

# Smoking Cessation Strategies in Patients with Rheumatoid Arthritis: A Systematic Review and Meta-Analysis

## Background

- >1% of the US population has been diagnosed with rheumatoid arthritis (RA)
- Up 30% of people with RA smokes in the US, which exceeds people without RA who do not smoke (15%)
- For people with RA, smoking has been associated with poor health outcomes, such as decreased response to treatment, increased cardiovascular risk, and decreased quality of life
- The benefits of smoking cessation are potentially numerous, however despite current guidelines on smoking cessation, approximately only 10% of rheumatology visits with patients who smoke include documentation of cessation counseling or follow-up advice.

## Objective

To identify smoking cessation strategies and synthesize the reported cessation rates and the effects of the interventions effects in patients with RA

## Methods

### Information Sources

We searched 5 electronic databases (MEDLINE, EMBASE, Cochrane, CINAHL, and Web of Science) from inception until August 2020. Sources of gray literature (unpublished records) were searched through ClinicalTrials.gov. Reference lists of included articles were hand-searched to look for articles otherwise not found.

### Eligibility Criteria

We included controlled trials and observational studies reporting the effects of interventions for smoking cessation in adult patients with RA in any setting

### Procedure

Screening, data collection, risk of bias assessment were done independently by two reviewers. Studies were using the risk of bias tool (RoB) and the risk of bias in non-randomized studies (ROBINS-I).

### Outcomes

We collected smoking cessation outcomes, referrals to smoking cessation services, knowledge about the benefits of smoking cessation, and disease measures.

## Results

Our search found 628 citations and found only 20 publications (17 studies) meeting our eligibility criteria (Figure 1).

Table 1 shows the study characteristics.

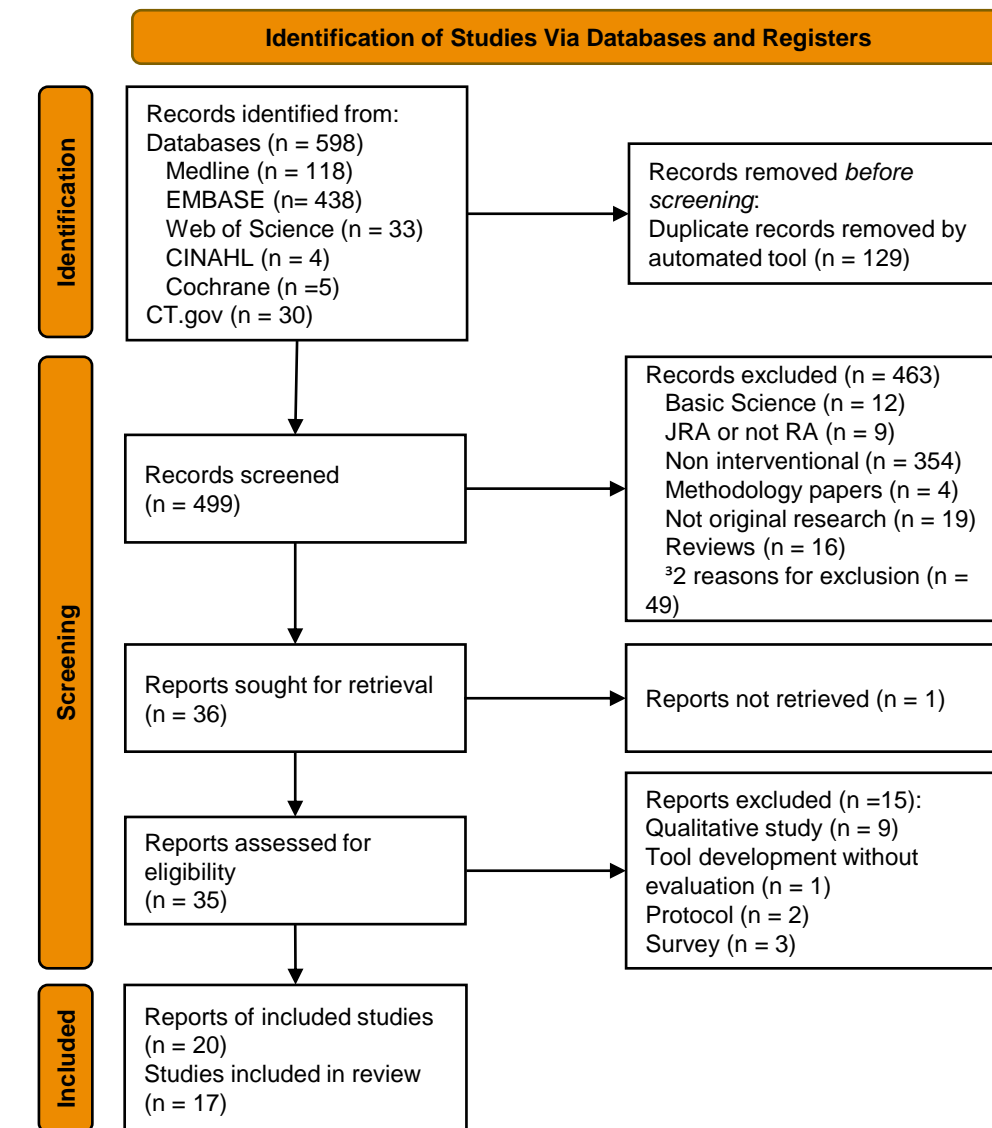


Figure 1. Diagram of study selection.

