Samantha Reyes

Association of Obesity with Periodontitis, Tooth Loss and Oral Hygiene in Non-Smoking Adults

Den 1200 – E601

March 22, 2018

**1. When was the work published?**

The article was published on October 23, 2013.

**2. What are the main points of the article? Write a 150- 200 word summary of the article that accurately conveys the content of the article.**

  The researchers of the article describe a cross-sectional study that focused on the relationship between periodontitis, tooth loss, oral hygiene and obesity in 292 non-smoking subjects from a dental facility in Croatia. The article explains how obesity exists as a risk factor for developing systemic diseases such as diabetes, cardiovascular disease, hypertension, and periodontal disease. The experimental design uses a non-smoking sample to assess the correlation between obesity and periodontitis and tooth loss without confounding factors such as comorbid effects from chronic diseases and smoking; periodontitis was classified as early, moderate, and advanced.

  The article relates the involvement of risk indicators such as socioeconomic status, nutritional habits, and educational level that indicates, statistically, there is a relationship between obesity, tooth loss, and periodontitis. The experiment surveyed a "convenient sample" and tests the subjects' periodontal status by measuring probing depths, gingival recession, clinical attachment loss, and oral hygiene. The results of the study are multifactorial as socioeconomic status, nutritional habits, and educational level all allow for predicting subject behavior. The study found 50.7% of males and 35.3% of females were affected by periodontitis and that poorly educated, overweight and obese

women aged 36-55 failed to floss regularly. The research findings support that obesity and oral hygiene affect periodontal health and tooth loss.

3. **Does the work meet the standards to be considered an appropriate/academic/scholarly source?  Justify your choice.**

      The article appropriately meets the standards of a scholarly and academic source because it is peer reviewed and the journal in which it is published publishes articles on disease prevention and health protection, the role of nutrition on health promotion, and the results of population health studies. The journal is reviewed by the National Institute of Public Health Editorial Board of CEJPH and the authors conducted their study through the University of Rijeka in Croatia.

4. **Are the qualifications of the author(s) appropriate for an academic article?  Briefly describe the authors' qualifications.**

      The qualifications of the authors are appropriate, as they have achieved status within the University of Rijeka and specialize in periodontology. The main author works at the University of Rijeka in the oral medicine and periodontology department and has been published in multiple periodontology journals dating back as early as 2004. She holds a doctorate in dentistry as well as obtained a PhD, and does research in Dental Hygiene and Epidemiology, Dental Surgery, and Dentistry.

5. **Is the purpose clearly stated?  Restate the purpose of the paper in your own words.**

The purpose of the experiment is clearly stated in the abstract as well as in the methods. The research goal is to obtain statistical evidence that proves oral hygiene and obesity, without confounding factors such as chronic diseases or tobacco use, correlates with periodontitis and tooth loss.

## Experimental Design and Execution (40%)

6. **Is the experimental design clearly described?  Describe the design in your own words.**

    The experimental design has an exclusionary factor against subjects who smoke or have chronic diseases such as diabetes or cardiovascular disease because of their comorbid effects with obesity on periodontal disease. The data produced is quantitative as the methods provide statistics on the groups of individuals who support the hypothesis. The study used cross-sectional design with convenience sampling of participants; meaning the sample was easy to reach and they analyzed the subjects at one point in time. The research was conducted between September 2008 and January 2010, and 320 patients ranging from 31-75 years of age were recruited to participate in the study. Participants were interviewed on their oral hygiene and educational level using a written questionnaire, had their height and weight measured, and had their periodontal health assessed.

7. **Have the possible influences on the findings been identified and controls instituted? Describe and evaluate the use of controls and possible influences (spurious variables)**

The possible influences on the research findings were pre-eliminated by using non-smoker test subjects who did not have chronic diseases. The influences identified to have the most implications on the experiment are diabetics and tobacco smokers; diabetes and tobacco use are known risk factors for periodontal disease. The study differs from others testing obesity and periodontal disease by focusing on subjects who meet the specific health and behavior criteria.

The researchers properly assessed the drawbacks of this study by discussing the median age, 57 years old, being possibly too high to reliably assess periodontitis without comorbidity. The authors discuss that the age range could have produced more supportive results of the hypothesis if the sample population was younger. It cannot be said for sure that the compromised health and immune response in people with obesity is the lone cause of periodontitis or whether poor oral hygiene practice is interrelated.

8. **Has the sample been appropriately selected (if applicable)? Describe the sample used in the study, and evaluate its appropriateness.**

The experiment was initiated to collect periodontal health status information on Eastern Europeans, as there was no data in relation to obesity and tooth loss in this region. The sample size is limited to patients chosen from the dental clinic, Clinical Hospital Centre in Rijeka, in Croatia. While the sample size is limited demographically, the number of participants allowed the experiment to accommodate for the expected loss of subjects and subjects who did not participate in all parts of the study. The statistical data of this experiment is analyzed by one-way ANOVA of participants' BMI from normal to obese, age 31-75, sex, and oral hygiene. Having a large sample size provided a

better analysis of the population supporting the hypothesis. The test subjects, from lowest to highest in number of participants, included 18.1%-obese subjects (BMI>30), 32.9%- normal weight (BMI<25), and 49%- overweight subjects (BMI 25-30).

