

Knowledge, Perceptions and Attitudes of Young Adults Towards Electronic-cigarettes

By

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ABSTRACT

Electronic cigarettes (e-cigarettes) are deemed to be safer than tobacco cigarettes because they do not contain a number of toxicants and carcinogens that are present in tobacco cigarettes. However, their long-term health effects are unknown. Despite concerns surrounding this, there has been a rapid market penetration of e-cigarettes worldwide. South Africa has no legislation which specifically controls the marketing, sale and use of e-cigarettes and concerns have been raised over the increasing use of e-cigarettes by youth, who are often attracted to these novel products. This study is one of the first studies to explore the knowledge and perceptions of e-cigarettes in South Africa. A qualitative approach was used to explore young adults' perceptions, attitudes and behaviour related to e-cigarettes and assess the factors that shape those perceptions. The sources from which the participants accessed e-cigarette-related information were also explored. The study was conducted at the University of Cape Town and participants were registered male and female students at the university. Focus group discussions and individual interviews were used to collect data and thematic analysis approach was used to analyse the data. The results show that participants generally perceived e-cigarettes as healthier than tobacco cigarettes despite showing limited knowledge of the chemical constituents of e-cigarette liquid. Rather, the majority of the participants felt e-cigarettes were safer because of the pleasant smell. A pleasant smell from e-cigarettes was associated with health and the unpleasant smell was associated with danger. E-cigarettes were also viewed as a symbol of social status. The study recommends that e-cigarette awareness should be increased, and e-cigarettes should be regulated as tobacco products to alter the perception that they are safe.

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ACRONYMS AND ABBREVIATIONS

UCT	University of Cape Town
HREC	Human Research Ethics Committee
CANSA	Cancer Association of South Africa
E-cigarettes	Electronic cigarettes
Vapes	Electronic cigarettes
Vaping	Electronic cigarette use
WHO	World Health Organization
SA	South Africa
USA	United States of America
UK	United Kingdom
FGD	Focus Group Discussion

PART A: RESEARCH PROTOCOL

INTRODUCTION

Electronic cigarettes (e-cigarettes), commonly known in South Africa by the brand name ‘Twisp’, are devices that resemble traditional cigarettes. E-cigarettes function through the heating of liquid to produce aerosol or vapour that is inhaled and expelled.¹ A typical e-cigarette is comprised of a pipe, electronic heating element and liquid cartridge or container. Inside the cartridge is a liquid mixture that typically contains nicotine, distilled water, flavourings and propylene glycol and/or vegetable glycerin.² Studies have found that the levels of toxicants found in e-cigarettes are much lower than those found in conventional tobacco cigarettes.³ As a result, a number of scientists and health professionals are of the view that e-cigarettes can be used as a healthier alternative to tobacco smoking or as a tool to help quit smoking or reduce tobacco consumption.⁴ The assumption is that since e-cigarettes contain nicotine which is the highly addictive substance in combustible cigarettes, they can be used to stop nicotine cravings among smokers, thereby reducing tobacco consumption. A number of studies have since been conducted to examine the risks and efficacy of e-cigarettes as an aid to smoking cessation.^{5, 6, 7}

Although studies presenting the benefits and/or risks of e-cigarettes have been explored, evidence of the long-term effects remain uncertain and conclusions are contested among researchers.^{8, 7} While the levels of toxicants found in e-cigarettes are relatively lower than that of combustible cigarettes, evidence indicates that temporary or persistent low levels of exposure to fine and ultrafine tobacco byproducts or air pollution can contribute to pulmonic problems or certain provocative processes that increase the risk of cardiovascular and respiratory diseases and death.^{9, 10} This implies that low levels of toxicants in e-cigarettes pose a risk to human health.⁹ Fine particles in e-cigarettes can vary from one brand to another and thus the exact components responsible for toxicity and their particle size and composition are generally not known.⁹ In this regard, current scientific evidence does not support the claims of safety and efficacy in smoking cessation that e-cigarette manufacturers and marketers make.¹ Thus, while proponents of e-cigarettes support their use as a method of harm reduction and/or an aid to smoking cessation, others are concerned that the potential long-term health effects of e-cigarettes might outweigh potential benefits.

People, including young adults throughout the world, have varying perceptions of potential/unknown risks of e-cigarette use and this has led to the differential classification of e-cigarettes in different countries. For example, e-cigarettes are classified as tobacco products in some countries such as the USA, while they are classified under medicinal products in countries like Japan and South Africa.¹¹ Other classifications of e-cigarettes in other countries include; electrical gadgets, dangerous chemicals, poison, and tobacco imitations.¹¹ These differential classifications affect the regulation of e-cigarettes especially with regard to marketing, use and promotion of such products. Due to e-cigarettes not meeting the criteria of traditional tobacco products, the regulation thereof proves challenging and worldwide, regulatory frameworks are varied. In South Africa, e-cigarettes are regulated under the Medicines and Related Substances Act that classifies nicotine as a ‘schedule 3 drug’ – requiring a prescription from a physician. Products under this act may only be sold by pharmacists.¹²

Despite the lack of evidence with regards to long-term health effects and overall public health impact of e-cigarettes, there has been a rapid market penetration of e-cigarettes over the past decade.¹ E-cigarettes are being marketed and promoted through television, internet and print advertisements as safer alternatives to tobacco smoking, aids to quit smoking or reduce tobacco consumption.⁴ Locally, the awareness and use of e-cigarettes is increasing rapidly. Evidence also demonstrates that e-cigarettes continue to be unregulated and sold from Tobacco stores and specialist e-cigarettes distributors within Cape Town. For example, Vape Africa now resells e-cigarettes and accessories in more than 60 Spar stores in the Western Cape and also distributes to other regions.¹³ The widespread increase in the use of e-cigarettes might possibly be due to the fact that they are being marketed as a safer alternative to traditional cigarettes.¹

Previous studies, especially in the United States, have shown that the majority of e-cigarette users are young adults.¹⁴ E-cigarettes also play a role as a gateway for cigarette smoking especially among adolescents and young adults.⁷ Young adults use e-cigarettes, not as an aid to smoking cessation but e-cigarettes are more socially acceptable and their flavours and appeal encourage them to experiment with such products.¹⁵ Despite a number of studies that have been conducted previously, little, if any, research has been done in South Africa on knowledge and perceptions around the use of e-cigarettes. This research seeks to explore young adults’ knowledge, perceptions and understandings around the use of e-cigarettes. University students

are of particular importance to focus on in this study. Young adults, particularly college students have always been the target for tobacco industry's marketing strategies and advertisements.^{16, 17} From an epidemiological viewpoint it is worth noting that university students are generally attracted to new products and have historically been at the forefront of societal changes in substance use that later materialize within the general population.¹⁸

STATEMENT OF THE PROBLEM

Despite the fact that e-cigarettes are gaining popularity in terms of use in South Africa, little if any, research has been conducted to explore people's knowledge and perceptions of these products. The uncertainty of evidence about their long-term health effect has not stopped e-cigarette marketing and use among young adults. As a result, there is need to explore and understand young adults' (both users and non-users) knowledge and perceptions of e-cigarettes and (in the case of users) the way in which they make use of these products. Understanding the knowledge that young adults have and identifying sources that provide them with information regarding e-cigarettes helps to provide insights into how different, well-targeted public health interventions could be designed. The results will also help to inform future and further studies on electronic cigarettes in South Africa.

RATIONALE AND AIMS OF THE STUDY

This study seeks to qualitatively explore young adults' knowledge, perceptions and behaviours around the use of e-cigarettes. Knowledge and perceptions in this regard include health risks and benefits that young adults' associate e-cigarettes with as well as young adults' views on e-cigarette regulation in South Africa. The study also endeavours to examine different sources of information related to e-cigarette use and how such information shapes participants' beliefs and attitudes. In addition, the study will try to establish how the presentation of e-cigarettes in media, research, marketing and regulation environment influences public perceptions and beliefs about such products. The purpose of this study is to understand the kinds of perspectives that young, often educated South African adults have about e-cigarettes.

RESEARCH QUESTIONS

Primary research Question

- What are young adults' perceptions, knowledge and behaviours relating to e-cigarette use and how are these shaped?

Subsidiary research questions

- What do young adults know about e-cigarettes?
- How do young adults understand and articulate the difference between e-cigarettes and conventional cigarettes?
- What knowledge do young adults (both users and non-users of e-cigarettes) have about the health effects of e-cigarettes?
- What are young adults' experiences of e-cigarette and tobacco dual use?
- How do young adults understand and articulate the health effects of e-cigarettes and tobacco dual use?
- What sources of information about the benefits and risks of using e-cigarettes do young adults draw on?
- How do young adults perceive the presentation of e-cigarettes in media, research, marketing and the policy environment?
- What do young adults think about e-cigarette regulation in South Africa?

METHODOLOGY

Study design

I will use a qualitative interpretivist approach to conduct this research. Interpretivism adopts a relativist ontology that reality is subjective and varies from one individual to another.¹⁹ Thus, a single phenomenon is subject to various interpretations as opposed to one objective truth that can be obtained through measurement.²⁰ According to the interpretivist perspective, social science knowledge cannot be gathered using the same methods that are used in physical sciences.²⁰ With interpretivism, the goal for the researcher is to seek a deeper understanding of the phenomenon in its unique context rather than trying to establish the basis for generalization.¹⁹ Since the aim of this study was to explore the knowledge, perceptions and beliefs that people hold about e-cigarettes, a qualitative design with an in-depth thematic analysis approach is deemed appropriate. According to Hancock (1998), "qualitative research is concerned with the opinions, experiences and feelings of individuals producing subjective data."^{21(p.16)} Thus, a qualitative

method of inquiry in this study helps to explore and understand different opinions and beliefs that participants have about e-cigarette use. This is one of the first studies to be conducted on young adults' perceptions of e-cigarettes, making a qualitative approach particularly appropriate.

Study population and setting

The University of Cape Town (UCT) is the main site where fieldwork will be conducted in this study. The study includes both undergraduate and postgraduate students regardless of gender. However, since this study focuses more on 'young adults', this study involves students from 18 to 25 years of age. University students have been chosen not only for convenience purposes but also because they are often targeted by tobacco and e-cigarette marketing strategies which seek to draw this younger population into such novel products.¹

Sampling and recruitment

Due to the nature of the qualitative inquiry, the purpose of sampling is not to generalize the results to the whole population. Rather, the aim of sampling in qualitative research is to find information from specific groups and subgroups in the population.²¹ A combination of purposive and snowball sampling will be used to recruit participants in this study. The researcher will draw on his networks of UCT students to recruit both e-cigarette users and non-users to participate in the study. Snowball sampling technique will be used to help recruit more e-cigarette users through exploiting participants' networks since e-cigarette users are a difficult-to-find population. From those who indicate their willingness to participate in the study, the researcher will purposively select participants who will take part in focus group discussions. Each FGD will comprise of 8 to 12 individuals. The focus group discussions will not only help to provide general knowledge and concerns that participants have about e-cigarettes, but they will also provide a platform on which other current and previous e-cigarette users can be identified and asked to participate in face to face interviews. Some current or previous e-cigarette users in the focus groups will be purposively asked to participate in further face to face in-depth interviews. A separate consent process will be required to allow participants to give consent before they participate in in-depth interviews. The researcher will also use his social networks to access e-cigarette users and purposively ask them to participate in in-depth interviews. The qualitative principle of appropriateness requires a purposive sampling that seeks information from

respondents who are articulate, reflective and willing to share ideas with the researcher.²² The study will focus on both UCT male and female students from 18 to 25 years of age.

Inclusion and exclusion criteria

The inclusion criteria for focus group discussions includes both users and non-users from 18 to 25 years of age. There will be 2 focus group discussions comprising of non-users only, 2 focus group discussions comprising of users only and 1 will combine both users and non-users. Focus group discussions help to explore shared beliefs, knowledge and attitudes of participants with regards to e-cigarette use. Some current and previous users in the focus groups will be asked to participate in further one-on-one interviews. The reason for conducting individual interviews with users and previous users stems from the idea that some users might not feel comfortable sharing their thoughts and personal experiences within the focus group context because of fear of being judged. Such information may include the reasons for using e-cigarettes and the use of second-hand e-cigarette devices. Thus, only e-cigarette users and previous users will be included in individual interviews. Participants will be excluded from the study if they are not registered students at the University of Cape Town. Students who are under 18 years of age or over 25 years of age will be excluded from the study.

