The Association of Electric Cigarette Using Period with Respiratory Symptoms in Male E-Cigarette User

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ARTICLE INFO	ABSTRACT
	Introduction: The increasing trend of e-cigarettes user is often found in productive young people, especially those who are undergoing education. The use of electric cigarettes can cause respiratory complaints such as coughing, coughing up phlegm and shortness of breath. To identify the subject characteristic and to examine association between e-cigarette using period with respiratory symptoms in e-cigarrette male user who are undergoing education in Senior High School and Medical Education in Medan **Methods**: This study took samples of research subjects using two groups, where each group numbered 15 people, these groups were entered according to the inclusion and exclusion criteria, with the pearson correlation test using the ATSQ instrument to assess respiratory symptoms. **Results**: The age range of 21-25 years is the most users of e-cigarettes (43.4%), the most education is in the form of professional general practitioner education in this study (43.3%). Respiratory complaints that were often felt by subjects were coughing in the morning which occurred most often 1-2 times a week and shortness of breath during exercise which appeared less than once per week. The pearson test shows r count > r table (0.883 > 0.641) and is positive. **Conclusion**: There is an association between e-cigarette using period with respiratory symptoms, where the longer you use, the more severe the respiratory symptoms will be.
Keywords	

INTRODUCTION

The lungs are a physiological organ, transmitting the entire cardiac output through approximately 2000 km of capillaries with each heartbeat and performing gas exchange in 300,000 alveoli with a surface area of approximately 70 m2. Each breath exposes this organ to destructive, inflammatory, and toxic environmental stimuli. [1] Smoking, the leading cause of preventable death in the United States, carries a range of health risks, including heart disease, stroke, and lung cancer. Projections indicate that smoke exposure-induced chronic obstructive pulmonary disease (COPD) will emerge as the third leading cause of death. [2]

Electronic nicotine dispensing systems (ENDS), known as e-cigarettes, are popular because they are considered an alternative to conventional cigarettes with fewer harmful effects. An e-cigarette is an electronic device that includes a cartridge containing e-liquid, a heating element/atomizer for heating the e-liquid and producing vapor for inhalation through a mouthpiece, and a rechargeable battery. Both the electronic device and the e-liquid are available and sold separately in conventional or online stores.[3]

Approximately 3% to 5% of adults in the United States currently use e-cigarettes, which are devices that produce an aerosol of liquid containing nicotine and flavorings into an inhalable vapor. [4] Of current e-cigarette users, 42.3% reported frequent and daily use. [5] The prevalence of regular e-cigarettes was also associated with being a current tobacco smoker (20.3%), former smoker (4.7%), and never smoker (1.2%). [6]

Overall, the most common reason for e-cigarette use was curiosity, followed by belief that e-cigarettes are less harmful than conventional cigarettes, desire to quit smoking, and capacity for indoor use. Animal model research evidence suggests impaired cellular lung function from e-cigarette aerosol exposure may be a concern even for exclusive users. [4,7]

Previously, isolated case reports have primarily documented lung disease associated with vaping, showcasing a variety of presentations such as mechanical injury (spontaneous pneumothorax), pneumonia (organizational, eosinophilic, and lipoid stages), or hypersensitivity pneumonitis without a single disease entity. Furthermore, studies have demonstrated that certain additives induce oxidative stress in the lung epithelium. [8] In a recent study in August 2019, the US Centers for Disease Control and Prevention (CDC) reported an outbreak of e-cigarette or vaping product use-associated lung injury (EVALI) causing multiple deaths in a young population. Computed tomography (CT) scans showed localized inflammation disrupting gas exchange caused by liquid aerosol from e-cigarettes. [3] According to the CDC's latest report on February 18, 2020, there were a total of 2,807 EVALI cases at hospitalization reported nationwide, including 68 deaths. The CDC then attributed the EVALI outbreak to illegally manufactured e-cigarettes containing THC (the psychoactive component of cannabis) and vitamin E acetate. [9]

METHODS

This study is an observational analytical study with a cross-sectional design for the relationship between e-cigarette smoking duration and respiratory symptoms. We will conduct this study at H. Adam Malik Central General Hospital Medan and Santo Thomas Private High School Medan. We will conduct this study from January 2023 to March 2023. Age ≥ 14 years, e-cigarette smokers, and people who are willing to participate and sign informed consent are included in this study.

