

# SMOKING CESSATION INTERVENTIONS FOR COLLEGE STUDENTS. A META-ANALYSIS

Miren I Pardavila-Belio<sup>1</sup>, Navidad Canga-Armayor<sup>2</sup>, Cristina García-Vivar<sup>3</sup>, Estefanía Toledo<sup>3</sup>, Ana Canga-Armayor<sup>2</sup>, Karla Y Mijangos-Fuentes<sup>1</sup>

School of Nursing, University of Navarra. 1. MS; BN. 2. PhD; BN. 3. PhD; MS; BN.

## BACKGROUND

Tobacco use and the exposure to tobacco smoke are associated with premature death from chronic disease, economic losses to society, and substantial burden on the healthcare system (Centers for Disease Control and Prevention, 2008). In young adults, the more immediate health effects include increased respiratory symptoms, as shortness of breath, persistent cough, wheezing and increased breathlessness after exercise (Oliveira-Vianna et al., 2008), and cardiovascular diseases (U.S. Department of Health and Human Services, 2012).

While people start using tobacco in early adolescence (before age 18), the college years are a critical time in the development of smoking behavior and tobacco use (Centers for Disease Control and Prevention, 2007). In fact some undergraduates start smoking at university and the consumption of smoking is consolidated at this age (Brown, 2013). However, most tobacco programs, for this group of age, are based around prevention and not in cessation of tobacco use.

## OBJECTIVE

To evaluate the effectiveness of smoking cessation programs for college students.

## METHOD

This meta-analysis was conducted according to the PRISMA Statement.

A systematic search (PubMed, CINAHL, PsycINFO (OVID), ISI Web of Knowledge, Cochrane Plus, Cochrane Tobacco Addiction Group, and CUIDEN) was performed to identify eligible articles. The reference list of identified studies was also examined. Randomized controlled trials (RCT) and quasi-randomized trials (QRT) comparing a smoking cessation program for college student versus traditional approach. The studies were considered eligible if they primary outcome was the incidence of smoking cessation and if they follow-up was longer than 6 month. The selection studies ( $k = 0.88$  ( $p > 0.001$ )) and the quality of studies ( $k = 1$  ( $p > 0.001$ )) was made independently by 2 authors. Odds ratios (OR) were summarized for each individual study and a pooled OR using the random effects model was estimated. To assess statistical heterogeneity between summary data and a trial level Cochran's Q statistic ( $p < 0.10$ ), the I<sup>2</sup> statistics ( $I^2 > 50\%$ ) and between-study variance ( $\tau^2$ ) were used. Publication bias was assessed using Begg's Correlation Model test, and Egger's Regression Model.

## RESULTS

Figure 1 shows the results of the literature review. A total of six RCT and two QRT (O'Neill et al, 2000; Hellman et al, 2000; Herman and Fahlander, 2003; An et al, 2008; Abrams et al, 2008; Prokhorov et al, 2008; Tevyaw et al, 2009) with a total of 1594 participants met the inclusion criteria. These studies were conducted between 2000 and 2009 in colleges and universities in the United States. The characteristics of these studies are presented in Table 1.

The principals characteristics of the participants of the six studies included are ( $n = 1243$ ):

- The mean age in the intervention group was 20.9 and the participants in the control group had a mean age of 21.0.
- The average number of cigarettes smoked daily was 8.52 in the intervention group, and 8.07 in the control group.
- Female participants represented 73.1% of the population in the intervention group, and 72.3% in the control group.
- Prochaska's Stages of Change (Prochaska and DiClemente, 1983), 57.0% of participants in the intervention group and 56.4% of participants in the control group were in the contemplation phase.

Figure 2 illustrates the incidence of smoking cessation for the intervention. Publication bias was not evident according to Begg's Correlational Model ( $\tau = 1.13$ ;  $p = 0.26$ ), or to Egger's Regression Model ( $a = 0.36$ ;  $p = 0.58$ ).