DATA COLLECTION METHODS

Focus group discussions

Five focus group discussions (FGDs) will be conducted in this study. Each FGD may comprise of 8 to 12 individuals. Since students have different experiences relating to e-cigarette use, a focus group discussion gives them chance to express their diverse and conflicting views about the topic. Both e-cigarette users and non-users will be accommodated in the FGDs to allow conversation between both parties. One advantage of FGDs is that they closely resemble natural interaction, thus providing an opportunity for researchers to observe and understand how people interact with each other on specific issues or topics.²³ FGDs in this study will not only help the researcher to explore participants' diverse views but also help to access different questions that people pose to each other regarding e-cigarette use. FGDs in this study will be conducted with the help of a research assistant who will be crucial in taking notes, helping with paperwork, assisting if someone arrives late once the discussion has already started. Having a research

assistant helps to ensure that the quality of data is not compromised by activities such as note-taking and attending to latecomers while at the same time facilitating the discussions.

Semi-structured interviews

Semi-structured individual interviews will be conducted with e-cigarette users. Individual interviews are useful in accessing information especially from those participants who cannot freely express their views and share experiences in a group context. The purpose of individual interviews in this study is to explore personal motives, beliefs and experiences of current and previous e-cigarette users with regards to e-cigarette use. Interviews help to explore new information from the participants' points of view and in this case, they shed light on the kind of perspectives and understandings that exist within young, often educated adults about e-cigarette use. The number of interviews cannot be pre-specified as interviews will be conducted until the researcher reaches data saturation. An interview guide will be used to keep track of the important questions throughout the data collection process. The interviews and focus group discussions will be audio-recorded and later transcribed for analysis.

Data safety and management

As part of the researcher's obligation to protect the participants' privacy, all hardcopy data obtained from the study, including audio recordings and written notes, will be kept in a securely protected closet. Softcopy data will be stored in my personal computer protected by a strong password and will also be backed up on Google Drive and Dropbox. For confidentiality purposes, only the primary researcher will have access to the hardcopy and softcopy data from the study. However, the writeup of the research findings and report will be monitored by the researcher's supervisor and co-supervisor. All the data will be destroyed after the submission of the report and any potential publication of the study.

Data analysis technique

Thematic analysis approach will be applied to analyse the findings where themes will be coded inductively. Thematic analysis helps the researcher not only to ascertain semantic themes but also latent themes that identify underlying factors and assumptions that shape people's perceptions and opinions. In this study, the thematic analysis will help me to understand and

develop themes that emerge from the perspectives of participants themselves. Thematic analysis is appropriate especially for analysing transcribed data from in-depth interviews and focus group discussions.²⁴ Thus, thematic analysis is well-suited to the nature of this inquiry and types of data collection methods that will be used. Double coding of transcripts will be done with the assistance of a colleague to ensure rigour in the analysis.

Methodological considerations

Language barriers

Due to fact that university students are going to be used as participants in this study, the English language will be used to conduct interviews and focus groups. I do acknowledge that some students might want to freely express their views in their mother languages but using English will not be a blow since English is the mode of education at the University of Cape Town.

Reflexivity

Qualitative research is prone to some degree of subjectivity since the understanding of the participants' behaviour, settings and data is to a certain extent influenced by the researcher's values, beliefs, and interest.²⁵ Reflexivity makes the research process open and transparent by allowing the researcher to self-introspect and explicitly state his position in relation to the research process. It is about providing a complete and honest explanation of the research process, clarifying the position of the researcher in relation to the study.²⁶ Reflexivity is an ongoing process in which researchers recognize, examine and reflect how their social, cultural and political values and assumptions may affect the research practice.²⁷ It recognizes the role of subjectivity throughout the research process.

In this study, the researcher will keep a notebook to record his thoughts, beliefs, assumptions and experiences throughout the research process. The notebook will provide a full account of the research process, explicating how the researcher's own subjectivity has shaped the research process and the steps taken by the researcher to limit his subjective influence on research findings.

ETHICAL CONSIDERATIONS

The most important component of any kind of research is not the research itself but to protect the safety and wellbeing of the participants. This study will be conducted in such ways that do not impede any participant's well-being. The researcher will take full responsibility to protect the well-being of participants at all stages of the research process (before, during and after data collection).

Informed Consent

Before taking part in the study, every participant will be informed about the purpose of the study. The researcher will explain to participants what the research is all about including potential risks and benefits associated with participating. "Potential participants must be competent to make a decision about being in the research..."^{24(p.11)} Participants will be asked to read the information sheet together with the consent form and ask the researcher for clarification if there is anything that they do not understand. After reading the information sheet and consent form and indicating that they clearly understood all the content, each participant will be asked to sign his/her consent form before the data collection process begins. No participant will be coerced or manipulated to participate in the study. Participants will only be allowed to participate freely giving their full consent. Participants will also be informed that participation in this study is voluntary and they are free to withdraw from the study at any stage without any threat or punishment imposed on them.

Privacy and Confidentiality

For confidentiality purposes, pseudonyms will be used to represent the names of the participants so as to protect their personal identities. All the information provided by respondents will be kept private and confidential. No information provided by one participant will be revealed to other participants or members of the university in general. However, it is difficult to ensure confidentiality and anonymity within the focus group context since participants will have access to what others say during the group discussions. Therefore, participants taking part in the focus groups will be informed that confidentiality cannot be guaranteed. However, this is not expected to negatively affect participants or the quality of data since the topic is not sensitive.

To protect the participants' privacy, all hardcopy data obtained from the study, including audio recordings and written notes, will be kept in a securely protected closet. Softcopy data will be stored in my personal computer and Dropbox account that will be used to store electronic data will be protected by strong passwords. Only the primary researcher will have access to the hardcopy and softcopy data from the study. However, the writeup of the research findings and report will be monitored by the researcher's supervisor and co-supervisor. All the data will be destroyed after the submission of the report and any potential publication of the study.

Potential benefits

There is no 'direct' benefit to participants for participating in the study, but the information gained might be used to inform future/ further research which could be beneficial beyond the individual. Since FGDs will be conducted during the weekend, participants will receive R100 (one hundred rand) reimbursement for their travel and time. Snacks will also be provided during data collection. Since the study provides an opportunity to explore participants' knowledge and health risk perceptions related to the use of e-cigarettes within the South African context, it is the researcher's hope that the results will contribute to the designing of effective public health interventions. This might not be a direct benefit to participants but understanding young adults' knowledge around e-cigarettes and identifying sources of information regarding e-cigarettes may contribute to the designing of different public health interventions that are well targeted. The results will also be used by the Cancer Association of South Africa to inform messaging in their health campaigns, and possibly to inform further research.

Potential risks

The study will pose minimal to no risk to participants since the interviews and FGDs will explore the general knowledge and perceptions of participants about e-cigarette use. Furthermore, the nature of the inquiry is not so sensitive, and I do not expect it to pose any serious risks to participants other than potential changes in thought processes or some feelings of guilt or embarrassment that may arise from talking about one's own behaviours and attitudes toward e-cigarette use. To avoid this situation, the research questions will be devised and delivered in an open-ended and non-obtrusive style. Participants may also be referred to UCT Student Wellness

Services for addiction-related counselling and services that help them to stop substance use. There is also a potential threat to confidentiality in the focus group settings since participants will have access to what others say.

TIME FRAME FOR THE STUDY

Table 1.

Task description	Time
Ethics Application	August 2018
Ethics approval	November 2018-
Data Collection and analysis	November- December 2018
Data analysis	December 2018 -January 2019
Write-up and dissemination-	January 2019- February 2019

BUDGET FOR PROPOSED STUDY

Table 2.

Item	Cost per unity	Number of Units	Total
Researcher's time	--	--	--
FGD assistant/ facilitator	R126/hour	10 hours	R1 260
Transcription services (focus groups)	R8/minute	300 minutes	R2 400
Transcription services (interviews)	R6/minute	450 minutes	R2 700
Printing	R0.50/ page	120	R60
Participant remuneration	R100	60	R6 000
Recording devices	--	--	CANSA to provide
Refreshments	--	--	R2 100
Total	--	--	R14 520

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PART B: LITERATURE REVIEW

INTRODUCTION

Electronic cigarettes are devices that resemble traditional cigarettes and they function through the heating of liquid to produce aerosol or vapour that is inhaled and expelled like tobacco cigarette smoke.¹ A typical e-cigarette is comprised of a pipe, electronic heating element and liquid cartridge or container. Inside the cartridge is a liquid mixture that typically contains nicotine, distilled water, flavourings and propylene glycol and/or vegetable glycerine.² Studies have found that the levels of toxicants found in e-cigarettes are much lower than those found in conventional tobacco cigarettes.³ As a result, a number of scientists and health professionals are of the view that e-cigarettes can be used as a healthier alternative to tobacco smoking and/or help stop or reduce tobacco consumption.⁴ However, since these products are relatively new (they have only been here for over a decade), their long-term health effects remain unknown.

Despite the level of uncertainty and lack of evidence with regards to their long-term effects, e-cigarettes are being marketed as a healthier alternative to tobacco smoking.⁵ E-cigarettes are continuously gaining popularity worldwide and their use is rising especially among youth. This chapter seeks to draw on relevant literature sources to explain how this research project fits into the broader landscape of research on this subject. The review begins by providing an overview of the existing debates in the literature surrounding the health effects and efficacy of e-cigarettes in smoking cessation. An evaluation of how e-cigarettes are perceived by young adults and the factors that influence young adults' perceptions of e-cigarettes will then follow.

AIM OF THE LITERATURE REVIEW

The purpose of this literature review is to evaluate the available literature and identify knowledge gaps in the existing literature. The review seeks to examine and understand different factors that influence young adults' knowledge and perceptions of e-cigarettes. Different concepts and perspectives from previous studies on e-cigarettes will be explored.

LITERATURE SEARCH STRATEGY

An assessment of the literature on young adults' knowledge, attitudes and beliefs about e-cigarettes was conducted. The initial plan was to review the studies that have been done in Sub-

Saharan Africa only, with a particular focus on young adults. However, the literature search on various platforms found no available studies of this nature that were conducted in Sub-Saharan Africa. In light of the inadequate literature available in this region, the review sought to include the studies that have been done elsewhere, including Europe and the United States. The literature search was conducted on various online databases and search engines, including PubMed, SAGE journals, Taylor and Francis, Google Scholar, Oxford Academic and HHS Public Access. Websites such as Public Health England, U.S Department of Health and Human Services and Medicines Control Council were searched for information pertaining to user statistics and legal status of e-cigarettes in different parts of the world.

Keywords that were used in the literature search include, “e-cigarettes”, “electronic cigarettes” “e-cigarette use AND young adults”, “e-cigarettes AND young adults’ perceptions” and “e-cigarettes and youth”. After reading the articles, an annotated bibliography was produced, which included the full citation of each article, a summary of key findings and its relevance to the study. The researcher also perused the reference list of each article to identify additional articles and manually searched online for review articles. Only articles that were written in the English language were included.

SUMMARY OF LITERATURE

Potential risks associated with e-cigarettes

Although studies have been conducted to uncover the risks associated with electronic cigarettes, their long-term health effects remain unknown.^{1, 4} The lack of evidence about the long-term health effects of e-cigarettes has led to differing opinions and conclusions not only against e-cigarettes but also in support of such products. For example, some studies have concluded that e-cigarettes are 95% safer than smoking conventional tobacco cigarettes.^{3, 6, 7} The argument is that even though e-cigarettes are not harmless, they have the potential to significantly reduce the risks of developing cancer, cardiovascular and respiratory diseases.³ This is because toxicants and carcinogens present in tobacco smoke are absent or present in much lower concentrations in e-cigarette aerosols.^{8, 9, 10} Thus, although e-cigarettes are not 100% safe, and their long-term effects

are not known, they are relatively safer than tobacco smoking and thus can be used to replace or reduce tobacco consumption.^{3, 6, 11}

A number of studies have been conducted to measure the efficacy of e-cigarettes in smoking cessation and concluded that e-cigarettes are effective in helping tobacco smokers quit smoking as compared to unaided attempts.^{12, 13} However, even though some studies have found a significant positive association between e-cigarette use and smoking cessation, e-cigarette use is not always driven by the desire to quit smoking. Concerns have been raised about the potential of e-cigarettes to create a new generation of smokers, specifically young, first-time smokers. In the United States, e-cigarette use has increased by 900% among high school students from 2011 to 2015, surpassing all conventional tobacco products.¹⁴ Such statistics indicate that e-cigarettes are not only used by previous and current smokers in an attempt to quit smoking but they are also used to initiate young non-smokers into e-cigarette use.¹⁵ There is a possibility that young first-time e-cigarette users can turn into conventional tobacco smokers once they get addicted to nicotine.¹⁶ Thus, e-cigarette use can be counterproductive to the effort and progress that has been in reducing tobacco consumption.¹⁴ Whether e-cigarettes can also expose the future generations to the associated health risks warrants further research and exploration.

