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Emerging emergency of e-cigarette: An overview

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ABSTRACT

Teenagers are quickly adopting electronic cigarettes, or "e-cigarettes," as a new trend that heralds in the era of vapors. With the help of battery-operated e-cigarettes, users can simulate traditional smoking by heating a liquid solution that usually has flavoring into an aerosol mist that they inhale. The purpose of this review article is to discuss the risks to health and lung damage that are associated with using e-cigarettes. To review the emerging emergency of e-cigarettes of the most susceptible group of teenagers who start using e-cigarettes. It is recommended that community-based and local health authorities endeavor to instruct youth on the detrimental consequences of vaping and enacting legislation that forbids minors from obtaining electronic cigarettes. We reviewed many literature articles from online electronic databases were the PubMed, EMBASE, and Google Scholar databases: teens, vaping, e-cigarettes, and adolescents. This review article is all about the widespread e-cigarette use, particularly among some adolescent demographic subgroups. It is focusing on e-cigarette/vaping. Electronic cigarettes are growing in popularity all over the world. Thus, nations must enact laws outlawing vaping in public areas and imposing more stringent regulations on the use and marketing of electronic cigarettes. In this review, explained about the consequences for human health including coronavirus disease 2019. To raise community awareness about vaping with e-cigarettes, information campaigns must be planned and executed. It is necessary to control the menace of e-cigarette/vaping in society to save the generation.

Keywords: electronic nicotine dispensing systems, vaping, youth, smoking, health risks

INTRODUCTION

Electronic nicotine dispensing systems (ENDS), sometimes referred to as e-cigarettes, are gaining popularity as a safer substitute for conventional tobacco use. For over a decade, electronic cigarettes have been available in the market. They primarily consist of an atomizer or heating element that heats the e-liquid to generate a vapor that can be breathed through a mouthpiece, a cartridge that holds e-liquid and a rechargeable battery [1, 2]. Various e-liquids and electronic devices are readily available in stores and online. In 2003, Hon Lik, a Chinese pharmacy technician, created the first electronic cigarette [3]. Lik made the decision to develop a less hazardous nicotine delivery system because he was dissatisfied with alternative nicotine treatments. He was inspired by the passing of his frequent smoker father from lung cancer as well as his personal dissatisfaction with the current state of modern medicine. E-cigarettes were first introduced to the global market in 2007 following a huge success in China. In 2008, FDA declared e-cigarettes to be both a drug and a device, which stopped smoking everywhere from bringing the product into the US. FDA claimed that these products fell within its jurisdiction and required FDA approval prior to being made available for purchase [4]. The study of review literature for this article was done by electronic databases PubMed, Google Scholar, Science Direct, and many more national and international relevant articles were studied in-detail.

ABOUT ELECTRONIC NICOTINE DELIVERY SYSTEMS

ENDS cover a wide range of gadgets designed to release an aerosol for inhalation, commonly known as "vaping." They cover a wide range of goods, such as smoking hookahs, pens, vaping devices and e-cigarettes. A mouthpiece that is used for inhalation, a vaporizing chamber with a heating element, a container holding the liquid formulation and a battery make up the structural elements of each device [5, 6]. Many of these devices which function as alternatives to conventional marijuana contain substances derived from cannabis, despite the fact that the majority of them also feature a flavoring agent. A few of the factors to consider are the liquid's contents, the heating element's electrical features, the temperature attained and the chemical composition of the ensuing aerosol. Since

their introduction, electronic nicotine delivery systems have experienced multiple changes in size, shape and flavoring agent, which has increased their appeal to teenagers and young adults [7]. The number of middle and high school students using electronic cigarettes has increased dramatically since the release of the newest model, which are pod-based devices like JUUL, which are manufactured by Juul Labs Inc. in San Francisco, CA, USA. These gadgets resemble USB drives more closely and are smaller [8]. The number of high school students who reported using e-cigarettes increased from 12% in 2017 to 19% in 2019 [9].

