

# ASSESSMENT OF ATTITUDES, KNOWLEDGE AND CURRENT PRACTICES RELATED TO ELECTRONIC CIGARETTES AMONG HEALTHCARE PROFESSIONALS WORKING IN THE FIELD OF PREVENTIVE HEALTHCARE AND SMOKING CESSATION IN SLOVENIA

Scientific monograph

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**Design**

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**Publisher**

*National Institute of Public Health, Trubarjeva 2, 1000 Ljubljana*

**Publication year**

2020

Electronic edition

Website

[www.nijz.si](http://www.nijz.si)

This monograph is a part of the Target Research Project CRP-2017 with the title Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation, with the preparation of educational material for a unified and evidence-based counselling to patients (ID V3-1729). The project is co-financed by the Ministry of Health of the Republic of Slovenia and the Slovenian Research Agency. The project leader is the National Institute of Public Health and the partner in the project is General Hospital Murska Sobota.

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Kataložni zapis o publikaciji (CIP) pripravili v Narodni in univerzitetni knjižnici v Ljubljani

COBISS.SI-ID=304271616

ISBN 978-961-6945-09-7 (pdf)

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IN SLOVENIA**

LJUBLJANA, 2020

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## **ACKNOWLEDGMENTS**

The authors would like to thank Monika Ažman, president of the Nurses and Midwives Association of Slovenia, Andreja Krajnc, president of the Professional Group of Nurses and Health Technicians in Community Care at the Nurses and Midwives Association of Slovenia, Sanja Vrbovšek, National Coordinator for Health Education, Tadeja Hočevar, National Coordinator of the Quitline telephone in 2018, Karmen Henigsman and Sanja Krušič, both from the National Institute of Public Health for helping invite healthcare professionals from respective groups to participate in the study. We would also like to thank Assoc. Prof. Borut Jug for his assistance in obtaining data from healthcare professionals working in Outpatient Cardiac Rehabilitation Units and Assoc. Prof. Antonija Poplas-Susič for her advice regarding possible approaches to include healthcare professionals from Family Medicine Practices in the study.

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## **ACRONYMS AND ABBREVIATIONS**

CC	Community Care
EC	electronic cigarette
FMP	Family Medicine Practices
HEC/HPC	Health Education Centres/Health Promotion Centres
HTP	heated tobacco products
NIPH	National Institute of Public Health
OCRU	Outpatient Cardiac Rehabilitation Units
QL	Quitline telephone



# PREFACE

*Kristina Mauer-Stender, MSc*

*Program Manager, Tobacco Control, World Health Organization Regional Office for Europe*

*Tobacco is a major global health hazard. It is a substance that kills up to half of its users and causes 8 million deaths every year around the world. The latest World Health Organization (WHO) reports show that countries are making admirable progress to reduce tobacco use and tobacco related diseases. However, the tobacco epidemic is far from over. On a global scale, reducing tobacco use is not advancing rapidly, and in the WHO European Region specifically, progress is uneven. According to recent projections, the Region will not reach related global targets unless governments strengthen implementation and enforcement of effective and evidence-based measures, as outlined in the WHO Framework Convention on Tobacco Control (WHO FCTC). Crucially, this includes provision of support for people wanting to quit tobacco use.*

*In recent years we have witnessed smoking renormalization becoming a new norm. Recognizing the threat, tobacco industry has turned to promoting 'smoke-free' alternative products as a means to maintain their profits and position themselves as part of the solution to the tobacco epidemic. E-cigarettes, alongside other types of novel and emerging nicotine and tobacco products, are aggressively marketed as cleaner alternatives to conventional cigarettes, as smoking cessation aids, or as "reduced risk" products. While some of these products have lower emissions than conventional cigarettes, they are not risk free, and the long-term impact on health and mortality is as yet unknown. There is insufficient independent scientific evidence to support the use of these products as an alternative to conventional tobacco use. There are also real concerns about the risk they pose to non-smokers who start to use them, especially young people. Unlike the tried and tested nicotine and non-nicotine pharmacotherapies that are known to help people quit tobacco use, WHO does not endorse e-cigarettes as cessation aids.*

*With only a few countries in the WHO European Region providing comprehensive tobacco cessation support to their populations, many people are left at risk of the extensive tobacco-related harm to health. Governments should recognize this unmet need and take swift action, so as to prevent future tobacco-related deaths. Providing access to, and encouraging the use of, effective cessation interventions, as recommended by Article 14 of the WHO FCTC, greatly increases the likelihood of successfully quitting tobacco. The best practice approaches include brief advice at primary care level, national toll-free tobacco quit lines, cost-covered nicotine replacement therapies and the use of digital and mobile technologies to empower those who want to quit.*

*The importance of evidence-based practice and cessation counselling in healthcare settings cannot be underestimated. This is particularly pressing given the tenacity of the tobacco industry in countering tobacco control efforts through misinformation about the potential benefits of novel and emerging nicotine and tobacco products. Healthcare professionals have an important role in smoking prevention and promotion of healthy lifestyle especially through the provision of tobacco cessation services. Deep knowledge and a practical understanding of the effective and evidence-based approaches to smoking cessation should be a constant goal for healthcare professionals and updated based on the latest available evidence.*

*This monograph provides a thorough analysis of the current attitudes, beliefs, knowledge and practices of healthcare professionals in Slovenia involved in tobacco cessation support. It shows, among other things, that there is a growing demand from the public to know more about the health effects and potential of e-cigarettes to aid cessation, and on the other hand, limited knowledge of these topics among healthcare professionals, which severely disable counselling practice. These results serve as a basis for further research, planning and development of the capacities of health practitioners in this area, as well as for initiation of policy discussions on the unified and evidence-based approach to cessation counselling in the healthcare settings.*

## REVIEWS

### **Prof. Ivan Eržen, MD, PhD**

*Specialist in Epidemiology, Specialist in Public Health, Centre for Analysis and Development of Health, National Institute of Public Health*

*Compared to tobacco products, knowledge of electronic cigarettes (EC) is rather scarce. The increasing use of EC during the past years has generated extensive research and discussion about their impact on individual and public health, and their role in smoking cessation. Despite all the research, there are still many open questions in this area.*

*Patients who are tobacco smokers or EC users often ask health professionals about EC harm. The questions are usually not easy ones, so it is very important to be aware of current facts. This is especially true for those healthcare professionals who are involved in various programmes to help patients with smoking cessation. They need a lot of specific support in order to remain credible and trustworthy counsellors in this matter. The authors of this monograph, Helena Koprivnikar, Tina Zupanič and Jerneja Farkaš Lainščak were aware of this fact and they decided to conduct research in order to explore the knowledge, attitude and practice among healthcare professionals working in the field of smoking prevention and smoking cessation in relation to EC. This is a big challenge in this developing field, where so many questions in theory and practice remain open. Academic research continues to explore the impact of EC on health and will hopefully soon be able to explain the causes and mechanisms of EC impacts on health.*

*For their purpose the authors opted for a cross-sectional, web based epidemiological study which was conducted among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia. This is an appropriate approach, especially now when basic information is still needed. The topic is very current and interesting, and it is not narrowly specific. It uses a broad definition of knowledge. It has a lot of focus and depth which is required by scientific communication and an academic audience.*

*The approach and methods used in the research as well as the structure of the monograph are systematic, transparent and uniform through the entire publication. It gives to the readers a good insight into the situation. It provides a high degree of reliability in defining the existing situation. It can also serve as the basis for defining the priorities for further development, and also for evaluating the success of the measures that will be introduced to ensure progress in reduction of the use of EC.*

*Given that, I can confirm that the publication achieves its intended purpose, namely its usefulness in the further development of public health in Slovenia. This work is published at just the right moment, as one of the short-term tasks is to draft a strategy for the development of public health in Slovenia. A professionally and scientifically sound presentation is a necessary prerequisite for the proper planning of further work. The results presented in the monograph are welcome for further research and management in this field. This approach could be complemented by a qualitative approach. I am thinking in particular of a structured interview of key stakeholders whose attitudes and practices could significantly contribute to identifying the needs of properly tailored training programmes for healthcare professionals involved in smoking prevention and cessation.*

*The conclusions of the research are an excellent basis for the design and implementation of specific interventions. They also serve to define the priorities for the further development of programmes that will raise the level of knowledge and attitudes towards EC among all those working in the field of tobacco prevention.*

*The publication is also of great international importance. It will be available online in English and will serve as reference information in Slovenia for all who are dealing with the same or similar questions. In this way it will reach readers all over the world as an example of assessing actual needs in the provision of basic public health activities to reduce tobacco and EC use.*

**Assist. Prof. Mihaela Zidarn, MD, PhD**

*Specialist in Internal Medicine, Specialist in Pneumology and Allergology, Allergology Unit, University Clinic of Respiratory and Allergic Diseases Golnik*

*The use of electronic cigarettes has been increasing recently. They are advertised in the media as low-risk products compared to conventional cigarettes and as a smoking cessation aid. Healthcare professionals are an important source of information on healthy lifestyles in society. Considering that the electronic cigarette is a new product, they were not acquainted with this topic during their education. Further education is, to some extent, left to the discretion of the individual and the institution in which he or she works. The research data provided in this publication offer important insights into knowledge and practices regarding electronic cigarettes, and will enable targeted additional activities for better knowledge about electronic cigarettes among healthcare professionals.*

*Electronic cigarettes could be a form of nicotine replacement therapy as a smoking cessation aid if designed and verified in accordance with the rules applicable to medicines and medical devices. In doing so, the inhalation safety of each aerosol ingredient as well as the safety of the device as such should be checked. None of the various electronic cigarettes available on the market have been verified in this way. For this very reason, it is quite clear that, in the age of evidence-based medicine, electronic cigarettes should not be regarded as a smoking cessation device or as a smoking harm reduction strategy.*

*Information about electronic cigarettes often comes with a conflict of interest. Most conventional cigarette makers have also focused on manufacturing electronic cigarettes and are devoting enormous resources for their promotion, mainly through influencing public opinion. The tobacco industry has more than a century of experience in misleading the public about the harmfulness of their products and almost unlimited financial resources. Their specific target group are health professionals and researchers; through them they can effectively influence public opinion. The interest of the tobacco industry is undoubtedly focused on maintaining nicotine dependence, since their future financial success and therefore their existence depends on it.*

*The authors identified in the study to what extent health professionals who are most likely to encounter smokers and electronic cigarette users are familiar with the field. They conducted a large, methodologically sound research on a sufficiently large sample of healthcare professionals. It showed that the majority of Slovenian healthcare professionals participating in the study agreed that the conversation about EC with healthcare users was important and that they supported electronic cigarette regulation similar to the regulation of tobacco. It is also gratifying that they want more targeted education in this area, as well as information and written material. Many want clear guidance on how to counsel about electronic cigarette use. It is worrying, however, that a significant proportion of healthcare professionals have so far received information on electronic cigarettes from sources with a conflict of interest.*

*The findings of the study are relevant to all healthcare professionals, and in particular to pulmonologists, who often encounter patients with diseases caused by smoking or patients in whom smoking has a negative effect on their lung disease. It is especially important for these patients to obtain relevant and correct information about electronic cigarettes. Given the known facts about electronic cigarettes*

so far, it is of the utmost importance that healthcare professionals systematically ask users of health services about the use of any tobacco or related products. Given the increasing presence, the focused issue of using cannabis products is also important. The electronic cigarette is also used as a device for using cannabis. This is especially important in patients with respiratory symptoms, since the first adverse effects of electronic cigarette use are likely to be manifested in respiratory diseases. So far, the use of electronic cigarettes has been confirmed to cause acute interstitial lung injury. The most likely reason, according to the research to date, is vitamin E acetate, which is added primarily to electronic cigarettes with cannabinoid supplementation. Cases of other respiratory diseases in users of electronic cigarettes have also been described, such as bronchiolitis obliterans, hard-metal pneumoconiosis, hypersensitivity pneumonitis and others. Diacetyl flavouring is known to cause bronchiolitis obliterans when inhaled, although it is safe to ingest. It is highly unlikely that any other of over 7000 flavourings used so far in electronic cigarettes would not cause any harm to health by inhalation. Particularly problematic are the ultra-fine particles present in electronic cigarette aerosol. Ultra-fine particles are better absorbed and can cause damage also to other organs, not just the lungs.

New facts about the harmfulness of tobacco smoke appear more than 100 years after the mass use of classic cigarettes. A more realistic assessment of the long-term risk of the electronic cigarette will require at least 30 years, but probably more, since electronic cigarettes are very diverse products with different technology and composition. Research to date has found that electronic cigarette use increases the risk of chronic pulmonary diseases, such as chronic obstructive pulmonary disease, chronic bronchitis, emphysema and asthma. The riskiest is dual use, where the risk is higher compared to smoking only classic cigarettes. Dual use of electronic cigarettes and classic cigarettes is the most common way of using electronic cigarettes.

Given the increasing use of cannabis in the general public and the tendency to legalize its use, I think it would also make sense in future research to identify how many electronic cigarette users are using it to inhale cannabis products.

**Assist. Prof. Andreja Kvas, PhD**

Nursing Department, Faculty of Health Sciences, University of Ljubljana

Smoking is one of the most well known risk factors for many disorders and diseases, and it is one of those factors that can be completely eliminated. It has major economic implications; long-term morbidity is associated with high healthcare costs, while also contributing to more frequent absences from work and earlier disability. Smoking is causally linked to many types of cancer, respiratory diseases, cardiovascular diseases and many other diseases such as diabetes, rheumatoid arthritis, diseases of the immune system, erectile dysfunction and so on.

Over the past few years and especially among young people, the use of electronic cigarettes, allowing the user to inhale nicotine, flavourings and many other substances, has been increasing. Research has found that ECs contain harmful substances: carcinogens, irritants and toxic substances. There is ample evidence that chemicals in the aerosol of electronic cigarettes can cause changes in the body that lead to various diseases such as cancer, cardiovascular diseases and respiratory diseases. The authors of the publication note that electronic cigarettes are a relatively new product and on the market for just over 10 years, so there is not yet enough evidence available on the effects of their long-term use on human health. They state that electronic cigarettes are often seen as smoking cessation aids, but based on existing data, it cannot be concluded that they are effective in smoking cessation. They emphasize that regarding smoking cessation, healthcare professionals need to be a credible and reliable source of health information, including on the risks associated with smoking, smoking cessation and electronic



*cigarette use. I believe that health professionals need to be properly trained to recognize the smoker, the signs of addiction, problems with smoking cessation, and to be able to provide assistance and support to the smoker who is in the process of smoking cessation.*

*Health professionals are often in a dilemma as to what and how to advise smokers to put an end to this harmful addiction, as new tobacco products are on the market, while there is insufficient research to prove their harmfulness. This publication will therefore be of great help to all health professionals working at the primary level of healthcare, where numerous programmes for smoking cessation are available to people in Slovenia: individual or group smoking cessation counselling at Health Education Centres/Health Promotion Centres, the workshop Yes, I quit smoking!, the smoking cessation programme at University Clinic Golnik and the Quitline phone. Healthcare professionals should also be constantly made aware that they are required to seek scientific evidence from quality databases. This allows them to include the latest scientifically proven facts in their counselling on smoking cessation. This way, some smokers will not be advised that use of electronic cigarette is less harmful than cigarette smoking. The authors of the publication state that they will, based on the data obtained from a survey conducted among healthcare professionals working in primary healthcare, prepare health education materials, directions on practices and counselling regarding electronic cigarettes and publications for healthcare professionals working as counsellors for smoking cessation. This will enable healthcare professionals to deliver uniform content based on scientific evidence. The results of this study will be the basis for preparation of educational materials, publications and activities for healthcare professionals in general, but also more specifically for those healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia.*

*However, it should be emphasized that health professionals working in the field of raising awareness about the harmful effects of smoking on health should also have the latest knowledge and skills to provide quality advice to people/users at the primary level of healthcare. In this area too, based on the results of the latest research, new approaches and ways are introduced. They emphasize that counselling provided by the healthcare provider should always be based on the needs and desires of the individual user. An individual approach is suggested as the most appropriate teaching form, enabling the healthcare professional to take into account the user's prior knowledge, the user's individual characteristics (e.g. learning style, learning approach), the user's focus on the problem/task, and the user's independence in solving problems/tasks. The impact of the healthcare provider as role model on the individual/user is also important in the counselling process. The smoker/user usually questions a healthcare provider who smokes or uses electronic cigarettes but still advises on the dangers of smoking or electronic cigarette use and on ways to quit smoking. Research has shown that healthcare professionals who are smokers, less often counsel people/users about smoking cessation, smoking cessation prevention programmes and behaviour change programmes (cessation of unhealthy behaviour).*

*It is very important for healthcare professionals working at the primary level of healthcare to be constantly improving their knowledge and to be trained to be able to raise awareness about the harmful effects of electronic cigarette use effectively and at the right time. It is also important to provide people/users with information about the prescription drugs for treating nicotine addiction, prescribed by a doctor, and which work to reduce the need for nicotine and reduce withdrawal symptoms. The ultimate goals of the healthcare professional in the counselling process should be: to change the behaviour of the individual/user and their acceptance of responsibility for changing their behaviour. The individual/user always has the option to choose and to choose healthier behaviour.*

## SHORT SUMMARY

Electronic cigarettes (EC) are relatively new products, intended for nicotine delivery to users, that have an important impact on the landscape of tobacco use, tobacco control and nicotine dependence. Their increasing use in recent years has generated extensive research and discussion about their impact on individual and public health and their role in smoking cessation. While supporters of EC and sources with a conflict of interest spread information of very low or almost no harm of EC to individual and public health, and emphasize the importance of tobacco harm reduction and important role of EC in smoking cessation, a review of available evidence shows that while EC may be less harmful to health compared to conventional cigarettes, they are not harmless at all; at the same time the effects of long-term EC use on health are unknown. In the short term they may be beneficial to the health of individual former daily smokers (who started to use EC exclusively instead of daily smoking of conventional cigarettes), but available evidence indicates possible threats of their use to public health. There is not enough data and research to prove that EC are effective in smoking cessation. EC are also a rapidly evolving and a very diverse group of products, and this is an important barrier to research and general statements about EC. Also issues related to the diversity and quality standards of this group of very diverse products need to be mentioned. Opinion on EC is currently not unified, contrary to the opinion on tobacco products, and not only the lay public but also healthcare professionals are receiving mixed messages.

Healthcare professionals and providers of smoking cessation interventions are a credible and trustworthy source of health information, including risks related to smoking, smoking cessation and also EC. Studies from abroad show that a significant share of healthcare professionals receive queries about EC from their patients and have to counsel on different aspects of EC. Even though available data show that EC use among adults in Slovenia is low (shares among adolescents are higher), we assumed that healthcare professionals in Slovenia have contacts with patients using EC, patients having queries about EC or patients that need counselling regarding EC, especially certain groups of healthcare professionals, such as those working in preventive healthcare and smoking cessation. While available studies from abroad showed that knowledge about EC among different groups of healthcare professionals is limited, their practices and counselling are widely variable and their main sources of information on EC are those with conflict of interest, which disables unified and evidence-based practices and counselling regarding EC, we did not have any insight into existing practices and counselling among healthcare professionals in Slovenia until now.

This scientific monograph presents attitudes, beliefs, knowledge and some practices regarding EC among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, and is based on the first study of this kind in Slovenia. These groups of healthcare professionals were chosen as they are the most common source of information on smoking and smoking cessation, which also makes them the most important contact group for EC. In this cross-sectional study we found that only around half of respondents in these groups of healthcare professionals have ever asked a patient about EC use and routine checking for EC use is rare. Around a third of respondents received queries on EC from their patients and the most frequent topics were EC safety/harmfulness, effectiveness in smoking cessation and aerosol content. A little over half of the respondents estimated that at least some of their patients use EC, and the majority that a tenth or less of their patients used EC. They report that the major reason for patients' EC use is to help them with smoking cessation, but there are also important other reasons for EC use beside smoking cessation. Substantial shares of respondents expressed concerns about

EC, the major concern pointed out by almost three quarters of respondents being the lack of evidence regarding the long-term safety of EC. Current knowledge of respondents on EC was limited and major sources of information on EC were dependent (those with conflict of interest), such as various media or news and patients. Almost a half of the respondents used only dependent sources. Around three quarters of the respondents were not aware of NIPH recommendations about EC. Most respondents were/would not be able to counsel patients on EC safety/harmfulness to health (around a half) or harmfulness of passive exposure to EC aerosol (around two thirds), mostly due to lack of knowledge. Less than half would tell their patients that EC are not safe for health and around a third of respondents would tell their patients that passive exposure to EC aerosol is harmful to health and it should be avoided. A fifth of the respondents reported that they do not feel comfortable discussing or counselling about EC to their patients, mostly due to lack of knowledge. Significant factors related to analysed indicators were education, type of workplace, knowledge about EC, smoking status, pack years and ever use of other products (EC, heated tobacco products or smokeless tobacco products). The majority of respondents in our study agreed that they would like to increase their knowledge about EC and the vast majority missed workplace guidelines/recommendations on EC regarding their work with patients.

Our study showed areas to work on. Checking for EC use should be encouraged in general, the same as for smoking. Healthcare professionals should also ask about EC use in the case of respiratory or other health problems or diseases of unknown aetiology in order to be alert to possible connections with EC use. Activities to improve knowledge about EC and increase awareness about NIPH recommendations should be implemented. For this purposes educational material will be prepared about EC and NIPH recommendations will be distributed and presented to different groups of healthcare professionals. We encourage creating workplace guidelines about practices and counselling on EC; management should strive for full compliance with workplace guidelines and as our study shows, special attention should be given to those healthcare professionals that smoke or have ever used or use other tobacco or related products in this respect. Similar approaches are recommended for different groups of healthcare professionals, as they also have or will have contact with EC users and are/will be faced with their queries and need for counselling, although probably less frequently. This way we could ensure more unified and evidence-based practices and counselling about EC. Further research must be planned and should include, beside the evaluation of activities and trends in groups of healthcare professionals included in our study, research of attitudes, beliefs, knowledge, practices and counselling among healthcare professionals working with key groups of inhabitants in respect of tobacco and related products, such as children, adolescents and pregnant women.

The results of this study will be the basis for preparation of educational materials, publications and activities for healthcare professionals in general, but also more specifically for those healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia.



# 1 INTRODUCTION

Electronic cigarettes (EC) are a diverse group of products that heat liquid, typically containing nicotine, to produce aerosol which users inhale via a mouthpiece. EC are also called e-cigarettes, e-cigs, vapes, e-hookahs, vape pens, tank systems, mods and electronic nicotine delivery systems (ENDS) (National Academies of Sciences, Engineering, and Medicine (NASEM), 2018). Their arrival on the tobacco market is quite recent, around 2006, and they became more popular around 2010 (Briganti et al., 2019).