The idea that e-cigarettes are safer than tobacco cigarettes because they do not contain a number of toxicants and carcinogens that are found in traditional cigarettes¹⁷ has not been accepted by everyone as concerns have been raised about the potential effects of e-cigarette ingredients.^{14, 18} According to US Department of Health and Human Services¹⁴, while the health effects and possibly damaging doses of heated and aerosolized ingredients of e-cigarette liquids such as solvents, flavourings, and toxicants are not completely understood, aerosol from e-cigarettes is not risk-free.¹⁴ The chemical composition of e-cigarette liquids elicited concern amongst researchers and public health institutions. The 2016 report by WHO states that aerosol produced from e-cigarettes including glycols, aldehydes, volatile organic compounds, tobacco-specific nitrosamines, polycyclic aromatic hydrocarbon, metals, silicate particles and other toxic substances have known health effects resulting in a range of significant pathological changes.¹⁸

¹⁹ Thus, the fact that e-cigarette concentrations are different from that of tobacco cigarettes does not mean that e-cigarettes are safer.

Furthermore, the diversity of e-cigarette products makes it difficult to determine the levels of toxicants and nicotine produced by e-cigarettes. Even though e-cigarettes are generally thought of as a single product class, they do constitute a diverse group with significant differences in the production of toxicants and the amount of nicotine delivered.^{18, 20} The diversity of e-cigarette products can be observed clearly in figure 2 below.



Figure 2. The diversity of E-cigarette products¹⁴

Due to the diversity of e-cigarette products in terms of type, size and shape, the levels of toxicants can vary extremely across brands and within brands and sometimes reach higher levels than in tobacco smoke.¹⁸ As a result, the health effects of one product can significantly differ from that of another product because of differences in chemical composition and level of toxicants across different devices.²¹ Furthermore, this diversity also presents a challenge in the regulation of e-cigarette products across different countries.

E-cigarette regulation around the world

A number of countries have developed national laws and legislation to regulate e-cigarettes. However, an interesting phenomenon is that the classification of e-cigarettes differs from one

country to another. For example, e-cigarettes are classified as tobacco products in USA, Argentina and Vietnam while they are classified as medicinal products in Japan, Philippines, South Africa and Chile.²² Belgium, France and UK classify e-cigarettes under medicinal and consumer goods while they are classified under poison and electrical appliances in Malaysia.²² These differential classifications are interesting in that they do not reflect the current debates pertaining to safety and efficacy of e-cigarettes in smoking cessation but they also affect how e-cigarettes are regulated in different countries in terms of sale, manufacturing, importation, distribution, use, ingredients, promotion, taxation, health warning labels, vape-free laws and child-safety standards.²² For example, because they are classified as tobacco products in the United States, the same laws that are used to regulate tobacco are applied to e-cigarette regulation while in Japan, smoking regulations do not apply to e-cigarettes as they are regarded as medicinal products.

South Africa has not developed any new legislation or amended any existing legislation to regulate e-cigarettes despite classifying them as medicinal products requiring doctor's prescription.²² Perhaps the reason why they are classified under medicinal products is that they are being framed as smoking cessation aids. The legislation relevant to the regulation of e-cigarettes in South Africa does not specifically address or refer to e-cigarettes.²³ Rather, it addresses nicotine-containing products. The import and sale of nicotine-containing e-cigarettes are currently permissible, subject to registration as a medicine under the provisions of the Medicines and Related Substance Control Act.²³ However, this poses a challenge especially when it comes to nicotine-free e-cigarettes which are not subject to regulation under Medicines and Related Substances Control Act. Whether people can exploit the deficiencies of the current act with regards to e-cigarette marketing and use in South Africa warrants further research. The Tobacco Products Control Amendment Act which aims to subject e-cigarettes to the same set of laws that regulate tobacco cigarettes in South Africa was recently introduced.²⁴ However, the Amendment bill is still under consideration and has not yet been approved. Because there is no research that has been conducted in South Africa pertaining to people's knowledge and perceptions of e-cigarettes, the following section evaluates how e-cigarettes are perceived by young adults in different countries.

Young adults' perceptions of e-cigarettes and smoking cessation

Previous studies on electronic cigarettes use in young adults indicate that young adults not only perceive e-cigarettes as healthier but also believe they can be used to aid smoking cessation.^{25, 26} The study by Hall et al in the United States found prevalence of e-cigarette use was high for previous and current smokers who used them mainly as an aid to smoking cessation.²⁶ People in general resort to the use of e-cigarettes for a variety of reasons, including to help reduce tobacco smoking, to help them while they are trying to quit smoking, as a cheaper alternative to cigarettes, and as a long-term replacement for traditional cigarettes.²⁵ The fact that there are known risks of tobacco smoking and e-cigarettes are being marketed as a 'healthier' alternative to smoking has drawn some sections of smokers into vaping.⁵ However, some studies have found that e-cigarettes were perceived differently depending on the age of the perceiver.^{27, 28} For example, the study by Coleman et al found that compared to older adults who saw e-cigarettes primarily as mechanisms that help to reduce or stop smoking, young adults were more likely to use e-cigarettes because they are considered as “cool” or “trendy”.^{27, 28}

Although a number of studies indicated that participants believe that e-cigarettes can be used as aids to smoking cessation,²⁹ e-cigarette use among young adults has not always been associated with the intention to reduce or quit smoking. For example, a study on e-cigarette use in the United States concluded that quit intentions do not play a critical role in e-cigarette use in the university student population.²⁸ A study among young adult smokers and vapers in Scotland found that while some young adults were positive about the idea of using e-cigarettes as an alternative to conventional cigarettes, they used e-cigarettes as a hobby, not necessarily to aid smoking cessation.³⁰ Another large internet-based study carried out among French students found that the main reasons why students have ever tried e-cigarettes were curiosity (77.4%), offered by someone to try (63.5%) and attractiveness of flavours (24.6%).¹⁵ Hence, a number of studies have concluded that the main motive behind e-cigarette use in young adults was neither intention to quit smoking or health-related.^{15, 27, 30}

Just as some young adults believe that e-cigarettes are effective in promoting smoking cessation, others have expressed scepticism about the efficacy of such products on smoking cessation. Despite having been exposed to e-cigarette adverts that depict e-cigarettes as smoking cessation

aids, the majority of college and high school participants in the study by Camenga et al³¹ maintained that e-cigarettes are not effective for cessation.³¹ Some young adults and college students express their distrust of e-cigarette marketing practices, believing that the marketers are more interested in “making profits” as opposed to promoting smoking cessation.^{29, 31} Because some college and high school students view e-cigarette marketers as an unreliable source of information, they tend to reference firsthand and secondhand experiences where e-cigarettes have failed to promote smoking cessation to support their argument.³¹ Firsthand and secondhand experience of e-cigarette use has become a valuable source of information that helps young adults to determine whether these products can truly promote smoking cessation. This shows that young adults are not passive recipients of the claims that e-cigarette manufacturers use to promote their products, but they actively engage in questioning and scrutinizing such claims and their intentions.

Although some studies have concluded that e-cigarettes are effective in smoking cessation, others maintain that e-cigarettes have the potential to compromise the progress made in reducing tobacco consumption as they can function as a gateway through which new nicotine users can be initiated.^{14, 15} A systematic review of studies that were done to measure the relationship between e-cigarette use and subsequent tobacco smoking among adolescents and young concluded that “e-cigarette use is associated with an increased risk of future smoking initiation and current cigarette smoking even after adjusting for potentially confounding demographic, psychosocial, and behavioural risk factors.”^{16(p.7)} One possible reason why e-cigarette use may lead to cigarette smoking is that e-cigarette use mimics the behavioural scripts of tobacco smoking.¹⁶ These include hand-to-mouth movements, puffing, inhalation of the mixture into the lungs and exhalation.¹⁶ Thus, adolescents and young adults may experiment with tobacco smoking because they would have already acquired smoking-related behaviours through e-cigarette use.¹⁶ In addition, e-cigarettes create a nicotine addiction that needs to be maintained. Cigarettes offer an avenue for this.

Knowledge and risk perception of e-cigarettes

Just as there are differing perceptions regarding the efficacy of e-cigarettes on smoking cessation, a number of studies have found variations of responses with regards to participants’

risk perceptions of e-cigarettes, with some maintaining that e-cigarettes are healthier than tobacco cigarettes and others believing that e-cigarettes are worse than tobacco cigarettes.^{21, 28, 32} One of the reasons why e-cigarettes are perceived to be relatively safer than tobacco cigarettes is because they do not have a number of toxicants and carcinogens that are present in tobacco cigarettes.^{27, 33} In some studies, participants believed that e-cigarettes are as harmful as conventional cigarettes while some also viewed them as more harmful than tobacco cigarettes as they have expressed concern about the unknown effects of e-liquid chemicals.^{28, 32} This reflects the current scientific state of e-cigarettes with regards to lack of understanding of their long-term health effects.²⁸

Even those who believe that e-cigarettes are safer than tobacco cigarettes have raised concerns about the lack of information from credible sources to educate them about the health effects of e-cigarettes.²¹ Lack of information from credible sources leaves people to rely solely on informal sources and networks for information related to such products.²¹ A more interesting finding from this study is that although participants believed that e-cigarettes are safe for bystanders, they reported ‘personal rules’ that contradicted their beliefs about the health/safety of e-cigarettes. Some of the participants’ personal rules include; not vaping in public places, in the presence of non-smokers or in the presence of children.²¹ Thus, participants’ personal rules may indicate some underlying doubt about the health/safety of e-cigarettes. Participants reported a lack of knowledge about e-cigarette concentrations and their health effect as concerning and expressed interests in learning more about such products.³⁴ However, despite not knowing the e-cigarette ingredients, they still believed e-cigarettes are less harmful than conventional cigarettes.²⁷

Factors that influence young adults’ perceptions and attitudes

Despite contesting views regarding safety and efficacy of e-cigarettes, young adults’ perceptions, attitudes and use of e-cigarettes continue to be shaped by several other factors ranging from individual to social and technological. E-cigarette marketing plays an important role in shaping young peoples’ perceptions and attitudes towards these products.⁵ Young people rely on e-cigarette marketing and commercials on TV, print media and the internet for information about e-cigarettes.³⁵ E-cigarette marketers and commercials present e-cigarettes as healthier, cool, trendy and these attributes are appealing to the young population.^{5, 36} Although some people find

e-cigarette marketers and commercials an unreliable source of information, their perceptions and reasons for use mirror these e-cigarette advertising and marketing claims.^{25, 26, 37} The technological aspect of e-cigarettes, when they are used or advertised, is seen as appealing and perceived as another gadget among the existing technologies such as mobile phones.^{36, 38} Exposure to e-cigarette commercials helps people to form positive attitudes towards the products even though they are wary of the lack of evidence about their long-term health effects.³⁸ Although the previous studies provide insights into how e-cigarette marketing affects young adults' perceptions about such products, none of these studies was conducted in South Africa. Lack of information on e-cigarette marketing in South Africa makes it difficult to understand the role that marketing plays in shaping young adults' perceptions of e-cigarettes in South Africa. This study will explore and evaluate young adults' perceptions and experiences in relation to e-cigarette marketing and use in South Africa. rather than looking directly at the ways of them.

The lack of evidence on the long-term effects of e-cigarettes prompt users and non-users to also rely on their social interactions in addition to marketing messages as a way of sharing information.²⁶ Due to lack of e-cigarette-related information from credible sources, word-of-mouth has been found to be the most common method of sharing information about e-cigarettes as smokers and non-smokers talk “about e-cigarettes with their friends, family members (including children), co-workers, medical professionals, and even strangers.”^{26(p.6)} Informal conversations play an important role in closing the gaps resulting from a lack of understanding of the longer-term effects of e-cigarettes.²⁶ Whether young adults in the South African context use social interactions as a source of information about e-cigarettes warrants further research. This study will dig deeper into further exploring how social interactions shape young adults' knowledge, attitudes and norms about e-cigarettes.