9. **Has the reliability and validity of the article been assessed? Evaluate, and state the test/diagnosis results.**

   The validity of the questionnaire resulted in data that proves the hypothesis, obesity and lack of oral hygiene is a cause of periodontitis and tooth loss, as well as provided additional information regarding specific groups of participants affected by periodontitis. A factor that was taken into consideration based on the results was the use of supplementary aids such as interdental brushes and floss proved to be associated with BMI. The study concluded that people suffering from obesity were less likely to keep up with good oral hygiene practice. The study found that, in general, test subjects suffering from obesity were less likely to use interdental aids, and overweight, uneducated women between the ages 36-55 were less likely to use floss. Periodontitis was observed at different stages: early, moderate, and advanced. Early periodontitis was found in 27.8% of the population, moderate periodontitis was found in 28.6%, and 23.6% of subjects had advanced periodontitis.

   The main un-biasing factor of the research, which was its exclusion of individuals who smoke or have diabetes, did not interfere with the results of the experiment. The highest prevalence of periodontal disease occurred within the overweight subjects and obese subjects were the lowest. The experiment has strong inter-examiner reliability because of how the researchers chose to test their subjects. A questionnaire is dependent

on the participant's answers, and has less to do for the researchers collecting data. The results of the test, however, are less reliable in that they were unable to determine BMI relationship with periodontal disease.

**10. Is the experimental therapy compared appropriately to the control therapy? Describe and evaluate the use of the control group.**

The study was a cross-sectional study that evaluates participants' subjective data at one point in time. The experimental design limited the amount of data able to be collected because there was only one time interaction with the subject, and systemic and oral health status was not reevaluated.

**11. Is the investigation of sufficient duration? Evaluate, and explain your reasoning.**

The study was performed for about a year and a half, which for the purposes of their study I believe is sufficient because of the greater importance towards the number of participants evaluated. The authors could have benefitted from extending the time duration to assess more participants to achieve a greater mixed sample.

## Results and Critique (40%)

**12. Have the research questions or hypothesis been answered? Restate the research questions and/or hypotheses in your own words, and describe if or how they are answered.**

The authors' hypothesis was formulated to prove a link between obesity, periodontitis, oral health, and tooth loss. Testing the hypothesis provided subjective data that has a high tendency to be unreliable because of patients' self awareness and honesty. The research results evaluated BMI, age, and sex of the participants who were affected by periodontitis and the data supported the authors' claims. They were able to produce positive results that support their hypothesis to some extent, but the method of their testing determined a conclusion based off subjective data. The strength of the questionnaire determines the validity of the experiment and because it was it is hard to determine if the test is reliable, the discrepancy of obtaining genuine data must be taken into consideration.

**13. Do the interpretations and conclusion logically follow the experimental finding? Restate the conclusion, and explain if or how they follow the experimental findings.**

Periodontitis and tooth loss is positively correlated to obesity, hygiene practice, and education level, as per the results. The results of the experiment showed statistical significance that overweight and obese women between the ages 36-55 with low education levels, have periodontal disease. The authors attributed the relationship of obesity and periodontal disease to not using interdental aids, which is predicted by the category of the participants' health behavior. Obese subjects were concluded to be less likely to use interdental aids and had more missing teeth. In general, the study positively produced results that support their hypothesis and conclusions that obesity causes periodontitis, but there are many confounding factors that make it difficult to assess obesity as the only variable.

**14. Do you agree or disagree with the article and findings? Explain why?**

I agree with the hypothesis and purpose of the study because there is scientific data that shows there is a correlation between obesity and periodontal disease. The article could have gone into extended detail about how the subjects were evaluated through the questionnaire and how the authors concluded their study, but I agree that it is difficult to use subjective data to form conclusive results. I think the authors' findings are supportive of the hypothesis, but the risk indicators make it so that it is difficult to quantify cause and effect.

**15. What would you change in the article? Why?  Think outside of the box. What would you add or delete.**

The study was conducted to research the correlation of periodontitis with tooth loss and obesity in individuals of Eastern Europe. I think the researchers would have been more valid in proving the hypothesis if they had expanded their study to a mixed population of individuals from other Eastern European countries, not just Croatia. I would change the convenience sampling from one dental clinic to incorporating multiple clinics of the same caliber. I agree that it is convenient to approach clinics to conduct data analysis, so I want to see a more diverse population rather than one from a localized area. I think it is important that when you are correlating two types of diseases that you take the total population into consideration.