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The Relationship Between E-Cigarette Use and Quit Rates in Public Health Tobacco Cessation Programs

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Abstract

E-cigarette use is an emerging and fast-growing trend particularly among young people that has not been thoroughly researched in terms of quit rates. Previous research shows that people perceive e-cigarettes to be a safer alternative to assisting tobacco cessation, yet solid result supporting this claim have yet to be published. This research compiled in Fiscal Year 2015 analyzes quantitative evaluation data gathered from state-wide public health tobacco cessation programs in the Northwest. Understanding quit rates related to electronic cigarette use is important to implementing changes in clean indoor air policies, improving quit and abstinence rates in tobacco cessation programs, and advancing accurate perceptions on the safety of e-cigarettes use for all users.

Keywords

quit rate, e-cigarettes, abstinence rates, cessation rates

Disciplines

Public Health Education and Promotion

The Relationship Between E-cigarette Use and Cessation Rates in Public Health Tobacco Cessation Programs

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Research Question

Is there an association between e-cigarette use and the quit[1] and abstinence[2] rates of tobacco cessation program participants?

1. Quit: stopped using tobacco by the end of the program
2. Abstinence: refrained from tobacco relapse at 1 month follow-up
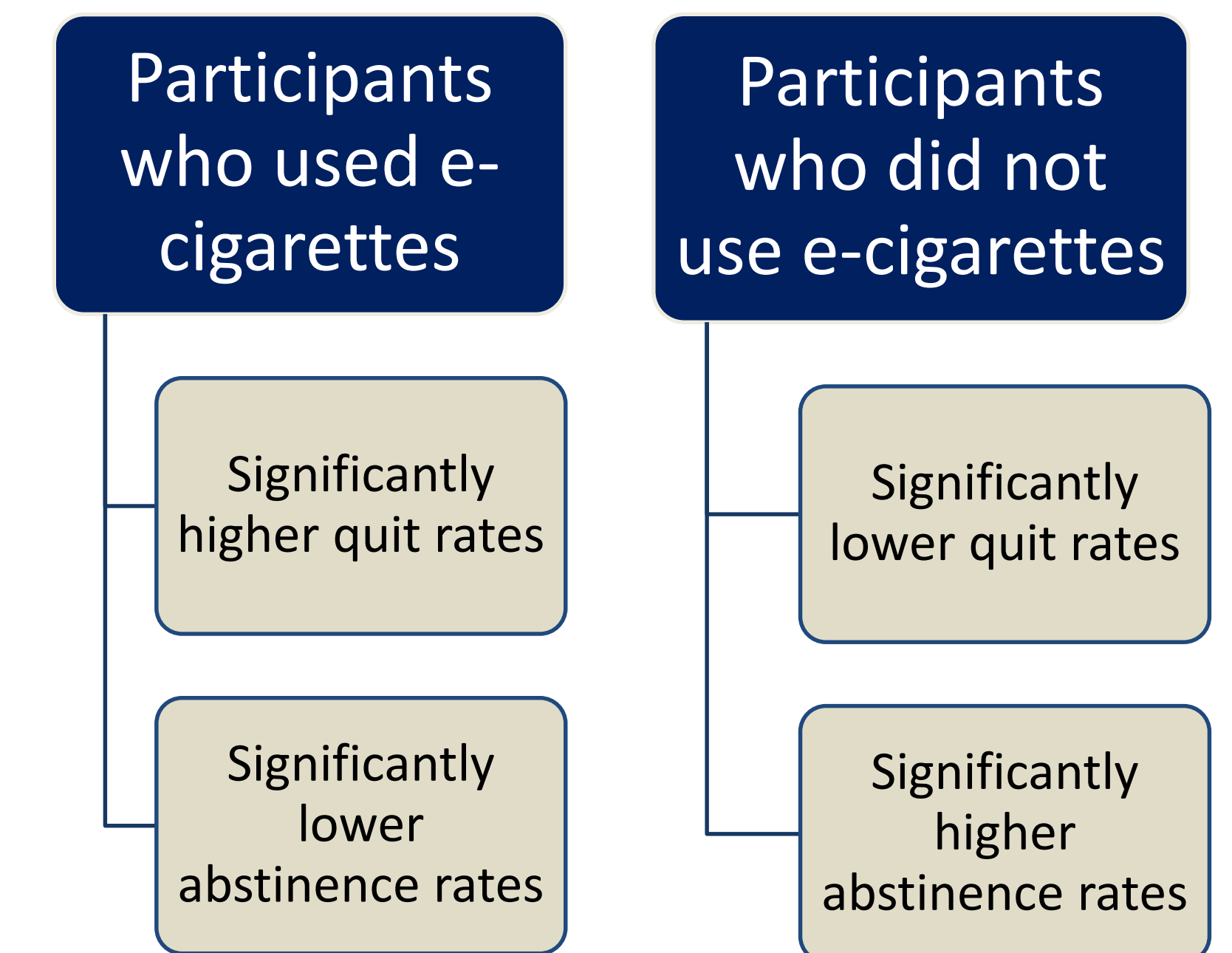
Purpose

This research aims to provide an opportunity for the public health districts to make informed changes related to the effectiveness of their tobacco cessation programs. The targeted objective is to decrease frequency of tobacco use and increase tobacco abstinence rates of the participants in these programs.

