
Brief report

Waterpipe Promotion and Use on Instagram: #Hookah

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Abstract

Introduction: Waterpipe (hookah) use is becoming more prevalent in the United States and abroad with potential implications for public health. As waterpipe use rapidly grows in popularity, novel data streams are needed that can help capture and document the social and environmental context in which individuals use, and are marketed, this emerging tobacco product. This study characterized waterpipe-related posts on Instagram in order to inform regulatory and policy activities in the United States.

Methods: Data were collected from Instagram, an image-based social media site. Inclusion criteria for this study comprised an Instagram post with the hashtag “#hookah” that was accompanied by geo-location metadata demonstrating that the post was inside the contiguous United States. Rules were established for coding themes of images ($n = 1705$).

Results: Seven percent of images depicted a single person using a waterpipe and/or blowing smoke, 25% depicted two or more persons lounging and/or using a waterpipe, 6% depicted waterpipes, coals or flavored tobacco without people, 18% of images were promotional material for hookah lounges and restaurant/bars/nightclubs referencing hookah in the text or depicting a waterpipe, 25% were non-waterpipe-related promotional material, 1% were sexually explicit material, and 18% other. 31% of all images depicted or referenced alcohol. 30% of posts provided geo-location from a hookah lounge, 56% from a restaurant/bar/nightclub, and 14% from other types of locations.

Conclusions: The cross promotion of waterpipe and alcohol use by hookah lounges, and restaurants/bars/nightclubs suggests that poly-substance use is regularly depicted, and promoted, in nightlife entertainment as well as normalized on Instagram in the United States.

Implications: In the US Instagram posts with the hashtag #hookah regularly depicted waterpipe use in conjunction with alcohol use. Instagram’s focus on images facilitates picture-based advertising where hookah lounges promote drink specials at the same time nightclubs promote waterpipe specials. Instagram users often document the variety of shapes, sizes, and styles, of waterpipes, suggesting users take pride in their purchases and like to show their customized, and often times elaborate, waterpipes to their followers. Instagram has been underutilized in understanding tobacco related-behaviors and identifying tobacco-related promotional material.

Introduction

Waterpipe (hookah) use is becoming more prevalent in the United States and abroad with implications for public health.¹ Waterpipes

deliver nicotine and share the same health risks as cigarettes.² Offered in a variety of shapes, sizes, and styles, waterpipes consist of a water bowl at the base, a body, a head that holds tobacco (usually flavored) and coals, as well as a hose and a mouthpiece.³ Tobacco

control policies in the United States do not equally apply to cigarettes and waterpipes.⁴ Cigarette use is disallowed in bars and nightclubs but waterpipe use is permitted as a result of policy exemptions in many US cities.⁵ Lax policies could be perpetuating the increase in waterpipe use in the United States.

As waterpipe use rapidly grows in popularity, novel data streams (eg, Google Web Search, Twitter) are needed that can help capture and document the social and environmental context in which individuals use, and are marketed, this emerging tobacco product. Novel data streams have been used to compliment and extend tobacco-related research including identifying trends in electronic cigarettes (e-cigarettes),⁶ documenting interest in mass-media campaigns,^{7,8} and describing how the internet is used to circumvent tobacco regulations.⁹ Initial studies examining hookah content on Twitter have suggested that hookah use is positively portrayed, with few posts containing negative sentiment.¹⁰⁻¹² A recent study of posts on Tumblr, an image-based social media platform, reported that images of hookah were regularly accompanied by images of alcohol and alcohol use as well as of individuals performing tricks with hookah smoke.¹³

Instagram—a social media site featuring photo-based content—offers a unique opportunity to examine user-generated depictions of waterpipe use. Instagram is an application that allows users to capture and customize photos, and then post them on the internet. With over 400 million active users,¹⁴ Instagram has surpassed Twitter's popularity and is the second most used social media site among youth, behind Facebook.¹⁵ This study characterized waterpipe-related posts on Instagram in order to inform US regulatory and policy activities at the federal level, local tobacco control efforts, and media campaigns.

Methods

Data Collection

Data were collected by establishing connections to Instagram's Application Programming Interface, allowing for external software to make requests for data. All data collected were publicly available, meaning any person with an internet connection could have viewed the image at the time it was retrieved.

