



Engaging Adults in Sexual Health Messages: Examining the Posts of Pornographic Performers' Social Media

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Abstract

Introduction In recent years, social media has become an important platform for sexual health information. Among the most followed stakeholders of sexual information on social media are pornography performers. To date, their influence on the dialogue around sexual health has yet to be measured.

Methods In this descriptive study, we compared the three most frequently used social media sites: Instagram, YouTube, and Twitter, for the top 30 Pornhub pornography performers ranked by views. The data was collected from January 2020 to June 2021.

Results Over the data collection period, there were 3407 posts on Instagram, 25 videos published on YouTube, and 31,630 tweets sent on Twitter. The study found that when pornography performers provided sexual health information (sexual health education or related global/social issues), their likes did not decrease compared to their regular brand posts. On YouTube, posts that provided education on sex had more likes ($M=3091$, $SD=1031$) than posts that did not ($M=1538$, $SD=800$) ($t(18)=-4.06$, $p<0.001$).

Conclusions The findings suggest that sexual health education has a significant reach and positive reception when pornography performers explain these health concepts on social media.

Policy Implications Despite their influence, pornography performers have not been widely included in online sexual health education efforts. Future research and sexual health education campaigns should recognize and utilize the social media of pornography performers to better promote sexual health to a larger and more receptive audience.

Keywords Safe sex · Sexual health · Education · Pornography · Pornography performers · Social media · STIs/HIV · LGBT

Introduction

Background

According to the World Health Organization, more than 1 million sexually transmitted infections are acquired

worldwide each day (World Health Organization, 2019). In the USA in 2018, there were approximately 68 million sexually transmitted infections (STIs) (National Academies of Sciences Engineering and Medicine, 2021). According to CDC 2019 data, STIs have reached an all-time high for the sixth year in the USA and have increased nearly 30% from 2015 to 2019 (Center for Disease Control and Prevention, 2021). Social media greatly impacts people's sexual beliefs and attitudes. Adults' sexual health beliefs are influenced by the social media and the pornographic media they are exposed to, and they choose their sexual health actions based on those beliefs (Bleakley et al., 2009; Griffin & Fournet, 2020; Guse et al., 2012; Knerr & Philpott, 2011; O'Donnell & Willoughby, 2017; Veale et al., 2015).

A large quantity of sexual content is displayed in online media sources (Pinkleton et al., 2008). The content should be tailored to improve sexual health literacy, particularly as this education is lacking in schools (Manduley et al., 2018). In the past decade, there has been a decline in formal sexual health education (Hall et al., 2016). The USA has no single federal

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guideline on how public schools should provide sexual health education, causing great variation nationwide (Stevens et al., 2017). Fifty percent of middle and junior high schools and 76% of high schools in the USA were taught abstinence-only sexual health education in 2014 (Santelli et al., 2017). Consequently, seeking sexual health information online is an important way for adults to obtain a more comprehensive sexual health education and to gain agency over their sexual health (Hall et al., 2016; Lindberg et al., 2016; Mitchell et al., 2014; O'Donnell & Willoughby, 2017; Ralph et al., 2011). Social media is a vital source of additional sexual health information for adults, as the information can be accessed quickly, easily, and privately at no cost (Flanders et al., 2017; Ralph et al., 2011; Stevens et al., 2017).

Studies have shown that adults are receptive to sexual health messages on social media. Adults are more likely to agree with and follow sexual opinions on social media the more they are exposed to it (Bull et al., 2012; Guse et al., 2012; Martino et al., 2005). STI prevention messages delivered via Facebook, Instagram, and Twitter are efficacious in providing information on risky sexual behavior (Bull et al., 2012; Collins et al., 2017; Gabarron & Wynn, 2016; Veale et al., 2015); adults practice more protected sex when their social media networks view posts on the issue (Bull et al., 2012; Gabarron & Wynn, 2016; O'Donnell & Willoughby, 2017). Furthermore, research indicates that exposure to positive sexual health messages on social media actively increases safe sex attitudes and behaviors such as condoms and contraceptive use (Gold et al., 2010; Guse et al., 2012); in contrast, sexual health information provided by parents, schools, and traditional media (billboards, posters, television, movies, and music) were not as strongly associated with such behaviors (Stevens et al., 2017).

