ARTICLES

Youth smoking: prevention and awareness techniques to improve healthcare sustainability

Emilio Greco*, Eliseo Sciarretta*, Riccardo Mancini*, Riccardo Sebastiani*

This manuscript, starting from scientific evidence linking cigarette smoking with the occurrence of genetic mutations and increased risk of cancer, aims to investigate the motivations behind the growing tobacco consumption among adolescents. As the costs of healthcare systems are always rising, solutions are needed to improve sustainability, by aiming at prevention and awareness programs. Through a survey addressed to students, the authors have studied the reasons behind the smoking-related behavior, in order to define the most suitable techniques for a prevention program. Results indicate that family and friends can affect the decisions of young people, so any planned intervention should target them too, through the involvement of parents and peer support groups. Equally important is the school environment. This work aims to make an important contribution to the understanding of the challenges of tobacco use among adolescents and demonstrates the effectiveness of targeted interventions to counter this issue in the school community from both a sociological and pedagogical/educational perspective.

Keywords: smoking; prevention; sustainable healthcare; youth; support group; active lifestyle.

Introduction

Increase in smoking among young adolescents is a social problem that involves all the players in contemporary society: from schools to families, from institutions to associations, from government bodies to social organizations.

Healthcare costs are always growing and governments of countries all around the world are struggling to find out how to optimize the resources available. Tobacco is maybe the most important public health issue, and

* Università degli Studi Link Roma. e.greco@unilink.it

Even if the contribution is a collective work, paragraphs may be attributed as follows: Introduction by Eliseo Sciarretta, Methods and Results by Riccardo Sebastiani, Discussion and sub-paragraph Educational programs at school by Riccardo Mancini, Discussion's sub-paragraphs Involvement of parents and friends and media campaign and Peer support groups, together with Conclusions by Emilio Greco.

Salute e Società, XXIV, suppl. 2/2025, ISSN 1723-9427, ISSNe 1972-4845 Doi: 10.3280/SES2025-19152

one of the most expensive, since it's the most preventable cause of illness and death in the world. If governments succeed in minimizing the occurrence of smoking-related disorders, resources could be saved and used to cope with unavoidable situations, turning into an improvement of the sustainability of the entire healthcare system. Each year, 7.2 million people die due to smoking-related causes (Droogers *et al.*, 2020), and 700 thousand from the direct consequences of tobacco use in the European Union alone. Moreover, although the negative health effects of smoking are widely known, the number of smokers is not expected to decline in the short term (WHO, 2018b). And all of these figures are not considering the threat from electronic nicotine delivery systems and electronic non-nicotine delivery systems (ENDS/ENNDS), also known as e-cigarettes, which can be the entry point towards nicotine addiction, especially for young people (Soneji *et al.*, 2017).

The research by Aldakhil *et al.* (2018) confirmed that tobacco consumption, together with other strong influential factors, increases out-of-pocket health expenditures. Hu *et al.* (2022, p. 188) focused on a different aspect of healthcare sustainability as «the healthcare industry has been identified as a major contributor to greenhouse gas (GHG) emissions that are responsible for climate change as well as other pollutants and unsustainable practices that ultimately have negative impacts on human health and well-being». The best strategy to solve this problem and to achieve improved healthcare sustainability is to promote healthy, smoke-free lifestyle, to raise awareness of risks and consequences and to empower people. A smaller number of adult smokers means better general health level of the society, which turns in lower healthcare costs and lower negative impacts for the community. Investigating the reasons behind the smoking habit is necessary in order to be able to implement corrective measures that can change lifestyles in a positive way.

This study focuses on the analysis of the socio-cognitive factors that permeate the attitudes, beliefs, judgements and behavior associated with tobacco consumption. Through the application of theoretical approaches from sociology and pedagogy, the purpose is to address the main questions: if the adolescents are aware of smoking-related health risks, why do they indulge in such behaviors? And what could be done to prevent them from smoking?

