

# Effect of psychological stress as a risk factor for periodontitis

## A systematic review and meta analysis



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### Background & Aim

Epidemiological studies regarding associations between psychological stress and periodontitis have reported inconsistent results. The current study aimed to review data on that potential association between psychological stress and periodontitis and, a meta-analysis should quantify the results of available studies on stress and risk of periodontitis.

### Methods

In advance, a search protocol was developed. Three databases, PubMed/Medline, Cochrane Library, and Web of Science, were searched for studies published from 1996 until June 2017 according to the PECO search strategy: adults (population P); psychological stress (exposure E); patients with and without psychological stress (comparison C); periodontitis (outcome O). Study selection was conducted by two independent reviewers (HS and BN). Risk of bias analysis was performed using the modified Newcastle-Ottawa scale. Meta-analysis was performed on the selected studies, and odd ratios (OR) with 95 % confidence intervals (CI) were calculated.

### Results

The primary search retrieved 218 studies. After applying inclusion and exclusion criteria, 26 observational studies (10 case control and 16 cross sectional studies) were included in the final analysis for data extraction and quality assessment (Fig.1). 14 studies reported an association between psychological stress and periodontitis, whereas 10 studies did not. For the remaining two studies, the association was only significant regarding certain types of stress. The risk of bias was medium to low in most studies. Meta-analysis was performed for the presence /absence of periodontitis (dichotomous) on 8 case-control and cross-sectional studies (Tab. 1). A random effects meta-analysis showed that the presence of stress is significantly associated with the risk of periodontitis (pooled OR 2.84; 95% CI: 1.76; 4.57). However, there was significant heterogeneity across studies (P value for chi<sup>2</sup> test was 0.0003; I<sup>2</sup> = 74 %) that may be explained by one study. By excluding that study, the pooled OR remained significant (2.13; 95 % CI: 1.77; 2.56), and heterogeneity decreased dramatically (I<sup>2</sup> = 0%), as shown in Tables 2 and 3.

