

Periodontal health and the frequency of COPD exacerbations: a systematic review and meta-analysis



Niamh Kelly, Lewis Winning, Christopher Irwin, Fionnuala T Lundy, Dermot Linden, Lorcan McGarvey, Gerard J Linden and Ikhlas El Karim

Rationale

Severe COPD exacerbations frequently lead to hospitalisation, with significant healthcare costs, and are associated with an increased risk of mortality.

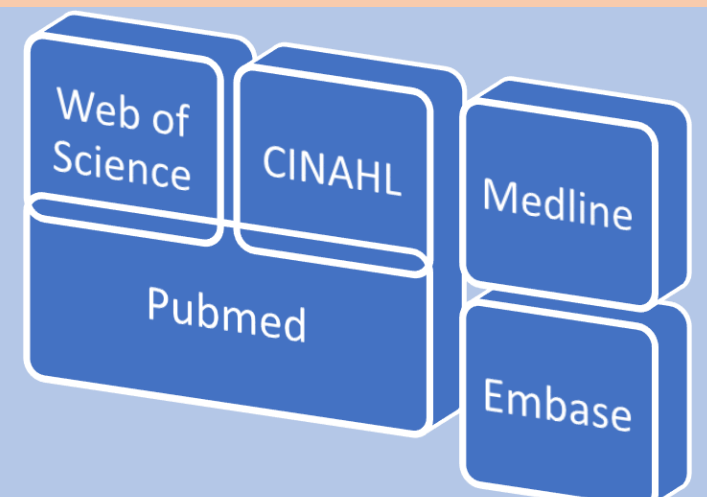
Emerging evidence suggests good periodontal health, including improvements as a result of periodontal treatment, can reduce the frequency of COPD exacerbations, hospitalisation and improve the quality of life for COPD patients.

Aim

The aim of this systematic review, was to critically appraise the emerging literature and to synthesise evidence on a putative link between poor periodontal health and COPD exacerbations to inform research and clinical practice.

Materials and Methods

- This systematic review is reported using the PRISMA guidelines and the PICO framework.
- Population:** Adult patients with COPD
- Exposure:** Poor periodontal health
- Comparison:** Good periodontal health
- Outcomes:** Reduced frequency of COPD exacerbations.
- Electronic database searches were undertaken using a combination of key search words (chronic obstructive pulmonary disease, exacerbation, reduced lung function, hospitalisation(s), quality of life, oral hygiene, periodontitis, gingivitis).
- The following databases were search up to May 2020 with no language restrictions.