Major constituents of EC liquids and aerosol are nicotine (some are without nicotine), different flavours and humectants (propylene glycol, glycerol) (Strongin, 2019; NASEM, 2018). Moreover studies show that the liquid and/or aerosol contains numerous additional potentially toxic substances, such as aldehydes, volatile organic compounds, polycyclic aromatic hydrocarbons, tobacco specific nitrosamines, small particles, metals and silicate particles (Bals et al., 2019; Strongin, 2019; NASEM, 2018). EC thus contain constituents that are present in tobacco smoke, but also those not present in tobacco smoke (Strongin, 2019). Exposure to nicotine from EC is highly variable and depends on product characteristics (both device and liquid) and how the device is operated. Nicotine intake from EC among experienced adult users can be comparable to that from conventional cigarettes. The number, quantity, and characteristics of potentially toxic substances, other than nicotine, emitted from EC are also highly variable and depend on product characteristics (both device and liquid) and how the device is operated. Under typical conditions of use, exposure to potentially toxic substances from EC, except for nicotine, is significantly lower compared to conventional cigarettes (Bals et al., 2019; Strongin, 2019; NASEM, 2018).

EC aerosol can induce different pathological changes in various body organs that can lead to diseases of the cardio-vascular system and lungs, cancer and other diseases. These pathological changes are similar to those that are caused by tobacco smoke, but less pronounced (Bals et al., 2019; NASEM, 2018). In vitro, animal and human studies list changes in DNA, mutagenicity (Lee et al., 2018; NASEM, 2018), endothelial cell dysfunction, oxidative stress, sympathetic nerve system activation (Kennedy et al., 2019; NASEM, 2018), angiogenesis, platelet activation, cardiac remodelling (Chen et al., 2019; Kennedy et al., 2019), inhibition of mucocilliary clearance, dysfunction of respiratory epithelium, inflammatory processes, hyper-reactivity, increased susceptibility to infection (Chen et al., 2019; Gotts et al., 2019) and others. Although this supports the biological plausibility of tissue injury and disease from long-term exposure to EC aerosols, the long-term consequences and outcomes on these parameters with long-term exposure to EC aerosol are uncertain (Bals et al., 2019; Chen et al., 2019; Gotts et al., 2019; Kennedy et al., 2019; NASEM, 2018). Currently we do not know the consequences of long-term use of EC (Bals et al., 2019; Bhatnagar et al., 2019; Chen et al., 2019; Gotts et al., 2019; Kennedy et al., 2019; NASEM, 2018). EC use results in symptoms of dependence, while the moderate database suggests that risk and severity of dependence could be lower for EC than conventional cigarettes and that variability in EC product characteristics (nicotine concentration, flavouring, device type, and brand) is an important determinant of risk and severity of EC dependence (NASEM, 2018). There is also moderate evidence for increased coughing, wheezing and also an increase in asthma exacerbations in adolescents who use EC (NASEM, 2018). EC devices can explode and cause burns and projectile injuries, especially when batteries are of poor quality, stored improperly, or modified by users (NASEM, 2018). Intentional or accidental exposure (drinking, eye contact, dermal contact) to EC liquids containing nicotine can result in adverse health effects (seizures, anoxic brain injury, vomiting, lactic acidosis, etc.) and can be fatal (NASEM, 2018). Different substances can be added to EC liquids. A systematic literature search found evidence that EC are used to vape almost all illicit drug types, but mostly cannabis (Breithbarth et al., 2018). Use of EC to vape cannabis is also shown in other studies (Trivers et al., 2018).

EC use increases airborne concentrations of particulate matter and nicotine in indoor environments compared with background levels, but at lower levels than tobacco smoking (Marcham & Springston, 2019; Bals et al., 2018; NASEM, 2018). The American Industrial Hygiene Association recommends that

EC should be considered a source of aerosols, volatile organic compounds and particulate matter in the indoor environment that have not been thoroughly characterized or evaluated for health risk or safety (Marcham & Springston, 2019). Passive exposure to aerosol may thus represent a risk to health and should be avoided.

EC are often promoted or perceived as a smoking cessation aid, but currently there is insufficient evidence about the effectiveness of EC in smoking cessation (Worku & Worku, 2018; Bals et al., 2018; NASEM, 2018). The National Institute of Public Health (NIPH) does not recommend use of EC for smoking cessation; the use of nicotine replacement therapy, prescription drugs and counselling are recommended (NIPH, 2019), and these recommendations are in accordance with other newer recommendations/guidelines (Bhatnagar et al., 2019; Livingston et al., 2019; Bals et al., 2018; Barua et al., 2018). Complete transition from cigarette smoking to exclusive EC use probably means a reduction in short-term negative health outcomes (NASEM, 2018), but most EC users also smoke (NASEM 2018; Bals et al., 2019).

There is also substantial evidence that EC use increases the risk of ever using combustible tobacco cigarettes among youth and young adults (Berry et al., 2019; Kinnunen et al., 2019; Stanton et al., 2019; Barrington-Trimis et al., 2018; Dunbar et al., 2018; NASEM 2018; Watkins et al., 2018; Soneji et al., 2017).

Healthcare professionals and providers of smoking cessation interventions are a credible and trustworthy source of health information for their patients, including risks related to smoking, smoking cessation and also EC. Their attitudes, beliefs and knowledge should be rich and aligned with evidence-based data. But foreign studies show that knowledge of EC among different groups of healthcare practitioners is on average very limited and their practices vary widely (Erku et al., 2018; Koprivnikar & Farkaš Lainščak, 2018). Studies show that it is very important which information sources healthcare professionals use regarding EC, in terms of whether a conflict of interest is present or not. Studies with conflict of interest find potential harm of EC significantly less often than studies without a conflict of interest (Kennedy et al., 2018; Martinez et al., 2018; Pisinger et al., 2018) and they were significantly more supportive of EC use in smoking cessation (Martinez et al., 2018). One study shows that almost all papers (95%) without a conflict of interest found potentially harmful effects of EC in comparison to 39% of those with a conflict of interest, and that a strong or moderate conflict of interest was associated with very high odds of finding no harm compared with studies with no or weak conflict of interest (Pisinger et al., 2018). The additional problem is that conflict of interest is in most cases identified only when it is reported, but this is not always the case (Kennedy et al., 2018; Martinez et al., 2018; Pisinger et al., 2018), as it has been shown that in over one third of papers conflict of interest was not reported (Martinez et al., 2018). Healthcare professionals also frequently use media, news, ads and patients as sources of information (Erku et al., 2019; Zgliczyński et al., 2019; Koprivnikar & Farkaš Lainščak, 2018), which are also sources with conflict of interest, including commercial interest.

There is data available on EC use in Slovenia among adults and youth (NIPH, 2019; Koprivnikar et al., 2019; Koprivnikar et al., 2018; Koprivnikar, 2018), but no research has been performed about healthcare professionals' attitudes, beliefs, knowledge and practices regarding EC. Preliminary data from 2018 show that among adults around 9% have used EC at any time and around 1% used EC in the last 30 days (NIPH, 2019), and reveal that use at any time did not change significantly in comparison to 2016 (Koprivnikar, 2018). EC use is more prevalent among youth. A study of a convenience sample of over 1,200 students of 2<sup>nd</sup> year of high school revealed that in 2018 around 31% of all participating students had used EC at some time and around 9% used EC in the last 30 days (Koprivnikar et al., 2019). Based on this data we can assume that healthcare professionals in Slovenia have contact with patients using EC, most probably receive queries about EC and are asked for counselling about EC use, especially in smoking cessation, so these situations are more prevalent in healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia. The aim of this study was to explore attitudes, beliefs, knowledge and practices regarding EC among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia.

## 2 METHODOLOGY

### 2.1 Study design

A cross-sectional, web-based study was implemented among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia.

### 2.2 Respondents

The study was conducted on convenience sample of healthcare professionals employed at Health Education Centres/Health Promotion Centres (HEC/HPC) situated in Health Centres<sup>1</sup>, Family Medicine Practices (FMP)<sup>2</sup>, Community Care (CC), Quitline telephone (QL)<sup>3</sup> and Outpatient Cardiac Rehabilitation Units (OCRU) in Slovenia. These groups of healthcare professionals represented our sample frame as they have the key role in prevention and cessation of smoking.

The invitation to participate in the study including the link to the questionnaire was sent by e-mail to:

- 76 contact persons in HEC/HPC by the National Coordinator for Health Education, asking them to participate in the study and forward the invitation to their co-workers (346 healthcare and other professionals were employed in these centres in 2019);
- 20 QL counsellors by the National Coordinator of QL;
- 878 offices in FMP, e-mails were searched for on the internet. Some of these e-mails were generic e-mail addresses and the addressees were asked to forward the invitation to their co-workers in these offices;
- 62 heads of CC Departments in all Health Centres in Slovenia and 70 CC nurses with concession. Invitations were sent by the president of the Professional Group of Nurses and Health Technicians in Community Care at the Nurses and Midwives Association of Slovenia asking them to participate in the study and forward the invitation to their co-workers in home care nursing (900 healthcare and other professionals were employed in home care nursing in January 2019; source: <https://www.nijz.si/sl/podatki/evidenca-patronazne-zdravstvene-nege>);
- 16 healthcare professionals working in OCRU.

The online questionnaire was open between November 2018 and March 2019. Two reminders were sent to increase response rate. Participation was anonymous.

We do not have detailed data on how many healthcare professionals working in HEC/HPC, FMP and CC actually received the invitation to participate in the study, therefore calculation of an exact response rate was not possible. Altogether 523 respondents participated in the study. The maximum response rate would be 46.6%, considering the total number of sent invitations (1,122 invitations), while minimum response rate would be 24.2% considering the total number of employed healthcare professionals in groups included in the study (2,164 healthcare professionals).

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<sup>1</sup> Health Education Centres/Health Promotion Centres are situated in Health Centres throughout Slovenia and offer individual counselling for smoking cessation and group smoking cessation free of charge; there is no GP referral necessary.

<sup>2</sup> Family Medicine Practices are equipped with an additional graduate nurse, who manages chronic patients and implements systematic preventive screening.

<sup>3</sup> Quitline telephone is a toll-free telephone number for smoking cessation information and advice and provision of smoking cessation.

## 2.3 Questionnaire

The questionnaire was developed by two public health specialists and a methodologist, based on previous similar research published in literature (Kanchubastam et al., 2017; Singh et al., 2017; Nickels et al., 2017; Sherratt et al., 2016; Hiscock et al., 2015), and was carefully reviewed for terminology and language. The questionnaire was piloted in a small group of healthcare workers. The final questionnaire consisted of 59 questions (53 closed and 6 open questions) from different domains: demographic and professional characteristics, personal smoking status and use of other products, communication with patients/users (referred to as patients below in the text) about EC and checking for EC use, attitudes and beliefs about EC, support for different EC regulatory measures, perceived and actual knowledge about EC, major sources of information about EC, counselling patients about EC, awareness of NIPH recommendations and availability of guidelines/recommendations at work, needs of respondents.

## 2.4 Study's ethics procedure

The study protocol was evaluated and approved by the Republic of Slovenia National Medical Ethics Committee (Approval No. 0120-460/2018/4).

## 2.5 Respondents' characteristics

### *Demographic and professional characteristics*

Respondents were asked to report their gender, year of birth, education, provider type, workplace, statistical region of the workplace, number of years at current workplace, number of years working with patients, usual number of patients per week, age groups of their patients and whether they provide smoking cessation support to their patients.

For the analysis we created two groups for education: lower (higher vocational, short-term higher or less) and higher (professional higher or more). Due to the small numbers of respondents from some types of workplaces, we created four groups for the analyses: HEC/HPC, FMP, CC, Other (incl. QL counsellors, OCRU and other).

### *Smoking status and use of other products*

#### *(EC, heated tobacco products (HTP), smokeless tobacco products)*

Respondents were asked whether they smoke or have ever smoked tobacco, including manufactured cigarettes, roll-your-own cigarettes, cigars, cigarillos, water pipe, but not EC or HTP (list of answers: daily smoking; occasional smoking; smoking in the past (daily or occasional), but no current smoking; no current smoking, but tried in the past; never smoked). For the analysis we created two different groups of respondents' smoking status:

- Ever smoking: no (never smokers and experimenters)/yes (ex-smokers and current smokers);
- Current smoking status: never smokers (never smokers, experimenters)/ex-smokers/current smokers.

Current and former smokers also reported the average number of cigarettes smoked per day and number of years of smoking; these data were used to calculate pack years. Pack year is a measure of the amount a person has smoked over a long period of time. It is calculated by multiplying the number of packs of cigarettes smoked per day by the number of years the person has smoked.

Respondents were asked whether they have ever heard of EC, HTP or smokeless tobacco (other products). If they had not yet heard about EC they did not answer further questions about EC. Respondents were also asked to report whether and how often they use either EC or HTP or smokeless tobacco with the same response options provided as in the question about tobacco smoking. For the purposes of analysis

we created two groups regarding respondents' ever use of other products (ever use of other products): never use of other products/ever use of other products.

By combining questions on smoking and use of other products, we created two groups for the analysis (ever use of tobacco or related products): the group that has never used tobacco or related products and group that has ever used tobacco or related products.

## **2.6 Checking for EC use and communication with patients about EC**

Respondents were asked whether they have ever asked any of their patients about EC use and whether they routinely screen their patients for EC use (list of answers: yes; no). They were also asked whether they were ever in contact with a patient that used EC (list of answers: yes; no; don't know).

Respondents were asked to roughly assess how many of their patients asked them about EC during the last 30 days (list of answers: none; 10% or less; more than 10%, but less than 25%; more than 25%, but less than 50%; more than 50%, but less than 75%; more than 75%) and whether the share had increased in comparison to one year ago. For the analysis we created two groups regarding the share of patients asking about EC: the group that received no queries about EC and group that received queries about EC.

Respondents had to indicate who usually starts the conversation about EC (list of answers: patient, respondent, never had conversation about EC with a patient). They were also asked to point out up to three main topics that patients raise most frequently about EC (list of answers: how safe/harmful are they for health; how effective are they for smoking cessation; how effective are they for reducing the number of cigarettes smoked; what are the effects of passive exposure to their aerosol; where can you get them; what is their price; do they contain harmful substances; how do they function; others).

Respondents were asked to roughly estimate how many of their patients use EC (list of answers: none; 10% or less; more than 10%, but less than 25%; more than 25%, but less than 50%; more than 50%, but less than 75%; more than 75%). For the analysis we created two groups (none vs. at least one). Respondents were also asked about the main reasons that EC users report for using EC; they could choose up to three (list of answers: to help them in smoking cessation; for use in places where smoking is banned or they should not smoke; for reducing the number of cigarettes smoked; to protect their health; to protect health of people around them; as an alternative to smoking; to get rid of the smell of tobacco; to see what EC is, curiosity; because they are cheaper than tobacco products; because they are better than nicotine replacement products; because they believe that they are not harmful to health; other).

## **2.7 Attitudes and beliefs about EC**

We used a five-point Likert scale (strongly agree; agree; neither agree nor disagree; disagree; strongly disagree) for respondents to indicate their agreement or disagreement with the number of statements about EC:

- EC is an effective smoking cessation tool;
- It is important to discuss EC with patients;
- EC is not safe for user's health (EC is harmful for user's health);
- In smokers EC may be effective in reducing the number of cigarettes smoked;
- EC's aerosol is harmful to health of people in the vicinity of the EC user;
- EC use promotes smoking initiation among adolescents and young adults that have never smoked cigarettes;



- My patients do not know a lot about EC;
- In smokers who would probably stop smoking, EC promotes continuation of smoking;
- Discussing EC with patients may encourage them to use EC;
- In smokers, a complete transition to EC can reduce the risk of tobacco-related diseases;
- EC containing nicotine are addictive for the user;
- Smokers who have quit smoking and use EC, should use EC permanently to prevent a relapse to smoking;
- EC should only be available as a registered smoking cessation device;
- Until we have more data on safety and efficacy of EC, they should not be recommended by healthcare professionals or counsellors;
- Smokers who have stopped smoking and use EC, should also stop using EC within a maximum of 3 months;
- EC are more effective in smoking cessation than nicotine replacement therapy (gum, patches, inhalers) or prescription drugs.

For the analysis we grouped strongly agree with somewhat agree, and somewhat disagree with strongly disagree to create three groups (agree; neither agree nor disagree; disagree).

Respondents were also asked to select up to three of their main concerns regarding EC by choosing from a list of possible concerns:

- Lack of evidence about the long-term safety of EC;
- EC are attractive starting products for young non-smokers that promote smoking initiation;
- Advertising, promotion of EC, especially by famous personalities;
- Maintenance of nicotine addiction and possible relapse to smoking among those who have quit smoking and have switched exclusively to EC;
- Passive exposure to EC aerosol and potential harmful effects on health of passively exposed;
- Harmful effects on EC user's health;
- Lack of evidence about EC's effectiveness in smoking cessation;
- Nicotine poisoning;
- EC can burn or explode and cause severe injuries and burns;
- I have no concerns regarding EC

or provide their special concern under answer option Other.

Risk beliefs about EC were assessed also by asking what is their opinion about the harmfulness of EC compared to conventional cigarettes and nicotine replacement therapy (possible answers: more; equal; less; don't know) and regarding EC's potential to addict the user in comparison to conventional cigarettes (possible answers: higher; equal; lower; don't know).

## 2.8 Support for different EC regulative measures

Respondents were asked about their support (list of answers: support; don't support; don't know) for different EC regulative measures, some already existing in Slovenia and some possible new measures:

- Total ban on advertising;
- Total ban on display;
- Total ban on promotion;
- Total ban on sponsorships and donations;

- Health warnings on packaging;
- Ban on characterizing flavours;
- Similar regulation as for tobacco products;
- Ban on sales to minors;
- Ban on use in enclosed public places;
- Ban on use in enclosed working places;
- Permits/licences to sell EC;
- Excise taxation;
- Substantial increase in excise tax and price;
- Ban on EC with or without nicotine;
- Ban on EC with nicotine;
- Availability of EC only on prescription;
- Registration of EC as medicinal devices for smoking cessation.

## 2.9 Perceived and actual knowledge about EC

Respondents were asked how well they know EC (possible answers: very well; well; neither well, nor bad; bad; very bad). For analysis we grouped answers very well and well together and also bad and very bad and we thus created three groups of answers and we named them high, medium and low (level of) perceived knowledge.

Respondents were asked which of the listed ingredients are present in EC liquid and/or aerosol (nicotine; humidifiers/solvents such as propylene glycol or glycerol; carcinogenic tobacco specific nitrosamines; formaldehyde; benzene; tobacco; flavours; metal particles; small particles; silicate particles; other), possible answers were yes; no; don't know. All listed ingredients, except tobacco, are present in EC liquid and/or aerosol.

They were also asked to rate listed statements as correct or incorrect; a possible answer was I don't know:

- Nicotine intake from EC among experienced adult EC users is comparable to that from conventional cigarettes (TRUE);
- Mostly EC aerosol contains fewer numbers and lower levels of toxicants than smoke from conventional cigarettes, thus EC appear to pose less risk to an individual than conventional cigarettes (TRUE);
- No specific figure about how much "safer" the use of EC is compared to smoking can be given currently (TRUE);
- The long-term consequences of EC use on users' health have not yet been explored (TRUE);
- Exposure to nicotine and other toxic substances emitted from EC is highly variable and depends on device and liquid characteristics and how the device is operated (TRUE);
- EC are registered as a smoking cessation aid (FALSE);
- Burning takes place in EC (FALSE);
- Chemical substances in EC can lead to changes in the body that lead to diseases of the lungs, heart and circulatory system and cancer (TRUE);
- EC heat a liquid that changes into an aerosol inhaled by the user (TRUE);
- The majority of EC users also smoke (TRUE);
- EC constituents are approved for inhalation (FALSE);
- EC aerosol contains numerous chemical substances also present in tobacco smoke (TRUE);

- EC or liquids without nicotine are also available (TRUE);
- EC can maintain addiction in former smokers who switched from smoking to EC use (TRUE);
- EC use may result in dependence in persons that did not use products containing nicotine before (TRUE);
- EC have official quality certificates (FALSE);
- Exposure to harmful substances from EC is highly variable and depends on device and liquid characteristics and how the device is operated (TRUE);
- Data show that long-term inhalation of certain flavours could lead to serious lung illnesses (TRUE);
- EC use increases airborne concentrations of particulate matter, nicotine and other toxic substances in indoor environments (TRUE);
- There is insufficient research and data on the effectiveness of EC in smoking cessation, so we can't conclude that they are effective aids for smoking cessation (TRUE);
- EC use increases risk of ever using conventional cigarettes among adolescents that never smoked (TRUE);
- Legislation in Slovenia regulates EC in a similar way to tobacco products (TRUE);
- Passive exposure to EC aerosol can pose risk for health (TRUE).

For analysis we created a knowledge score combining both questions. For each correct answer the respondent received 1 point, for incorrect -1 and 0 points when he/she answered with I don't know. The knowledge score ranges from -33 to +33. We calculated the knowledge score for all respondents that answered at least two thirds of the questions on ingredients and correctness of statements.

## 2.10 Major sources of information about EC

The respondents were asked about their major sources of information about EC; they could choose up to three sources from a list of thirteen potential sources (patients; various media or news; colleagues; professional organizations or institutions; scientific literature; EC advertisements; on-the-job training; National Institute of Public Health website and materials; World Health Organization reports or report of other international or foreign organizations; experienced EC users; websites of producers or sellers of EC; websites of EC users' societies; nowhere) or indicated another not listed source of their own (other). We categorized professional organizations or institutions, scientific literature, on-the-job training, National Institute of Public Health website and materials and World Health Organization reports or report of other international or foreign organizations as independent sources, while patients, various media or news, colleagues, EC advertisements, experienced EC users, websites of producers or sellers of EC and websites of EC users' societies were categorized as dependent sources. For the analysis we excluded the group other and then created 3 different types of groups of major sources:

- Users of independent sources: yes/no
- Users of dependent sources: yes/no
- Use of different types of sources: exclusive user of independent sources/exclusive user of dependent sources/user of both types of sources/nowhere.

Respondents were also asked whether they were acquainted with the opinion and recommendations regarding EC prepared by NIPH and published on the NIPH website and in different materials, with possible answers yes or no.



## 2.11 Counselling patients about EC

Respondents were asked to report how they counsel or would counsel patients if asked about the safety of EC and safety of passive exposure to EC aerosol.

Regarding safety of EC potential responses were:

- Long-term safety/harmfulness of EC is not yet known, they contain numerous harmful substances, including carcinogens, so EC are not safe for health;
- EC contain less harmful substances compared to tobacco products (tobacco smoke), so their use is associated with less risks than smoking tobacco products;
- There is not enough research and data to advise you or answer your questions;
- I do not know enough about EC to advise you or answer your questions;
- Other.

Regarding the safety of passive exposure to EC aerosol, potential responses were:

- Passive exposure to EC aerosol exposes bystanders to substances harmful to health, so passive exposure to EC aerosol should be avoided;
- Passive exposure to EC aerosol does not represent a major risk for health;
- There is not enough research and data to advise you or answer your questions;
- I do not know enough about EC to advise you or answer your questions;
- Other.

Respondents were asked whether they feel uncomfortable discussing or counselling about EC to their patients (list of answers: yes, no). If they answered positively, they were asked to indicate the reason for being uncomfortable by choosing among lack of knowledge, lack of guidelines, lack of research and data or report some other reason. For comparison purposes, they were also asked about their comfort when discussing proven effective and safe smoking cessation treatments and programmes with their patients (list of answers: yes; no).