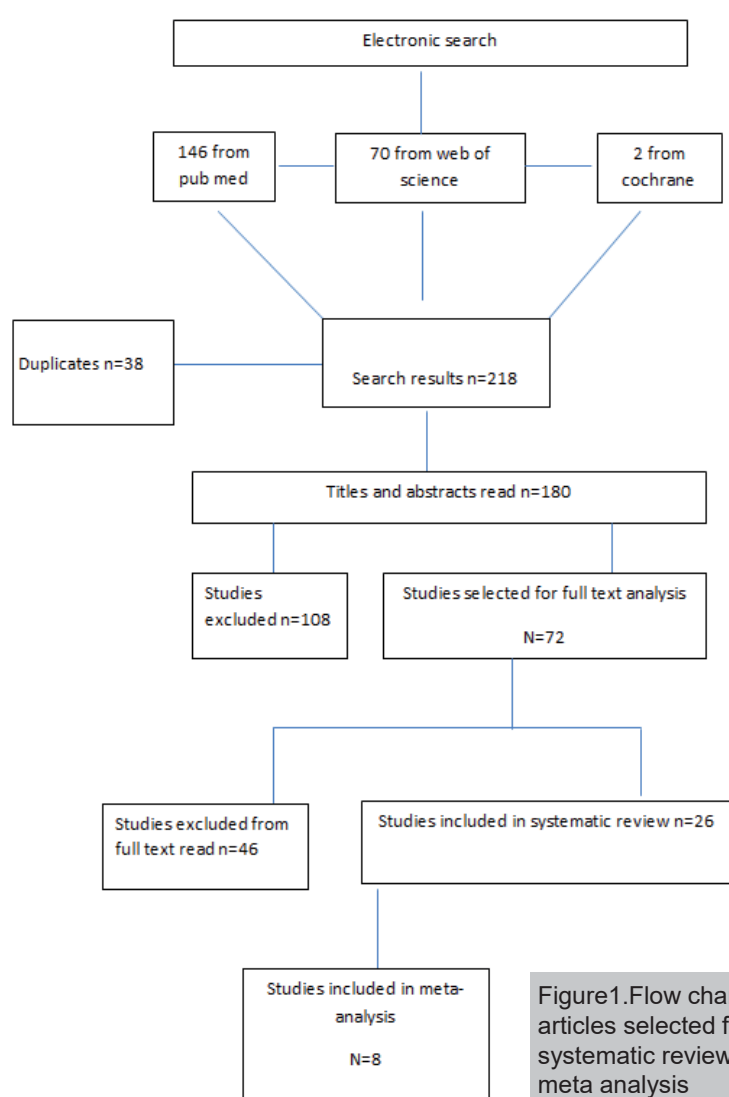


Figure 1. Flow chart of articles selected for systematic review and meta analysis

Author/ Country	Year of publication	Study design	Sample size (stress)	Sample size (no stress)	Odds ratio, 95% CI
Mousavijazi et al. / Iran	2013	Case Control	7	43	2.88 (0.50, 16.48)
Mannem et al. / India	2012	Cross sectional	73	38	31.27 (10.37, 94.31)
Arteaga et al. / Columbia	2010	Cross sectional	11	37	1.67 (0.31, 9.08)
Borrell et al. / USA	2011	Cross sectional	1618	3092	2.48 (1.84, 3.35)
Akter et al. / Japan	2005	Cross sectional	557	492	1.83 (1.40, 2.39)
Vettore et al. / Brazil	2003	Case control	24	55	1.23 (0.41, 3.67)
Moss et al. / USA	1996	Case control	25	123	2.20 (0.90, 5.36)
Spalj et al. / Japan	2008	Cross sectional	71	53	3.35 (1.59, 7.08)

Table 1. Studies included in meta-analysis

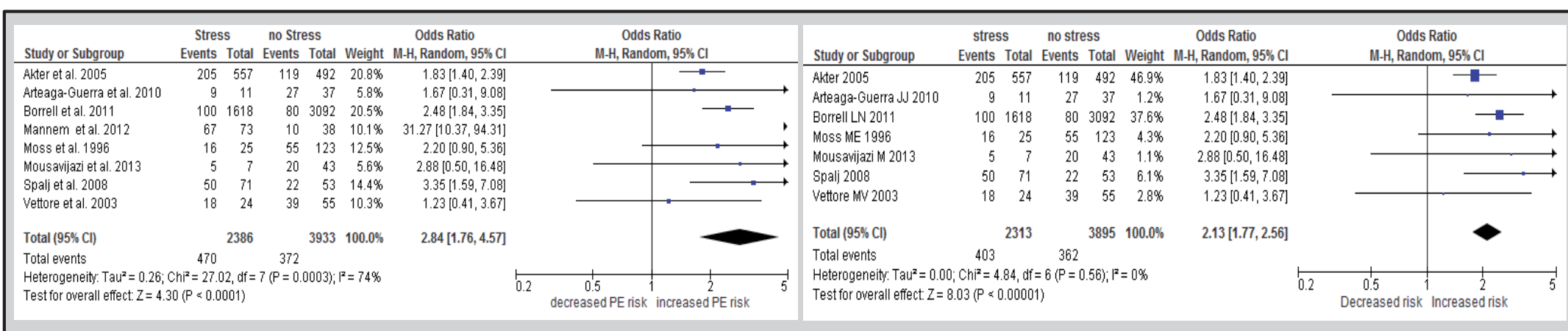


Table 2 & 3. Forest plot for association between psychological stress and periodontitis.

### Conclusion

The systematic review and meta-analysis showed an increased risk of periodontitis in subjects exposed to psychological stress. However, the different parameters in assessing periodontitis and stress were the main drawback in this analysis. Further well-designed longitudinal studies and standard parameters are necessary to confirm the role of stress as a risk factor for periodontitis.