Exploratory Analysis of Electronic Cigarette-Related Contents on Instagram: Observational Study

[1]Yankun Gao, [1]Zidian Xie, [2]Li Sun, [3]Chenliang Xu, [1]Dongmei Li

[1]Department of Clinical & Translational Research, University of Rochester Medical Center, Rochester, NY, USA; [2]Goergen Institute for Data Science, University of Rochester, Rochester, New York, USA; [3]Department of Computer Science, University of Rochester, Rochester, New York, USA

Introduction

❖ E-cigarettes have now become the most popular tobacco product among youth in the U.S..

❖ Social media platforms are widely used by e-cigarette companies and vape stores for marketing and promoting the sale of their products.

❖ Instagram has been regularly used by more than half of the U.S. youth and young adults. While the e-cigarette-related posts on Instagram are dominated by vaping-promoting images, there is another voice claiming that vaping is potentially harmful.

❖ Few studies have characterized current vaping-related content on both pro-vaping and vaping-warning groups on Instagram.
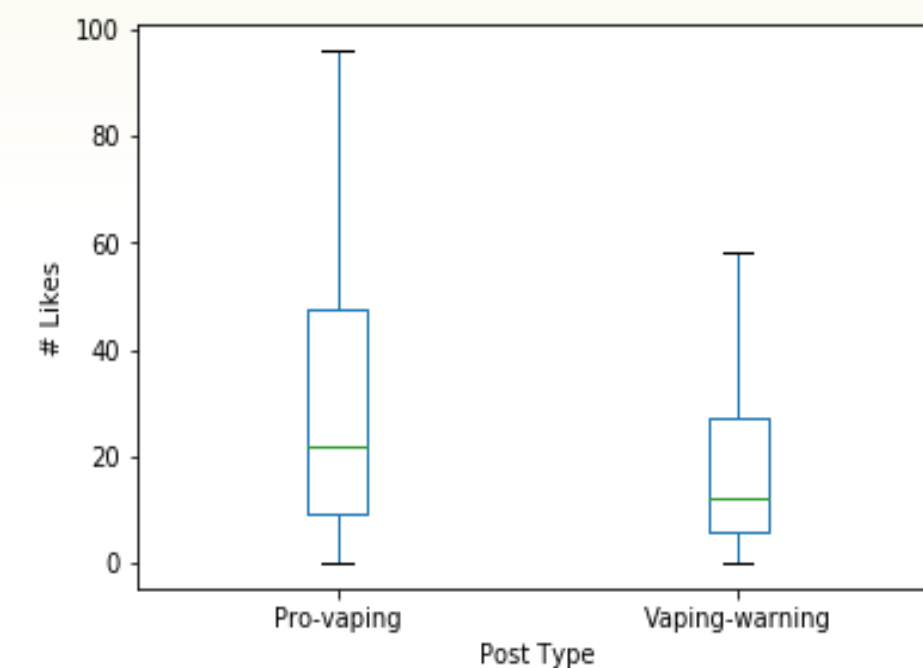
Methods

❖ There were 41,412 unique pro-vaping posts and 1,539 unique vaping-warning posts collected through Instagram's Application Programming Interface (API) on November 18, 2019, using popular pro-vaping and vaping-warning hashtags.

❖ Instagram posts and user accounts were classified into 'pro-vaping', 'vaping-warning', 'neutral-to-vaping' or 'not-related-to-vaping' by considering the visual and textual content together. Random samples in each group were selected for further analysis.

❖ Type of the images was categorized as: (1) advertisement; (2) catchphrase; (3) product display; (4) educational; (5) events; (6) memes; (7) news/notice; (8) vaping, and (9) others.

❖ Type of the user accounts included: (1) pro-vaping community; (2) personal; (3) sponsored vapor; (4) store; (5) vaping store; (6) community; (7) vaping-warning community; (8) business organization and (9) influencer.

❖ The distribution of the follower count and the media count for each Instagram user account, and the like count of each post were plotted, and the median values were compared between the pro-vaping group and the vaping-warning group using Permutation Test.

Results

Table 1: The image types of the pro-vaping and vaping-warning posts.

Image Types	Pro-vaping Posts		Vaping-warning Posts	
	N	Percentage (%)	N	Percentage (%)
Advertisement	23	11.5	1	0.5
Catchphrase	0	0	16	8
Product display	163	81.5	7	3.5
Educational	1	0.5	95	47.5
Events	1	0.5	15	7.5
Memes	1	0.5	15	7.5
News/notice	1	0.5	21	10.5
Vaping activity	8	4	9	4.5
Others	2	1	21	10.5
Total	200	100	200	100

Table 2: The account types of the pro-vaping (A) and vaping-warning (B) Instagram user accounts.

A.

Account types	# accounts (%)	# pro-vaping posts (%)	Posts/Account
Pro-vaping community	6 (3.2%)	10 (2.2%)	1.67
Personal	34 (18%)	69 (15.3%)	2.03
Sponsored vapor	30 (15.9%)	49 (10.8%)	1.63
Store	9 (4.8%)	93 (20.6%)	10.33
Vaping store	110 (58.1%)	231 (51.1%)	2.1
Total	189 (100%)	452 (100%)	

B.

