Exploring the Experiences of Electronic Cigarette Users and Their Previous Attempts to Quit Smoking

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Thesis and Systematic Review

This thesis has been written as part of the researchers Professional Doctorate in Health Psychology. The focus is exploring the experiences of electronic cigarette (EC) users who have also attempted to quit smoking in the past, either with no support or using NHS recommended interventions, prior to their most recent attempt using an EC.

One requirement of the Doctorate was to complete a systematic literature review. The title of which was 'the effectiveness of electronic cigarettes compared with recommended alternative methods for smoking cessation: a systematic literature review'. The aim of this review was to evaluate the effectiveness of EC's in supporting smokers to quit smoking compared with well-established NHS recommended smoking cessation quit aids; Nicotine Replacement Therapy (NRT), Prescription only Medication (POM), behavioural support or a combination of NRT or POM and behavioural support. The review found evidence that ECs were more effective for achieving smoking abstinence compared with NHS recommended quit aids. However, wide confidence intervals, only two studies being included and a lack of one consistent measure of abstinence meant that further research was required to develop a more definitive conclusion. A copy of this review is in appendix 1.

Following the completion of this systematic literature review, the plan was to build on its findings, and explore with EC users, who were accessing a Stop Smoking Service (SSS) for support, *why* they had chosen to use an EC as opposed to NRT or POM as an aid to quitting. However, continuing to appraise the available literature and conversing with experts in the field, the researcher came to realise that this focus would not contribute to the evidence base like they once thought. Instead, the focus shifted from only focusing on *why* ECs were the preferred quit aid, to exploring and understanding participant's experiences of quitting using an EC and how this compared with their previous attempts to quit using NHS recommended interventions. This

meant that although the systematic literature review contributed to the underpinnings of this thesis, it did not share the same distinct aim.

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Methods: 5299

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Abstract

The aim of this research was to explore the experiences of EC users; their reasons for using an EC and how their most recent attempt to quit compared to any previous attempts they had made that were unsuccessful. These previous attempts included going alone with no support, or using NHS recommended interventions such as NRT, POM or accessing an NHS SSS. Semi-structured interviews were carried out with a total 7 participants; 3 women and 4 men. Interviews were analysed using content analysis and three main themes were identified; Quit Triggers, Safely Satisfied and Modern Quitting. The results of this research illustrated that motivations for quitting remain unique to each individual, ECs provide a de-medicalised approach to quitting and worked because they provided a satisfying replacement to cigarettes that no other products or support were able to offer. As well as this the long-term quitting goal of participants was remaining abstinent from smoking cigarettes and not to stop using nicotine altogether.

Introduction

Smoking: A Public Health Issue

Tobacco kills up to half of its users and its continuing epidemic remains one of the world's biggest public health threats (WHO, 2020). Worldwide, smoking remains one of the highest causes of avoidable and preventable premature death, and kills more than seven million people per year; more than six million of which are a direct result of tobacco use and just under one million are because of second hand smoking (WHO, 2020). In the UK alone, there are still around 100,000 deaths per year that are attributable to smoking (ONS, 2019), and based on estimates from the latest Annual Population Survey, 14.1% of people (around 7.4 million people) aged 18 or over still smoke (ONS, 2019).

As well as the devastating effects smoking has on people's lives, it costs the UK taxpayer an estimated £12.5billion per year (ASH, 2020), with NHS healthcare costs hitting circa £2.4billion per year. It's not just the cost to the NHS, the remaining £10.1billion pays for loss of productivity due to premature deaths, smoking related sickness and breaks, as well as social care costs arising from additional care and support needs due to disease and disability caused by smoking. There are also significant environmental costs of smoking that range from clearing cigarette butts off the streets to the emissions of carbon dioxide and methane that tobacco smoke directly leads to, which equates to 2.6million and 5.2million tones respectively worldwide (WHO, 2015).

Reducing smoking prevalence: a public health priority

The role of Public Health is to protect and improve the nation's health and well-being whilst also reducing health inequalities (Public Health Wales, 2022). Smoking is the leading cause of preventable morbidity and mortality, as well as one of the leading causes of health inequalities in the UK. Preventing smoking and helping smokers to quit therefore remains a Public Health priority across all parts of the UK and worldwide.

Health inequalities are the avoidable differences in the health outcomes of different groups within a population (NHS Scotland, 2014). People who have lower incomes are more likely to smoke, experience poorer health outcomes and/or die earlier compared with those who have higher ones (Wighton, 2018). Latest life expectancy at birth data tells us that across England and Wales, a 'north-south' difference still exists; life expectancy is generally lower in the north than in the south, and this is in line with smoking rates; overall they are higher in the north than in the south (ONS, 2019). The reasons why people are more likely to smoke if they live and exist in areas of higher deprivation are far reaching, and include factors such as poorer access to healthcare, lower education opportunity and attainment, and lower employment opportunities (ONS, 2018). Access to pleasure amongst many smokers in this situation is scarce, and so smoking fills this void; especially given the past two years of uncertainty during the COVID-19 pandemic when pleasures were made even scarcer (Cox, 2020).

A strong public health system not only strives to achieve better health for all and reduce inequalities, but interventions to reduce poor health outcomes because of unhealthy behaviours like smoking should be linked closely to policy and a robust understanding of what interventions are most effective to prevent people starting to smoke and to support smokers to quit (Buck and Frosini, 2012).

Smoking initiation

Why people start to smoke is usually driven by psychosocial motives, and trying cigarettes for the first time usually occurs in early teenage years (Jarvis, 2004), with children whose parents smoke being four times as likely to take up smoking (Department of Health and Social Care, 2021). Vuolo and Staff (2013) in their longitudinal, multigenerational study looking at how parents' smoking trajectories were associated with their children's likelihood of smoking, concluded that children of current and/or former smokers were at a significantly higher risk of smoking themselves

than children whose parents didn't smoke. A family is more often than not the primary underpinning by which social, cultural, genetic and biological factors that underpin individual differences in taking up and continuing to smoke exist (Avenevoli and Merikangas, 2003). Smoking often continues to be transmitted from one generation to the next by parents easing access to tobacco products, the imitation of parents smoking behaviours by role modelling and shared genetic traits such as their individual response to nicotine (Bantle et al, 2002; Munafo & Johnstone, 2008).

Having regular contact with smokers, particularly living in the same home, provides a regular role model smoker and as such is a strong determinant risk factor to smoking uptake. Leonardi-Bee et al (2011) added to this the increased risk of sibling smoking, concluding that both parental and sibling smoking are a strong and significant determinant of the risk of smoking uptake amongst children and young people. This idea of parental role modelling contributing to the significant increase in the risk of children taking up smoking is cited in the literature time and time again (Alves et al, 2017; Wiium et al, 2004). Role modelling has also been evidenced when focusing on the influence of peers who are not family members. What researchers have found when examining the relationships between peer influences and the risk of taking up smoking is that it is not the encouragement or pressure to smoke from peers that was the highest risk factor, but instead the passive influence of role modelling and imitation that was the significant risk factor (Harakeh and Vollebergh, 2012; Antonuccio and Lichestein, 1980).

One of the most well-known theories to underpin the idea of role modelling and imitation is Badura (1977) in their Social Learning Theory, which suggests that individuals observe and imitate the behaviours of others that deliberately lead to positive rewards. These positive rewards can include feeling a sense of belonging or acceptance to a group, or being liked by relevant individuals. As well as these social rewards,

addictive substances like nicotine are physically rewarding. Unfortunately for those who begin to smoke for reasons such as having smoking parents, the aversion of the first few attempts is tolerated to achieve their motivation, e.g., a desired image, being accepted by their peers or to successfully mimic the behaviour of their parents. After which time the pharmacological component of smoking (nicotine) supports the addiction to be sustained due to the pervasive effects nicotine has on the brain and the subsequent negative withdrawal symptoms that smokers feel if they try to stop (Jarvis, 2004). Nicotine activates parts of the brain that regulates feelings of pleasure; positively reinforcing the smoking behaviour. This idea of smoking behaviour being reinforced or controlled by its outcomes (in the case of a smoker this is initially positive social and physical rewards), can be linked to operant conditioning (Skinner, 1937). Operant conditioning is a behaviour "controlled by its consequences" (Skinner, 1937), and what many people now term a habit; something that can be repeated easily, particularly when the same schedule that leads to the reward is repeated (Staddon and Cerutti, 2002).

In the context of public health, social learning theory (Bandura, 1977) and the concept of role modelling can be considered pertinent when considering how to reduce inequalities in the health of a population. Alves et al (2017) investigated whether the association between parent and adult smoking contributed to inequalities in adolescent smoking by carrying out a cross-sectional survey in six European cities. They found that although susceptibility to parental smoking was similar across social classes, the association between parent and child smoking behvaiour contributed to inequalities. This is because the prevalence of parental smoking is greater among the worse-off. Smoking behvaiour that starts in adolescence usually persists through the life of the individual which further compounds the ongoing intergenerational cycle of addiction to smoking, and tobacco related disease and mortality (Jarvis, 2004).

Smoking addiction theory

Smoking, and understanding why people continue to do it knowing it's actively damaging their health and/or making them poorer, is complex. Whilst there is not one theory or definition that encompasses all aspects of addiction or is harmoniously agreed collectively by all experts in the field, there is a robust evidence base that services can use to inform interventions and that researchers can continue to build on.

"People smoke for nicotine but they die from the tar" (Russell, 1976, p.1431). Decades of research that underpins a now well-established evidence base supports the accuracy in this statement. The serious harms caused by smoking combusted tobacco is widely known and accepted, but the physical addiction to nicotine is one reasons that keeps smokers smoking. Smoked tobacco delivers nicotine almost immediately after a smoker inhales, and inhaling shares almost the same efficiency as intravenous delivery (Mello et al, 2015). This enables nicotine to reach the brain in as quickly as 5-10 seconds. Once a smoker finishes a cigarette, they quickly begin to crave another and experience withdrawal symptoms such as feeling anxious, stressed, irritable and/or down (Benowitz, 2010), and so the cycle continues. However, if nicotine was the only thing that kept smokers smoking, surely less harmful means of delivering nicotine would be adopted and the public health epidemic would be solved? Like with any health harming behaviour it's not that simple, and the reasons why people continue to smoke are complex and much more than just nicotine addiction. Understanding addiction means understanding human behaviour its many facets, and their implications.

Firstly, defining addiction is hard. This is because it is not a concrete object, but instead is socially defined with no objective existence and boundaries that can be uniquely identified (West, 2006). Addiction has been the subject of much debate and its origin referred to as being 'highly devoted' to a person or activity (Alexander and Schweighofer, 1998) or engaging habitually in a behaviour that potentially has positive or

negative implications (Levine, 1978). Since then, many have continued to try and define addiction. Heather (1998) suggested that addiction was the repeated failures to refrain from drug use, and the American Psychiatric Association more recently in 2017 defined it as a complex condition and brain disease that is manifested by compulsive substance use despite the harmful consequences. Smoking is a complex one that is influenced by a wide range of factors including the physical addiction to nicotine, psychological factors such as motives and impulses, and the sensory factors of the behaviour itself (West, 2006). For smokers who continue to smoke it is important to determine how they can be best supported to quit by fully understanding these facets and what motivates them to keep smoking.

To define addiction alone, and describe *what* it is, is meaningless without theory that attempts to understand *why* it happens. Over time the understanding of why people become addicted has grown and augmented, giving way to a wide variety of addiction theory. Earlier theories such as the moral model suggests that addicts are solely responsible for acquiring their addiction and for resolving it, and those who become addicts are morally weak with faulty values (Peele, 1987). There is little support for this type of theory in the scientific literature, as is the case with philosophical based models such as enlightenment, that suggests an individual who is addicted is responsible for creating the problem but not solving it. Solving it can be done by following the guidance and direction of a greater authority and often involves an intense spiritual journey (Green et al, 1998). Due to the lack of robust scientific research in this area both such models are often disregarded. Although this continues to eb the case some researchers have reported that amongst those recovering from addiction, higher levels of religious faith and spirituality have been associated with more optimistic life orientation and higher resilience to stress which could support relapse prevention (Pardini et al, 2000).

In response to outdated models of addiction such as those aforementioned, the biomedical model suggests a biological predisposition for addiction (Miller and Giannini, 1990). The addict is therefore not considered responsible for the development of their addiction neither for recovering from it, and suggests that it is a process of disease that requires a health professional or a medical intervention to fix. Whilst regarding smoking as an addiction to nicotine and therefore a medical problem, smokers have been eligible to receive help from the health service and has led to the creation of cessation products that significantly improve a smoker's chances of quitting (West, 2006). However, what the biomedical model fails to report is that the majority of smokers quit without any medical or pharmaceutical support (Chapman and MacKenzie, 2010), and that most people who use pharmacotherapy fail to maintain their abstinence (Morphett et al, 2017). Critics of the biomedical model also highlight a neglect of structural and social factors that knowingly sustain smoking, as well as the behavioural and psychological aspects of smoking that smokers themselves report cessation medications do not appease (Uppal et al, 2013). The idea that there is just one cause of addiction, i.e., the biological make up of an individual is limited, with not one 'addiction gene' that accounts for all addictions and their variances, and instead there are many pathways into becoming addicted, and maintaining it (Grisel, 2019).

One way in which the psychological and behavioural aspects of smoking could be better understood is with the application of a more holistic multifaceted consideration of addiction that acknowledges a wide variety of factors contribute to it (Marlatt and Baer, 1988). The biopsychosocial model of addiction was first developed by George Engel in 1977, challenging a biomedical approach and advocating the need for a new model that would give room to the social, psychological and behavioural dimensions of addiction as well as biological (Engel, 1977). It does not disregard the biological and physiological elements of addictions, but instead advocates that biological, psychological and sociocultural factors

must *all* be taken into consideration together in the prevention and treatment efforts of individuals who are addicted to smoking or other substances (Skewes and Gonzalez, 2013). The health-related behaviour of smoking can be explained with the application of the biopsychosocial model. The drug nicotine is attributed to the biological contribution to smoking addiction, and when an addict does not receive it, they experience withdrawal symptoms such as anxiety, low mood or the inability to concentrate (Benowitz, 2010). This is because there are many neurotransmitters involved in the experience of inhaling nicotine such as the release of dopamine which makes you feel good, and thus rewards the smoker. Additionally, a deficiency in neurochemicals like dopamine could contribute to an individual's likelihood of becoming addicted, for example the Reward Deficiency Syndrome hypothesis (Blum et al, 2014) suggests that some individuals are born primed to be more vulnerable to the rewarding effects of addiction due to an underactive reward system. As well as the biological component of the model the psychological composition of an individual is a contributing factor to their addiction to smoking, which is broad. It can include an individual's desire to sensation seek, their impulsivity, mental health and self-efficacy, as well as the need to use their addiction to regulate their emotions (Giordano, 2016; Burke Harris, 2018). Nobody is born a smoker and as such the behaviour, and its associated habits, of smoking is learnt over time until it becomes and unconscious association to stimuli such as smoking with a cup of tea; smoking produces the feeling of happiness and/or relaxation and so the cup of tea becomes a stimulus that produces a response to smoke (Kowalski and Westen, 2005).

Finally, knowing that behaviour doesn't exist in a vacuum, the social component of the biopsychosocial model ensures social systems and environments such as family, peers, social norms, cultural beliefs, availability of cigarettes, and legality are included when considering why people become addicted and continue to smoke (Giordano, 2016).

The factors that increase an individual's risk of becoming addicted and maintaining an addiction seem to find their place together in the biopsychosocial model (Marlatt and Baer, 1988); capturing the complexity of addiction and guidance towards how addictions can be addressed.

In a similar vein to the biopsychosocial model, the PRIME theory of motivation suggests that addiction is multifaceted. But places a particular focus on the motivational system and sensory factors associated with the behaviour of smoking. It proposes that evolution has led to a multi-level motivational system (West, 2009) and the human motivational system is the system of things that direct our actions and shape behaviours, and an understanding of it is key to understanding the multiple aspects of addiction to cigarettes (West, 2006). The motivation system can be captured by the acronym 'PRIME'; plans, responses, impulses, motives and evaluation. A smoker who is nicotine dependent has a continuous motivation to smoke due to withdrawal symptoms when their nicotine levels drop, their evaluation (or belief) that smoking will provide pleasure and so anticipate this enjoyment which reinforces their motivation to smoke (West, 2006). These pleasures can include the relief of withdrawal symptoms, the activation of dopamine or the sensory sensations that smokers get when they smoke i.e., holding a cigarette and feeling the smoke hit the back of their throat. As well as these kinds of internal stimulations, the external environment provides smokers with significant stimuli and initiates their thinking and therefore motivation to smoke. These external stimuli can include seeing other people smoking or going to a place where they would normally smoke or are reminded of smoking. The combination of the internal and external stimulations outlined above is clear evidence of the complexity of the behaviour and thus the associated challenges of quitting (West, 2009).

The act of smoking, and the associated behavioural, psychological and sensory sensations a smoker feels when they smoke also strongly

influence their ability to quit. These include; holding a cigarette, feeling the smoke in their mouth and throat and/or exhaling the smoke and over time can prove similar in their addictive nature to nicotine, and can be just as rewarding (Rose et al, 2000). These stimuli are often associated with the pleasure that is felt when nicotine hits the brain, and dopamine is activated (Benowitz, 1996) meaning in most cases they too become satisfying which further contributes to the addiction. The behavioural and sensory effects that smokers lose when they stop make quitting difficult, but when these are mimicked in other ways it has shown to reduce cravings and withdrawal symptoms. Buchhalter et al (2005) found that in the short term, the use of denicotinised cigarettes which had negligible or no nicotine effects helped to suppress some tobacco abstinence withdrawal symptoms including the urge to smoke, irritability and low mood. This idea has been further supported by findings that compared with the intravenous delivery of nicotine, smoking it provides a higher reported level of satisfaction (Westman and Rose 1996). This again suggests that it is more than just the physical addiction to nicotine that keeps smokers smoking and challenges the biomedical model of smoking and instead supports the proposals made by the biopsychosocial model and PRIME theory.

With this in mind it is important that when designing their interventions, public health bodies and stop smoking services respond to addiction to smoking in ways that address its many facets in a non-isolated way. Using theories of smoking addiction like those previously mentioned to design policy and behaviour change stop smoking interventions is key to addressing the smoking epidemic.

Reducing Smoking Prevalence

In the UK and amongst its devolved nations a significant number of system wide tobacco control measures have been introduced that attempt to reduce the prevalence of smoking, often led by Public Health agencies. These are split into population- level interventions i.e.

comprehensive advertising bans, a ban on smoking in public places, standardised packaging of tobacco products, the increase in the legal age to buy tobacco (including proxy purchasing), the revised EU tobacco product directive, the ban on cigarette and tobacco displays in shops, the ban on smoking in cars carrying children, the increase in taxation on tobacco products, and individual-level interventions i.e. stop smoking support that offers behavioural support combined with pharmacotherapy quit aids (Welsh Government, 2022). These policies and interventions that we have in the UK has supported the sustained downward trend in adult smoking rates over the past 20 years (Public Health England, 2019).

Stop Smoking Support

The support available to smokers wanting to quit has grown over time, and in most cases recognises that continuing to smoke is not only due to the very real physical addiction to nicotine, but is also due to the behavioural, sensory, psychological and social factors that reinforce the addiction. NHS stop smoking support draws on a well-rehearsed evidence base to support smokers to achieve abstinence from tobacco and then nicotine. Attempting to quit smoking alone increase the likelihood of relapse and failure, and so smokers are encouraged to access support that incorporates behavioural and pharmacotherapy interventions to significantly increase their likelihood of success (Raupach et al, 2012). Combining behavioural support, that addresses the reasons people continue to be addicted, with pharmacotherapy (nicotine replacement therapy (NRT) or prescription only medication (POM)) increases the chances of a smoker quitting by three times compared to going alone (Stead et al, 2016). Measuring the success of a stop smoking service and obtaining quit rates of its service users is, as a gold standard, done by obtaining a CO score from the individual's breath at 4 weeks post quit date, and repeated again at 52 weeks. A national evaluation of NHS treatments for smoking cessation found that these services were effective in helping smokers to quit at 4 weeks (53% CO validated quit rate) however at 1 year this fell to 15% (Bauld et al, 2010). In 2015, Dobbie

et al found even lower CO validated abstinence rates amongst their cohort of research participants; 34% at 4 weeks and only 8% at 1 year, and this is anticipated to reduce year on year.

