



Introduction

Due to a vast increase in processed foods in the last half a century, the Nutrition Labeling and Education Act of 1990 created a mandate for the Nutrition Facts Label on food and beverages (1). Their goal was to provide nutrition information in an effort to help the consumer change their food choices, however more than a third of the US is obese and a portion of the population does not consume important nutrients (1). Along with the detrimental health effects that obesity and poor nutrition have on the body overall, high carbohydrate foods have a negative effect on the oral health of individuals, causing dental caries. Nutrition labels are meant to help the population make healthier choices, but if consumers do not understand how to read and interpret them as well as acknowledge the importance of doing so, they are more likely to make unhealthy choices. In fact, prior studies have found that knowledge of basic nutrition and expertise in reading labels is significantly related to education level (2). The aim of this study is to determine whether a parent's practice of reading a nutrition label and their ability to analyze and interpret affect their child's oral health measured in Decayed, Missing, and Filled Teeth DMFT score and Plaque Index (PI) score.

Grade	Description	Abbreviation	Grade
0	No Plaque		0-3
1	Thin plaque layer at the gingival margin, only detectable by scraping with a probe		
2	Moderate layer of plaque along the gingival margin, interdental spaces flow, but plaque is visible to the naked eye		
3	Abundant plaque along the gingival margin, interdental spaces filled with plaque		

Figure 1. Plaque Score Chart

Children ranging from the ages of 2-17 who present for scheduled appointments or emergency visits at St. Barnabas Hospital (SBH) and Union Community Health Center (UCHC) will be asked to participate in this study. Parents will be asked to fill out a questionnaire regarding their use and knowledge of nutrition labels. Only parents who speak English as their primary language will be asked to participate due to the fact that nutrition labels are written in English. During a clinical and radiographic exam of the patient, the DMFT and Plaque Index scores will be calculated and compared to their parent's responses on the questionnaire.

Study Objectives

The aim of this project is to determine whether a parent's ability to read, analyze and interpret nutrition labels affects their child's risk of developing dental caries and the status of their oral hygiene. This will be measured in the child's plaque score and DMFT (decayed, missing, filled teeth) score.

Methods

Subjects

Ninety-seven patients between the ages of 2 and 17 years and their parents or legal guardians took part in this study.

Patient Selection

Male and female patients between the ages of 2-17 years old from all ethnic backgrounds will be included in this study. In order to participate, patients need to present to the dental clinic for either a scheduled appointment or emergency visit, and the patient's primary caregiver must be present. The level of cooperativeness of the child will be assessed using the Frankl scale. Inclusion criteria will include patients who meet the Frankl class II, III and IV. Exclusion criteria will include any participant who is determined to be Frankl class I. If a patient is Frankl I, a thorough examination may not be able to be completed due to combative and agitated behavior.