The importance of social media as a potential area of focus to expand health messaging is increasing. The use of social media has risen rapidly among American adults. Only 5% of American adults reported using at least one social media platform in 2005 (Pew Research Center, 2021). As of 2021, 72% of American adults use some type of social media; most of these users visit the social media platforms daily (Pew Research Center, 2021). Some of the most widely used social media platforms are YouTube, Instagram, and Twitter. YouTube is a platform that enables individuals to post long videos. Instagram is a platform that is used to share photos and often shorter videos. Twitter is often used as a platform to share ideas and information with only a few words or sentences and sometimes images. According to the Pew Research Center, as of 2021, 81% of Americans use YouTube, 40% use Instagram, and 22% used Twitter (Pew Research Center, 2021). Among 18- to 29-year-olds, 95% use YouTube, 71% use Instagram, and 42% use Twitter (Pew Research Center, 2021).

Not all online social media sources have equal reach. According to a systematic review of sexual health social networks, sexual health information may be better disseminated by celebrities and organizations than regular social media users, as regular users tend to seek information or keep up with other social media accounts without sharing their content or comments (Veale et al., 2015). In viewing the general sexual health landscape on social media, some of the most prominent stakeholders targeting sexual health on social media, aside from condom brands and user-created sexual health information accounts, are pornography performers who have videos featured on Pornhub. Unfortunately, there is a prevalent suppression and stigmatization of content produced by sex workers despite their highly influential history as vital sex educators (Blunt & Stardust, 2021). Pornography performers have often led the charge on sexual education with whatever tools were available, striving to convey important messages like instructions and advice on using condoms and education on AIDS (Estate Project for Artists with AIDS, 2000). Some examples of activists include Richard Berkowitz's work on the manual "How to Have Sex in an Epidemic," Tony Valenzuela's HIV advocacy as a pornography performer, and Kayden Gray's "UEFU." Pornography performers/actors face disproportionate censorship on social media even when they strive to disseminate vital sexual health information through discriminating community standards, terms of service, and algorithms such as through shadowbanning—hiding or deprioritizing content without informing the user (Are & Paasonen, 2021; Blunt & Stardust, 2021). The censorship of sex workers has gotten worse since 2018, when Public Law 115-164, better known as FOSTA-SESTA, was established. The stated aim of the law was to reduce human trafficking. However, the law has mainly only pressured internet platforms to censor their users. According to communities that it directly impacts, the law has increased "their exposure to violence and left those who rely on sex work as their primary form of income without many of the tools they have used to keep themselves safe" (Blunt & Wolf, 2020). This is a concern as the demand for pornography performers is increasing; now in the USA, nearly 9 out of 10 men and 1 out of 3 women in the 18–26 age group report watching pornography online (Lim et al., 2016). Shadowbanning and censorship can make it difficult for users to find pornography performers through popular media compared to celebrities (Are & Paasonen, 2021). Consequently, pornography sites may be an easier method for users to be introduced to pornography performers. Due to the difficulty in solely tracking pornography performers through popular media, as the sources constantly remove and block pornography performers' content and accounts, our research was centered around analyzing the performers who work for studios whose content is posted on the most popular pornographic media website—Pornhub. Pornhub was the highest viewed

adult site and the 8th most-viewed site overall in the USA in 2020 (Cerdán Martínez et al., 2021; SimilarWeb, 2020). In 2019, there were 42 billion user visits to Pornhub and 115 million visits per day, accounting for 1.36 million hours of content watched, which is the equivalent of a person watching the content for 169 years (Pornhub, 2019). In terms of Pornhub site visitors, 18–24 year olds accounted for 25% of all visitors, and 25–34 year olds accounted for 36% of all visitors (Pornhub, 2019). Pornhub’s pornography performers are actively promoting Pornhub’s content on social media. However, there is currently limited information on the extent to which pornography performers can serve as alternative sources of sexual health media.

Theory and Study Aims

The pornographic performer communications in this study were analyzed based on the information-motivation-behavioral skills theory (IMB). Based on IMB, having safe sex information available is one of the primary constructs to risk behavior change, having the motivation to engage in safer sex, and having the behavioral skills to engage in safe sex (Fisher et al., 1996; Noar et al., 2006). Studies utilizing the IMB model have shown that the theory is associated with increased condom use (Anderson et al., 2006; Walsh et al., 2011; Wang et al., 2020). IMB posits that sexual health risk reduction is reached when the individual possesses (1) information regarding the sexual health risk such as HIV, (2) motivation to practice preventive measures, and (3) behavioral skills that will decrease the risk of the negative sexual health outcomes. Studies have shown that each of the above constructs can work independently to affect behavior change, but using all of three together highly increases the likelihood of success (Aliabadi et al., 2015). This descriptive study aims to examine the first step of IMB by understanding the extent and type of information pornography performers communicate on social media accounts. Understanding the type, extent, and frequency of the sexual health information provided by pornography performers is a vital initial step to understanding the sexual health landscape. It shows what resources pornography performers can provide and what social media users can obtain from the pornography