People with a previous history of chronic lung disease and a history of lung transplantation who are currently on medication for lung disease and who work as athletes with jobs that are often exposed to dust and smoke were included in the exclusion criteria.

E-smokers who fulfilled the inclusion criteria and excluded the exclusion criteria were recruited using the purposive sampling technique. Basic characteristics in the form of data on age, type, and length of smoking were documented from interviews, then grouped according to length of smoking. Then the evaluation of respiratory symptoms experienced, namely cough, shortness of breath, chest pain, and hemoptysis. We completed the American Thoracic Society Questionnaire (ATSQ) to assess the severity of respiratory symptoms. Data were collected, tabulated, and statistically analyzed. The research yielded quantitative data. The data that has been collected, researched, and analyzed computerized, which includes univariate analysis and bivariate analysis.

RESULTS

The study involved 30 participants, with 13 individuals aged 21-25 years, accounting for 43.43% of the total research subjects, and 11 individuals aged 14-20 years, accounting for 36.7%.

Table 1. Subject characteristics study based on age

Variable	n (%)
14 – 20	11 (36.7)
21 – 25	13 (43.4)
26 – 30	4 (13.3)
31 – 35	1 (3,3)
36 – 40	1 (3,3)

Table 2. Subject characteristics study based on education

Variable	n (%)
School Intermediate On	11 (36.7)
Education Profession Doctor General	13 (43.3)
Education Profession Specialist	6 (20)

In this study, it was found that respiratory complaints that were often felt by research subjects who smoked e-cigarettes were coughing in the morning and tightness during exercise, where in the morning coughing complaints began to arise most often at 1–2 times per week while in tightness during exercise most often at less than once per week, with respiratory complaints that never arose were wheezing and fatigue (Tabel 3).

Table 3. Subject characteristics study based on complaint respiration with ATSQ

Complaint respiration with ATSQ	n (%)
Cough Morning day	
No Once	14 (46.7)
Less than once a week	7 (23.3)
1-2 times per week	6 (20.0)
Several times per week	3 (10.0)
Cough every day	
No Once	21 (70.0)
Less than once a week	4 (13.3)
1-2 times per week	5 (16.7)
Wheezing	
No Once	30 (100)
Congested walk	
No Once	23 (76.7)
Less than once a week	7 (23.3)
Congested breath moment exercise	
No Once	10 (33.3)
Less than once a week	11 (36.7)
1-2 times per week	9 (30.0)
Cough phlegmy	
No Once	22 (73.3)
Less than once a week	8 (26.7)
Painful chest	
No Once	18 (60.0)
Less than once a week	9 (30.0)
1-2 times per week	3 (10.0)
Fatigue	
No Once	30 (100)

There is a significant correlation in subjects who smoke under 30 days with the low respiratory symptoms that arise in subjects who smoke under 30 days and ATSQ, as seen from the value ($p < 0.05$). The Pearson test shows r count > r table (0.612> 0.514) and is positive, which means that the newer the subject smokes e-cigarettes, the fewer respiratory symptoms occur (Tabel 4).

Table 4. Relationship between smoking duration electric under 30 days with symptom respiration

	r	p (2-tailed)
Smoke under 30 days and symptoms respiration (ATSQ)	0.612*	0.015

Noted: * significant if $p < 5\%$

As shown by the value ($p < 0.05$), there is a significant correlation between smoking for more than 30 days and increasing respiratory symptoms that arise in subjects using ATSQ. The Pearson test reveals a positive correlation (r count > r table, 0.883 > 0.641), indicating that the longer a subject smokes e-cigarettes,

the more severe their respiratory symptoms become. As shown by the value ($p < 0.05$), there is a significant correlation between smoking for more than 30 days and increasing respiratory symptoms that arise in subjects using ATSQ. The Pearson test reveals a positive correlation (r count > r table, 0.883 > 0.641), indicating that the longer a subject smokes e-cigarettes, the more severe their respiratory symptoms become.