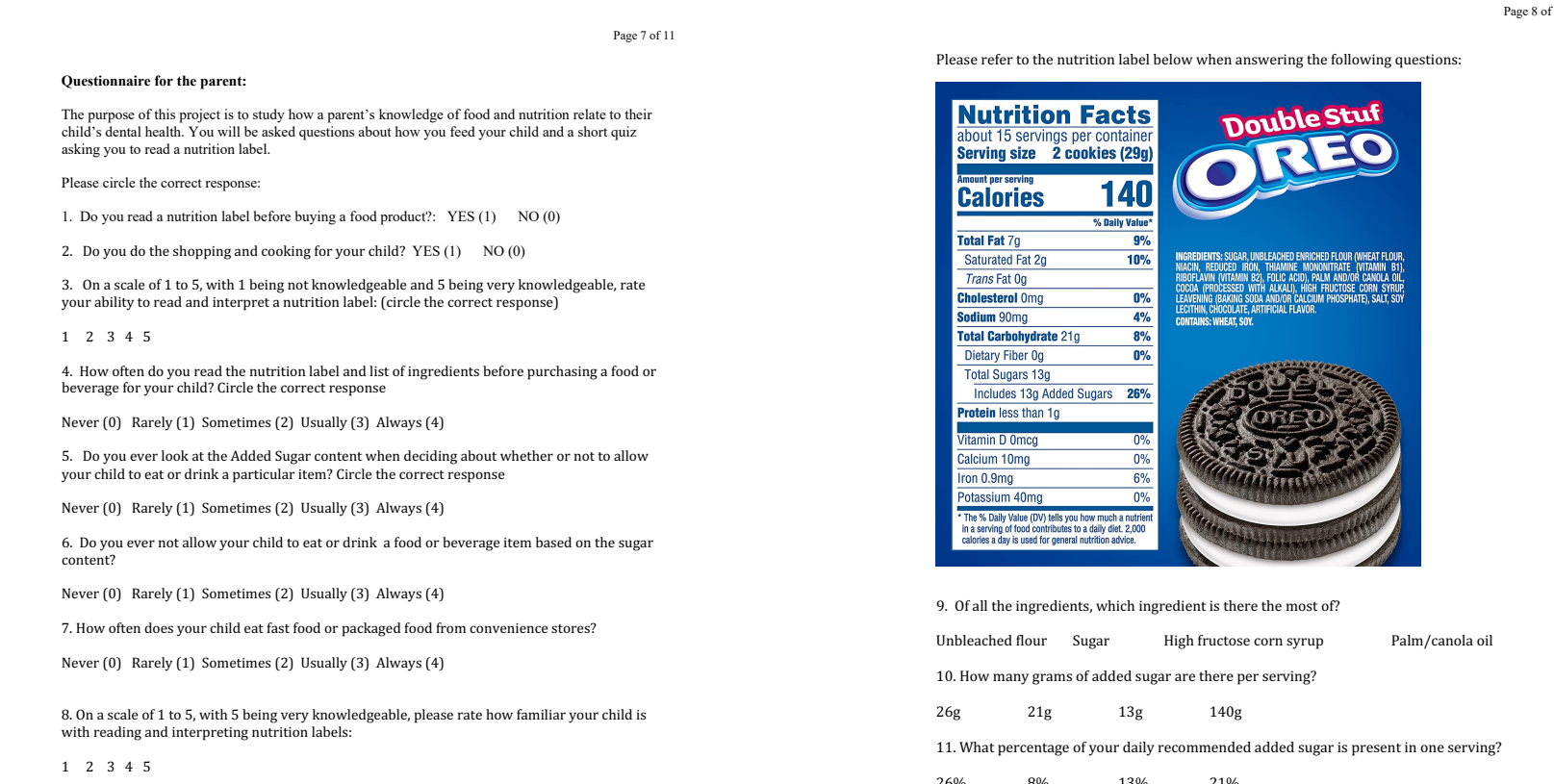


Figure 2. Questionnaire for parents/legal guardians

Data Collection

Patients aged 2-17 years old who present to St. Barnabas Hospital or Union Community Health Center's dental clinic will be included in this study. Data will be collected by pediatric dental residents from St. Barnabas Hospital. Parents will be consented to have the child participate in the study. Parents will be handed a questionnaire to complete about their knowledge and familiarity with reading nutrition labels. The ability to read English will also be a requirement in this study as a majority of nutrition labels are written in English. The second portion of the study will include a clinical and radiographic exam. The Decayed, Missing and Filled Teeth (DMFT) index will be used to calculate the caries prevalence for each participant of the study. The Plaque Index (PI) will also be calculated to record the participant's relative oral hygiene. These two scores are both routine indices to calculate during an exam.

Statistical Analyses

A regression analysis was performed on the collected data to determine whether the questionnaire was predictive of DMFT and PI score. It was found that Q3 and Q4 were highly predictive of DMFT scores and the results were statistically significant with $P < 0.05$. Furthermore, Q6 demonstrated predictable correlation in its relationship with both DMFT and PI with the results being statistically significant.

Results

Q1	61.85% YES
Q2	64.95% YES
Q3	3.897
Q4	2.330
Q5	2.402
Q6	2.103
Q7	1.186
Q8	1.392
Q9	92.78% SUGAR
Q10	83.50% 13g
Q11	88.65% 26%
Q12	89.69% 2
DMFT	0.249
PI	0.714