performers so that individuals can implement the following IMB steps. It also shows crucial gaps in sexual health information that future sexual health stakeholders should address in their works. The availability of sexual health messaging on Pornhub pornography performers’ media accounts meets adults’ need for sexual health information and is received with significant user interaction. Additionally, previous studies have found that adults are attracted to online sexual health information framed in an informative and entertaining way by celebrities (Johnston, 2016). Consequently, we hypothesize that pornography performers’ social media can be used as an important communication tool to provide sexual health education that is met with positive reach and reception.

We looked at the Instagram, YouTube, and Twitter accounts of pornography performers who are popular on Pornhub based on the three main pillars of social media measurement: the reach of the account, what the account discusses, and the outcomes these discussions have in terms of engagement (Agostino & Sidorova, 2016; Murdough, 2009). We chose these social media platforms as they are most popular with our audience of interest, adults ages 18–26. We aimed to determine patterns in the engagement and reception of sexual health information by users within these media platforms based on measures supported by previous research on sexual health engagement strategies (Veale et al., 2015). This research is a foundational step in understanding the current information available regarding safe sex on social media, thus laying the groundwork to enabling future work on the next IMB steps: conducting large studies that measure participants’ motivations, skills, and actions affecting the initiation and continuation of safe sex behaviors.

Methods

Sample

Data was gathered for pornographic performer accounts on Instagram, YouTube, and Twitter. We collected all posts for these accounts from January 1, 2020, to June 1, 2021. The top 30 pornography performers were chosen for inclusion in our sample (see Fig. 1). The top performers were based on

Fig. 1 Pornhub’s 30 most popular pornography performers

Pornography Performers	Lana Rhoades, Abella Danger, Eva Elfie, Riley Reid, Mini Diva, Mia Khalifa, Mia Malkova, Lena Paul, Angela White, Emily Willis, Brandi Love, Yinyleon, Leolulu, Nicole Aniston, Solazola, Cory Chase, Alex Adams, Elsa Jean, Reislina, Adriana Chechik, Johnny Sins, Lisa Ann, Crystal Lust, Skylar Vox, Hong Kong Doll, DickForLily, Lela Star, Sara Jay, Rae Lil Black, Autumn Falls
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the Pornhub “Most Popular Pornography Performers” page from Pornhub.com, where the rankings are measured by the number of views each pornographic performer receives (Pornhub, 2021). We chose this ranking system because these performers would likely have a wide viewership. Of the pornography performers in the sample, 23 had active Instagram accounts. For the YouTube data, all 30 pornography performers were included. These performers were interviewed by the porn studio Wood Rocket on their YouTube channel. Wood Rocket is an adult production studio that is featured on Pornhub. Wood Rocket’s channel has a video series called “Ask a Pornstar.” The “Ask a Pornstar” series interviews pornography performers on a wide range of questions relating to sex and also about their personal life and opinions. All the performers filmed in the Wood Rocket series have videos featured on Pornhub, and the complete Wood Rocket “Ask a Pornstar” video series featured on Pornhub’s website is on the Wood Rocket YouTube channel at the time of data collection. The Wood Rocket “Ask a Pornstar” videos were used instead of the pornography performers’ own YouTube channels because of how YouTube censors and policies the performers. YouTube is constantly shadowbanning, blocking, demonetizing, and censoring the performers’ own YouTube channels, which has resulted in most of the performers not having their own YouTube channels at the time of data collection. Finally, 27 pornography performers had active Twitter accounts and were included in the sample. All the pornography performers selected were performers on Pornhub. We selected the 30 top pornography performers listed on Pornhub for the study, and this included men and women ranging from ages 20 to 60.