In addition, factors influencing future decisions about smoking and the dynamics of changing social roles throughout life and their link to cigarette consumption are investigated. A key role is played by parents and peers, as they can influence the choices of potential young smokers. Understanding

what guides young adults in taking decisions can provide a clearer framework for the design of specific interventions aimed at smoking prevention and cessation.

This multidisciplinary approach aims to offer an in-depth view of the psychosocial dynamics underlying smoking, helping to outline innovative strategies to tackle this global health problem, and improving sustainability as a consequence.

The connection between a healthy lifestyle and sustainability is shown once again by a different figure, related to physical activity: data from the World Health Organization show that 81% of adolescents are at risk of developing various diseases, including cancer, due to lack of physical activity (WHO, 2018a). Consequently, the WHO is implementing a new action plan to reduce the percentage of people who do not engage in physical activity by 10 per cent by 2025, and to contain the expense.

Physical activity is beneficial for anyone, but even more for smokers, because the level of physical activity is positively associated with the increase in the success rate of smoking cessation programs (+33%), as emerged in a study by West Virginia University (Chassin *et al.*, 2005), and with the reduction in nicotine withdrawal symptoms and stress, thanks to the release of endorphins. In addition, adopting an active lifestyle makes non-smokers less likely to relapse into addiction, as they are more aware of their bodies and more concerned about preserving them.

Training and education play a key role in the fight against smoking among adolescents. Involvement of educational institutions, families, local health authorities and communities is essential to provide comprehensive and targeted information to this age group. Investing in educational programs and awareness-raising campaigns not only promotes smoking cessation, but represents a social investment in collective well-being, towards a sustainable healthcare system. Ultimately, it is crucial to adopt integrated and education-based approaches to prevent smoking among adolescents and promote a healthy lifestyle from an early age.

1. Methods

In order to address the main questions of the research, a study has been conducted involving students in two mid-sized Italian cities: Pisa, located in the central/northern part of the country, and Crotone, in the south. It should be noted that in Tuscany, the region where Pisa is located, 19.8 out of 100 people over 14 declare they are smokers, in line with the national

average (19.9%). On the other hand, in Calabria the value of the same item is 16.9%, one of the lowest at a regional level, in the latest survey conducted by Istat[1]. This impacts the analysis of the results of this study, as the ones concerning Crotone need to be normalized to this evidence, before they can be generalized. A total of 101 participants, with no other requirements but being high school students, answered an entry questionnaire, about their smoking habits, and an exit questionnaire, after a process of awareness-raising. The research approach is primarily an integrated longitudinal study assessing the participants' attitudes towards smoking.

2. Results

101 students (53 in Pisa and 48 in Crotone), aged mainly between 15 and 17, were the sample of the study, with the females (65% of the total) outnumbering the males. A significant proportion of students have at least tried smoking (23.5%), with a slightly higher prevalence among females. Among those who have tried, more than a half can be considered at least occasional smokers and more than 30% smoke on a daily basis. From the analysis, it emerged that youngsters tend to start smoking when they are 14, often influenced by their family and social environment. Such data could even be underestimated, since some of the respondents may be reticent to admit their own bad habits: when asked "how many of your 5 best friends smoke?", over 50% of students answered at least 2, and 10% said all of them.

Within the protection of the circle of friends, young people experiment and start these habits: out of 25 students who admitted to having smoked at least once, 23 declared that they had done it for the first time together with friends.

However important the social network may be, the impact of family, above all, appears evident, with a considerable number of students reporting that they have parents who smoke, thus influencing their perceptions and habits related to smoking. The analysis of family background revealed that most of the participants' parents do not have a university degree. However, secondary education prevails significantly. With regard to smoking behavior, the data indicate that smoking is more prevalent among fathers than mothers, with significant implications for children's behavior. Interest-

[1]https://public.tableau.com/app/profile/istat.istituto.nazionale.di.statistica/viz/BES2023/Bes2023 (04/06/2025).

ingly, in cases where both parents smoke, there is a greater influence on their children's habits.

