ORIGINAL ARTICLE

# Effectiveness of a training course on smoking cessation knowledge and behaviour for health profession students: the SISMA project

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Keywords

Healthcare students • Training smoking cessation • Health education • Online course

Summary

**Introduction**. *University students are at risk of starting smoking or continuing and increasing the consumption of tobacco products. The aim of the study was to assess the impact of the training course, Sisma Project, about smoking in healthcare degree courses, in terms of knowledge, behaviour and to evaluate the course.*
**Methods**. *SISMA project was a pre- post study about an intervention delivered to healthcare profession students about smoking and smoking cessation. It had a before-after design and was an online optional course available on the eLearning platform Moodle 2. The course was structured in four lessons of sixty minutes, a debate among experts and a final test of evaluation. The McNemar test was used to measure the effectiveness of Sisma on smoking behaviour of students after the intervention. Students rated the course assigning a score from one to ten, and expressed free comments about point of strength and weakness of Sisma project.*
**Results**. *The participants were 365 students, 28.5% males and 71.5% females, most were nursing 194 (53.2%) and dental hygienists students 105 (28.8%). Current smokers were 161 (44.1%) before and 142 (38.9%) after the course, there was statistical significant difference in smoking status after attending the course ($p < 0.001$). Students evaluated the course giving a high score with a mean of 8.13 (SD: 1.1); the main points of strength were the content (33.2%), the structure (15.6%) and knowledge given by the course (12.6%). The main point of weakness were the online structure 62 (37%), problem related to length and time 17 (10%) and the final test 15 (9%).*
**Discussion**. *Given the central role health professionals play in patient care, students need to be aware and trained in tobacco cessation techniques. Our results indicate that smoking behaviour significantly changed after attending a university course for smoking cessation and students appreciated its contents and structure.*

## Introduction

Young adults between the ages of 18 and 25 are at high risk of consuming cigarettes and becoming current smokers. Center for Diseases Control and Prevention (CDC) defines the "current smoker" an adult who has smoked at least 100 cigarettes in his lifetime and who currently smoke every day or somedays.
In Italy, the prevalence of smoking is 16.2% in the age group 15-24 years, and even higher among 25-44 years old (28.9% of men and 27.1% of women) [1].
Tobacco use starts primarily during adolescence and the average age of smoking initiation is about 18 years (17.6 years for men and 18.8 for women) according to CDC statistics [2]. Most smokers (82.6%) starts smoking between 15 and 20 years.
University students are at risk of smoking initiation [3], as well as continuing and increasing the consumption of tobacco products [4]. Surprisingly, tobacco has a high percentage of use among biomedical students. The prevalence of smoking among European medical students was 29.3% (95%CI: 28.1 to 34.7), with percentages ranging from 28% in Germany to 31.3% in Italy [5]. In the observational study of Ferrante [6] the percentage of current smokers among health professional students was 38.2%, with 94.3% of the total sample believing as important to receive specific training to quit smoking. Among physicians specializing in public health in 24 Italian universities, the prevalence of current smokers was reported as 20.9%. Even if 79.6% considered health professionals as behavioural models for patients, only 17% received specific smoking cessation training [7].
La Torre et al. [5] found almost a prevalence of 30%, although health professionals are expected to be trained and aware about of consequences of tobacco. So, special attention should be given to train healthcare profession students on smoking cessation considering the role they play both in healthcare and in prevention and as role model for patients.
In a previous experience of our group, a pilot school-based intervention seemed to be effective in reducing the prevalence of smoking among healthcare students [8]. After this experience, we standardized the methodology and considered a larger sample. So, the main objectives of this study were:

a) to evaluate the effectiveness of the course to change smoking status of students attending the course;

b) to do a quantitative and qualitative analysis of the course through the opinion and comments that students expressed about it.

## Materials and methods

### Study design, setting and participants

SISMA (Students Intervention on Smoking Attitude) project was an intervention delivered to health profession students of the Faculties of Medicine at Sapienza University of Rome, for all three years of their program, the participation to the course was voluntary. The monographic course was delivered on the online platform Moodle2.
SISMA was an experimental study, a pre-post design with a single group. The aim of the course was to give knowledge about tobacco and to help smokers to stop smoking. The smoking status was the main outcome, measured and compared before and after the course.
The students of healthcare professions courses were future nurses, dental hygienists, medical radiology technicians, prevention technicians. In order to attend the course students had to fill a pre-course assessment with related privacy information and informed consent.

