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RELATIONSHIP BETWEEN PERIODONTAL DISEASE AND ASTHMA AMONG OBESE ADULTS

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Abstract:

Objective: *To assess the relationship between periodontal disease and asthma among obese adults.*

Methods: *This longitudinal study was carried out at the Dept. of Periodontology and Dept. of Chest Medicine at Liaquat University of Medical & Health Sciences, Jamshoro from November 2017 to February 2019 on a sample of 1315 pre-diagnosed patients of asthma, aged 18 to 48 years (chosen via non-probability, consecutive sampling) presenting to the chest medicine outpatient department. After taking written informed consent from subjects, data was collected using a pre-structured, interview-based questionnaire containing inquiries about basic sociodemographic information and detailed disease particulars at the time of presentation. Periodontitis, bleeding on probing (BOP) and plaque index were determined by clinical examinations. The data obtained was analyzed using MS. Excel 360 and SPSS v. 21.0.*

Result: *A total of 1315 subjects were enrolled during the study duration. The mean age of sample stood at 47 years (SD ±7.5) and most of the subjects were males. Using logistic regression adjusting for gender, smoking status, age, body mass index, family history of asthma and income level, revealed that the odds ratio (OR) of asthma for a participant with severe periodontitis was 0.44 (95% confidence interval: 0.27, 0.70) that of a participant with none/mild periodontitis. On the other hand, proportion of BOP sites and plaque index were not statistically significant. For a participant with severe periodontitis, the OR of taking asthma medication was 0.20 (95% confidence interval: 0.09, 0.43) that of a participant with none/mild periodontitis. Moreover, proportion of BOP sites was statistically associated with use of asthma medication.*

Conclusion: *After carefully considering the results, it can be concluded that patients with severe periodontitis were less likely to have asthma. Stronger evidence of an inverse association was found when using asthma medication as outcome.*

Key Words: *Periodontitis, Oral Health Status, Asthma, Obesity, Chest Medicine, and Plaque Index.*

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INTRODUCTION:

Rates of periodontal disease and tooth decay are generally down partly due to advancements in dentistry and partly due to a reduction in risk factors. Researchers have wondered what type of association advancements on dentistry have with other diseases, including asthma and allergy-related illnesses. [1]

Arbes & Matsui examined 12 studies evaluating the association between allergic disease or asthma and oral bacteria or periodontal disease. Five found an inverse association between allergic disease or asthma and periodontal health, four showed a positive association and three found no link. [2]

A recent small study also found a positive association between periodontal disease and severity of asthma. Inverse associations have been attributed to the hygiene hypothesis. Through this hypothesis it is argued that with better oral health, fewer opportunities for infections and microbial exposures exist. [3]

As a consequence, asthma and atopic diseases become more likely. Positive associations, on the other hand, have been attributed to mouth breathing habits and frequent use of inhalational drugs in patients suffering from severe asthma. The inconsistent results of the studies may be partially attributed to the use of different definitions of periodontal disease. [4]

In 2007, the Centers for Disease Control and Prevention and the American Academy of Periodontology (CDC-AAP) developed standard case definitions for periodontitis for use in surveillance and population-based research. [5]

Although some studies evaluating the association between oral pathogens and allergy-related outcomes have considered the possible confounding effects of ethnicity or race, there is evidence of differences in morbidity of these diseases among Hispanics. Specifically, Puerto Ricans have been found to have higher asthma morbidity and mortality rates and higher severe periodontitis than other Latino groups. The objective of this study was to determine if there is an association between periodontal disease and asthma. [6]

METHODOLOGY:

This longitudinal study was carried out at the Dept. of Periodontology and Dept. of Chest Medicine at Liaquat University of Medical & Health Sciences, Jamshoro from November 2017 to February 2019 on a sample of 1315 pre-diagnosed patients of asthma, aged 18 to 48 years (chosen via non-probability, consecutive sampling) presenting to the chest medicine outpatient department. After taking written informed consent from subjects, data was collected using a pre-structured, interview-based questionnaire containing inquiries about basic sociodemographic information and detailed disease particulars at the time of presentation. Periodontitis, bleeding on probing (BOP) and plaque index were determined by clinical examinations. The data obtained was analyzed using MS. Excel 360 and SPSS v. 21.0.

RESULTS

A total of 1315 subjects were enrolled during the study duration. The mean age of sample stood at 47 years (SD ±7.5) and most of the subjects were males. Using logistic regression adjusting for gender, smoking status, age, body mass index, family history of asthma and income level, revealed that the odds ratio (OR) of asthma for a participant with severe periodontitis was 0.44 (95% confidence interval: 0.27, 0.70) that of a participant with none/mild periodontitis. On the other hand, proportion of BOP sites and plaque index were not statistically significant. For a participant with severe periodontitis, the OR of taking asthma medication was 0.20 (95% confidence interval: 0.09, 0.43) that of a participant with none/mild periodontitis. Moreover, proportion of BOP sites was statistically associated with use of asthma medication.

Variable	Asthma Prevalence		Asthma Medication	
	Yes	No	Yes	No
Age (years)	*50.49*	*50.21*	*50.57*	*50.13*
Males (%)	*13*	*27*	*13*	*27*
BMI (Kg/m^2)	*34.1*	*33.2*	*31*	*32*
Periodontitis (%)	*31*	*33*	*39*	*34*
Plaque Index	*0.67*	*0.65*	*0.6*	*0.61*

Odds Ratio:

Variable	Asthma Diagnosis	Asthma Medication
Periodontitis	*0.44*	*0.2*
Oral Hygiene (Plaque Index)	*0.84*	*0.76*

DISCUSSION:

Our study demonstrated that, on average, participants with severe periodontitis or higher PBOP are less likely to have asthma. Severe periodontitis resulted in the largest reduction on the likelihood of asthma. Stronger evidence of an inverse association between asthma and oral health was found when asthma medicine intake was used as an indicator of asthma severity instead of asthma diagnosis. [7, 8]

The results of this analysis support the hygiene hypothesis. Five other studies found an inverse association between asthma or allergy and periodontal disease. Several other studies either did not find an association between allergy or asthma and periodontal disease variables in humans) or found a positive association between these variables. [9 - 14]

The diverging conclusions in the literature can be attributed to several factors. Most noticeably, both asthma and periodontitis are affected by multiple factors. Some authors argue that mouth breathing habits and frequent use of inhalational drugs in patients suffering from severe asthma may lead to a positive association between asthma severity and periodontal disease, contrary to our findings. Furthermore, periodontal disease was measured in different ways in these studies. For example, Gomes-Filho et al. (2013) defined periodontitis based on clinical measures, but did not distinguish between none/mild, moderate and severe periodontitis, only using a yes/no periodontitis definition. [15 - 17]

Moreover, their periodontitis case definition included bleeding on probing, and compared participants with no asthma against patients with severe asthma. On the other hand, Friedrich et al. (2008) used attachment loss but not pocket depth to define periodontitis severity. As attachment loss can accompany non-inflammatory gingival recession, determining periodontitis severity using attachment loss alone may overstate severity. Several studies suffer from small sample sizes, and limited control of confounding variables. Another factor was the way asthma diagnosis was determined. In most studies, asthma diagnosis was self-reported, based on whether they have been diagnosed with asthma or allergies by a health professional. None of the studies used challenge tests to determine asthma diagnosis. [18 - 20]

Researchers have found that about a third of patients diagnosed with asthma by a physician did not have asthma when assessed through lung function and challenge tests. We did not find any association between mean plaque index and asthma prevalence or taking asthma medication. A possible explanation is that although the Silness Loe plaque index reflects the oral hygiene status and expresses the presence of plaque at or above the gum line, it does not assess the amount of plaque below the gum line, or the bacterial composition of plaque which may be more pertinent for periodontitis, and perhaps asthma. [21, 22]

CONCLUSION

After carefully considering the results, it can be concluded that patients with severe periodontitis were less likely to have asthma. Stronger evidence of an inverse association was found when using asthma medication as outcome.

REFERENCES:

1. Aaron, S. D., Vandemheen, K. L., Boulet, L. P., McIvor, R. A., FitzGerald, J. M., Hernandez, P., Lemiere, C., Sharma, S., Field, S. K., Alvarez, G. G., Dales, R. E., Doucette, S. & Fergusson, D. (2008) Overdiagnosis of asthma in obese and nonobese adults. Canadian Medical Association Journal 179, 1121–1131.
2. Abrahamsson, T. R., Sandberg-Abelius, M., Forsberg, A., Bjorkst € en, B. & Jenmalm, M. C. (2011) A th1/th2-associated chemokine imbalance during infancy in children developing eczema, wheeze and sensitization. Clinical & Experimental Allergy 41, 1729–1739.
3. Al-Delaimy, W. & Willett, W. (2008) Measurement of tobacco smoke exposure: comparison of toenail nicotine biomarkers and self-reports. Cancer Epidemiology, Biomarkers & Prevention 17, 1255–1261.
4. Andriankaja, O. M. & Joshipura, K. (2014) Potential association between prediabetic conditions and gingival and/or periodontal inflammation. Journal of Diabetes Investigation 5, 108–114. Arbes, S. J. J., Sever, M. L., Vaughn, B., Cohen, E. A. & Zeldin, D. C. (2006) Oral pathogens and allergic disease: results from the third national health and nutrition examination survey. Journal of Allergy and Clinical Immunology 118, 1169–1175.