Furthermore, it emerges that family members are often aware of their children's habits: in 80% of cases, smoking students declared that they had communicated this to their parents. This data, combined with the level of education of the parents, suggests that a real awareness of the risks might lack within the family unit, leading to different generations repeating the same bad behaviors. Still, the research also investigated the perceived effects of smoking, revealing widespread awareness among students of the harm caused by smoking, such as decreased physical endurance, yellowing of teeth and fingers, and cancer risk. Slightly in contrast is the data relating to the quantity of cigarettes that young people think is allowed to smoke without risk: while 55% of those interviewed answered none, for 22% one cigarette a day is an acceptable quantity.

All (100%) students, on the other hand, agreed that smoking is harmful to health. Despite this, some students continue to smoke, suggesting the need for more targeted and effective educational interventions. However, this perception changed during the exit questionnaire: after the awareness-raising activities, not only a large majority of students acknowledged the danger of smoking and its negative impact on health, but the general feeling about smoking changed from indifference to marked aversion.

The lifestyle dimension was investigated through questions aimed at highlighting the students' level of physical activity and adherence to particular dietary regimes, as they are parameters that can influence tobacco use: it emerged that only 52% of the respondents regularly practice some sport, while almost 30% answered they do not practice any at all. Furthermore, over 80% declared that they did not follow any particular dietary indications.

3. Discussion

The effects of educational and awareness-raising interventions were evaluated in the exit questionnaire, which led to highlighting the need for continuous education and prevention in schools to combat smoking among adolescents.

By the end of the analysis, in fact, over 85% of the students who were smokers at the beginning had at least partially reduced the quantity of cigarettes; the average daily number of cigarettes for smokers has dropped from

20 to 12. Furthermore, almost 60% of those who still smoke say they have already tried to quit permanently and are willing to try again in the future.

Increased awareness is also shown by the trend in answers to the question relating to how many cigarettes it is possible to smoke per day, where the percentage of the "none" response went from 55%, as reported before, to a more reassuring 86%.

The feeling towards smokers also changes, going from mostly indifference to a clear majority of aversion motivated by the fact that they damage everyone's health (66%). This raising hostility to smoking is confirmed by the fact that no one would accept a cigarette from a friend anymore.

About lifestyle and physical activity, times in the 1km running test improved, the median results dropped from 11 minutes to 10 and the level of average and maximum heart rate was lower than before.

From the data analyzed during the survey, it clearly emerges that there is not yet total awareness among young people of the risks of smoking, and that socio-educational approaches and awareness programs can bring very encouraging results.

To promote sustainability, and not burden the healthcare system, it is necessary to act early through prevention, so that the rate of smoking among young people can be significantly reduced, thus mitigating its harmful effects on long-term health.

3 main techniques can be identified, also based on studies on the subject, to improve smoke prevention or treatment without wasting resources:

- Educational programs at school;
- Involvement of parents and friends and media campaigns;
- Peer support groups.

3.1. Educational programs at school

The first key method in effectively combating smoking among young people is the introduction of educational programs in schools that go beyond simply providing information on the risks associated with smoking. These programs, often led by health professionals, are enriched with hands-on activities, workshops and simulations that help students understand and manage the social pressures associated with smoking. The effectiveness of these programs is amplified by the active engagement of students, making them more aware and able to make informed decisions and promoting the development of personal and social skills (Thomas *et al.*, 2013).

The long-term effectiveness of such program is also supported by meta-analyses that have examined various prevention programs, concluding that well-structured initiatives integrated into the school curriculum can have a significant impact on reducing smoking rates (Rooney, Murray, 2017).

