Smoking cessation interventions in nurses and other health care workers

Interventi volti alla cessazione del fumo negli infermieri e in altri professionisti sanitari

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Abstract

Introduction: Tobacco smoking can be considered an old and a new challenge for public health. The aim of this review was to analyse different smoking cessation interventions aiming at health care workers.

Methods: A literature search of electronic journal databases for studies on smoking cessation interventions among health care workers was performed according to PRISMA criteria, using the MEDLINE and Scopus databases.

Results: Smoking restriction policies shouldn't be considered as actual interventions, being ineffective, unpopular and reducing willingness to quit smoking in many subjects. Even though pharmacological therapies based on bupropion SR and transdermal nicotine patches grant significant results on the short-term (weeks and months), smoking recurrence rates are high and individualised interventions should be preferred or integrated since they seem to grant better results on the long-term (years).

Conclusions: There is evidence that smoking cessation interventions among health care workers can be effective. This is of particular interest both for reducing tobacco smoking prevalence among this type of workers and for helping them to be useful model for the general population.

Keywords

Smoking; Cessation; Health care workers; Systematic review

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Introduction

Tobacco smoking is the leading preventable cause of the most important diseases such as lung cancers, chronic obstructive pulmonary disease and of coronary heart disease and it is also responsible of overall mortality accounting for more than 20% of all deaths in developed countries [1].

The treatment of tobacco-related diseases makes up an economic burden to the health care system as well as to society due to the fact that almost half of those who die due to smoking die before the age of 70 [2]. Health care professionals have an important role to play both as advisers – influencing smoking cessation – and as role models.

Smoking among nurses has been recognised as a serious concern affecting the profession since the 1970s, when female registered nurses smoked at a higher rate (38.9%) than women in the US population (32.0%) and at a substantially higher rate than physicians (21%) [3].

Smoking is both a matter of personal health and a public health concern for healthcare providers [4-7]. A number of studies have pointed to the potential value of nurses taking an active role in facilitating smoking cessation in general population [8-10]. Nurses could be the largest workforce providing effective smoking cessation interventions, and powerful advocates for tobacco free communities. However, despite recognition of their professional responsibility as models of good health practices and known health risks associated with smoking, many nurses continue to smoke [11,12].

It has been suggested that the smoking behaviour of nurses potentially impairs their role in altering patterns of smoking in the general public [13-15]. Nurses who smoke downplay their role in patient education and tend to show a more negative attitude towards patients. Moreover, it has been proposed that before nurses can serve as role models for positive health behaviours, they must incorporate these behaviours into their own personal lifestyles [16-19].

Nurses who smoke should set an example by quitting smoking both for themselves and their patients, so healthcare workers staff attitudes towards smoking have been shown to be important in determining the effectiveness of workplace smoking policies [20].

Aim of this review is to identify the most effective smoking cessation interventions for nurses and other health care workers.

Methods

We performed literature searches of electronic journal databases for studies on smoking cessation interventions among health care workers, according to PRISMA criteria [21].

Searched databases were MEDLINE and Scopus. The keywords used were: "smoking cessation"; "smoking cessation intervention"; "quit smoking"; "non-smoking policy"; "health care workers"; "health care professionals"; "hospital staff"; nurse; physician. We performed searches for: "smoking cessation" AND "health care workers"; "smoking cessation" AND "health care professionals"; "smoking cessation" AND "hospital staff"; "quit smoking" AND "health care workers"; "quit smoking" AND "health care professionals"; "quit smoking" AND "hospital staff"; "smoking cessation intervention" OR "quit smoking" OR "non-smoking policy" AND nurse; "smoking cessation intervention" OR "quit smoking" OR "non-smoking policy" AND physician. Search criteria are summarised in Figure 1. The inclusion criteria were prospective studies, observational studies and clinical trials evaluating smoking cessation interventions among nurses and other health care workers published in English. We excluded reviews and studies not pertaining smoking cessation interventions. This literature review was completed in December 2010. Duplicates were removed using RefWorks Web Based Bibliography Management Software. Quality assessment of the clinical trials included in this review is shown in Table I and was performed according to Jadad scale, ranging from 0 (poor) to 5 (rigorous) [22].