Previous studies have identified family and social networks as playing an important role in shaping young adults' attitudes and decisions to use e-cigarettes.³⁰ The use of e-cigarettes has been found to be relatively common in the family and social networks of the young adults who used e-cigarettes.^{27, 30} Family and friends do not only function as sources of information about e-cigarettes but also function as a source of support for e-cigarette users especially when they use e-cigarettes in place of conventional cigarettes.²⁷ Thus, the main reason why family and friends

support the use of e-cigarettes may be to keep users away from tobacco smoking which they believe is more dangerous. However, since none of these studies was conducted in South Africa, it is not clear as to whether the family in a South African context also plays a role in shaping e-cigarette use and how big a role family play in either supporting or discouraging e-cigarette use.

A study that examined e-cigarette use in relation to other social aspects such as gender, race, smoking and heavy drinking among college students in Canada found that e-cigarette use was higher among male students as compared to female students.³⁹ These gender differences in e-cigarette use mirror those of tobacco smoking where smoking prevalence rates are higher in males as compared to females.⁴⁰ The lower prevalence rates among females as compared to their male counterparts have been attributed to the social condemnation of female smokers and lower socio-economic status of women in society.⁴¹ It is not clear as to whether these aspects of smoking play a part in e-cigarette use. Some studies have found a positive association between e-cigarette use and other behaviours such as smoking and alcohol drinking.³⁹ The study by Simmons et al found that those who used e-cigarettes in an attempt to quit combustible cigarettes reported that compared to other smoking cessation methods which can be isolating, e-cigarettes offer them space to interact with other users. When these participants were smoking, they used to hang out with other smokers, likewise, e-cigarettes provide an opportunity for them to hang out as vapers, making the transition from tobacco smoking to e-cigarette use easier.³⁸ Due to the lack of research on e-cigarette use in South Africa, it is difficult to determine whether e-cigarette use is associated with these social aspects.

The study by Hess et al found that while e-cigarettes played a utilitarian role in which they were used as legitimate smoking cessation tools, they also played a social role where they served as a mark of social identity among the participants.⁴² Because of the novel and trendy nature of e-cigarettes, they are becoming a new form of social identity where users attempt to distinguish themselves from tobacco smoking and identify themselves as vapers.³⁸ In a study by Simmons et al, those who had been successful in quitting combustible cigarettes spontaneously distanced themselves from smokers and identified themselves as vapers.³⁸ Not only do e-cigarette users use e-cigarettes as a mark of social identity but non-users do as well. A qualitative study among the black youth in the US found that participants, including cigarette smokers, dissociated

themselves from e-cigarette use because they viewed such products as signalling white, middle class, hipster social identity and mocked typical e-cigarette users as hipsters who want to look cool.⁴² Using e-cigarettes, even for their utilitarian role, would still indicate affiliation to certain a racial, social, and socioeconomic status group that does not represent the identities of participants and even some smokers who were interested in quitting smoking expressed their disregard for e-cigarettes due to their association with other cultural groups.⁴² These studies provide some theoretical explanation (theories of social and cultural identity) in understanding how young adults perceive e-cigarettes. However, since they were conducted in the United States and European context, they cannot be generalized to a South African context.

The regulatory environment also plays some part in influencing youths' perceptions and use of e-cigarettes and smoking-related behaviours.^{15, 25, 27, 35} In countries where e-cigarette use is not regulated, some people use e-cigarettes in places or circumstances where smoking is prohibited, thereby circumventing smoking regulation.^{15, 27} In such cases, e-cigarettes function as sustaining smoking habits as opposed to reducing smoking. A study by Wagoner et al found that participants were of the view that lack of e-cigarette regulation means that they are not harmful.³⁵ This study helps to understand the link between the regulatory environment and people's perceptions of e-cigarettes as participants believed that if e-cigarettes were harmful, they would have been regulated like traditional cigarettes. Thus, while some people may interpret a lack of e-cigarette regulation as stemming from the fact that such products are still new, others may be prompted to think that lack of regulation means they are not harmful.

IDENTIFICATION OF GAPS IN LITERATURE

While previous studies are crucial in providing insightful ideas into the kind of perspectives and experiences that young adults have around the use of e-cigarettes, it is important to note that the majority of those studies were conducted in Europe, the United States and Canada and thus cannot be generalized to South Africa. Previous studies have identified family and social networks as important sources of information and support for e-cigarette users,^{26, 30} however, these cannot be generalized to South Africa due to differences in the family structures and socio-cultural contexts. It is not clear as to whether the family in the South African context also plays a role in shaping e-cigarette use and how big a role family plays in either supporting or

discouraging e-cigarette use. Previous studies also point out the role of e-cigarette marketing and commercials in shaping young adults' attitudes towards such devices.³¹ Again, my literature search has found no studies that have been conducted in South Africa pertaining to e-cigarette marketing and their impact on youth. Other than anecdotal evidence, no study has been done to assess how e-cigarettes are marketed in South Africa and how such marketing affects the attitudes and perceptions of young people. Some studies have identified the importance of other behavioural proxies such as smoking, drinking on e-cigarette use but it is not clear as to whether that applies to young adults in a South African context.

This study focuses on young adults mainly because e-cigarette marketing strategies seem to target youth and the way e-cigarettes are presented is appealing to this younger section of the population.^{5, 43, 44} From a public health perspective, it has been found that university/ college students are easily attracted to new products and have historically been at the forefront of societal changes in substance use that later materialize within the general population.⁴⁵ Hence, this study focuses on exploring knowledge, perceptions and behaviour of young adults, particularly university students and attempts to uncover different factors that shape their perspectives and attitudes towards e-cigarettes in a South African context.

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PART C: JOURNAL MANUSCRIPT

Title of the manuscript:	Knowledge, Perceptions and Attitudes of Young Adults Towards Electronic-Cigarettes
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ABSTRACT

Background: Electronic cigarettes (e-cigarettes) are deemed to be safer than tobacco cigarettes because they do not contain a number of toxicants and carcinogens that are present in tobacco cigarettes. However, their long-term health effects are unknown. Despite this, there has been a rapid market penetration of e-cigarettes worldwide. South Africa has no legislation which specifically controls the marketing, sale and use of e-cigarettes and concerns have been raised over the increasing use of e-cigarettes by youth, who are often attracted to these novel products and specifically targeted by industry.

Aim: To understand how young adults perceive e-cigarettes and explore their attitudes towards the use of these novel products.

Setting: The study was conducted at the University of Cape Town upper campus.

Methods: The study used an exploratory qualitative approach, using focus group discussions and in-depth interviews to collect data and a thematic analysis approach to analyse the data.

Results: Participants generally perceived e-cigarettes as healthier than tobacco cigarettes. Participants associated the pleasant aroma from e-cigarettes with health and the unpleasant aroma from tobacco with danger. Many participants were predominantly attracted to the flavours and perceived 'Trendiness' of e-cigarettes as opposed to the intention to quit tobacco smoking and vaping has not actually been helpful in quitting smoking. The main sources of e-cigarette related information were social media and informal conversations. Participants believed e-cigarettes could be used in places where smoking is prohibited.

Recommendations: The study recommends that e-cigarette awareness should be improved especially in schools and through social media where young people access most of their information.

INTRODUCTION

Electronic cigarettes (e-cigarettes), commonly known in South Africa by the brand name ‘Twisp’, are devices that resemble traditional cigarettes. E-cigarettes function through the heating of liquid to produce aerosol or vapour that is inhaled and expelled.¹ A typical e-cigarette is comprised of a pipe, electronic heating element and liquid container. Inside the container is a liquid mixture that typically contains nicotine, distilled water, flavourings and propylene glycol and/or vegetable glycerine.² Studies have found that the levels of toxicants found in e-cigarettes are much lower than those found in conventional tobacco cigarettes.³ As a result, a number of scientists and health professionals are of the view that e-cigarettes can be used as a healthier alternative to tobacco smoking or as a tool to help quit smoking or reduce tobacco consumption.¹ The assumption is that since e-cigarettes contain nicotine which is the highly addictive substance in combustible cigarettes, they can be used to alleviate nicotine cravings among smokers, thereby reducing tobacco consumption.

Previous studies on electronic cigarette use in young adults indicate that they perceive e-cigarettes as healthier and believe they can be used to aid smoking cessation.⁴ People use e-cigarettes for different reasons, including to help reduce tobacco smoking, to help them while they are trying to quit smoking, as a cheaper alternative to cigarettes, and as a long-term replacement for traditional cigarettes.⁵ The fact that there are known risks of tobacco smoking, and e-cigarettes are being marketed as a ‘healthier’ alternative to smoking⁶ has drawn some sections of smokers into vaping. Perceptions of e-cigarettes can differ according to age as some studies have indicated that young adults are more likely than older adults to use e-cigarettes because they are considered as “cool” or “trendy” whereas older adults primarily see such devices as mechanisms that help to reduce or quit smoking.⁷

In the United States, more than 90% of e-cigarette users are young adults.⁸ The US Department of Health and Human Services has warned that the use of e-cigarettes might compromise the progress made in reducing tobacco consumption as they can function as a gateway through which new nicotine users and/or tobacco smokers can be initiated.^{7, 8, 9} A systematic review of studies conducted to measure the relationship between e-cigarette use and subsequent tobacco smoking among adolescents and young adults around the world concluded that e-cigarette use is

associated with an increased risk of future tobacco smoking initiation and current smoking even after adjusting for potentially confounding demographic, psychosocial, and behavioural risk factors.¹⁰ Therefore, e-cigarettes do not only function as cessation aids but they can also work as a gateway through which young, never smokers can be initiated into smoking.

E-cigarette market has grown rapidly over the past decade.¹¹ In South Africa, e-cigarettes are currently classified as medicinal products¹² and the law requires e-cigarettes to be sold only in pharmacies under the prescription of a doctor but anecdotal evidence indicates that e-cigarettes continue to be unregulated and sold from tobacco stores and specialist e-cigarette distributors within the country. For example, Vape Africa now sells e-cigarettes and accessories in more than 60 Spar stores in the Western Cape and also distributes to other regions.¹³ While previous studies help to provide insights into the kind of perspectives and experiences that young adults have around the use of e-cigarettes, it is important to note that the majority of those studies were conducted in Europe, the United States and Canada. There has been a lack of data from the South African context on use and perceptions of the e-cigarette, hence the need for the study. The aim of this study is to assess the perceptions and attitudes of young adults (university students) towards e-cigarette use. The study focuses on university students because students are often attracted to new products and have historically been at the forefront of societal changes in substance use that later materialize within the general population.¹⁴

METHODOLOGY

Study design

This study used a qualitative phenomenological approach to explore the knowledge, perceptions and attitudes of young adults towards e-cigarettes. A qualitative design with an in-depth thematic analysis approach helped to explore participants' perceptions and attitudes and to understand factors that shape those perceptions and attitudes.

Study population and setting

The study was conducted at the University of Cape Town (UCT) campus and included both undergraduate and postgraduate students regardless of gender. However, since the aim was to

explore the perspectives of ‘young adults’, the study only included students from 18 to 25 years of age.

Sampling and recruitment

A combination of purposive and snowball sampling was used to recruit participants in this study. The co-investigator drew on his networks of UCT students to recruit both e-cigarette users and non-users to participate in the study. Snowball sampling technique helped to recruit more e-cigarette users through targeting participants’ own networks since e-cigarette users are a difficult-to-find population. After obtaining a list of students who expressed interest to participate in the study, the researcher purposively selected participants who took part in both individual interviews and focus group discussions (FGDs). Participants who qualified for inclusion in FGDs were both e-cigarette users and non-users between 18 to 25 years of age. Two FGDs comprised of non-users only, two comprised of users only and one combined both users and non-users. Only e-cigarette users were included in individual interviews. The idea behind selecting e-cigarette users only for individual interviews was that some users might not feel comfortable sharing their thoughts and personal experiences within the focus group context because of fear of being judged. Such information may include the reasons for using e-cigarettes and the use of second-hand e-cigarette devices.

Data collection methods

Five focus group discussions (FGDs) were conducted in this study, each comprised of 8 to 11 participants. The FGDs were conducted in the English language and each lasted for about 40 minutes to an hour. Each discussion was held in a private room. FGDs provided an opportunity to explore the participants’ shared and conflicting beliefs, knowledge and attitudes. The investigator was the facilitator of the discussions while his research assistant helped in taking notes and instructing participants who arrived while the discussion had already started. In addition to five FGDs, nine individual interviews were conducted with e-cigarette users. Interviews were conducted in English. Individual interviews helped the researcher to access information and views not freely shared in a group context. Data collection for both FGDs and individual interviews was based on a semi-structured interview guide that was developed and

refined after initial data collection took place. Both individual interviews and FGDs were audio-recorded and later transcribed for analysis, using an independent transcription service.