Stop smoking services in the main use theoretically driven behaviour change interventions based on specific models such as the Transtheoretical Model (Prochaska and DiClemente, 1992). However, no one theory of behaviour change can be said to offer a complete explanation of behaviour and relevant interventions, and as such there is a need to select appropriate approaches and interventions relevant to the individual that are theory agnostic and use a range of relevant theoretical concepts (Abraham, 2015). This enables practitioners to understand how to best support someone to quit by conceptualising their plans, responses, impulses, motives and evaluations in relation to their smoking addiction.

Whilst stop smoking support services provide a valuable choice to people wishing to quit, and are a key part of the UK's public health strategy to reduce smoking prevalence, the reality is they typically place emphasise on individual capabilities and motivation with limited consideration to the context in which the individual exists, and the social, cultural and economic factors that influence them and their behaviours (Davis et al, 2015). They are also focused on moving smokers to become non-smokers, and any associations of smoking including behavioural and sensory associations and nicotine use should cease by 12 weeks. After this time, other than follow up telephone calls to assess if an individual remains abstinent or not, NHS SSS provide very little support in relation to maintenance of smoking abstinence. This could help to begin to understand the observed drop in abstinence rates between 4 weeks and 1 year after quitting. The significant reduction that we see supports the idea that behaviour change interventions are effective in supporting temporary behaviour change but long-term maintenance is rarely attained (Kwasnicka et al, 2016). There is a lack of understanding into

the long-term effects of behaviour change interventions as well as the attrition in maintenance of the behaviour change over time (Dombrowski et al, 2010). However, what is known is that behaviour is more likely to be sustained if the reinforcement structure to remain abstinent continues to provide immediate outcomes and rewards rather than longer-term rational outcomes (Kwasnicka, 2016).

The demand for stop smoking services has declined in recent years (Kmietowica, 2015) which could be attributed in part to the increased popularity and availability of electronic cigarettes. As well as this, NRT and POM lack the ability to meet behavioural and sensory aspects of the addiction that smokers miss when they quit that behavioural support cannot provide, such as moving a cigarette between their hand and mouth, and inhaling and exhaling smoke. The only licensed product available that seems to address parts of these associations is the nicotine inhalator however it still lacks other associations to the addiction i.e., lack of exhaled smoke, not feeling like a cigarette to hold and low nicotine delivery speed. Whilst quit rates are good at 4 weeks this lack of satisfactory behavioural or sensory reinforcement may also contribute to the decline in abstinence over time. It is important to remember that most smokers choose to quit for health reasons (Vangeli and West, 2008) rather than a proactive desire to stop using nicotine or disconnect from any behaviours or pleasures associated with their smoking. To sustain change positive maintenance motivations are needed (Weinstein & Sandman), and may include the enjoyment of performing a behaviour or the enjoyment of ongoing immediate outcomes of the behaviour (Rothman, 2000).

Electronic Cigarettes

In the UK, we have seen a sustained and significant downward trend in adult smoking rates over the past 20 years. Although it is hard to ascertain exactly what the single most effective cause of this has been,

due to the system wide interventions that have been implemented, there is a recognition that electronic cigarettes have had a role to play.

Electronic cigarettes (EC), also known as electronic nicotine delivery systems (ENDS) or vapourisers, have gained huge interest and increased rapidly in popularity as a quit aid since their appearance on the market over ten years ago. They are battery powered devices that deliver nicotine by heating a solution that typically consists of glycerin, propylene glycol, nicotine and flavouring into an aerosol that is inhaled by the user (Public Health England, 2019). There are three broad types of EC; first, second and third generation (see figure 1). All of which usually consist of a mouthpiece, battery and cartridge, or tank containing the nicotine solution (ASH, 2019). The number of people using EC in the UK has gradually increased since 2015 but 2020 was the first time EC use declined year on year; from 7.1% to 6.3% of the adult population in the UK, amounting to 3.2million people (ASH, 2020).

Most EC are designed to deliver nicotine in a safer way than smoking combusted tobacco and provide throat and taste sensations like those of tobacco smoke in a more effective way than other nicotine replacement products do e.g., the inhalator or gum. The exhaling of vapour further replicates the process that happens when tobacco is smoked. The most commonly reported reason people use EC is as an aid to quit smoking tobacco entirely (ASH, 2020; Cancer Research UK, 2019). This is followed by preventing relapse and to cut down the number of cigarettes smoked (ASH, 2020). Other less commonly reported reasons people use EC are to save money and because they can use them indoors or around other people and not cause them harm (Etter, 2010; Etter and Bullen, 2011). Amongst EC users there is also a large belief that they are less harmful than smoking tobacco and can help to successfully reduce or quit smoking completely (Pepper and Brewer, 2014).

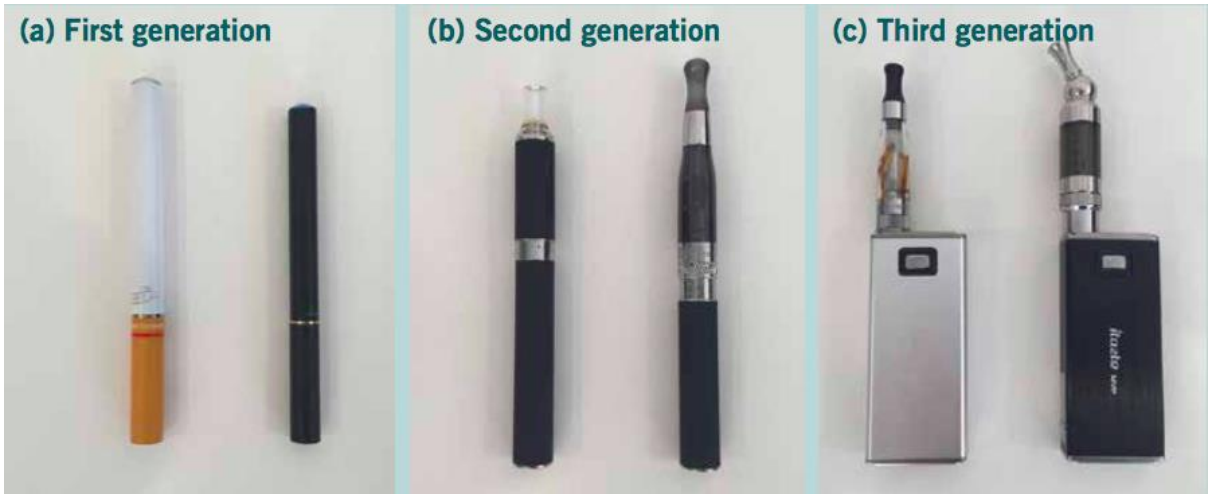

Figure 1. Image: Anna Phillips, in: Changing Behaviour: Electronic Cigarettes (Dawkins and McRobbie, 2017)

Safety of Electronic Cigarettes

There have been great efforts to understand the safety of EC and in the 2015 Public Health England EC evidence update it was concluded that the health risks posed by e-cigarettes are relatively small by comparison to tobacco, but the long- term effects should continue to be studied (Public Health England, 2015). This has been consistently reinforced by the evidence reviews that have followed. The potential harm of EC is much lower than in cigarette smoke, mainly due to producing less toxic vapour than cigarette smoke. The Royal College of Physicians (2016) have also concluded that EC's can provide the nicotine that smokers are addicted to without the harmful components of tobacco smoke, and so can prevent most of the harm caused by smoking.

Like with any other tobacco harm reduction product, EC are not entirely without risk. Research into the products has shown that some contain toxic chemicals such as formaldehyde and acetaldehydes which can be carcinogenic for humans in large amounts. However, these are generally far lower (up to 450 times lower) than the levels found in tobacco smoke and in some cases are even comparable to the trace amounts found in an inhalator (Maciej Lukasz et al, 2013). One prominent safety concern that has been raised is the potential to cause bronchiolitis obliterans, commonly known as popcorn lung; a type of lung disease caused by the

inhalation of a chemical called diacetyl (Cancer Research UK, 2018). Allen et al (2015) analysed 51 types of flavoured EC for the total mass of all three chemicals (diacetyl, acetoin and 2, 3-pentanedione). Diacetyl was found in 39 out of the 51 tested and concluded that further action to understand the effects of this chemical. The associations between diacetyl and popcorn lung remains unclear; this research aimed to find out if those three chemicals were present in EC vapour, and not the association between diacetyl and popcorn lung. More needs to be done to develop a better understanding of the association between these chemicals and popcorn lung, including the amount of the chemical needed for damage to occur. Precautions have been taken to mitigate exposure to diacetyl, and in 2016 under the European Union Tobacco Products Directive (TPD), it was banned in EC liquid. Any legitimate EC sold in the UK should therefore not contain diacetyl. There is a continuously growing body of evidence exploring the safety of EC; much of which supports the idea that allowing EC to compete with cigarettes in the marketplace may decrease smoking related morbidity and mortality (Hajek et al, 2019).

As well as safety, there has been speculation about the impact EC have had on smoking cessation in the population (Kalkhoran and Glantz, 2015). The position taken by Public Health has changed in many countries dramatically since EC first made their way to the European consumable market in 2006. In the UK, the consensus is that EC are safer than smoking and a complete switch to EC from tobacco smoking to quit is advocated. However, there is still the caveat that smokers should try evidence-based support to quit as a first option; combining behavioural support with licensed pharmacotherapy (NRT or POM). Internationally there is still a lack of consensus over their role and their future impact on public health (Kennedy et al, 2016). Many argue that the wealth of evidence available is enough to support their safety and effectiveness in practice, whilst others are still cautious; questioning the longevity and size of the evidence available. During their preparatory work for their 2019 evidence update on EC, PHE found that as at

November 2018 there were 98 countries that had laws regulating EC, 29 of these banned the sale of EC products, and 6 ban the use of EC entirely (Public Health England, 2019). These 6 countries included; Cambodia, Jordan, Japan, Nepal and the United Arab Emirates.

Caution about EC leading to decisions like banning them or regulating them has been driven by a range of reasons and understandings including; EC use resulting in increased nicotine dependence, former smokers being reintroduced to nicotine and relapsing, varying manufacturing quality and their potential to act as a gateway to smoking tobacco, particularly amongst young people who have never smoked (Czoli et al, 2014; Conner et al, 2018). Barrington-Trimis et al (2016) evaluated the cross-sectional association between EC use, the psychosocial environment and susceptibility to future cigarette use amongst students who had never smoked cigarettes. They found that amongst those who had never used cigarettes, 31.8% of past EC users and 34.6% of current EC users indicated susceptibility to cigarette use compared with 21% of never EC users. The odds of indicating susceptibility were twice as high for current users compared to non-users (OR=1.97; 95%CI: 1.21, 3.22). It was concluded that EC use in adolescents, and a 'pro' EC environment could put them at risk of using cigarettes in the future; through the addiction to nicotine and/or the normalisation of smoking behaviours. Similar findings were reported by Leventhal et al (2015) in their longitudinal repeated assessment study of 14-year-olds to evaluate whether EC users, who have never tried combustible tobacco, was associated with initiating the use of combustible tobacco products. They concluded that those who used EC at baseline compared with nonusers were more likely to report an initiation of combustible tobacco smoking over the next year. This raises the possibility that the association of EC and combustible tobacco use initiation is bi-directional (Leventhal et al, 2015); provoking thoughts specifically around those who ever smoked tobacco, and if there was an absence of EC, would they initiate smoking tobacco again.

Goniewicz et al (2014) also raised concerns after finding sharp increases in EC use amongst 15–19-year-olds; ever used increased from 16.8% in 2010-2011 to 62.1% in 2012-2013, and current EC use increased from 5.5% to 29.5%. This was more than twice the increase in prevalence than usual tobacco smoking. If adolescents were adopting EC instead of tobacco, there was an expectation that the prevalence of tobacco smoking and dual use of EC and tobacco would have declined but this was not the case; prevalence in both these cohorts also increased. Data of this nature has been observed in other countries including USA, Korea and France; all showed rapid growth in EC use and dual use of both EC and tobacco (Dutra and Glantz, 2014).

Calls to approach EC with caution as a potential gateway to smoking tobacco shouldn't be ignored, especially as young people are at a critical developmental age. However, what we don't know from this research is what proportion of dual users started with EC, or vice versa. What has been reported in the UK and US is a decline in adolescent smoking, whilst vaping numbers rise; noting though these trends were evident before the introduction of EC (Johnston et al, 2016). It's important to remember that psychological processes that mean some people who exhibit curiosity and sensation seeking behaviour are more vulnerable to any drug use (Vanyukov et al, 2012) and thus more likely to experiment with both cigarettes and EC. At this present time, none of the research can be considered conclusive and longer term, repeated studies are needed.

As well as the safety and gateway to smoking debates, controversy about dual use (an individual using an EC whilst still smoking cigarettes) remains a topic of discussion. It is believed by some that dual use could extend the use of both products, and inhibit any progression in quit attempts. However, there is some evidence that challenges this. For example, Zhuang et al's (2016) longitudinal study of the relationship between long term EC use and smoking cessation in a two-year period concluded that short term EC use was not associated with a lower rate of

smoking cessation and that long term use of ECs was associated with a higher quit rate. Research like this means that EC are considered by many as requiring a fair place in smoking cessation, and the services that provide such support.

Nicotine: Harm Reduction

It's well known that the biggest health gains are achieved when smokers quit smoking completely, rather than reducing the amount smoked or substituting their smoking with a nicotine containing product. This is because nicotine is relatively harmless and is not a carcinogen. It does however increase your heart rate and blood pressure, has a range of local irritant effects and increases the risk of cardiovascular, respiratory and gastrointestinal disorders (Mishra et al, 2015). It is also known that although not without some risk, using NRT is much safer than continuing to smoke (Hartmann-Boyce et al, 2018). Nutt et al (2014), using a multi-criteria decision analysis (MCDA), provided a framework that shows the harmfulness of nicotine containing products compared with tobacco use (figure 1; adapted by Abrams et al, 2018).

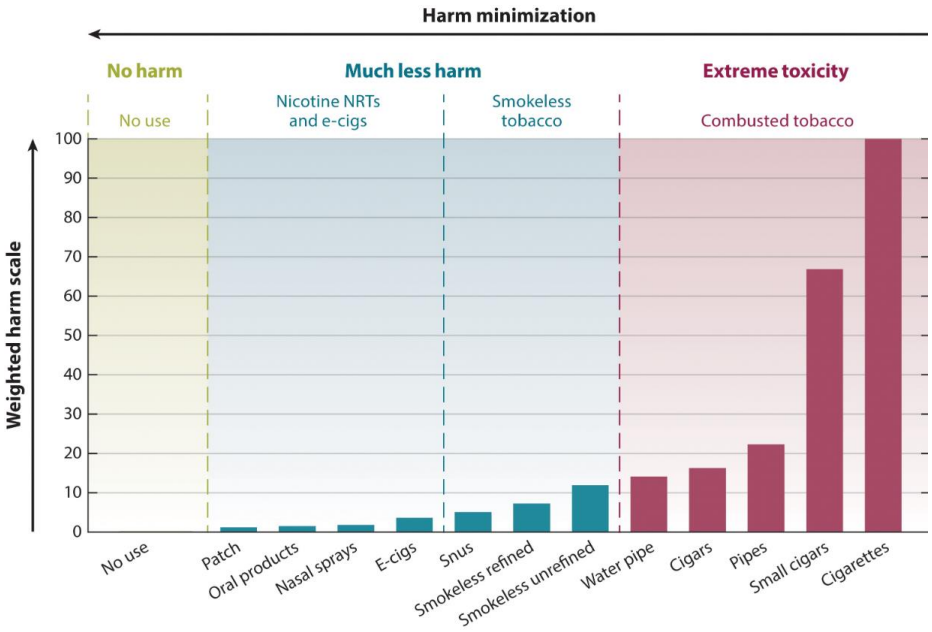

Figure 1: Products along the harm minimising continuum (Abrams et al, 2018).

The harm minimisation continuum in figure 1 suggests that not all nicotine containing products are as harmful as one another; they range from extremely harmful (cigarettes) to extremely low harm (NRT i.e., patches). For many smokers, abrupt quitting with no support and with

nothing to suffice the very real physical withdrawal from nicotine, is sometimes impossible. Therefore, reducing the harm associated with smoking (tobacco harm reduction) that involves the continued use of nicotine over time, although not without risk, is significantly safer than continuing to smoke. The National Institute for Clinical Excellence (NICE) recommends harm reduction as an approach for smokers who do not want to give up nicotine completely, or those who wish to reduce their cigarette consumption (NICE, 2013).

Electronic Cigarettes for Smoking Cessation

Using EC as a tool to quit smoking has been somewhat controversial; amongst countries worldwide, but also between the UK nations. In England, the use of EC as a quit aid is widely advocated by Public Health England (PHE), and NHS Scotland recommend that EC have a similar role to play in aiding quit attempts to NRT and POMs (McNeil et al 2018; NHS Scotland 2021). However, in Wales the use of EC is only proactively advocated for use if the smoker is *unable or unwilling to quit*; in which case a total switch to EC is encouraged. Since the start of their evidence reviews and subsequent guidance, PHE have consistently advocated EC to be significantly less harmful than tobacco products, and have enabled their use in NHS commissioned support through the provision of EC vouchers, and creating 'EC friendly' services. PHE have also stated, based on the appraisal of available evidence, that the greatest quit success is among those who combine using an e-cigarette with support from a local stop smoking service (Public Health England, 2019).

Conventional NRT delivers nicotine through buccal or transdermal absorption but does not stimulate the behavioural components of smoking. EC however not only provide a rapid dose of nicotine, they also stimulate the sensory and behavioural and psychological elements of smoking i.e., the hand to mouth action, the exhalation of vapour and the maintenance of a social identity (Notley et al, 2018). These stimulations could therefore mean EC are an easier and more appropriate way for

some smokers to achieve smoking abstinence (Hajek et al, 2014). Despite these seemingly valuable features they aren't always the preferred or most successful route for some smokers. Kalkhoran and Glantz (2016) found in their meta-analysis that EC were unhelpful at helping people quit. The researchers also suggested that EC may even undermine cessation due to the high numbers of dual users; using cigarettes and EC concurrently. Some of these studies however excluded people who had already quit using an EC, and many of the included studies were not designed to specifically examine the effectiveness of interventions. Hitchman et al, (2015) found that dual use may be associated with differences in EC type and the efficiency of nicotine delivery. Newer types of EC with larger tanks ('third generation') tended to have lower levels of dual use due to more efficient nicotine delivery compared to older 'first generation' EC. For some who have tried and failed to quit using standardised therapies, EC may now be considered a successful option for quitting due to their close proximity to smoking, and ability to mimic it in a safe way (Bullen et al, 2016).

The results of clinical trials suggest that EC increase the likelihood of smokers quitting and when combined with behavioural support they can be up to twice as effective compared with NRT (Hajek et al, 2019; Hartmann-Boyce et al, 2021). Like other NRT, EC provide the nicotine that smokers crave when they quit. The sensory experiences associated with EC use such as the feeling of vapour in their throat, holding the device and exhaling vapour may be the reason that quit rates amongst EC users are higher (DiPiazza et al, 2020). Smokers use EC to recreate or replace their smoking attributes (Hoek et al, 2017), and help to explain why EC users favour them, and are more successful in their smoking abstinence as a result, compared with other NRT. EC also address smoker's problems with smoking and the ques to make them want to quit such as smelling of cigarette smoke and to improve their health (Goldberg and Cataldo, 2018). Although EC address smoker's ques to quit smoking, contrary to the structured 12 week model of a stop smoking service and

NRT use, many EC users report using them as an enjoyable substitute for smoking tobacco and envisage using them long term (Farrimond, 2017). One reason for EC providing a sense of enjoyment could be that EC provide a unique feature in their ability to offer a variety of flavours; enhancing the user's experience. Farsalinos et at (2013) found that EC flavours contributed to reduced cigarette consumption and smoking abstinence amongst users. This was also found during Soule et al's (2016) research that used concept mapping to understand why EC users used flavours. Reasons for flavoured EC use included better taste, to provide themselves with variety and the ability to customise their experience. This sense of autonomy and ability to customise their experience in this way is not possible in a stop smoking service.

