

Biomarkers Associated with Obstructive Sleep Apnea and Morbidities: A Scoping Review

De Luca Canto G^{1,2}, Pacheco-Pereira C², Aydinov, S^{3,4}, Major PW², Flores-Mir C², Gozal, D⁴

¹ Department of Dentistry, Federal University of Santa Catarina, Brazil.

² Department of Dentistry, University of Alberta, Canada.

³ Pediatrics at GATA Haydarpasa Teaching Hospital, Istanbul, Turkey.

⁴ Department of Pediatrics, The University of Chicago, USA.

OBJECTIVE

To map potential biomarkers of obstructive sleep apnea (OSA)-associated morbidities in both adults and children, to identify gaps in current evidence, and to determine the value of conducting a full systematic review.

METHODS

Eligibility Criteria. Retained articles were only those studies whose main objective was to identify morbidity biomarkers in subjects with OSA, the latter being confirmed with a full overnight polysomnography (PSG) in a laboratory or at-home settings.

Search. Detailed individual search strategies for Cochrane, MEDLINE, EMBASE, PubMed, and LILACS were developed. The references lists from selected articles were also checked. A partial grey literature search was undertaken using Google Scholar.

Study Selection. In phase 1, two reviewers independently reviewed the titles and abstracts. In phase 2, the same selection criteria were applied to the full articles. At both stages a third author was involved when disagreements emerged among the two primary evaluators.

Data Collection Process and Data Items. One author collected the required information from the selected articles. A second author crosschecked all the retrieved information.

Level of Evidence. The methodology of selected studies was classified using a non-validated adaptation of the evidence quality criteria from American Academy of Pediatrics.

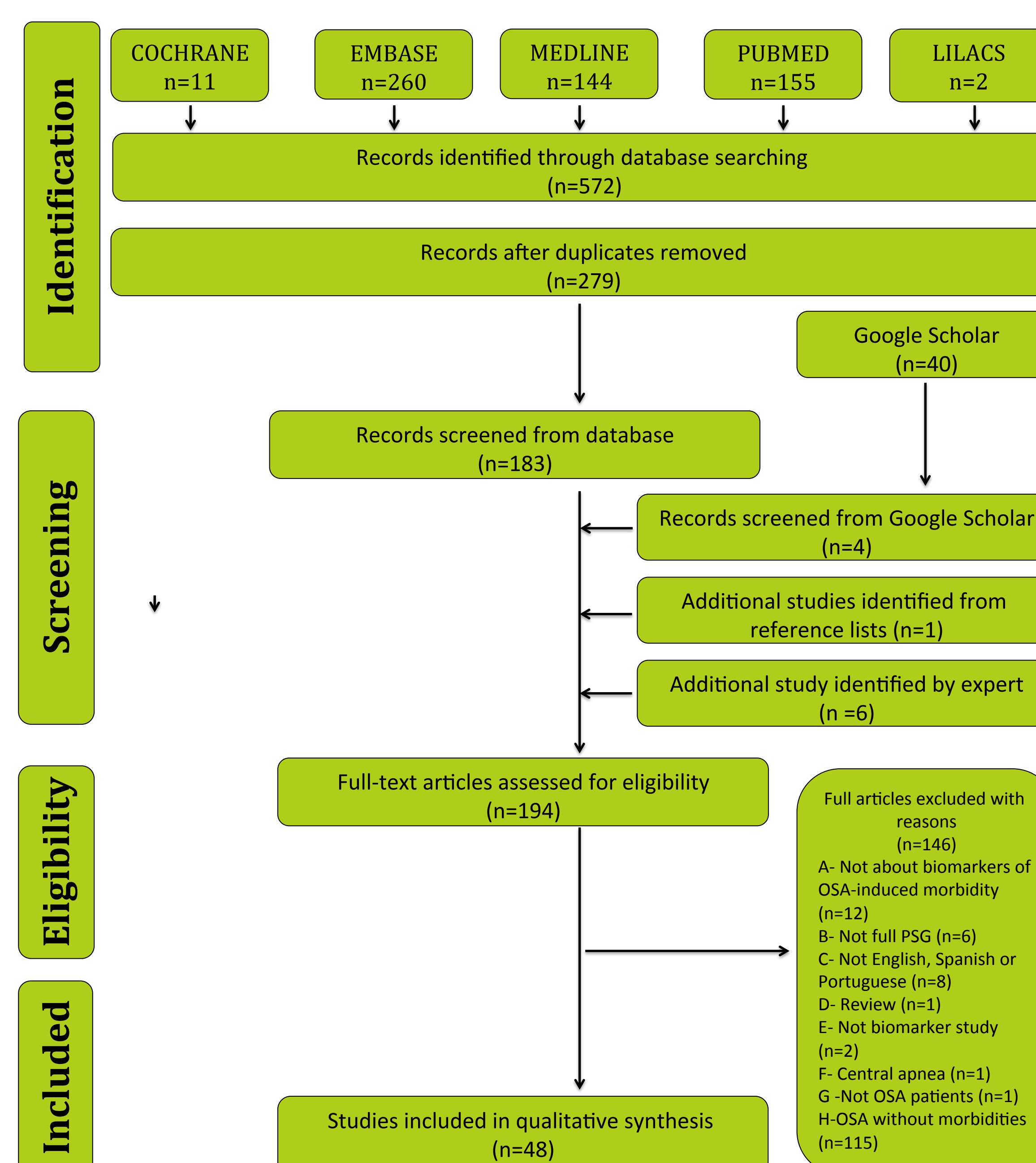
Collating, summarizing and report the results. Any outcome measurement was considered (risk ratio (RR), odds ratio (OR) or risk difference for dichotomous outcomes; mean difference or standardized mean difference for continuous outcomes; sensitivity and specificity in diagnostic studies).

RESULTS

Thirty-four studies were conducted in adults and 14 involved children.

Most of the studies evaluated blood biomarkers, and presented 31 potential diagnostic biomarkers (Table)

A flow chart of the process of identification, inclusion, and exclusion of studies is shown in Figure.



Potential Biomarkers	Children	Adults
8-isoprostane	✓	
Adiponectin	✓	
AGEs		✓
AOPP		✓
APOE4	✓	
Calprotectin		✓
Catecholamines	✓	
Catestatin	✓	
CRP	✓	✓
Cystatin C		✓
FFA		✓
FRAP		✓
FRAS		✓
Fructosamine		✓
GGT		✓
IL-6	✓	✓
IL-8		✓
HOMA	✓	
KL-6		✓
Leptin		✓
Lipid profiles		✓
MRP8/14	✓	
NP		✓
Resistin		✓
sTNF-RI		✓
S100B		✓
sVCAM-1		✓
TAC		✓
TBARS		✓
TNF-α	✓	
Urinary Neurotransmitters	✓	

CONCLUSION

The majority of studies that performed explored blood-based biomarkers, with most not identifying definitive morbidity biomarkers. Of the potentially promising morbidity biomarkers, plasma IL-6 and high sensitivity C-reactive protein appear to exhibit a favorable profile, and may discriminate OSA patients with and without morbidities in both adults and children. MRP 8/14 was retained in children as well as cardiovascular morbidity-associated biomarker. Urinary neurotransmitters may also provide a good tool for screening OSA cognitive morbidity in children.