Data analysis

The researcher used NVivo 12 software to help organise the transcribed data. Thematic analysis approach was used to analyse the findings and inductive coding was used to allow themes to emerge from the data. The researcher started the analysis by carefully reading all the transcripts and developing a codebook in which initial codes were recorded. The initial codes comprised the ideas and topics that were frequently discussed by the participants. The researcher then amended the codebook through grouping similar codes into themes and identifying emergent relationships between different categories. In this paper, only ideas that appeared more frequently in almost all interview transcripts and/or focus group transcripts were considered for developing themes and included in the findings. The researcher regarded ideas that came up less frequently as too flimsy to warrant being a finding, and thus excluded such ideas from the discussion. However, where an idea that appeared only once or twice across the whole dataset was included, it was presented not as a theme but as a ‘deviant case’ that contradicts the developed themes. The researcher presented the results according to different themes pertaining to participants’ perspectives and experiences.

Ethical considerations

This study was conducted in partial fulfilment of the Master of Public Health degree at the University of Cape Town (UCT). The researcher took full responsibility to protect the well-being of participants at all stages of the research process (before, during and after data collection). The study was approved by the UCT Human Research Ethics Committee (HREC) and by the School of Public Health and Family Medicine (see Appendix 5).

RESULTS

Description of participants

Individuals who participated in this study were full-time registered University of Cape Town students aged from 18 - 25. The number of participants was 57 in total (24 e-cigarette users and 33 non-users). 9 e-cigarette users participated in individual interviews while 48 students (15 users and 33 non-users) participated in 5 focus group discussions. Of the 24 e-cigarette users, 16

(67%) of them were dual users, meaning they were using both e-cigarettes and tobacco cigarettes. 26 female students and 31 male students participated in this study. Nine (34.6%) of the female participants and thirty-one (48.4%) of male participants reported using e-cigarettes. A summary of the participants' main characteristics is presented in table 1 below.

Table 1: Sample Characteristics (n=57)

Characteristic	Frequency	Percentage
Participant's age		
18-19	19	33%
20-21	13	23%
22-23	14	25%
24-25	11	19%
Participant's sex		
Female (users)	26 (9)	46% (35%)
Male (users)	31 (15)	54% (48%)
Participant's race		
Black	14	25%
White	15	26%
Mixed race	20	35%
Other	2	4%
E-cigarette use status		
Ever use (<i>dual use</i>)	24 (16)	42% (67%)
Never use	33	58%

The author observed some differences in knowledge of e-cigarettes between e-cigarette users and non-users. While all the e-cigarette users knew e-cigarettes and tried to compare these products with traditional cigarettes, some of the non-users who took part in FGDs admitted that they had seen people using e-cigarettes, but they did not know the name and purpose of these products prior to this study. Most of the non-users admitted that the focus group discussions in this study helped them to learn about e-cigarettes and sparked their interests in reading more about these products. However, despite having little knowledge about e-cigarettes, most non-users showed positive attitudes toward these devices. Both users and non-users in this study believed that e-cigarettes are better and healthier than conventional cigarettes and had positive attitudes towards e-cigarettes. There were no differences in males' and females' knowledge and attitudes toward e-cigarettes in this study. This challenged the researcher's expectation that females may have

negative attitudes toward e-cigarette use as compared to their male counterparts due to social condemnation of female smokers and lower socio-economic status of women in society.¹⁵

KEY THEMES

E-cigarettes as “healthy”

Participants assessed the potential health effects of e-cigarettes in relation to that of traditional cigarettes. Despite expressing concern over the potential risk of e-cigarettes, the majority of the participants in both interviews and focus group discussions believed that e-cigarettes are healthier than tobacco cigarettes. For example, when asked whether he was aware of the risks associated with e-cigarettes, one participant responded;

Obviously, e-cigarette is better. Health wise. To be more health-conscious many people - many people quit cigarettes to smoke e-cigarettes because they know normal tobacco cigarettes is much more harmful. So, I feel like e-cigs is much more healthy
(19-year female, user)

I know they are slightly bad for you but they're still like roughly 95% healthier than real cigarettes. I know that they are not like 100% good for me but I know that everyone also eats sugar and sugar is also terrible for you. So, I decided it's not that bad. (20-year old male, user)

The above extracts show that participants believe that e-cigarettes are healthier than tobacco cigarettes. Likening e-cigarettes to sugar people may indicate that the participant is aware of their negative or potentially negative health effects but that does not necessarily translate into a change in individual behaviour. However, some participants were specific about their concerns about e-cigarettes as evidenced by the excerpt below.

I know the water vapour that you inhale has a big effect on your lungs because it's like - it's almost like water on your lungs and smoking cigarettes doesn't have as much of an effect on that. Because the water vapour that gets into your lungs can cause problems. But I still think tobacco causes a lot more damage than water vapour that comes with e-cigarettes (19-year old male, user).

The above participant expressed concerns about the potential health effects of e-cigarette liquid. However, despite expressing concerns about the potential damage that the inhaled vapour can cause on human lungs, the participant still maintains that e-cigarettes remain less harmful than tobacco cigarettes. However, one participant raised concerns about the unknown long-term health effects of e-cigarettes as evidenced by the extract below.

With the traditional cigarettes - it's proven that it causes cancer and we know people who have been smoking for 60 years, 50 years, 40 years, so like we sort of know the effects. But for the e-cigarettes there's nobody that was smoking 20 years so you're taking a chance. You're breaking new ground and you're smoking 20 years because you don't know what could happen when you smoke as long. So it's like an uncertain thing. Because maybe it doesn't cause cancer but maybe it can cause blindness (22-year old male, non-user)

Unlike most of the participants who tended to focus on the immediate health effects of e-cigarettes, the participant's concern is about the unknown health effects of e-cigarettes. From the participant's view, lack of evidence of harmful effects of e-cigarettes does not mean that these products are safe. The participants' argument follows the current debates in smoking epidemiology about the uncertainty of evidence and unknown health effects of e-cigarettes.^{1, 11}

Factors influencing the use of e-cigarettes

Although participants in this study generally believed e-cigarettes to be healthier than tobacco cigarettes, the majority indicated that they started using e-cigarettes because of curiosity. Evidence from the study shows that participants were mainly attracted to e-cigarettes because of their appeal:

I don't know, for me, it wasn't like the very serious reasons. I just saw people vaping and they looked cool. It smelled nice, it looked fun, they were doing vape tricks and whatever. So I said to myself, I need to try that cool thing. (22-year female, user)

I thought they were pretty cool from the start because I always thought that it was cool that you can blow lots of smoke. Now it's one of my favourite parts about it was - I mean the nicotine is like not that important. But the blowing smoke was pretty cool.

They are classy as well. You wouldn't see someone from the township vaping. I mean everything about it is just cool. (19-year old male, user)

This information shows that the main factors that attracted participants to e-cigarettes were not related to health. Even those who reported having tried to use e-cigarettes for smoking cessation admitted that they were attracted by the appeal of an e-cigarette and then decided to replace tobacco cigarettes with it. E-cigarette features such as nice smell, flavours and smartness are so appealing and young people get caught up in that 'coolness'. The above excerpts above also indicate that e-cigarettes function as a symbol of aspirational wealth for young people, a desirable fashion accessory or a perceived indicator of higher social class.

Knowledge about e-cigarette chemical constituents

Despite the majority of the participants believing e-cigarettes to be healthier than traditional combustible cigarettes, they had limited knowledge about the chemical constituents of e-cigarettes. While some participants pointed out nicotine and flavours as the only constituents that they knew, others indicated that such information is not always available to them. The fact that some e-liquid containers do not have any contents-related information written on them means individuals are required to actively seek this information. Some felt it was unnecessary to do so and rather pointed out some positive attributes of e-cigarettes such as 'nice smell' and 'cleanliness' as indications that e-cigarettes are healthier. For example, when asked whether she is concerned about the chemical constituents of e-cigarettes, one participant responded;

Okay, it's different from the normal cigarettes that are disgusting if I may say. Because the normal cigarette is very disgusting. Just me bumping into a person smoking, I feel like smelling death when I get that smell. But with e-cigarettes, you think like "oh it's so nice". So, the thing with e-cigarettes is that it kind of attracts people as well because of the smell. Like sweet smell. I feel like oh yeah this smell is not disgusting, it's nice and it must be healthy. You can just feel it. I also think they are clean. Like you don't drop the stub and leave the environment dirty. It's not dangerous in terms of maybe, starting a fire or something. You see when people do the normal cigarettes, they just throw it then they don't know where that smoke or that small piece of cigarette is going to go. (20-year old female, non-user)

Some participants expressed concerns over the potential dangers of e-cigarettes and viewed e-cigarette marketing strategies as deceiving. However, they still believed e-cigarettes to be healthier than traditional cigarettes, pointing to the ‘nice smell’ as an indication that they are healthier. The perception of them as environmentally friendly may also serve to enhance their perceived ‘goodness’ and relative wholesomeness. The idea that participants had no knowledge of the chemical constituents of e-cigarettes was also evidenced by the fact that the majority of the participants asked the interviewer to educate them about the chemicals that are found in e-cigarettes at some point during the interviews or discussions. However, despite expressing the desire to know more about e-cigarettes, no participant reported having tried to read a scholarly article or to consult a health practitioner for such information. Rather, the main sources of information as indicated by the participants were e-cigarette marketers, social media, friends or family members.

E-cigarettes and smoking cessation

Many participants expressed doubt over the efficacy of e-cigarettes in smoking cessation, citing examples from the first-hand experience to support their views. They reported that they had tried to use e-cigarettes to help them quit or reduce smoking, but they had been unsuccessful. Rather, some participants thought e-cigarettes had encouraged them to smoke even more. For example, in explaining her experiences, one participant said:

I smoke cigarettes so I started using e-cigarettes thinking like - maybe I could smoke less. But that thing actually makes you smoke way more...now I smoke both. Like when I come to school or if I'm in a building where I'm not allowed to smoke, I can just smoke my vape. (21-year old female, user)

The above quotation shows that even though the participant was motivated by a desire to quit smoking, the result was not what she was initially hoping for. It can be seen in her remarks that instead of stopping tobacco smoking, the participant has now turned into using both e-cigarettes and tobacco cigarettes. Other participants, especially those who have never used e-cigarettes cited examples of people they knew who have attempted and failed to use e-cigarettes to quit smoking. For example, one participant said:

I know a friend who was smoking traditional cigarettes. He wanted to stop. He moved to an e-cigarette, and he became addicted to an e-cigarette. But he would buy a pack of tobacco cigarettes each time he runs out of the liquid. It's so funny because now he is switched back to smoking and he is smoking even more. He's a chain smoker now. (24-year old male, non-user)

Some participants were also critical about the whole idea of using an e-cigarette to try and help people quit smoking. For example, one participant said:

What's the purpose of replacing tobacco with something else? If you want people to stop smoking, why not just encourage them to stop smoking? Because at the end of the day they still taking some kind of substance into their lungs and that might kill them (23-year old female, non-user)

However, not all participants questioned the efficacy of e-cigarettes in smoking cessation. Some participants were confident that e-cigarettes could help smokers quit and indicated that they were encouraging smokers to replace cigarette smoking with e-cigarette use. For example, although he indicated that he has never smoked tobacco, one e-cigarette user indicated that he was trying to introduce e-cigarettes to his girlfriend and friends to help them quit smoking.

E-cigarette exposure to minors

Although participants were registered university students during the period of this study, those who reported current or previous e-cigarette use indicated that they were exposed to these devices way before they came to university. Almost all current and previous e-cigarette users in this study first learnt about e-cigarettes when they were still in high school and below the age of 18. For example, when asked, the participant said:

I actually learnt about it like in matric. I was 16 years old. I didn't smoke back then but used to see this group of students using it and blowing clouds of smoke. I asked and they told me it was vape not smoke. (19-year old male, user)

Another participant had this to say;

I first heard about them – I think in grade 7. And then I first tried one in either grade 8 or grade 9. A friend of mine had one and then I tried it and I didn't try it for a

while. Then I finally bought one for myself. But my parents don't know because I hide it. Just put it in my pocket. If they see it, they probably think it's a pen. It smells like perfume, so I won't be smelling bad. (18-year old male, user)

The above excerpts indicate that the participants were exposed to e-cigarette when they were still in high school. Due to their pleasant smell and portability, youngsters can easily hide these products from elders or parents. Some participants believed that minors are allowed to use e-cigarettes because unlike tobacco cigarettes which have clear warnings and an age restriction, they have never seen an age restriction on the devices, which has been interpreted to mean that e-cigarettes are okay for minors.