One of the most effective smoking preventions programs is the Social and Emotional Learning (SEL) program (Cipriano *et al.*, 2023), which is based on a set of theoretical principles aimed at developing key competences in individuals, enabling them to manage emotions effectively, establish positive relationships, feel and show empathy for others, set positive goals and make responsible decisions. The theoretical basis of SEL can be divided into five key competences that form the core of these educational programs:

1. Self-awareness: referring to the ability to understand one's own emotions, strengths, limitations and values and how this influences behavior.
2. Self-management: this refers to the ability to effectively regulate one's emotions, thoughts and behavior in different situations and includes stress management, impulse control, personal motivation, and the ability to set and work towards personal goals.
3. Social awareness: focuses on the ability to understand and empathize with others, including people from different backgrounds and cultures. It includes the ability to understand social norms for behavior and to recognize family, school, and community resources and support, while identifying at the same time economic and institutional barriers.
4. Interpersonal skills: involves the ability to establish and maintain healthy and helpful relationships, work in teams, communicate clearly, listen actively, cooperate, negotiate conflicts constructively and ask or offer help when needed.
5. Responsible decision-making: this competence includes the ability to make constructive choices regarding one's own behavior and social interactions based on ethical considerations, social norms and safety for oneself and others.

3.2. Involvement of parents and friends and media campaigns

The second key pillar of anti-smoking interventions is the involvement of parents and the wider community. Programs that include information sessions for parents and promote active involvement in school life can ex-

tend the educational influence beyond the school walls (Dobbie *et al.*, 2019). Creating a supportive family and community environment that discourages tobacco use amplifies the effects of the education received at school, forming a social safety net that protects young people from taking up smoking.

Alongside family interventions, the strategic use of the media is essential in the fight against teenage smoking. Well-designed media campaigns can effectively communicate the risks of smoking and promote a healthy lifestyle. An emblematic example of such strategies is provided by the Center for Disease Control and Prevention (CDC, 2021), which emphasizes the importance of media campaigns in tobacco prevention.

The use of relevant testimonials is another important feature of these campaigns. Teenagers are significantly influenced by characters they perceive as similar or aspirational. Influencers on social media, young celebrities and public figures that young people admire can have a great impact in shaping their perceptions and behavior related to smoking. Wakefield, Loken e Hornik (2010) pointed out how identification with these testimonials can motivate young people to avoid or quit smoking.

The interactivity and involvement component is equally crucial. Campaigns using competitions, quizzes and educational games not only attract young people's attention but also help them to internalize information about smoking. These interactive tools can help consolidate knowledge about the risks of smoking and reinforce the intention not to smoke, as indicated by Hornik e Yanovitzky (2003).

The integration of multiple platforms as described by the National Cancer Institute (2008) is essential to maximize the reach and impact of campaigns. Adapting messages to the different contexts of platforms from social media to television and radio can significantly expand the audience and increase the effectiveness of communication, which must be focused on promoting positive behavior as an essential strategy.

3.3. Peer support groups

The last socio-educational technique is based on peer support groups, which are a valuable resource in smoking cessation programs, especially for adolescents and young adults. These groups create a motivating and supportive environment that not only helps participants resist the temptation to smoke, but also offers a safe place to share experiences and coping strategies. Interaction with peers facing similar challenges can significantly

increase individual and collective resilience, facilitating a more sustainable path to a smoke-free life.

Studies have shown that peer support groups can improve smoking cessation success rates when integrated with other forms of intervention, such as behavioral therapy or pharmacological treatments. May *et al.* (2014) demonstrated that participation in support groups that encourage open discussion and mutual support can significantly reduce the sense of isolation that often accompanies the attempt to quit smoking, thereby increasing the likelihood of long-term success.

Further research and case studies have revealed that peer support groups are particularly effective when they are part of a broader school or community program that also includes educational and outreach components (Horn *et al.*, 2013).

A key aspect that emerged is the effectiveness of an integrated approach that includes physical activity, psychological support and health education to promote healthy behavior. The analysis emphasizes the importance of the commitment of schools, families and institutions in creating a supportive environment for adolescents to reduce the incidence of smoking and promote healthy lifestyles.

