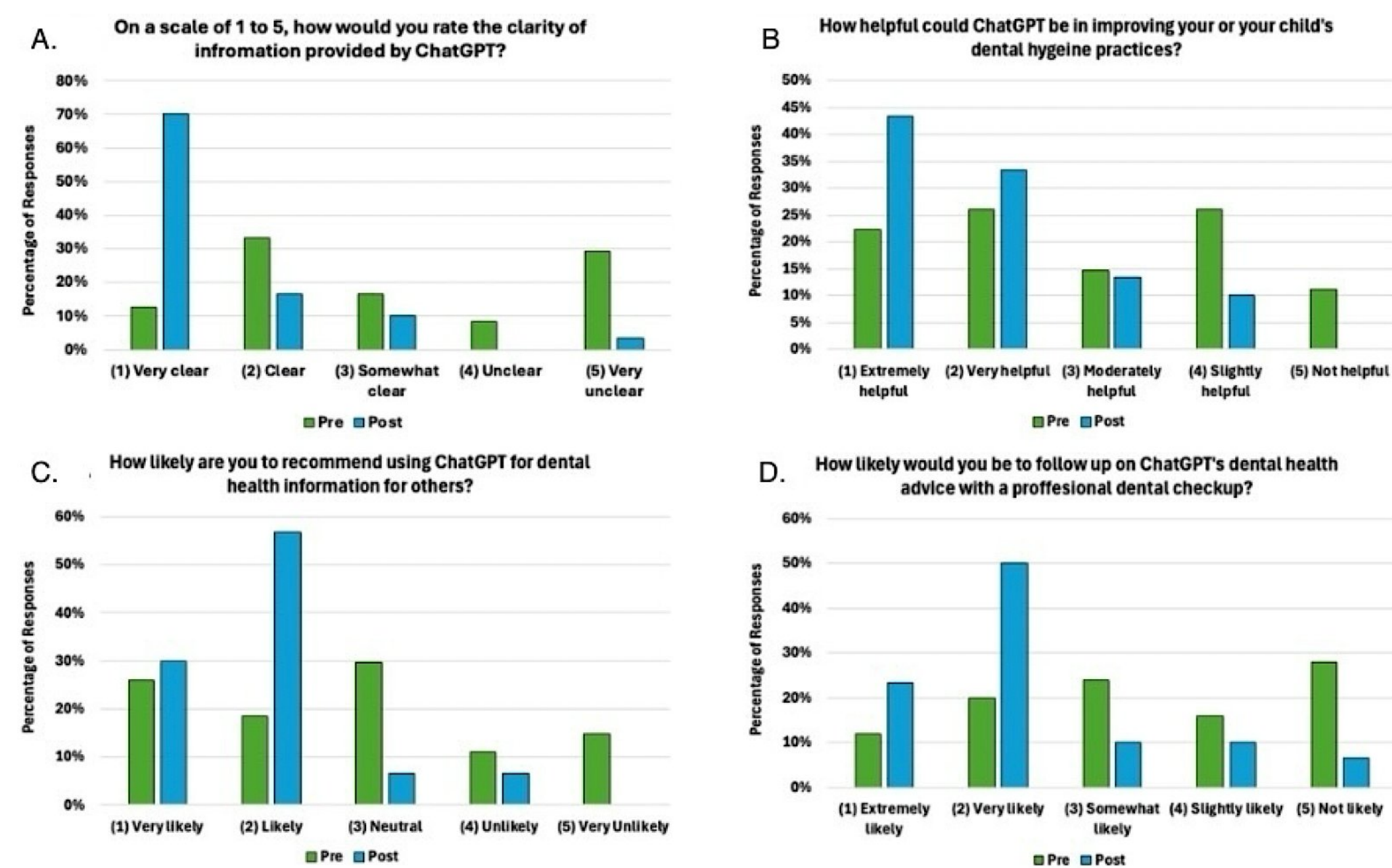

Figure 3: Parents' Perceptions and Attitudes about the Usefulness of ChatGPT before and after ChatGPT use
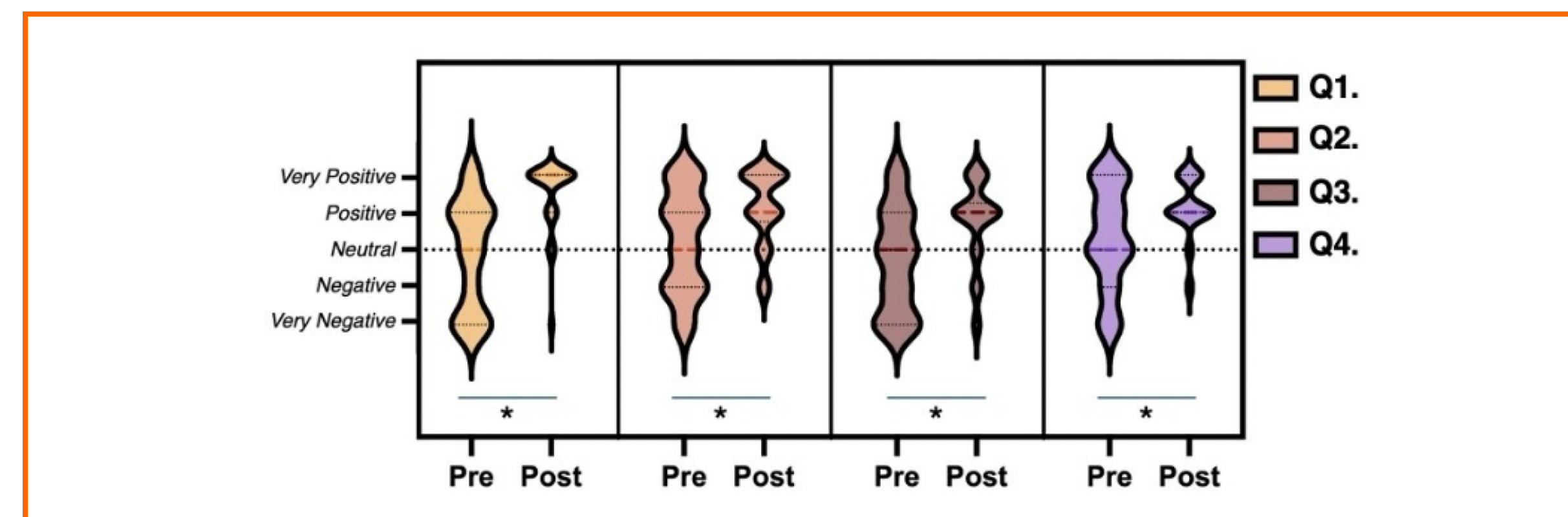
RESULTS *(cont.)*

Chart 2: Distribution of Parent Responses: Pre- vs. Post-ChatGPT Usage for Pediatric Dental Guidance

DISCUSSION

- Focus on perinatal and infant oral health care, fluoride, caries, oral health, dietary recommendations, and trauma in pediatric dentistry - a field where anticipatory guidance and accurate information dissemination are particularly *critical*.
- Comparison with prior AI Chatbot studies
  - Rokhshad et al. (2024) found that AI chatbots had low to moderate accuracy, especially in clinical applications like special needs dentistry.
- Continuous need for AI evaluation

LIMITATIONS – Phase 1
- The scope of questions
- Dataset specificity
- Access limitations to live databases or real-time updates
- Challenges with source referencing
- Need for human oversight

LIMITATIONS – Phase 2
- Unique study population
- Small sample size
- Single setting
- Short—term evaluation
- Self-reported data
- No comparison group

CONCLUSIONS

- ChatGPT-4o shows potential in pediatric dentistry for anticipatory guidance and oral health education
- Real-world utility depends on integrating AI into clinical workflows under healthcare professional supervision, aligned with updated references and patient needs
- The study lays the groundwork for further research on AI in pediatric dentistry, focusing on complex inquiries and diverse demographics
- AI should complement, not replace, clinical expertise for a balanced approach in dental care

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