Data Collection

Popsters was used to gather data on Instagram, YouTube, and Twitter. Popsters is a tool that automatically gathers metadata

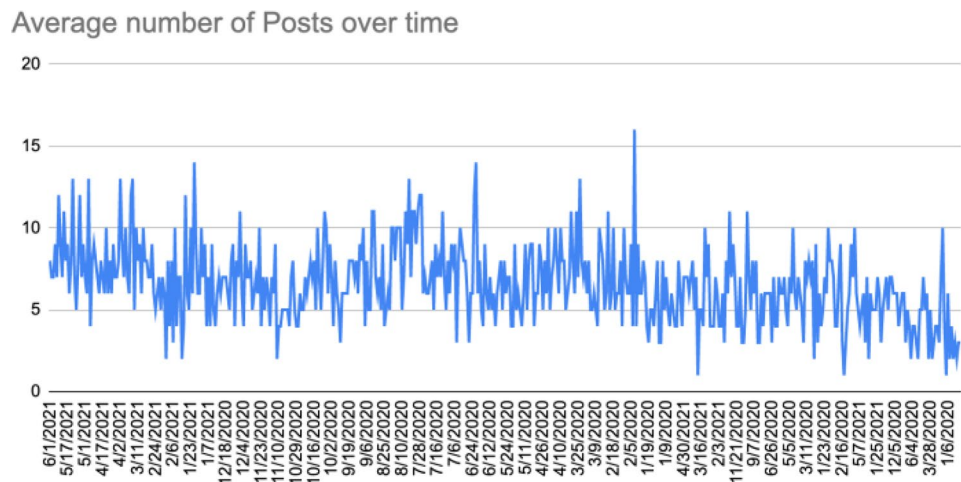
on social media posts in a specified period. Its software can connect to Instagram, YouTube, and Twitter servers and retrieve metadata for each post. The metadata variables collected were social media platform, URL of each post, likes, comments, post’s text, date, author, and media format (video or image). The data for each account was collected onto individual spreadsheets (see Fig. 2 for an example).

Each spreadsheet was then duplicated, and variables were removed and inserted. The variables social media platform, URL, and text were removed. After information on each account was gathered, the data was combined into three sheets: pornography performers’ Instagram, YouTube, and Twitter social media content.

Statistical Analysis Plan

All the following variables, as defined in measures, were dummy coded with 0 being the absence of their specified subject and 1 being the presence. Sexual health information was divided into two variables (providing sexual health education and discussing global/social issues relating to sexual health), and the variables were derived from previous literature (Xu et al., 2022). Examples of sexual health information posts include topics such as “Real Sex vs. Porn Sex,” “Anal Sex Tips,” and “Describe your Vagina,” where the performers would discuss the physical anatomy and look of their vagina. Analyzing global and social issues is an important way for social media users to see the pornography performers’ posts, as shadowbanning may prevent users from easily finding the post by looking up an account name; however, the post will have a greater likelihood of showing if there is a word in the description or hashtag that mentions a current issue (Are & Paasonen, 2021). This data was manually gathered by going through each post and determining the values of each category. Within sexual health education, the variables collected were sex, condom, STIs, masturbation, female reproductive health,

Fig. 2 Popster’s pornographic performer Instagram posts from January 2020 to June 2021



and pornography. The variables within global and social issues relating to sexual health were female empowerment, COVID-19, Black Lives Matters/Stop Asian American Pacific Islander Hate (BLM/AAPI), LGBT, and problems within the pornography industry. The descriptive statistics were computed before statistical analysis. All analyses were conducted with Stata 17.

The data was coded by one of the members of the research team. To ensure the quality of the content analysis, an additional member of the research team coded 20% of the YouTube videos. This content was selected randomly using a random number generator corresponding to the row number in our database. Five different YouTube videos were selected. There were 75 data points (5 videos and 11 different variables) and 4 points of disagreement. The rater agreement percentage for the YouTube videos is 94.7%. Intercoder reliability was not used for Instagram and Twitter, as there were no sexual health education posts.

Measures

Likes and *comments* were collected directly as represented by each post. *Date* refers to the date the post was created. *Author* refers to the account username that created the post. *Media* refers to the post's format (e.g., photo or video). *Provides sexual health education* refers to if the post explicitly talks about sexual health education or provides sexual health information; *provides sexual health education* includes all the following subcategories: *providing education on sex, condom, STIs/HIV, masturbation, female reproductive health, and pornography*. Global and social issues including *female empowerment, COVID-19, BLM/AAPI, LGBT, and problems within the Porn Industry* were also measured. The definition of the variables and examples are shown in Fig. 3.