Types of Publication	Abstracts	11
	Full Text	6
Location of Study	UK	5
	USA	3
	NZ	2
	Croatia, France, India, Ireland, Scotland, Spain, Sweden	1
Study Design	Before & After	8
	Randomized Control Trial	3
	Control Trial	1
	Prospective Cohort	5
# of Centers:	Single center	15
	Multicenter	2
Setting	Academic	6
	Community	10
	Not Reported	1
Follow-up	Ranges from 3 months to 2 years	

Table 1. Characteristics of included studies.

- Figure 2 shows intervention strategies reported in included studies.
- Most non-randomized studies were assessed at critical risk of bias (Figure 3).
- 1 month to 2 years after the implementation of the cessation strategy, the pooled smoking cessation rate was 33% (Figure 4) and referrals to quit services increased from 4% to 23% (Table 2).

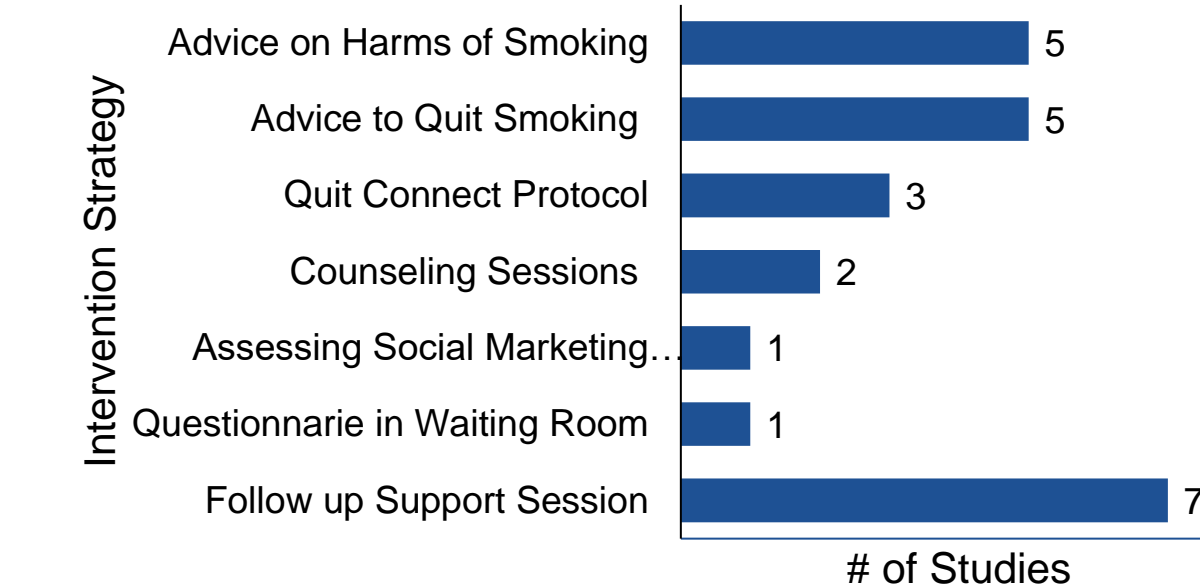


Figure 2. Types of intervention strategies in included studies.

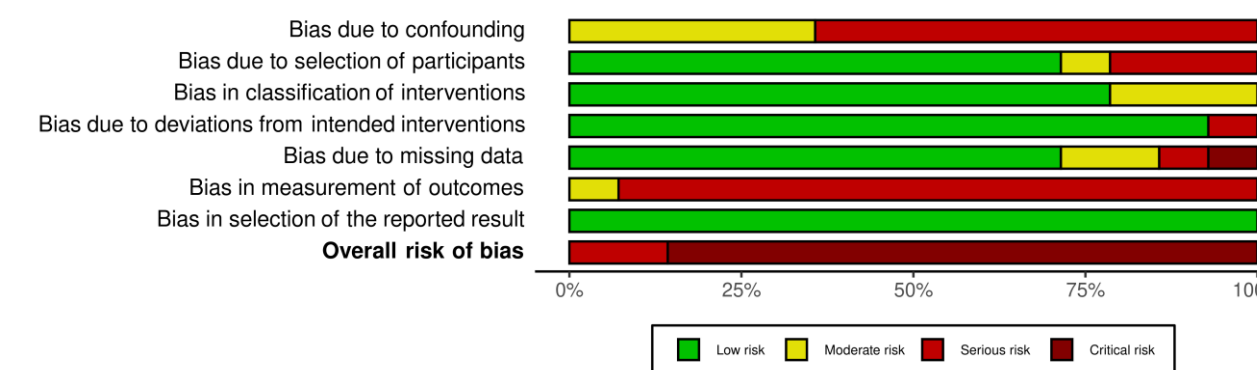


Figure 3. Weighted bar plots showing the risk of bias of individual studies.