As well as providing a behavioural and sensory replacement to smoking, nicotine, and an enhanced experience, the understanding of EC safety as well as alterations to user's sense of identity can be motivations for EC use and maintenance. An understanding about the safety of EC compared to tobacco is a common reason why user choose them (Goniewicz et al, 2014; Pepper and Brewer, 2014). Users in these studies talked about the health harming effects of smoking and although not totally without risk, EC being a far safer alternative and therefore a motivation for their use. In recent decades we have seen a significant shift in the social meaning of smoking; from a glamourous attractive habit to an addiction that harms not just the smoker themselves but those around them and is very much stigmatised (Farrimond, 2017). For many smokers, shifting away from being a smoker to being an ex-smoker is what motivates them to quit successfully (McEwen and West, 2010). For EC users, there is a distinct culture and associated identity amongst its users. This culture has developed partly by the virtual creation of chat rooms where users can provide support to one another about appropriate use and vape shops have provided a physical space for user to connect with one another and affiliate themselves with these spaces, staff and other customers. More recently dedicated conferences and events for EC

users have allowed them to build and maintain connections with others who identify in the same way (Bell and Keane, 2012). Barbeau et al (2013) found in their qualitative research that adult EC users value the 'group experience' that they associate with their use. This group experience makes people feel they are part of a wider network of people who they can identify with. McQueen et al (2011) in their exploration of EC user's lived experiences found they were immersed in the culture and language associated with EC as a collective, and there was an abundance of social and informational support that they shared amongst one another. Learning to vape and influences on their motivation to quit was more likely to come as a result of having social interactions with other EC users rather than other channels, such as those used by NHS services to encourage smokers to quit.

When assessing the Public Health impact of EC, there needs to be consideration about how much they contribute (or not) to smoking cessation rates in the population. West et al (2016) reported that in England there was an estimated 16,000-22,000 additional long-term quitters due to EC. This is not only evidenced in the UK but also in other parts of the world. In Europe for example, of the 7.5million EC users, 35.1% reported their success was due to EC (Farsalinos et al, 2016) and in US population data, decreases in smoking rates have been associated with increases in EC prevalence rates (Zhu et al, 2017). Although these associations have been observed, the complexities of smoking and quitting means that it cannot categorically assumed to be just because of EC. As well as prevalence rates, the contribution that EC seem to have made to additional long term quitting success cannot just be assumed to transfer into reduce inequalities. The smoking toolkit study (STS) set up by the Tobacco and Alcohol Research Group at University College London (UCL) monitors the population trends in smoking in England and provides a platform for researchers to keep up with EC use over time. Using STS data, Kock et al (2018) analysed data ranging from 2014-2017 to understand the use of EC by different socio-economic groups and

included a sample of over 81,000 people. They found that from 2014-2016 those in lower socioeconomic groups were around half as likely to use EC. By 2017 though this difference was no longer founded and this absence of difference, should it remain, indicates that EC do not have an impact on inequalities. Although promising in relation to EC use, what this research did not do was understand the success of quit attempts made using EC. Further analysis using the same data set found that amongst ex-smokers those who were disadvantaged were more than twice as likely to use an EC. What this research didn't do was understand if EC were preventing those who were disadvantaged from relapsing and protect them from taking smoking back up. If this was the case, EC could be a tool to help reduce inequalities. That said there are opposing potential impacts; Green et al (2020) found potential for EC to widen inequality gaps amongst young never smokers and adult ex-smokers. These differences indicate the need for further research to understand the role of EC in reducing inequalities and how the benefits of their use can be maximised in the smoking cessation arena.

There are sound conclusions that can be drawn on to assess the public health impact of quitting smoking, the success rates of those who use EC to quit and the experiences of EC users who share their reasons for choosing to quit in this way. However, even more needs to be done to explore the individual experiences of EC users and their previous quit attempts. The aim of this research therefore was to explore the experiences of EC users; their reasons for using an EC and how their most recent attempt to quit compared to any previous unsuccessful attempts they had made. These previous attempts included going alone with no support, or using NHS recommended interventions such as NRT, POM or accessing an NHS SSS. It is important that this kind of research is conducted as it will contribute to the ever-growing body of evidence surrounding EC and hopes to contribute to the ongoing development and delivery of NHS stop smoking services and the public health agenda.

Methods

Design

Awareness and use of ECs has increased significantly, and far more is now known about why people use them, their preferences and motivations, the number of people accessing SSS's for support to quit, choosing an EC as a quit aid and quitting success rates (Baweja et al, 2015; Beard et al, 2016). However, far less is known about the experiences of these individuals and their quit journey. Due to this, an approach to collecting data that was flexible and exploratory was required. Qualitative research provides the opportunity to explore new areas of interest and gather insight into individual perspectives; exploring areas that may not have been considered by the researcher when planning the research or constructing the interview schedule. New areas of interest are drawn directly from participants; enabling interviewees to express their own thoughts and feelings, and speak in their own voice (Berg, 2007).

Qualitative approaches allow the researcher to explore and discuss sensitive issues with participants that would less likely be achieved by many quantitative approaches. Building and maintaining a research relationship with participants is one of the key skills a qualitative researcher needs to have (Taylor and Bogdan, 1984). Utilising these skills often results in eliciting richer data that is less likely to be the case when using a quantitative approach, and when the relationship between the researcher and participant is less significant e.g., questionnaires, including those that provide space for free text (Rutberg and Bouikidis. 2018).

The purpose of this research is to explore the experiences of EC users, meaning participants' personal experiences and perceptions is the focus. Reality and the sense of ourselves is constantly being constructed and changed each time we speak or even think (Weedon, 1997), and so this research seeks to elicit language and discussions from participants that

reflects their own realities in a way that can be described as experiential rather than critical. Qualitative research is typically experiential or critical (Braun and Clarke, 2013). Experiential research focuses on the desire to understand people's perceptions through the language they use and *what* they say. The research process collects information and puts an organising, interpretive framework around what participants have said in the data, with their own experiences and meanings driving it. On the other hand, critical research focuses on the researcher's own interpretations of the data rather than just the data itself; with language creating reality rather than reflecting it applying a questioning approach to understand what has influenced participants to say what they say (Braun and Clarke, 2013).

Theoretical Standpoint

A critical realist ontology and contextualism epistemological approach underpinned this research. Ontology and epistemology respectively refer to the nature of *what* is meaningful knowledge and *how* we go about knowing it (Hathcoat et al, 2017). In qualitative research the ontological and epistemological approaches and the methods for gathering information and interpreting it must be closely aligned (Bracken, 2010). A critical realist ontology approach acknowledges that everyone's own individual perceptions and interpretations of their reality are their own, and are influenced by the world in which they exist, and can change over time (Bhaskar, 1989). As such, the researcher rejects both realist and relativism ontology positions. A realist approach assumes there is only one truth that can be found by applying the right research techniques, and relativism assumes that reality is a finite subjective experience with nothing existing outside of our thoughts (Braun and Clarke, 2013; Denzin and Lincoln, 2015). Somewhere in between realism and relativism is critical realism. This approach acknowledges that yes, a reality does exist but everyone's own individual perceptions and interpretations of that reality are their own, are influenced by the world in which they exist and can change over time (Bhaskar, 1989). Critical realism is a belief that

individual interpretations, which are influenced by people's social worlds, informs knowledge; from both researcher and participants (Bhaskar, 1989).

Defining what is meant by reality (ontology) is important, but so is *how* the researcher comes to know or believe the reality (epistemology). There are three distinct epistemological standpoints; positivism, constructivism and contextualism (Flick, 2009). Positivism is straight forward in its thinking and obtains the truth through unbiased, scientific data collection (Park et al, 2020). In contrast, constructivism questions this straight forwardness; viewing how we know the world a result of the social world that we live within (Cobern, 2010). Somewhere in the middle is contextualism. Contextualism does not assume the existence of only one reality, and considers people's experiences within the certain contexts they exist. It also acknowledges how people create their own meanings behind experiences, and how the social context(s) in which they exist impacts on those meanings (Braun and Clarke, 2006).

The ontological and epistemological stand point of a researcher is a key aspect of qualitative research and defining the approach. A researchers ontological and epistemological positions reflect their perspective on what meaningful knowledge is and how they can pursue to know it (Braun and Clarke, 2013). By defining their theoretical standpoint, in this case critical realism contextualism, the researcher can clearly share how their own perceptions of human nature and behaviour impacts on the approach they consciously adopt when carrying out and reporting their research (David and Sutton, 2004). A critical realist contextualist approach aligned with the researchers own personal beliefs of human behaviour and how it should be understood and/or explored; each participants' perceptions and experiences will be different and subjective, non-static and influenced by the multifaceted social world in which they live. The research aims reflected this and was exploratory in nature, and shaped the qualitative methods of enquiry for this research.

Data Collection

Semi- structured interviews were used to collect most of the data for this research; allowing broad areas to be explored. The researcher could also be responsive to other issues or topic areas that were raised by participants during the interview process. In depth, semi-structured interviews facilitate a participant led response that can alter the focus of the interview at any point, and allow the researcher to probe responses to gain a greater understanding of meaning and collect new, exploratory data (DeJonckheere and Vaughn, 2019). In contrast to structured interviews, they provide much greater flexibility for the researcher to frame and approach questions in different ways for each individual participant, and using appropriate language can elicit rich responses about the subject matter from a range of different individuals (Barriball and While, 1994).

Focus groups and one to one interviews were both considered and appraised for their appropriacy for this research. Interactions between group members in a focus group can often elicit richer data because participants can further develop ideas that have already been proposed by other group members (Kennedy, Kools and Krueger, 2001). Group processes can also help people explore and clarify their own views (Kitzinger, 1995). However, one to one interviews were used to allow the researcher to explore individual differences in participants' own EC use experiences which may not have been achievable in a focus group environment. This is because responses given in a focus group can often be influenced by the responses of other group members. The researcher was also considerate of the potential sensitivities of giving up smoking. This means that one to one interviews were more appropriate and would allow for greater openness between the participant and researcher which was more likely to elicit more participant directed discussions (Barriball and While, 1994).

Interview Schedule and Questionnaire Design

Adopting a qualitative approach using interviews allows the researcher to arrange questions in such a way that can slowly build trust and confidence within participants by beginning with less focused, 'easier' questions to answer. More controversial or 'difficult' questions can then be introduced as the interview progresses and the researcher and participant have begun to build a more trusting relationship (Jacob and Furgerson, 2012).

A semi-structured interview was designed following a review of the literature relevant to the research aim. The schedule had four broad sections; smoking history, reasons for choosing an EC to quit, comparisons between most current and any previous quit attempts and experiences of receiving support from a SSS (for full interview schedule see appendix 2).

The first section encouraged participants to talk generally about their smoking, and smoking history, before talking about the reasons they had chosen to use an EC. This was a way of helping participants to relax and feel comfortable during the interview process. It also enabled a rapport to be built between the researcher and participants. As well as easing participants into the interview, it created an understanding of their smoking, and in some cases, quitting journey to date.

The second part was focused predominantly on exploring why they had chosen to use an EC to quit smoking. As part of this, participants were also encouraged to reflect on the similarities and differences between smoking tobacco and using an EC. This allowed the researcher to elicit any specific motivations that contributed to the participant quitting smoking, and why they had chosen to use an EC to aid their quit attempt instead of another, more traditional, aid e.g., conventional nicotine replacement therapy (NRT) such as patches or gum. This led naturally into the third section that encouraged participants to compare their experiences of previous quit attempts to their current one. In many cases

their previous experiences of using NRT and other traditional methods offered by the NHS, including support from a SSS directly, influenced their decision to use an EC.

The final part of the interview was designed to explore more specifically with participants their experiences of using an EC compared with receiving support from a SSS. There is currently a lack of research that focuses and compares both of these. It is well understood that the combination of pharmacotherapy (NRT or POM) with support from a SSS (behavioural/motivational support) yields better quit and abstinence rates compared with just using pharmacotherapy or not receiving any support (Stead and Lancaster, 2012). However, we also now know that more smokers are quitting successfully with EC than with NRT and/or POM (Hajek et al, 2019). What we know much less about are the *experiences* of EC users who have also used a SSS; this was therefore the focus of this section.

Prior to their interview taking place participants were asked to complete a short questionnaire (appendix 3). This captured their age, gender, occupation, the local authority they lived in and their EC and tobacco use. The purpose of this questionnaire was to provide further context and transferability of the non-generalisable research findings and allows readers to understand similarities and differences across studies, replicate the design and build on the researcher's findings. Questionnaire responses were incorporated into describing the results of this research.

Recruitment Materials

A recruitment leaflet (appendix 4), participant information sheet (appendix 5) and a consent form (appendix 6) were designed, and approved by the UWE ethics committee. The recruitment flier contained relevant information about the research and how to become a participant. This was used to encourage people to take part in the research. The participant information sheet outlined the purpose of the research, and

all the relevant information that participants needed to know; supporting them to make an informed decision about their involvement. It also provided assurance to participants that any data collected from them would remain completely confidential and they would remain anonymous throughout the entire research process; from initial stages of recruitment to final publication. Participants were also reassured that their contribution to the research was on a completely voluntary basis and if they wanted to withdraw themselves at any point, they could without giving any reason for doing so. They were also informed that withdrawing meant any contributions they made to the research would also be removed and destroyed appropriately without question.

Patient information sheets were sent to participants prior to their interview via email and they were given the opportunity to ask the researcher any questions they had about their participation at any point before their interview started. Prior to their interview starting participants were asked if they fully understood the information sheet, and if they did and were happy to proceed, they were asked to read and sign the consent form. For telephone interviews, consent was gained by the researcher reading the consent form to participants and asking them to provide their consent verbally. They were asked to answer 'yes' or 'no' when asked "after considering the information you have received to date, are you fully aware of the nature of the research, your rights as a participant, and do you give your fully consent to take part". This was recorded on the same dictaphone that the interview was then recorded on.

Ethics

UWE Faculty of Research Ethics Committee ethics was granted for this research and accompanying materials (appendix 7). Two further iterations of ethical approval were sought to aid with the recruitment of participants (appendix 8 and appendix 9). This was because the SSS who agreed to support the recruitment of participants for this research

were resistant; causing delays and eventual disengagement. The first was to widen the scope of recruitment of participants due to difficulties with recruitment from the identified SSS. This iteration allowed the researcher to seek to recruit participants in England and Wales from pharmacies offering stop smoking support, as well as other places that EC users accessed e.g., social media, EC shops and online forums. The second iteration was to include enable to inclusion of participants who had not received support from a SSS at the time of recruitment. This was to encourage the involvement of younger participants as up until this point all were over the age of 40. UK data shows that those who typically access SSS's are aged over 35, therefore removing the need to having already accessed support, and alter the sampling strategy, from one would mean the experiences of younger EC users could be included.

Interviews took place face to face in community settings or via the telephone. A general risk assessment was completed to identify potential hazards and their associated harm whilst conducting the interviews with mitigating actions such as a process for the researcher to notify their line manager and/or supervisor that they had completed a face to face interview and were safely in their car vacating the venue. The researcher also worked in accordance with the UWE lone working policy. Adherence to both the risk assessment and lone working policy ensured that any potential risks to the researcher and participants were mitigated.

There were no other anticipatable ethical issues surrounding this research. However, the sensitive nature of smoking and quitting and the potential that participants were unhappy about support they had received from their SSS meant that the interview process may raise emotional or anxiety provoking issues about their experiences. Participants were therefore made fully aware of their right to stop their interview at any time. Additional control measures were also put in place that included; if the researcher observed the participant feeling any distress, they would ask if they want to stop, reassuring participants that they are aware of

the sensitive nature of quitting smoking and advising any distressed participants to seek support from the national smoking support service. A pilot interview was conducted to test the flow of the schedule and gain feedback from the individual on the appropriacy of the interview focus and content. No changes were made to the interview schedule; however, a questionnaire was put together to capture basic demographic information as well as information about participants EC and tobacco use. This was submitted to the UWE Faculty of Research Ethics Committee for approval (appendix 3 and 8).

Participants

Participants could be part of the research if they could speak and understand English, were aged 18 years or over, were currently using an EC to quit smoking and had experience of receiving support from a SSS. However, to widen the sampling strategy and encourage the inclusion of younger participants the need to have ever received support from a SSS was removed. No geographical exclusions were applied neither were any exclusions relating to the type of EC that the participant had chosen to use. There were also no exclusions made relating to participant's ethnicity, number of quit attempts, gender, or any other demographics.

In the UK, cigarettes and EC should not be sold to anyone under the age of 18 which is why anyone younger was excluded. Using an EC and having received support from a SSS was originally essential to ensure the participants could talk about their real-life experiences. However, as recruitment commenced, it became apparent that the experiences of younger EC users who were less likely to seek support to quit smoking was missing. Therefore, the need to have accessed a SSS was removed and the aims of the research updated because the largest number of quit attempts made by individuals seeking support from a SSS is 45-59 (NHS Digital, 2021). Removing requirement resulted in two participants under the age of 30 (26 and 27) being recruited which was felt to be sufficiently lower than the average age of smokers accessing a SSS. Including the

experiences of younger people meant that a broader understanding of the experiences of EC users compared to their previous attempts to quit could be explored.

Prior to interviewing the two additional participants, the researcher ensured that all of the research material that had been agreed and was in use was reviewed for its appropriacy. There was no requirement to formally alter any of the materials however the researcher ensured that the application of the interview schedule was appropriate, particularly when covering questions 7 and 8. During this latter part of the interview the researcher harnessed the flexibility of the semi-structured interview schedule which by nature allowed the researcher to frame and probe responses to these questions in a slightly different way (Barriball and While, 1994). Given that the two additional participants had not accessed a SSS previously, the researcher focused on drawing from them why they had not accessed a SSS, NRT or POM; placing emphasis on their reasons for moving straight to an EC.

Sample Size

In quantitative research, power calculations determine the sample size needed to find a statistically significant intervention effect. However, for qualitative research these types of calculations do not exist (Malterud et al, 2015; Cohen, 1988; Sandelowski, 1995). Calculating power means that the data can be generalisable but in qualitative research generalisability is not the key concern. The quality and depth of the study is the focus, and the sample size must be appropriate for the research aim(s) (Braun and Clarke, 2013). There must also be enough data to demonstrate patterns but is manageable for the researcher. Due to the nature of this research, it was difficult to determine the exact sample size from the outset. However, the logistical limits of the research (one researcher having to complete the work within a set timeframe) meant that a maximum of 10 participants could be included. This also fitted with the Braun and Clarke (2013) guidelines that suggest exploring the

experiences of participants using one to one interviews needs a moderate sample of between 10 and 20 participants.