### Structure of course

The course was delivered over five days: the first four days were dedicated to online lectures of 60 minutes each, the students had to follow each online lesson which remained available only one day and was preparatory to the next one. The last day there was a short debate among experts about topics of the course. The online debate involved oncologist, pulmonologist, cardiologist, hygienist and pharmacologist about the severity of the damage to health caused by tobacco, other problems that smoking causes to the modern society.
The contents of the four lessons were as follows:

1. First lesson: epidemiology of smoking-related diseases, chronic obstructive pulmonary disease (COPD), lung cancer and cardiovascular diseases.
2. Second lesson: motivations to start tobacco smoking. Effects of nicotine. Electronic cigarettes.
3. Third lesson: nicotine addiction and motivation to quit. Smoking-related diseases.
4. Fourth lesson: Ask Advise Refer. Pharmacological and not pharmacological treatment of nicotine addiction.

### Pre-course assessment

Students were asked if they knew about consequences of smoke as dependence and preventable illness and of damage caused by second-hand smoke. Moreover, their awareness about Italian law against smoking was investigated.
Smoking status was assessed by asking the students: "did you smoke in the last thirty days" (yes/no). Students who responded "yes" were classified as current smokers in the analysis while others as non- smokers.

### Post-course assessment

The knowledge acquired after attending the course was assessed with a multiple choice test. The evaluation was carried out in thirtieths with the sufficiency established with a minimum of eighteen points.
Smoking status was assessed after the course asking students: "did you smoke in the last thirty days" (yes/no). Smoking behaviour was measured again after four months of follow up with a telephone interview using the following question: "which was your smoking status in the last four months" (I stopped/ I smoked as usual/I tried to stop/I increased/I reduced smoking/I restarted).
The meaning of the question has been explained orally during the telephone interview. In particular, the answer "I tried to stop" is referred to the students' attempt to stop smoking at least one time after the course, "I reduced smoking" was related to the decrease at least one third of the total cigarette consumption, as well "I increased" was of one third of total consumption.
Moreover, students filled out a questionnaire about their satisfaction of the course giving an evaluation in a linear numeric scale from 1 to 10. Students expressed their opinion concerning strength and weakness: this data was used for the qualitative analysis of the course.

### Statistical analysis

A descriptive analysis of the sociodemographic characteristics of the study participants was carried out. Descriptive statistics were performed using absolute frequencies and percentages for categorical variables, while mean and standard deviation (SD) for quantitative variables. The associations between socio-demographic characteristics, attitude and knowledge, and smoking status were evaluated. The differences between groups with respect to the categorical variables were analyzed using the Chi-square test. The McNemar test was used to evaluate the effectiveness of the interventions on the variation of current smoking behaviour in the two periods. Data were analyzed with the software SPSS 25.0 for Windows. The statistical significance was set at $p < 0,05$.

## Results

The characteristics of the sample concerning knowledge, attitude and behaviour on smoking are reported in Table I.

### Characteristics of the sample

A total of 365 students filled out the online questionnaire (28.5% male and 71.5% female). The majority of students were between ages 19 and 24 years (73.2%). Most students were nonsmokers and there were not significant differences in smoking status among male and females, and among different age categories.
Out of 365 students, 71 (19.5%) attended the first year while 133 (36.4%) and 159 (43.6%) attended the second and third year of course. The majority of students attended nursing courses (53.2%), followed by dental technicians (28.8%) medical radiology technicians and