Response rate	1. Initial response rate > 75% 2. Comparison of persons who did and did not participate 3. Follow-up rate > 75% 4. Comparison of who were and were not lost to follow-up
Study design	5. Method of determining the smoker subjects described and appropriate 6. Specific "smoker" condition criteria given 7. Intervention efficacy validation method described and appropriate
Data analysis	8. Demographic data listed 9. Statistical analysis demographic data 10. Precise p values 11. Statistic test specified

Table I. Scoring items used to assess the quality of prospective and observational studies in this review. Adapted from Angelillo-Villari [23]
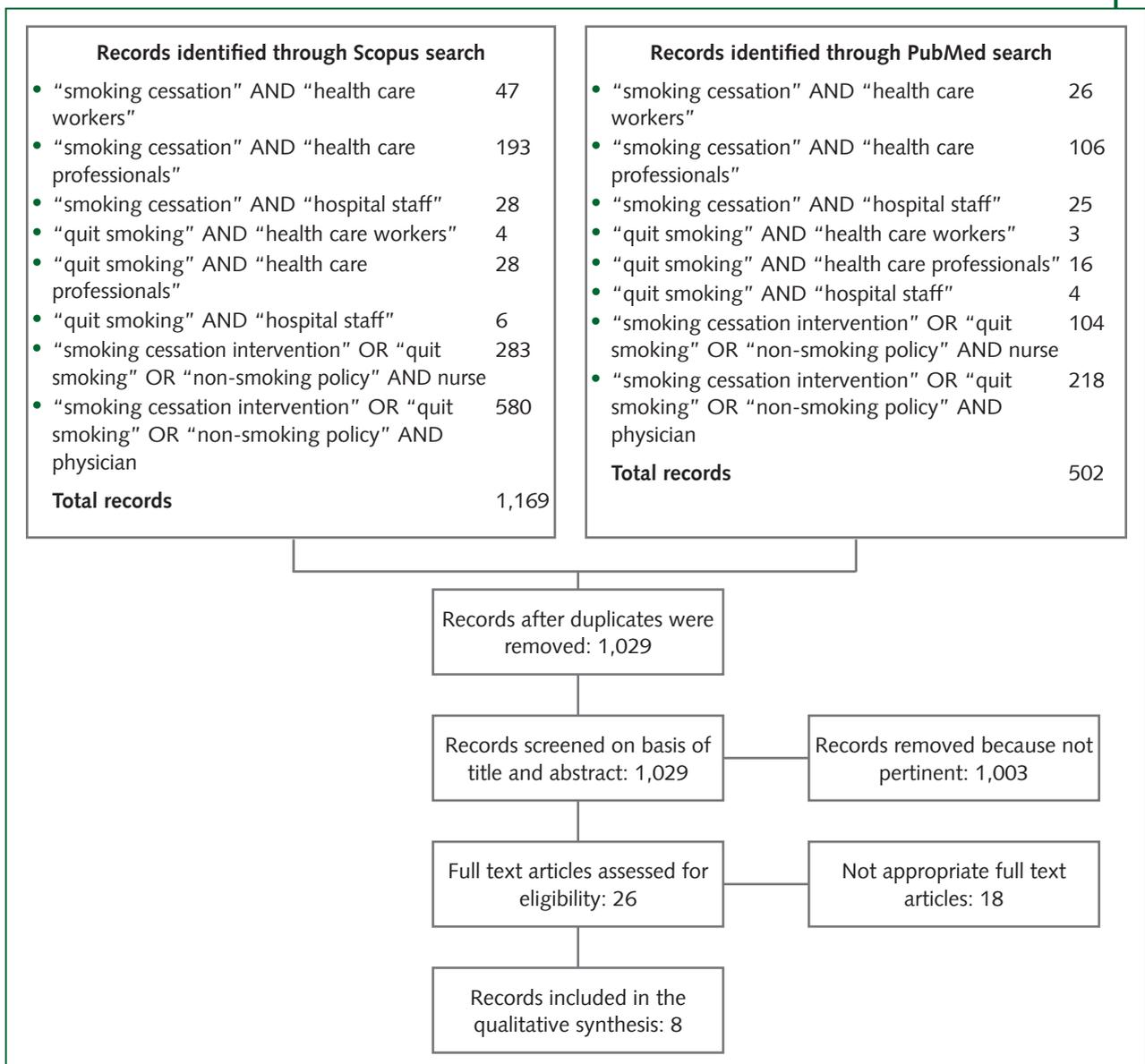
Records identified through Scopus search