It is crucial to develop, implement and evaluate public health programs that are based on robust behavioral theories, as demonstrated by extensive research in the field. Among the most widely adopted psychological theories to decipher the link between psychological variables and smoking-related behavior are: social cognitive theory (Ajzen, 1991), the theory of planned behavior (Locke, Latham, 1990), goal setting theory (Rosenstock, 1974), the health belief model (Prochaska, DiClemente, 1983), the transtheoretical model and self-determination theory (Deci, Ryan, 1985; 2000). It is clear from this evidence that there is a need for awareness-raising initiatives to encourage physical activity and counteract the onset of smoking, especially among young people. Awareness-raising programs in schools, extended to all educational levels, are imperative to inculcate healthy habits from a young age, the period in which behavior for adult life crystallizes.

Conclusions

Data collected and analyzed during the study provide a significant insight into the impact of educational and socio-pedagogical interventions on smoking-related behavior among adolescent students. The analysis showed

a reduction in the active smoking rate among the students involved, demonstrating the effectiveness of the approach.

The rate of active smoking among students at the beginning of the study was 23%, an alarming figure reflecting the influence of social and family dynamics on adolescents' choices. After the awareness raising initiatives, the smoking rate decreased significantly to 14%, with a remarkable 9% reduction.

Active student participation in the educational process was crucial, as students involved in activities based on simulations, workshops and guided discussions showed an increase in awareness of the risks associated with smoking, with 85% of students recognizing the significant damage of smoking on health, compared to 65% pre-intervention.

Peer support, as demonstrated by the use of peer groups to discuss and debate smoking, played a significant role in changing perceptions and behavior. 78% of students indicated that the support they received from peers was a key factor in their decision not to smoke or quit.

The conclusions of this study emphasize the importance of targeted educational and socio-pedagogical interventions, which are particularly effective in addressing the phenomenon of adolescent smoking, which is strongly influenced by social and cultural dynamics.

In sociological terms, the effectiveness of school-based interventions that include life skills education, peer support and active engagement of students, enabling them to resist social pressures and make informed choices about smoking, is highlighted. The presence of a supportive environment, including family and the wider community, amplifies the effects of these educational programs, creating a social safety net that protects young people from adopting harmful habits.

Thanks to these initiatives and techniques, an optimization in the exploitation of resources is expected, towards more sustainable healthcare.

References

Ajzen I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50:179-211. DOI: 10.1016/0749-5978(91)90020-T.

Aldakhil A.M., Nassani A.A., Abro, M.M.Q., Zaman K. (2018). Food-beverage-tobacco consumption, smoking prevalence, and high-technology exports influenced healthcare sustainability agenda across the globe. *Environ Sci Pollut Res,* 25: 33249–33263 2018. DOI: 10.1007/s11356-018-3277-3

CDC, Centers for Disease Control and Prevention (2021). *Best Practices for Comprehensive Tobacco Control Programs*. 2021. Available online: https://www.cdc.gov/tobacco/stateandcommunity/guides/pdfs/2014/comprehensive.pdf (last accessed on 12 June 2024).

Chassin L., Presson C.C., Rose J., Sherman S.J., Davis M.J., Gonzalez J.M. (2005). Parenting Style and Smoking-Specific Parenting Practices as Predictors of Adolescent Smoking Onset. *Journal of Pediatric Psychology*, 30(4). DOI: 10.1093/jpepsy/jsi028

Cipriano C., Zieher A.K., Strambler M.J. (2023). Apprendimento Sociale ed Emotivo: Una meta-analisi sull'efficacia e sugli esiti. *Psicologia Educativa*, 115(2): 337-355.

Deci E.L., Ryan R.M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. New York: Plenum.

Deci E.L., Ryan, R.M. (2000). The "What" and "Why" of Goal Pursuits: Human Needs and the Self-Determination of Behavior. *Psychological Inquiry*, 11: 227-268. DOI: 10.1207/S15327965PLI1104_01

Dobbie F., Purves R., McKell J., Dougall N., Campbell R., White J., Amos A., Moore L., Bauld L. (2019). Implementation of a peer-led school based smoking prevention programme: a mixed methods process evaluation, *BMC Public Health*, 19. DOI: 10.1186/s12889-019-7112-7

Droogers M., Jansen D., Lindert J., Saboga-Nunes L., Rudén M., Guichardon M., Zeegers Paget D. (2020). Health-related Sustainable Development Goals: countdown on alcohol use, smoking prevalence, child overweight and suicide mortality. *European Journal of Public Health* 2020, 30(Supplement_1): i10–i13. DOI: 10.1093/eurpub/ckaa027

Horn K., Dino G., Hamilton C., Noerachmanto N., Zhang J. (2013). Peer and teacher influences on the social acceptability of smoking: A mixed-methods study among adolescents. *Health Education Research*, 28(4): 563-576.

Hornik R., Yanovitzky I. (2003). Using theory to design evaluations of communication campaigns: the case of the National Youth Anti-Drug Media Campaign. *Communication Theory*, 13(2): 204-224. DOI: 10.1111/j.1468-2885.2003.tb00294.x

Hu H., Cohen G., Sharma B., Yin H., McConnell R. (2022). Sustainability in health care. *Annual Review of Environment and Resources*, 47(1): 173-196. DOI: 10.1146/annurev-environ-112320-095157

Locke E.A., Latham G.P. (1990). *A Theory of Goal Setting and Task Performance*. Englewood Cliffs: Prentice Hall.

May S., West R., Hajek P., McEwen A., McRobbie H. (2014). Social support and success in smoking cessation: An update on the effectiveness of the buddy system. *Addiction Research & Theory*, 22(3): 183-197. DOI: 10.1037/t21753-000

National Cancer Institute (2008). The Role of the Media in Promoting and Reducing Tobacco Use. *Tobacco Control Monograph,* 19. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute. NIH Pub. No. 07-6242.

Prochaska J.O., DiClemente C.C. (1983). The Stages and Processes of Self-Change in Smoking: Towards an Investigative Model of Change. *Journal of Consulting and Clinical Psychology*, 51: 390-395. DOI: 10.1037/0022-006X.51.3.390

Rooney B.L., Murray D.M. (2017). A meta-analysis of smoking prevention programs after adjustment for errors in unit of analysis. *Health Education Research* 2017, 13(1): 35-46. DOI: 10.1177/109019819602300104

Rosenstock I. (1974). Historical Origins of the Health Belief Model. *Health Education & Behavior*, 2: 328-335. DOI: 10.1177/109019817400200403

Soneji S., Barrington-Trimis J.L., Wills T.A. *et al.* (2017). Association between initial use of e-cigarettes and subsequent cigarette smoking among adolescents and young adults: a systematic review and meta-analysis. *JAMA Pediatr* , 171:788–797. DOI: 10.1001/jamapediatrics.2017.1488

Thomas R.E., McLellan J., Perera R. (2013). School-based programmes for preventing smoking. *Cochrane Database of Systematic Reviews*, 4. Art. No.: CD001293. DOI: 10.1002/14651858.CD001293.pub3

Wakefield M., Loken B., Hornik R.C (2010). Use of mass media campaigns to change health behaviour. *Lancet*, 376(9748): 1261-1271. DOI: 10.1016/S0140-6736(10)60809-4

WHO (2018a). Global Action Plan On Physical Activity 2018-2030. More active people for a healthier world. 2018. Available online: https://iris.who.int/bitstream/handle/10665/272722/9789241514187-eng.pdf (last accessed on 12 June 2024).

WHO (2018b). *WHO Global Report on Trends in Prevalence of Tobacco Use 2000–2030*. 2018. Available online: https://iris.who.int/bitstream/handle/10665/375711/9789240088283-eng.pdf (last accessed on 12 June 2024).