**Tab. I.** Descriptive and univariate analysis of health profession students.

| | | N (%) | Smoking status before course | | |
|---|---|---|---|---|---|
| | | | Smokers (%) | No smoker (%) | p |
| Sample | | 365 (100) | 161(44) | 204 (56) | |
| Age | 19-24 | 267 (73.2) | 122 (76) | 145 (71) | 0.278* |
| | 25-29 | 63 (17.3) | 28 (23) | 35 (17) | |
| | > 30 | 35 (9.6) | 11 (1) | 24 (12) | |
| Sex | M | 104 (28.5) | 53 (33) | 51 (25) | 0.096* |
| | F | 261 (71.5 | 108 (67) | 153 (75) | |
| Year of course | 1st | 71 (19.5) | 27 (17) | 44 (21) | 0.286* |
| | 2nd | 133 (36.4) | 61 (38) | 72 (35) | |
| | 3rd | 159 (43.6) | 71 (45) | 88 (43) | |
| Type of course | Nursing | 194 (53.2) | 106 (66) | 88 (43) | 0.005* |
| | Dental hygienists | 105 (28.8) | 36 (22) | 69 (34) | |
| | [1]MRT and P | 48 (13.2) | 15 (10) | 33 (16) | |
| | [2]MDS | 18 (4.9) | 3 (2) | 13 (6) | |
| Do you think that smoke create dependence? | Yes | 364 (99.7) | 160 (99) | 204 (100) | 0.26* |
| | No | 1 (0.3) | 1 (1) | 0 | |
| Do you think that smoke is the main cause of preventable death in Italy? | No | 65 (17.8) | 31 (19) | 34 (16) | 0.178* |
| | I do not know | 108 (29.6) | 76 (47) | 116 (57) | |
| | Yes | 192 (52.6) | 54 (33) | 54 (26) | |
| Do you know that there is a law about smoking ban in public places? | No | 22 (6) | 9 (5) | 13 (6) | 0.755* |
| | Yes | 343 (94) | 152 (95) | 191 (94) | |
| Do you think that second hand smoking is harmful? | No | 1 (0.3) | 0 (0) | 1 (1) | 0.181* |
| | I do not know | 5 (1.4) | 4 (2) | 1 (1) | |
| | Yes | 359 (98.4) | 157 (97) | 202 (98) | |
| Smoking status after course | Yes | 142 (38.9) | 136 (84) | 6 (3) | 0,01** |
| | No | 223 (61.1) | 25 (15) | 198 (97) | |
| Post course evaluation | < 18 | 25 (6.8) | 12 (9) | 13 (7) | 0.817 |
| | 18-22 | 53 (14.5) | 20 (15) | 33 (25) | |
| | 23-26 | 153 (41.9) | 65 (47) | 88 (66) | |
| | 27-30 | 90 (24.7) | 40 (29) | 50 (37) | |
| Follow up of smokers after four months. How was your smoking status in the last four months? | I stopped | 19 (11,8) | | | |
| | I smoked as usual | 64 (39,8) | | | |
| | I tried to stop | 12 (7.5) | | | |
| | I increased | 10 (6.2) | | | |
| | I reduced smoking | 47 (29.2) | | | |
| | I restarted | 3 (1.9) | | | |

* chi square test; ** McNemar test; 1 MRT and P: Medical Radiology Technicians and prevention technicians; 2 MDS: Master Degree in Sciences of the health professions and other.

prevention technicians (13.8%), students attending master's degree in sciences of the health professions (4.9%).
Overall, 161 (44.1%) students were classified as smokers, 53 (33.0%) of initial smokers were males. After the course, the number of smokers decreased to 142 (38.9%).
Data of follow up showed that: 11.8% stopped smoking and 7.5% tried to stop smoking after following the course, 29.2% reduced cigarette consumption. Instead, 6.2% increased cigarette smoked and 1.9% restarted smoking.
Most of the students passed the final test 296 (81.1%) and 90 (24.7%) got the highest grade. A small proportion (6.8%) failed the test.

### Knowledge and attitude about smoking

Almost all students acknowledged that smoking leads to dependence (99.7%), and 52.6% believed that smoking is one of the main causes of preventable death 192 (52.6%). With respect to secondhand smoking, 94% of the sample was aware of the ban on smoking in public places and 98.4% were aware of the harmful effects of secondhand smoke.

### Univariate analysis

Results indicate a significant difference between smokers and non-smokers by major, with nursing students

smoking at a higher rate. Significant differences were found concerning smoking status after following the course ($p < 0.01$) showing that students attending the course were more likely to stop smoking.

### Qualitative and quantitative evaluation of the course

Students positively rated the course with a mean score of 8.13 (SD: 1.1).

Most students expressed as a point of strength the contents of the course (33,2%): epidemiology of smoking-related diseases, nicotine addiction and motivation to quit, treatment and technique to stop smoking. Students thought the course was clear simple and essential (14,5%), liked topic as risk and harms associated to smoke (12.2%), appreciated practical experience faced in the course (13.7%).

On the other hand, some examples of weaknesses underlined were: the lack of a live teacher (4.4%), lack of live debate (5.8%), the course online (7.9%), length of lessons (5.7%).

The main point of weakness that were underlined were the online structure of the course 62 (37%), problem related to length and time 17 (10%) and the final test 15 (9%).

Results about evaluation are reported in Table II and Table III.