Results

Summary Statistics for Pornography Performers' Social Media Accounts

Table 1 presents the total social media presence of the pornography performers' Instagram, YouTube, and Twitter accounts. For pornographic performers' Instagram accounts, there were a total of 3407 posts and an average of 183,392 likes, 1326 comments, 4,143,281 followers, and 3.16 days between posts. For the YouTube accounts, there were 25 posts, an average of 2470 likes, 202 comments, 352,000 followers, and 7.5 days between posts. Finally, the Twitter accounts of the pornography performers had a total of 31,630 posts, an average of 7930 likes, 1,050,586 followers, and 0.32 days between posts.

Table 2 provides summary statistics for the number of social media posts that mention sexual health education

and global and social issues. Of the 3407 Instagram posts, the frequency of posts mentioning global and social issues is as follows: < 0.5% ($n = 3$) for female empowerment, < 0.5% ($n = 12$) for COVID-19, < 0.5% ($n = 10$) for BLM/AAPI, < 0.5% ($n = 1$) for LGBT, and < 0.5% ($n = 5$) for problems within the pornography industry. No pornographic performer discussed sexual health education topics on Instagram. Of the 25 YouTube posts, the frequency of YouTube posts that provide sexual health education is as follows: 64% ($n = 16$) for sex, 12% ($n = 3$) for STIs/HIV, 28% ($n = 7$) for masturbation, 16% ($n = 4$) for female reproductive health, and 68% ($n = 17$) for pornography. Condoms were not discussed. The number of posts that mention global and social issues on YouTube was as follows: 4% ($n = 1$) for LGBT, and 12% ($n = 3$) for the problems within the pornography industry. The topics of female empowerment, COVID-19, BLM/AAPI, and LGBT were not discussed on YouTube. The analysis of the pornographic performer's Twitter accounts revealed that there were no mentions of sexual health education or global and social issues.

Analysis

Independent *t*-tests were performed to examine user engagement with sexual health education posts and global and social issue posts on YouTube. Posts that provided education on sex had significantly more likes ($M = 3091$, $SD = 1031$) than posts that did not ($M = 1538$, $SD = 800$) ($t(18) = -4.06$, $p < 0.001$), but there was no significant difference for comments ($t(16) = -1.80$, $p = 0.09$). There was no significant difference between likes or comments for posts that mentioned any other sexual health education variables and posts that did not mention sexual health education. There was also no significant relationship between mentioning global and social issues and the number of likes on both Instagram and YouTube. Analysis could not be developed for Twitter posts as there was no mention of sexual health information.

Discussion

Adults are increasingly using social media as their sexual health education source (Bull et al., 2012; Ralph et al., 2011; Twenge et al., 2019); society must recognize social media's important role in providing vital safe sex information. Furthermore, discussions on sexual health often present sexual health with a sex-negative approach (Knerer & Philpott, 2011). Future sexual health education campaigns need to be mindful not to treat sexual behavior as harmful and problematic by only mentioning the adverse outcomes of sex, like STIs. Instead, sexual health stakeholders should take a sex-positive approach that promotes safe