Inclusion criteria for this study comprised an Instagram post with the hashtag "#hookah" that was accompanied by geo-location metadata demonstrating that the post was inside the contiguous United States (defined approximately by latitude 24.446 667 to 49.384 472 and longitude -66.949 778 to -124.785). Separate root terms synonymous with hookah like waterpipe are more commonly used in scientific reports than used by individuals on social media, and terms like nargile and shisha are more commonly used in countries outside the United States, so these terms were not included in this study.¹³ All Instagram users can elect to post a geo-location that can accompany their image. Instagram categorizes geo-location for its users so all users can view posts from public accounts from the same location. By using latitude and longitude to define the sampling frame, this study ensured that the waterpipe content described herein pertained to policies and individuals in the United States. Images from Instagram posted between February 19, 2016 and May 19, 2016 were collected. This study used a stratified sampling frame based on week with 14 weeks in the study period, and randomly sampled from each stratum proportionate to the number of posts. About 467 000 posts included the hashtag #hookah during the study period worldwide, and about 162 000 (35%) of these posts

contained geo-coded data, of which 56 844 posts were within the US meeting the inclusion criteria (see Supplementary File for flowchart). Three percent of posts were randomly sampled each week yielding 1705 posts to analyze.

Coding of Themes

Two investigators worked together to become familiar with the data, generated a coding frame, and identified five themes before saturation was reached. The purpose of the approach was to condense the raw image-based data into summary format and report the underlying themes that were evident in the data. The primary themes identified were: (1) Individual Waterpipe Use: one person using a waterpipe and/or blowing smoke; (2) Social Gathering: two or more persons socializing together and/or using a waterpipe; (3) Waterpipe and Components: photo of waterpipe, coals, or tobacco without people; (4) Promotional Material: flyer for a hookah lounge or restaurant/bar/nightclub referencing hookah in the text or depicting a waterpipe; (5) Other: posts that did not clearly fall into one of the above categories. A secondary theme, Alcohol Promotion and Use, was identified that transcended all themes and was coded "1" if alcohol was depicted in the image or referenced in the promotional material (including references to happy hour or drink specials) and "0" otherwise. The presence (coded "1") and absence (coded "0") of secondhand smoke exposure in Social Gathering were also recorded. One investigator coded all posts and another investigator coded a subsample of posts ($n = 200$) to determine reliability. Agreement for coding primary themes ($K = 0.92$) and the alcohol theme ($K = 0.88$) were substantial as was coding the presence of secondhand smoke exposure ($K = 0.86$). In order to determine what if any themes appeared in the Other category, these images were reanalyzed. Two themes were identified including Non-waterpipe-related Promotional Material (eg, a promotional flyer without any reference to, or depiction of, waterpipe use [$K = 0.86$]) and Sexually Explicit Material ($K = 0.40$). Discrepancies were resolved by discussions between the two investigators.

Coding of Geo-Location

Because some tobacco control policies in the United States allow for waterpipe use in hookah lounges, and restaurants/bars/nightclubs, this study examined whether themes varied by these specific locations. Instagram images can contain user-input geo-location, which includes latitude, longitude, and a text field with a location name. This study coded the text field from all posts into one of three categories—inside of a hookah lounge coded "1" inside of a restaurant/bar/nightclub coded "2" or otherwise coded "0". For example, the location "Euphoria Hookah Lounge" would be coded 1, "Toppings Pizza Lounge" would be coded 2, and "Windansea Beach" would be coded "0". Agreement for coding location was substantial ($K = 0.82$).

Statistical Analysis

The percentages of themes were described, and how themes varied by geo-location (hookah lounge, restaurant/bar/nightclub, other location) were analyzed by χ^2 tests.

Results

Among the 1705 Instagram posts, 7% were Individual Waterpipe Use, 25% Social Gathering, 6% Waterpipe and Components, 18% Promotional Material, (Figure 1A–D) as well as 25%



Figure 1. Demonstrates images representative of themes. (A) Individual Waterpipe Use: one person using a waterpipe and/or blowing smoke; (B) Social Gathering: two or more persons socializing together and/or using a waterpipe; (C) Waterpipe and Components: photo of waterpipe, coals, or flavored tobacco without people; (D) Promotional Material: flyer for a lounge/bar/nightclub referencing hookah in the text or depicting a waterpipe. Note for ethical and copyright reasons the exact posts from Instagram were not used. While these four images accurately represent their respective themes, (D) Promotional Material often depicted images of hookahs and alcohol (eg, bottle of vodka) or price promotions (happy hour drink specials) that are not depicted in the figure.

Non-waterpipe-related Promotional Material, 1% Sexually Explicit Material, and 18% Other. Among all posts, 31% depicted or referenced alcohol. Two percent of Social Gathering depicted secondhand smoke exposure. About 30% of posts provided geo-location from a hookah lounge, 56% from a restaurant/bar/nightclub, and 14% from other types of locations. Primary themes significantly varied by geo-location (Table 1).