- "smoking cessation" AND "health care workers" 47
- "smoking cessation" AND "health care professionals" 193
- "smoking cessation" AND "hospital staff" 28
- "quit smoking" AND "health care workers" 4
- "quit smoking" AND "health care professionals" 28
- "quit smoking" AND "hospital staff" 6
- "smoking cessation intervention" OR "quit smoking" OR "non-smoking policy" AND nurse 283
- "smoking cessation intervention" OR "quit smoking" OR "non-smoking policy" AND physician 580

Total records 1,169

Records identified through PubMed search

- "smoking cessation" AND "health care workers" 26
- "smoking cessation" AND "health care professionals" 106
- "smoking cessation" AND "hospital staff" 25
- "quit smoking" AND "health care workers" 3
- "quit smoking" AND "health care professionals" 16
- "quit smoking" AND "hospital staff" 4
- "smoking cessation intervention" OR "quit smoking" OR "non-smoking policy" AND nurse 104
- "smoking cessation intervention" OR "quit smoking" OR "non-smoking policy" AND physician 218

Total records 502

Records after duplicates were removed: 1,029

Records screened on basis of title and abstract: 1,029 → Records removed because not pertinent: 1,003

Full text articles assessed for eligibility: 26 → Not appropriate full text articles: 18

Records included in the qualitative synthesis: 8

Figure 1. Study selection flow diagram

Author, year	Study design	Workers involved (subjects included)	Methods	Main results	Quality assessment
Bloor, 2006 [25]	Observational study with anonymous questionnaire	Nurses (92)	All the nurses of a psychiatric hospital were administered a questionnaire after the introduction of a smoking restriction policy. The questionnaire consisted of questions on smoking habits (number of cigarettes per day, previous attempts of smoking cessation, etc.), 21 questions investigating nurses opinion on the smoking restriction policy in public places (evaluated with a five level Likert scale) and items addressed only to smoking nurses about their competence with smoking cessation educational interventions	71.8% of the nurses believed that the restriction policy was not effective in motivating to quit smoking. 82.5% believed that staff should have the right to smoke at work. 82.6% believed that non-smokers should not be in contact with smoke. 75% declared that being a smoker didn't affect the ability to give advice on smoking. Only 11 (34.3%) of the 32 nurses who smoke planned to quit smoking	Modified Angelillo-Villari score: 3/11 Response rate: 2 Study design: 0 Data analysis: 1
Etter, 2008 [26]	Observational study with anonymous questionnaire	Nurses and physicians (57)	To assess the impact of a partial smoking ban followed by a total smoking ban in a psychiatric hospital, anonymous administered. The target sample included all patients and staff present at the time of data collection. The questionnaires covered age, sex and smoking status, opinions about the no-smoking policy, perceived exposure to environmental tobacco smoke, smoking behaviour and smoking cessation interventions received from hospital staff	Exposure to environmental tobacco smoke decreased after the partial ban and further decreased after the total ban. Among nurses and physicians many participants (59.6%) commented that the total ban was too strict, and most preferred the partial ban. The total ban was not followed by any change in smoking prevalence or cigarette consumption	Modified Angelillo-Villari score: 7/11 Response rate: 2 Study design: 1 Data analysis: 4
Kannegaard, 2005 [27]	Observational study with anonymous questionnaire and comparison with a similar study	Hospital staff (729)	Results of two surveys about smoking among hospital staff. Results are compared in order to provide changes in smoking habits in a hospital which was about to start a smoking restriction policy 2 years after the first survey and a few months after the second survey. Both surveys utilised an anonymous questionnaire sent via ordinary mail to every member of the staff (both fulltime and part-time workers). Questions investigated smoking habits, passive smoking, discomfort caused by smoking in the hospital, age, gender, occupation	Number of smokers among hospital staff diminished from 33% to 26% after 2 years. According to the survey those who kept on smoking were less willing to quit smoking at the end of the study and were also reluctant to accept any smoking cessation intervention	Modified Angelillo-Villari score: 7/11 Response rate: 2 Study design: 1 Data analysis: 4
Dalsgareth, 2004 [28]	Randomised clinical trial	Hospital staff (336)	Randomised double-blind clinical trial. The study lasted 26 weeks. 222 patients in the experimental group were administered bupropion SR for 7 weeks, 114 patients in the control group were administered a placebo. Follow-up visits were set at 3, 7 and 19 weeks after the end of the treatment protocol. Diary cards and measurement of the carbon monoxide concentration in the exhaled air were used to assess the abstinence	After 7 weeks 43% of the patients in the experimental group and 18% of the patients in the control group were abstinent (p < 0.001). The number of continuous abstinents declined during the observation period to 23% in the experimental group and 11% in the control group at the end of the study (p = 0.007)	Jadad scale: 5/5 Randomisation: described, appropriate (+2) Blinding: double blind, appropriate (+2) Withdrawals and dropouts: described (+1)