The final sample size for this research was 7. There were various reasons that for this, including resistance from the national stop smoking service in Wales and non-engagement from an alternative SSS that was identified in England which meant that no participants were recruited within the time period identified for recruitment to take place. As a result, and as already outlined in the iterations made to ethics applications, an alternative research strategy was deployed and participants were recruited via Facebook rather than from a SSS, pharmacy or EC foras; online or a shop/cafe. Altering the research strategy in this way provided 7 participants, but due to time lost during the initial attempt of recruitment the deployment of this new strategy was time extremely time limited; after which time no further recruitment could take place. Whilst learning from this approach would inform any future studies of this nature, the amount of useable data from each participant through the process of interview was high. The relationship between the amount of useable data and the number of participants meant that in the case of this research the researcher considered 7 participants to be sufficient to continue the research due to the large amount of data obtained in relation to the research aim from each participant (Morse, 2000). As well as this, the aim of the research was to provide an organised account of themes and common issues within the data through the use of content analysis (Erlingsson and Brysiewicz, 2017) and as such saturation of the data's meaning was not driving this research and its approach to recruitment. Code saturation to underpin themes i.e., 'hearing it all' as opposed to 'understanding it all' in the context of saturation and this research would be a more meaningful approach. Hennink et al (2017) found that code saturation could be met by nine interviews, whereas meaning saturation would require a up to 24 interviews in some instances. Whilst this research would not be considered to have reached a point in data collection where no additional insights could emerge (Glaser and Strauss

(1967), neither was its intention. The concept to reach data saturation was developed within the grounded theory approach to qualitative research (Glaser and Strauss, 1967). However, this research was exploratory, and described in a coherent way what was found in the data it collected, it was not to develop theory, provide research with a representative sample and neither was it to fully explore and develop a rich account of the phenomenon.

Procedure

Recruitment strategy

The original recruitment strategy for this research was from a SSS. Participants who were attending and were using an EC, or had done in the past, would be offered a recruitment flyer and their stop smoking advisor would discuss with them the nature of the research and how to take part. This was unsuccessful due to a lack of engagement from the SSS and following ethical approval, an alternative approach was deployed. The researcher visited several pharmacies and EC shops across south east Wales, advertised the research on multiple Facebook groups set up for EC users to share experiences and provide peer support. The researcher also used their own social media channels (Facebook and Twitter) to promote the research. All 7 participants were recruited from the latter.

Participants were given the opportunity to have skype, telephone or face to face interviews. Three participants chose a face to face interview and four chose to use the telephone. Before each interview started the researcher spent time talking with the participant to be confident that they understood the purpose of the research and their rights as a participant. All participants were made fully aware that their involvement in the research was purely voluntary and they had the right to withdraw at any time; with any information they had contributed destroyed. Once participants were fully aware of their rights, and the purpose of the research, they were asked to give their consent.

Before their interview started each participant was asked to complete the short questionnaire. For those who had chosen a telephone interview, the researcher read the questions to the participant and recorded their answers. Interviews lasted between 42 and 85 minutes, with an average time of 56 minutes. Every interview was recorded using a dictaphone and once complete, were electronically transcribed verbatim by the researcher in preparation for the data to be analysed.

Analysis

Conventional content analysis was used to analyse the answers that participants gave to the questions posed to them during interviews (Hsieh and Shannon, 2005). Once transcribed the researcher read and re-read the interview transcripts to familiarise themselves with the depth and breadth of the contents. At this stage the researcher was able to draw out condensed parts of the transcripts that were relevant to the research aim. Doing this meant that the text that researcher was reading was shortened to make more manageable to analyse whilst preserving its core meaning in relation to the research aim (Erlingsson and Brysiewicz, 2017). Codes were then identified and were used to mark these condensed statements, and those that were considered to have the same meaning or related to each other were grouped together to form categories. Themes were then developed by way of expressing an underlying meaning found in two or more categories (Erlingsson and Brysiewicz, 2017). Analysis at this stage was focused at a broader level than the coding process; with categories underpinning overarching themes. These themes were then refined and named; including the defining or what themes are, and are not. The final phase of analysis appears in the results chapter where the analysis findings are presented as a coherent story of what the data is telling.

Thematic Analysis (TA), a method by which themes and patterns within the data are identified, described and analysed (Braun and Clarke, 2006) was initially considered for this research. However, during the

commencement of analysis, it became apparent that this approach wasn't appropriate. Instead of the in-depth understanding and identification of patterning across interviews, the large amount of data and its contents required transforming into an organized and concise summary of key results; that content analysis lent itself to and other approaches did not. The aim of this research was to explore the experiences of EC users, and through the process of content analysing the researcher could systematically code and categorise each interview unobtrusively to determine patterns and themes (Mayring, 2000). Whilst content analysis and TA both break down narrative into manageable units of content and use themes to describe the data, this research was exploratory in an area where not much is known and therefore content analysis was better suited to report the common issues reported in the data (Green and Thorogood, 2004) as opposed to a richer more detailed account of the data that searched for common themes which TA would have done (Braun and Clarke, 2006).

As well as TA, Interpretative phenomenological analysis (IPA) and grounded theory (GT) were also considered but later disregarded. TA, IPA and GT aim to describe patterns across data with IPA and GT being bound by theory. GT was discounted as a method of analysis for this research as the aim of a GT is to create a theory that is grounded in the data (Strauss and Corbin, 1997). To carry out GT in its prescribed form, the researcher would need to have no pre-existing ideas or assumptions about the data. This would be impossible to achieve given the researcher had been involved in this area of interest for many years, meaning that they had pre-existing theoretical ideas, and had spent time familiarising themselves with the literature prior to the research commencing. Although IPA has a dual purpose and does consider the patterning of meaning across participants, it also focuses on each individual participant. Adopting an idiographic approach, that focused on each specific individual, was not appropriate for this research.

Although there are not many qualitative studies that have examined the experiences of EC users, there has been a large amount of research into specific areas of interest that the researcher used to inform the interview schedule and research aim. A purely theoretical approach risked any unexpected themes in the data being dismissed by themes that were modelled on the researchers own prior preconceptions. The researcher therefore remained flexible in their approach; considering the identification and discussion of any unexpected themes. Content Analysis therefore enabled this to happen.

Qualitative Research: Quality and Rigor

Qualitative research is often criticised for its lack of critical, scientific rigor that quantitative research offers (Noble and Smith 2015). However, qualitative research has formal rules of procedure and verification, reliability, validity, and the ability to replicate and to generalise, generating large amounts of detailed information about a small number of people (Mays and Pope, 1995). Quantitative research through its use of standardised statistical formats creates a space where the researchers own beliefs can be put to one side (Yilmaz, 2013). Qualitative researchers are active vehicles in their research, in a way that doesn't happen in quantitative research. The theoretical standpoints and the experiences of researchers means that they bring these experiences and beliefs with them to their research and as such should be reflexive and clearly articulate their personal views and biases (Sutton, 2015). What is then produced in the data, and shared as knowledge reflects this.

Conventional criteria used in quantitative research (validity, reliability and generalisability) to judge the quality of a study are largely not applied to qualitative research due to differences in sampling approaches, sample sizes, and methods of analysis (Kitto et al, 2008). Instead, the quality, or 'trustworthiness' of qualitative research are often judged by the studies' rigour, credibility and relevance. For quantitative research, there are standardised reporting mechanisms and checklists that researchers

can use to reflect the assessment of their work, i.e., the CONSORT (2010) statement (Schulz et al, 2010) and the EPHPP (Thomas et al, 2004). Using this checklist approach in qualitative research is questionable due to the sheer diversity of the epistemological and ontological approaches. A set of agreed quality criteria that can be universally applied to these range of approaches is too difficult. Benchmarking qualitative work in this way would exclude the unique contribution that qualitative research provides (Barbour, 2001).

In public health, evidence-based practice that is reliable and valid is king. Evidence based practice guidelines, public messaging and interventions to change behaviour to improve health outcomes is only implemented if it is underpinned by trustworthy evidence; usually informed by reliable quantitative research and information. Securing and maintaining its place in this world where people aren't as familiar with it, and may deem it as less credible, means that qualitative work needs to demonstrate its rigor, quality and its credibility (Johnson et al, 2020).

Guidelines and criteria in which to benchmark are useful in helping us to learn and improve our practice, not just in research, but in life with novices often relying on rule-based structures to learn (Dreyfus et al, 1986). These criteria can be regarded as the core values of practice, and therefore a simple structure of qualitative methodological best practices can encourage discussion between qualitative and quantitative communities (Tracy, 2010). Over time we have come to accept that these core values can be used to distinguish between the end goal(s) of qualitative research, and the means the researcher used to get there. This research has used the 'eight 'big-tent'' criteria (Tracy, 2010) as the structure for examining and presenting the quality and end results of the research. These criteria suggest that high quality qualitative research has eight key markers; worthy topic, rich rigour, sincerity, credibility, resonance, significant contribution, ethical and meaningful coherence. A full table of these markers and how they can be achieved is in appendix

10. The researcher's transparency and detail about their research journey is a technique of rigor; allowing readers to follow a clear audit trail of research activity. Not only should they be transparent, self-reflexivity is also key. This process helps to establish the objectivity of the data and the nature of their proximity to it (Meyrick, 2006). For this reason, a reflective chapter is included in this research.

One practice that could not be achieved within this research was triangulation, the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding, to support the research credibility (Patton, 1999). However, the researcher discussed their data and the ordering of themes and conclusions at length with their supervisor (an experienced qualitative researcher). Making use of more than one researcher is valuable and allows different facets of the data to be explored, and achieve a consistent interpretation of themes between both researchers (Tracy, 2010).

Researcher Self-Reflection

A key aspect of ensuring quality and rigour in qualitative research is the researcher's practice of self-reflection (Tracey, 2010; Meyrick, 2006). This not only contributes to establishing the proximity of the researcher to the data and demonstrates transparency of their practice, it also provides them with the opportunity and space to think about areas for their own personal development and improvement as part of their research journey. This chapter will be written in the first person because the researcher is sharing their own personal experience in the context of their research.

Qualitative researchers are active vehicles in their research in a way that doesn't happen in quantitative research. As the sole researcher for this study, I was responsible for designing, implementing, analysing and presenting every element of it. I had also had previous experience of working for a few years in an NHS stop smoking service, which is where

my vested interest in EC was born. With this in mind it would be insincere and possibly naïve to believe that I could maintain complete objectivity throughout the whole research process and instead to accept and be transparent to readers of this work about my own experiences and beliefs in relation to this work. The theoretical standpoints and the experiences of researchers means that they bring these experiences and beliefs with them to their research, which is reflected in the end product (Manderson et al, 2006). To be a good researcher who delivers good quality research, the ability to be open and honest about your work, your role within it and proximity to it is key. Part of this process includes reflecting on what went well but also what didn't go so well by way of learning and developing my research skills. To do this I will provide an overview of myself as a researcher and my background as well as the main challenge that I faced with during this study.

Shortly after completing my MSC in Health Psychology I secured a job as a stop smoking advisor for NHS Wales. However, I had left this role and was not working as a stop smoking advisor or in any capacity on tobacco control at the time this research was carried out. During my time as an advisor, I was able to develop a sound understanding of the tobacco control agenda in Wales, and successfully support smokers to quit using evidence based interventions. These at the time consisted only of behavioural support (provided by me) in combination with nicotine replacement therapy or prescription only medication. Electronic cigarettes (EC) were very much rejected by the service and deemed an unsuitable quit aid due to the lack of evidence available to support their safety and efficacy. As a result, I was required to discourage their use and was unable to provide any support to people who chose to use an EC. As a young aspiring Health Psychologist, I was acutely aware of the lack of insight we as a service had about the motivations people had for choosing to use an EC and their role within NHS stop smoking services, which was a motivating factor for carrying out this research.

For many researchers in the field of EC their views and experiences of stop smoking services and EC alike may be entirely theoretical but for me this was not the case. My experience of EC within stop smoking services was that of frustration and helplessness which no doubt affected my initial approach to the research design. However, as I became more immersed, I came to realise that five years on the world of EC and stop smoking services had indeed progressed in the right direction and was better at supporting those seeking to quit using an EC. This opened up a new dimension of thought and approach to my work. Although I will always be bound to my own experiences of being a stop smoking advisor, I was able to grow as a researcher and my motivation went form one of frustration to that of wanting to gather insight from EC users and provide an offering to stop smoking service improvement. Not sharing my past experiences as a stop smoking advisor that initiated the motivation to carry out this work would be fallacious to my work and anyone reading it.

The biggest challenge that I faced whilst carrying out this work was resistance from stop smoking services. I attempted to engage with them on several occasions by way of hoping they could act as a vehicle for recruiting the participants for this work. Having exhausted all avenues in Wales I shifted my focus to a Bristol based service that had been commissioned by Bristol City Council. The same resistance to engage was met. This chronic resistance took up valuable time, required several iterations to ethics applications and was a primary reason for the small sample. What I learnt from this experience was that you cannot assume that a stop smoking service, regardless of obtaining robust ethical approval, would be willing to engage in research of this nature. At the time I was unaware of the contradictions between corporate standpoints and efficacious service delivery that were in place. As a result, building in more time to understand such friction and attempt to overcome it would be required. I would also seek to include stop smoking practitioners and corporate leaders in any ongoing research from the

outset in an attempt to gain their trust and for them to better understand the research and its potential implications for them and the organisation they represent.

Results

Participants

Seven participants were recruited; 3 women and 4 men aged between 26 and 56 years old. All seven participants lived in south east Wales and were in employment at the time of their interview. See table 1 for participant (P) demographics. A mixture of telephone and face to face interviews were carried out; chosen by the participant.

P	Gender	Age	Occupation	Local Authority	Interview Type
1	Woman	46	Nurse	Caerphilly	Telephone
2	Woman	43	Housing Officer	Newport	Face to face
3	Man	39	College Lecturer	Cardiff	Telephone
4	Man	48	Air cooling business owner	Cardiff	Telephone
5	Woman	56	Training Consultant	Torfaen	Face to face
6	Man	26	Student Career Advisor	Cardiff	Telephone
7	Man	27	Insurance Broker	Cardiff	Face to face

Table 1. Participant demographics and interview type

No participants were receiving support from a stop smoking service (SSS) at the time of their interview but all, apart from two, had received support at least once in the past. The two participants who had never received support from a SSS were P6 and P7. Both participants were included following the active recruitment of younger people to the research. P1-P5 are typical of those who would access a SSS for support to quit; over 35 years old and in employment (NHS Digital, 2020).

Information about participants EC use was also gathered (table 2). All participants were ex-smokers and current EC users, used their EC frequently throughout the day and never use tobacco, apart from P3 who has on very few occasions since quitting; describing their use as 'rare'. All participants, apart from P6, had been using their EC for over a year; most for several years. P6 had previously used an EC to quit smoking but had experienced a recent relapse for a short period. Most participants were using a 3rd generation EC, with two using 2nd generation. The type

of SSS support that participants had previously received, and any accompanying pharmacotherapy they used, was not captured as part of the questionnaire. However, this information was elicited during the interview stage and has been summarised in table 3. The support participants had received was either via their GP surgery or Stop Smoking Wales (SSW). SSW now forms part of the single brand for stop smoking services in Wales called *Help Me Quit*.

The aim of this research was to explore the experiences of EC users; including their reasons for using an EC and how their most recent attempt to quit compared to any previous attempts they had made that were unsuccessful. Although the number of participants included in this research was 7, which was lower than originally planned, the range of experiences that the researcher wanted to explore in relation to the research aim was done successfully. The small numbers, whilst not representative, were included for their specific attributes in relation to the research aim and the inclusion of P6 and P7 provided a divergent but increased breadth to the research findings (Charmaz, 1990).

P	**Tobacco/EC user**	**Frequency of EC use**	**Frequency of tobacco use**	**Length of time using EC**	**Type of EC used**
1	Ex-Smoker and current EC user	Frequently	Never	>1yr	2nd generation
2	Ex-Smoker and current EC user	Frequently	Never	>1yr	3rd generation
3	Ex-Smoker and current EC user	Frequently	Never	>1yr	3rd generation
4	Ex-Smoker and current EC user	Frequently	Never	>1yr	3rd generation
5	Ex-Smoker and current EC user	Frequently	Never	>1yr	2nd generation
6	Ex-Smoker and current EC user	Frequently	Never	>1yr	3rd generation
7	Ex-Smoker and current EC user	Frequently	Never	<6 months	3rd generation

Table 2. Participant's current EC use

P	Type of SSS Accessed	Pharmacotherapy Used
1	GP Surgery and pharmacy	Zyban, inhalator, patches and lozenges
2	Stop Smoking Wales support arranged by employer	Patches, lozenges and mouth spray
3	Stop Smoking Wales support	Champix, gum, patches and lozenges
4	Nurse at GP Surgery	Patches, tabs and gum
5	GP Surgery for pharmacotherapy and Stop Smoking Wales	Zyban, patches and gum
6	Never accessed	N/A
7	Never accessed	N/A

Table 3. Type of SSS support received and pharmacotherapy used

Themes

There were three main themes identified along with six categories, as outlined in table 4. The three main themes are; quit triggers, safely satisfied and modern quitting. Quit triggers provided insight into the reasons why participants were motivated to quit, based on their personal short-medium term goals and their personal beliefs and experiences of the risks and stigma (respectively) associated with smoking. Safely satisfied brought participant's previous attempts to quit smoking using NRT/POM and/or NHS support and the reasons why this failed, together with the ability that ECs had in replacing the behavioural and sensory elements of cigarette smoking in a safe and pleasurable way. The third theme, modern quitting, brought together the perceptions and beliefs that participants had in relation to EC as a way of quitting; one that was the opposite to medicalised NHS stop smoking support and instead provided an 'up to date', flexible, autonomous approach that harnessed support and advice from sources relevant to their EC use, such as vape shop staff.

Each theme will now be presented in more detail along with their associated categories and examples that have contributed to their development.

Theme	Category	Code
Quit Triggers	Personal Goals	Loved ones
		Fitness
		Healthcare costs
	Reduced social acceptability of smoking	Socially unacceptable
		Personal disappointment
Safely Satisfied	Previous quit attempts	NHS stop smoking support
		Adverse experiences
		Unmet need
	Cigarette replacement	Safe alternative
		Routine
		Inhale (throat sensation) and exhale
		Hand to mouth
		Flavours
Modern Quitting	De-medicalisation of quitting	Vape shop experts
		Online peer advice
		Social settings
		Perception of stop smoking services
	Autonomy	Purchasing control
		Control over ingredients

Table 4. Summary of themes, categories and codes

1. Quit Triggers

This theme brings together the reasons that participants gave for being motivated to quit smoking and is made up of two categories; personal goals and reduced social acceptability of smoking. Personal goals encompass the short to medium term goals for quitting smoking that participants had, and reduced social acceptability of smoking brought together their experiences and perception of the social unacceptance there was towards smoking.

1.1 Personal Goals

The reasons that participants gave for wanting to quit smoking were very much driven by their personal short to medium term goals e.g., before and during pregnancy or to get fitter and be able to run a marathon. The potential cost of having to self-fund medical treatments was also a clear motivator for a younger participant.

The majority of participants in this research were active and talked in detail about wanting to get fitter, and train for an event that was hindered whilst they were a smoker. Participant 3 was training for a marathon and their motivation to quit was the realisation that if they continued to smoke weren't going to be able to achieve this goal:

> P3: *"So the marathon really was kind, you know, it was one of them things. It was kind of the push for me really- I knew I had to change… I wouldn't be able to go running if I was still smoking"*

Although participant 5 wasn't training for a marathon, they too were very aware of the barrier that smoking created to them being able to run:

> P5: *"I needed to try and sort something out…I was doing a lot of running at the time, and I found that I could run no problem on the flat. The minute I hit some kind of incline; I could feel it in my chest…if I wanted to improve on it, I needed to stop smoking. So, I stopped smoking and started vaping."*

It seemed that P7, who was one of the younger research participants, was motivated to quit by the potential financial cost incurred to them if they continued to use their asthmas pump at the rate, they were using it due to smoking:

> P7: *"They were telling me I use my asthma pump too much…they basically said if I order more asthma pumps, they'll start charging me for them. They're about £12 a pump and I get them on the NHS so you realise how expensive they are…I worked it out and I'll have had to spend £100 in one year on asthma pumps so I just thought 'fuck that, I need to do something about it and save the money'"*

Interestingly P7 didn't focus on the fact that the reason they were using their pump more was likely to be at least partly to do with their smoking status. For P2, their experience of a miscarriage followed by years of trying to get pregnant meant that when they fell pregnant, they

immediately stopped smoking. For their first attempt that lasted their full pregnancy they quit cold turkey. The health harming effects on themselves because of smoking wasn't their motivation to quit, but instead it was to support their goal of getting, and staying, pregnant:

> P2: *"I didn't smoke from the minute I found out I was pregnant…cold turkey, nothing at all…you know the health risks about introducing any form of- I wouldn't even take a paracetamol when I was pregnant because of the risk of miscarriage"*

They went on to talk about quitting for this period of time being easy, and had no desire to smoke at all:

> P2: *"I had no desire to smoke then…I don't know if that was a psychological thing because I knew I was pregnant and it was harmful…but for whatever reason, I had no desire"*

Whilst exploring the reasons why participants wanted to quit smoking wasn't the aim of this research, having a description for each participant in this way provided insight into their motivations to quit and insight into their perceptions of EC use in relation to their quitting goals. None of the participants in this research were motivated by long term quit attempts that are often advocated by SSS to motivate smokers to quit (Public Health Wales, 2022). They weren't motivated by anything beyond a year and instead needed a tool to support them overcome the weeks/months ahead of them. This tool was an EC, and the reasons for choosing this over any other support will be discussed in more detail later on.