Category	Definition	Example
Providing Education on Sex	Post describes happens during sex between two or more people, advice on what to communicate before and during sex like what to say to partner(s) to increase sexual arousal during sex, sex positions, consent and normalizing discussing sex.	"Communicate with your partner. I think the most important thing is if you want to have anal sex with your girlfriend, you need to communicate with her to make sure that she is comfortable" - "Anal Sex Tips"
<i>Condom</i>	What a condom is, how to put on a condom, what a condom is made of, condom expiration date, which condoms are suitable for which penis sizes and personal needs and troubleshooting condom issues such as why condoms rip.	"We had a 24 hour binge of sex and went through a whole pack of condoms and then some." - Virginity Stories
<i>STIs/HIV</i>	What STIs/HIV are, how to prevent them, and symptoms of different kinds of STIs.	"As a performer we have to be tested every two weeks and they draw your blood and they do full STI testing to make sure everyone is safe in the industry" - Biggest Fear?
<i>Masturbation</i>	How to masturbate, how different tools can be used to masturbate, the effects of masturbation, and what having an orgasm looks like during masturbation	"I really like vibrators because it makes everything amazing. My violet wand is an electric implement that has a little glass bulb and it shoots static electricity through the glass bulb and it tickles and stings a little bit. It is a really cool little sensation." - What Is Your Favorite Sex Toy?
<i>Female Reproductive Health</i>	Explaining the female reproductive systems and organs, contraception, infertility, pregnancy, menstrual health, and vaginal health.	"(My vagina) has a pretty outside labia but it also has a pretty "Describe Your Vagina"
<i>Porn</i>	How realistic sex in pornography is and how pornography should be viewed.	"What we are doing is putting on a show for the viewer. ...Something that looks good to you guys or someone that is watching me doesn't necessarily always feel the best for me" - "Real Sex vs Porn Sex"
<i>Sexual Self-Acceptance</i>	Accepting one's sexuality and body relating to sex	Body positive / The lioness is not submissive, she merely lets you be king for as long as it pleases her #lioness #queenofthejungle #bossbaby #junglevibes #junglefever #wildwoman #lionesses - Sara Jay
Social Issues	Post mentions the specified social issues (female empowerment, COVID-19, BLM/ AAPI, LGBT, or porn industry).	
<i>Female Empowerment</i>	Includes listening to the viewpoints of females and increasing the voice of females through methods such as education and awareness	The best thing I've been practicing lately has been actively loving my truest, most authentic self, and each decision I choose, while not apologizing or taking offense when someone isn't satisfied with it... truly something I've never felt so fully until recently when I realized it DOESN'T matter how you're perceived by an onlooker with their subjective lenses of personalized experience and belief. You don't NEED empathy, nor sympathy, but compassion; only you are in charge of unconditionally providing that compassion for yourself to an extent which no other could possibly offer, nor should they be relied upon for understanding. No one is wrong in their judgement of another, just as the one being viewed in judgement isn't wrong for existing as they are, without need for involvement or consideration for outside opinion. You are whole and complete, as you are, when you are, without exception. -Have a beautiful weekend... I love you! - Nicole Aniston
<i>COVID-19</i>	Educational discussions on COVID-19	Kinda miss the outdoors / Kinda happy indoors where I'm not infecting anyone high risk or myself #saferathome #butjustgottheseeditsback - Mia Khalifa Wash your hands please! ♡- Crystal Lust
<i>Black Lives Matters/Stop Asian American Pacific Islander Hate (BLM/AAPI)</i>	Discussions seeking to highlight racism, discrimination, and racial inequality experienced by minorities of these minority groups	SUPPORT BLM...PROTECT BLACK TRANS PEOPLE. - Mia Khalifa
<i>LGBT</i>	Discussions on LGBT awareness and acceptance	"I had a girlfriend at the time... We hooked up so essentially that was mental virginity loss right there" - Virginity Stories
<i>Problems within the Porn Industry</i>	Discussions on problems within the porn industry and censoring the industry that need to be addressed	When you're exhausted but still tryna look good for social media 🙄🙄 Please comment, save and share this pic so we can progress on Instagram again! 🙄🙄 We've been shadow-banned for so long 🙄 - LeoLulu How I feel when my post get removed for spam.... - Ariadna Chechik

Fig. 3 Categorization of sexual health education and global/social issues messages

Table 1 Social media presence of pornographic performers across three social media platforms between January 2020 and June 2021

	Pornographic performers’ Instagram, n = 3407	Pornographic performers’ YouTube, n = 25	Pornographic performers’ Twitter, n = 31,630
Social media presence			
Average views	*	251,066	*
Total views	*	6,276,644	*
Average likes	183,392	2470	7930
Total likes	546,637,559	61,755	214,122
Average comments	1326	202	*
Total comments	3,884,895	5038	*
Average number of followers	4,143,281	352,000	1,050,586
Total number of followers	95,295,469	352,000	28,365,835
Average total posts	146.65	25	1273
Average mentions of social issues	0.01	0.16	---
Average mentions of sexual health education	---	0.68	---
Average days between posts	3.16	7.5	0.32

*Not able to be calculated due to the media type and the content analysis software

sex behavior while maintaining that sex is a natural and healthy human behavior (Knerr & Philpott, 2011). Pornography performers have often led the charge on sexual education, whether invited to the table of “official” educational institutions or not. They provide a sex-positive approach to sexual health in their posts by providing crucial sexual health education on sex, masturbation, female reproductive health, and pornography in a way that encourages viewers to be non-judgmental and respectful of the diversity

of sexual and gender expressions but also recognizes the potential risks of certain unsafe sexual behaviors (Stardust et al., 2022). Studies have shown that viewing pornographic performer videos has been associated with greater user comfortability and open-mindedness about sex and one’s sexual identity (Lim et al., 2016). Recognizing the importance of pornography performers’ influence in providing sexual health education is important as adults are watching pornography more frequently and at a younger age (Lim