Figure 3. Averages of collected data

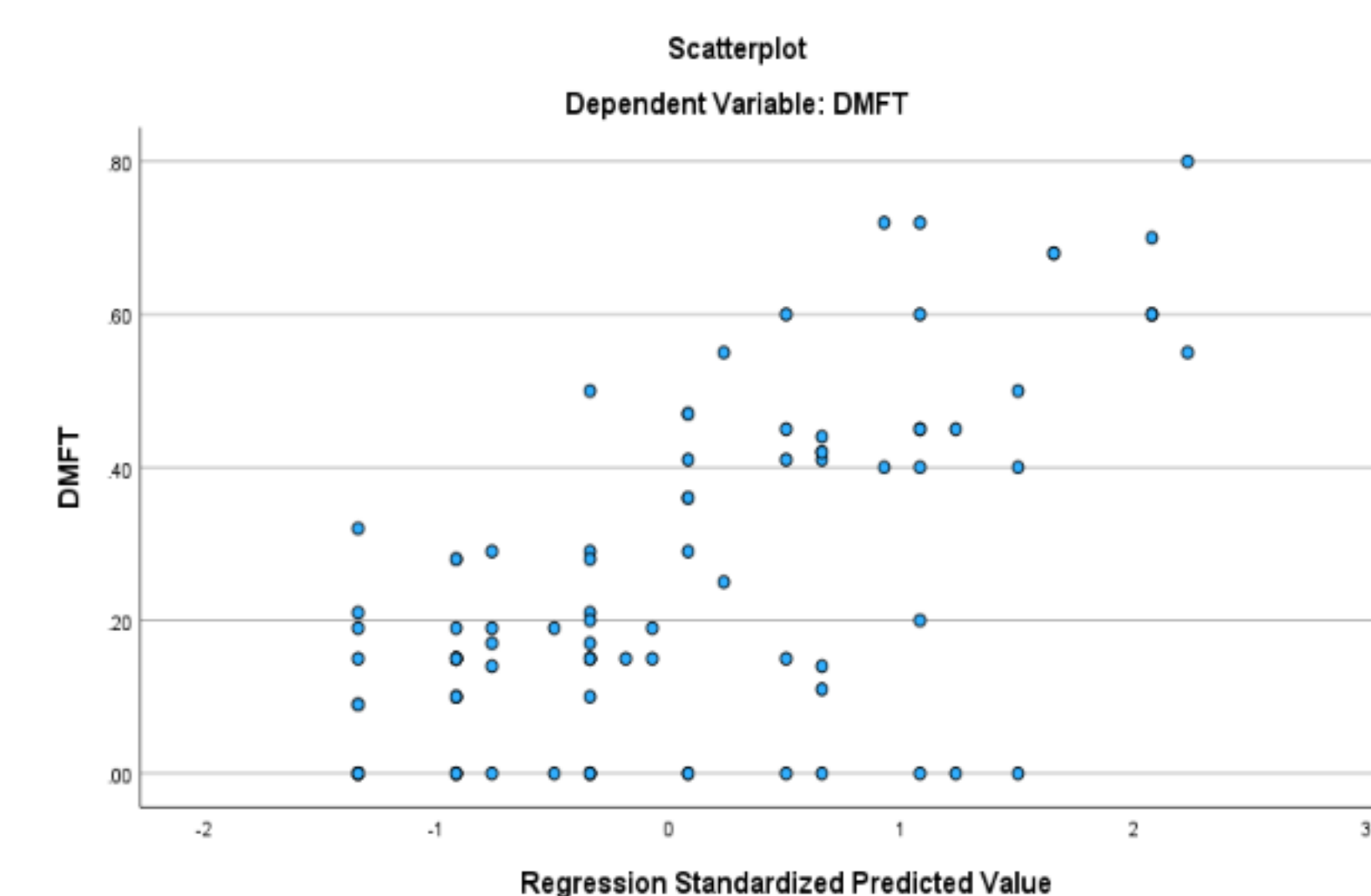


Figure 4. Q1, Q3, Q4 on DMFT

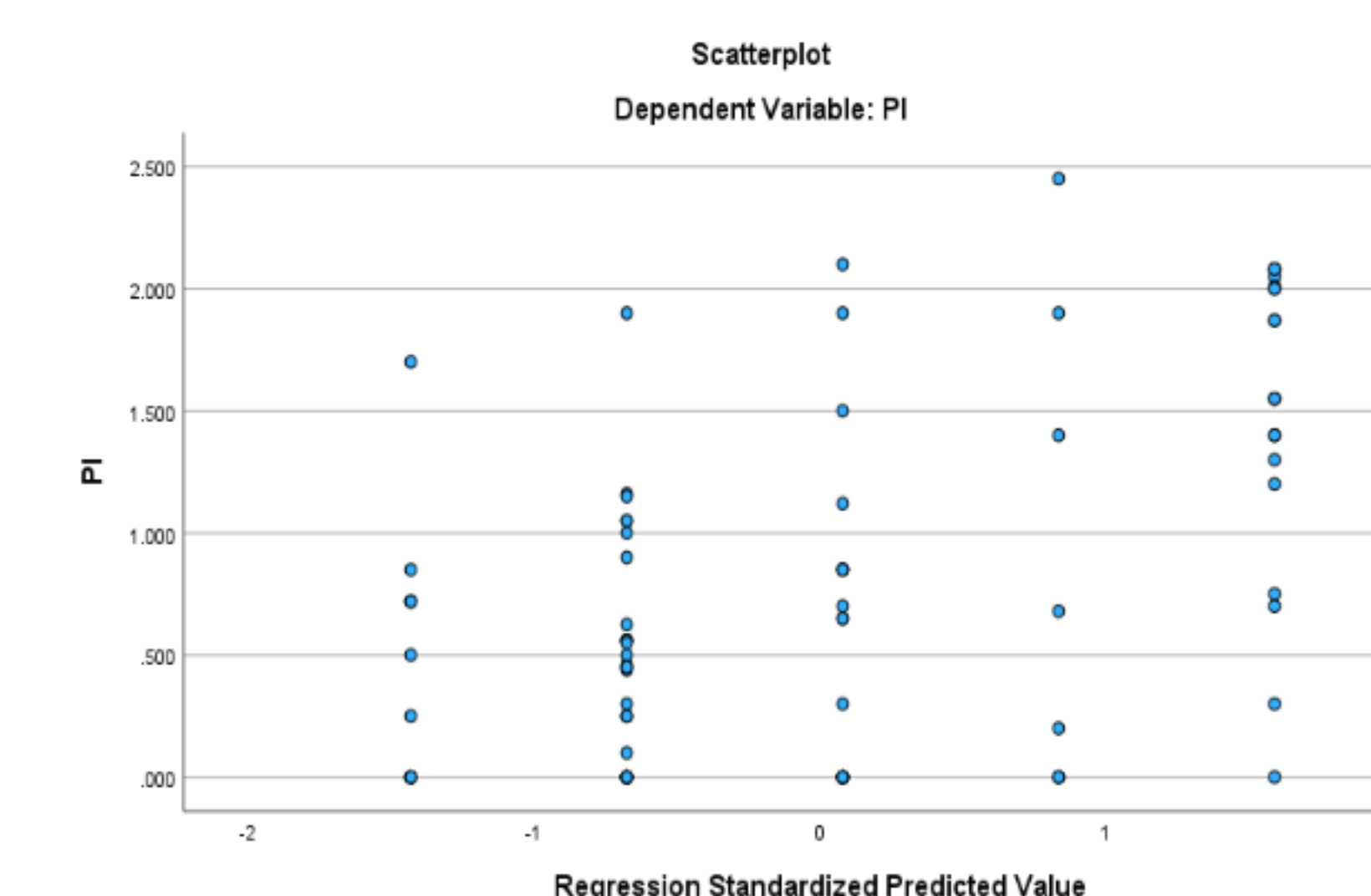


Figure 5. Q5, Q6, Q7 on PI

Discussion

- Using a questionnaire for parents regarding their knowledge and use of nutrition labels demonstrated to be a productive mode for screening the oral health of their children. Questions 3, 4, and 6 of the questionnaire used in this study proved to be the most indicative of the patients' oral health.
- Parents who reported having an understanding and knowledge of a nutrition label as well as those who frequently read the nutrition label had children whose DMFT scores negatively correlated.
- Parents who claimed they were more likely to not allow their child to consume a food or drink due to its high sugar content had children with both a lower PI and DMFT score.

Conclusions

- This study demonstrates that a few key questions regarding nutritional knowledge, habits of reading nutrition labels, and tendencies to restrict certain food categories can be asked of a parent to obtain a general idea of the patient's oral health.
- Asking parents questions regarding nutritional knowledge, habits of reading nutrition labels, and tendencies to restrict certain food categories for their children can be used an effective way to screen for their child's dental needs.

Study Limitations

- One of this study's limitations is that the patient's primary caretaker who prepares their food may be different from their parent or legal guardian.