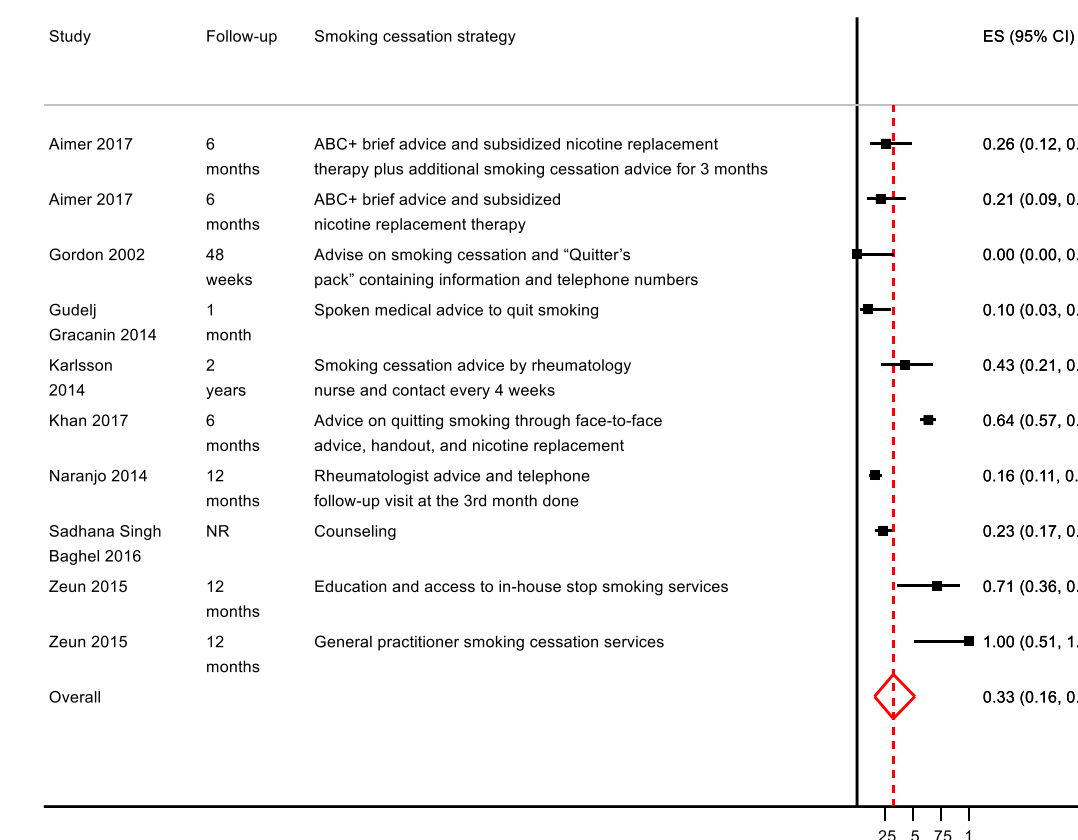


Figure 4. Self-reported smoking cessation

Secondary Outcomes	# of Studies	Pooled Rates (CI)	
		Pre-Intervention	Post-Intervention
Smoking Status	6	20% (19% to 21%)	23% (21% to 26%)
Number of Cigarettes Smoked	3	11.5 (2.2 to 20.7)	9.0 (1.4 to 16.6)
Referral to Quit Lines for Smoking Cessation	4	4% (0% to 12%)	23% (7% to 44%)
Knowledge About the Benefits of Smoking Cessation	1	Is there is a link between RA and smoking?	15/291
		Can smoking lessen the effect of RA treatment?	12/289
		88/340	165/340

Table 2. Synthesis of results of secondary outcomes.

## Disease Measures

- One study compared participants who quit smoking versus participants continuing smoking. The mean DAS28-CRP was higher in patients who continued smoking compared with patients who quit smoking (4.9 vs 2.9, respectively) (MD -2.0, 95% CI -2.3 to -1.7).
- Another study found that the Health Assessment Questionnaire (functional ability tool) score improved from 0.57 to 0.0 in the patients who quit versus 0.75 to 0.26 in patients who continued smoking (MD -0.26, 95% CI -0.84 to 0.32). Lower score indicates better functional ability.

## Conclusions

- Studies largely varied in patient characteristics, the interventions used, and their implementation structure.
- Only three studies were randomized clinical trials.
- The smoking cessation rate observed after the implementation of the reported strategies was lower than the published national rate of 62%.
- Additional controlled studies are needed to determine best practices for smoking cessation education, counsel, and pharmacological treatment offered to patients with RA.