Table continues >

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Author, year	Study design	Workers involved (subjects included)	Methods	Main results	Quality assessment
Zellweger, 2005 [29]	Prospective clinical trial	Psychiatrists and nurses (687)	Prospective double-blind randomised clinical trial. Bupropion SR was administered to the experimental group (517 subjects) with the purpose of stopping smoking. Placebo was administered to the control group (170 subjects). The treatment lasted 7 weeks. They were also administered two questionnaires to measure anxiety, smoking addiction, anger and withdrawal. Participants were followed for 52 weeks with phone calls and medical visits	Treatment with bupropion SR was well tolerated by participants and adverse events were comparable to those of previous studies. Bupropion SR was superior to placebo in reducing smokers prevalence (50% vs. 40% at week 4; p = 0.013). Statistical differences were not maintained after withdrawal of the treatment due to high placebo response	Jadad scale: 5/5 Randomisation: described, appropriate (+2) Blinding: double blind, appropriate (+2) Withdrawals and dropouts: described (+1)
Glavas, 2003 [30]	Prospective clinical trial	Physicians and nurses (112)	Prospective randomised double-blind clinical trial. Each patient in the experimental group (56 subjects) was administered daily transdermal nicotine system patches. The control group patients (56 subjects) were administered identical placebo patches. Follow-up visits were set at 7, 14 and 21 days and after 5 years. Abstinence was assessed through a questionnaire and measuring carbon monoxide concentration in the exhaled breath	After 3 weeks the amount of cigarettes consumed decreased by 74.7% in the experimental group (CO in exhaled air = -61.3%) and by 50.7% in the control group (CO in exhaled air = -37.4%). Abstinence rate was 39% in the experimental group and 20% in the control group (p = 0.038). After 5 years abstinence rate was 17.8% in the experimental group and 14.3% in the control group (p = 0.797)	Jadad scale: 5/5 Randomisation: described, appropriate (+2) Blinding: double blind, appropriate (+2) Withdrawals and dropouts: described (+1)
Rowe, 1999 [31]	Quasi-experimental non randomised study	Nurses and student nurses (110)	Quasi-experimental study to evaluate the effectiveness of individual interventions for smoking cessation. The individual intervention consisted of a weekly supportive interview and measurement of alveolar carbon monoxide and assessment of salivary nicotine to objectively verify abstinence at 6 and 12 months. Experimental group included 22 nurses and 32 student nurses; control group included 23 nurses and 33 student nurses. There is no randomisation	24% of the subjects in the intervention group stopped smoking vs. 7% of the subjects in the control group. In detail, 22.7% of the nurses in the intervention group ceased smoking vs. 8.6% in the control group (p < 0.05) and 25% of the student nurses in the intervention group ceased smoking vs. 6% in the control group (p < 0.05)	Modified Angelillo-Villari score: 9/11 Response rate: 2 Study design: 3 Data analysis: 4
Sarna, 2009 [32]	Quasi-experimental prospective study without a control group	Nurses and student nurses (246)	Prospective study assessing the efficacy of a smoking cessation internet assistance program with a 3, 6 and 12 months follow-up. The study analysed the correlations with demographic data (age, sex, ethnicity, education) and the types of departments in which the patients worked. The demographic and professional characteristics of the sample according to smoking status were reported at each follow-up	Nurses who quit smoking were 43% after 3 months, 45% after 6 months and 53% after 12 months	Modified Angelillo-Villari score: 9/11 Response rate: 3 Study design: 2 Data analysis: 4

Table II. Studies included in this review and quality assessment

Prospective and observational studies were evaluated for response rate, study design and data analysis according to 11 scoring items modified from the Angelillo-Villari criteria (scoring items are shown in Table I) [23,24]. Studies were then given a score from 0 (poor) to 11 (rigorous) based on the number of criteria satisfied.

Results

Identification of relevant research

We identified 1,671 records in the two databases. 1,237 records were available for screening after we removed the duplicates. 1,211 records were excluded because not relevant. 18 records were excluded because we judged them not suitable for the purposes of this study or because of poor data quality (Figure 1).