Methods

This research will look at individuals that participated in a tobacco cessation program (N=1387) and the correlation with their quit rates and reported e-cigarette use. The research will be conducted using SPSS to analyze tobacco cessation outcomes by target group. Chi square analysis will be conducted between e-cigarette use and the quit rates and abstinence rates of each target group.

Target Groups

Adult	• 18 and older
Youth	• 17 and younger
Pregnant	• Women who began program while pregnant

Expected Results

I expect to see a significant difference in the quit and abstinence rates of smokers who use e-cigarettes compared with smokers who did not use e-cigarettes. I anticipate there will be a significant association between e-cigarette use and cessation rates.

Participants who used e-cigarettes	Participants who did not use e-cigarettes
Significantly higher quit rates	Significantly lower quit rates
Significantly lower abstinence rates	Significantly higher abstinence rates

Importance of Research

Understanding behaviors in electronic cigarette use is important to implementing changes in clean indoor air policies, improving quit and abstinence rates in tobacco cessation programs, and advancing accurate perceptions on the safety of e-cigarette use for all users.

Acknowledgements

TABLE 1 Hazard quotients associated with the direct exposures of e-cigarette users and the indirect (passive) exposure of non-users.

CHEMICAL	Exposure Criteria		Direct Exposure		Indirect Exposure	
	NSRL (ug/day)	CREL (ug/m3)	HQ[1] NSRL	HQ[1] CREL	HQ NSRL	HQ CREL
Acetaldehyde	90	140	0.18	0.01	0.004	0.0001
Acrolein	N/A	0.35	N/A	**7.0**	N/A	0.17
Formaldehyde	40	9	**1.64**	0.36	0.04	0.009
Cadmium	0.05	0.02	**5.13**	0.64	0.12	0.015
Lead	0.5	0.15	**1.33**	0.22	0.03	0.005
Nickel	0.8	0.05	0.42	0.34	0.008	0.007
Nicotine	N/A	5	N/A	**222**	N/A	**5.4**
NNK[2]	0.014	N/A	**2.36**	N/A	0.05	N/A
Propylene Glycol	N/A	50	N/A	**967**	N/A	**23**

[1]Hazard quotients expressed as the ratio of the calculated exposure to the NSRL and CREL health exposure guidelines, with values above 1.0 **bolded.**

[2]NNK, 4-(nitrosomethylamino)-1-(3-pyridyl)1-butanone).

Table 1
E-cigarettes on average contain higher quantities of chemical than is recommended by the cancer and non-cancer exposure hazard analyses guidelines. They therefore have the potential to present adverse outcomes in user health. Adapted from: Offerman F. J. (2014). The Hazards of E-Cigarettes. ASHRAE Journal, 56(6), 38-44.

TABLE 2 Comparison of sample toxicants emitted by tobacco cigarettes and e-cigarettes			
Toxic compound	Tobacco cigarette (ug in mainstream smoke)	E-cigarette (ug per 15 puffs*)	Average ratio (conventional vs e-cigarette)
Formaldehyde	1.6-52	0.20-5.61	9
Acetaldehyde	52-140	0.11-1.36	450
Acrolein	2.4-62	0.07-4.19	15
Toluene	8.3-70	0.02-0.63	120
NNN**	0.005-0.19	0.00008-0.00043	380
NNK**	0.012-0.11	0.00011-0.00283	40

*The authors assumed smokers of e-cigarettes would take an average of 15 puffs per vaping session, corresponding to smoking one tobacco cigarette.
**Tobacco-specific nitrosamine, a carcinogenic compound that originates in the curing and processing of tobacco.

Table 2
In comparison to traditional tobacco cigarettes, e-cigs contain much smaller amounts of these chemicals and are far less toxic. E-cigarettes may provide tobacco users with an alternative that presents less dangerous consequences. Adapted from: Arnold, C. (2014). Vaping and Health: What Do We Know about E-Cigarettes?. Environmental Health Perspectives, 122(9), A244-A249.