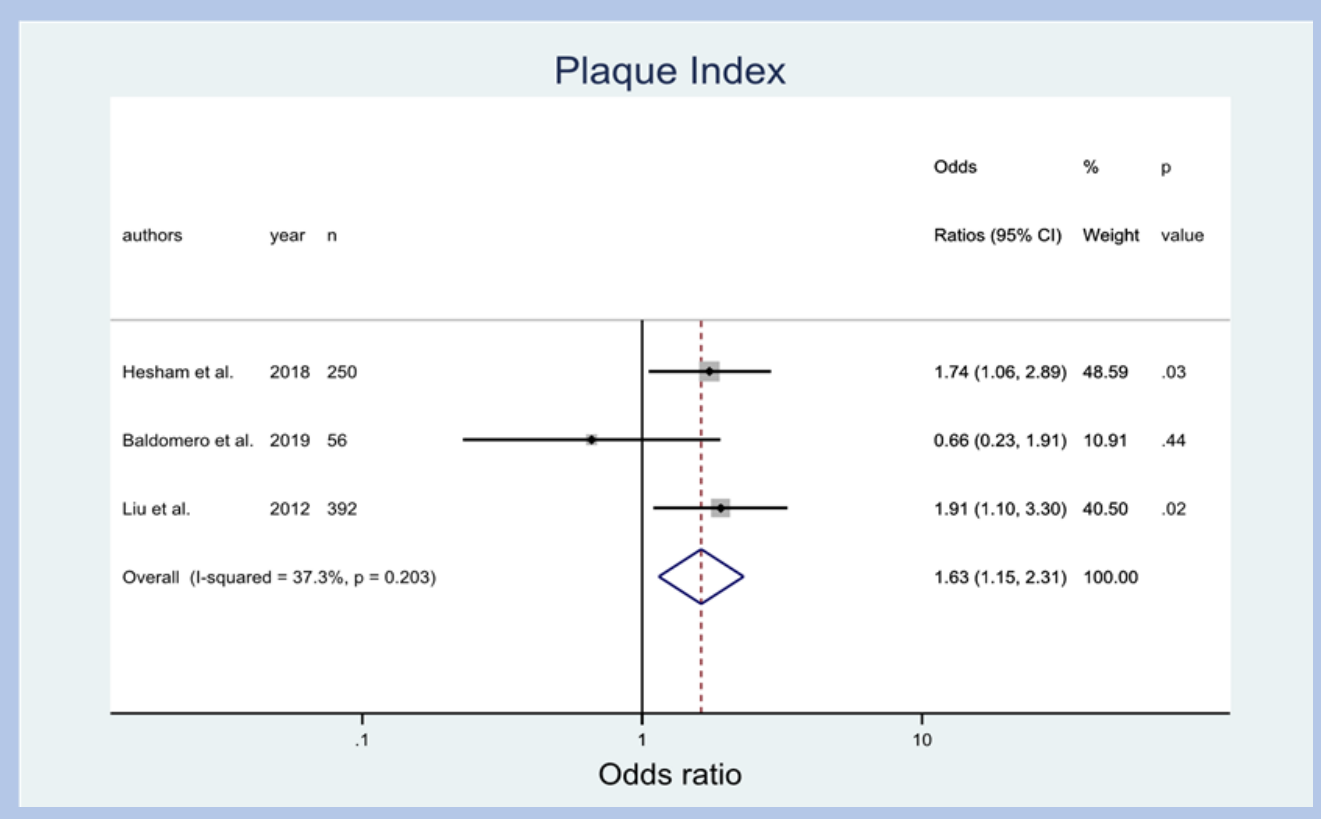
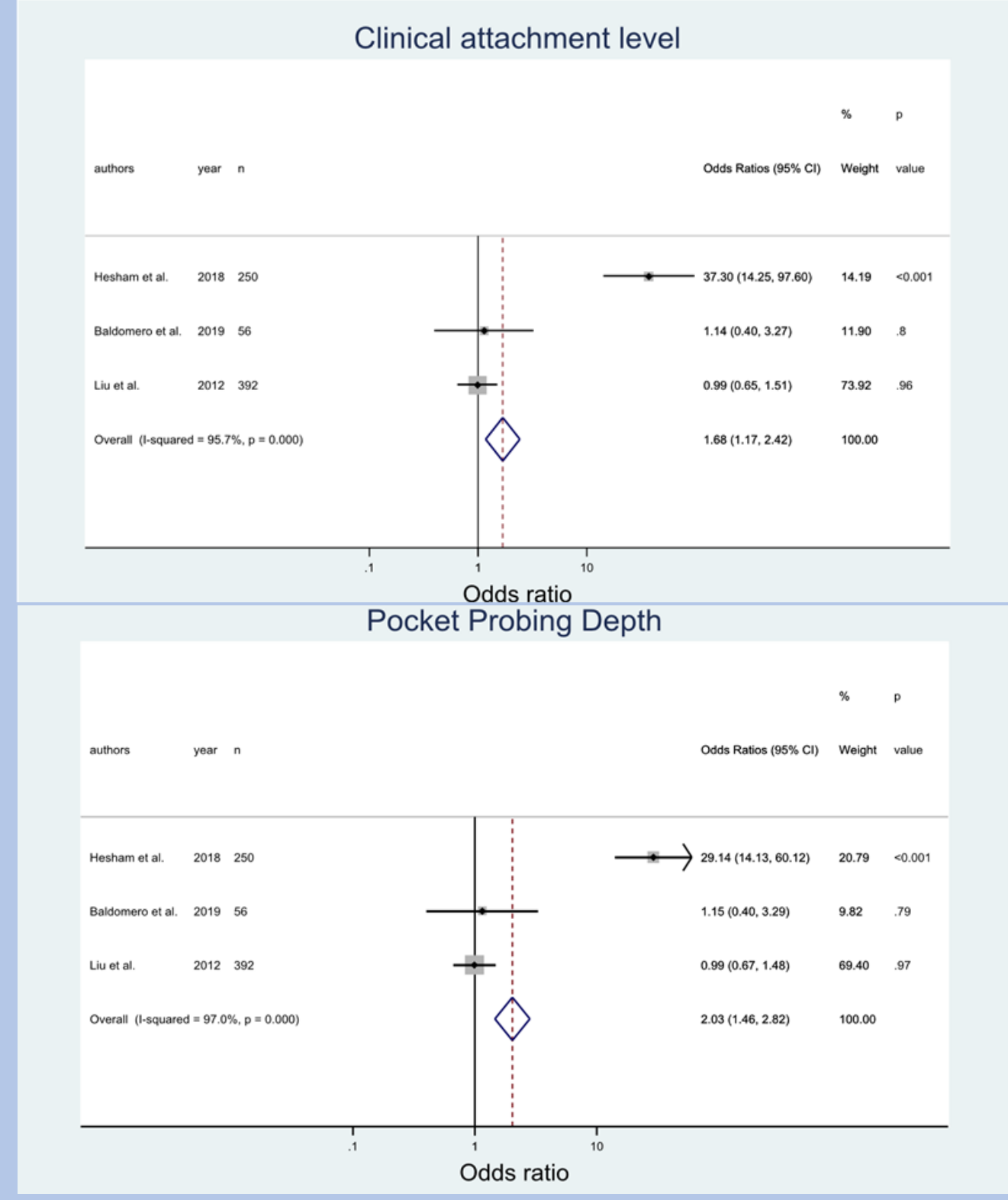
Study Selection