Table 2 Sexual health messages shared by pornographic performers across three social media platforms between January 2020 and June 2021

	Pornographic performers’ Instagram, n = 3407 % (n)	Pornographic performers’ YouTube, n = 25 % (n)	Pornographic performers’ Twitter, n = 31,630 % (n)
Total mentions sex	0.32 (11)	72 (18)	100 (31,630)
Sexual health education	---	68 (17)	---
Providing education on sex	---	64 (16)	---
Condom	---	---	---
STIs/HIV	---	12 (3)	---
Masturbation	---	28 (7)	---
Female reproductive health	---	16 (4)	---
Porn	---	68 (17)	---
Sexual self-acceptance	---	---	---
Social issues	1 (45)	16 (4)	---
Female empowerment	<0.5 (3)	---	---
COVID-19	<0.5 (12)	---	---
BLM/AAPI	<0.5 (10)	---	---
LGBT	<0.5 (1)	4 (1)	---
Problems within the porn industry	<0.5 (5)	12 (3)	---

Not able to be calculated as there were no posts related to this topic

et al., 2016). Consequently, sex and sexual content should not be banned, deleted, and deplatformed on social media. Sex and sexual content has cultural, social, and political value, and it expands our literacy on health (Stardust et al., 2022). Policy makers and technologists should not stigmatize and block the content produced by pornography performers. Especially with the lack of standardized and quality formal sexual health education (Johnston, 2016), pornography performers provide an important voice in the sexual education space. Sex workers are knowledgeable health stakeholders and need to be incorporated as vital decision-makers and leaders of the sexual health conversation. Previous collaborations and conferences have proved that having sex workers' perspectives is invaluable to creating a more inclusive and holistic conversation on sexual health (Blunt & Stardust, 2021).

To our knowledge, this is the first study to document the amount and type of sexual health messages provided by pornography performers on social media. Adults are more likely to agree with and follow sexual opinions on social media the more they are exposed to it (Bull et al., 2012; Guse et al., 2012; Martino et al., 2005). According to the IMB model, risk reduction interventions are most impactful when individuals are informed and motivated, which improves their behavioral skills and, in turn, their sexual risk behavior (John et al., 2016). This study demonstrates that pornography performers are providing the foundational risk reduction information in a relatable and accessible manner that may potentially increase motivation, behavior skills, and ultimately safer sexual health behaviors. The social media of pornography performers, particularly on YouTube, are important sources of sexual health information. The social media platforms of pornography performers, which generally disseminate sexual health information on a weekly basis, are vital methods of disseminating information on sexual health-related education and sexual health-related global and social issues.

Instagram had the most reach based on an average number of followers, posts, and likes per post (4,143,281, 147, and 183,392, respectively) compared to YouTube (352,000, 25, and 2470, respectively) and Twitter (1,050,586, 1273, and 7930, respectively). Of the three social media platforms, Twitter was not a good sexual health resource as pornography performers did not provide any sexual health information and mainly posted advertisements to their Pornhub videos on the platform. For both Instagram and YouTube, the more visually driven social media platforms (Kuligowski, 2021), users continue to like and comment on posts even when they provide sexual health information. The reasons that Instagram and Twitter may not have been popular platforms to disseminate sexual health education is that there is higher suppression of sexual content on these platforms, which may discourage performers from posting about sexual health topics. Some of the sexual health comments may

have been potentially removed from their social media sites through methods such as shadowbanning.

In terms of the relationship between sexual health education and likes and comments, pornographic performer Instagram accounts had no mentions of sexual health education. However, on YouTube, posts that provide education on sex tended to get more likes than posts that do not provide sex education. For both Instagram and YouTube, posts that mentioned social issue topics did not significantly differ from other posts in terms of likes. We found that users do not negatively react to pornography performers steering away from their usual content to provide sexual health education on the topics of sex, STIs/HIV, masturbation, female reproductive health, and porn. Viewers may be accepting of the sexual health education content by pornography performers because they do not create shame around these safe sex topics. Pornography performers discuss their personal experiences of having pleasurable sex while still practicing safe sex. They also candidly discuss some of their sexual health regrets such as not getting regular sexual health checkups and not being more comfortable discussing consent in the past. Thus, they strive to normalize a sex-positive approach to health, which is not often done in sexual health education (Knerr & