

Awareness and Attitude of Vape Users in the Saudi Community regarding its effect on general and oral health

AREEJ SULAIMAN ABU KHALID^{1*}, MOHAMMAD ALZHRANI¹, WED ALI ALHARBI², AMBREEN SHABBIR³

¹Department of Dental & Oral Health, Prince Sultan College of Health Sciences, Dhahran- Saudi Arabia.

²Department of Dental Oral Health, Prince Sultan Armed Force Hospital, Medina-Saudi Arabia.

³Department of Pathology, CMH Institute of Medical Sciences, Multan-Pakistan

Correspondence to Dr. Areej Sulaiman Abu Khalid, Email: jomaan@psmchs.edu.sa

ABSTRACT

Background: Vapes are forms of electronic nicotine delivery systems promoted as a safer alternative to cigarette smoking.

Aim: To compare the attitude, knowledge and health status between male and female vape users in the Saudi community.

Study Design: Cross sectional study.

Methodology: Present study enrolled 865 participants involving both genders. A self-administered questionnaire related to the awareness and attitudes of vape users was uploaded online and spread through the community targeting vape current and previous users through the different social media tools. Informed written consent was taken. Unwilling participants were excluded. Data analyzed by SPSS 23.0. Frequency and percentage were given for socio-demographic, attitude, knowledge and health status. Moreover, Chi square test was also used to compare the attitude, knowledge and health status between both genders. A p-value ≤ 0.05 was taken as significant.

Results: There was no significant difference in attitude and health status between male and female. However, the adequate knowledge was higher in male participants as compared to female.

Conclusion: This study concluded that the Saudi vaping community shows a high level of knowledge and awareness regarding the use of vape and its possible consequences on the general and oral health and believe it to be an effective tool in smoking cessation.

Keywords: Vape Users, Awareness, Attitude and Health Status.

INTRODUCTION

Vapes are forms of electronic nicotine delivery systems promoted as a safer alternative to cigarette smoking.¹ Their use is commonly called "vaping".² They come in various forms and with various nicotine concentrations, some of them reported of having zero nicotine. Instead of cigarette smoke, the user inhales an aerosol, commonly called vapor.³ It is composed of a mouthpiece, atomizer, cartridge, and battery. The cartridge is a reservoir which is filled by a fluid consisting of a mixture of propylene glycol, vegetable glycerin, nicotine, and flavors. The atomizer heats the liquid ingredients into vapor that is inhaled by the user.⁴

The benefits and the health risks of e-cigarettes have been subject to controversy for a while, and although compared to tobacco cigarettes, they are considered by some to be safer^{5,6} but their use is still unsafe and hazardous to the human health.⁷

Vaping is believed to have negative pulmonary effects with the vapor smoke, with and without nicotine, having a cytotoxic effect on oro-epithelial cell lines and inducing breaks in DNA strands.⁸ Vaping can lead to illness and compromised immunity through degrading the body's ability to kill harmful microorganisms.⁹ There is also concern for the uncertainty of second and third-hand exposure to the vapor and its effects on nonusers, particularly children, pregnant women and people with pre-existing cardiovascular and other diseases.¹⁰ There is documentation of general health consequences related to the use of e-cigarettes including elevated heart rate and blood pressure, airway inflammation, impaired immunological response, impaired bacterial phagocytosis,

ulcerative colitis, lipid pneumonia, and subacute bronchial toxicity.¹¹

From another aspect, there have been reports on oral side effects following only 4 weeks of vape use such as mouth irritation, sore throat, dry mouth, and mouth ulcers, and complaints of coughing, throat irritation, and dry mouth after 24 weeks of use.¹⁰ There have also been reports of severe palatal injuries, oral and nasal damage, respiratory tract burns and periodontitis.¹²

In many countries, e-cigarettes have gained popularity in adolescents. Past 30-day e-cigarette use prevalence increased from 1.5% in 2011 to 20.8% in 2018 in United States (US) high school students¹³; and from 5.5% in 2011 to 29.9% in 2014 in Poland high school student.¹⁴ Since their introduction into the market that have gained massive popularity among the youth in the Saudi community with its colourful devices, assortments of flavours, and variety of nicotine concentrations. .