## 2.12 Needs of respondents

Respondents were asked whether they would like to increase their knowledge about EC (list of answers: strongly agree; somewhat agree; neither agree nor disagree; somewhat disagree; strongly disagree). For the analysis we combined answers to form three groups: agree, neither agree nor disagree, disagree. Respondents were also asked which method of increasing knowledge would suit them best (multiple choice question), either web-based information or printed materials, education, guidelines or other. They were asked whether materials for patients would be useful to them (list of answers: yes, in printed version; yes, in electronic version; no). For the analysis we also combined answers to form two groups, yes and no. Respondents were asked how strongly they agree with the statement that they miss guidelines/recommendations regarding their communication with patients about EC at their workplace (list of answers: strongly agree; somewhat agree; neither agree nor disagree; somewhat disagree; strongly disagree). For the analysis we grouped strongly agree with somewhat agree, and somewhat disagree with strongly disagree to create three groups (agree; neither agree nor disagree; disagree).

For the analyses in this part of the monograph we did not include respondents' smoking status and use of other products as an independent variable, but focused on demographic and workplace characteristics.

### 2.13 Data analysis

Questionnaires from 479 respondents out of 523 at least partially completed questionnaires were included in the analysis, after data from 44 respondents that did not work with patients and/or did not answer the majority of questions in the study were removed. Missing data were excluded from the analysis. Descriptive statistics were calculated for all questions. In many questions response categories were collapsed into a lower number of categories, as described previously to ensure an adequate sample size within each category. The questionnaire included several questions which offered respondents the opportunity to enter free text – these answers were coded. We used the Chi-square test ( $\chi^2$ ) to examine the association between selected variables. In all cases p value of  $< 0.05$  was considered statistically significant. All analyses were conducted in IBM SPSS ver. 25 (SPSS Inc., Chicago, IL, USA).

## 3 RESULTS

### 3.1 Respondents

Respondents' characteristics (n=479) are described in Tables 1 and 2.

Table 1: Respondents' characteristics, shares

		n	%
<b>TOTAL</b>		<b>479</b>	<b>100.0</b>
<b>Gender</b>	Male	47	9.8
	Female	431	90.2
<b>Age</b>	20–39	235	49.1
	40+	244	50.9
<b>Education</b>	Secondary or less	37	7.7
	Higher vocational	49	10.3
	Professional higher	245	51.3
	Academic higher	80	16.7
	Specialization after academic or more	67	14.0
<b>Provider type</b>	Nurse or midwife	356	74.5
	Physician	70	14.6
	Other	52	10.9
<b>Workplace</b>	Health Education Centres/Health Promotion Centres (HEC/HPC)	122	25.6
	Quitline telephone counsellors (QL)	10	2.1
	Family Medicine Practices (FMP)	221	46.3
	Community Care (CC)	93	19.5
	Outpatient Cardiac Rehabilitation Units (OCRU)	14	2.9
	Other	17	3.6
<b>Cohesion region</b>	Eastern Slovenia	254	53.0
	Western Slovenia	225	47.0
<b>Number of years at current workplace</b>	Less than 1	96	20.1
	1–9	223	46.8
	10 or more	158	33.1
<b>Number of years working with patients</b>	Less than 1	65	13.6
	1–9	156	32.7
	10 or more	256	53.7
<b>Number of patients/week</b>	Less than 20	135	29.5
	20–40	169	36.9
	41+	154	33.6
<b>Patients' age group</b>	Only adults 26+	317	66.9
	Others	157	33.1
<b>Provision of smoking cessation support</b>	Yes	378	79.4
	No	97	20.4
<b>Smoking status</b>	Never smoker	223	46.7
	Tried smoking on few occasions in life (experimenter)	123	25.7
	Ex-smoker	78	16.3
	Current occasional smoker	25	5.2
	Current daily smoker	29	6.1

		n	%
<b>Ever heard of EC</b>	Yes	469	99.4
	No	3	0.6
<b>Ever heard of HTP</b>	Yes	204	48.8
	No	214	51.2
<b>EC use ever in life</b>	Yes	33	7.1
	No	431	92.9
<b>HTP use ever in life</b>	Yes	22	8.9
	No	225	91.1
<b>Smokeless tobacco use ever in life</b>	Yes	19	4.8
	No	380	95.2
<b>EC use</b>	Current user	8	1.7
	Former user	2	0.4
	Tried on few occasions in life	23	5.0
	Never user	431	92.9
<b>HTP use</b>	Current user	5	2.0
	Former user	4	1.6
	Tried on few occasions in life	13	5.3
	Never user	225	91.1
<b>Smokeless tobacco use</b>	Current user	1	0.3
	Former user	6	1.5
	Tried on few occasions in life	12	3.0
	Never user	380	95.2
<b>Ever use of other products</b>	Yes	54	21.5
	No	197	78.5
<b>Ever use of tobacco or related products</b>	Yes	99	27.7
	No	259	72.3

EC - electronic cigarette; HTP - heated tobacco products

**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

*Table 2: Respondents' characteristics, averages*

	Average	n	Minimum	Maximum	Standard deviation
<b>Age</b>	40.7	479	21	71	10.8
<b>Number of years at current workplace</b>	8.6	477	0	47	9.9
<b>Number of years working with patients</b>	13.0	477	0	45	11.5
<b>Pack years</b>	8.5	121	0.1	75.0	11.1

**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

## 3.2 Checking for EC use and communication with patients about EC

### Checking for EC use

Around half of all respondents have already asked at least one of their patients about EC use, while a substantially lower proportion, one sixth, of respondents reported routine screening of EC use among their patients, as shown in Table 3.

Table 3: (Routine) checking for EC use by significantly related variables

	Ever asked any of their patients about EC use			Routinely checking their patients for EC use		
	n	%	p	n	%	p
<b>TOTAL</b>	<b>256/474</b>	<b>54.0</b>		<b>78/474</b>	<b>16.5</b>	
<b>Education</b>						
Lower	34/84	40.5	<b>0.006</b>			
Higher	222/389	57.1				
<b>Provider type</b>						
Nurse	207/351	59.0	<b>&lt;0.001</b>	70/351	19.9	<b>0.001</b>
Physician	33/70	47.1		3/70	4.3	
Other	15/52	28.8		4/52	7.7	
<b>Workplace</b>						
HEC/HPC	77/121	63.6	<b>0.009</b>	34/121	28.1	<b>&lt;0.001</b>
FMP	122/220	55.5		38/220	17.3	
CC	38/91	41.8		4/91	4.4	
Other	18/40	45.0		2/40	5.0	
<b>Usual number of patients/week</b>						
Less than 20	67/131	51.1	<b>0.028</b>			
20–40	105/169	62.1				
41+	74/154	48.1				
<b>Patients' age group</b>						
Only adults 26+			<b>0.002</b>	63/314	20.1	<b>0.002</b>
All others				14/156	9.0	
<b>Provision of smoking cessation support</b>						
Yes	232/375	61.9	<b>&lt;0.001</b>	75/375	20.0	<b>&lt;0.001</b>
No	22/96	22.9		2/96	2.1	
<b>Smoking status</b>						
Current smoker	21/54	38.9	<b>0.033</b>	4/54	7.4	<b>0.033</b>
Ex-smoker	48/78	61.5		19/78	24.4	
Never smoker and experimenter	187/342	54.7		55/342	16.1	
<b>Ever use of tobacco or related products</b>						
Yes	137/258	53.1	<b>0.013</b>	38/258	14.7	<b>0.011</b>
No	67/99	67.7		26/99	26.3	
<b>Perceived knowledge</b>						
High	35/46	76.1	<b>&lt;0.001</b>	19/46	41.3	<b>&lt;0.001</b>
Medium	89/118	75.4		32/118	27.1	
Low	116/263	44.1		22/263	8.4	

CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

The percentage of respondents (routinely) checking EC use was found to differ significantly by numerous variables as presented in Table 3. Checking for EC use also significantly differs by average knowledge score. Respondents that have ever asked any of their patients about EC use or routinely check EC use had a significantly higher knowledge score in comparison to those that do not (ever asked any of their patients about EC use: 12.06 vs. 7.55;  $p < 0.001$ ; routinely check EC use: 14.09 vs. 9.23;  $p < 0.001$ ).

#### *Ever had contact with a patient using EC*

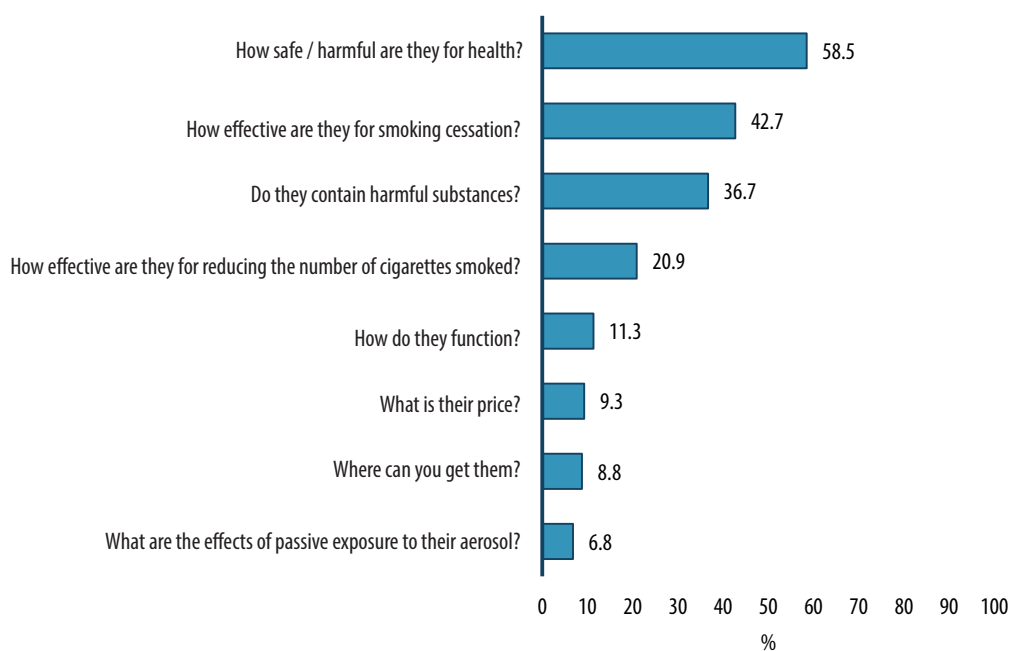
Around two thirds (65.0%) of respondents reported that they have already had contact with an EC user among their patients, 20.8% reported no contact, while 14.3% did not know. The share was found to differ significantly by provider type ( $p < 0.001$ ), number of years at current workplace ( $p = 0.023$ ), age group of respondent's patients ( $p = 0.002$ ), providing smoking cessation support ( $p < 0.001$ ) and perceived knowledge ( $p < 0.001$ ). Providers other than nurses and physicians, those working less than 1 year at current workplace, those that also have patients from other age groups beside adults, those that do not provide smoking cessation support and have low perceived knowledge were less likely to report that they had already had contact with an EC user among their patients.

#### *Patients' queries about EC*

66.1% of all respondents reported that they received no queries about EC from their patients during the last 30 days, while 30.7% reported queries from 10% or less of their patients, 2.3% from over 10%, but less than 25% of their patients and 0.9% over 25%, but less than 50% of their patients. Overall 33.9% of respondents indicated that they received queries about EC from their patients and none reported queries from over 50% of patients. The share of those that reported queries was found to differ significantly by provider type ( $p = 0.043$ ), workplace ( $p < 0.001$ ), provision of smoking cessation support ( $p < 0.001$ ), use ever of tobacco or other products ( $p = 0.005$ ), perceived knowledge ( $p < 0.001$ ) and knowledge score ( $p < 0.001$ ) in comparison to those that did not receive queries about EC from their patients. Respondent physicians and other provider types, those that provide smoking cessation support, those that have never used any tobacco or other product and those with higher knowledge score were more likely to report patients' queries, while respondents working in CC and those with low perceived knowledge about EC were less likely to report queries.

Around three quarters of respondents (74.3%) reported that the proportion of patients making queries about EC did not change in comparison to one year ago, while around one fifth (19.7%) reported its increase. Only 6.0% of all respondents estimated that proportion has declined. Shares were found to differ significantly by gender ( $p = 0.015$ ), cohesion region ( $p = 0.042$ ), provision of smoking cessation support ( $p = 0.028$ ) and perceived knowledge about EC ( $p < 0.001$ ). Male providers, providers working in Western Slovenia, those providing smoking cessation support and those with high perceived knowledge were more likely to report an increase in the proportion of patients making queries compared to one year ago.

In most cases the discussion about EC was initiated by the patient (42.4%) and less often by the healthcare professional (23.8%). 33.8% of all respondents have never discussed EC with their patients. The most frequent topics of patients' queries about EC are their safety/harmfulness, effectiveness in smoking cessation and toxic substances content (Figure 1). Respondents did not report other important queries outside the proposed list.



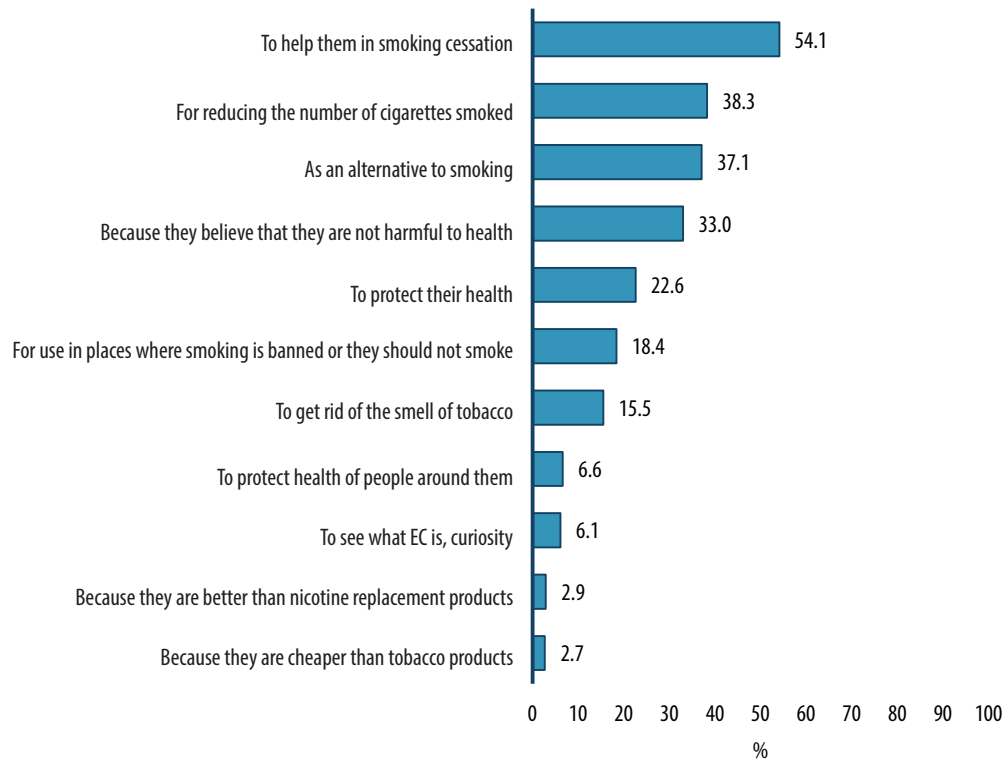
**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

*Figure 1: Most frequent topics of patients' queries about EC*

### ***Estimating prevalence of EC use among patients and patients' main reasons for EC use***

42.0% of respondents estimated that none of their patients that they were in contact with during the last 30 days, use EC. 54.4% estimated that 10% or less of their patients use EC, 3.2% estimated that more than 10%, but less than 25% of their patients use EC and 0.5% estimated that more than 25%, but less than 50% of their patients use EC. None reported a higher share of EC users among their patients. The share of those estimating that at least some patients use EC was found to differ significantly by provider type ( $p=0.023$ ), workplace ( $p=0.007$ ), providing smoking cessation support ( $p=0.006$ ), ever use of tobacco or other products ( $p=0.009$ ), perceived knowledge ( $p<0.001$ ) and knowledge score ( $p=0.018$ ) in comparison with respondents that estimated that none of their patients that they were in contact with during the last 30 days, use EC. Nurses in CC, those that do not provide smoking cessation support, those that have never used any tobacco or other product and those with low perceived knowledge and lower knowledge score about EC were more likely to estimate that none of their patients use EC, while physicians were more likely to estimate that some of their patients use EC.

The most prominent reason that respondents' patients report for using EC is to help them in smoking cessation. Other frequent reasons are to reduce the number of cigarettes smoked, to use EC as an alternative to smoking and because they believe that they are not harmful to health or to protect their health (Figure 2). Respondents did not report other important reasons outside the proposed list.



**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 2: Patients' main reasons for EC use

### 3.3 Attitudes and beliefs about EC

#### *Different attitudes and beliefs*

Respondents first expressed their level of (dis)agreement with a number of statements about EC, as shown in Figure 3. We formed three groups of attitudes and beliefs regarding EC: about smoking cessation, safety & harm and communication with patients. It is noteworthy that between a fifth and more than half of respondents neither agreed nor disagreed with the statements, which represents a substantial share of those with no clear opinion. On the other hand, substantial shares, at least a third or more, of respondents supported those statements about harm & safety and smoking cessation that are in line with current evidence and research.

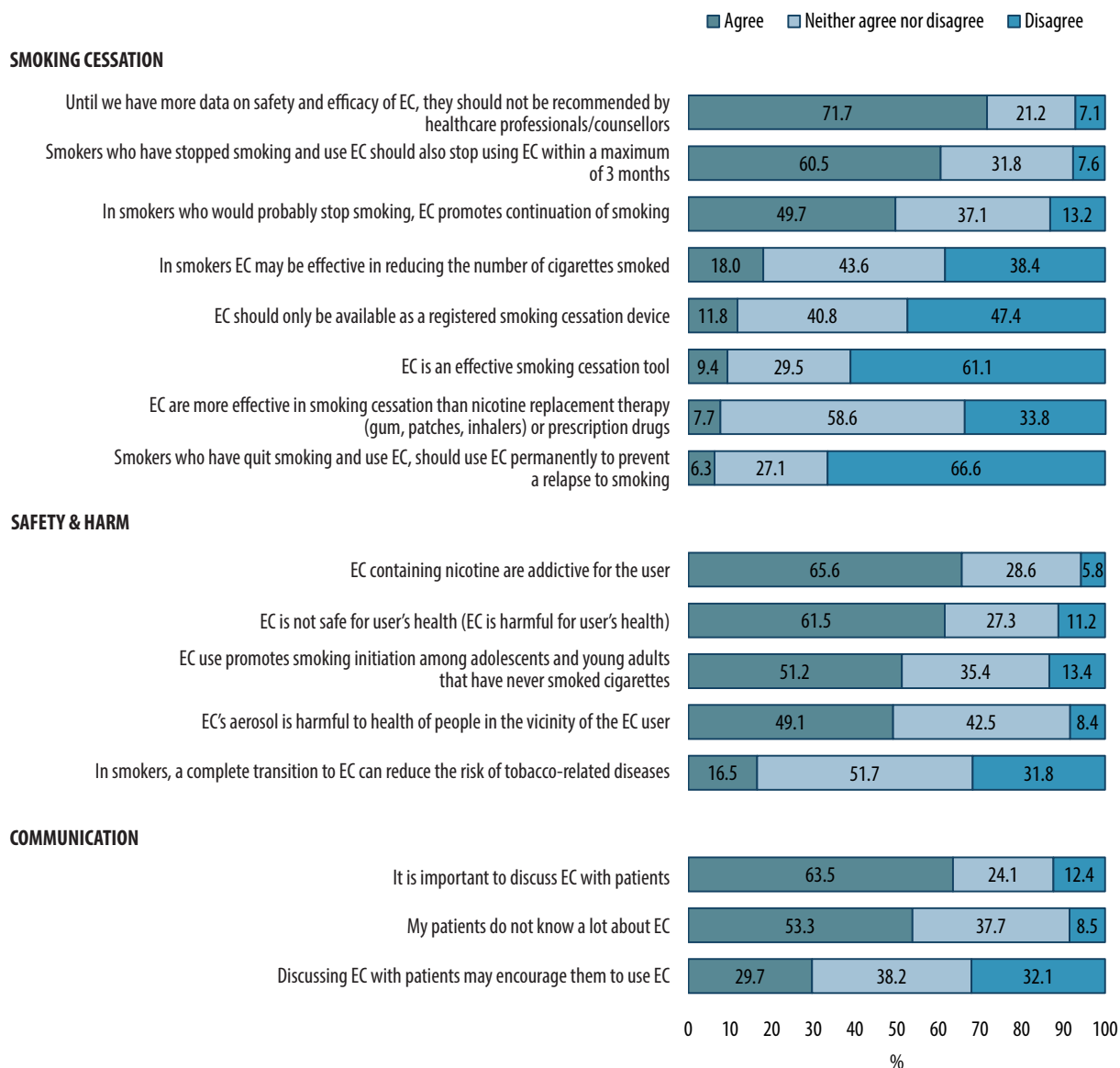
**Smoking cessation (8 statements):** The majority (61.1%) of respondents did not believe that EC is an effective smoking cessation tool and the majority (71.7%) agreed that until we have more data on the safety and efficacy of EC, they should not be recommended by healthcare professionals/counsellors. Almost a half (49.7%) agreed that EC promotes continuation of smoking. A majority (66.6%) did not agree that smokers who switched to EC should use it permanently to avoid relapse and also the majority (60.5%) agreed that they should stop using EC within a maximum of 3 months. More than half of the respondents (58.6%) disagreed that EC are more effective in smoking cessation than nicotine replacement therapy (gum, patches, inhalers), but only around a tenth of respondents (11.8%) agreed that EC should only be available as a registered smoking cessation device. 18.0% of respondents agreed that in smokers EC may be effective in reducing the number of cigarettes smoked. Variables significantly related to at least half of these eight statements are gender, education, workplace, ever use of other products, perceived knowledge, knowledge score and among ever smokers pack years.



**Safety & harm (5 statements):** More than half of respondents agreed that EC use is not safe for health (61.5%) and that EC containing nicotine are addictive to users (65.6%), around half that EC use promotes smoking initiation among adolescents and young adults that never smoked cigarettes (51.2%) and that EC's aerosol is harmful to the health of people in the vicinity of the EC user (49.1%). 16.5% agreed that in smokers, a complete transition to EC can reduce the risk of tobacco-related diseases. Variables that are significantly related to at least half of these five statements are ever use of other products, perceived knowledge, knowledge score and among ever smokers pack years.

For statements on smoking cessation and safety & harm, variables that are significantly related to (dis)agreement with different statements are shown in Table 4. Higher education, working in HEC/HPC, never use of other products, higher knowledge score and in ever smokers lower number of pack years seem to be related to more likely agreement with statements that are in line with current evidence and research.

**Communication with patients (3 statements):** The majority of respondents (63.5%) agreed that it is important to talk to patients about EC and more than half that their patients do not know a lot about EC (53.8%). 29.7% believe that discussing EC with patients may encourage them to use EC and a similar share (32.1%) disagree with this statement. There is only one variable that is significantly related to at least half of these three statements, and that is cohesion region. Respondents from Western Slovenia are more likely to agree that it is important to discuss EC with patients and less likely to agree that these discussions would lead to EC use among patients.