E-CIGARETTE MARKETING

According to the surgeon general's report from 2016, flavors and a wide range of media platforms and strategies that have previously been employed to market traditional tobacco products to children and young adults are used to promote e-cigarettes [10]. Manufacturers of e-cigarettes revived tobacco companies decades old marketing strategies to get children to start smoking, including some that were illegal for tobacco companies to use because of their kid-friendly nature [11].

Types of E-Cigarette Marketing

Youth-focused advertisements, free samples and sponsorships of youth-focused events like motor races and music concerts, celebrity spokespeople who present using e-cigarettes as appealing, social media marketing, kid-friendly and sugary flavors are some of the e-cigarette marketing strategies employed. Federal Trade Commission (FTC) documents show that among $197.8 million in 2015 and a record high of one billion dollars in 2019, the major manufacturers of e-cigarettes spent over five times as much on product advertising. By 2020, however, their spending had dropped to $719.9 million [12]. Exposure to e-cigarette advertisements is one of the "factors that has contributed to the surge in e-cigarette use among youth", according to a previous statement from FTC [13]. These results are consistent with earlier research that demonstrated rising marketing expenditures in the years when the use of e-cigarettes by minors increased [14]. Independent ad-tracking data indicates that JUUL drove the majority of the increase in spending in 2018 and 2019, with BAT/Reynolds (manufacturers of Vuse) and ITG Brands (manufacturers of blu) following closely behind. 90% of observed ad spending by 2020 was attributable to BAT/Reynolds following JUUL's discontinuation of all digital, broadcast and print advertising for products [15]. The rising appeal of e-cigarettes, particularly JUUL, one of the most well-known brands, has been facilitated by social media. JUUL, the well-known e-cigarette company, was among the first to primarily rely on online platforms for product marketing and promotion, according to a study that examined its marketing. Compared to other brands, JUUL initially made fewer investments in conventional marketing channels and these costs dropped as the company raised its social networking existence and developed more content [16].

E-VAPING AROUND THE WORLD

E-liquids consist of nicotine, but not tobacco. They frequently have unhealthy additives, flavors and chemicals in them. The reality that these items are being fully distributed to adolescents and are accessible for purchase as everyday items worries the World Health Organization (WHO). At the moment, 74 countries lack legislation governing these harmful products and 88 nations have no age limit for purchasing e-cigarettes. E-cigarettes are marketed to children on social media platforms and through celebrities, they are available in more than 16000 delectable flavors. Younger customers will be drawn to some of these items because of their animated characters and stylish designs. Some appear to be games and toys. Young people and children use e-cigarettes at an alarmingly higher rate than adult users in many countries. Positive views toward e-cigarettes as well as a greater desire to use these items have been linked to even minimal exposure to electronic cigarettes content on social networking platforms [17].

Furthermore, open-ended responses were coded to find out if a significant percentage of respondents supported any additional reason. They were questioned about any other possible explanations that weren't covered. The argument that e-cigarettes are better than traditional cigarettes was the only recent defense set forth. Participants were asked to select the one they believed to be "most important" after supporting everyone that they felt appropriate. The most important things, according to a small percentage of respondents, were not saving money or smelling like cigarettes. The idea that there is less health risk associated with electronic cigarettes came in second (eight percent). Merely 4-6% of the respondents deemed it the most important issue to reduce the amount of tobacco products consumed and use in smoke-free areas [18]. The regular online activities of young people appeared to be a significant factor in their use of electronic cigarettes, irrespective of their country of origin or usage level. Simple access to online markets allowed young people to create and consume social media content related to vaping. Those who knew the most about this product were smokers, men, young adults and adults with less education. Given the way ENDS products are marketed, it should not be shocking that younger consumers are becoming more aware of them. Over the past two years, ENDS has been aggressively promoted online through social media pages, search engine websites and promotional videos. The audience for these online advertisements has grown. Additionally, e-cigarettes "are growing more and more widespread at shopping mall kiosks", according to reports [19].