Circumventing smoking restrictions

Many participants justified their use of e-cigarettes because they can be used in areas where smoking is prohibited. Such areas include public places and inside buildings. This is mainly because they believe that e-cigarettes are different from and safer than traditional cigarettes.

It's so much easier to vape. Like if you walk out you don't have to look for a lighter and it takes like 15minutes to charge. Or looking for cigarettes. Nothing. Or looking for some space where you have to be alone and light it up. You don't have to be away from people. (21-year old female, user)

Another participant also said:

I think you can vape it inside. Like I don't think people mind when you vape it inside. Like I see people vape it in malls and stuff. Have you seen the guys who sell them in malls, they have some vapes people can try. You try it inside the mall. Even in buildings with smoke sensors, you can vape. The smoke sensors don't detect the vapour, I have seen some people using e-cigarettes in buildings that have smoke sensors and nothing happened. (25-year old male, user)

From the above information, people use e-cigarettes in areas where smoking is prohibited. Participants believe that e-cigarettes are not as bad as traditional cigarettes and thus can be used indoors and in public. Participants also indicated that some e-cigarette marketers sell and test these devices inside malls, creating an impression that e-cigarettes are safe to use indoors or in

public. Lack of legislation or related signage possibly enforces this belief. Furthermore, the fact that smoke sensors do not detect vapour from e-cigarettes might also be reinforcing the belief that second-hand smoke from an e-cigarette is less hazardous than second-hand cigarette smoke which has been shown to be dangerous.

Social acceptability of e-cigarettes

The circumventing of smoking regulation by e-cigarette users might be caused by the fact that e-cigarettes are more socially acceptable than traditional cigarettes. This is indicated by the evidence below:

Like if you're in your house you can just vape like - you don't have to worry because like - my mommy does not smoke or vape. But if I smoke cigarettes my mommy would tell me to go outside. If I use my vape my mommy would be like "oh okay. It's fine, whatever". (22-year old female, user)

Another participant had this to say:

E-cigarettes are okay bro. Not only for us as young people but let me give you an example. Like in my hood, young people don't smoke in front of elders. It's disrespectful. But if it's an e-cig the elders don't say anything, they sought of understand that it's safer. (23-year old male, user)

From this, even those who have never smoked or used e-cigarettes prefer to be around someone who is using an e-cigarette than to be around someone who is smoking. This may be due to the environmental friendliness of e-cigarettes and the belief that second-hand smoke from an e-cigarette is less hazardous than second-hand smoke from combustible cigarettes. The pleasant smell from e-cigarettes might also be playing a part in increasing the social acceptability of e-cigarettes. The above excerpt also highlights the link between social acceptability of e-cigarettes and circumvention of smoking rules where people can use e-cigarettes in the presence of bystanders and bystanders do not get offended by that. However, not all the responses from participants support indicate that e-cigarettes are socially acceptable. For example, responding to whether more information was needed to educate people about e-cigarettes, one participant said:

I think people should be told the truth. These things are safe and a lot of people don't know that. They see you vaping, and they say "hey why are you doing that, just do the real thing, don't be a little bitch or something" so there's a lot of hate towards them. It's kind of like wearing a helmet when you cycle. You know people to be like "ha ha look you're such a little bitch wearing a helmet" when actually you're just being safe. And the same with this. I'm just trying to be safe by using e-cigarettes instead of tobacco ones. It's like why do it in a way that's worse if I can do it in a way that's better? (19-year old male, user).

The above quotation indicates that there is a (negative) perception of e-cigarette users as being a bit weak in comparison to 'real' cigarette smokers. The bike-helmet analogy illustrates how some e-cigarette users get ridiculed or insulted when they take precautions to do something in a safer way. In this case, while the participant tries to use e-cigarettes to avoid getting into more dangerous tobacco smoking, he gets ridiculed and insulted by other people for taking such precaution. There is a social stigma around the use of e-cigarettes as indicated by the label "little bitch". Hence the bike-helmet analogy opposes the idea of social acceptability of e-cigarettes which was reported by most of the participants.

E-cigarette marketing and regulation

Participants indicated that e-cigarettes can be accessed everywhere, in the country. E-cigarettes are available in malls, retail shops, vape shops and on online platforms. However, due to higher costs of e-cigarettes, some people opt to buy second-hand devices from other individuals or online and social media platforms such as Gumtree and Facebook. Second-hand devices help those with less money to buy e-cigarettes as evidenced by the information below:

There are so many places to get them now. Like anywhere. Uhm, but I don't have a lot of money. They can get very expensive to buy so I usually try and buy uhm, I buy second-hand ones usually from the same online forum where I get my news and stuff about them - they also have a classified section. So it's people selling second-hand stuff. So I'll either buy from them or I'll buy from a friend - so someone at varsity if they're selling then I'll buy it from them. And I just sell it if I no longer want it. Like I sold my previous one before I bought this one. It's cheaper that way. (19-year old male, user)

It can be observed from the excerpt above that e-cigarette users do not only buy these devices from shops, they also buy from other individuals. The buying and selling of second-hand e-cigarette devices make it difficult to separate e-cigarette users from marketers. Some participants have also indicated that they are making some profit out of second-hand e-cigarette business in which they buy e-cigarettes with lower prices and sell them with slightly higher prices:

I also build my own coils and stuff. So I've gotten into the whole technical side of it. And I've traded stuff. So like I'll buy stuff for cheap and then sell it for more and fix it up. And also making my own flavours and stuff. (20-year old male, user)

What is also interesting from the above excerpt is the participant making his own flavours and selling them. The safety of the ingredients used in making their own flavours is not known. Thus, the making of counterfeit e-cigarette products might pose serious public health and or/ regulatory challenge.

DISCUSSION

The findings from this study provide insights into young adults' perceptions, attitudes and behaviours in relation to e-cigarettes, and how such perceptions are shaped. Most of the participants in this study perceived e-cigarettes as safer and healthier than combustible cigarettes despite acknowledging that they had very limited knowledge about the chemical constituents of e-cigarette liquid. Thus, participants did not base their risk perception of chemical constituents or by-chemicals of e-cigarette liquid. Rather, they pointed out some general characteristics of e-cigarettes such as nice smell, neatness and expensiveness as indicators of health and safety. Some participants pointed out that they felt e-cigarettes are healthier because they smell and taste good, unlike tobacco cigarettes which smell bad. Good smell tended to be associated with health and safety while the bad smell was associated with health risk. This is contrary to previous research which established that e-cigarettes are relatively safer than tobacco cigarettes because they lack a number of toxicants and carcinogens that are present in tobacco cigarettes.^{6, 16} In this study, general aspects of e-cigarettes such as smelling nice, elegance and being expensive played a role in shaping participants' judgements pertaining to risk and safety of e-cigarettes. These aspects were not only appealing to the participants, but they also played an important role in masking the potential risks of e-cigarettes.

Results have shown that e-cigarettes are more socially acceptable than tobacco cigarettes. One of the reasons why people tolerate e-cigarettes is based on risk perception. This means people accept the use of e-cigarettes simply because they do not perceive these products as posing a threat to their health.^{5, 17} Another aspect that makes e-cigarettes socially acceptable is the pleasant smell that they produce. Some participants indicated that they would not be bothered if someone starts vaping around them or kids because the smell is far less offensive and dangerous compared to that of tobacco cigarettes. The high social acceptability of e-cigarettes might pose a public health threat in that it leads to non-smokers/ non-users being exposed to secondary vaping. The belief that vaping is not smoking and perception of e-cigarettes as safe might promote the use of these products indoors and in the presence of bystanders, including kids and pregnant women.

Although most of the participants in this study perceived e-cigarettes as healthier or safer than combustible cigarettes, the participants' reasons for starting to use e-cigarettes were not cited as being health-related. In fact, health and safety were perceived by the participants as just an advantage that comes with using e-cigarettes but not a factor that they had considered in deciding to use e-cigarettes. The main reason why most participants started using e-cigarettes was curiosity, as the 'coolness' of e-cigarettes made them want to try these products. E-cigarettes are being presented by marketers and in the media as trendy, cool and classy and these qualities appear to be the ones that mostly attracted participants. E-cigarette marketers and commercials present e-cigarettes in ways that are appealing to the young population.^{10, 18}

While e-cigarettes have been marketed as an aid to smoking cessation,¹⁹ most of the participants in this study did not use e-cigarettes for cessation reasons as they reported that they had never smoked before when they started using e-cigarettes. This might be because most of them started using e-cigarettes while they were still in high school and under the age of 18. Curiosity was one of the main reasons why participants started using e-cigarettes. This is related some findings from previous studies which established that compared to older adults who use e-cigarettes primarily as mechanisms that can help quit smoking, e-cigarette use among young adults is not always associated with the intention to quit smoking.^{6, 7} Only a few participants in this study reported that they started using e-cigarettes for quitting purposes and they started using e-cigarettes after their 20th birthday. However, they were not successful in quitting or reducing

tobacco smoking. Rather, all of them had turned into dual users (using both e-cigarettes and tobacco cigarettes). Although the potential long-term health effects of e-cigarettes are not yet known¹¹, dual-use exposes them to both smoking-related risks and the unknown risks of e-cigarettes. The extent to which e-cigarettes may promote dual-use warrants further research.

Furthermore, participants who identified themselves as dual users reported that they used e-cigarettes especially in places where smoking is inappropriate. These areas include indoors, around bystanders or any other places where smoking is prohibited by law. This is not only because of social acceptability of e-cigarettes but also because e-cigarettes are not currently classified as tobacco products in South Africa, and thus the country's smoking regulations do not cover e-cigarette use. In countries where e-cigarette use is not regulated, some people use e-cigarettes in places or circumstances where smoking is prohibited, thereby circumventing smoking regulation.^{6,9} In this case, it can be seen that e-cigarettes can be used to sustain smoking habits as opposed to reducing smoking. Thus, the regulatory environment plays a part in influencing youths' perceptions and smoking-related behaviours.^{5,9,20}

Although e-cigarette users in this study were young adults, many of them reported having started using e-cigarettes when they were still in high school and under the age of eighteen. The use of e-cigarettes by minors reflects the ease with which they are accessed, especially in a country with no legislation that regulates the distribution, sale and use of e-cigarettes. Most e-cigarette brands used by participants have no age restriction and this was also cited as an advantage of an e-cigarette over a combustible cigarette. Lack of e-cigarette regulation is not only exploited by minors or marketers through selling these products to minors but also play a role in shaping participants' perception of these products. Some participants perceived the lack of e-cigarette regulation as an indicator of harmlessness as they argued that if e-cigarettes were harmful, they would have been regulated just like tobacco or any other drugs. While the lack of e-cigarette regulation stems from the fact that such products are still new and their effects are yet to be fully understood, it is interpreted as an indicator of e-cigarettes being harmless.²⁰ Coupled with poor regulation, e-cigarette flavours and portability may also promote use by minors as they find it easier to hide from their parents and elders.

Furthermore, e-cigarettes are generally more expensive than tobacco cigarettes and some participants described them as classy because of their high costs. The selling of second-hand e-cigarette devices help some users to avoid paying higher prices associated with new products. Second-hand e-cigarette devices are advertised and sold at a cheaper price by individuals online or through social networks. Some participants reported using second-hand devices because were attracted by their 'coolness' or 'classiness' but could not afford new ones. Perhaps looking 'cool' or 'classy' helps them to boost their self-esteem or to fit into certain class categories such as 'middle class'. In the study by Hess et al, e-cigarette use was seen as representing a white, middle-class, hipster social identity and e-cigarette users were described as hipsters who want to look cool.²¹ In this study, e-cigarettes were perceived as a symbol of aspirational wealthy and social standing to the young people. Those who do not afford new e-cigarette devices opt to buy secondhand ones, not for cessation or health-related reasons but perhaps to be considered as fashionable or belonging to the high social class.

The use of secondhand products also provided an entrepreneurial opportunity for young people who are involved in the buying and selling of second-hand products. There is a virtual and actual social network around the purchase of second-hand devices, news about e-cigarettes, information and risks. Such connections make young people feel as part of a small community for not only users but also for prospective users to learn about e-cigarettes. Social media and informal conversations with friends, relatives or strangers function not only as a source of information but provide an opportunity for people to sell and purchase their products. Social networks and informal conversations play an important role in closing the gaps that result from a lack of understanding about the longer-term effects of e-cigarettes.⁴ The marketing and use of second-hand products may, however, make it difficult for users to get adequate and authentic information about these products because unlike new products, most secondhand products come without boxes and manuals that carry detailed instructions and warnings. In addition, selling of second-hand devices and counterfeit liquids might not only pose a challenge to the regulatory environment but may also present a different public health challenge.