Table 5. Relationship between smoking duration electricity over 30 days with symptom respiration

	r	p (2-tailed)
Smoke over 30 days and symptoms respiration (ATSQ)	0.883*	0,000

Noted: * significant if $p < 5\%$

DISCUSSION

The Global Adult Tobacco Survey (GATS) results for 2021 showed that the prevalence of e-cigarette smoking increased from (0.3%) (2011) to (3%) (2021). Then, the prevalence of adolescent smokers aged 13–15 years also increased by 19.2%. Most e-cigarette smokers are productive young people pursuing education. According to William A. Thomas et al., 27.5% of high school adolescents in the United States use various types of e-cigarettes. The study involved 30 participants, with 13 individuals aged 21-25 years, accounting for 43.43% of the total research subjects, and 11 individuals aged 14-20 years, accounting for 36.7%. This is in line with the research of Jon-Patrick Allem et al., which states that the age of most e-cigarette smokers is between 18 and 25 years, with an average age of 22 years. [10]

According to Lee JA, the main reasons for adolescents who have smoked e-cigarettes are curiosity (22.9%), the assumption that O-tobacco products are safer than conventional cigarettes (18.9%), the desire to quit conventional smoking (13.1%), and the desire to be able to smoke indoors (10.7%). [7]

E-cigarette use can cause respiratory tract disorders. Respiratory tract disorders are medical conditions that affect the lungs' bronchi, bronchioles, and alveoli. Some common respiratory disorders include asthma, chronic bronchitis, and chronic obstructive pulmonary disease (COPD). [6.11] Wold Loren E et al. reported that e-cigarettes impair the immune system, increase proinflammatory cytokines, and increase the risk of lung infection. [12] Rice, Shawn J. et al. reported in 2019 a cluster of patients with severe acute respiratory symptoms in the United States. Patients with EVALI use e-cigarette liquids containing THC, Vitamin E Acetate, Nicotine, and Cannabidiol, where their emergency condition is the clinical presentation of respiratory (85%–98%), gastrointestinal (57%–90%), and constitutional (76%–100%) symptoms. Respiratory symptoms included cough (78%-85%), shortness of breath (82%-85%), chest pain (43%-52%), and coughing up blood (8%-12%). [13]

According to some studies, e-cigarette smokers fall into one of three categories: ever, regular, or daily. In some cases, classification was based on the device, filling system, and e-cigarette liquid. E-cigarette smoking was also associated with current e-cigarette smokers (20.3%), ex-smokers (4.7%), and never smoked tobacco (1.2%). [11] Wills A. Thomas et al. reported an association between e-cigarette smoking length (>30 days) and respiratory symptoms. [12] Rob McConnell et al. concluded that regular e-cigarette use (>30 days) in adolescents and young adults increases the risk and symptoms of chronic bronchitis. [1]

According to this study, subjects who smoked for less than 30 days showed a significant correlation with lower respiratory symptoms when using the ATSQ, suggesting that the more recently a subject smoked e-cigarette, the fewer respiratory symptoms they experienced.

CONCLUSION

There is an association between e-cigarette using period with respiratory symptoms, where the longer you use, the more severe the respiratory symptoms will be.

DECLARATIONS

This study was approved by Ethical Committee of Universitas Sumatera Utara, Medan, Indonesia. The sampels provided the consent to participated in the study.

CONSENT FOR PUBLICATION

The Authors agree to publication in Journal of Society Medicine.

COMPETING INTERESTS

The authors declare that there is no conflict of interest in this report.

AUTHORS' CONTRIBUTIONS

All authors are responsible for conceptualization, manuscript preparation, manuscript editing, and manuscript assurance.

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