HARMFUL HEALTH EFFECTS OF E-CIGARETTES

From conception to death, practically every bodily system in the human body is negatively impacted by the use of ENDS or e-cigarettes [20, 21]. A typical cartridge can contribute to nicotine addiction because it has roughly the same amount of nicotine as a pack of 20 regular cigarettes [22]. The consumer is also kept within a state of mystery about the actual contents of the products they use because the amount of nicotine and other chemical substances in these products varies widely. Studies conducted on these nicotine solvents have shown that a variable degree of release of potentially carcinogenic substances, including acetaldehyde, formaldehyde and acetone, can occur based on the battery output voltage [23]. A number of serious health effects, such as cancer and ailments of the heart, lungs and brain have also been connected to the metals and dangerous chemicals discovered in the liquid-

vaporizing remedies [20, 21]. Furthermore, because refill fluid flavorings are cytotoxic, it has been demonstrated by multiple studies that the flavors used in e-cigarettes to attract consumers may also be harmful to their health [24, 25]. Expectant mothers who use ENDS aerosol or are passively (second-hand) exposed to it have serious concerns about safety because stem cells are more susceptible to cytotoxicity than differentiated adult pulmonary fibroblast cells [26]. Research has indicated that, although ENDS aerosol is marketed as "water vapor," the vapor in e-cigarettes is actually particulate. These devices deliver particles that resemble regular cigarettes in terms of shape, distribution and amount. The majority of particles are ultrafine, which makes it easy for them to enter the bloodstream and go deep into the lungs [27, 28]. According to a study, human bronchial cells exposed to e-cigarette aerosol exhibit gene expression patterns similar to those of cells exposed to tobacco smoke. Furthermore, e-cigarettes can damage DNA and cause cell death, as demonstrated by cell lines [29, 30]. E-cigarettes have been shown to have negative effects on the cardiovascular system [31-33], contain known carcinogens [34, 35], impair immune cell function and respiratory function [36], affect airways similarly to smoking cigarettes, cause severe respiratory diseases [37] and pose risks to the development of the fetus, infant and child's brain [10, 38].

E-CIGARETTE CONSUMPTION DURING COVID-19

As per multiple reports, individuals who smoke or use vape devices have an increased risk of acquiring severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections or worsening their COVID-19 infection [39]. Despite evidence from a systematic review to the contrary, a meta-analysis refuted the idea that smoking cigarettes is linked to greater damage from COVID-19 [40]. Another issue with the meta-analysis was the small sample sizes. It's interesting to note that most research indicates a connection between higher respiratory tract levels of angiotensin-converting enzyme 2 (ACE2) and COVID-19 adverse effects of smoking or vaping. It's common knowledge that ACE2 is the gate that allows SARS-CoV-2 to get into the respiratory tract [41, 42]. Alveolar macrophages and type 2 alveolar epithelial cells are the primary cells that express ACE2. The majority of research in this area to date indicates that compared to healthy non-smokers, smokers exhibit greater amounts of ACE2 within their lungs [43-45]. However, despite a recent report suggesting that vaping with e-cigarettes also caused nicotine-dependent ACE2 upregulation, other studies have not found increased lung ACE2 expression in either e-cigarette users or acute inhalation of vapor from e-cigarettes, regardless of the presence of nicotine in the e-liquid [46, 47].