Discussion

In the United States, Promotional Material was common on Instagram with the hashtag #hookah. The promotion of tobacco-related products over social media was unsurprising,¹⁶⁻¹⁹ however the cross promotion of waterpipes and alcohol use by hookah lounges, restaurants/bars/nightclubs suggests that poly-substance use is regularly depicted, and promoted, in nightlife entertainment on Instagram. Instagram's focus on images facilitates picture-based advertising where hookah lounges promote drink specials at the same time nightclubs promote waterpipe specials. This finding could be of great importance to public health as tobacco use facilitates greater intake of alcohol and vice versa.²⁰ In other words, allowing waterpipes in restaurant/bars/nightclubs might result in patrons getting drunk, and having alcohol in hookah lounges might result in patrons inhaling more smoke.

Table 1. Waterpipe-related Themes by Geographic Location

	Hookah lounges, %	Restaurants/bars/nightclubs, %	Other locations, %
Individual waterpipe use	42	27	31
Social gathering	48	44	8
Waterpipe and components	50	22	28
Promotional material	36	59	5
Non-waterpipe-related promotional material	4	88	8
Sexual explicit material	14	68	18
Other	21	49	30

Numbers in cells are percentages with themes varying by location $\chi^2_{(12)} = 442.960$ 4 $p < .001$.

Depiction of, or reference to, alcohol use was not limited to Promotional Material but appeared in all primary themes. This finding is in line with earlier research on hookah posts on Tumblr,¹³ as well as survey-based research that demonstrated that those who use waterpipes were significantly more likely to use other substances, including alcohol, cigarettes, marijuana, and cocaine compared to those who refrained from waterpipe use all together.²¹ Instagram has been underutilized in understanding tobacco related-behaviors and

identifying tobacco-related promotional material,^{22,23} and may be crucial to the success of future mass-media campaigns in efforts to counteract waterpipe use and its co-occurrence with alcohol.

Individual Waterpipe Use and Social Gathering collectively made up 32% of the images described herein and 70% of these images were posted in a hookah lounge or restaurant/bar/nightclub. Survey studies have shown that those who use waterpipes believe it is a good way to socialize with friends,²⁴ and that it is fun and socially acceptable.²⁵ These attitudes and beliefs may be reinforced on social media where Instagram users may see their friends and family enjoying themselves in social settings in photos accompanied by #hookah. Additionally, earlier research has reported that hookah content is generally positively portrayed on Twitter.¹⁰⁻¹³

Waterpipe and Components depicted the variety of shapes, sizes, and styles, users can consider when purchasing their waterpipe. These depictions suggest users like to document their customized, and often times elaborate, waterpipes to their followers on Instagram. This finding may be particularly concerning since it suggests that individuals portray waterpipes similar to a collector's item and as a result provide unsolicited marketing material of a tobacco-related product to their followers. Given the potential diffusion of such images through social media,¹⁹ it will be important for tobacco control researchers to develop programs to combat the depiction of waterpipes and their use on Instagram.

Twenty-five percent of all posts were Non-waterpipe-related Promotional Material. Each of these posts was accompanied by #hookah, suggesting this hashtag is a mechanism for bars/restaurants/nightclubs to communicate with their target audiences. This hashtag appeared to serve as a flag for Instagram users looking to view images associated with waterpipe use which may include images of nightlife entertainment. Bar/restaurant/nightclub promoters may have realized the popularity of the #hookah hashtag and regularly use it to promote events. A majority of these posts were accompanied by a geo-location in a bar/restaurant/nightclub suggesting these businesses were promoting an event or individual users were telling their followers where they were, or where they were going, for entertainment. The co-occurrence of waterpipe-related content and nightlife entertainment on Instagram is likely a result of lax policies allowing for waterpipes to be used inside bars/restaurants/nightclubs. The removal of policy exceptions in the United States would likely prevent waterpipe use from being part of nightlife promotion and entertainment in the future.

Limitations

This study relied on Instagram's Application Programming Interface to retrieve data, which prevented access to users with private accounts. This study focused solely on images of posts and not the captions which may have provided additional insight to waterpipe use and is an area of future research. This study was also limited to posts with geo-location metadata and may not represent posts without a geo-location. Instagram users may be reluctant to post their geo-location if they are in private residences. Instagram users over represent younger age groups (18–29) and ethnic minority groups²⁶; therefore data does not perfectly represent the US population. However, youth including young adults and minority groups are priority populations for tobacco-related research suggesting Instagram can provide substantial insight to waterpipe use.

Despite these limitations, the waterpipe-related themes identified in this study could inform the design of media campaigns that aim to counter the depiction of waterpipe use on Instagram, and the development of regulatory policies in the future. Findings from this study

should springboard efforts to better understand the consequences of tobacco-related behaviors and promotions on Instagram.

Supplementary Material

Supplementary data are available at *Nicotine & Tobacco Research* online.

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Declaration of Interests

None declared.

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