**Tab. II.** Satisfaction evaluation of the course (qualitative analysis).

| | | N (%) |
|---|---|---|
| Point of strength of the course | Contents of the course | 121 (33.2) |
| | Structure of the course | 57 (15.6) |
| | Knowledge about danger caused by smoking | 46 (12.6) |
| | The implementation of course in university | 37 (10.1) |
| | Qualities of the course: clear, simple, essential | 53 (14.5) |
| | Practical knowledge given by the course | 50 (13.7) |
| | Online structure of the course | 32 (8.8) |
| Point of weakness | Not useful | 10 (6) |
| | Problem related to lenght and time | 17 (10) |
| | Lack of material | 7 (4) |
| | Online structure of the course | 62 (37) |
| | Repeated content | 8 (5) |
| | Content non clear for different reasons | 7 (4) |
| | Long lesson | 5 (3) |
| | Short lesson | 5 (3) |
| | Lack of debate | 5 (3) |
| | Nothing | 10 (6) |
| | Difficult test or not clear | 15 (9) |
| | Lesson not clear or to change | 14 (8) |
| | Need to be advertised | 2 (2) |

**Tab. III.** Satisfaction evaluation of the course (quantitative analysis).

| Score given by students | Score | N (%) |
|---|---|---|
| | 5 | 7 (1.9) |
| | 6 | 8 (2.2) |
| | 7 | 69 (18.9) |
| | 8 | 156 (42.7) |
| | 9 | 66 (18.1) |
| | 10 | 42 (11.5) |

## Discussion

The major objective of the study was to evaluate the training course delivered to healthcare profession students and examine the change in smoking status from pre to post course. Our study found several important results. First, we found that the prevalence of past 30-day smoking was 44.1% on a pool of 365 students of healthcare profession courses in Rome. Secondly, the study showed that the smoking status varied significantly after attending the smoking cessation course and at the follow up period. Considering that overall 21.4% of Italians are current smokers [9], the percentage of smokers found in this study is consequently far from what can be considered acceptable. Many cross-sectional studies found that there is a worldwide increasing trend of smoking during university [10]. Our findings suggest that health professional students could need training about nicotine addiction and tobacco cessation in their core university curriculum to help them stop smoking.

The university environment represents an important place where students shape their personal and professional behaviour. Moreover, because future healthcare professionals may influence the smoking behaviour of patients, their lifestyle should represent healthy behaviours and not ones like smoking [6]. Interestingly the past 30-day smoking was higher among nurses compared to other health profession students and medical students. Nurses play a central role in the field of health promotion compared to other people and health professions [11].

They have more interaction with patients and answer more health-related questions, both therapeutic and preventive. It is important for them to model healthy and positive behaviours [12].

Before the conduction of the course most students seemed to be aware of consequences of smoking as dependence, tobacco related diseases, danger caused by second hand smoke. Although smoking rate was considerably high. This showed the need for a course to help students quit smoking; the course was also able to change smoking status and was appreciated by students. Moreover, most students passed the final exam, the course seemed to be effective in conveying knowledge. Students underlined different point of strengths as the presence of an online course to be a convenient training and learning solution, compatible with university commitments. Although other students considered it a point of weakness, because of the lack of a talk with a teacher

and colleagues for a live debate. Contents of the course and the quality as essentiality and simplicity were still appreciated. Some students complained about problem related to length of lessons or timing problems.
Overall, greetings and support for the course suggested the necessity to spread the message and training against tobacco to the whole healthcare educational system and to other faculties.
The study presents several limitations which include the sample size which was not very big and the questionnaire which was not able to collect free comments from all students. In addition, the follow-up survey was held after four months and there was not a further evaluation. Nevertheless, the course was usable and widespread as it was online, had a clear and structured organization. The possibility to obtain the comments and evaluations of the students attending the course is another important aspect of value. Feedbacks from students can help to improve the characteristics and quality of the course.

## Conclusions

Healthcare profession students need adequate training about nicotine dependence and tobacco cessation techniques in the core curriculum of their programs. This study showed that Sisma Project, a prototype online course on smoking cessation, was able to change smoking status of healthcare profession students and was appreciated.

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## Conflict of interest statement

None declared.

## Authors' contributions

Conceptualization: GLT; Investigation: RB and GLT; Methodology: AM, MCG, GLT; Statistical analysis: AM, GLT, RP; Writing, review and editing: VD, MC, GLT, GDV; Methodology: VD, GLT.

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