The 8 articles reviewed are shown in Table II. Considering the study design, 3 randomised clinical trials, 1 non randomised clinical trial, 3 observational studies and 1 prospective study were found.

Considering the smoking cessation intervention, 3 studies discuss the efficacy of smoking restriction policies at the workplace, 2 studies consider bupropion SR, 1 study considers an internet assistance program, 1 study considers the efficacy of supportive interviews and 1 study considers transdermal nicotine patches.

Quality assessment

Table II shows the results of the quality scoring procedures. Each of the 3 clinical trials scored 5/5 on the Jadad scale, being randomisation described and appropriate, blinding described and appropriate and withdrawals and dropouts described in each of these studies. 5 other studies scored based on a modified Angelillo-Villari criteria set. Response rate was excellent in every study, but only one article described properly the subjects lost during follow-up and no study described non participant population characteristics. Study design was poor or very poor in most cases, only 2 studies describing properly the criteria for being included in the "smoker" population and only 1 study assessing smoking cessation with a proper method. Data analysis was appropriate in 4/5 studies. Therefore, 2 studies scored 9/11 on the modified Angelillo-Villari score system, 2 studies scored 7/11 and 1 study scored 3/11.

Efficacy of smoking restriction policies at workplace

An observational study by Bloor et al. [25] showed that even if smoking restriction policies might be effective in reducing environmental tobacco smoke exposure, these interventions are unpopular and ineffective in reducing prevalence of smokers among health care workers. In fact, only 11 (34.3%) out of the 32 nurses who smoke planned to quit smoking and 71.8% of the nurses believed that the restriction policy was not effective in motivating to quit smoking. Even tough 82.5% believed that staff should have the right to smoke at work, 82.6% believed that non-smokers should not be in contact with smoke. Etter et al. came to the same conclusion in their observational study on a partial smoking ban followed by a total ban [26]. From their work is clear that exposure to environmental tobacco smoke decreased after the partial ban and further decreased after the total ban. However, among nurses and physicians many participants (59.6%) commented that the total ban was too strict, and most preferred the partial ban. Moreover, the total ban was not followed by any change in smoking prevalence or cigarette consumption. Better results obtained Kannegaard [27], who noticed in an observational study that number of smokers among hospital staff diminished from 33% to 26%

after 2 years when workers were informed that the hospital was about to start a restriction policy at the end of the study. However, according to the survey, those who kept on smoking were less willing to quit smoking at the end of the study and were also reluctant to accept any smoking cessation intervention.

Efficacy of bupropion SR

A randomised double blind clinical trial by Dalsgareth et al. proved that buproprion SR is more effective than placebo in reducing smoking prevalence in health care workers at 26 weeks from the beginning of the treatment [28]. After 7 weeks 43% of the patients in the experimental group and 18% of the patients in the control group were abstinent ($p < 0.001$). The number of continuous abstainers decreased during the observation period to 23% in the experimental group and 11% in the control group at the end of the study ($p = 0.007$). Efficacy of bupropion SR didn't seem to last longer, as proved by Zellweger et al. in a prospective double blind clinical trial [29]. In their study bupropion SR was superior to placebo in reducing smokers prevalence at week 4 (50% vs. 40% at week 4; $p = 0.013$), but statistical differences were not maintained after discontinuation of the treatment (week 52), proving that measures to prevent recurrence are necessary to continue the long-term abstention.

Efficacy of transdermal nicotine patches

A prospective randomised clinical trial by Glavas proved that transdermal nicotine patches are better than placebo in reducing smoking prevalence in health care workers in the short term, but statistical differences are not maintained years after the treatment [30]. After 3 weeks the amount of cigarettes consumed decreased by 74.7% in the experimental group (CO in exhaled air = -61.3%) and by 50.7% in the control group (CO in exhaled air = -37.4%). Abstinence rate was 39% in the experimental group and 20% in the control group ($p = 0.038$). After 5 years abstinence rate was 17.8% in the experimental group and 14.3% in the control group ($p = 0.797$).

Efficacy of supportive interviews

Rowe and Clark studied the efficacy of individualised supportive interviews among nurses and student nurses [31]. The study lasted 1 year. At the end of the study 24% of the subjects in the intervention group and 7% of the subjects in the control group quit smoking. In detail, 22.7% of the nurses in the intervention group ceased smoking vs. 8.6% in the control group ($p < 0.05$) and 25% of the student nurses in the intervention group ceased smoking vs. 6% in the control group ($p < 0.05$).