Study participants were adults diagnosed with COPD. Clinical trials, longitudinal, cohort, and case-control studies were included. The primary outcome was the reduction in the frequency of COPD exacerbations and secondary outcomes included quality of life, reduction in hospital admissions and treatment costs. Studies were assessed for eligibility and quality by two assessors independently.

Quality Assessment

- The methodological quality of non-randomised and case control studies was assessed using the Newcastle-Ottawa scale.
- The quality of randomised controlled trials was assessed using the criteria outlined in the Cochrane handbook for systematic reviews of interventions.
- The evidence level for each of the included studies was graded using the Oxford Centre for Evidence-Based Medicine recommendations.
- The risk of bias and quality of studies was assessed independently by three assessors (NK, LW, IEK).

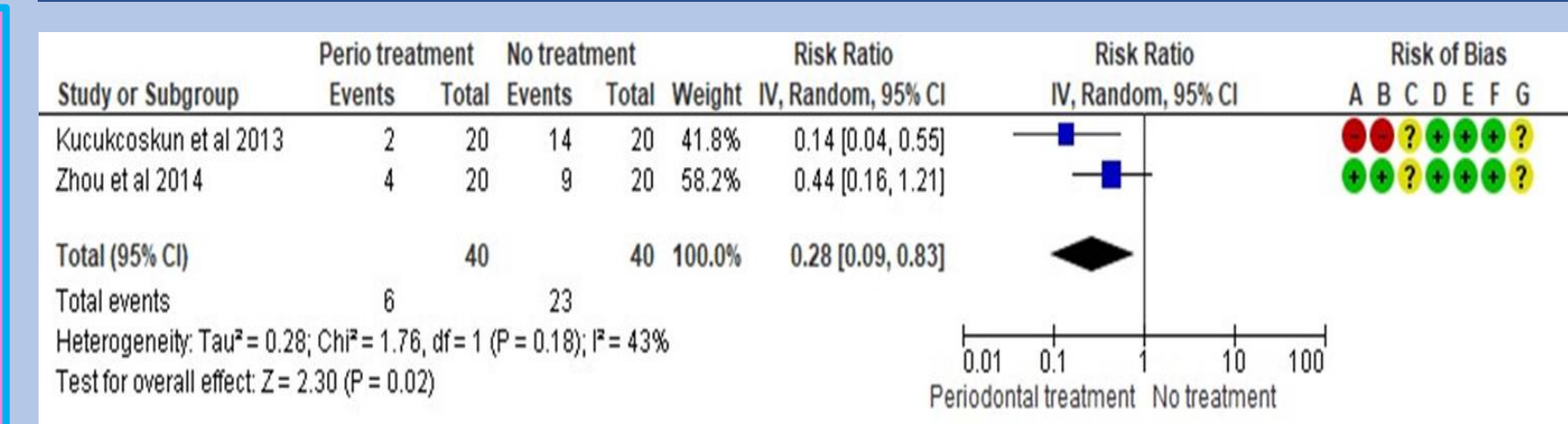
Meta Analysis



Results

- Searches identified 214 records. Eight articles met the inclusion criteria for the review, including four cross-sectional studies, a case control study and three clinical trials.
- The data from clinical trials showed a significant reduction in the frequency of exacerbations following periodontal treatment (RR 0.28; 95% CI 0.09-0.83, p=0.02).**
- Based on the random-effects model of pooled studies, poor periodontal parameters; plaque index (OR=1.63, 95% CI 1.15 to 2.31, p=0.01), probing pocket depth (OR=2.03, 95% CI 1.46 to 2.82, p<0.001) and clinical attachment loss (OR=1.68 (95% CI 1.17 to 2.42, p=0.01) were associated with increased risk of exacerbations.**
- Qualitative analysis revealed that improved periodontal health is associated with reduced hospitalisations and improved quality of life. The quality of the included studies, however, was low and there was evidence of heterogeneity.

Risk Ratio and Risk of Bias



CONCLUSION

The data supports an association between poor periodontal health and the frequency of COPD exacerbations. A limitation was the high risk of bias and the poor quality of some of the included studies.

FUTURE RESEARCH

Well randomised, adequately powered randomised controlled trials are required to establish whether the periodontal condition influences the frequency of COPD exacerbations.