CONTROL OF E-VAPING

Despite a steep decline over decades, South-East Asia remains the world leader in tobacco consumption, with vaping gaining popularity. Therefore, WHO is recommending that the countries in the region step up their efforts to reduce the use of tobacco products and electronic cigarettes. The region remains to have the greatest prevalence of using tobacco products, which increases the risk of fatal diseases like heart disease, lung cancer and respiratory disorders. E-cigarette regulations must also be implemented immediately because e-cigarettes have not been shown to be a successful tool in helping people stop smoking. To protect people's health and save lives, we must take all necessary measures to restrict the use of tobacco and e-cigarettes. While tobacco use in the WHO South-East Asia Region reduced from 68.9% in 2000 to approximately 43.7% in 2022, 411 million people are expected to continue using tobacco, according to the most recent data released this year. With 280 million smokeless users of tobacco (roughly 77% of the total worldwide) and approximately 11 million adolescent tobacco users (roughly 30% of the worldwide total) in the 13-15 age range, the region leads the world in both categories. The use of electronic cigarettes is growing globally, especially among youth, and mixing them with traditional cigarettes is commonplace. Thailand is one country where the use of e-cigarettes has been closely monitored. According to 3.3% in 2015 to 17.6% in 2022, kids in elementary school there used e-cigarettes more frequently. WHO is dedicated to advocating for laws that prevent the tobacco and electronic cigarettes industries from threatening the wellness of the over 2 billion people living in the region. While e-cigarettes are prohibited in the nations of DPR Korea, India, Nepal, Sri Lanka, Thailand, as well as Timor-Leste, they are regulated as tobacco products in the Maldives. The nations in this region have made great strides in the fight against tobacco over time. The highest decrease in tobacco use among all WHO regions was seen in men's use, which decreased from 68.9% in 2000 to 43.7% in 2022 and the female use, which decreased from 33.5% in 2000 to 9.4% in 2022. It is anticipated that WHO African Region as a whole will meet the NCD 2025 go after of a 30% decrease in tobacco consumption by 2025. India and Nepal are predicted to have achieved the NCD go after by reducing tobacco use by a minimum of 30% by 2025, while eight other countries are predicted to have decreased tobacco use by less than 30%. India launched the "Tobacco Endgame" and Bangladesh declared that it would do away with tobacco use by 2040. WHO MPOWER M: Monitor tobacco use and prevention policies; P: Protect people from tobacco smoke; O: Offer help to quit smoking; W: Warn about the dangers of tobacco; E: Enforce bans on tobacco advertising, promotion and sponsorship; and R: Raise taxes on tobacco] package along with other measures to combat tobacco are being followed by the countries in the region when they implement demand reduction strategies. The tobacco industry's powerful influence necessitates the use of more forceful methods to enforce the control of tobacco laws and regulations [48].

REGULATIONS FOR E-VAPING

To reduce the potential health risks associated with e-cigarettes, WHO framework convention on tobacco control invited all of its signatories to consider outlawing or regulating them [49]. Even though India's e-cigarette ordinance forbids the production, distribution and sale of e-cigarettes, other nations have approached e-cigarette regulation very differently. At the moment, the production, sale and promotion of electronic cigarettes are prohibited in more than 39 nations, such as Thailand, Mexico, and Brazil. Furthermore, it is explicitly forbidden to own e-cigarettes in Singapore and Cambodia. Nonetheless, WHO advised the more than 98 other nations such as the UK, Canada, and France that chose not to outlaw e-cigarettes to pass the following legislation:

(1) prohibit youth and non-smokers from starting to use e-cigarettes,

(2) reduce the health risks that e-cigarette exposure could bring to users and non-users,

(3) stop making unsubstantiated health claims about e-cigarettes, and

(4) shield tobacco control initiatives from any kind of e-cigarette-related commercial concerns.

Emerging emergency of e- cigarette to enforce these regulations, various regulatory mechanisms have been put in place by countries. These include identifying e-cigarettes as tobacco-related goods, outlawing sales to minors, restricting use in public areas and regulating the maximum amount of nicotine that can be found in e-cigarettes.

For instance, producers of e-cigarettes are required by the European Union's tobacco products directive to cap the level of nicotine at 20 mg/ml [50]. Furthermore, electronic cigarettes must have warning labels alerting users to the fact that they contain nicotine and are not recommended for use by non-smokers. In contrast, product packaging in the UK is required to include details about the product's ingredients as well as information about its nicotine content, toxicity, adverse effects and addictive qualities [51].