**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 3: Attitudes and beliefs about EC – (dis)agreement with different statements about EC

Table 4: Attitudes and beliefs about EC – (dis)agreement with different statements about EC by significant independent variables

		Respondents that more likely agreed with the statement	Respondents that less likely agreed with the statement
<b>Smoking cessation</b>	EC is an effective smoking cessation tool	Lower education, ever use of other products, high perceived knowledge, lower knowledge score, ever smokers with higher pack years	Working in HEC/HPC
	In smokers EC may be effective in reducing number of cigarettes smoked	Ever use of other products, high perceived knowledge, lower knowledge score, ever smokers with higher pack years	Working in HEC/HPC
	In smokers who would probably stop smoking, EC promotes continuation of smoking	Working in HEC/HPC	Higher education, ever use of other products, high perceived knowledge, lower knowledge score, ever smokers with higher pack years
	Smokers who have quit smoking and use EC, should use EC permanently to prevent a relapse to smoking	Low knowledge score	Higher education, working in HEC/HPC and FMP
	EC should only be available as a registered smoking cessation device	Low education, higher perceived knowledge, lower knowledge score, working in HEC/HPC	
	Until we have more data on safety and efficacy of EC, they should not be recommended by healthcare professionals/counsellors		Ever use of other products, ever smokers with higher pack years
	Smokers who have stopped smoking and use EC should also stop using EC within a maximum of 3 months	Higher education, high perceived knowledge, higher knowledge score	
	EC are more effective in smoking cessation than nicotine replacement therapy or prescription drugs		Higher education, working in HEC/HPC, ever smokers with lower pack years
<b>Safety &amp; harm</b>	EC is not safe for user's health (EC is harmful for user's health)	Never use of other products, medium perceived knowledge, high knowledge score, ever smokers with lower pack years	
	EC's aerosol is harmful to health of people in the vicinity of the vaper		
	EC use promotes smoking initiation among adolescents and young adults that never smoked cigarettes		
	EC containing nicotine are addictive for the user		
	In smokers, a complete transition to EC can reduce the risk of tobacco-related diseases	Ever use of other products, high perceived knowledge, lower knowledge score, ever smokers with higher pack years	

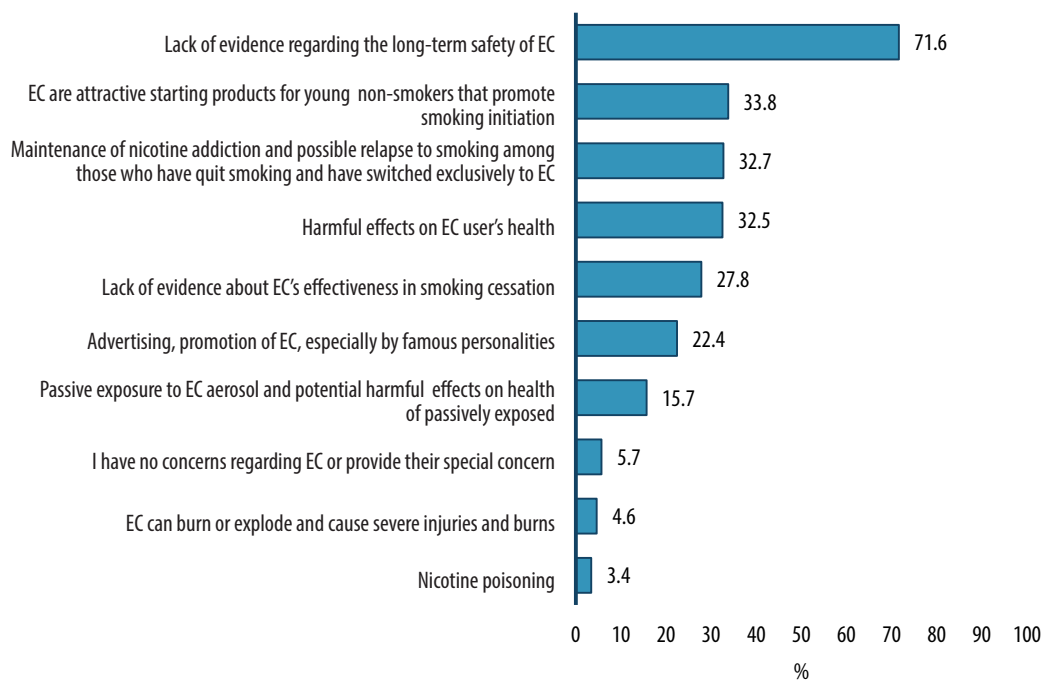
HEC/HPC - Health Education Centres/Health Promotion Centres; FMP - Family Medicine Practices

**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

### Main concerns about EC

Respondents' major concern about EC is lack of evidence regarding the long-term safety of EC, pointed out by the majority of respondents (71.6%), as shown in Figure 4. The percentages of respondents pointing out this major concern did not differ by any of the analysed independent variables. Only a minority (5.7%) of respondents reported that they have no concerns about EC.

Aside from the major concern, concerns that were pointed out by at least 15% of respondents varied by individual variables, half of them by level of perceived knowledge and knowledge score. Respondents with high perceived level of knowledge and higher knowledge score were more likely to point out some of these concerns.

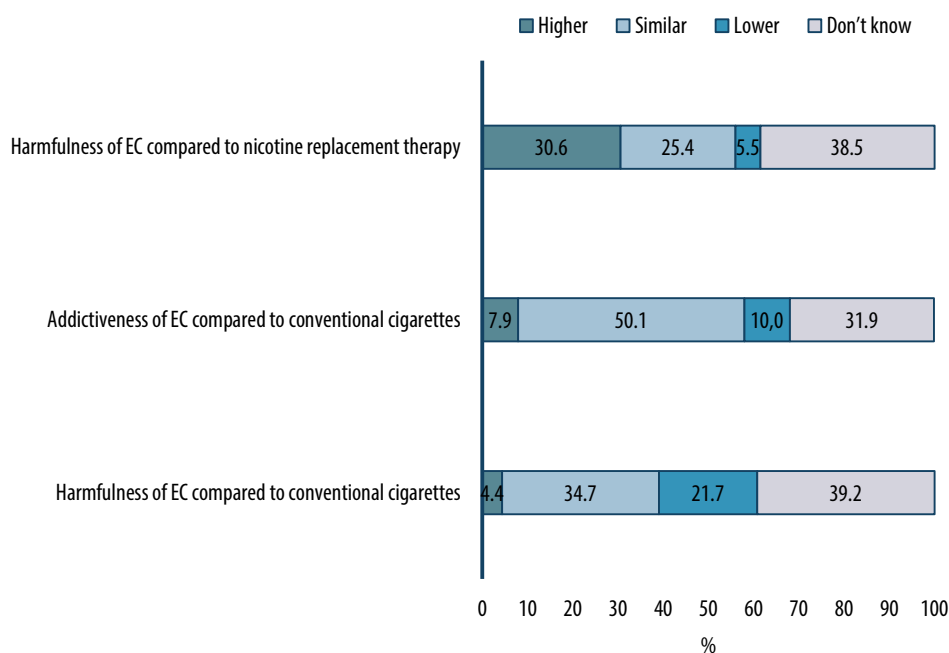


**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 4: Respondents' main concerns about EC

### Beliefs about harmfulness of EC compared to conventional cigarettes, nicotine replacement therapy and beliefs about addictiveness of EC compared to conventional cigarettes

Around a third of respondents did not know how to rate harmfulness and addictiveness of EC, while around a quarter or less believed that harmfulness and addictiveness of EC are lower compared to conventional cigarettes or nicotine replacement therapy as shown in Figure 5.



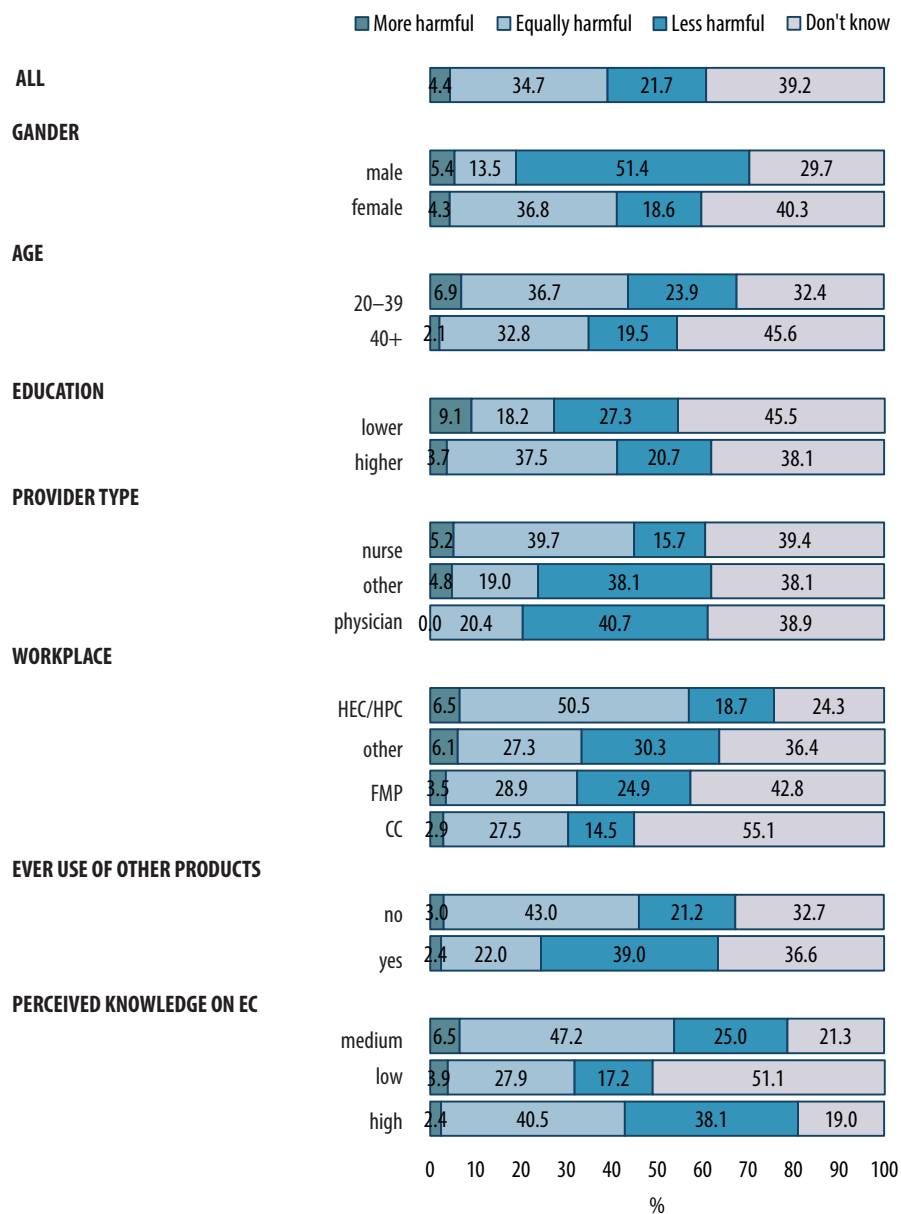
**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

*Figure 5: Comparing harmfulness and addictiveness of EC to conventional cigarettes and nicotine replacement therapy*

**Harmfulness of EC compared to conventional cigarettes** is shown in Figures 6 and 7. Shares differed significantly by gender ( $p < 0.001$ ), age group ( $p = 0.014$ ), education ( $p = 0.021$ ), provider type ( $p < 0.001$ ), workplace ( $p = 0.001$ ), perceived knowledge ( $p < 0.001$ ), score of actual knowledge ( $p < 0.001$ ) and in ever smokers by pack years ( $p = 0.048$ ). The share also differed by ever use of other products ( $p = 0.043$ ), but in this case the chi-square test is not reliable, as the minimum expected cell count in some cells is less than one.

**Harmfulness of EC compared to nicotine replacement therapy** is shown in Figures 8 and 9. The shares differed significantly by age group ( $p = 0.007$ ), education ( $p = 0.031$ ), provider type ( $p < 0.001$ ), workplace ( $p = 0.012$ ), cohesion region ( $p = 0.030$ ), number of years working with patients ( $p = 0.041$ ), providing smoking cessation support ( $p = 0.021$ ), ever use of other products ( $p = 0.011$ ), perceived knowledge ( $p < 0.001$ ), knowledge score ( $p < 0.001$ ) and in ever smokers by pack years ( $p = 0.002$ ).

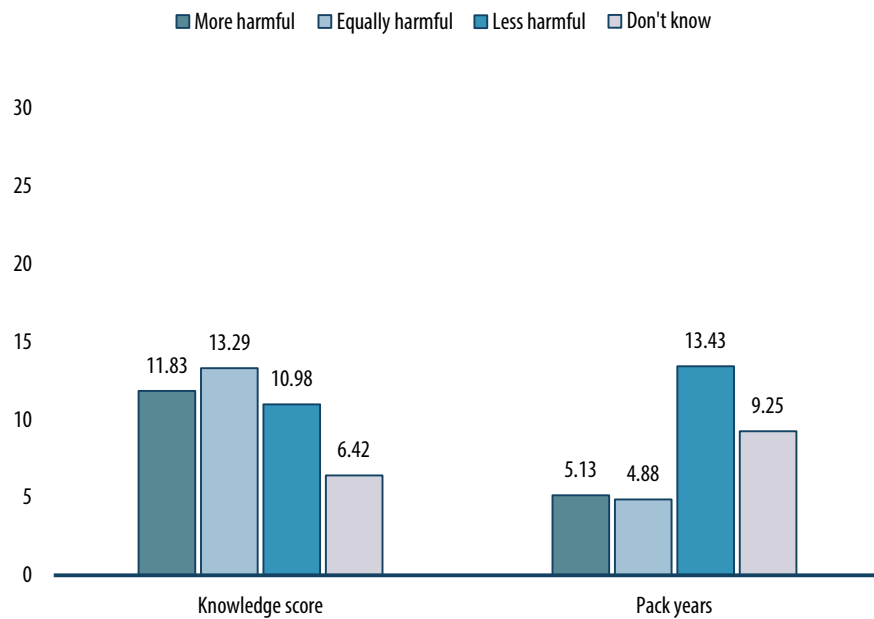
**Addictiveness of EC compared to conventional cigarettes** is shown in Figures 10 and 11. Shares differed significantly by education ( $p = 0.019$ ), workplace ( $p = 0.012$ ), ever smoking ( $p = 0.014$ ), perceived knowledge ( $p < 0.001$ ), knowledge score ( $p < 0.001$ ) and in ever smokers by pack years ( $p = 0.002$ ). Shares also differed by current smoking status ( $p = 0.032$ ), but in this case the chi-square test is not reliable (more than 20% of cells have expected cell counts less than 5) and by ever use of other products ( $p = 0.006$ ), but in this case the chi-square test is also not reliable (the minimum expected cell count in some cells is less than one).



CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

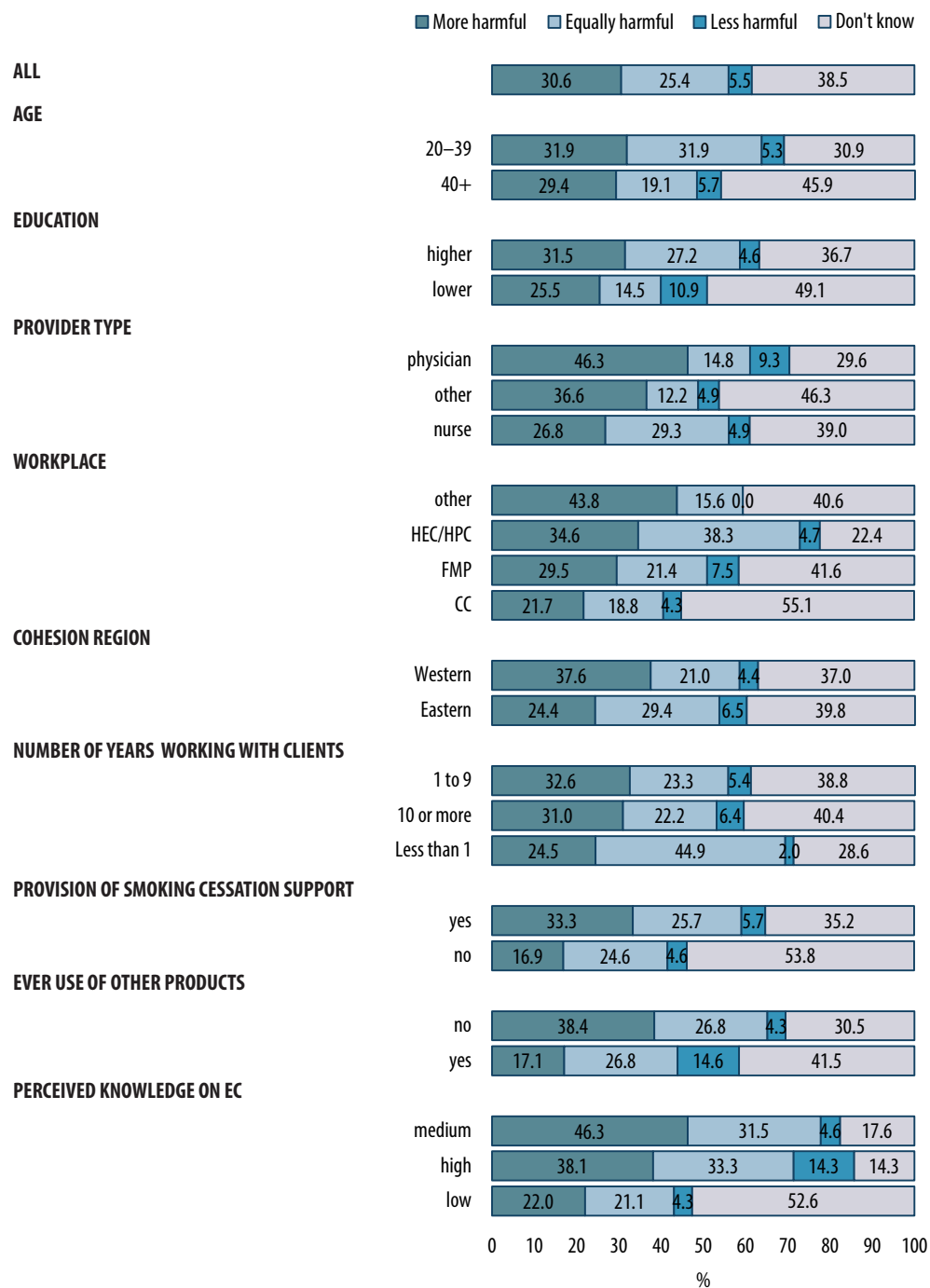
Figure 6: Harmfulness of EC compared to conventional cigarettes by significantly related independent variables



**Note:** Average knowledge score: 10.11  
Average pack years: 8.45

**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

*Figure 7: Harmfulness of EC compared to conventional cigarettes by significantly related independent variables*

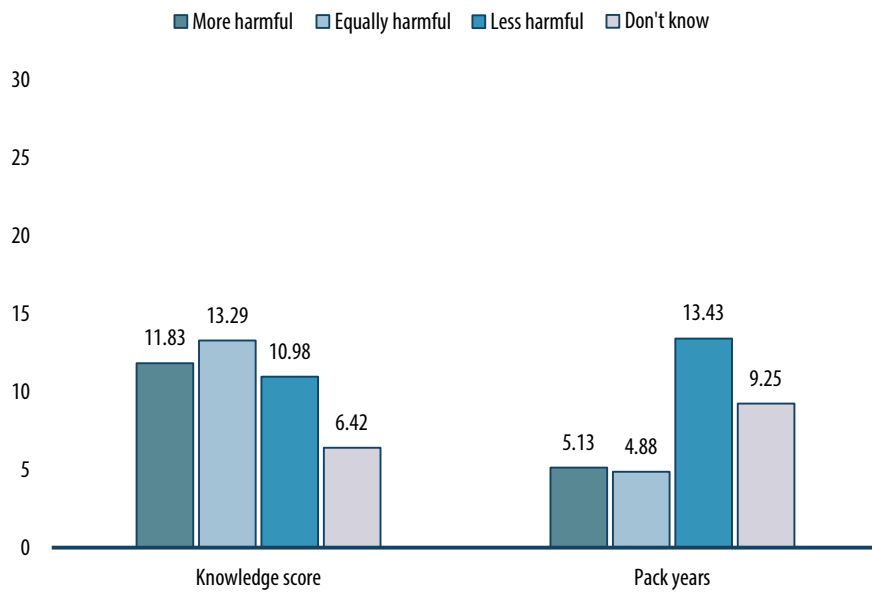


CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 8: Harmfulness of EC compared to nicotine replacement therapy by significantly related independent variables