As smokers started to convert to vaping and non-smokers adopted it as a new social habit, many researches started to impeach the safety claims of vapes. Up to the author's knowledge, there are not enough studies measuring the level of awareness of the Saudi community regarding this habit and its possible general and oral health consequences. We planned current study to compare the attitude, knowledge and health status between male and female vape users in the Saudi community.

The objective of the study was to compare the attitude, knowledge and health status between male and female vape users in the Saudi community.

METHODOLOGY

Awareness and attitudes of vape users was uploaded online and spread through the community targeting vape current and previous users through the different social media tools. Willing participants were directed to the questionnaire and asked to fill it up once they click on the attached link. Volunteering participants could withdraw from this study at any time without any consequences and all collected information was handled confidentially. Only participants who approve the informed consent check box can submit it. The survey ethical approval was requested from the ethics committee of our institution at (PSMCHS). Unwilling participants were excluded.

Statistical analysis: The data were analysis by using SPSS 23. Frequency and percentage were given for socio-demographic, attitude, knowledge and health status. Attitude and knowledge scores were measured by giving 1 mark for each correct/appropriate answer and those who took 50% and above marks were consider as positive attitude and adequate knowledge. Health score were measured by giving 1 mark for no symptom, 2 for sometimes and 3 for often option and those who had 50% and above score were consider as poor health status. Chi square test was also used to compare the attitude, knowledge and health status between both genders. A p-value ≤ 0.05 was taken as significant

RESULTS

Results showed that 86.5% subjects had Saudi nationality. Other socio demographic parameters like age, job and gender were shown as frequency and percentage in table-1. Results regarding smoking habits, attitude and preferences among enrolled subjects were shown as frequency and percentage in table-2. Majority (84.5%) of participants were vape users in present study according to survey. Few symptoms and side effects of vaping were summarized in table-3 that reported 53.4% subjects complained of mouth dryness, 26.8% had sputum and 23.8% suffered SOB which alters the quality of life and can impose a serious health risk.

Table-1: Socio-Demographic Data Among All Subjects (n=865)

Parameters	Categories	Frequency	%age
Nationality	Saudi	748	86.5
	Non-Saudi	117	13.5
Age (years)	18- 22	264	30.5
	23-27	191	22.1
	28-32	151	17.5
	33- 37	158	18.3
	38-45	89	10.3
Gender	Male	727	84.0
	Female	138	16.0
Jobs	Medical	112	12.9
	Educational	101	11.7
	Trade	96	11.1
	Management	186	21.5
	Others	370	42.8

Positive attitude was observed in 81.7% participants. Majority of participants had good health (symptom score less than 50%) however only 59.3% participants had adequate knowledge as shown in table-4.

Results revealed that there was no significant difference in attitude and health status between male and female. However, the adequate knowledge was higher in male participants as compared to female as shown in table-5.

Table-2: Smoking Habits, Attitude And Preferences Among All Subjects (n=865)