1.2 Reduced social acceptability of smoking

Another pertinent reason that participants gave for wanting to quit smoking was their perceived and felt social unacceptance towards smoking. For some, the number of their immediate family and friends who had quit had reduced significantly over time, often leaving just them smoking and as such feeling socially isolated in their smoking role. Some participants also described how having to stand outside alone to smoke

created a feeling of being judged by others, and a sense of personal disappointment in themselves for continuing to do it. P1 talked about their experiences of having to stand outside restaurants alone to smoke and how awful it was:

> P1: *"You know if you were in a restaurant, you wanted to go and smoke, you have to go stand outside which is awful…and like, now I look at other people and think oh my God, that's what I look like you know, stood outside smoking, it's just not something I wanted to be associated with"*

Some participants also talked about what they would do to try and make sure other people weren't aware that they smoked because of the social unacceptance surrounding it:

> P3: *"…you seen a massive change and the kind of acceptability in relation to cigarette smoking…If you went to a meeting, you got to work or whatever, you'd want to make sure that you weren't, you know, you'd obviously be in the bathroom washing your hands and you'd have chewing gum, you'd have a spray if you had one available so others wouldn't know you've been smoking."*

Reduced social acceptability can be linked in part to the changes in society's social norms and attitudes towards smoking. Established social norms shape and reinforce the perceptions towards behaviours that attract either social approval or disapproval (Legros and Cislaghi, 202). Many of the participants in this research acknowledged that their social norms had changed, and as such described how they had changed or incorporated new behaviours in an attempt to adhere to this, as seen in the previous extract from P3, and was described by P2:

> P2: *"…I always had chewing gum to hand, and made sure I sprayed after I smoked."*

These changes in behaviours were self-enforcing amongst participants, and it was clear that their social norms; perceived approval of smoking

by friends, family and society had changed over time (East et al, 2018). These changes in their social norms seemed to be a strong contributing factor to trigger an attempt to quit smoking amongst participants, in line with literature such as the biopsychosocial model of behvaiour and addiction theory (Engel, 1977; West, 2006) that acknowledge the role that the social environment in which an individual exists has on their behaviours.

The reasons that participants gave for wanting to quit smoking was very specific to their own personal goals rather than broad brush reasons that are often delivered as part of public health campaigns, such as 'health' and 'money'. There was also a very clear perception that continuing to smoke came with a felt feeling and perception of isolation as a smoker in a world where smoking is socially unacceptable by the majority.

2. Safely Satisfied

The second theme, safely satisfied, was made up of two categories; previous quit attempts and cigarette replacement. There was an overwhelming consensus amongst participants that they were seeking a replacement to cigarettes as opposed to wanting to quit nicotine or the action of smoking altogether. Their previous attempts to quit, using NRT, POM and/or NHS stop smoking support had failed. Reasons for this included having adverse experiences with pharmacotherapy and experiencing unmet need in relation to what they lost behaviourally and sensory when they stopped smoking cigarettes. These were reasons they gave for choosing an EC in their latest, successful attempt to quit; they provided a safe replacement to cigarettes that satisfied their needs.

2.1 Previous quit attempts

All participants apart from those who were under the age of 30 had attempted to quit previously, several times in some instances, using traditional methods of stop smoking support; NRT, POM and/or support from a stop smoking advisor or healthcare professional. For the majority

this support enabled them to quit short term; between one month and two years.

Although the period of time in which participants were abstinent during their previous quit attempts was short lived, the experiences that they had seemed positive. When talking about their experiences of accessing an NHS stop smoking service there were three elements that participants spoke about; gaining a support network, access to free pharmacotherapy and the use of a carbon monoxide (CO) monitor to record the CO levels in their exhaled breath:

> P3: *"I thought it was very good to be quite honest…it was quite a good support network…everybody had their own kind of experience which everybody was able to kind of share…all the different kinds of ways they were using to get over the cravings"*

> P2: *"I had free patches, free spray, free mints, anything I wanted…I don't think that I'd have done it if it wasn't free…like even though the cost of cigarettes was really high it wouldn't have been, I wouldn't have had that incentive."*

> P4: *"…breathing into a tube and measuring your kind of carbon monoxide levels and things was quite helpful…it was nice to give you a little bit of achievement"*

However, even when prompted, none of the participants recalled receiving any behavioural support from their advisor or healthcare professional e.g., goal setting, setting a quit date, coping mechanisms should they risk relapsing and their social environments. If this was true and none of this was included in their support it would seem that some substantial and vital parts of their smoking addiction were not proactively being addressed by their support advisors. Instead, what was being described was a biomedical approach (Miller and Giannini, 1990) to smoking cessation. It is well known that addiction to smoking is

multifaceted and as well as the networks created during support and the pharmacotherapy aids that provide nicotine to suffice physical withdrawal, the social and environmental factors of the addiction must be considered to support a successful outcome (Marlatt and Baer, 1988; West, 2009).

Not only was access to free pharmacotherapy one of the three components that participants talked about, the experiences they had of using it was a primary cause for their abstinence failure or success. Both participants who had used POM reported adverse experiences which meant they no longer used them and as a result returned to smoking:

> P3: *"I had a panic attack on the Champix and that was it, I came off those and from that then I just kind of gradually started smoking again"*

As well as having an adverse experience with POM, P5 also talked about their negative experiences of using patches. Both meant that they reverted back to smoking:

> P5: *"they put me on the Zyban. That made me so ill…I tried, the patches. Um, but the patches. Um, but the patches made me have nightmares…really bad nightmares…so that didn't last long"*

As well as adverse experiences to POM and NRT, they didn't provide participants with what smoking cigarettes gave them, leaving them with what the researcher described as 'unmet need'. Quitting smoking and using POM or NRT seemed to leave participants with very real voids in their behavioural and sensory needs such as hand to mouth action and exhaling smoke:

> P2: *I found that when I gave up smoking for the first time with the patches like what do I do with my hands now? You'd have a drink in this hand and a cigarette in this hand…I mean I starts sewing but, it's the action…The actual hand to mouth action is probably what I needed to replace"*

P1: *"the inhalator – I think I did try them…that didn't really work or give me what I needed, like blowing out smoke so you get complacent and then before you know it, you'd be back on the slippery slope again"*

P7: *"I always needed something to smoke. I needed something to make me feel I'm smoking something. Chewing gum and all that doesn't interest me or work"*

2.2. Cigarette replacement

The category 'cigarette replacement' encompasses the reasons that participants gave for choosing an EC, and why they were able to successfully quit with it. In contrast to the unmet need that was described in the previous category, EC provided participants with the behavioural and sensory components of smoking that they missed when they quit, in a safe way. All participants talked to some extent about how EC successfully met the voids that were left when they quit smoking, and were a suitable, safe and effective replacement for cigarettes. This included how EC replicated the behavioural and sensory elements of smoking such as exhaling vapour and the ability to continue the routine they had created whilst smoking.

Participants clearly didn't want to stop the behaviour associated with smoking, neither were they planning to stop using nicotine together. Instead, they were seeking a safer alternative to cigarettes which an EC gave them. There was even a sense of hope that EC remained a safe alternative to smoking so they could continue to use them long term:

P2: *"I didn't really want to give up smoking, I just wanted a bit of an alternative… It just does for me whatever the cigarette was doing."*

P3: *"I'm kinda hoping that they do turn out to be the safe option"*

It seemed that directly replacing smoking with an EC habit was a positive un-harmful thing to do:

> P3: *"I think it's a habit like any habit- it's just hard to break. If you're used to doing something 20-30 times a day and you're now doing that but with a vape, you're still able to do that but you're able to feel the benefits of not actually smoking."*

Participants even described their use of their EC in the context of their smoking routine; using it at similar times of the day and after certain triggers:

> P2: *"…probably similar to when I smoked before, so like you know, when I'd have a coffee"*

As well as describing EC as a replacement for cigarettes, including when they use their EC because of their smoking addiction, participants talked specifically about EC being able to meet their behavioural and sensory needs. This included inhaling (throat sensations) and exhaling vapour, and the hand to mouth action and:

> P5: *"Similar kind of sensation. That's what- I think when I was smoking that was the thing I was always going for that kind of that- that hit in your throat… It was kind of all I wanted was the hit that you get when you smoke – hitting the back of your throat""*

> P3: *"Being able to kinda I suppose inhale vapour and then exhale it which was probably the best route for me. Uh, because it was the most realistic kind of thing, 'cause you smoke it…that sensation that you get in the back of your throat. I think for me it was really about trying to get that right."*

> P6: *"I suppose mainly it was just the action of sort of simulating smoking and just inhaling and the hit at the back of the throat"*

P2: *"…it's the actual action of holding and putting something in your mouth and getting the draw from it… The actual hand to mouth action is probably what I needed to replace."*

P2 also added that the inhalator, when asked if this was a quit aid they had explored to potentially suffice this need, wasn't sufficient because although it did provide the hand to mouth action, it lacked the ability to visually exhale vapour:

P2: *"It's a bit weird because there is no vapour"*

The behavioural and sensory cues of smoking are often associated with a feeling of pleasure that is correlated with dopamine being activated when nicotine hits the brain (Benowitz, 1996). It seems that participants were replacing cigarettes with EC to continue to receive these cues and associated rewards, but were wanting to do so in a safe way. To date it seemed that no participants were able to get this from any other means other than cigarettes.

As well as sensory and behavioural requirements, the use of flavours played an important role in some participant's quit attempts. This was due to EC providing a more pleasant taste experience, as well as ensuring they didn't relapse- not having flavours for some would be detrimental and risked them relapsing:

P6: *"it just tastes nicer, so more of a pleasant experience."*

P2: *"It would be detrimental, completely. You might as well just smoke a cigarette."*

Whilst all participants described EC as a safe replacement to cigarettes, and used a flavoured EC, there was a very clear difference between the two younger and five older participants in their use of flavours. Younger participants talked about getting bored of flavours and frequently

changing them, yet this was not the case amongst older participants who tended to use the same flavour all of the time:

> P7 (younger): *"…every week I'll try something new. I'll be like I'm loving this at the moment then I'm bored of that, I'll go buy another one…when I get bored I'll move onto another one."*

> P5 (older): *"I don't deviate. I don't deviate from it because I've- I-I-I think that it's-it's almost like it is another addiction, uh, I think as well. And I think I don't want risk going back to smoking because I'm not getting what I need from the vape, and so at the moment I get exactly what I need from what it is I'm using. Um, I stay-- I've kept the same brand and the same flavour."*

It is believed that fruit or sweet flavoured EC appeal to young adults more than tobacco flavoured EC do, and that overall young people are more likely to opt to use a flavoured EC compared to older adults; in some cases, this difference could be over 30% more likely (Pepper et al, 2016; Garrison et al, 2018; Harrell et al, 2017). The findings within this research seem to align with this idea, as younger participants used flavoured EC, and were open to trying new flavours, whereas older ones didn't. As well as this it is important to remember that the gateway hypothesis in tobacco control is centered around the idea of people starting to use EC without having smoked previously and from this transitioning to smoking (Shahab et al, 2022). The findings in this research did not explore the likelihood of younger EC users moving from EC to tobacco use, but there is a wider body of evidence emerging that suggests that EC are associated with a higher risk of tobacco use (Martinelli and Candel, 2021). Whilst this research is not representative, it does provide descriptive responses from its participants that align to the idea that advertising flavoured EC could encourage young people to use them more (Garrison et al, 2018).

A safe alternative to cigarettes was what the participants in this research were seeking; and not by way of eventually stopping the action of smoking or using nicotine, but by way of replacing the behavioural and sensory voids they created when they quit smoking with something that safely filled them which for them was an EC. Their previous quit attempts had failed because this had not been the case or accessible to them via their stop smoking support service.

3. Modern Quitting

Modern quitting brings together the perceptions and beliefs that participants had in relation to using an EC as a way to quit smoking. The use of an EC provided an up to date 'modern' way to quit smoking that couldn't be offered by previous and current stop smoking services. This modern method wasn't a medicalised, rigid approach but instead it was flexible, sought support from alternative sources such as EC shops, and allowed participants autonomy over their approach to quitting.

3.1 De-medicalisation of quitting

Beliefs amongst participants about who were the experts at advising people to quit were individuals working in vape shops and people sharing their personal experiences online, they were not NHS health professionals. P5 for example talked about a vape shop educating them. It seemed that those working in EC shops were perceived as experts in EC use and quitting, which wasn't the case when they talked about those providing them with NHS support:

> P5: *"I used to go to a shop and I was relying on them to educate me into what I needed."*

> P1: *"the vape shops you mean…they're really knowledgeable… you know they really try and find out what it is that you want, and the different ones that might suit you. They seem to be experts."*

For other participants, vape shops were also a place to socialise as well as receive support. This provided insight into the potential social settings that may support successful quitting (in the context of EC use):

> P6: *"…the lads have got good chat in there, it's brilliant…me and my mates can spend hours there…it's like going in the bar, instead of having a drink you're having a vape."*

All participants talked about how helpful vape shops were in supporting them, particularly at the beginning of their EC quit attempt, to work through the huge array of options. This was an important and largely talked about part of the process of establishing their EC requirements and subsequent preferences.

As well as vape shops, the use of online platforms to seek support and advice was evident. The advice participants were seeking from online platforms wasn't direct encouragement to maintain their smoking abstinence, in a way that would be offered from a stop smoking service, instead it was to gather information about EC equipment and its suitability and efficacy:

> P3: *"…there are certain people you do watch the reviews 'cause they're probably a lot better than other people…you kind of buildup trust in those people as well if you try the piece of equipment or you try to vape, it's like you've seen the review from them."*

> P5: *"On Facebook I'm part of a group and it's really helpful because we can help each other out, like if there are new products or someone wants to try something new we can ask each other if we've tried it before and if it is any good."*

The idea that EC provided a de-medicalised, modern way to quit was also accompanied amongst some with the belief that NHS stop smoking support was dated and explicitly described ECs as a modern method:

P7: *"I had a feeling it was for older people. Does that make sense? All the photos were of older people smoking. I thought no, I can do it myself through modern methods like my EC."*

The rigidity of NHS stop smoking support also seemed to be the reason why it wasn't the preferred option for participants who had experience of this support. Instead, they opted for a more flexible way to do it that was led by them at their own pace:

P5: *"The thing about the classes was you had to have the time commitment…I can see the rationale behind it but it was like I'm going to miss that or I'm not going to that…it was in the daytime…so you were trying to skip out of work to do it…it's about how committed you are…you commit to that and it's easier to avoid…I'm just not going this week; I'll go next week…other people really rely on that kind of structure…Like I need to have like a real flexible approach to it. That's not to say I won't do it, just to say I'll do it in my own time."*

As well as sharing their thoughts and beliefs about modern vs dated quit methods, participants also provided insight into how stop smoking services could provide more up to date support. This was in the context of what they felt would have motivated them to seek support in this way. This was focused on where sessions could be delivered. Their focus was very much about delivering sessions in environments, such as pubs where they were more likely to relapse, rather than in usual clinics. This focus on changing the environment where sessions take place suggests grounding it in everyday life, social settings and situations that act as smoking triggers for them:

P7: "*The hardest time to do it is when you're drinking, so if you set somebody up in a bar for a meeting…do your little talky thing, but if you don't have a fag then because it's all about putting yourself out of the comfort zone isn't it, and actually facing it head on...Otherwise, they might think I can never go out anymore."*

EC was also a way of ensuring that some participants were able to socialise with their friends in the same way that they did when they smoked cigarettes:

> P7: *"I've got something to do. I find it very sociable in a smoking area. I usually spend my night in a smoking area with my EC."*

Throughout all of the participants accounts of their personal experiences was the rejection of a biomedical approach to quitting and abstinence in its entirety. This abstinence approach is one that continues to be advocated by NHS SSS, and is based on the removal of any behavioural, sensory or pleasurable associations with smoking (Machulska et al, 2020). Instead, participants were seeking a flexible approach that allowed them to continue to enact and experience smoking and the pleasures associated with it in a safe way

3.2 Autonomy

Having autonomy over their quit attempt was something that all participants talked about as being important. This spanned two key facets; control over purchasing what EC products they wanted to use and having control over the ingredients in their EC liquids. The latter was driven by the perception that having control over the ingredients made it safer for them. It seemed that higher internal locus of control, and perception of having a greater deal of personal control (Bennett et al, 1998) could be a factor in participants succeeding in their latest quit attempt.

All participants talked about a period of time at the start of their EC use that was spent trying lots of different types of ECs and flavours. This seemed to allow them to research and have complete choice over the combination of EC and flavour they used to quit. This was usually based on practical features such as battery life or flavour preferences:

P4: *"I used to carry the pen-type ones but they wouldn't' last a day, that's why I tried a load and finally got a tank with a bigger battery in there. So with the tank you could experiment more on flavours so I started doing, you know, visiting the vape shops and sort of chose whatever flavour I took a fancy to that day."*

Having control over their EC choice and purchases in this way took time; time that wasn't available or offered with NHS stop smoking support. P3 had previously attended an NHS stop smoking service and they felt that they are too time limited to support people to establish their EC requirements:

P3: *I don't know if they would and the reason being is 'cause it's taken me- it took me a long time to find the right thing…I needed the time to find what was right for me."*

Having control over the ingredients in their EC and what they were inhaling was also a way of having autonomy over their quit attempt which in turn contributed to their personal success. Knowing exactly what was in their EC was important:

P6: *"I make my own liquid at the moment…it kind of cuts down the risk of the um, the flavour enhancers that are put in…so you know I have a good idea what's in it you know."*

Knowing what was in their EC not only provided participants with autonomy but also knowing it was safe to use:

P2: *"There's no risk in it for me- like no harmful substances in it because, well, I'm making it."*

Participant's experiences of using an EC was one that was not rooted in a medical, structured approach and instead one that provided them with a more flexible alternative to more traditional NHS stop smoking support, and one that could be led by themselves.

In participants sharing their experiences of using an EC to quit smoking, and the subsequent results of this research we are provided with valuable insight into reasons for quitting smoking, reasons for choosing to use an EC over other quit aids and why using an EC resulted in a successful quit attempt. These results will now be discussed in relation to the study aim, contextualised within relevant literature, highlight potential implications and limitations, discuss any contributions to new and existing knowledge, and provide recommendations for future research.

Discussion

The aim of this research was to explore the lived experiences of EC users; their reasons for using an EC and how their most recent attempt to quit compared to any previous attempts they had made that were unsuccessful. These previous attempts included going alone with no support, or using NHS recommended interventions such as nicotine replacement therapy (NRT), prescription only medication (POM) and/or accessing an NHS stop smoking service (SSS). By doing this the researcher hoped to contribute to the ongoing development and delivery of NHS recommended support.

In total 7 participants were interviewed; 3 women and 4 men. From these interviews and subsequent analysis, 3 themes were identified; 1. Quit Triggers, 2. Safely Satisfied and 3. Modern Quitting. These three themes will now be discussed individually in relation to the research aims.

Quit Triggers

Although the aim of this research was not to specifically explore the motivators for quitting smoking amongst participants, it was an integral part of being able to fully explore their experiences. During the interview stage of the research, it quickly became apparent to the researcher that participants wanted to share, in greater detail than anticipated, their journey of quitting; starting with why they were motivated to in the first place. Participants talked in depth about what had triggered them to quit smoking, which was driven by their personal short to medium term goals and the feeling of being isolated from their friends, family and society whilst they were a smoker.

None of the participants in this research expressed concern about the long-term effects smoking cigarettes would have on their health in the future. Instead, they were focused on their own, very specific, personal goals rather than broad brush reasons that are often delivered as part of public health campaigns, such as ‘health’ and ‘money’ (Public Health

Wales, 2022). There was also a very clear perception that continuing to smoke was associated with being isolated in a world where smoking was now socially unacceptable. The short to medium term goals that participants talked about included saving money on healthcare costs that they would have to fund, pregnancy, and their ability to achieve their specific fitness goals. There is a wealth of research about why smokers quit. These reasons are often high level and include health impacts, economic cost, smoking bans and to protect loved ones (Gallus et al, 2013). The reasons that participants gave were aligned to some of these but were very much focused on their individual goals rather than broad, long term ones. The current evidence base for delivering effective messages to motivate quit attempts are broad and suggest the need to grab attention, educate about the harms of smoking, the benefits of quitting and eliciting an emotional response (ASH, 2021). NHS SSS continue to use these messages to encourage people to access support to quit (Public Health Wales, 2021). Once there, the support those quitters receive includes prompting them to set and review their goals (NCSCT, 2019).

Participants in this research were very much motivated to quit by their own personal, short to medium term goals rather than any long-term health harming effects smoking would bring them. Currently only 30% of smokers each year make a serious attempt to quit smoking and only around 5% of these succeed (smoking toolkit study, 2019). Granted, public health campaigns are not just made up of sharing messages far and wide, they attempt to harness and embed a system wide multifactorial approach to interventions that influences change that spans from population wide to individual interventions. Communications and the messages and messengers however are a key part of this. Given that less than a third of current smokers attempt to give up each year there seems to be an opportunity to increase this number. Although the participants in this research are not representative of the UK population of smokers, they do share similar demographics to those who typically

access SSS. The narrative they provide therefore gives some insight into how public health messaging could be refreshed.

As well as choosing the right messages to encourage people to quit smoking, choosing the right people to deliver these messages (messengers) is fundamental to the impact of a campaign (ASH, 2021). These messengers are usually credible health professionals as it is well known that one of the most common external triggers to quitting smoking is advice from a health professional (Vangeli and West, 2008; ASH, 2021). Public Health campaigns in the UK therefore have and continue to use a range of credible health professionals by way of triggering quit attempts amongst smokers. These include, but are not exhaustive of; Directors of Public Health, Stop Smoking Advisors and Local Council representatives. There is no doubt this has and continues to work and elicit quit attempts but given the increased popularity of EC, EC shop staff are rarely, if ever used as part of public health campaigns. The participants in this research considered people working in EC shops to be experts. Not using them to support public health campaigns may be a very real opportunity, which will be discussed in more detail as part of theme 3 (modern quitting).

As well as having their own personal goal-orientated reasons for quitting, the feeling of being socially isolated as a smoker was real for many of the participants. This was driven by the social unacceptance of smoking amongst their social networks but also their own feelings of disappointment in themselves for continuing to smoke. The 1962 report of the Royal College of Physicians established the impact that smoking had on health (Royal College of Physicians, 2013). Since then, societal behaviour and attitudes about smoking has changed dramatically over the last 50 years and these changes have been legitimately considered one of the greatest public health achievements in this time period (Burns, 2013). Public health bodies across the world have worked to drive smoking rates down and reduce avoidable morbidity and mortality as a

direct cause of smoking. These interventions have included, but not exhaustive of, reducing exposure to smoking such as introducing bans on smoking in public places and in cars carrying children, offering free support for smokers to quit, creating capacity and strengthening leadership in the tobacco control arena, and preventing the uptake of smoking in young people (Welsh Government, 2017). All of these have contributed to a change in attitudes, beliefs and social norms relating to smoking (Gilpin et al, 2004) as well as the significant decrease in the acceptance of smoking within society (Stuber and Galea, 2008). The participants in this research were subject to this feeling of unacceptance and isolation which was a key motivator for them choosing to quit. This is also in line with the findings of Schoenaker et al (2018) in their population-based cohort study that indicated the disapproval from close others were strong motivators to quitting smoking. It also aligns with West's (2006) theory of addiction and Engel's (1977) biopsychosocial model of behavior that both acknowledge the social environments in which people exist can significantly contribute to their behaviour and addiction related motivations; in this case the participants social worlds played a role in them increasing their motivation to quit smoking.

Safely Satisfied

The theme 'safely satisfied' provided profound insight into the questions posed by the research aims; i.) Why participants used an EC instead of any other support and ii.) What their previous experiences of quitting were. This theme was made up of two categories; previous quit attempts and cigarette replacement. There was an overwhelming consensus amongst participants that they were seeking a safe replacement to cigarettes as opposed to wanting to quit nicotine or the action of smoking altogether, which their EC provided for them and that their previous attempts had not. As well as this the action of smoking and the sensory pleasures they got from it were a strong driver in the use of EC for their most recent quit attempt but also for it being a success.

There is divided opinion in the literature about whether EC are an alternative to tobacco or an aid to quit nicotine altogether. Some EC users use them as a less harmful alternative to smoking tobacco whilst others use them in a similar way to other forms of NRT; by way of quitting smoking and then quitting nicotine all together (Institute for Quality and Efficiency in Health Care, 2006). For the participants in this research, their ECs were considered a safe replacement to smoking tobacco; their goal was to simply replace cigarettes with an EC. As part of this there was no sense of concern from participants about a long-term addiction to nicotine, the risk of increasing their nicotine dependence or risking them relapsing; in contrast to the findings of the research of Soneji et al (2017) and Czoli et al (2014) respectively. Instead, there was a sense of hope that EC would continue to be considered a 'safe option' or 'safe alternative' to smoking in the long term.

NHS stop smoking services offer support that is commonly influenced by theories of behaviour change; to change people's behaviours towards achieving an end goal of complete smoking and nicotine abstinence (Prochaska and DiClemente, 1992; Bandura, 1977 and West, 2006). The participants in this research however didn't have this as an end goal and instead chose not to change their behaviours and instead continue them in a safe way. This bodes the question about how public health bodies can effectively motivate people to quit; focusing on a harm reduction approach and encouraging more people to switch to EC rather than 'quit smoking'. The purpose of SSS are to support people to quit smoking (NHS Digital, 2022), and by doing so health professionals and the public health system recognise that the health of those quitting will improve (Centers for Disease Control and Prevention, 2020). If the purpose of SSS is to help prevent negative health outcomes for people, the contribution the EC can have longer-term, as demonstrated by the participants in this research, surely should be considered.

Nicotine, although not without some risk, is considered to be a safe alternative to smoking (Mishra et al, 2015), and NICE (2013) advocates harm reduction through the use of NRT as an approach for smokers who do not want to give up nicotine completely. The narrative used to promote SSS however still advocates that they give smokers the best chance of quitting for good (Public Health Wales, 2021; NHS Scotland, 2021). What was very clear from this research was that participants weren't at all interested in 'quitting for good' and instead wanted to continue the act or associated behaviours of smoking, and the use of nicotine, but in a safe way.

Effective behaviour change approaches that have been developed from behavioural insights provide evidence based principles to evoke positive behaviour change. One of these principles is to make change *easy* and to harness the *power of defaults,* because humans have a tendency to choose their default option (Behavioural Insights Team, 2010). ECs seemed to provide participants in this research with their default option of their smoking behaviours. One participant went as far as saying they felt like 'a cheat' because they were replacing cigarettes with their EC as opposed to quitting nicotine completely. They felt that they were a cheat because it didn't take much effort or willpower to quit because they were simply replacing smoking cigarettes which for them was easy. This provides further insight into how the role of EC in the context of smoking cessation and public health could be considered, and seems to challenge the current approaches to smoking cessation. Current approaches challenge smokers to quit smoking, the use of nicotine and the act or association of any smoking behaviours within a 12-week window. Although the use of EC amongst participants in this research, as well as other published work, is longer than 12 weeks maintenance of abstinence from smoking has been reportedly higher when compared to NRT users (Chen et al, 2020). Whilst EC seem to achieve longer windows of abstinence from cigarettes compared to other quit aids, there still needs to be an air of caution exercised. Nicotine alone, although safer than

inhaled with cigarettes does not come without risk. It is still a highly addictive drug, has carcinogenic potential and has been shown in some studies to adversely affect the heart and other organs (Mishra et al, 2015).

The associated behavioural and sensory sensations that were lost when participants had previously tried to quit, which hindered their success, were being met by their EC. These associations include the hand to mouth action, the sensation in the back of the throat, and inhaling and exhaling vapour. Behavioural and sensory cues are often associated with a feeling of pleasure that is correlated with dopamine being activated when nicotine hits the brain (Benowitz, 1996). For the participants in this study, EC replaced cigarettes in a way that no other product they had previously used could do. All participants used their EC frequently throughout the day and never used tobacco. Using their EC frequently suggests that not only are participants seeking the behavioural and sensory reinforcement that cigarettes gave them, it also makes one assume that their use is also as a result of the continuous response to nicotine withdrawal. We know that once a smoker finishes smoking a cigarette, they quickly begin to crave another (Benowitz, 2010), and so the frequent supply of nicotine to the brain alleviates potential withdrawal symptoms. For the participants in this research, their EC provides them with this requirement but in a safe way that doesn't require them to change their behavioural responses; they have simply swapped EC into what was their normal everyday smoking routine (Barbeau et al, 2013).

It is well known that smoking is a complex addiction influenced by a wide range of factors including the physical addiction to nicotine, motivations and impulses as a result of internal and external stimuli, and the sensory rewards of the behaviour itself (West, 2006). For participants in this research, their previous attempts to quit had failed, and for the majority this was due them experiencing unmet need. This unmet need wasn't just a lack of nicotine, but a combined lack of behavioural and sensory

stimuli that cigarettes had given them. As with many other smokers, participants reported NRT, POM and NHS stop smoking support being unable to address the behavioural and sensory components of their smoking addiction (Barbeau et al, 2013). This suggests that public health systems may need to pay increased attention to the behavioural and components of smoking, as well as an increased consideration for harnessing nicotine harm reduction approaches that challenge the current status quo.

Whilst the participants in this research strongly advocated the use of EC, it is important to remember that the evidence base surrounding EC is still, in parts, not well established. The long-term risks in relation to their health implications, role as a gateway to smoking and impact on longer term abstinence rates is largely unknown and no general consensus amongst public health bodies within the UK and across the world has been reached. Whilst the majority of the participants in this research were not motivated by the flavours available, the two younger ones were. Their potential therefore to act as a gateway to smoking tobacco amongst young people due to the variety of flavours that are available shouldn't be ignored (Czoli et al, 2014; Conner et al, 2018). EC are sold in a huge variety of flavours with marketing restrictions on their audiences not being seen in the UK until 2016 (ASH, 2019). However, many of the regulations to heavily restrict EC have been motived by the citation of the being a gateway from EC use to cigarette smoking amongst young people (Beard et al, 2022). With this in mind, even more needs to be understood about the role they play in increasing the risk of smoking uptake and the effects of EC use long term in relation to health and risk of relapse.

Modern Quitting

SSS attempt to address the social and psychological elements of smoking by encouraging quitters to set goals and make plans for avoiding relapse when faced with smoking triggers (NCSCT, 2019), but the support is still

very much rooted in medicine. Smokers are offered a structured, standardised intervention of weekly time limited sessions to monitor progress, offer free NRT or POM and make plans with smokers to help them quit (Public Health Wales, 2021). National reviews however continue to find low abstinence rates amongst this cohort of patients to as low as 8% success at 1 year (Bauld et al, 2010). One of the reasons why participants in this study had successfully quit using an EC was that their experience was considered 'modern' or 'up to date', and led by them as consumers rather than them as recipients of a rigid intervention. Their approach to quitting was very much led by them as individuals and the support that they accessed was built around their EC use and the social environments in which they existed. Participants did not need to be considered patients in need of a medical based intervention but instead consumers of a product that fitted with their current lifestyle choices. They also reported having autonomy over what they purchased, the contents of the ingredients in their EC and quit at their own pace rather than having to quit in a rigid timeframe that was applied in a SSS. Whilst providing structured support to quit is supported by a vast evidence base, it still assumes a 'one size fits all' approach. Participants clearly felt like they had autonomy over their EC use which was a contributing factor to successfully quitting. There is a vast array of evidence to support this idea spanning many years e.g. Stuart et al (1994) found that feeling in control of a quit attempt yielded higher abstinence rates at the end of treatment and Abikeyo et al (2010) were more likely to correct their habits and quit smoking if they had a higher sense of internal locus of control.

Regarding smoking as a medical problem has enabled smokers to access free support to quit from health professionals in the NHS, albeit structured and not suitable for everyone. There is also no denying that many people have and continue to quit successfully this way each year. This may however yield some undesirable effects such as unreasonably restricting the range of professionals who are considered eligible to help

smokers quit (West, 2019). Participants in this study seemed to consider the people working in vape shops as experts; having the ability to successfully educate and support them to choose what EC and supporting components they needed to quit successfully. In some parts of the UK, SSS are beginning to consider the role of vape shops and how they can effectively work together to increase successful quit rates. Although rejected by many NHS trusts and public health bodies, engaging with these shops could provide valuable insight into the purchasing habits of its consumers, up to date information about new products, regulation and technical support that may take more time to reach the NHS stop smoking practitioners (NCSCT, 2020). Emerging evidence suggest that vape shops as social environments and those working in them can provide effective support to quitters and successfully maintain cigarette smoking abstinence (Ward et al, 2018; Pattinson et al, 2018). Within this research participants were aligned to this and reported that quitting smoking should happen in every day environments, and in places where they would struggle to abstain the most. This external environmental stimulation is described as part of the PRIME theory of motivation (West, 2006) and supports this idea.

As well as the environment, participants in this research challenged what and who would usually be considered a credible and expert source of information and/or support. The participants considered those selling them their ECs and who were working in vape shops to be credible, and in some cases experts, sources of information. Source credibility is understood to be the expertise or trustworthiness of a source of information, i.e., a person or an organisation presenting a message (Pornpitakpan, 2004), and has a significant role to play in how information is processed and considered by the individual and how their attitudes to what the message is saying is developed (Schmidt et al, 2016). If an individual considers a source of information to be credible, they are more likely to process the information it is telling them, especially when the content is novel to them (Pornpitakpan, 2004; Petty

et al, 1981). The findings from this study provide original knowledge in relation to how information is received and behaviours are carried out amongst EC users when the source of their information is considered an expert; in this case vape shop workers and not the traditional credible sources we know (health professionals, public health bodies or local authorities). When deciding what and how information about quitting smoking, including EC use, can be shared the findings of research like this should be considered. More research is needed to further understand what impact proactively using vape shop workers in public health campaigns could have on the attitudes and subsequent behaviours of both current EC users as well as motivating smokers to quit.

Considerations for stop smoking services

The findings of this research provide valuable insight into the experiences of EC users; what triggered them to quit smoking, why EC worked for them and why previous attempts to quit smoking did not. Whilst the findings in this research are not generalisable there are some relevant and original findings that could be considered by SSS. One consideration is to review the messengers who are used to share information and targeting their use to cohorts who consider them to be credible. In the case of this research this could be the use of vape shop workers providing information relating to EC use as well as any associated and relevant information such as their safety. EC continue to be the preferred option for quitting amongst smokers in the UK whilst the numbers of people using a SSS has fallen for eight consecutive years (Nuffield Trust, 2021). Building capacity to provide encouragement and support to people who want to quit by using alternative messengers or sources of information could also be complimented by reviewing the places that support is offered.

Exercising more flexibility in relation to the use of nicotine longer term for smokers not wanting to quit the behaviour and sensory cues associated with it could also be considered. For the participants in this

research, their goal wasn't to change their smoking related behaviour or stop using nicotine, but instead to replace cigarettes with a safe alternative. However, more needs to be understood about the long-term implications EC use has and these considerations should be carefully thought through alongside the study limitations and the wider literature.

Limitations and future directions

There were a number of limitations to this research, one being the sample size. The biggest challenge in recruiting participants for this research was the resistance from SSS which resulted in significant delays for the research. A change in recruitment strategy, whilst yielded some success, was extremely time limited and no further participants could be included in the research after the agreed timeframe was reached. Any further delays would have led to the researcher being unable to complete it. With that said no consideration was given at any point during the research about the role that patient and public involvement (PPI) could have contributed. PPI in research has the potential to help researchers develop the design, including their recruitment strategy, in a way that is relevant and participant friendly (Bagley et al, 2016). Using PPI has the ability to increase the likelihood of recruitment and participant retention, and enable the inclusion of perspectives from the target population, particularly when the research is intended for their benefit (Morgan et al, 2016). Other than piloting the interview schedule prior to interviews with participants taking place the researchers did not seek any other contribution to the research design. The strategy for recruiting to this research was decided by the researcher. Harnessing PPI could have provided alternative strategies that could have yielded a larger response, and higher participant numbers, within the required timeframe.

As well as having a small number of participants included in the research, the sample was mixed. Whilst this was intentional and included the experiences of two younger participants it also meant that a comparison between the use of a SSS and their most recent quit attempt could not

be explored. It also meant that that research material had to be reviewed to ensure it was fit for purpose. Although there was no requirement to formally alter the research materials, the researcher had to approach certain parts of the interview schedule differently. The nature of carrying out semi-structured interviews meant that the researcher could be flexible with its application (Barriball and While, 1994). However, for two of the questions (7 and 8), the researcher had to focus more on eliciting why the two younger participants moved straight from smoking to quitting with an EC as opposed to seeking support from a SSS. The aim of this research was to explore the experiences of EC users; their reasons for using an EC and how their most recent attempt to quit compared to any previous attempts they had made that were unsuccessful. Neither of the two younger participants had attempted to quit before their most recent quit attempts using the support described above. Instead, they had moved straight from smoking to using an EC. Whilst mixing the sample in this way included a wider range of experiences that have been integrated together into this research, doing this could be considered as two distinguishable research results (Schoonenboom et al, 2018). With this in mind future research focusing on the experiences of EC users under the age of 30 would allow a more in depth understanding of why they had chosen not to use other support and pharmacotherapy aids to quit.

Finally, this research was carried out by someone who was involved and worked within SSS and tobacco control within the public health. When a researcher is a member of or has a connection or prior knowledge with a group, or community that their research is focused on it is often known as insider bias (Mercer, 2007). As such it is important to acknowledge the challenges and opportunities that this poses within this research. In contrast to insider research, research undertaken by an outsider has often been considered the only way to carry out research objectively (Chavez, 2008), and as such be criticised for not conforming to the same standards of rigour due to the researcher's closeness to their research

(Brannick and Coghlan, 2007). However, although this researcher had in depth knowledge and experience of the subject area, they were exploring areas of EC use where very little was known. As well as this, the participants that they were interviewing were strangers to them.

Whilst inside researchers have come under criticism for the proximity to their research, there are also key advantages to it. The researcher carrying out this research had an understanding of the subject area and was able to design it in a way that was relevant (Fleming, 2018). An outside researcher on the other hand may not have been able to as efficiently and effectively ascertain the issues needing to be explored and the research designs needed (Smyth and Holian, 2008). There seems to be no definitive agreement within the world of research to indicate what is right or wrong in relation to inside or outside research approaches. There is no way of being purely objective in research, as there will always be reasons why people are motivated to carry out it out, and to address this researcher needed to ensure their research design is rigorous and transparent (Symth and Holian, 2008). The researcher of this research has demonstrated transparency and provided detail about their research journey including their proximity, approach and delivery of it, this includes a self-reflection (see page 43). This transparency demonstrates a technique of rigor which allows readers to follow a clear audit trail of research activity and be clear on the proximity between the researcher and their research.

Conclusion

Whilst this research is not generalisable and is specific to its participants, it has provided valuable and original insight that can be considered by other researchers to determine next steps, as well as stop smoking practitioners and public health professionals working within smoking cessation (Denny and Weckesser, 2018). This research has shown, amongst its participants, that motivations for quitting remain unique to each individual and ECs as a method of quitting works by providing a direct replacement to cigarettes that no other products or support has to

date been able to offer. The EC users in this research were also motivated to continue using their EC to remain abstinent from smoking, and wanted to continue using nicotine and enacting their smoking related behaviours. Trusted sources of information (messengers) that participants referred to were also not the traditional sources that are regularly used by public health bodies, and instead were vape shop workers.

SSS and public health bodies need to continue to understand these nuances in quitting behaviours, as well as the choices and experiences shared by EC users. Doing this will support the continuous improvement to service provision and public health interventions that aim to reduce smoking prevalence and the avoidable morbidity and mortality that smoking brings.

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Appendices

Appendix 1: Systematic Literature Review

Effectiveness of electronic cigarettes compared with recommended alternative methods for smoking cessation: A systematic literature review

ABSTRACT

Background

The popularity of electronic cigarettes (EC) has grown dramatically since their 2006 appearance on the market as an aid for smoking cessation amongst smokers. However, the lack of evidence to support their effectiveness and safety has left healthcare providers unable to advise smokers on the use of them, and how effective they are compared with other available and recommended smoking cessation interventions; nicotine replacement therapy (NRT), prescription only stop smoking medication (POM) and behavioural support. The aim of this review was to evaluate the effectiveness of EC's in supporting smokers to abstain from smoking compared with recommended alternative smoking cessation interventions; NRT, POM, behavioural support or a combination of NRT or POM with behavioural support.

Methods

Four databases were searched for relevant records published between 2004 and January 2016. Search results were screened using specified inclusion and exclusion criteria. Outcome measures of included studies were self-reported or validated, using exhaled breath to identify carbon monoxide levels, abstinence rates at the longest point of follow up.

Results

As a result of implementing the search strategy and screening for inclusion/exclusion criteria, two studies were included to review; a randomised control trial and a cross-sectional population study. Both found EC to yield better abstinence rates compared with nicotine patches or no aid, and NRT bought over the counter or no support (respectively).

Discussion

There is evidence from both studies that EC are more effective for achieving smoking abstinence however, wide confidence intervals around estimates and having such a small number of likewise studies means that the confidence that can be had from results reported in this review are low. The lack of one consistent measure of abstinence (one self-reported and one measuring CO levels in exhaled breath) also adds to the limitations of this review and its suggested results.

BACKGROUND

Condition description

Smoking still remains the highest cause of avoidable premature death and kills more than 5 million people per year worldwide (WHO, 2015), with around 100,000 deaths per year in the UK (Peto et al, 2007). The morbidity and eventual mortality from cigarettes is caused mainly by toxins that smokers inhale, rather than the addictive drug nicotine contained within the smoke. Quitting smoking comes with huge health benefits and complete tobacco cessation is the best solution for the health outcomes of smokers (Farsalinos and Polosa, 2014). This said, a smoker's physical addiction to nicotine combined with the ritualistic behaviour and psychological dependency to smoking create very real hurdles to quitting, even for those who are motivated to quit.

There are a number of ways that a smoker can quit and it is well evidenced that attempting to quit smoking unassisted increases the likelihood of relapse and failure, with supported methods (including the use of nicotine replacement therapy (NRT), prescription only medication (POM) and behavioural and/or motivational support) increasing the likelihood of success (Raupach et al, 2012). There is sound evidence that combining behavioural support (including face to face, online or telephone counselling sessions in a group or 1:1 setting) with pharmacotherapy (NRT or POM), increases the chance of quitting (Stead and Lancaster, 2012). However, even with all of these varying, evidence based support mechanisms available, long term abstinence rates

amongst smokers that have quit still remain low (Hughes, 2014). The support available to motivated smokers wanting to quit has grown over time and with this time, has grown the recognition and understanding that smoking cigarettes (or any other tobacco containing product) is not just that of the physical addiction to nicotine, but also the habitual and psychological dependency that is provoked. These 'non-nicotine' components pose very real barriers to quitting (Rose, 2005). People unarguably become dependent on cigarettes due to the addictive nature of nicotine and its ability to positively stimulate the brains reward system, but what has become more evidenced and understood is the holistic nature of smoking and the addiction to it. Some believe that current methods of support available lack the ability to meet all of the behavioural and sensory aspects of the addiction that the smoker experiences, and goes on to miss when they attempt to quit; such as holding a cigarette in their hand, moving a cigarette between their hand and mouth and inhaling and exhaling smoke (McRobbie et al, 2015). These behavioural cues appear to provide further encouragement and reinforcement to continue smoking and over time for many smokers, prove similar in their addictive nature to nicotine, and can be just as rewarding (Rose et al, 2000). There is a growing body of evidence to support this notion, with several varying reasoning's; inhaling nicotine through cigarette smoke is an efficient way for the smoker to gain a quick hit, as absorption through the lungs is far quicker than through other methods such as the digestive system or transdermally; nicotine takes around seven to ten seconds to reach and act on brain receptors to elicit positive reinforcement, where as a time lag of twenty to thirty minutes can be had between delivering nicotine to the body in other forms (i.e. ingestion) and the smoker achieving a hit. This short period of time therefore between actions (inhaling) and reward (physiological hit) reinforces the desire for the smoker to deliver nicotine to their brain in this way. In contrast to this though, even when nicotine has been delivered intravenously to smokers, the same level of satisfaction has not been reported compared with the satisfaction evoked from smoking (Westman 1996; Rose 2006).

Supporting the argument that it is more than the nicotine addiction that keeps smokers smoking rather than quitting. Other sensory effects that smokers lose when they abstain from cigarettes can also make quit attempts more difficult, and when these are mimicked in other ways have shown to reduce cravings and withdrawal symptoms. For example, Buchhalter et al (2005) found that in the short term, the use of denicotinised cigarettes which have negligible or no nicotine effects helped to suppress some tobacco abstinence withdrawal symptoms including the urge to smoke, irritability and low mood and this was also supported by Walker et al (2012) who found this to be the case for longer term abstinence from cigarettes. An ideal product then for smoking cessation would not only address and reduce the physical nicotine withdrawal, would also act as a substitute for the rituals, behaviours and sensory's that are associated with smoking cigarettes but would not put the health of its users at risk like tobacco smoke does. At present, the only smoking cessation products available that seems to address parts of those aforementioned associations is the nicotine inhalator (McRobbie et al, 2014). The inhalator allows individuals to exercise the 'hand to mouth' action that they display when smoking a cigarette and some anecdotal evidence suggests that it can sometimes mimic a similar sensory effect on the throat that cigarettes elicit. This said however, the inhalator still seems to lack some associations; a lack of exhaled smoke, not feeling like a cigarette to hold and its low nicotine delivery.

Intervention Description

One way that some are starting become convinced is helping to overcome suggested behavioural and sensory voids experienced by smokers when they quit, is with the use of electronic nicotine delivery systems (ENDS). The most common ENDS exemplar are electronic cigarettes (EC) and for the purpose of this review, EC are the ENDS that will be focused on, and throughout the abbreviation that will be used to describe them is EC. These devices do not require the use of tobacco but instead use battery power to heat an element. This then disperses a liquid solution into a smoke like aerosol, or vapour, that the user inhales. The majority of EC

are designed to look, feel and where possible mimic their tobacco counterparts (i.e., cigarettes, cigars, pips and shishas) and so arguably fulfil a smoker's behavioural and sensory voids once they stop smoking cigarettes. They are thought to provide throat and sometimes taste sensations similar to those of tobacco smoke, in a more effective way than the inhalator does and the visible exhaled vapour mimics that of tobacco smoke, and so support the argument for their effectiveness as a smoking cessation intervention.

The extent to what is contained in these solutions is not always fully understood due to the vast number of brands and models available, but as well as nicotine, when nicotine is added, the main constituents are propylene glycol, with or without glycerol, and flavouring agents. Due to such an extensive menu of EC options available, along with their varying amount and delivery of nicotine means that assessing their efficacy is difficult, and conclusions need to relate to the EC brand under assessment rather than being able to make general assumptions or decisions. In some EC, other compounds have also been detected; some of which are known toxins (WHO, 2015). Findings like this often cause concern for health professionals due a small and often conflicting evidence base supporting their long term efficacy and safety. The availability, promotion and use of e-cigs has increased dramatically in recent years and whilst it is believed there is emerging evidence that these devices offer the potential to reduce the harmful effects of smoking and/or help people to quit, the current regulation of all EC remains unclear as does the still very small evidence based associated with them.

Importance of this review

Although there seems to be the start of a general agreement within the UK that EC are effective to help smokers quit and are safer for the user than cigarettes are, and are associated with very few reported unfavourable effects amongst users (Caponnetto, 2013), there is call for them to be regulated appropriately and stringently to ensure that their safety for users and those exposed to exhaled vapour is protected, to monitor their efficacy as a smoking cessation aid, to ensure that their use

in public places does not undermine the smoke free legislation and risks the re-normalising of smoking. As it currently stands, there continues to be growth in sales of EC over time and so health professionals and users alike need to know more of their efficacy to best support smoking cessation efforts.

Aim

The aim of this review therefore was to evaluate the effectiveness of EC's in supporting smokers to abstain from cigarettes compared with alternative available and recommended smoking cessation interventions; NRT, POM, behavioural support or a combination of NRT or POM with behavioural support.

METHODS

Criteria for considering the inclusion and exclusion of studies for this review

Study Types

Due to the nature of smoking, cessation from it and the associated psychological and physical addiction to it, the interest in this field is both of a clinical and psychosocial nature. It was inappropriate therefore to only include studies that complemented just one part of the smoking cessation paradigm (i.e., only inclusion of RCTs). All study designs were therefore considered for this review as long as they compared the use of ECs to an alternative method for smoking cessation, as identified in the review aim. The gold standard methodology for this would be the sole inclusion of randomised control trials (RCTs), with smokers randomised to either ECs or a control condition however, the nature of behaviour change dictates that just including these kinds of studies would eliminate other potentially valid work. However, solely qualitative work was excluded as it was felt this would not be complimentary to gauge the immediate effectiveness of ECs, but would rather be more useful to understand why participants used and continued to use them.

Only studies available in English and in full text form were included, but there was no preference of their publication status. To support the

author's construction of inclusion and exclusion criteria for this review as well as support the development of search strategies, a PICO form and search strategy worksheet was completed.

Study Participants

Participants had to be a smoker at the point of enrolment into the trial or quit attempt. Smokers that were included could be motivated or unmotivated quitters. There were no age requirements for study participants other than they had to be 18 years or older but weren't required to be of a specific gender. Any study that included participants below the age of 18 were excluded from this review. Also excluded were papers that included participants with diagnosed mental health issues, participants who were using other substances such as alcohol and cocaine or those diagnosed with a physical illness at study commencement (both acute and/or chronic).

Intervention Types

The potential interventions that could be compared were; EC's versus; NRT, POM, behavioural support, or a combination of NRT or POM with behavioural support.

Outcome Measures

The primary outcome measures were to be based on an intention to treat basis of abstinence from smoking at the longest point of follow up. The preferred method of abstinence measurement was the verification of self-reported abstinence by testing carbon monoxide (CO) levels in exhaled breath, however self-reported abstinence rates were also acceptable due to the lack of evidence base currently available for this area of work.

Search methods and identification of studies

Electronic Searches and search terms

The search was conducted to identify studies that supported the main aim of this review; to evaluate the effectiveness of EC for supporting smokers to quit smoking compared with other recommended available smoking cessation methods. The search date limitations were set to 2004 to present (January 2016) as EC's only became available from 2004. In January 2016 the following databases were searched:

- CINAHL (via EBSCO) (2004 TO January 2016)
- Medline (via OVID) (2004 to January 2016)
- EMBASE (via OVID) (2004 to January 2016)
- PsychINFO (via EBSCO) (2004 to January 2016)

The search terms used were: (smoker*) AND (electronic nicotine delivery system OR ENDS OR electronic cig* OR e-cig* OR electronic nicotine) AND (NRT OR nicotine replacement therapy OR POM OR prescription only medication OR varenicline OR bupropion OR champix OR zyban OR standard treatment OR behavioural OR pharmacotherapy OR combination). No other resources were searched (i.e., reference lists of papers found as a result of the literature search and no authors of known trials were contacted).

Data collection and analysis

Selecting studies

All titles and abstracts that were initially acquired from the search were screened for inclusion and exclusion criteria by the review author. Full texts of those included were then obtained and screened further to exclude further any publications that were not relevant for this review. Relevant papers identified were also screened by a second reviewer who was post graduate doctorate student. There were no disagreements between the decisions made to include/exclude papers, however if any disagreements had occurred these would have been resolved with the support of a third reviewer.

Inclusion and exclusion criteria were derived from concepts inherent in the existing literature and review question, supporting the ability to carry out a robust review to be compiled.

Quality Assessment of included studies

To assess the quality and risk of bias in included studies, the Effective Public Health Practice Project (EPHPP) quality assessment tool for quantitative studies was used. This was carried out independently by the review author as well as the same post graduate doctorate student who had also supported the review author to select included studies. The EPHPP tool addressed six different areas; selection bias, study design,

confounders, blinding, data collection methods, withdrawals and drop-outs. Each domain was rated as strong, moderate or weak, resulting in a global rating for each paper.

RESULTS

Search results

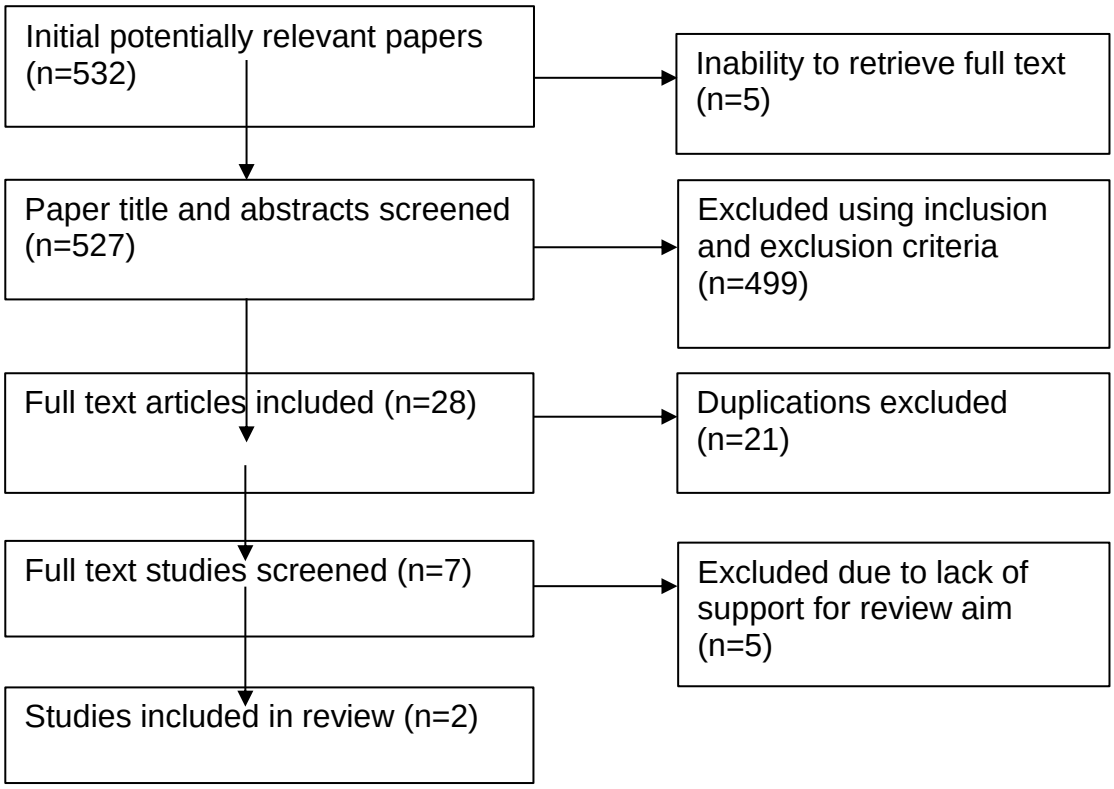
The initial literature search yielded 532 studies, and through abstract screening and then full text screening using inclusion and exclusion criteria, 2 papers were included in the review as illustrated in Figure 1.

Included Studies

One of the studies included was an RCT (Bullen et al, 2013) and the other was a cross-sectional population study (Brown et al, 2014). A summary of the key characteristics of these studies, including their assessment of quality outcome is shown in Table 1. Both papers reported that EC are effective at helping smokers to achieve smoking abstinence compared with NRT or no aid at all. Bullen (2013) randomised 657 smokers (who were middle-aged, highly dependent smokers) that wanted to quit to one of three groups for 12 weeks following a set quit date to use either; an Elusion brand first generation EC that had nicotine cartridges containing 16mg of nicotine, a 24 hour 21mg patch, or an EC that contained no nicotine (placebo EC). Those randomised to use an EC (nicotine containing or non-nicotine containing) were sent these in the post along with a spare battery, charger, nicotine cartridges (with labels to mask the nicotine content) and a set of simple instructions. Those who were randomised to the NRT group were sent exchange cards in the post that could be exchanged for 21mg 24 hr patches at community pharmacies along with instructions on how to use the patches each day from week one of use, up until 12 weeks' post quit date. A voucher to cover dispensing costs were also sent to participants. All randomised participants were referred to quit line to receive behavioural support over the telephone however less than 10% accessed this support. The EC used in this study contained a low nicotine level. This was determined by a subsample of 4 participants who had used the EC for at least one week before. Baseline blood samples were taken and they then took one

puff of their EC every minute for a space of 10 minutes, and then provided blood samples every 10minutes for an hour after they began to puff on their EC. Plasma nicotine concentrates peaked at 10minutes after commencement of use at 3.4ng/ml, a median increase from baseline of 2.1ng/ml. The primary outcome measure was continuous smoking abstinence (self-reported abstinence over the whole follow up period), verified at 6 months post quit date using participants exhaled breath to measure carbon monoxide levels.

Figure 1. *Paper Exclusion process*



This was done in line with the Russell Standard. (West, 2005). The second study included in this review was Brown et al's (2014) cross-sectional population study that aimed to assess the effectiveness of EC's when used to aid smoking cessation compared with NRT bought over the counter, and with unaided quitting. The brand/make of EC's used by respondents was not described, neither was the make and type of NRT product. However, if respondents had received no aid, this meant they had not used EC's, NRT bought over the counter, a prescription stop smoking medication or face to face behavioural support. The use of the

different methods was assessed by asking the question 'Which, if any of the following did you try to help you stop smoking during the most recent serious quit attempt?' The three options aforementioned were; (i) EC's, (ii) NRT bought over the counter, (iii) no aid. Aggregated data was used from respondents to a cross-sectional household survey in England between July 2009 and February 2014. July 2009 was the first wave of the survey to track use of EC's and February 2014 was the latest wave of the survey which data was available. The data set included 5863 adults who had smoked within the previous 12 months and had made one serious quit attempt that was assessed by asking the question 'How many serious quit attempts have you made in the last 12 months? By serious quit attempt I mean you decided that you would try to make sure you never smoked again. Please include any attempt that you are currently making and please include any successful attempt made within the last year.' Measure of outcome was self-reported non-smoking up to the time that the survey was completed, by asking the question 'How long did your most recent serious quit attempt last before you went back to smoking?' Those who answered 'I am still not smoking' were classed as non-smokers.