- Another limitation of this study is that only fluent English speakers were able to be included in the study when a large portion of the patients are Spanish speaking. A future study should be conducted to include Spanish-speaking patients.

References

- Dumoitier, Alice et al. "A review of nutrition labeling and food choice in the United States." *Obesity science & practice* vol. 5, 6 581-591. 14 Nov. 2019, doi:10.1002/osp4.374
- Viola, Gaia Claudia Viviana et al. "Are Food Labels Effective as a Means of Health Prevention?." *Journal of public health research* vol. 5, 3 768. 21 Dec. 2016, doi:10.4081/jphr.2016.768
- Crippen DJ, Wood AJ, Chambers DW. Initial plaque score as an indicator of patient appointment compliance. *J Calif Dent Assoc.* 2003 Aug;31(8):621-5. PMID: 13677404.
- Firmino RT, Ferreira FM, Martins CC, Granville-Garcia AF, Fraiz FC, Paiva SM. Is parental oral health literacy a predictor of children's oral health outcomes? Systematic review of the literature. *Int J Paediatr Dent.* 2018 Jul 8. doi: 10.1111/ipd.12378. Epub ahead of print. PMID: 29984431.
- Moradi, Ghobad et al. "Evaluation of Oral Health Status Based on the Decayed, Missing and Filled Teeth (DMFT) Index." *Iranian journal of public health* vol. 48, 11 (2019): 2050-2057.
- Wapniarska K, Buła K, Hilt A. Parent's pro-health awareness concerning oral health of their children in the light of survey research. *Przegl Epidemiol.* 2016;70(1):59-63, 137-40. English, Polish. PMID: 27344476.