5. Arbes, S. J. & Matsui, E. C. (2011) Can oral pathogens influence allergic disease? Journal of Allergy and Clinical Immunology 127, 1119–1127.
6. Card, J., Carey, M., Voltz, J., Bradbury, J., Ferguson, C., Cohen, E., Schwartz, S., Flake, G. P., Morgan, D. L., Arbes, S. J. Jr, Barrow, D. A., Barros, S. P., Offenbacher, S. & Zeldin, D. C. (2010) Modulation of allergic airway inflammation by the oral pathogen porphyromonas gingivalis. Infection and Immunity 78, 2488– 2496.
7. Chaves, E., Wood, R., Jones, A., Newbold, D., Manwell, M. & Kornman, K. (1993) Relationship of "bleeding on probing" and "gingival index bleeding" as clinical parameters of gingival inflammation. Journal of Clinical Periodontology 20, 139–142.
8. Choudhry, S., Ung, N., Avila, P., Ziv, E., Nazario, S., Casal, J., et al. (2005) Pharmacogenetic differences in response to albuterol between puerto ricans and mexicans with asthma. American Journal of Respiratory and Critical Care Medicine 171, 563–570.
9. Eke, P. I., Page, R. C., Wei, L., Thornton-Evans, G. & Genco, R. J. (2012) Update of the case definitions for population-based surveillance of periodontitis. Journal of Periodontology 83, 1449–1454.
10. Eloot, A. K., Vanobbergen, J. N., De-Baets, F. & Martens, L. C. (2004) Oral health and habits in children with asthma related to severity and duration of condition. European Journal of Paediatric Dentistry 5, 210–215.
11. Fleiss, J. L., Park, M. H., Chilton, N., Alman, J., Feldman, R. S. & Chauncey, H. H. (1987) Representativeness of the "ramfjord teeth" for epidemiologic studies of gingivitis and periodontitis. Community Dentistry and Oral Epidemiology 15, 221–224.
12. Friedrich, N., Kocher, T., Wallaschofski, H., Schwahn, C., Ludemann, J., Kerner, W., et al. (2008) Inverse association between periodontitis and respiratory allergies in patients with type 1 diabetes mellitus. Journal of Clinical Periodontology 35, 305–310.
13. Friedrich, N., Volzke, H., Schwahn, C., Kramer, A., Junger, M., Schafer, T., et al. (2006) Inverse association between periodontitis and respiratory allergies. Clinical and Experimental Allergy 36, 495–502.
14. Garlet, G. (2010) Destructive and protective roles of cytokines in periodontitis: a re-appraisal from host defense and tissue destruction viewpoints. Journal of Dental Research 89, 1349– 1363.
15. Gomes-Filho, I. S., Soledade-Marques, K. R., Seixas da Cruz, S., et al. (2013) Does periodontal infection have an effect on severe asthma in adults? Journal of Periodontology 85, 179–187.
16. Grossi, S. G., Zambon, J. J., Ho, A. W., Koch, G., Dunford, R. G., Machtei, E. E., et al. (1994) Assessment of risk for periodontal disease. i. risk indicators for attachment loss. Journal of Periodontology 65, 260–267.
17. Hansel, T. T., Johnston, S. L. & Openshaw, P. J. (2013) Microbes and mucosal immune responses in asthma. The Lancet 381, 861–873.
18. von Hertzen, L. C., Laatikainen, T., Makela, M. J., Jousilahti, P., Kosunen, T. U., Petays, T., et al. (2006) Infectious burden as a determinant of atopy - a comparison between adults in finnish and russian karelia. International Archives of Allergy and Immunology 140, 89–95.
19. Hujoel, P. P., Cunha-Cruz, J., Maupome, G. & Saver, B. (2008) Long-term use of medications and destructive periodontal disease. Journal of Periodontology 79, 1330–1338.
20. Jimenez, M. C., Sanders, A. E., Mauriello, S. M., Kaste, L. M. & Beck, J. D. (2014) Prevalence of periodontitis according to hispanic or latino background among study participants of the hispanic community health study/study of latinos. Journal of the American Dental Association 145, 805–816.
21. Laurikainen, K. & Kuusisto, P. (1998) Comparison of the oral health status and salivary flow rate of asthmatic patients with those of nonasthmatic adults—results of a pilot study. Allergy 53, 316–319.
22. Lugogo, N. L., Kraft, M. & Dixon, A. E. (2010) Does obesity produce a distinct asthma phenotype? Journal of Applied Physiology 108, 729– 734.