FUTURE DIRECTIONS

Nowadays, a wide range of e-cigarette brands are available from brick-and-mortar and online retailers [52]. The amount of money used to promote e-cigarettes increased significantly [53], but there are still unanswered concerns regarding their long-term health effects and safety based on the body of available scientific research. Because of the intensive marketing, e-cigarettes became widely accepted in all age groups, particularly among vulnerable adolescent and youth populations [54-57]. Indeed, 4.3% of middle school students and 11.3% of high school students reported using e-cigarettes in the previous year, according to recent US reports [58]. Moreover, reports from the UK, based on data from 60,000 youth aged 11 to 16, showed that 1% to 3% of the youth regularly used e-cigarettes, and 7% to 18% of them did so at some point in their lives [59]. Furthermore, data collected from 24,658 respondents in the 2012 national youth tobacco survey showed that almost one-third of teenagers in the USA think e-cigarettes are safer than traditional cigarettes [60]. The vapour from e-cigarettes contains many of the same known dangerous ingredients found in conventional cigarettes, which include formaldehyde, cadmium and lead, though usually in smaller concentrations. While the safety of e-cigarettes and their potential to assist smokers in quitting are still debatable, the short and long-term health effects of using these devices are still unknown. Of particular concern is e-cigarette marketing, which perpetuates the myth that e-cigarettes are less hazardous than traditional tobacco cigarettes [61]. Vitamin E acetate has been connected to lung damage related to e-cigarettes or e-cigarettes, particularly among users of tetrahydrocannabinol based items, two cases were additionally linked to coconut oil and limonene, although research into other potential agents is still ongoing [62]. Research is also needed to evaluate unknown risk factors and understand additional causes of pulmonary damage associated with vaping and electronic cigarettes products. Given the growing popularity of these devices, more research is required to fully comprehend the long-term effects of vaping as well as the long-term consequences for patients who have pulmonary injuries related to e-cigarettes or vaping products [5]. Medical professionals must keep informing state authorities and the Centers for Prevention and Control of Diseases about any cases of lung injury linked to vaping products or e-cigarettes. Additionally, the creation of a database describing the variety of vaping products would make it easier to conduct an epidemiological evaluation to determine the scope of the issue [6]. It is recommended that community-based and local health authorities endeavor to instruct youth on the detrimental consequences of vaping and enact legislation that forbids minors from obtaining electronic cigarettes [63].

DISCUSSION

Over 8 million people worldwide lose their lives to tobacco-related illnesses each year, and 1.3 billion tobacco users live in low- and middle-income countries [64]. Worldwide, tobacco use costs more than US$1 trillion a year in health care and reduced productivity [65].

Over the past 30 years, despite an important worldwide decrease in the prevalence of tobacco use, there has been an increase in the utilization of new and emerging tobacco-related products [9]. Despite the fact that the electronic cigarettes have become illegal within India and that there are measures in place to avoid their availability, roughly 10% of the adolescents and young adults who participated in this online survey stated they were presently vaporizing and another 14% stated they had utilized e-cigarettes. This is similar to other nations where similar restrictions have failed to stop people from obtaining and using e-cigarettes. Just 2% of the sample as a whole, however, indicated that they were daily users, which probably highlights the significant role that laws play in deterring use. Respondent's accounts of where they access e-cigarettes and are exposed to e-cigarette advertising suggest that despite the existence of bans on sales and promotion and substantial potential penalties, e-cigarettes are readily available in India and promoted in ways that can reach young people [66]. Crucially, though e-cigarettes were also frequently dismissed as juvenile and a "thing from their past" and many users did not appear interested in continuing to use them, even at the same time that they were described as possibly entertaining, unique and alluring. The records in our research regarding JUULs as the latest "hype" could be interpreted as a rejection of the notion that vaporizing is a social activity limited to youth testing, even though they indicate that electronic cigarettes may become increasingly common among young people in the future. Furthermore, it has been suggested that adolescents use e-cigarettes and snus in addition to traditional cigarettes rather than as a substitution and that this habit is common in all countries. We must gain a deeper understanding of how vaporizing is a social practice made up of specific substances, meanings and behaviors in order to create regulations that successfully address youth e-cigarette use. We also need to understand how connections between the components of social practices, such as vaping among young people, can cause the practices to emerge, persist, change or disappear. These findings help address the regulatory concerns surrounding the use of electronic cigarettes by shedding light on the various facets of daily life that young

people who inhale combine into. These findings emphasize the need for targeted preventive interventions that consider young people's unique vaping behaviors as well as the social implications those behaviors have within the framework of their generation's culture. Despite the general consensus that policies that forbid tobacco advertising prohibit high tobacco prices and enforce smoke-free laws reduce the number of young smokers. The results of our study suggest that youth vaping may be more difficult to stop using the same strategies because of the ease with which youth can obtain electronic-cigarette devices online, the impact that e-cigarettes have on online platforms and the fact that they use e-cigarettes covertly to get around anti-vaping laws. Our research also demonstrates the ways in which youth take part in digital vaping behaviors that could influence their peers. For instance, they might share selfies with friends and imitate the moves performed by "professionals" in videos they've watched. This demonstrates how today's youth have been "digital natives" and how vaporizing is an integral aspect of their lives on the internet, contributing to the youth culture that is becoming more and more global. This indicates that vaping is connected to advancements in the significance of the e-cigarette product as well as digital entertainment, positioning, self-examination and social interactions with peers both off-line and online. The elements of the cultural norm of vaping among youth should be considered when developing policies and interventions [67].

CONCLUSION

The findings of this research indicate that electronic cigarettes are spreading throughout the globe. Thus, nations must pass legislation outlawing vaping in public areas and imposing more stringent regulations on the usage and distribution of electronic cigarettes. The tobacco epidemic has a major detrimental impact on people's health and finances and affects about 1.2 billion people worldwide. As the most avoidable cause of premature death worldwide, smoking is responsible for almost 6 million deaths caused by tobacco use each year. Heart disease, stroke, lung cancer and persistent pulmonary obstructive disorder are among the top five leading causes of death. WHO framework convention on the control of tobacco states that encouraging smokers to give up can significantly reduce the medium-term health costs related to tobacco use. In actuality, that aren't enough tobacco users who are able or willing to quit and the effectiveness of the programs that are currently available to help people quit smoking is rather low. Therefore, a wider range of interventions is needed to increase the amount of smokers getting therapy as well as those who are motivated to try quitting [68].

Alternatively, "vaping" may replace traditional tobacco use. It is clear that there are additional successful strategies for treating smokers' nicotine addiction, but the specific mechanism through which nicotine is infused into the body remains a matter of personal preference. It is up to every smoker to figure out the most effective way to reduce or give up smoking. Therefore, in order to consistently implement regulations across national borders as well as assist individual nations in lowering the acceptance and use of electronic cigarettes among young adults, it is imperative that worldwide and European regulations be strengthened. Therefore, in order to consistently enforce regulations across national borders as well as assist individual nations in lowering the acceptance and use of electronic cigarettes among young adults, it is imperative that worldwide and European regulations be strengthened. Vulnerable adolescents may be safeguarded from the promotion and advertising of electronic cigarettes by enacting strong legal and environmental laws that impose prohibitions on tobacco products advertising, sponsorship, advertising and promotion in accordance with WHO MPOWER M recommendation. Teenagers and young adults are more vulnerable to health issues due to the rising use of e-cigarettes. Even though electronic cigarettes are a safer option than traditional cigarettes and may be used by smokers to reduce their harm, teens and young adults should be shielded from uninvited use and the possibility of dual smoking. Urgent action is needed to prevent this from happening. Whether enough primary care and public health initiatives are implemented to protect young people and adolescents will determine how things turn out in the future. Since the long-term consequences are unknown, it is especially wise to limit unnecessary exposure. The development of vulnerable group-focused, evidence-based primary care and public health interventions is urgently needed. In order to safeguard young people, more stringent public health protection laws and prohibitions are also required. The findings of this study indicate that electronic cigarettes are growing in popularity all over the world. Thus, nations must enact laws outlawing vaping in public areas and imposing more stringent regulations on the use and marketing of electronic cigarettes. To raise community awareness about vaping with e-cigarettes, information campaigns must be planned and executed.

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