Figure 1: Flowchart of meta-analysis

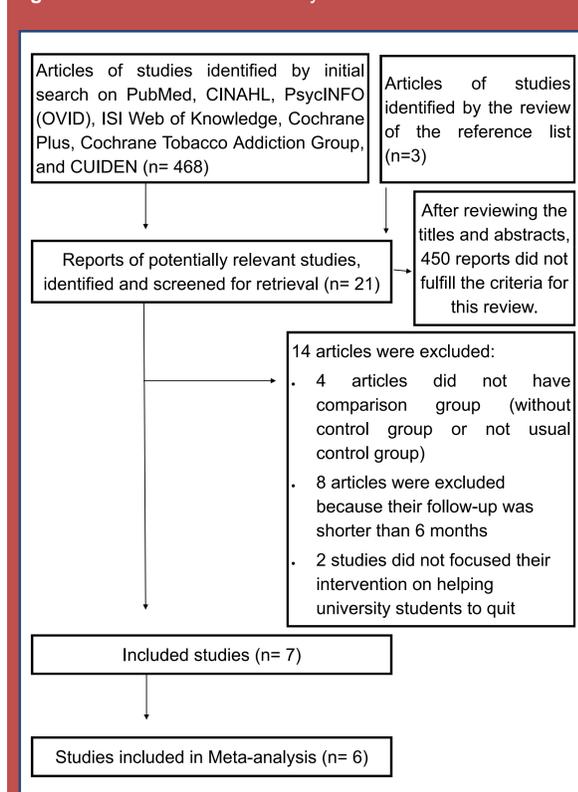
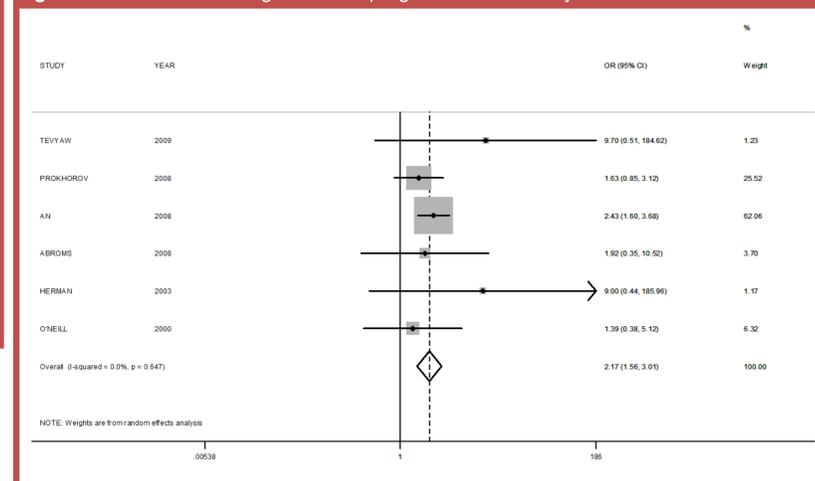


Table 1: Summarized characteristics of the seven studies included in the meta-analysis.

Author (publication year)	Country	Design	Intervention/control	Theoretical basis for the intervention	Enrolment	Follow-up	Verification of smoking status
Tevyaw et al (2009)	USA	RCT	55:55	Contingency Management, Motivational Enhancement	Advertisements posted on campuses, in students newspapers	6 months	Expired CO levels, Salivary cotinine sample
Abrams et al (2008)	USA	RCT	48:35	Bandura's Theory	Advertisements in students' newspapers; staff study tables and promotional activities	30 weeks	Salivary cotinine sample
Prokhorov et al (2008)	USA	RCT	207:219	Health Belief Model, Trans-theoretical Model of Change	Advertisements posted on campuses, in students' newspapers; staff study tables and promotional activities	6 months	Salivary cotinine sample
An et al (2008)	USA	RCT	257:260	Bandura's Theory; Problem Behaviour Theory	Email invitations to complete a 46-item health screening survey; if they fulfilled the inclusion criteria, they were invited to join the study.	10 months	Expired CO levels
Herman and Fahlander (2003)	USA	QRT	20:20	Motivational Interviewing	Not Specified	6 months	Self-report
O'Neill et al (2000)	USA	RCT	31:34	Trans-theoretical Model of Change	Recruitment questionnaire including an assessment of their current smoking status; if candidates fulfilled the inclusion criteria, they were contacted by telephone and invited to participate in a study on "computer-based health education."	7 months	Self-report
Hellman et al (2000)	USA	QRT	172:179	Brief Advice	Students visiting health services were asked if they smoked. Smokers were invited to participate in the research.	6 months	Self-report

Figure 2: Effects of smoking cessation programs on university students



## CONCLUSION

- This meta-analysis suggests that programs specifically designed for college students are more effective than traditional tobacco cessation programs.
- Further high-quality intervention studies are needed (Brown, 2013).
- To reduce bias and heterogeneity among studies, power calculation, an adequate follow-up (at least, 6 months), and cotinine as biochemical validation, should be included
- To generalize our results more interventions should be tested in other countries.

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