STRENGTHS AND LIMITATIONS

These results are based on a qualitative study conducted at the University of Cape Town, so they cannot be generalized. The sample size for this study was relatively small and thus the results do not represent the opinions and experiences of all University of Cape Town students. Likewise, the results also do not represent the perspectives of all young adults, particularly those who have not attended a tertiary education institution. However, despite these limitations, this study provided an opportunity to explore young adults' experiences and perceptions, information which is currently lacking in a context where long-term health effects of e-cigarettes are not known, and the regulatory environment is poor. The study helped to explore new information from the participants' point of views, shedding light on the kind of perspectives that exist within young, often educated adults about e-cigarette use. Although generalizable, the results from this study are transferable. Unlike generalizability which encompasses broad claims, transferability invites readers to make connections between aspects of the research and their own experiences.²² A detailed description of the study context and methods helps readers to make an informed judgement and determine which aspects of this research can be transferred to their own situations.

RECOMMENDATIONS

As a result of this study, the following recommendations have been made:

1. For precautionary reasons, the marketing, sale and use of e-cigarettes should be regulated under the Tobacco Products Control Amendment Act²³ that is currently under consideration. Classifying e-cigarettes as tobacco-related products will not only help to reduce the use of e-cigarettes in areas where smoking is prohibited and reduce e-cigarette use by minors but may also alter the perception that these products are safe.
2. Increase e-cigarette awareness especially through utilizing platforms such as social media where young people access information. This can be done by blogging more information on social media platforms in ways that are easy to understand. E-cigarette awareness can help to challenge the misperception that good smell is an indicator of safety or translates into good health.

3. E-cigarette education and information should also be provided in schools to avoid situations where young people start using these products without knowing the potential risks and challenges in the regulatory environment.
4. The study, of course, raises further questions and directs areas for further research. The extent to which e-cigarettes promote tobacco use or dual-use remains unknown. Further research should also focus on the regulatory and public health challenges of second-hand and counterfeit e-cigarette marketing and use in South Africa. The safety of the accessories and ingredients used to make counterfeit products is questionable and this might present a challenge to both public health and the regulatory environment.

CONCLUSION

This study is one of the first in South Africa to explore attitudes and perceptions of e-cigarettes in South Africa. It, therefore, contributes to the current dearth of research in this area, albeit it was based on a small sample size and may not necessarily be representative. From this study, it can be concluded that e-cigarettes are perceived as healthier or safer than tobacco cigarettes even though many people have little/ no knowledge about their chemical constituents. E-cigarette appeals and flavours do not only attract young people, but they also play a role in shaping people's perception of the risk these products pose, where the pleasant smell is associated with health and safety while the bad smell is associated with danger. The study also found that social acceptability of e-cigarettes may promote the circumvention of smoking regulations and this has implications for passive smokers being exposed to e-cigarettes and accepting it. The safety of the accessories and ingredients used to make counterfeit products is questionable and this might present a challenge to both public health and the regulatory environment.

Acknowledgements

This article acknowledges the contribution of Mr Nafees Floris, who helped in the participant recruitment process.

Competing interests

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

Author contributions

P. Mhazo formulated the research question, research design, data collection and analysis and drafted the initial manuscript. A. Swartz and M. Wallace supervised the work throughout the whole process. All authors reviewed and contributed to the final manuscript.

Funding

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Disclaimer

The views expressed in this article are the authors' own views and not an official position of the University of Cape Town or Cancer Association of South Africa.

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PART D: APPENDICES

APPENDIX 1: Consent Form for Individual Interview

This consent form is divided into two sections. The first section is the information sheet and the second section is an informed consent. Please read carefully and make sure you understand everything before signing the consent form. If there is something that you do not understand, please ask the investigator for clarification.

Principle investigator: Mr Pakhani Mhazo
Co-investigators: Dr Alison Swartz, Dr Melissa Wallace
Name of organization(s): University of Cape Town (UCT) & Cancer Association of South Africa (CANSA).
Name of project: *Knowledge, Perceptions and Attitudes of Young Adults Towards Electronic-Cigarettes*
Study site: University of Cape Town

SECTION 1: INFORMATION SHEET

Introduction

Electronic cigarettes are gaining popularity in terms of use in South Africa and the world in general. Studies in the United States have found that the prevalence of electronic cigarette use is higher among young adults (US Department of Health and Human Services: 2016). The products are being marketed as an aid to smoking cessation or an alternative to tobacco smoking. However, little research has been done to explore young adults' knowledge and perceptions around the use of electronic cigarettes, especially in the South African context.

Purpose of the research

The purpose of this study is to understand how you perceive electronic cigarettes and explore your experiences in relation to e-cigarette use. We would like to explore your understanding of the difference between electronic cigarettes and traditional tobacco cigarettes in terms of their health effects. We also want to explore the different sources from which you draw information about the risks and benefits of electronic cigarettes. We would also like to understand how you perceive the presentation of e-cigarettes in media, research and marketing and what you think about electronic cigarette regulation in South Africa.

Voluntary participation

Participating in this study is voluntary. If you do not want to participate in this study, you do not have to. If you want to withdraw from the study, you are free to do so without having to provide any reasons. Refusing to participate or withdrawing from the study will not affect your relationship with the researchers, the University of Cape Town or CANSA in any way.

Procedures

You are invited to participate in an **individual interview**, which will be conducted by the co-investigators at _____ (place). If you choose to participate, the co-investigator will tell you about your role in the study. Your participation will be particularly important in this study as it gives us an opportunity to explore young adults' knowledge and perceptions about electronic cigarettes. The interview will be conducted in English. Each interview will take approximately 45 minutes to an hour. The interview begins with a brief explanation of the study. During the interview, you will be asked to share your own views, opinions and experiences with regards to e-cigarette use. However, please note that you are not obliged to share any information that you are not comfortable sharing. At the end of the interview, the researcher will give you an opportunity to ask any questions that you might have. The interview will be tape-recorded, but you will not be identified on the tape. The tape will be kept in a safe and secure closet. The information recorded is private. Only the researchers and transcribers will have access to the interview recordings. The tapes will be destroyed soon after transcription has completed

Risks

There is no direct risk to participants associated with this study. However, participants may experience potential changes in the thought process or some feeling of guilt or embarrassment that may arise from talking about one's own behaviours and attitudes toward e-cigarette use. If that happens to you, you will be referred to the appropriate professionals for counselling services.

Benefits

There is no 'direct' benefit to participants for participating in the study. However, the information collected will help us to understand the knowledge and perceptions of young adults about electronic cigarettes. This might help to provide insights into how different, well-targeted public health interventions could be designed. The results from this study will also be used by the Cancer Association of South Africa to inform messaging in their health campaigns, and possibly to inform further research.

Reimbursements

You will be reimbursed for your travel, time and participation in this study. Snacks will also be provided during the interview/ focus group discussion.

Confidentiality & anonymity

The information that you share during the interview will be kept private. All information collected will be kept safe in the closet and on password-protected computers. The information will not be shared or discussed with anyone other than members of the research team. However,

the Research Ethics Committees may inspect the research records if required. To protect the participants' identity, pseudonyms will be used to represent the participants' names.

Right to refuse or withdraw

You have a right to refuse or withdraw from this study at any stage if you wish. No justification or explanation will be required for withdrawing from the study. Refusing to participate or withdrawing from the study will not affect your relationship with the researchers, the University of Cape Town or CANSA in any way. You can also ask the researcher to change or remove parts of the information if you feel that he has not understood you correctly.

Who to contact?

If you have any questions or concerns at any point during the study, you may contact either the UCT Research Ethics Committee (021 406 6492), Pakhani Mhazo (0764284164) or Dr Alison Swartz (Alison.swartz@uct.ac.za)

This proposal has been reviewed and approved by the University of Cape Town Human Research Ethics Committee, which is responsible for making sure that participants in the study are safe from harm.

You are free to ask any questions about the study if you wish to.

PART 2: INFORMED CONSENT

I _____ have been invited to participate in research study, knowledge, perceptions and attitudes towards electronic cigarettes. I have read the information sheet, or it has been read to me. I have been given the chance to ask questions about the study, and any questions that I have asked, have been answered. I consent voluntarily to participate in this study.

Print name of participant: _____

Signature of participant: _____

Date: _____

APPENDIX 2: Consent Form for Focus Group Discussions

This consent form is divided into two sections. The first section is the information sheet and the second section is an informed consent. Please read carefully and make sure you understand everything before signing the consent form. If there is something that you do not understand, please ask the investigator for clarification.

Principle investigator: Mr Pakhani Mhazo
Co-investigator: Dr Alison Swartz, Dr Melissa Wallace
Name of organization(s): University of Cape Town (UCT) & Cancer Association of South Africa (CANSA).
Name of project: *Knowledge, Perceptions and Attitudes of Young Adults Towards Electronic-Cigarettes*
Study site: University of Cape Town

SECTION 1: INFORMATION SHEET

Introduction

Electronic cigarettes are gaining popularity in terms of use in South Africa and the world in general. Studies in the United States have found that the prevalence of electronic cigarette use is higher among young adults (US Department of Health and Human Services: 2016). The products are being marketed as an aid to smoking cessation or an alternative to tobacco smoking. However, little research has been done to explore young adults' knowledge and perceptions around the use of electronic cigarettes, especially in the South African context.

Purpose of the research

The purpose of this study is to explore or find out how you perceive electronic cigarettes. We would like to find out what you think is the difference between electronic cigarettes and traditional tobacco cigarettes in terms of their health effects and explore your experiences in relation to electronic cigarette use. We also want to explore the different sources from which you draw information about the risks and benefits of electronic cigarettes. We would also like to understand how you perceive the presentation of e-cigarettes in media, research and marketing and what you think about electronic cigarette regulation in South Africa.

Voluntary participation

Participating in this study is voluntary. If you do not want to participate in this study, you do not have to. If you want to withdraw from the study, you are free to do so without having to provide any reasons. Refusing to participate or withdrawing from the study will not affect your relationship with the researchers, the University of Cape Town or CANSA in any way.

Procedures

You are invited to participate in a **focus group discussion**, which will be conducted by the co-investigators at _____ (place). If you choose to participate, the investigator will tell you about your role in the study. Your participation will be particularly important in this study as it gives us an opportunity to explore young adults' knowledge and perceptions about electronic cigarettes. The focus group discussion will be facilitated by the investigator in the English language. The duration of the focus group discussion will be around 50 minutes to an hour. Each focus group will have a maximum of 12 participants who are either electronic cigarette users or non-users. The focus group discussion begins with a brief explanation of the study. During the focus group discussion, you will be asked to share your own views, knowledge and opinions about e-cigarettes. However, please note that you are not obliged to share any information that you are not comfortable sharing. At the end of the focus group discussion, the researcher will give you an opportunity to ask any questions that you might have. The discussion will be tape-recorded, but you will not be identified on the tape. The tape will be kept in a safe and secure closet. The information recorded is private. Only the researchers and transcribers will have access to the recordings. The tapes will be destroyed soon after transcription has completed.

Risks

There is no direct risk to participants associated with this study. However, participants may experience potential changes in the thought process or some feeling of guilt or embarrassment that may arise from talking about one's own behaviours and attitudes toward e-cigarette use. If that happens to you, you will be referred to the appropriate professionals for counselling services

Benefits

There is no 'direct' benefit to participants for participating in the study. However, the information collected will help us to understand the knowledge and perceptions of young adults about electronic cigarettes. This might help to provide insights into how different, well-targeted public health interventions could be designed. The results from this study will also be used by the Cancer Association of South Africa to inform messaging in their health campaigns, and possibly to inform further research.

Reimbursements

You will be reimbursed for your travel, time and participation in this study. Snacks will also be provided during the interview/ focus group discussion.

Confidentiality & anonymity

The information that you share during the focus group discussion will be kept private. All information collected will be kept safe in the closet and on password-protected computers. When the results of the study become available, your name in the focus group discussion will not be mentioned in the report. However, The Research Ethics Committees may inspect the research records if required.

Please note: If you agree to take part in the focus group discussion, you are asked to keep any information that is shared in the group private and not to share this with anyone outside of the group. It is worth knowing, however, that we cannot stop or prevent participants in the focus group from sharing information that should be private. We will respect the confidentiality of the participants by not revealing their personal information to third parties.

Right to refuse or withdraw

You have a right to refuse or withdraw from the study at any stage if you wish. No justification or explanation will be required for withdrawing from the study. Refusing to participate or withdrawing from the study will not affect your relationship with the researchers, the University of Cape Town or CANSa in any way. You can also ask the researcher to change or remove parts of the information if you feel that he has not understood you correctly.

