Assessing Behavior Modalities Of Pediatric Patients With Teledentistry Consultations

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Introduction

- The CDC reports dental caries as one of the most common chronic diseases among children, supporting the need for streamlined care.[1]
- Telemedicine is the use of technology to provide consultation, diagnosis, treatment, and/or to expedite health care service through great distances between patients and healthcare providers.[2] Applying telemedicine in the realm of oral health could prove to be as effective in dentistry with further studies.
- General dentists may not have the training to treat children under certain behavioral modalities. In this case, a referral to a pediatric dentist is necessary. Teledentistry can be a beneficial tool in assessing if specialty care is necessary.
- A retrospective study performed by The Eastman Institute for Oral Health found the initial behavioral modality for treatment did not change for 88% children and changed for 12% of children.[3]
- Streamlining care to pediatric patients through a teledentistry consultation is beneficial if the consultation is accurate in assessing how the child will best need treated. Eliminating an additional in person visit to the dentist can help relieve barriers to access to dental care, helping reduce the rate of untreated childhood caries.

Purpose

The objective of this study is to determine the change in behavior guidance modality (BGM) from the initial teledentistry consultation through treatment completion to investigate if a change in BGM was associated with a set of clinical and demographic factors.

Materials and Methods

- Data abstraction, done through a manual retrospective chart review of electronic health records (axiUm) of referral patients to the University of Iowa College of Dentistry for specialty care (UICOD).
- Inclusion criteria consists of patients seen at UICOD Pediatric Dentistry clinic under the age of 18 years old who received either a teledentistry or an in-person consultation between July 1, 2020 to June 4, 2021 and follow up treatment.
- 79 patients had teledentistry consultations and follow up care. 3 patients had teledentistry consults but did not receive follow up care and were excluded.
- Demographic information collected about the patient included:
  - Age, sex, insurance provider if applicable, presence of a behavioral or neurological condition, visit status, treatment complexity, treatment location, and distance traveled to receive treatment at the University of Iowa College of Dentistry
- Data were analyzed using non-parametric statistical methods, including Fisher's exact test and the Wilcoxon rank sum test.

Results

- Initial behavioral modality for treatment did not change for 86% children and changed for 14% of children. The results of this study are comparable to the study done by The Eastman Institute for Oral Health.
- The data showed that subjects treatment complexity by quadrant (57% 0-3 quadrants, 43% 4 or more) were more likely to change BGM (24% 4 or more quadrants vs 6.7% 0-3 quadrants; p=0.048) if more quadrants of dental care were needed.
- Assessing BGM through teledentistry consultations for treatment in 1-3 quadrants is sufficient. Children with 4 or more quadrants of care are more challenging to assess future treatment BGM with teledentistry consultations.

Table 1. Characteristics of Participants in the Study (N=79)

Variables	Frequency (%)
Age (years)	
Median	5.0
Range	2.0 -17.0
Sex	
Female	36 (46.0)
Male	43 (54.0)
Distance traveled to receive treatment at the College of Dentistry (miles)	
Median	89.6
Range	8.13 - 264.87
Insurance Coverage	
Private Insurance	23 (29.0)
Other	56 (71.0)
Behavioral/Neurological Conditions	
No	64 (81.0)
Yes	15 (19.0)
Initial visit status	
Cancelled	1 (1.3)
Checked-in	75 (94.9)
Failed	3 (3.8)
Subsequent visit status	
Cancelled	10 (13)
Checked-in	68 (86)
Failed	1 (1.3)
Tx Location	
GA	25 (32)
Clinic	54 (68)
Tx Complexity (Sextant)	
0-3 sextants	45 (57)
4 or more sextants	34 (43)
Tx Complete (Yes/No)	
Complete	68 (86)
Incomplete	11 (14)

Table 2. Changes in Treatment Modality (N=79)