Statements	Categories	Frequency	%age
Which type do you smoke?	Cigarettes	103	11.9
	Electronic Cigarettes	287	33.2
	Hookah	118	13.6
	Vape	731	84.5
	Others	7	0.8
Do you use Electronic cigarettes (Vape) currently?	No, Never used it	7	0.8
	No, but I used before	52	6.0
	Yes, but not every day	135	15.6
	Yes, every day	671	77.6
Do you use Electronic cigarettes in the morning than rest of the day?	More in the morning	83	9.6
	Equal all during the day	782	90.4
Do you have allergy to electronic cigarettes (Vape)?	Yes	793	91.7
	No	72	8.3
How long have you been using an Electronic Cigarettes?	< 1 month	29	3.4
	1 - 6 month	51	5.9
	7 - 12month	128	14.8
	> 12 month	657	76.0
Do you think using electronic cigarettes (vape) is safe on your health?	Yes, totally safety	168	19.4
	No, but less damage than cigarettes	628	72.6
	No, it's damage more than cigarettes	6	0.7
	No, it is equal to cigarettes	21	2.4
	I don't know	42	4.9
In your opinion what are the medical affect that could be related to using electronic cigarettes (vape)?	Mouth Cancer	69	8.0
	Pulmonary Caner	91	10.5
	Blood circulatory system	33	3.8
	Cerebral thrombosis (stroke)	18	2.1
	Impotence	25	2.9
	Nothing	392	45.3
Do you think using (Vape) helping to quit cigarettes smoking?	I don't know	400	46.2
	Yes	766	88.6
	No	54	6.2
	I don't know	45	5.2

Table-3: Symptoms and Side Effects Among Vape Users (n=865)

Symptoms	Categories	Frequency	%age
Nausea	No	704	81.4
	Sometimes	148	17.1
	Often	13	1.5
Dizziness	No	746	86.2
	Sometimes	106	12.3
	Often	13	1.5
Difficulty of breathing while doing physical work	No	659	76.2
	Sometimes	153	17.7
	Often	53	6.1
Sputum	No	633	73.2
	Sometimes	178	20.6
	Often	54	6.2
Mouth Dryness	No	403	46.6
	Sometimes	319	36.9
	Often	143	16.5

Table-4: Distribution of attitude, health and knowledge among all subjects (n=865)

Parameters	Categories	Frequency	%age
Attitude	Positive	707	81.7
	Negative	158	18.3
Health	Poor	85	9.8
	Good	780	90.2
Knowledge	Adequate	513	59.3
	Inadequate	352	40.7

Table-5: Distribution Of Attitude, Health And Knowledge Among All Subjects (n=865)

Para-meters	Gender	Categories	Frequency	%age	p-value
Attitude	Males	Positive	591	81.3	0.441
	Females		116	84.1	
	Males	Negative	136	18.7	
	Females		22	15.9	
Health	Males	Poor	73	10.0	0.626
	Females		12	8.7	
	Males	Good	654	90.0	
	Females		126	91.3	
Knowledge	Males	Adequate	461	63.4	<0.001*
	Females		52	37.7	
	Males	Inadequate	266	36.6	
	Females		86	62.3	

*Statistically Significant

DISCUSSION

This study provided an updated prospective on using electronic vapes and sheds the light on the vaping community in Saudi Arabia. It also evaluated the awareness and attitudes of Saudi current and previous vape users regarding its effects on the general and oral health.

The study shows that the level of awareness of Saudi vapers towards its possible consequences (94.3%) is similar to another study made by students of Taibah university¹⁵ where the level of awareness in the study was 93.6%. However, it is much higher than the level of awareness found in another study covering 14 countries¹⁶ where the highest level of awareness measured was 66.6% in countries with less restrictive policies. This high level of awareness among Saudi vapers might be attributed to the increased online vape marketing, the growing number of promotional vaping online videos, the large sample size, and the regional distribution of this study through social media platforms, which aided in the randomization of the sample.

Of all participants, almost 20% thought that vape using is absolutely safe to the general and oral health, and 72.6% find vaping to be a safer alternative to cigarette smoking, which is an increase since the publication of the previous article¹⁵, where 13.7% of users found it to be absolutely safe to health and 56.8% of vape users thought it was safer than conventional smoking.

In present study, 88.6% of the participants considered vaping to be an effective tool in smoking cessation, and of those, 71.7% reported quitting all other smoking means after they started using the electronic vape. And to put this large percentage in perspective, only 35% of participants in an American study¹⁷ used electronic nicotine delivery systems to quit smoking. Participants reported that although, the majority of them (88.6%) stopped any other mean of smoking after switching to vape, and although they consider it to be an aid in smoking cessation and method to break nicotine dependency, they are still using the vape on regular basis and 47.6% admitted it gives them more satisfaction than conventional smoking.