Efficacy of the internet assistance program

Sarna et al. used an internet assistance program to help nurses and student nurses quit smoking [32]. Patients had full time access to a website which provided skills to enhance smoking cessation success, no-cost smoking cessation services, evidence based medication information and options for one-to-one counselling. Nurses who quit smoking were 43% after 3 months, 45% after 6 months and 53% after 12 months.

Discussion

The main barriers to smoking cessation among health care workers are the starting high prevalence of smokers, particularly among nurses, and the low awareness of health professionals of being a role model in tobacco control [33], and this is a paradox if one considers the smoking related costs for the health services [34,35].

There is evidence that cigarette smoking is the most frequent, and completely preventable risk factor for adverse neonatal outcomes [36], and that preventive interventions that influence smoking attitudes must be put in place before children start experimenting tobacco [37] with the help of parents and teachers [38] and community services [39]. Smoking prevention programs proved to be effective if methodologically rigorous [40], but in populations with high smokers prevalence may be inadequate in controlling smoking. Moreover, it's now clear that smoking prevalence tends to increase during academic studies in the health care sector [41]. Therefore, targeted policies and smoking cessation services are needed in order to reduce smoking habits in health care workers, and can be viewed as different from other settings. In fact, as suggested by Chiatti et al. [42], occupation type should be considered in prioritising subsets of populations towards which smoking cessation campaigns should be targeted first. In order to program effective interventions, working conditions, population characteristics and smoking habits should be carefully evaluated. In fact, Eriksen proved that the number of hospital employees who succeed in quit smoking decrease with increasing hours of work per week and that subjects smoking less than 10 cigarettes per day, younger than 30 years of age and married with preschool children are more likely to stop smoking [43]. Nowadays, even if health care workers should give the example adopting smoke-free lifestyle, they barely tolerate smoking bans at the workplace (although they are in favour of smoking bans in public areas such as hospitals) [25-27,33].

According to the results of this review, smoking restriction policies can't be considered as smoking cessation interventions. Not only smoking bans couldn't significantly reduce the smoking prevalence among health care workers [25,26], but they also reduced willingness to quit smoking in subjects who kept on smoking [27]. Only Kannegaard et al. noticed a decreasing trend in smoking prevalence in their observational study of 2 years. However, it should be remarked that during these 2 years no restriction policy at all was actually applied: workers were only informed that the hospital "was about" to start a restriction policy at the end of the study.

Bupropion SR and nicotine transdermal patches seemed to be more effective in reducing smoking prevalence than other interventions, but measures to prevent recurrence are necessary to continue the long-term abstention as their effects are superior to other methods only in the first months after the treatment [28-30]. Individualised interventions such as supportive interviews and internet assistance granted the best long-term effects, but further studies are needed to assess their effectiveness in periods longer than 1 year [31,32].

This study has some limitations that must be acknowledged. The use of quality scores in systematic reviews about public health issues is important, and especially for smoking [44]. Even though data quality was elevated in each of the articles included in this review, the number of studies dealing with smoking cessation interventions among health care workers was just too low to permit a rigorous quantitative synthesis. Study design didn't meet our expectations in many cases and further studies are needed to assess the efficacy of the different interventions treated in this review, especially on the long-term period.

Conclusion

Tobacco smoking can be considered an old and a new challenge for public health [45]. This review analyses different smoking cessation interventions aiming at health care workers. According to our results, we can state that smoking restriction policies shouldn't be considered as actual interventions, being ineffective, unpopular and reducing willingness to quit smoking in

Questions for further research

Further studies are needed to better assess the effectiveness of the various smoking cessation interventions: the studies here analysed don't grant sure results due to their poor numerousness. In particular effectiveness in periods longer than one year needs to be investigated.

many subjects. Even though pharmacological therapies based on bupropion SR and transdermal nicotine patches grant significant results in the short-term period (weeks and months), smoking recurrence rates are high and individualised interventions should be preferred or integrated since they seem to grant better results in the long-term (years).

The review in brief	
Clinical question	Analysis of the effectiveness of smoking cessation interventions aiming at health care workers
Type of review	Systematic review
Search of the literature	Scopus and PubMed
Conclusions	Individualised smoking cessation interventions among health care workers are more likely to be effective
Limitations	Too poor number of studies analysed to grant a rigorous quantitative synthesis

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