Account types	# accounts (%)	# vaping-warning posts (%)	Posts/Account
Community	35 (22.6%)	52 (17.9%)	1.49
Anti-vaping community	37 (23.9%)	136 (46.8%)	3.68
Personal	79 (51%)	99 (34%)	1.25
Influencer	1 (0.6%)	1 (0.3%)	1
Business organization	3 (1.9%)	3 (1%)	1
Total	155 (100%)	291 (100%)	

Figure 1: Number of "Like" for the pro-vaping and vaping-warning posts.

Figure 2: Follower count (A) and media count (B) of the pro-vaping and vaping-warning Instagram accounts.
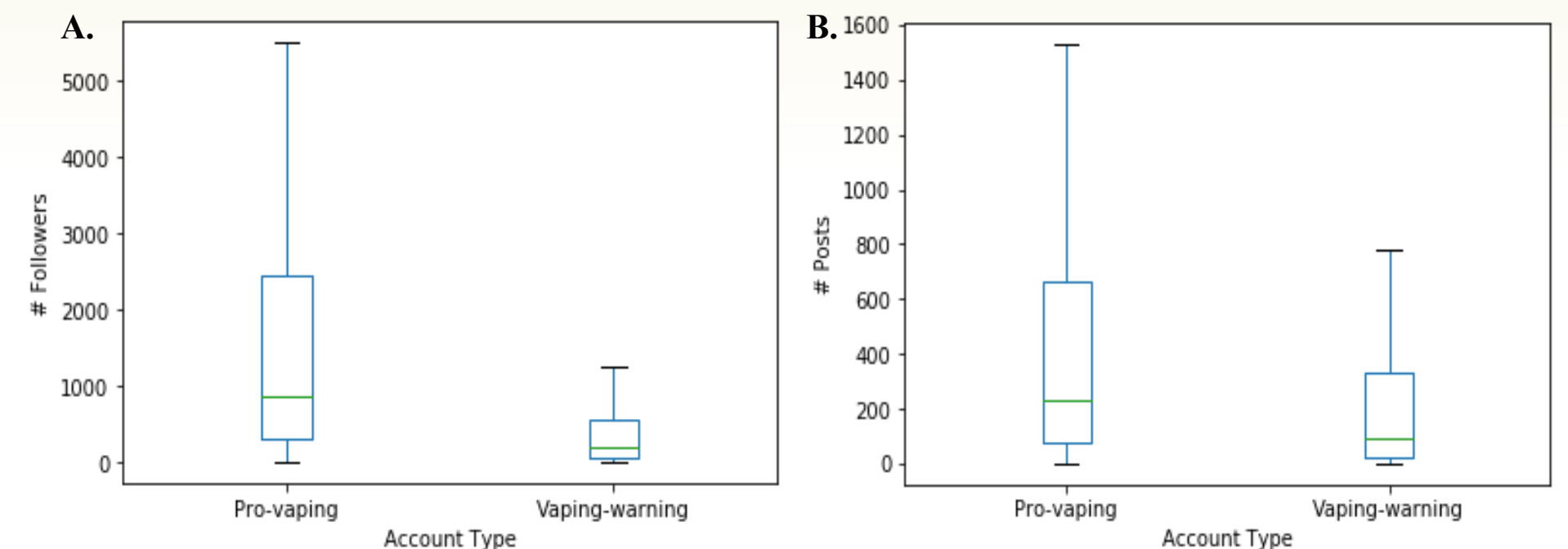
Discussion

❖ More posts could be collected by using pro-vaping hashtags than vaping-warning hashtags.

❖ The image types of pro-vaping posts were relatively consistent, while the image types of vaping-warning posts varied a lot.

❖ The pro-vaping Instagram posts had a higher median like count (22) than the vaping-warning posts (12) ($P<0.001$), which indicated more user engagement of pro-vaping posts.

❖ The median of the number of followers of the pro-vaping group (850) were higher than the vaping-warning group (191) ($P<0.001$), which may help with the spread of information and increase the chance of getting 'like'.

❖ Hashtag communities were found in both pro-vaping (e.g.: #vapefam) and vaping-warning (e.g.: #atheletesdontvape) groups. The self-identification within those communities may help with the spread of information.

Conclusion

❖ Instagram had been dominated by the pro-vaping content, and the pro-vaping posts and user accounts seem to have more user engagement than vaping-warning.

❖ These results highlight the importance of regulating e-cigarette posts on social media, and the urgency of identifying effective communication with the public about the health effects of e-cigarettes to ameliorate the epidemic of vaping in youth.

Acknowledgements

CLINICAL&TRANSLATIONAL SCIENCE INSTITUTE

CROFT — WNY CENTER FOR RESEARCH ON FLAVORED TOBACCO

UNIVERSITY of ROCHESTER MEDICAL CENTER

Disclosure

- **All authors have no potential conflict of interest to declare.**

- **Research reported in this publication was supported by the National Cancer Institute of the National Institutes of Health (NIH) and the Food and Drug Administration (FDA) Center for Tobacco Products under Award Number U54CA228110.**