And yet, with this high level of awareness, screening still showed that 77.6% of participants use vape on daily basis, and 76% have been vaping for over a year. Which is significantly higher than the 2017 study made by the students of Taibah university¹⁵ which recorded only 57.5%

of daily vapers and 37.8% who have been vaping for over a year. This is specifically important since it suggests that vaping is an actively growing epidemic in Saudi Arabia.

While 20% of participants considered vaping to be absolutely safe, it was also reported that 53.4% complained of mouth dryness, which eventually leads to periodontal diseases and dental caries. 26.8% complained of sputum which might indicate a number of upper respiratory tract conditions, and 23.8% suffered from shortness of breath while performing any type of physical activity (Dyspnea) which alters the quality of life and can impose a serious health risk.

Finally, despite the fact that the vast majority of this study's participants agreed that the use of vape must be monitored and regulated by the government and must be banned to those under the age of 21 years, 30.5% of them were found to be aging 18 to 22 years old.

Limitations: Present study had limitations that included time, exclusion of the adolescents whose education and attitudes are of primary concern, inability to assure that the random sample taken was a true representative of the general population.

CONCLUSION

This study concluded that the Saudi vaping community shows a high level of knowledge and awareness regarding the use of vape and its possible consequences on the general and oral health and believes it to be an effective tool in smoking cessation. However, it was found that this increase in awareness was faced with an increase of positive attitudes of the Saudi vaping community (81.7%) toward the use of vape. This study also emphasized the role of government on establishing restrictive regulations to vape use and raise the legal vaping age to 21 years and above, with hopes that it decreases the percentage of vape users among the youth of Saudi Arabia in the future.

Author's contribution: ASAK: Overall supervision, write up and literature review. MA & WAA: Statistics application analysis literature review, help in write up. AS: Literature review help in write-up.

Acknowledgements: I am thankful to Allah and my colleagues who made it possible for me. I want to acknowledge the efforts of Ms Awatef Albalawi for making current project possible.

Conflict of interest: None

Funding: None

REFERENCES

- Caponnetto, Pasquale; Campagna, Davide; Papale, Gabriella; Russo, Cristina; Polosa, Riccardo (2012). "The emerging phenomenon of electronic cigarettes". *Expert Review of Respiratory Medicine*. 6 (1): 63–74. doi:10.1586/ers.11.92. ISSN 1747-6348. PMID 22283580.
- Orellana-Barrios, Menfil A.; Payne, Drew; Mulkey, Zachary; Nugent, Kenneth (2015). "Electronic cigarettes-a narrative review for clinicians". *The American Journal of Medicine*. 128 (7): 674–81. doi: 10.1016/j.amjmed.2015.01.033. ISSN 0002-9343. PMID 25731134.
- Cheng, T. (2014). "Chemical evaluation of electronic cigarettes". *Tobacco Control*. 23 (Supplement 2): ii11–ii17. doi:10.1136/tobaccocontrol-2013051482. ISSN 0964-4563. PMC 3995255. PMID 24732157.
- Fda.gov; 2017. "Vaporizers, E-Cigarettes, and other Electronic Nicotine Delivery Systems (ENDS)". Available from: <https://www.fda.gov/tobaccoproducts/labeling/productingredientscomponents/ucm456610.htm>.