Who to contact?

If you have any questions or concerns at any point during or after the study, you may contact either the UCT Research Ethics Committee (021 406 6492), Pakhani Mhazo (0764284164) or Dr Alison Swartz (Alison.swartz@uct.ac.za)

This proposal has been reviewed and approved by the University of Cape Town Human Research Ethics Committee, which is responsible for making sure that participants in the study are safe from harm.

You are free to ask any questions about the study if you wish to.

PART 2: INFORMED CONSENT

I _____ have been invited to participate in research study, knowledge, perceptions and attitudes towards electronic cigarettes. I have read the information sheet, or it has been read to me. I have had the chance to ask questions about the study, and any questions that I have asked, have been answered. I consent voluntarily to be a participant in this study.

Print name of participant: _____

Signature of participant: _____

Date: _____

APPENDIX 3: Focus Group Guide

The purpose of this guide is to help the interviewer to keep track of the important issues that need to be discussed. The questions can be asked in any order and the interviewer is encouraged to probe further from the listed questions.

Section A: Knowledge and perceptions toward e-cigarette

1. What do you know about electronic cigarettes?
2. Where did you first hear or learn about electronic cigarettes?
3. Do you think there a difference between electronic cigarettes and traditional cigarettes, why?
4. What do you think are the health effects of e-cigarettes compared to traditional cigarettes?
5. What do you think is the effect of electronic cigarettes to bystanders? Why?
6. What sources do you get information about electronic cigarettes from?
7. Do you trust the sources from which you draw information about electronic cigarettes? Why?
8. Do you recommend the use of electronic cigarettes instead of traditional cigarettes? Why?
9. What factors do you think influence the use of electronic cigarettes in SA?
10. Do you have any concerns about e-cigarette marketing and use in SA? If yes, what are they?
11. What are your thoughts on e-cigarette regulation in South Africa?
12. Do you think e-cigarette sale, marketing and use should be regulated in SA? Why?

APPENDIX 4: Interview Guide

The purpose of this guide is to help the interviewer to keep track of the important issues that need to be discussed. The questions can be asked in any order and the interviewer is encouraged to probe further from the listed questions.

Section A: Perceptions and experiences of e-cigarette use

1. Please tell me about yourself.
2. What do you know about e-cigarettes?
3. When did you first hear about e-cigarettes?
4. When did you start using e-cigarettes?
5. What were the main reasons why decided to use e-cigarettes?
6. Where do you buy your electronic cigarettes?
7. Do your family and friends support your decision to use electronic cigarettes? Why?
8. How do you feel about using e-cigarettes?
9. What do you think are the health effects of electronic cigarettes on both users and bystanders?
10. Which one do you think is better between e-cigarette and tobacco cigarette? Why?
11. What do you think about e-cigarettes and tobacco cigarette dual use?
12. What sources do you get information about e-cigarettes from?
13. Do you trust the sources that provide you with information? Why?
14. Do you think electronic cigarettes can be used indoors or in public spaces? Why?
15. Does e-cigarette help you to cope with nicotine addiction?
16. What are your thoughts on e-cigarette marketing and use in SA?
17. How do you perceive the presentation of e-cigarettes in the media?
18. Do you have any concerns about the way e-cigarettes are presented in the media?
19. What are your thoughts on e-cigarette regulation in SA?
20. Do you recommend other young adults to use e-cigarettes instead of traditional cigarettes? Why?

APPENDIX 5: Ethics Approval Letter



UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee



Room E53-46 Old Main Building
Groote Schuur Hospital
Observatory 7921
Telephone [021] 406 6624
Email: shuretta.thomas@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

07 November 2018

HREC REF: 532/2018

Dr Allison Swartz
Social and Behavioural Sciences
Public Health & Family Medicine
Falmouth Building

Dear Dr Swartz

PROJECT TITLE: KNOWLEDGE, PERCEPTIONS AND ATTITUDES OF YOUNG ADULTS TOWARDS ELECTRONIC-CIGARETTES (Masters candidate - Mr P Mhazo)

Thank you for submitting your response to the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

Approval is granted for one year until the 30 November 2019.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

Please quote the HREC REF in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

The HREC acknowledges that the student, Mr P Mhazo will also be involved in this study.

Yours sincerely

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE

Federal Wide Assurance Number: FWA00001637.

Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical

HREC 532/2018

Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2006), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines.
The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

APPENDIX 6- Cover Letter for Journal Submission

Full title: Knowledge, Perceptions and Attitudes of Young Adults Towards Electronic-Cigarettes

Tweet for the journal Twitter profile: Pleasant smell from electronic cigarettes mask the risks associated with these products. Twitter name: Pakhani Mhazo (@Pakhs3)

Full author details:

- 1. Name:** Mr Pakhani Mhazo, **Affiliations:** School of Public Health and Family Medicine, University of Cape Town and University of Cape Town Knowledge Co-op. **Position:** MPH Candidate. **Highest academic degree:** BSc Honours. **Email:** pakhanim@gmail.com **Cell:** +27 764284164.
- 2. Name:** Dr Alison Swartz, **Affiliations:** School of Public Health and Family Medicine, University of Cape Town. **Position:** Lecturer. **Highest academic degree:** PhD. **Email:** alison.swartz@uct.ac.za
- 3. Name:** Dr Melissa Wallace **Affiliations:** Cancer Association of South Africa, Cape Town. **Position:** Head of research. **Highest academic degree:** PhD. **Email:** mwallace@cansa.org.za.

Corresponding author: Pakhani Mhazo

Authors' contributions:

- 1. Pakhani Mhazo:** Formulated the research question, research design, data collection, analysis and drafted the initial manuscript. Integrated the comments from the co-authors to produce the final manuscript.
- 2. Alison Swartz:** Supervised the whole process, providing guidance and recommendations. Reviewed the initial and final drafts of the manuscript.
- 3. Melissa Wallace:** Was the co-supervisor and provided guidance and recommendations throughout the study. Reviewed the initial and final drafts of the manuscripts.

Disclaimer: The views expressed in the submitted article are the authors' own and not an official position of the University of Cape Town or Cancer Association of South Africa.

Source(s) of support: This study was funded by the Cancer Association of South Africa. The study also received support from the UCT Knowledge Co-op Scholarship.

Summary:

1. Number of words: 6310 (excluding abstract and references)
2. Number of pages: 20 (including abstract and references)
3. Number of tables: 1
4. Number of figures: 0
5. Supplementary material: Ethics approval letter.

APPENDIX 7- Journal Submission Guidelines

Cover Letter

The format of the compulsory cover letter forms part of your submission. It is located on the first page of your manuscript and should always be presented in English. You should provide the following elements:

- Full title: Specific, descriptive, concise, and comprehensible to readers outside the field, max 95 characters (including spaces).
- Tweet for the journal Twitter profile: This will be used on the journal Twitter profile to promote your published article. Max 101 characters (including spaces). If you have a Twitter profile, please provide us your Twitter @ name. We will tag you to the Tweet
- Full author details: The title(s), full name(s), position(s), affiliation(s) and contact details (postal address, email, telephone, highest academic degree, Open Researcher and Contributor Identification (ORCID) and cell phone number) of each author.
- Corresponding author: Identify to whom all correspondence should be addressed.
- Authors' contributions: Briefly summarise the nature of the contribution made by each of the authors listed.
- Disclaimer: A statement that the views expressed in the submitted article are his or her own and not an official position of the institution or funder.
- Source(s) of support: These include grants, equipment, drugs, and/or other support that facilitated conduct of the work described in the article or the writing of the article itself.
- Summary: Lastly, a list containing the number of words, pages, tables, figures and/or other supplementary material should accompany the submission.

Anyone that has made a significant contribution to the research and the paper must be listed as an author in your cover letter. Contributions that fall short of meeting the criteria as stipulated in our policy should rather be mentioned in the 'Acknowledgements' section of the manuscript. Read our [authorship](#) guidelines and **author contribution** statement policies.

Original Research Article full structure

Title: The article's full title should contain a maximum of 95 characters (including spaces).

Abstract: The abstract, written in English, should be no longer than 250 words and must be written in the past tense. The abstract should give a succinct account of the objectives, methods, results and significance of the matter. The structured abstract for an Original Research article should consist of six paragraphs labelled Background, Aim, Setting, Methods, Results and Conclusion.

- Background: Summarise the social value (importance, relevance) and scientific value (knowledge gap) that your study addresses.
- Aim: State the overall aim of the study.
- Setting: State the setting for the study.
- Methods: Clearly express the basic design of the study, and name or briefly describe the methods used without going into excessive detail.

- Results: State the main findings.
- Conclusion: State your conclusion and any key implications or recommendations.

Do not cite references and do not use abbreviations excessively in the abstract.

Introduction: The introduction must contain your argument for the social and scientific value of the study, as well as the aim and objectives:

- Social value: The first part of the introduction should make a clear and logical argument for the importance or relevance of the study. Your argument should be supported by use of evidence from the literature.
- Scientific value: The second part of the introduction should make a clear and logical argument for the originality of the study. This should include a summary of what is already known about the research question or specific topic, and should clarify the knowledge gap that this study will address. Your argument should be supported by use of evidence from the literature.
- Conceptual framework: In some research articles it will also be important to describe the underlying theoretical basis for the research and how these theories are linked together in a conceptual framework. The theoretical evidence used to construct the conceptual framework should be referenced from the literature.
- Aim and objectives: The introduction should conclude with a clear summary of the aim and objectives of this study.

Research methods and design: This must address the following:

- Study design: An outline of the type of study design.
- Setting: A description of the setting for the study; for example, the type of community from which the participants came or the nature of the health system and services in which the study is conducted.
- Study population and sampling strategy: Describe the study population and any inclusion or exclusion criteria. Describe the intended sample size and your sample size calculation or justification. Describe the sampling strategy used. Describe in practical terms how this was implemented.
- Intervention (if appropriate): If there were intervention and comparison groups, describe the intervention in detail and what happened to the comparison groups.
- Data collection: Define the data collection tools that were used and their validity. Describe in practical terms how data were collected and any key issues involved, e.g. language barriers.
- Data analysis: Describe how data were captured, checked and cleaned. Describe the analysis process, for example, the statistical tests used or steps followed in qualitative data analysis.
- Ethical considerations: Approval must have been obtained for all studies from the author's institution or other relevant ethics committee and the institution's name and permit numbers should be stated here.

Results: Present the results of your study in a logical sequence that addresses the aim and objectives of your study. Use tables and figures as required to present your findings. Use quotations as required to establish your interpretation of qualitative data. All units should conform to the [SI convention](#) and be abbreviated accordingly. Metric units and their international symbols are used throughout, as is the decimal point (not the decimal comma).

Discussion: The discussion section should address the following four elements:

- Key findings: Summarise the key findings without reiterating details of the results.
- Discussion of key findings: Explain how the key findings relate to previous research or to existing knowledge, practice or policy.
- Strengths and limitations: Describe the strengths and limitations of your methods and what the reader should take into account when interpreting your results.
- Implications or recommendations: State the implications of your study or recommendations for future research (questions that remain unanswered), policy or practice. Make sure that the recommendations flow directly from your findings.

Conclusion: Provide a brief conclusion that summarises the results and their meaning or significance in relation to each objective of the study.

Acknowledgements: Those who contributed to the work but do not meet our authorship criteria should be listed in the Acknowledgments with a description of the contribution. Authors are responsible for ensuring that anyone named in the Acknowledgments agrees to be named.

Also provide the following, each under their own heading:

- **Competing interests:** This section should list specific competing interests associated with any of the authors. If authors declare that no competing interests exist, the article will include a statement to this effect: *The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.* Read our [policy on competing interests](#).
- **Author contributions:** All authors must meet the criteria for authorship as outlined in the **authorship** policy and **author contribution** statement policies.
- **Funding:** Provide information on funding if relevant
- **Disclaimer:** A statement that the views expressed in the submitted article are his or her own and not an official position of the institution or funder.

References: Authors should provide direct references to original research sources whenever possible. References should not be used by authors, editors, or peer reviewers to promote self-interests. Refer to the journal referencing style downloadable on our *Formatting Requirements* page.

Word limit	3500-7000 words (excluding the structured abstract and references)
Structured abstract	250 words to cover a Background, Aim, Setting, Methods, Results and Conclusion
References	60 or less
Tables/Figures	no more than 7 Tables/Figure
Ethical statement	should be included in the manuscript
Compulsory supplementary file	ethical clearance letter/certificate
Language	only manuscripts presented in English or French will be considered