Behavior Modality Recommended	Teledentistry Consult Recommendation	Clinical Treatment	P-Value
	No (%)	Yes (%)	
Clinic	52 (65.8)	43 (54.4)	
Sedation	9 (11.4)	11 (13.9)	
General Anesthesia	18 (22.8)	25 (31.6)	
Overall	68 (86)	11(14)	0.08

*Patients treated in clinic received treatment with or without nitrous oxide/oxygen inhalation

Table 3. Demographic and Clinical Factors affects on change in Behavior Guidance Modality

Characteristics	Change in BGM		P-value
	No (N=68)	Yes (N=11)	
Age (years)	5.5 (2.0, 17.0)	5.0 (3.0, 14.0)	0.12
Sex			0.7
Female	32 (89%)	4 (11%)	
Male	36 (84%)	7 (16%)	
Distance traveled to receive treatment at the College of Dentistry (miles)	90 (8, 265)	87 (30, 198)	0.7
Insurance Coverage			0.5
Private Insurance	21 (91%)	2 (8.7%)	
Other	47 (84%)	9 (16%)	
Behavioral/Neurological Condition	12 (80%)	3 (20%)	0.4
Initial visit status			>0.9
Cancelled/ Failed	4 (100%)	9 (82%)	
Checked-in	64 (85%)	59 (87%)	
Subsequent visit status			0.6
Cancelled/ Failed	0 (0%)	2 (18%)	
Checked-in	11 (15%)	9 (13%)	
Tx Location			0.031
GA	18 (72%)	7 (28%)	
Clinic	50 (93%)	4 (7.4%)	
Tx Complexity (Sextant)			0.048
0-3 sextants	42 (93%)	3 (6.7%)	
4 or more sextants	26 (76%)	8 (24%)	
Tx Complete			0.3
Yes	57 (84%)	11 (16%)	
No	11 (100%)	0 (0%)	
BGM Completed			<0.001
Clinic	43 (100%)	0 (0%)	
Sedation	7 (64%)	4 (36%)	
GA	18 (72%)	7 (28%)	

Statistical Analysis

- In **Table 1** descriptive statistics were conducted to provide an overview of characteristics of participants in the study.
- **Table 3** implements bivariate tests of each of the demographic and clinical factors with the outcome, change in BGM. Associations with categorical items were assessed with Fisher's exact test, and associations with numeric items were assessed with the Wilcoxon rank-sum test. These tests were used to find associations with change in BGM due to demographic and clinical characteristics of participants.
- Statistical analyses were preformed using the software R (version 4.1)), and a significance level of 0.05 was used.

Limitations

- Findings may not be generalizable to other populations.
- Caregivers were given the option to have an initial in-person or teledentistry appointment and were not randomly assigned.
- Limitations of retrospective methods of data collections including errors in documentation.
- Limited number of patients with change in behavioral modality

Conclusions

- A change in the behavior modality from teledentistry consultation to treatment was always to a more advanced modality.
- Treatment complexity was associated with change in BGM.
- The findings from this study can help practitioners understand the limitations of teledentistry when assessing BGM for a patient with 4 or more quadrants of dental care.

Future Direction

- During the following year, 2022-2023, we plan to continue this project by matching the teledentistry consultation patients to patients who had an initial in-person consultation. They will be matched by age, gender, and distance traveled to the College of Dentistry. This comparison will assess the accuracy of teledentistry to in-person consultations at predicting behavior modalities for future treatment.
- A multivariant analysis can be completed to assess whether there are any statistically significant relationships between clinical and demographic factors with change in BGM.

Acknowledgements

References

1. Centers for Disease Control and Prevention. Children's Oral Health. Centers for Disease Control and Prevention. 2021, April 21.
2. Farlex. Telemedicine. The Free Dictionary.
3. McLaren et al. Accuracy of teledentistry examinations at predicting actual treatment modality in a pediatric dentistry clinic. Journal of Telemedicine and Telecare. 2017;23(8):710-715. doi:10.1177/1357633X16661428