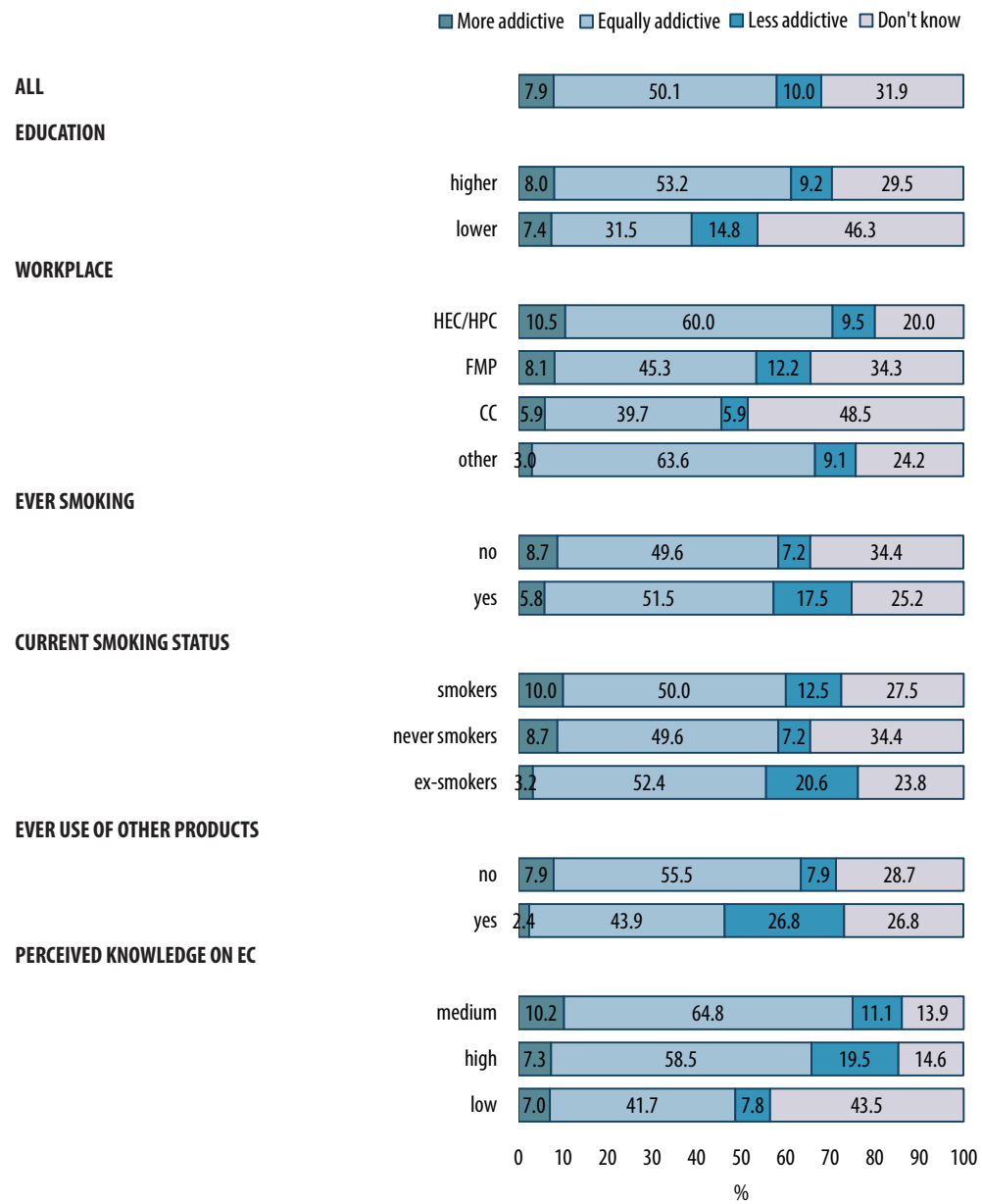




**Note:** Average knowledge score: 10.11  
Average pack years: 8.45

**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

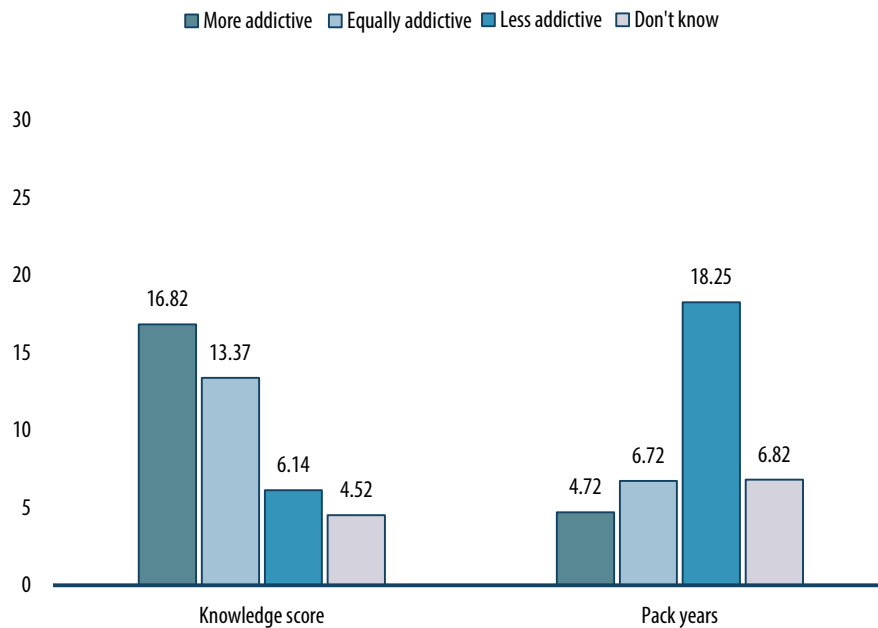
*Figure 9: Harmfulness of EC compared to nicotine replacement therapy by significantly related independent variables*



CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 10: Addictiveness of EC compared to conventional cigarettes by significantly related independent variables



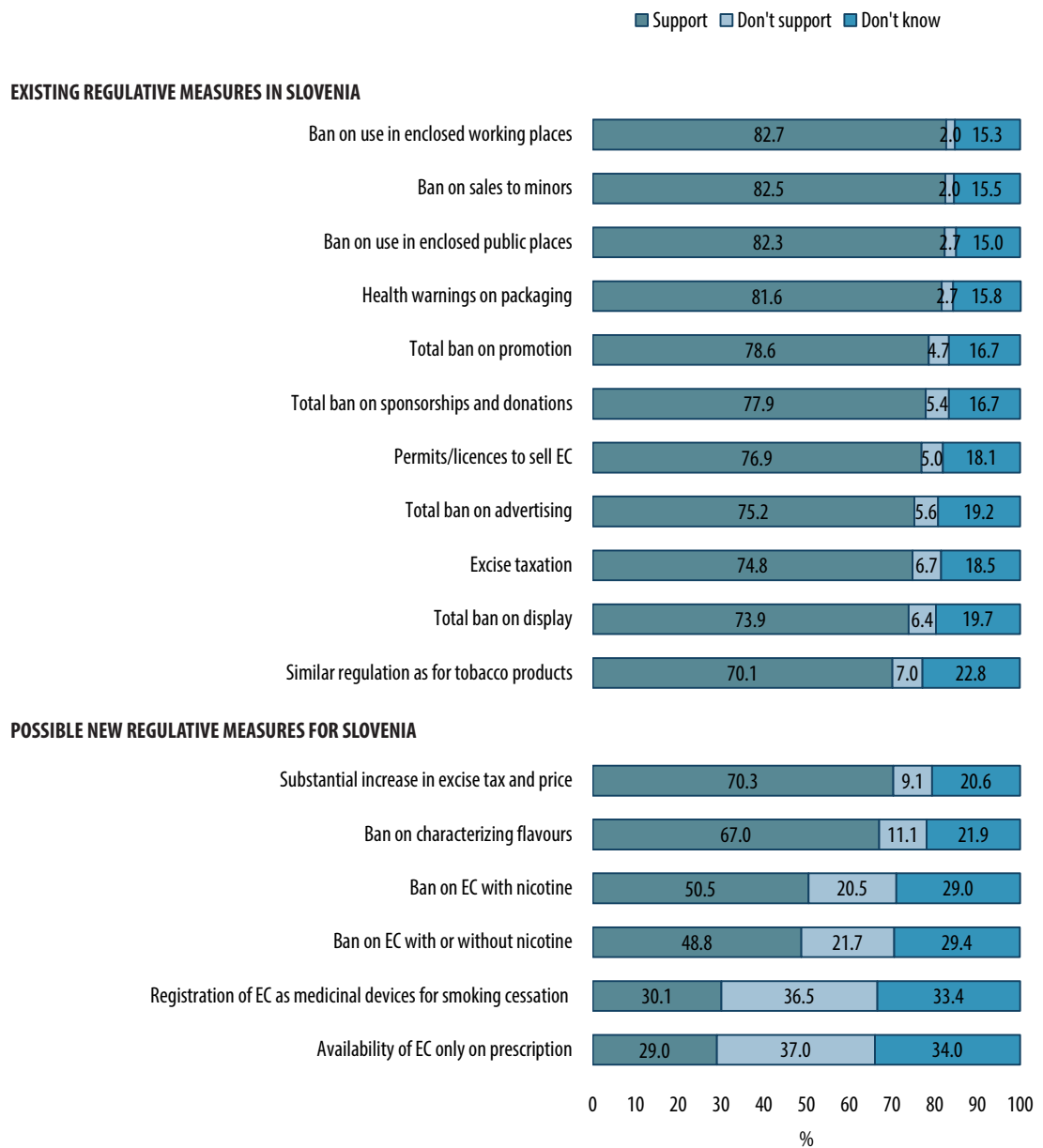
**Note:** Average knowledge score: 10.11  
Average pack years: 8.45

**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

*Figure 11: Addictiveness of EC compared to conventional cigarettes by significantly related independent variables*

### 3.4 Support for different EC regulatory measures

As shown in Figure 12, from around 70% to up to almost 83% of respondents support existing regulatory measures (first 10 measures) and only a minority (from 2% to 7%) does not support them. High excise taxes and their substantial increase are supported by 70% to 75% of respondents and less than 10% do not support these measures. Among new measures the highest level of support was given to a ban on characterizing flavours by two thirds of respondents. A ban on EC, either with or without nicotine, was supported by approximately half of respondents and not supported by around a fifth. Respondents gave the least support (around 30%) to the availability of EC by prescription and registration of EC as a smoking cessation device, while around 37% did not support these measures. Higher shares of respondents were not determined about measures not implemented in Slovenia, from one fifth to a third.



Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 12: Support for different EC regulatory measures

In all statements shares differed significantly by knowledge score (in all cases  $p < 0.001$ ); respondents who support the measures have a significantly higher knowledge score compared to others. In more than half (9 or more out of 17) of regulatory measures shares differed significantly by gender, provision of smoking cessation services, use ever of other products and perceived knowledge. Measures are supported by significantly higher shares of women compared to men. Respondents providing smoking cessation support are more likely to support the measures and are less likely to be undecided than those that do not provide smoking cessation support, while those who were ever users of other products are less likely to support the measures and are more likely to be undecided than those who were never users of other products. Respondents with low perceived knowledge are more likely to be undecided than other respondents.

## 3.5 Perceived and actual knowledge of EC

### Perceived knowledge

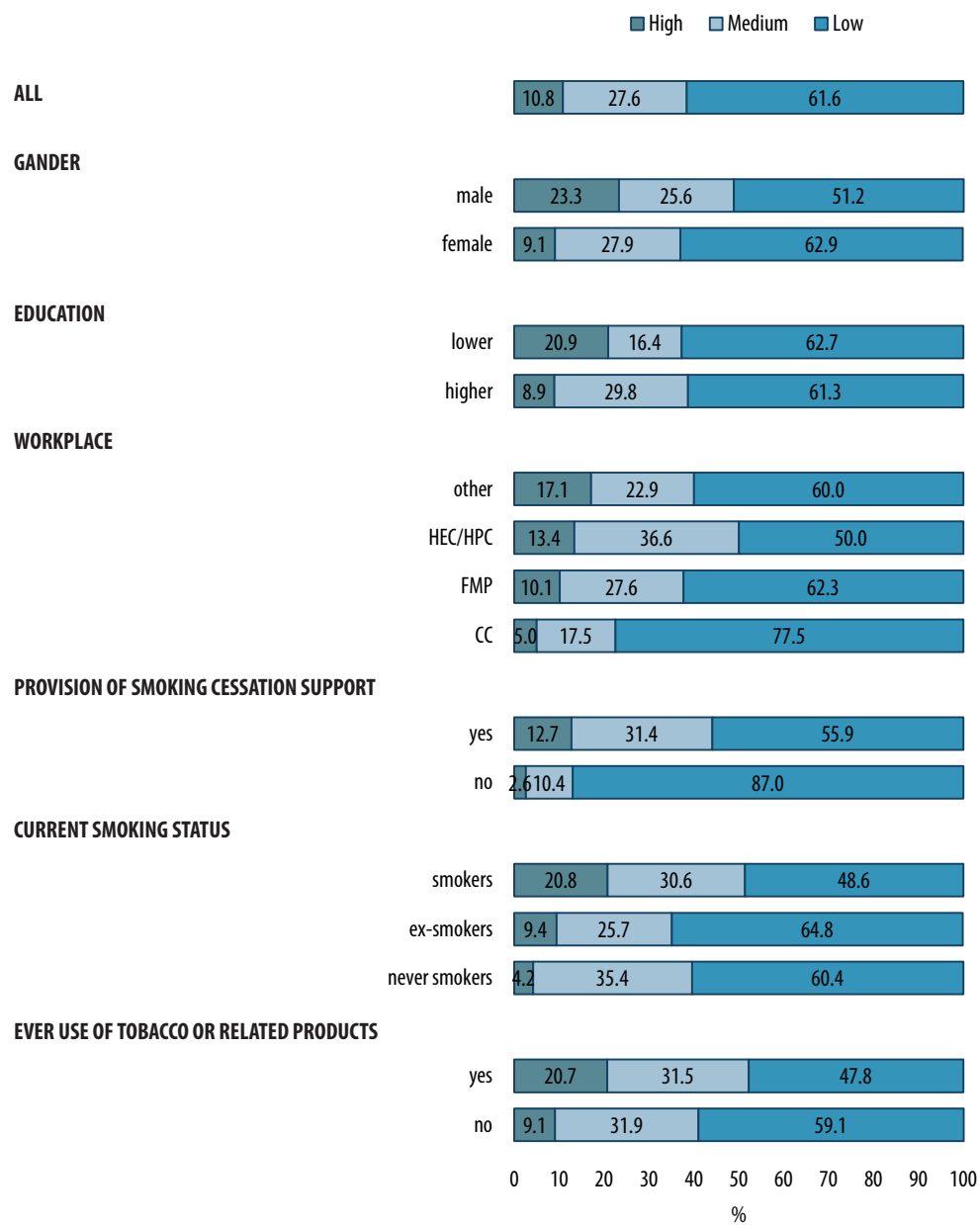
The majority of respondents rated their knowledge of EC as low (61.6%), and only 10.8% as high, as shown in Table 5.

Table 5: Perceived knowledge of EC

Perceived knowledge of EC	n	%		n	%
Very well	11	2.6	High = very well + well	46	10.8
Well	35	8.2			
Neither well nor bad	118	27.6	Medium = neither well nor bad	118	27.6
Bad	143	33.5	Low = very bad + bad	263	61.6
Very bad	120	28.1			

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

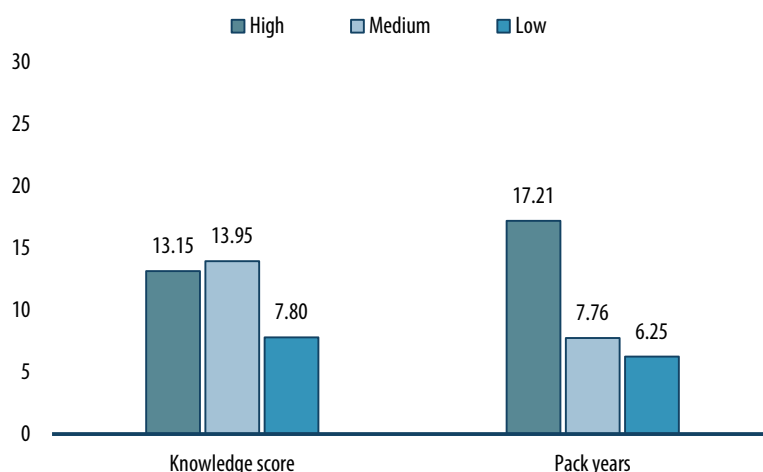
Shares vary significantly by gender ( $p=0.016$ ), education ( $p=0.004$ ), workplace ( $p=0.010$ ), providing smoking cessation services ( $p<0.001$ ), current smoking status ( $p=0.010$ ), ever use of tobacco and other products ( $p=0.013$ ) and knowledge score ( $p<0.001$ ); among ever smokers also by pack years ( $p=0.001$ ). Male respondents, those with higher level of education, working at other workplaces (most probably due to QL counsellors in this group), respondents providing smoking cessation support, ex-smokers, respondents that never used tobacco or related products and ever smokers with higher pack years more likely rated their knowledge as high, while those working in CC more likely rated their knowledge as low. Respondents that rated their knowledge as low had a significantly lower knowledge score, while those that rated their knowledge as high or medium had similar knowledge scores. Perceived knowledge by significant variables is shown in Figures 13 and 14.



CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 13: Perceived knowledge of EC by significantly related independent variables



**Note:** Average knowledge score: 10.11  
Average pack years: 8.45

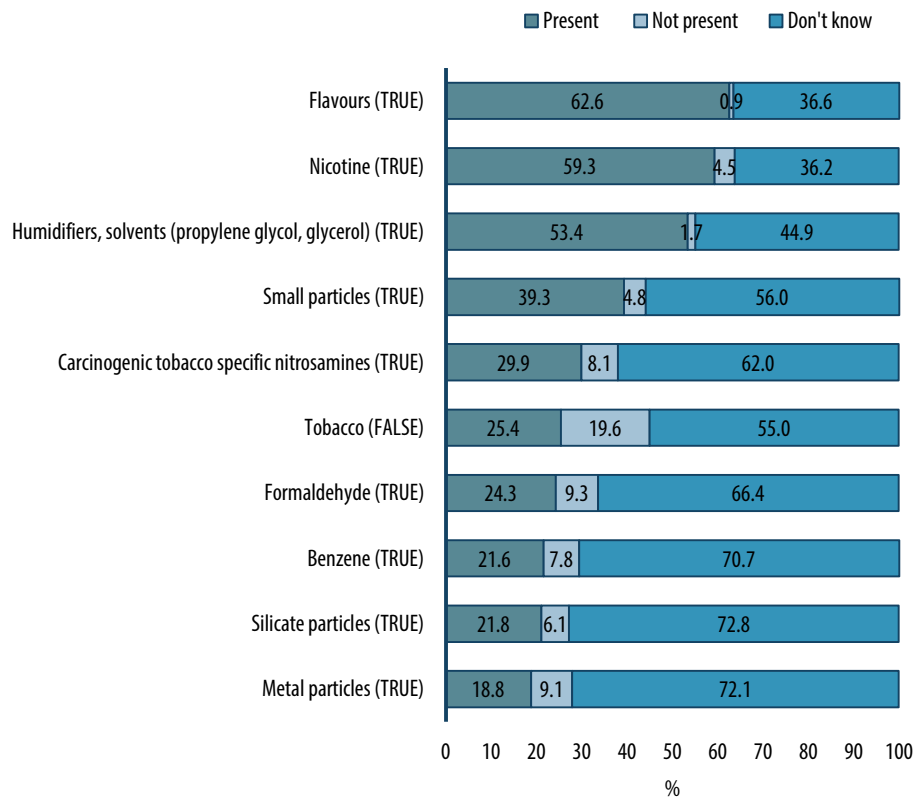
**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

*Figure 14: Perceived knowledge of EC by significantly related independent variables*

### **Actual knowledge and knowledge score**

Respondents were first asked to indicate which of the listed substances are present in EC liquid and/or aerosol; the results are shown in Figure 15. Nicotine, solvents such as propylene glycol or glycerol, carcinogenic tobacco specific nitrosamines, formaldehyde, benzene, flavours, metal particles, small particles and silicate particles are present in EC liquid and/or aerosol, while tobacco is not. More than half of the respondents knew that nicotine, solvents and flavours are present in EC. In the case of other constituents and emissions (carcinogenic tobacco specific nitrosamines, formaldehyde, benzene, metal particles, small particles, silicate particles) more than half to up to three quarters did not know whether they were present in EC. A quarter of respondents incorrectly responded that tobacco is present in EC.

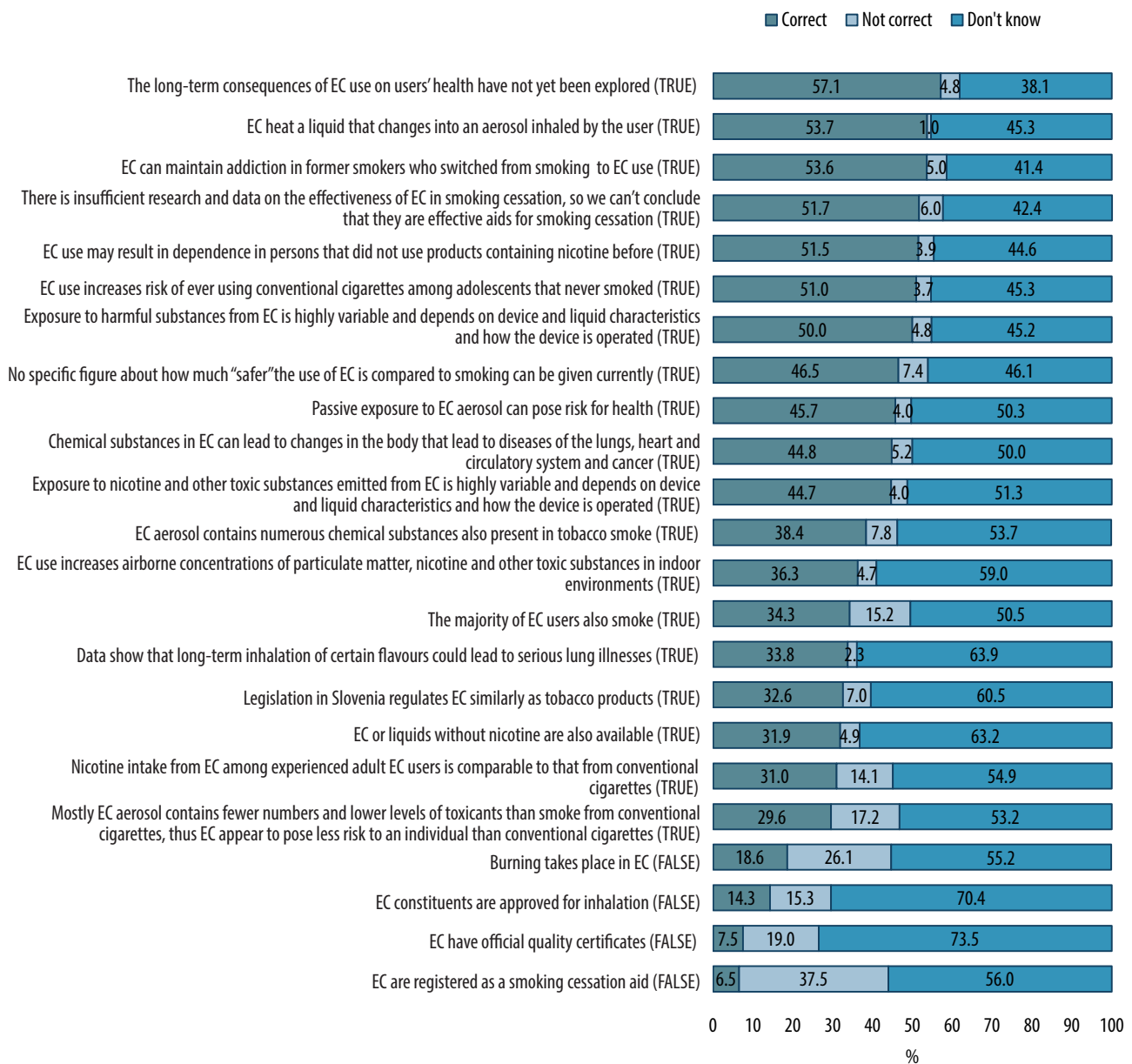




**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

*Figure 15: Respondents' assessment of presence of different constituents in EC liquid/aerosol*

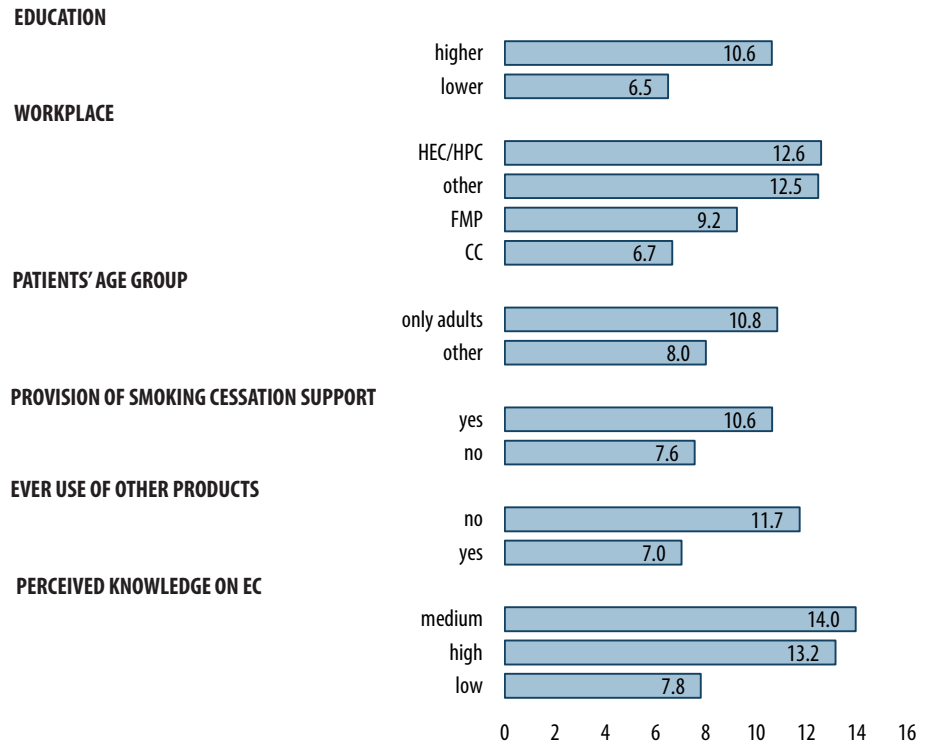
Respondents were also asked to rate 23 statements as correct or incorrect; the third option was to answer I don't know. Most of the statements were correct, but 4 were incorrect: EC are registered as smoking cessation aid; Burning takes place in electronic cigarettes; EC constituents are approved for inhalation; EC have official quality certificates. In the majority of statements close to half and up to almost two thirds of respondents did not know whether the statements were correct or not, as shown in Figure 16. On the other hand, shares of respondents answering correctly were in most statements much higher than shares of those answering incorrectly.



**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

*Figure 16: Respondents' assessment of correctness of individual statements*

For each respondent we calculated a knowledge score with a range from -33 to +33; average knowledge score was 10.11 with a range from -16 to +29. Average knowledge score differed significantly by education ( $p=0.006$ ), workplace ( $p<0.001$ ), patients' age group ( $p=0.008$ ), providing smoking cessation support ( $p=0.019$ ), ever use of other products ( $p=0.006$ ) and perceived knowledge ( $p<0.001$ ), as shown in Figure 17.



Note: Average knowledge score: 10.11

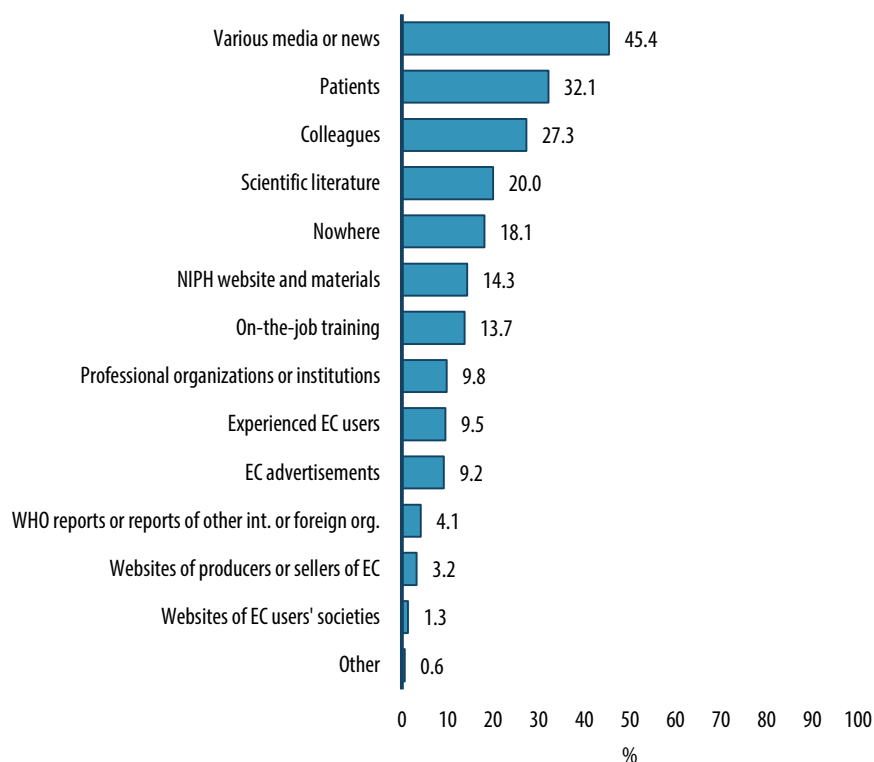
CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 17: Knowledge score by significantly related independent variables

### 3.6 Major sources of information about EC

While somewhat less than one fifth of respondents (18.1%) did not use any sources of information about EC, others used a variety of sources, mainly various media or news, patients and colleagues, as shown in Figure 18.



NIPH - National Institute of Public Health; WHO - World Health Organization

**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

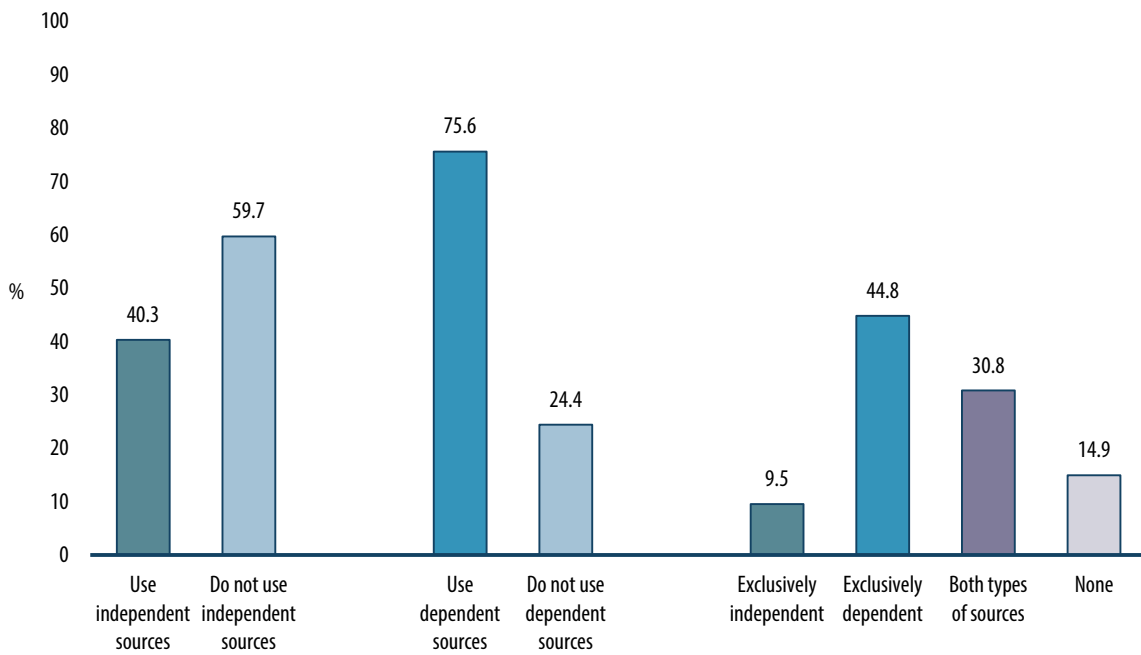
*Figure 18: Respondents' major sources of information about EC*

It is important whether healthcare professionals use independent or dependent sources of information, as this may significantly impact their knowledge and practices. We thus analysed more deeply the use of independent and dependent sources. Data in Table 6 and Figure 19 show that use of dependent sources is extensive and more frequent than use of independent sources.

*Table 6: Respondents' major sources of information about EC (independent, dependent sources)*

		n	%
<b>Use of independent sources</b>	Yes	127	40.3
	No	188	59.7
<b>Use of dependent sources</b>	Yes	238	75.6
	No	77	24.4
<b>Use of different sources</b>	Exclusively independent	30	9.5
	Exclusively dependent	141	44.8
	Both types of sources	97	30.8
	None	47	14.9

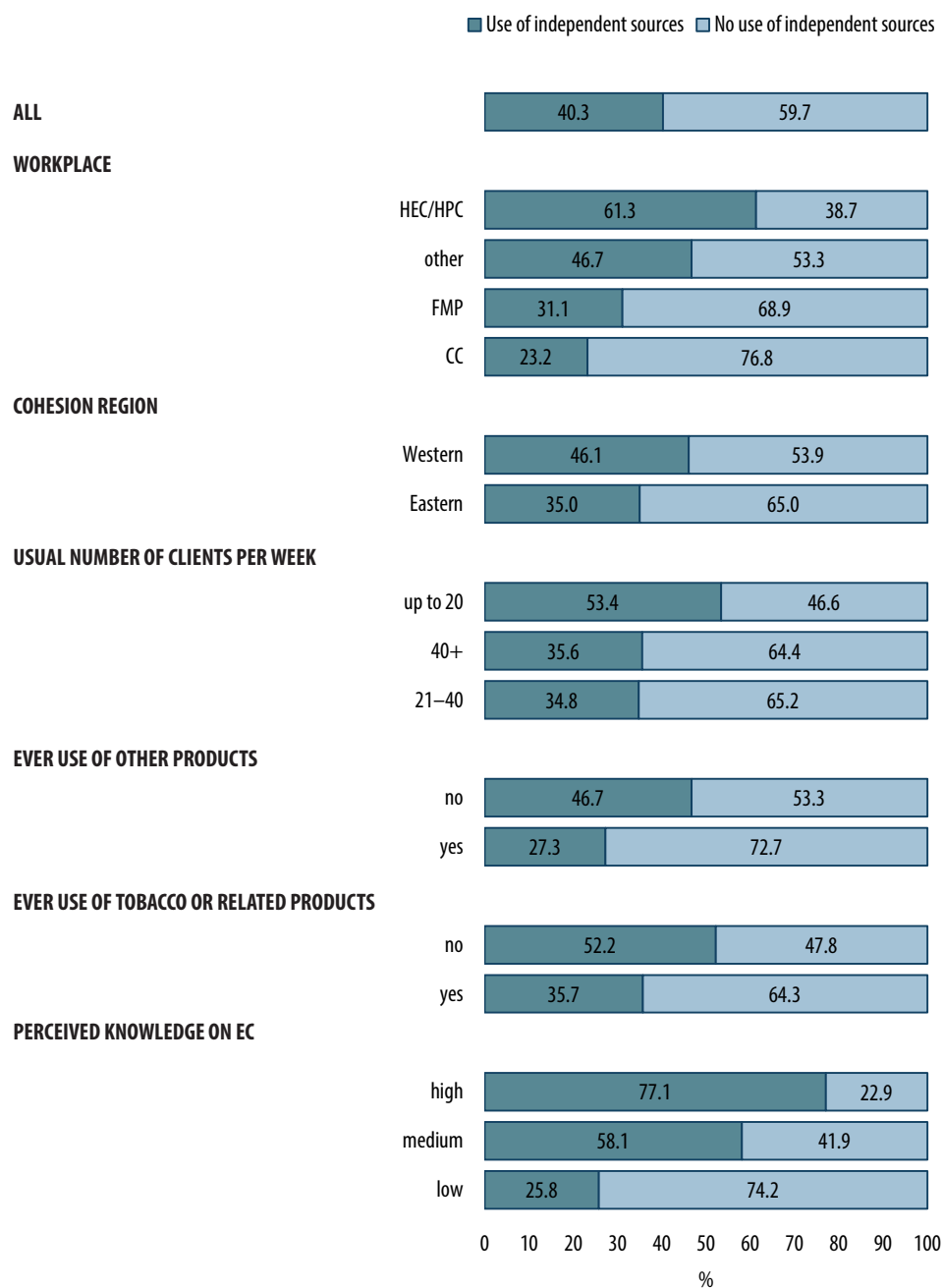
**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19



**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

*Figure 19: Respondents' major sources of information about EC (independent, dependent sources)*

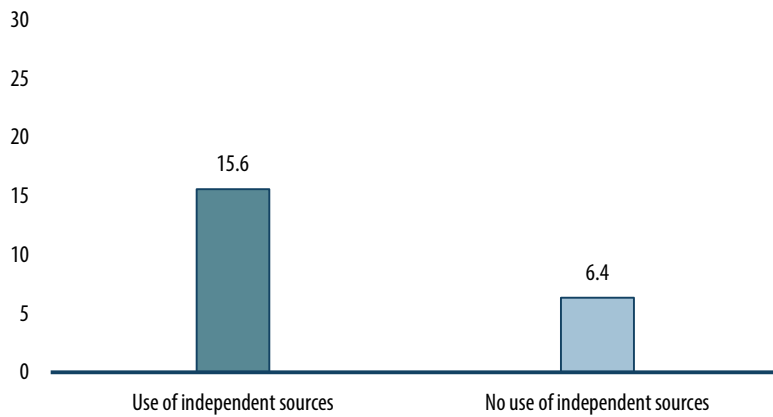
**Use of independent sources:** The share of those that use independent sources differs significantly by workplace ( $p < 0.001$ ), region ( $p = 0.045$ ), number of patients per week ( $p = 0.013$ ), ever use of other products ( $p = 0.044$ ), ever use of tobacco and other products ( $p = 0.020$ ), perceived knowledge ( $p < 0.001$ ) and knowledge score ( $p < 0.001$ ) from those that do not use independent sources. Use of independent sources by significantly related independent variables is shown in Figures 20 and 21.



CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 20: Use of independent sources of information about EC by significantly related independent variables

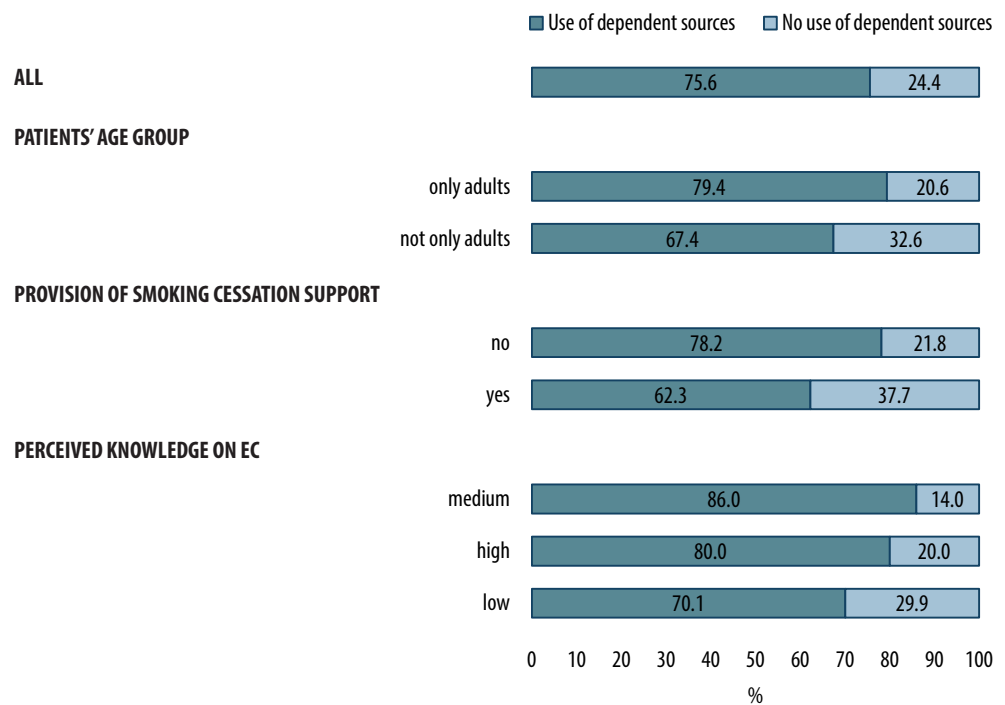


Note: Average knowledge score: 10.11

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 21: Use of independent sources by knowledge score

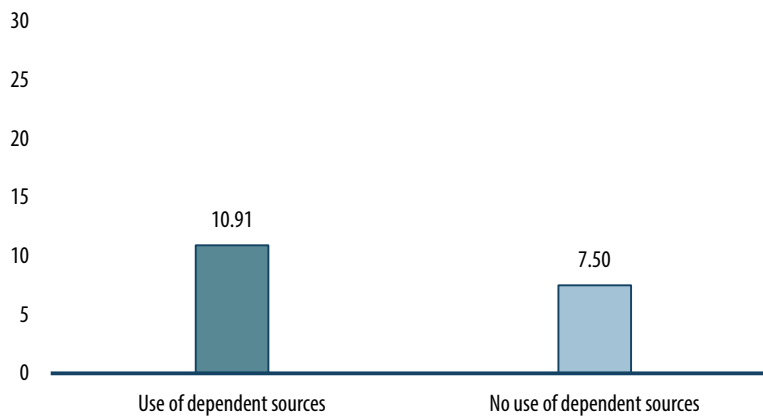
**Use of dependent sources:** The majority (75.6%) of respondents use dependent sources as one of the major sources of information on EC. The share of those that use dependent sources differs significantly by age group of patients ( $p=0.023$ ), providing smoking cessation support ( $p=0.014$ ), perceived knowledge ( $p=0.013$ ) and knowledge score ( $p=0.004$ ) from those that do not use dependent sources as one of the major sources of information on EC. Use of dependent sources by significantly related independent variables is shown in Figures 22 and 23.



CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 22: Use of dependent sources of information about EC by significantly related independent variables



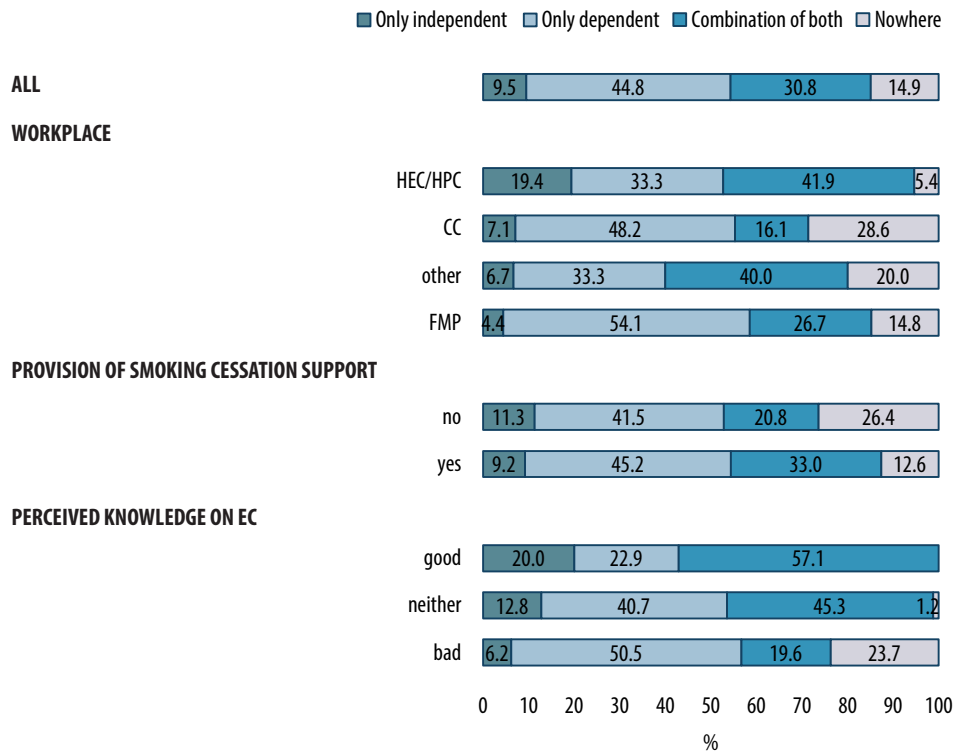
**Note:** Average knowledge score: 10.11

**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

*Figure 23: Use of dependent sources by knowledge score*

**Use of independent/dependent types of sources:** Only a minority of respondents use only independent sources (9.5%), while almost half (44.8%) use only dependent sources. Shares differ significantly by workplace ( $p < 0.001$ ), providing smoking cessation support ( $p = 0.045$ ), perceived knowledge ( $p < 0.001$ ) and knowledge score ( $p < 0.001$ ) and in ever smokers also by pack years ( $p = 0.001$ ). Use of independent/dependent sources by significantly related independent variables is shown in Figures 24 and 25. As shown in Figure 25, in the case of pack years, data show that those with significantly higher pack years smoking more likely use independent sources. We investigated further who constitutes this group and found that there are only four respondents in this group and they are all ex-smokers, two of them currently use EC daily, while two have never used EC.

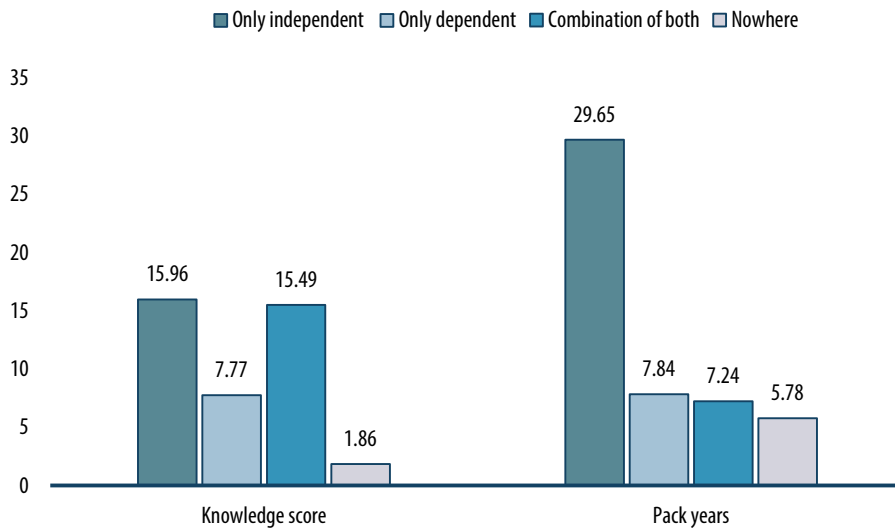




CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 24: Use of independent/dependent sources of information about EC by significantly related independent variables



Note: Average knowledge score: 10.11  
Average pack years: 8.45

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 25: Use of independent/dependent sources by knowledge score and pack years

### Awareness of National Institute of Public Health (NIPH) recommendations

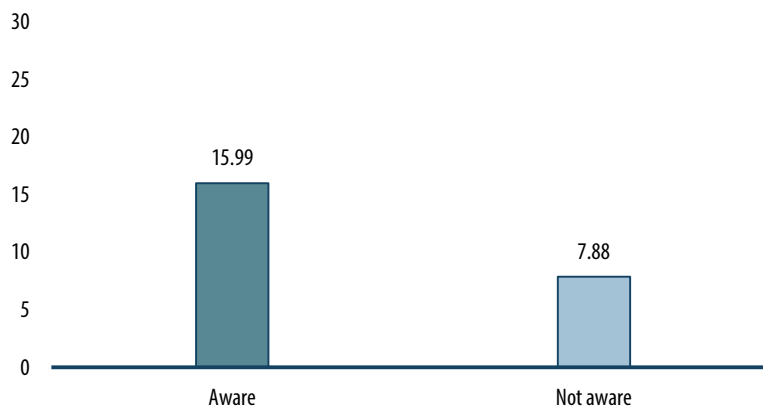
The majority of respondents are not aware of NIPH recommendations about EC published on the NIPH website and in various materials, as shown in Table 7.

Table 7: Awareness of National Institute of Public Health (NIPH) recommendations

Aware of NIPH recommendations	n	%
Yes	84	26.6
No	232	73.4

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

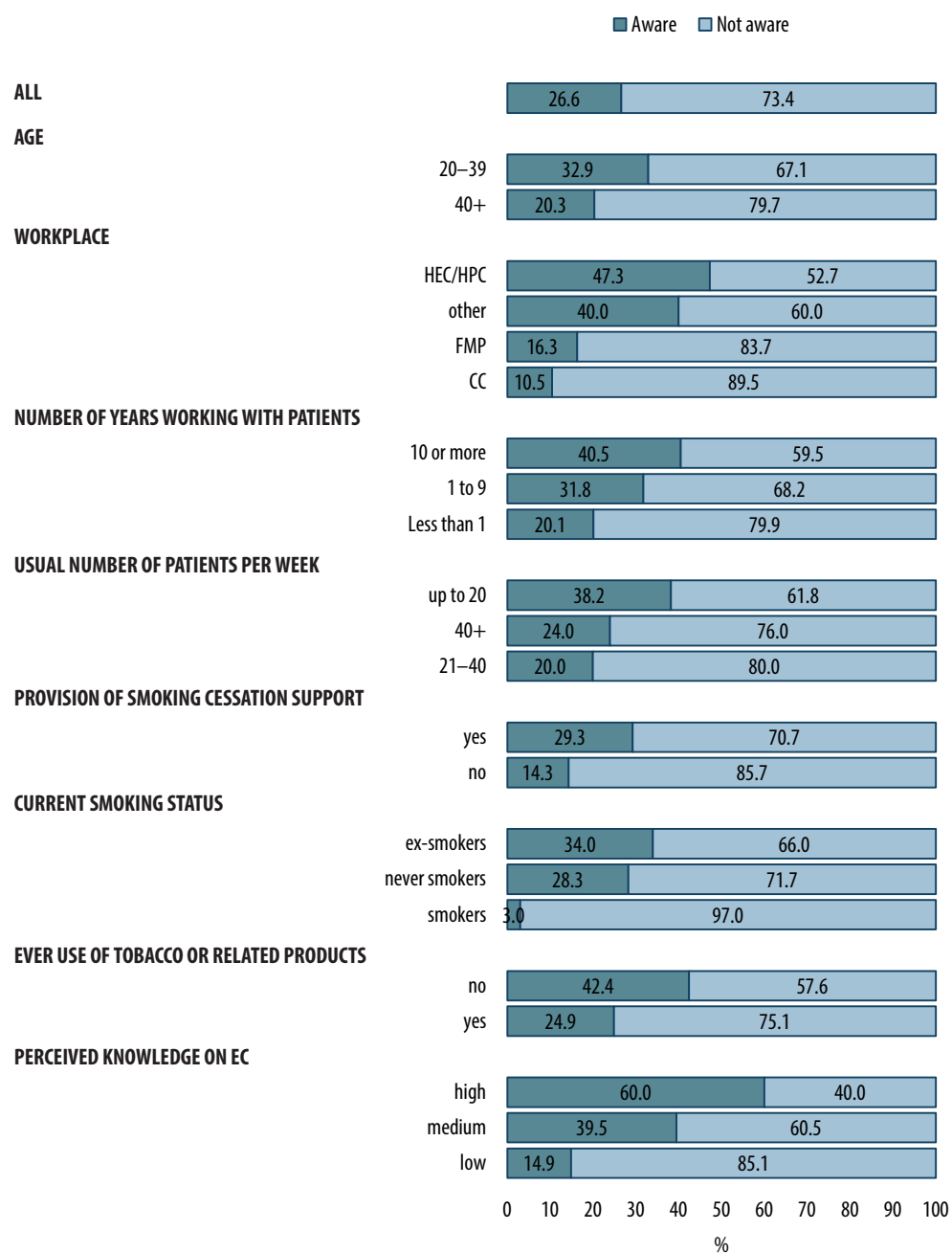
The share of those that were aware of NIPH recommendations published on the website and in various materials differs significantly by age ( $p=0.011$ ), workplace ( $p<0.001$ ), number of years working with patients ( $p=0.012$ ), number of patients per week ( $p=0.011$ ), providing smoking cessation support ( $p=0.021$ ), current smoking status ( $p=0.004$ ), ever use of tobacco or related products ( $p=0.008$ ), perceived knowledge ( $p<0.001$ ) and knowledge score ( $p<0.001$ ) compared to those not aware (Figures 26 and 27). Respondents in older age group, working at FMP and CC, working at the current workplace for a lower number of years, not providing smoking cessation support and with bad perceived knowledge and lower knowledge score are less likely to be aware of NIPH recommendations.



Note: Average knowledge score: 10.11

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 26: Awareness of NIPH recommendations by knowledge score



CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 27: Awareness of NIPH recommendations by significantly related independent variables

## **3.7 Counselling patients about EC**

Respondents were asked to report how they counsel or would counsel patients if asked about the safety of EC and safety of passive exposure to EC aerosol.

When or if respondents were asked by their patients about safety of EC, their harmfulness to health and content of harmful substances, around 40% would tell their patients that EC are not safe for health. Half of respondents were or would be unable to advise their patients mostly due to lack of knowledge, and less due to lack of data and research. Shares were found to differ significantly by level of education, provider type, workplace, number of patients per week, provision of smoking cessation support, ever smoking, current smoking status, ever use of other products, perceived knowledge, knowledge score and among ever smokers also by pack years, as shown in Table 8.

When or if respondents were asked by their patients about the harmfulness of passive exposure to EC aerosol, a little below a third of respondents would tell their patients that passive exposure to EC aerosol is harmful to health and it should be avoided. Almost two thirds of respondents were or would not able to advise their patients, again mostly due to lack of knowledge, less due to lack of data and research. Shares were found to differ significantly by gender, workplace, provision of smoking cessation support, ever smoking, current smoking status, ever use of other products, perceived knowledge, knowledge score and among ever smokers also by pack years, as shown in Table 9.

Table 8: Respondents' counselling on patient's queries about safety of EC, their harmfulness to health and content of harmful substances by significant independent variables

	EC are not safe for health		EC use is associated with less risks than smoking tobacco products		There is not enough research/data to advise you/answer your question		I do not know enough about EC to advise you or answer your questions		p
	n	%	n	%	n	%	n	%	
<b>TOTAL</b>	<b>186</b>	<b>43.3</b>	<b>32</b>	<b>7.4</b>	<b>64</b>	<b>14.9</b>	<b>147</b>	<b>34.2</b>	
<b>Education</b>									
Lower	16	22.9	10	14.3	12	17.1	32	45.7	<b>0.001</b>
Higher	170	47.4	22	6.1	52	14.5	115	32.0	
<b>Provider type</b>									
Nurse	136	43.5	20	6.4	48	15.3	109	34.8	<b>0.015</b>
Physician	28	41.8	12	17.9	7	10.4	20	29.9	
Other	21	43.8	0	0.0	9	18.8	18	37.5	
<b>Workplace</b>									
HEC/HPC	65	58.6	3	2.7	20	18.0	23	20.7	<b>&lt;0.001</b>
FMP	71	35.3	25	12.4	29	14.4	76	37.8	
CC	31	39.2	4	5.1	9	11.4	35	44.3	
Other	17	47.2	0	0.0	6	16.7	13	36.1	
<b>Usual number of patients per week</b>									
Up to 20	54	44.6	7	5.8	20	16.5	40	33.1	<b>0.046</b>
20 to 40	73	47.7	6	3.9	18	11.8	56	36.6	
41 or more	54	38.0	19	13.4	23	16.2	46	32.4	
<b>Provide smoking cessation support</b>									
Yes	164	47.0	28	8.0	56	16.0	101	28.9	<b>&lt;0.001</b>
No	19	24.7	4	5.2	8	10.4	46	59.7	
<b>Ever smoking</b>									
Yes	45	37.5	17	14.2	17	14.2	41	34.2	<b>0.010</b>
No	141	45.6	15	4.9	47	15.2	106	34.3	
<b>Smoking status</b>									
Current smokers	14	28.6	4	8.2	11	22.4	20	40.8	<b>0.001</b>
Ex-smokers	31	43.7	13	18.3	6	8.5	21	29.6	
Never smokers	141	45.6	15	4.9	47	15.2	106	34.3	
<b>Ever use of other products</b>									
Yes	15	31.9	11	23.4	9	19.1	12	25.5	<b>&lt;0.001</b>
No	95	52.8	9	5.0	28	15.6	48	26.7	
<b>Perceived knowledge</b>									
High	24	54.5	12	27.3	7	15.9	1	2.3	<b>&lt;0.001</b>
Medium	83	70.3	7	5.9	20	16.9	8	6.8	
Low	75	29.2	13	5.1	36	14.0	133	51.8	
	<b>n</b>	<b>Average</b>	<b>n</b>	<b>average</b>	<b>n</b>	<b>average</b>	<b>n</b>	<b>average</b>	<b>p</b>
<b>Knowledge score</b>									
Average score	136	15.04	19	6.11	44	10.64	105	4.55	<b>&lt;0.001</b>
<b>Pack years</b>									
Average	41	5.39	16	14.70	15	9.21	39	6.58	<b>0.005</b>

CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Table 9: Respondents' counselling on patient's queries about harmfulness of passive exposure to EC aerosol

	Passive exposure to EC aerosol is harmful to health, so it should be avoided		Passive exposure to EC aerosol does not represent a major risk for health		There is not enough research/data to advise you/answer your question		I do not know enough about EC to advise you or answer your questions		p
	n	%	n	%	n	%	n	%	
<b>TOTAL</b>	<b>133</b>	<b>31.0</b>	<b>20</b>	<b>4.6</b>	<b>90</b>	<b>20.9</b>	<b>186</b>	<b>43.3</b>	
<b>Gender</b>									
Male	14	32.6	6	14.0	10	23.3	13	30.2	<b>0.012</b>
Female	118	30.6	14	3.6	80	20.8	173	44.9	
<b>Workplace</b>									
HEC/HPC	48	42.5	5	4.4	26	23.0	34	30.1	<b>0.007</b>
FMP	52	26.1	12	6.0	39	19.6	96	48.2	
CC	23	29.1	3	3.8	12	15.2	41	51.9	
Other									
<b>Provide smoking cessation support</b>									
Yes	120	34.4	19	5.4	77	22.1	133	38.1	<b>&lt;0.001</b>
No	10	13.0	1	1.3	13	16.9	53	68.8	
<b>Ever smoking</b>									
Yes	31	25.4	11	9.0	24	19.7	56	45.9	<b>0.029</b>
No	102	33.2	9	2.9	66	21.5	130	42.3	
<b>Smoking status</b>									
Current smokers	13	26.0	1	2.0	13	26.0	23	46.0	<b>0.003</b>
Ex-smokers	18	25.0	10	13.9	11	15.3	33	45.8	
Never smokers	102	33.2	9	2.9	66	21.5	130	42.3	
<b>Ever use of other products</b>									
Yes	10	21.3	8	17.0	8	17.0	21	44.7	<b>0.001</b>
No	63	35.0	6	3.3	47	26.1	64	35.6	
<b>Perceived knowledge</b>									
High	15	33.3	7	15.6	15	33.3	8	17.8	<b>&lt;0.001</b>
Medium	60	50.8	6	5.1	29	24.6	23	19.5	
Low	54	21.1	7	2.7	45	17.6	150	58.6	
	<b>n</b>	<b>Average</b>	<b>n</b>	<b>average</b>	<b>n</b>	<b>average</b>	<b>n</b>	<b>average</b>	<b>p</b>
<b>Knowledge score</b>									
Average score	99	14.76	10	3.00	69	13.16	126	5.47	<b>&lt;0.001</b>
<b>Pack years</b>									
Average	28	5.03	10	20.48	23	8.70	51	7.55	<b>0.002</b>

CC - Community Care; FMP - Family Medicine Practices; HEC/HPC - Health Education Centres/Health Promotion Centres

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

19.6% of respondents reported that they do not feel comfortable discussing or counselling about EC to their patients. The shares of those feeling (un)comfortable were found to differ significantly by age group ( $p=0.021$ ) and perceived knowledge ( $p<0.001$ ). Higher shares in the younger age group and among those with low perceived knowledge reported being uncomfortable. Among ever smokers, shares were found to differ significantly by pack years ( $p=0.037$ ); those with higher pack years were less likely to feel uncomfortable than those with lower. Respondents reported that they are uncomfortable mostly due to lack of knowledge (73.1% of all that feel uncomfortable), but also because they lack guidelines at the workplace (24.7% of all that feel uncomfortable). Only 2.2% of all respondents pointed out a lack of research and data on EC to be the cause of their discomfort. Data indicate that respondents in the younger age group and respondents that do not provide smoking cessation support mostly point out lack of knowledge, while older respondents and those that provide smoking cessation support mostly point out lack of recommendations/guidelines.

A substantially lower share (9.9%) reported that they feel uncomfortable when discussing or counselling about proven effective and safe smoking cessation treatments and programmes to their patients. While shares of uncomfortable respondents regarding EC communication did not significantly vary by many variables, shares of those uncomfortable with discussing proven effective and safe smoking cessation treatments and programmes with their patients were found to differ significantly by age group ( $p=0.006$ ), region ( $p=0.042$ ), number of years working with patients ( $p=0.040$ ), providing smoking cessation support ( $p<0.001$ ) and perceived knowledge ( $p<0.001$ ). Providers in the younger age group, Eastern Slovenia, those with a lower number of years working with patients, those not providing smoking cessation support and those with lower perceived knowledge were more likely to report being uncomfortable when discussing proven effective and safe smoking cessation treatments and programmes with their patients.

Over two thirds of respondents (77.5%) feel comfortable discussing or advising about EC and proven effective and safe smoking cessation treatments and programmes with their patients, but there are 9.5% of respondents that feel uncomfortable with both. Shares differ significantly by age group ( $p=0.013$ ), providing smoking cessation support ( $p=0.004$ ) and perceived knowledge ( $p<0.001$ ). Higher shares of providers in the younger age group, those not providing smoking cessation support and those with low perceived knowledge reported being uncomfortable when discussing both topics.

### 3.8 Needs of respondents<sup>4</sup>

The majority of respondents (84.0%) agree that they would like to increase their knowledge about EC, and only a small minority (4.4%) disagrees, as shown in Table 10. Shares of respondents that agree they would like to increase their knowledge about EC significantly differ by providing smoking cessation support ( $p=0.001$ ) and knowledge score ( $p=0.007$ ) from respondents that do not agree or are undecided. 87.0% of those that provide smoking cessation support want to increase their knowledge about EC, while among those that do not provide smoking cessation this share is significantly lower (69.6%). Those that want to increase their knowledge have a significantly higher knowledge score (10.65) in comparison to those that do not want to increase their knowledge (6.87).

<sup>4</sup> For the analyses in this part of the report we did not include respondents' smoking status and use of other products as independent variables, but focused on demographic and workplace characteristics.

Table 10: Respondents' need to increase their knowledge about EC

	n	%		n	%
<b>Strongly agree</b>	141	44.3	Agree = strongly agree + agree	267	84.0
<b>Agree</b>	126	39.6			
<b>Neither agree nor disagree</b>	37	11.6	Neither agree nor disagree	37	11.6
<b>Disagree</b>	6	1.9	Disagree = strongly disagree + disagree	14	4.4
<b>Strongly disagree</b>	8	2.5			

Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

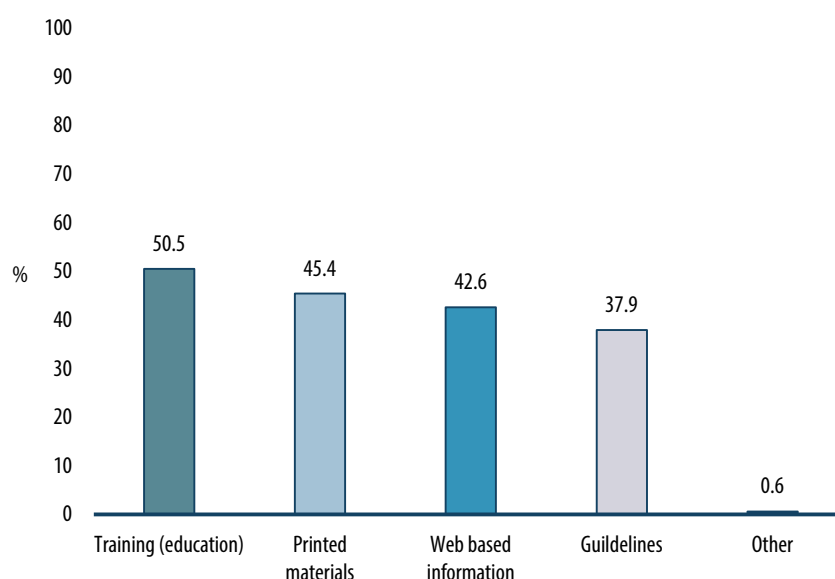
When we asked respondents to choose among different proposed methods of increasing knowledge, their first choice was training (education), closely followed by printed materials and web-based information (Figure 28). The least attractive method, but still supported by around 38% of respondents, was guidelines.

Shares of those that chose training (education) varied significantly by age group ( $p=0.049$ ), workplace ( $p=0.016$ ), by provision of smoking cessation support ( $p=0.048$ ) and level of actual knowledge ( $p=0.027$ ). Respondents in younger age groups, working at HEC/HPC and other workplaces and respondents that provide smoking cessation support were more likely to show interest in training.

The share of those supporting web-based information significantly varied by education ( $p=0.041$ ). Respondents with lower education supported web-based information in a significantly higher share compared to those with higher education.

The share of those supporting printed materials significantly varied by provider type ( $p=0.002$ ). Other provider types supported printed materials in a significantly lower share compared to nurses or physicians.

The share of those supporting guidelines did not significantly vary by any independent variable analysed.



Source: Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

Figure 28: Respondents' desired methods of increasing knowledge



Respondents were also asked whether materials for patients would be helpful and whether they should be printed or in electronic version. The majority (93.4%) of respondents report that materials for their patients would be helpful. Shares of those that find materials helpful differ significantly by knowledge score ( $p=0.047$ ) and gender ( $p=0.026$ ), but in the case of gender the chi-square test is not reliable (more than 20% of cells have expected cell counts less than 5). Respondents with a lower knowledge score find materials less helpful. 81.1% of respondents support printed materials, while 35% support materials in electronic version.

The vast majority of respondents (85.1%) agree with the statement that they miss clear guidelines/recommendations about EC regarding their work with patients and only a minority (1.3%) disagree (Table 11).

*Table 11: Need for clear guidelines/recommendations*

	n	%		n	%
<b>Strongly agree</b>	177	56.0	Agree = strongly agree + agree	269	85.1
<b>Agree</b>	92	29.1			
<b>Neither agree nor disagree</b>	36	11.4	Neither agree nor disagree	36	11.4
<b>Disagree</b>	7	2.2	Disagree = strongly disagree + disagree	11	3.5
<b>Strongly disagree</b>	4	1.3			

**Source:** Assessment of attitudes, knowledge and current practices related to electronic cigarettes among healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia, 2018/19

We compared shares of those that agree with the statement that they miss clear guidelines/recommendations about EC with those that are undecided or do not agree with this statement. Shares significantly varied by age group ( $p=0.007$ ), number of years working at current workplace ( $p=0.030$ ), number of years working with patients ( $p=0.019$ ), number of patients per week ( $p=0.006$ ) and providing smoking cessation support ( $p<0.001$ ). Respondents from the older age group, working at current workplace or with patients for over 1 year, those that have over 20 patients per week and provide smoking cessation support are more likely to express the need for clear guidelines/recommendations about EC regarding their work with patients.

## 4 STUDY'S STRENGTHS AND LIMITATIONS

Our study is the first in Slovenia to explore attitudes, beliefs, knowledge, counselling practices and needs regarding EC in healthcare professionals in Slovenia, and its results will serve as a guide for improvements. The study shows the associations of many different demographic, personal and professional characteristics of respondents with attitudes, beliefs, knowledge, counselling practices and needs. The study also has several limitations. Calculation of the exact response rate is not possible, because we do not know exactly how many healthcare professionals eventually received the invitation. If calculated for only those that received our invitation then the response rate would be 46.6%, but we do not know to how many of their colleagues the invitation was forwarded. If we take into account all employed in the invited groups of healthcare professionals in Slovenia, and calculate the minimum response rate possible, it represents 24.2%. First, the response rate is not optimal, making non-response bias possible and limiting generalisability, but it is still comparable to many other studies with a similar topic (Baldassarri et al., 2018; Gould et al., 2017; Kanchubastam et al., 2017; Nickels et al., 2017; Cummins et al., 2017; Geletko et al., 2017; Moysidou et al., 2017; Sherratt et al., 2016; Shin et al., 2017; van Gucht & Baeyens, 2017; Hiscock et al., 2015; Pepper et al., 2015). The study is cross-sectional, which does not allow for any conclusion on causality or chronology and at the same time allows insight only into current perspectives of respondents, which may change with time and evolving literature. Also, self-response raises the possibility of social desirability bias. In our study we used elements used in other previous studies, while certain questions were also newly created; reliability and validity have not been studied. In Slovenia the number of QL counsellors is low, while their response rate was one of the highest among different providers' groups of the study; their absolute number was low (n=10) and as such this group was included among other type of workplace, which most probably influenced the results for the group other workplace. The majority of respondents were women, but this reflects the actual gender distribution of the studied population. A considerable number of respondents decided to leave the study before completion and thus missing data was substantial (the first questions were answered by 479 respondents, the last about availability of guidelines by 318). Numbers of respondents in some groups were low and did not enable any further analyses.

## 5 SUMMARY OF KEY FINDINGS

### 5.1 Checking for EC use and communication with patients about EC

Around half (54.0%) of all respondents have already asked at least one of their patients about EC use, while a substantially lower proportion, one sixth (16.5%), of respondents reported routine screening of EC use among their patients. Results of our study are consistent with the results from foreign studies showing that checking for EC use is not a routine practice (Baldassarri et al., 2018; Cooper et al., 2019; Erku et al., 2019; Koprivnikar & Farkaš Lainščak, 2018). Our study shows that workplace, provider type, provision of smoking cessation support, knowledge, use ever of tobacco or related products and current smoking status have a significant impact on the extent of checking for EC use. Respondents working at HEC/HPC, nurses, respondents providing smoking cessation support and respondents with higher knowledge are significantly more likely to check for EC use, while current smokers and those who were ever users (referred to below as 'ever users') of tobacco or related products are significantly less likely. Respondents working in HEC/HPC and respondents providing smoking cessation support receive more training on the subject of tobacco products, related products, smoking cessation and more frequently work with smokers, so this should be an expected finding, but still shares of those (routinely) checking for EC use are not high in these groups (and much lower in other groups). Only around two thirds of respondents in both groups have ever asked about EC use and between a fifth and less than a third routinely check EC use.

Around two thirds (65.0%) of respondents in our study reported that they already had contact with an EC user among their patients, which is probably the result of the selection of the participating health professionals working in preventive healthcare and smoking cessation. Foreign studies in other types of healthcare professionals show that the majority have not yet had contact with EC users (Shin et al., 2017; Yaldrum et al., 2017). In our study around a third (33.9%) reported that they received queries about EC from their patients, the majority of them from 10% or less of their patients. Foreign studies show that a fifth to the majority of different healthcare professionals receive queries about EC from their patients (Baldassarri et al., 2018; Erku et al., 2019; Koprivnikar & Farkaš Lainščak, 2018) and some indicate that significant differences exist between different groups of healthcare professionals (Nickels et al., 2017). Our study shows that provider type, workplace, provision of smoking cessation support, ever use of tobacco or related products and knowledge have a significant impact on the extent of reporting patients' queries about EC. Respondent physicians and other provider types (including QL), respondents that provide smoking cessation support, respondents that have never used any tobacco or related product and respondents with higher knowledge score were more likely, while respondents working in CC and those with lower perceived knowledge about EC were less likely, to report patients' queries. Around three quarters of respondents (74.3%) estimated that the percentage of patients making queries about EC did not change in comparison to one year ago, which is consistent with the fact that prevalence of EC use among adults in Slovenia did not significantly change in recent years and is around 1% (NIPH, 2019; Koprivnikar, 2018), but still almost a fifth (19.7%) reported an increase. Foreign studies mostly show an increase in patients' queries over time (Hiscock et al., 2019; Koprivnikar & Farkaš Lainščak, 2018). The most frequent topics of patients' queries about EC were their safety/harmfulness, effectiveness in smoking cessation and aerosol content, which is consistent with the conclusions of foreign studies (Koprivnikar & Farkaš Lainščak, 2018). In adults in most cases the discussion about EC is initiated by the patient (42.4%) and less often by the healthcare professional (23.8%), as shown also in some foreign studies (Kollath-Cattano et al., 2018). In adolescents the discussion about EC is initiated mostly by the

physician (Pepper et al., 2015), but we cannot make any comparisons, as in our study we did not include healthcare professionals that work mostly with adolescents, such as paediatricians and school medicine specialists.

Somewhat more than half (58.0%) of respondents estimated that at least some of their patients use EC. The majority estimated that 10% or less of their patients use EC while none reported the percentage to be higher than 50%. In various foreign studies the estimates of shares of patients using EC vary significantly (Baldassarri et al., 2018; Northrup et al., 2017), which is related to variability in shares of EC users in individual countries and inclusion of different groups of healthcare professionals in these studies. In our study workplace, type of provider, provision of smoking cessation support, knowledge about EC and ever use of any tobacco or related products were related to whether the respondent estimated that there were EC users among his or her patients. Nurses in CC and those that do not provide smoking cessation support (both groups of respondents with lower probability of being sensitive to EC use or have patients that use EC), those that have never used any tobacco or other product, those with low perceived knowledge and with lower knowledge score were more likely to estimate that none of their patients use EC, while physicians were more likely to estimate that some of their patients use EC. Respondents report that the most prominent reason for patients to use EC is to help them in smoking cessation. Other frequent reasons are to reduce the number of cigarettes smoked, to use EC as an alternative to smoking and to gain benefits for health. This is in line with other studies showing that reasons for using e-cigarettes are varied and are not limited to stopping smoking (Kinouani et al., 2019).

## 5.2 Attitudes and beliefs about EC

A substantial share, from a fifth to more than a half, of respondents had no clear opinion regarding the list of provided statements about EC on smoking cessation and safety & harm, but substantial shares, from one third up to almost three quarters, of respondents supported those statements about harm & safety and smoking cessation that are in line with current evidence. When asked about their beliefs about harmfulness compared to conventional cigarettes and nicotine replacement therapy and addictiveness compared to conventional cigarettes, around a third to 40% of respondents could not evaluate the comparison, while the largest shares of respondents believe that EC are similarly harmful and addictive compared to conventional cigarettes and more harmful compared to nicotine replacement therapy. Generally speaking, higher education, working in HEC/HPC, higher levels of perceived knowledge, higher knowledge score, never use of other products and in ever smokers lower pack years seem to be related to more likely agreement with statements that are in line with current evidence and research or a lower share of undecided.

Below we describe in more detail some of the most important beliefs, such as beliefs about efficacy of EC in smoking cessation, risk for health of EC users or those passively exposed to aerosol, beliefs about promotion of smoking initiation, harmfulness compared to conventional cigarettes or nicotine replacement therapy and addictiveness compared to conventional cigarettes.

- A majority of respondents (61.1%) did not agree that EC is an effective smoking cessation tool, but around 10% (9.4%) did. Almost a third of respondents (30%), could not make up their mind on this topic. Around one third (33.8%) of respondents agreed that EC is not more effective for smoking cessation than nicotine replacement therapy, but less than a tenth (7.7%) believed they were, while a majority (58.6%) could not make up their mind. Nevertheless, almost three quarters of respondents (71.7%) agreed that EC should not be recommended for smoking cessation until we have more data on the safety and efficacy of EC.
- A majority of respondents (61.5%) agreed that EC is not safe for the user's health (is harmful to user's health) and around a tenth (11.2%) disagreed, while a quarter could not make up their mind regarding this topic. Around a third (34.7%) believed that EC are similarly harmful as

conventional cigarettes, around a fifth (21.7%) that they are less harmful, and only a minority (4.4%) that they are more harmful than conventional cigarettes. A substantial share (39.2%) reported that they don't know how to answer. A similar share (38.5%) of respondents chose the answer I don't know when they were asked to compare harmfulness of EC with nicotine replacement therapy, but mostly it was rated as higher (30.6%) or similar (25.4%) compared to nicotine replacement therapy. Around two thirds (65.6%) agreed that EC are addictive to users, only a minority did not (5.8%), but over a quarter (28.6%) could not make up their mind. Around a half (50.1%) of respondents believed that EC have similar addictiveness potential as conventional cigarettes, a substantial share (31.9%) again chose the answer I don't know and a tenth (10.0%) that they have lower addictiveness potential.

- Regarding harmfulness of passive exposure to EC aerosol approximately half (49.1%) agreed it is harmful, but a similar share (42.5%) could not make up their mind, while less than a tenth (8.4%) believed it is not harmful.
- Around a half of respondents (51.2%) agreed that EC use promotes smoking initiation in youth, but a substantial share (35.4%) could not make up their mind, while again around a tenth (13.4%) disagreed.

There are many studies assessing different beliefs regarding EC among healthcare professionals and reported shares mostly vary widely (from a minority to majority in the case of certain beliefs), which prevents meaningful comparisons (Baldassarri et al., 2018; Erku et al., 2019; Ferrara et al., 2019; Hiscock et al., 2019; Zgliczyński et al., 2019; Ahmed et al., 2018; Koprivnikar & Farkaš Lainščak, 2018; Mughal et al., 2018; Northrup et al., 2017).

Around two thirds of respondents (63.5%) agreed that it is important to talk to patients about EC, although 30% expressed the concern that that might encourage their patients to use EC. We found one study that looked into this aspect of communication between physicians and adult patients and found that a similar share reported the necessity to talk to patients, while a substantially higher share, around two thirds, expressed the concern that that might encourage their patients to use EC (Shin et al, 2017). In our study more than half of the respondents also believed (53.8%) that their patients do not know a lot about EC.

Only a minority (5.7%) of respondents reported that they have no concerns about EC. The respondents' major concern about EC is lack of evidence regarding the long-term safety of EC, which was pointed out by the majority of respondents (71.6%). Around a third of respondents selected the concern of EC being an attractive starting products for young non-smokers that encourage them to initiate smoking, the concern of maintenance of nicotine addiction with possible relapse to smoking among those who have quit smoking, and concern about harmful effects on the user's health. Similar concerns have been shown in foreign studies (Cooper et al., 2019; Erku et al., 2019; Koprivnikar & Farkaš Lainščak, 2018). In our study, knowledge seems to be the key determinant of pointing out the majority of concerns, and respondents with higher perceived level of knowledge and higher knowledge score were more likely to point out any concerns.

### 5.3 Support for different EC regulatory measures

The majority of respondents (from around 70% to up to almost 83%) expressed support for existing regulations, while lower shares (29%-67%) expressed support for possible new EC regulatory measures. Among new measures the highest level of support was given to a ban on flavours, the least to availability of EC with prescription and registration of EC as a smoking cessation device. The most important determinants of support for various EC regulatory measures were knowledge, gender, provision of smoking cessation services and ever use of other products. In a few foreign studies that examined support for various regulatory measures, healthcare professionals mostly supported a ban on use in enclosed public places and a ban on EC advertising, health warnings on EC packaging and a ban on sale to minors (Erku et al., 2019), which are all measures already adopted in Slovenia. Healthcare professionals abroad also mostly supported restriction of flavours (Erku et al., 2019).

### 5.4 Perceived knowledge about EC and actual knowledge (knowledge score)

Only a minority (10.8%) of respondents rated their knowledge as good, and more than half (61.6%) as bad. Also in foreign studies a substantial share of healthcare professionals perceive their own knowledge about EC as limited (Koprivnikar & Farkaš Lainščak, 2018).

In our study respondents had to identify correct and incorrect statements about EC and the results show that there are significant gaps in knowledge about most of the facts regarding EC, even the most basic. Substantial shares of respondents, from over one third to up to three quarters, could not mark individual facts on EC as correct or incorrect and they chose the answer I don't know. Below we describe in more detail some of the facts on EC, such as liquid/aerosol content, functioning of EC and certain characteristics of EC, exposure to harmful substances, impact on health, impact on smoking initiation in youth, patterns of use and smoking cessation:

- more than half of respondents (53% to 63%) correctly identified that nicotine, humidifiers or solvents and flavours are present in EC liquid/aerosol, but shares of those identifying other constituents were generally substantially lower (19% to 39 %);
- around a half of respondents (54%) knew that EC heat a liquid that changes into an aerosol inhaled by the user;
- half of respondents (45% to 50%) knew that exposure to nicotine and other toxic substances emitted from EC is highly variable and depends on the device and liquid characteristics and how the device is operated, while around a third (31%) knew that nicotine intake from EC among experienced adult EC users is comparable to that from conventional cigarettes;
- over a half of respondents (57%) knew that the long-term consequences of EC use on users' health have not yet been studied;
- around a third (36%) knew that EC use increases airborne concentrations of particulate matter, nicotine and other toxic substances in indoor environments;
- half of respondents (51%) knew that EC use increases risk of ever using conventional cigarettes among adolescents that never smoked and also around a half (52%) that EC use may result in dependence in persons that did not use products containing nicotine before;
- around a third (34%) knew that the majority of EC users also smoke;
- around a half (52%) knew that there is insufficient research and data on the effectiveness of EC in smoking cessation, so we cannot conclude that they are effective aids for smoking cessation;
- around a third (33%) knew that legislation in Slovenia regulates EC in a similar way to tobacco products.



Knowledge score with possible range from -33 to +33 yielded an average of 10 (range from -16 to +29). Knowledge scores were significantly lower in respondents with lower level of education, those working in CC, whose patients are not only adults, that do not provide smoking cessation support, ever users of other products and those that perceive their knowledge as bad.

The differences in knowledge about EC among different groups of participating healthcare professionals are not unexpected, as they receive a different extent of education on the topic of tobacco and related products. The most systematic education is available to respondents working on QL and also those working in HEC/HPC, while others may have heard about EC at symposia, conferences, other gatherings or gathered information from different sources.

Foreign studies also show that knowledge of healthcare professionals about EC is limited, and there is a substantial lack of knowledge (Koprivnikar & Farkaš Lainščak, 2018). Some foreign studies also indicate that there is a gap between perceived and actual knowledge, as even those with higher perceived knowledge had difficulties answering some specific questions on EC (Koprivnikar & Farkaš Lainščak, 2018), but we did not find such a gap in our study.

## 5.5 Major sources of information about EC

Respondents' major sources of information on EC are dependent sources (those with a conflict of interest). Almost half (44.8%) of respondents use only dependent sources, while around a tenth (9.5%) use only independent sources and around a third (30.8%) a combination of both. Every seventh respondent (14.9%) did not use any sources about EC. Variables that impact use of different sources are type of workplace, provision of smoking cessation support and knowledge. Respondents working in HEC/HPC were more likely to use only independent sources, less likely to use only dependent sources and less likely to use no sources than respondents from other workplaces. Respondents with high perceived knowledge and those with higher knowledge score were more likely to use only independent sources and less likely to use only dependent sources (the direction of this relation cannot be assessed in this cross-sectional study). Our study's results are consistent with other foreign studies that also show that primary sources of information on EC in healthcare professionals are dependent and not professional, mostly media, patients, oral information and advertisements (Erku et al., 2019; Zgliczyński et al., 2019; Koprivnikar & Farkaš Lainščak, 2018).

Around three quarters (73.4%) of respondents were not aware of NIPH recommendations about EC, which are published on the NIPH website and in various materials. Respondents in the older age group, working at FMP and CC, working at their current workplace for a lower number of years, not providing smoking cessation support, with lower perceived knowledge and lower knowledge score are less likely to be aware of NIPH recommendations. Smoking status also impacts awareness of NIPH recommendations, ever users of tobacco or related products and smokers are less likely to be aware of NIPH. Some foreign studies also indicate that the majority in various groups of healthcare professionals are not aware of guidance documents or recommendations (Ahmed et al., 2018).

## 5.6 Counselling patients about EC

When or if respondents were asked by their patients about safety of EC, their harmfulness to health and content of harmful substances, over 40% would tell their patients that EC are not safe for health, but a half of respondents were or would be unable to advise their patients, mostly due to lack of knowledge, but also due to lack of data and research. A substantial minority would counsel that EC use is associated with fewer risks than smoking tobacco products. When or if respondents were asked by their patients about harmfulness of passive exposure to EC aerosol, a little below a third of respondents would tell their patients that passive exposure to EC aerosol is harmful to health and it should be avoided, while almost two thirds of respondents were or would be unable to advise their patients, again mostly due to lack of knowledge, but also due to lack of data and research. A substantial minority would counsel that EC use does not represent a major risk for health. The common key determinants of counselling were workplace, provision of smoking cessation support, ever smoking, current smoking status, use ever of other products, perceived knowledge, knowledge score and among ever smokers pack years. Meaningful comparisons with other studies are not possible, mainly due to different types of questions.

A fifth (19.6%) of respondents reported that they do not feel comfortable discussing or counselling about EC to their patients, which is a lower share compared to foreign studies that researched this issue (Baldassarri et al., 2018; Koprivnikar & Farkaš Lainščak, 2018). Higher shares in the younger age group, those with lower perceived knowledge and ever smokers with higher pack years reported being uncomfortable. Respondents reported that they are uncomfortable mostly due to lack of knowledge (73.1% of all that feel uncomfortable), but also because they lack clear guidelines on this at the workplace (24.7% of all that feel uncomfortable). A substantially lower share (9.9%) reported that they feel uncomfortable when discussing proven effective and safe smoking cessation treatments and programmes with their patients. Over two thirds of respondents (77.5%) feel comfortable discussing or advising about EC and proven effective and safe smoking cessation treatments and programmes with their patients, but there are 9.5% of respondents that feel uncomfortable with both. Higher shares of providers in the younger age group, those not providing smoking cessation support and those with lower perceived knowledge about EC reported being uncomfortable when discussing both topics.

## 5.7 Needs of respondents

In line with foreign studies (Koprivnikar & Farkaš Lainščak, 2018), the majority of respondents (84.0%) agreed that they would like to increase their knowledge about EC, more likely those that provide smoking cessation support and those with higher knowledge score. Respondents' first choice of preferred methods of increasing knowledge was training (education), closely followed by printed materials and web-based information, while the least interesting method, but still supported by over a third of respondents, was guidelines. The vast majority of respondents (85.1%) missed clear guidelines/recommendations about EC regarding their work with patients, consistent with foreign studies (Koprivnikar & Farkaš Lainščak, 2018). The majority (93.4%) of respondents would find materials for patients helpful, mostly printed materials.



## 6 KEY HIGHLIGHTS FROM THE STUDY

Around half of the respondents have ever asked a patient about EC use; routine checking is not prevalent. Checking for EC use is more likely in respondents from workplaces providing smoking cessation support and respondents with better knowledge of EC, but less likely in smokers and ever users of tobacco or related products.

Around two thirds of respondents already had contact with EC users. A third of respondents received queries on EC from their patients, a majority of respondents reported that the number of queries did not increase in the last year. The most frequent topics of patients' queries were their safety/harmfulness, effectiveness in smoking cessation and aerosol content.

Somewhat less than half of respondents estimate that at least some of their patients use EC; the majority estimate that 10% or less of their patients use EC. They report that the major reason that their patients use EC is to help them with smoking cessation, but there are also important other reasons for EC use.

Substantial shares of respondents, from one third up to almost three quarters, supported those statements about harm & safety and smoking cessation that are in line with current evidence, but a substantial share of respondents, from a fifth to more than a half, had no opinion regarding the statements. Respondents with higher education, working in workplaces providing smoking cessation support, respondents with better knowledge of EC, those who were never users (referred to below as simply 'never users') of other products and ever smokers with lower pack years were more likely to agree with statements that are in line with current evidence and research or are more likely to be undecided.

The majority of respondents had concerns about EC, the major concern pointed out by almost three quarters of respondents being the lack of evidence regarding the long-term safety of EC. Around a third of respondents pointed out the concern of EC being an attractive starting product for young non-smokers that encourages them to initiate smoking, the concern of maintenance of nicotine addiction with possible relapse to smoking among those who have quit smoking, and concern about harmful effects on the user's health.

From around 70% up to almost 83% of respondents supported existing regulations, while lower shares (29%-67%) supported possible new measures, mainly a ban on flavours.

Current knowledge of EC was limited, there were significant gaps in knowledge regarding most of the facts regarding EC, even the most basic.

Respondents' major sources of information on EC were dependent sources (those with a conflict of interest), such as various media or news and patients. Almost half (45%) of respondents used only dependent sources, around a tenth (10%) only independent sources and around a third (31%) a combination of both, while 15% did not use any sources about EC.

Around three quarters (73%) of respondents were not aware of NIPH recommendations about EC, mainly from the older age group, those not working at HEC/HPC, with less working experience at current workplace, not providing smoking cessation support, with low knowledge score, also ever users of tobacco or related products and smokers.

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Most respondents were/would be unable to counsel patients on EC safety/harmfulness to health (around a half) or harmfulness of passive exposure to EC aerosol (around two thirds), mostly due to lack of knowledge, while over 40% would tell their patients that EC are not safe for health and a little below a third of respondents would tell their patients that passive exposure to EC aerosol is harmful to health and it should be avoided. The common key determinants of counselling were type of workplace, provision of smoking cessation support, ever smoking, current smoking status, ever use of other products, perceived knowledge, knowledge score and among ever smokers also pack years.

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A fifth of respondents reported that they do not feel comfortable discussing or counselling about EC to their patients, almost two thirds due to lack of knowledge and a quarter because they lack clear guidelines on this topic at the workplace.

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The majority of respondents (84%) agreed that they would like to increase their knowledge about EC, mainly through trainings, also printed materials, web-based information and workplace guidelines. The vast majority of respondents (85%) missed clear guidelines/recommendations about EC regarding their work with patients. The vast majority (93%) of respondents would find materials for patients helpful, mostly printed materials.

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The most prominent independent variables significantly related to analysed indicators are education, type of workplace, knowledge about EC, smoking status, pack years and ever use of other products (EC, HTP or smokeless products).

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Respondents with higher education are more likely to check for EC use, more likely to support those statements about harm and safety of EC and about their role in smoking cessation that are in line with current evidence, have higher knowledge about EC and are more likely to advise about the harmfulness and safety of EC use and passive exposure to aerosol in line with current evidence.

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There are certain workplaces that stand out in our study and that are HEC/HPC (QL counsellors were placed in the group of other workplaces due to the very small absolute number of respondents, so we cannot exclusively assess their role). Respondents working in HEC/HPC are more likely to check for EC use, more likely to support those statements about harm and safety of EC and about their role in smoking cessation that are in line with current evidence, have high knowledge about EC, more likely to use only independent sources on EC, are more likely to be aware of NIPH recommendations and more likely to advise about the harmfulness and safety of EC use and passive exposure to aerosol in line with current evidence. This is not unexpected as those working in HEC/HPC are coordinated by NIPH, receive continuous education and various materials and guidelines. Perhaps we should expect even higher shares in certain indicators for this group. Ten out of twenty QL counsellors in Slovenia participated in this study and

we could assume they would also stand out in the above-mentioned topics as they also have continuous educations and support and are coordinated by NIPH. Of course it is unjustifiable to expect the same results from respondents from other workplaces as they have less contact with the topic of smoking, EC use, smoking cessation, continuous education, materials etc. So we could probably expect that some other healthcare professionals' groups not included in our study, have probably even less contact and information on EC.

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Knowledge about EC is one of the most prominent independent variables as it impacts almost all analysed indicators. We find this variable to be the most important and the one we can significantly influence in the future. According to the results of our study, improving knowledge would have a significant impact on unified and evidence-based practice and counselling in the area of EC.

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Current smoking status, smoking history or ever use of other products (EC, HTP or smokeless products) have a significant negative impact on practice, counselling and knowledge about EC. Respondents reporting any of these characteristics are less likely to check for EC use, less likely to support those statements about harm and safety of EC and about their role in smoking cessation that are in line with current evidence, have lower knowledge about EC, are less likely to be aware of NIPH recommendations and less likely to advise about the harmfulness and safety of EC use and passive exposure to aerosol in line with current evidence. Comparing data from respondents in our study to preliminary data on prevalence in the general population (NIPH, 2019) shows that the prevalence of current smoking among respondents in this study is around half of those in the general population, while EC use is close to use in the general population, HTP use is somewhat higher than in the general population and smokeless tobacco use is somewhat lower.

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## 7 IMPLICATIONS

Healthcare professionals working in the field of preventive healthcare and smoking cessation in Slovenia have an important role in smoking prevention and promotion of healthy lifestyle; they are the most common and first contact for smokers in smoking cessation counselling. This makes them also the most important group of healthcare professionals that have contact with and advise users of other tobacco and related products, including EC. We found that checking for EC use in this group of participating healthcare professionals is not prevalent, but a majority already had contact with EC users and one third received various queries about EC. We found significant gaps in knowledge about EC and limited knowledge is actually the major contributor to inability to advise on EC and feeling uncomfortable giving advice, and has a significant impact on attitudes and beliefs. Nevertheless, the majority of respondents agreed they would like to increase their knowledge of EC. Mainly dependent sources of information about EC were used by respondents, who are also mostly not aware of NIPH recommendations on EC. Smoking status and use ever of other tobacco and related products significantly influence practices and counselling.

Based on the findings of our study we determined certain activities and factors we can work on in order to improve practices and counselling regarding EC. Checking for EC use should be encouraged in general, as is the case for smoking. Healthcare professionals should also ask about EC use in cases of respiratory or other health problems or diseases of unknown aetiology in order to be alert to possible relations to EC use. Activities to improve knowledge about EC and increase awareness about NIPH recommendations should be implemented. For this purposes educational material will be prepared about EC and recommendations from NIPH which will be distributed and presented to different groups of healthcare professionals. We encourage creating workplace guidelines about practices and counselling on EC; management should strive for full compliance with workplace guidelines and as our study shows, special attention should be given to those healthcare professionals that smoke or have ever used or use other tobacco or related products in this respect. Similar approaches are recommended for different groups of healthcare professionals as they also have or will have contact with EC users and are/will be faced with their queries and need for counselling, although probably less frequently. This way we could ensure more unified and evidence-based practices and counselling about EC. Further research must be planned and should include, in addition to evaluation of activities and trends in groups of healthcare professionals included in our study, research of attitudes, beliefs, knowledge, practices and counselling among healthcare professionals working with key groups of the population in respect of tobacco and related products, such as children, adolescents and pregnant women.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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