5. Harrell PT and Simmons V (2014). "Electronic Nicotine Delivery Systems ("ECigarettes"): Review of Safety and Smoking Cessation Efficacy" *Otolaryngol. Head Neck Surg.*, 151(3): 381–393.
6. Glasser AM, Collins L, Pearson JL, Abudayyeh H, Niaura RS, Abrams DB, Villanti AC (2017). "Overview of Electronic Nicotine Delivery Systems: A Systematic Review". *Am J Prev Med.* 2017 Feb;52(2): e33-e66. doi: 10.1016/j.amepre.2016.10.036. Epub 2016 Nov 30. Review.PMID: 27914771.
7. Meo S and Al Asiri S (2014). "Effects of electronic cigarette smoking on human health, *European Review for Medical and Pharmacological Sciences*". 18: 3315-3319.
8. Yu V, Rahimy M, Korrapati A. "Electronic cigarettes induce DNA strand breaks and cell death independently of nicotine in cell lines". *Oral Oncol.*2016;52:58-65. doi: 10.1016/j.oraloncology.2015.10.018
9. Camenga DR, Cavallo DA, Kong G. (2015) "Adolescents' and Young Adults' Perceptions of Electronic Cigarettes for Smoking cessation: A Focus Group Study". *Nicotine Tob Res.* 2015;17(10):1235-41. doi: 10.1093/ntr/ntv020.
10. Qasim, Hanan; A. Karim, Zubair; Rivera, Jose; Khasawneh, Fadi; Alshbool, Fatima (2017). "Impact of Electronic Cigarettes on the Cardiovascular System" Originally published 30 Aug 2017 <https://doi.org/10.1161/JAHA.117.006353> *Journal of the American Heart Association.* 2017;6
11. Couch ET, Chaffee BW, Gansky SA, Walsh MM. (2016). "The changing tobacco landscape: What dental professionals need to know". *J Am Dent Assoc.*2016. 14. pii: S0002-177(16)00057-X. doi: 10.1016/j.adaj.2016.01.008
12. Harrison R, Hicklin Jr. D. (2016). "Electronic cigarette explosions involving the oral cavity". *J Am Dent Assoc.* 2016; <http://dx.doi.org/10.1016/j.adaj.2016.03.018>.
13. Cullen, K. A. et al. (2018) "Notes from the Field: Use of Electronic Cigarettes and Any Tobacco Product Among Middle and High School Students—United States, 2011– 2018". *MMWR Morb Mortal Wkly Rep* 67, 1276–1277 (2018).
14. Goniewicz, M. L., Gawron, M., Nadolska, J., Balwicki, L. & Sobczak, A. (2014). "Rise in electronic cigarette use among adolescents in Poland". *J Adolesc Health* 55, 713– 715 (2014)
15. Karbouji, Mohammad; Abduldaem, Alhasan; Allogmani, Abdulrahman; Alharbi, Ahmad; Alnozha, Omar; Al-Zalabani, Abdulmohsen (2018) "Awareness and Attitude toward Smoking E-Cigarettes (Vape) among Smokers in Saudi Arabia 2017"; *The Egyptian Journal of Hospital Medicine* (January 2018) Vol. 70 (8), Page 1346-1351 1346 Received: 16/12/2017 DOI: 10.12816/0044646 Accepted: 26/12/2017
16. Shannon Gravely, Pete Driezen, Janine Ouimet, Anne C. K. Quah1, K. Michael Cummings, Mary E. Thompson, Christian Boudreau, David Hammond, Ann McNeill3, Ron Borland, James F. Thrasher6, Richard Edwards, Maizurah Omar, Sara C. Hitchman, Hua-Hie Yong, Tonatiuh Barrientos-Gutierrez, Marc C. Willemssen, Eduardo Bianco, Marcelo Boado, Fastone Mathew Goma14, Hong Gwan Seo, Nigar Nargis, Yuan Jiang, Cristina De Abreu Perez18 & Geoffrey T. Fong.(2019) "Prevalence of awareness, ever-use and current use of nicotine vaping products (NVPs) among adult current smokers and ex-smokers in 14 countries with differing regulations on sales and marketing of NVPs: cross-sectional findings from the ITC Project".(2019) doi:10.1111/add.14558
17. Emery SL, Vera L, Huang J, Szczypka G (2014) "Wanna know about vaping? Patterns of message exposure, seeking and sharing information about e-cigarettes across media platforms". *Tob Control* 23(Suppl 3): iii17–iii25.