Intervention Effect

Bullen et al (2013) found that verified continuous abstinence at 6 months after quit date, verified by measuring CO in exhaled breath was highest amongst those who were assigned to use nicotine containing EC's (7.3%) compared with the patches group (5.8%) and the placebo EC's group (4.1%). However, when comparing the abstinence rates between those using nicotine containing and placebo EC's no significant difference could be reported; (7.3% vs. 4.1%, RR 1.77, 95% CI = 0.54 to 5.77), and this was also the case when comparisons between nicotine EC and NRT patch user outcomes were compared; (7.3% vs. 5.8%, RR 1.26, 95% CI =0.68 to 2.34). Superiority of EC as a more effective method of cessation at 6 months could not be claimed to insufficient statistical power and significance. Repeated measures at 1 month showed a benefit to using ECs compared with NRT patch (23.2% vs 15.9%, RR 1.46 $p<0.05$ 95%

CI =1.04 to 2.04), however this was based on self-reported abstinence, not CO verified abstinence.

EC users in the Brown et al (2014) study were more likely to report smoking abstinence compared with those who had used NRT bought over the counter

Table 1. ***Characteristics of included studies***

STUDY	**Bullen et al (2013)**
METHODS	**Design:** 3 parallel group RCT **Recruitment:** Community newspapers, inviting people to call the study centre **Setting:** Research centre, New Zealand (NZ) **Inclusion Criteria:** 18 years of age and over, had smoked ten or more cigarettes per day for the past year, wanted to stop smoking and could provide consent **Exclusion Criteria:** Pregnant and breastfeeding women, anyone using cessation medication or who were engaging in an existing cessation programme of support, those who had suffered heart attack, stroke or severe angina in the previous 2 weeks and anyone with a poorly controlled mental disorder, allergies or any other chemical dependence
PARTICIPANTS	**Total number**: 657 randomised and included in Intention to Treat analysis 62% women with a mean age of 42and included both NZ Māori and non-Māori ethnicities. The mean fagerstrom test for nicotine dependence was 5.5

	Lost to follow up or discontinued treatment at 6 months: 48/289 in nicotine e-cigarette group (NEC), 80/295 in the patches group (PAT) and 16/73 in the placebo e-cigarette group (PEC).
INTERVENTION	Randomised 4:4:1 to NEC (16mg nicotine cartridge -elusion brand sent to participants via courier), PAT (24-hour 21mg patch that were retrieved by the participants being sent vouchers that were exchanged for patches at a pharmacy) and PEC (same as NEC, but cartridges contained 0mg nicotine) for 13 weeks (from 1 week before to 12 weeks after quit date). All randomised participants were referred to Quitline and offered behavioural support via telephone or text- uptake was <10%
OUTCOMES	**Primary:** Continuous smoking abstinence (self-reported over the whole follow up period allowing for 5 or less cigarettes to have been consumed in total) 6 months after quit date (validated at this point in time by exhaled breath carbon monoxide measurement or <10ppm)
RESULTS	**Statistical Analysis:** Chi-Squared test with multivariate adjusted regression **Findings:** insufficient statistical power to conclude superiority of NEC to PAT or PEC however e-cigarettes with or without nicotine were modestly effective at

	helping smokers quit, as were nicotine patches
QUALITY ASS.	
BIAS	**Reviewers' judgement and support for judgement**
SELECTION BIAS	Weak: not representative of target population as self-referred
STUDY DESIGN	Strong: RCT with described method of randomisation
CONFOUNDERS	Moderate: Most relevant cofounders controlled for
BLINDING	Moderate: Assessor unaware of exposure status, unknown if participants were aware
DATA COLLECTION	Strong: Valid and reliable collection tools
WITHDRAWALS/DROPOUTS	Strong: Drop out reasons reported
STUDY	**Brown et al (2014)**
METHODS	**Design:** Cross-sectional survey **Inclusion criteria:** Those who had made a quit attempt in the previous 12 months and had used EC, NRT bought over the counter or those who had received no aid (defined as not using; EC, NRT, POM or face to face behavioural support). **Exclusion Criteria:** Had used EC or NRT in combination with one another, a POM or face to face behavioural support
PARTICIPANTS	Aggregated data of 5863 adult respondents who had smoked within the previous 12 months and made at least one quit attempt during that period with either and EC (n=464), over the counter

	bought NRT (n=1922) or with no aid in most recent quit attempt (n=3477)
INTERVENTION	Comparative study of aggregated data to compare effectiveness of EC compared with NRT bought over the counter or no aid.
OUTCOMES	**Primary:** Self-reported non-smoking up to the time of the survey
RESULTS	**Statistical analysis:** logistic regression-regressed outcome measure (self-reported non-smoking compared with smoking) on the effect measure (use of e-cigarettes compared with either NRT bought over the counter or no aid) **Findings:** After adjusting for potential confounders, EC users were more likely to report abstinence than those using NRT or received no aid
QUALITY ASS.	
BIAS	**Reviewers' judgement and support for judgement**
SELECTION BIAS	Strong: Representative
STUDY DESIGN	Moderate: Not an RCT
CONFOUNDERS	Moderate: Relevant cofounders controlled for
BLINDING	Weak: Assessor aware of exposure status, unknown if participants were aware
DATA COLLECTION	Moderate: Self reporting bias reduced due to no social pressure to claim abstinence
WITHDRAWALS/DROPOUTS	Moderate: Drop out numbers reported

(Unadjusted odds) (OR=2.23, 95% CI=1.70-2.93, 20.0 vs 10.1%) and compared with those who received no aid or support (OR=1.38, 95% CI=1.08-1.76, 20.0 vs 15.4%). The difference between reported effectiveness of EC compared to NRT bought over the counter and no aid continued to persist when adjusted for a range of related smoking characteristics. Fully adjusted odds of smoking abstinence in EC users was 1.63 ($p<0.05$, 95% CI=1.17-2.27) times higher than those who used NRT bought over the counter, and 1.61 ($p<0.05$, 95% CI=1.19-2.18) times higher compared with those who received no aid or support.

Risk of bias

The risk of bias within the Bullen et al (2013) RCT was considered low across the majority of quality assessed component ratings, with a moderate score for quality however there was strong selection bias. Participants were not representative of the target population as they were not randomly selected from a list of individuals in the target population, but instead they self-referred meaning that selection bias was high. The randomisation procedure though that was used once participants were selected was appropriate, as was their method of CO validating self-reported abstinence rates. There were around 78% of participants that completed the study, meaning that quality of withdrawals/drops outs was deemed strong (and thus low bias). The group assigned to receive the patch had a higher lost to follow up rate (LTFU) than did the nicotine EC and placebo EC however intention to treat analysis and protocol analysis differences were minimal, again meaning that bias risk was low. In the Brown et al (2014) study, again the quality global quality rating for the paper was moderate, however there were components that were judged by the reviewers to be of a lower quality, with higher levels of bias. Selection bias was low, and judged as strong in its quality, however blinding within the study was unclear resulting in a weak quality rating along with heightened risk of bias. Data collection methods were also subject to increased bias because participants self-reported their smoking abstinence status that was not then verified by CO validation of exhaled breath. Details of quality assessment judgements are shown in Table 1.

DISCUSSION

Summary of the evidence

In relation to addressing the review aim, it has been shown by the two included studies that in comparison to NRT (either bought over the counter or the use of 24hr/21mg patch), placebo EC and no aid or support, ECs are and effective smoking abstinence intervention. However, even though the two included studies were judged to be of moderate quality (as opposed to weak or strong), the overall combined quality of the evidence is low because of the small base of evidence that is available. The Bullen (2013) RCT was of good quality; with adequate randomisation and treatment allocation. The abstinence outcome data was also collected in line with recommended practice standards through the CO validation of self-reported smoking status at 6 months follow up. However, the time from quit date to the 6 months follow up relied on self-reported abstinence data, which is not considered to be of equivalent recommended practice to confirmed CO validation of exhaled breath. The Brown et al (2014) study was not a randomised control trial and therefore this resulted in differences in the characteristics of participants using different methods to help them quit. This therefore means that other confounding factors that were not controlled for, and that may have been associated with the self-selection of treatment used may have influenced findings. One example of this could be motivation to quit being associated positively with use of treatment and thus abstinence rates, compared to those who were less motivated. This said though, Vangeli et al (2011) found that this was not the case, and that strength of motivation was not associated with success of participants quit attempts once their attempt had commenced. One other major limitation of Brown et al (2013), was the reliance on self-reported abstinence, as opposed to CO verified outcomes. This introduces the risk of reporting bias from participants and presents difficulties to adequately compare with each of the study outcomes in a robust way and instill confidence in overall review findings. Although reporting bias seems to be high, some would argue that this risk is lower amongst participants who are taking part at a

distance and not in a controlled environment as they do not feel the same pressure to misreport and so it is generally considered to rely upon this type of self-reported data (Wong et al, 2012).

To further examine the effectiveness of ECs in comparison to other recommended interventions for smoking cessation and abstinence, more research needs to be done to add to and strengthen the confidence of EC efficacy. Neither of the two included studies reported adverse effects associated with EC amongst their study population, that adds to the increasing body of evidence that suggests EC are safe for use, and safer for users than cigarette smoke (Buchhalter et al, 2005). The huge variety of EC products now available, as well as their ever changing design and ability to deliver nicotine, means that the kinds of EC's that smokers are using to quit needs to be understood, so that intervention selection can be based on representative use, standards, reliability and satisfaction. What also needs to be considered for future RCT trials, and others alike is the real-world use of ECs; with consideration for how and when people use them, and the preferences individual users have for the strengths and flavours of preferred liquids, as well as the aesthetic, ergonomic, behavioural and sensory preferences of the EC device. Although the gold standard to measure the effectiveness of medications like nicotine, and the devices used to deliver it is to compare the active intervention with a placebo or control in a randomised and controlled way (i.e., using an RCT to test), comparing EC's with placebo EC's is not as simple as measuring an active against a placebo intervention because of the associated sensory and behavioural replacement they arguably offer to smokers in the absence of cigarettes (Rose et al, 2000). By offering nicotine, sensory and behavioural replacement therapy, a placebo controlled trial of ECs may in essence, remove the sensory and behavioural elements, and simply just compare the effects of the nicotine being delivered in the 'active' arm therefore there may be a risk that the effects of what EC's offer to a smoker may not be appropriately measured, compared and understood. Both studies although have evidently demonstrated that EC are seemingly more effective than their study comparisons at aiding

smoking cessation, what they don't attempt to understand are the reasons why certain interventions are chosen (i.e., NRT or EC). More work therefore needs to be done to understand if EC are more effective because they fulfil not only nicotine lost through smoking cessation, but if they also satisfy the behavioural and sensory voids that are so often reported as barriers to quitting and long term abstinence for smokers (Rose 2000; Westman 1996; McRobbie 2015)

More research also needs to be had to compare ECs with usual care that is currently offered and advised to smokers, or minimal/no support to understand why people choose to use EC's rather than other available support recommended by bodies such as National Institute for Clinical Excellence (NICE) and to understand further the effectiveness comparisons. NICE (2008) recommend that NHS providers of stop smoking services offer face to face support to smokers in this way, in a group or 1:1 setting. With these recommendations in place and with NHS services locally and nationally being guided by this as best practice, future research needs to attempt to understand is EC's offer better or equivalent outcomes to pave the way, or not, for their place as a recommended smoking cessation intervention.

Funding

This systematic review was not funded by any third party, neither did the review author receive support (i.e., supply of data, etc.) from anyone else other than a second reviewer (post graduate doctorate student) to screen for potentially relevant studies to be included and to quality assess the two studies that were included; to reduce reporting bias.

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Appendix 2: Interview Schedule

Semi-Structured Interview Schedule

Before starting interview, ensure that the participant has read and fully understood the participant information sheet and signed the consent form.

Explain to the participant that the overall purpose of the interview is to try and understand their experience(s) of using an electronic cigarette (EC) as an aid to stopping smoking; as part of the support, they have received from their stop smoking service support, or compared with this support.

1. **Can you tell me about your smoking history?**
    - How long have they been smoking for?
    - Why they started to smoke
    - What made you want to quit

2. **Can you tell me about why you started to use an electronic cigarette?**
    - What was their appeal? (Health, money, safety, issues with tobacco, harm reduction)

3. **Do feel there are similarities and differences between smoking and EC and smoking cigarettes?**
    - Taste, feel, satisfaction, safety compared to tobacco
    - Are these the reasons why they use them?

4. **How much do you use your electronic cigarette?**

5. **How much did you used to smoke?**
    - Explore any differences in use:
        - Health/harm meaning smoke EC more
        - Smoking EC in places where you can't smoke cigarettes
        - Cravings
        - Taste
        - Accessibility
        - Stigma and acceptability

6. **Do you/did you find using an EC a positive or negative experience?**
    - Quitting aid
    - Health
    - Availability/accessibility to replacement parts/ refills
    - Has it helped to stay smoke free for longer than other quit aids?

- Is your EC something you ever plan to stop using? Explore why
- Feels like smoking
- Harm reduction

7. **Thinking back to other quit attempts you may have made in the past; can you tell me about how you went about these**
    - Pharmacotherapy use
    - Support from a stop smoking service:
        - Probe positives and negatives/ elements of the support:
            - face to face, weekly meeting, Co monitoring, acceptance (or not) of EC, peer support
    - Cold turkey
    - What made them successful/unsuccessful?
        - Stop smoking service support (above)
        - CO monitoring
        - Medication
        - Lack of ongoing support

8. **Can you tell me about how your current quit attempt/ using an EC is different from the previous attempts you have just talked about?**
    - What makes it different
    - What is better/ worse
    - If EC weren't available, would you have given up giving up
    - Have you looked for other support e.g., vape shops/ Facebook groups- if yes explore what and the value it brings?

9. Depending on participants current situation (just using EC or also using a stop smoking service) depends on how next question is framed: **Was there anything missing from your EC quit attempt that you think you could have benefited from?**
    - More regular support
    - More information about EC
    - Free access to EC
    - EC only groups (if they have had group support)
    - Different information and support offered by the advisor
    - More guidance on EC use
    - Help to understand information in media about EC

10. **Is there anything more that you want to add or anything important that you feel we haven't talked about?**

Appendix 3: Participant Questionnaire

Participant Questionnaire (Please circle or insert your answers)
Participant Number: ……

1. Gender: Man Woman

2. Age: ……

3. Tobacco smoking and E-Cigarette use:

   Ex-smoker and Ex-vaper/e-cig user
   Ex-smoker and current vaper/e-cig user
   Current smoker and ex-vaper/e-cig user
   Current smoker and current vaper/e-cig user

4. How often do you use your e-cigarette?

   Do not use an e-cigarette currently

   Only a few times a day

   Only at certain times of the day

   Frequently throughout the day

   Constantly throughout the day

5. How often do you smoke tobacco?

   Do not smoke currently
   Smoke Sometimes
   Smoke daily

6. Length of time using e-cigarette during last quit attempt:

   1 week or less

1 month or less (but more than 1 week)

6 months or less (but more than 1 month)

1 year or less (but more than 6 months)

More than 1 year

7. Type of Electronic Cigarette using/used:

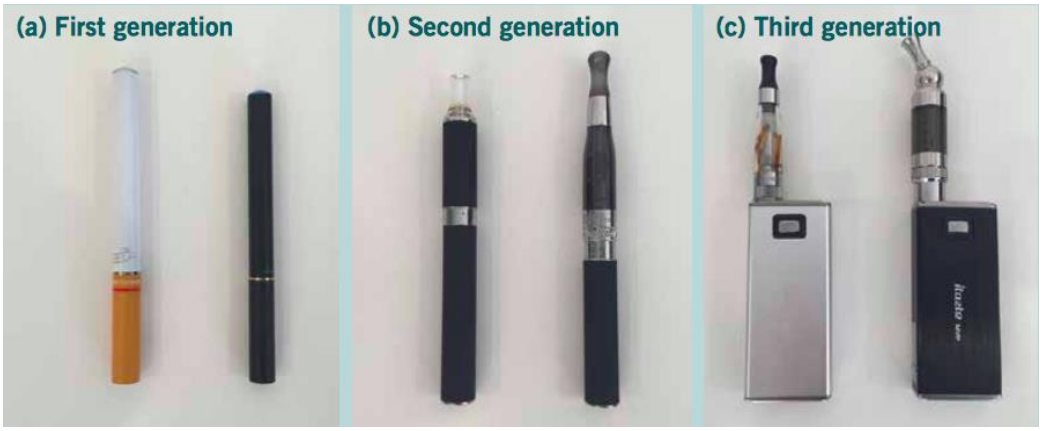

Image: *Anna Phillips, Changing Behaviour: Electronic Cigarettes. Available from: https://www.bps.org.uk/sites/bps.org.uk/files/Policy%20-%20Files/Changing%20behaviour%20-%20electronic%20cigarettes.pdf*

Appendix 4: Recruitment Leaflet:

Specific appendix removed from publicly available version due to containing researchers' personal information.

Appendix 5: Participant Information Sheet

Specific appendix removed from publicly available version due to containing researchers' personal information.

Appendix 6: Consent Form

Informed Consent Form

Project title

An exploratory study of user's experiences of electronic cigarettes and their potential for smoking cessation services

By signing below, you are agreeing to the following statements:

- You have read and understood the participant information sheet
- You have had the opportunity to ask questions about the research and your part in it, and have had them appropriately answered
- You understand that all efforts will be made to make sure you cannot be identified
- You agree that any data gathered in this research will be stored anonymously and securely, and will be used only for this research
- You understand that your participation is purely voluntary and you can withdraw yourself and any data you have contributed at any time prior to your interview and within one month of your interview taking place without having to give any reason
- You are aware of the support mechanisms available to you should you wish to access them
- You agree to take part in the study
- You give your consent to be contacted by telephone after the interview if the researcher needs to clarify that they have correctly understood what you meant during your interview. If you do not wish to be contacted by the researcher for this reason, please tick this box □ Opting not to be contacted by the researcher after the interview means that you can still take part
- You are 18 years old or over

_____

Participants Name* (PRINTED)

_____

Participants Signature and Date

_____

Name of researcher obtaining consent (PRINTED)

_____

Signature of researcher obtaining consent and Date

**Participants wishing to preserve some degree of anonymity may use their initials (from the British Psychological Society Guidelines for Minimal Standards of Ethical Approval in Psychological Research)*

Appendix 7: Ethics

Specific appendix removed from publicly available version due to containing researchers' personal information.

Appendix 8: First Ethics Amendment

Specific appendix removed from publicly available version due to containing researchers' personal information.

Appendix 9: Second Ethics Amendment

Specific appendix removed from publicly available version due to containing researchers' personal information.

Appendix 10: Tracy (2010) Criteria for quality with evidence of achievement, as referred to in Tracy, S. (2010)

Criteria for Quality (key markers)	**Evidence of achievement**
Worthy topic	The topic of research is; relevant, timely, significant and interesting
Rich rigour	The study uses sufficient, abundant, appropriate and complex; theoretical constructs, data and time in the field, sample(s), context(s), data collection and analysis processes
Sincerity	The study is characterised by; self-reflexivity and subjective values, biases and inclinations of the researcher(s), transparency about the methods and challenges
Credibility	The research is marked by; thick description, concrete detail, explication of tacit (no textual) knowledge, and showing rather than telling, triangulation or crystallisation, multivocality, member reflections
Resonance	The research influences, affects, or moves readers or a variety of audiences through; aesthetic, evocative representation, naturalistic generalisations, transferable findings
Significant contribution	The research provides a significant contribution; conceptually/theoretically, practically, morally, methodologically, heuristically
Ethical	The research considers; procedural ethics (such as human subjects), situational and culturally specific ethics, relational ethics and exiting ethics (leaving the scene and sharing the research)

Meaningful coherence	The study; achieves what it purports to be about, uses methods and procedures that fit its stated goals, meaningfully interconnects literature, research questions/foci, findings and interpretations with each other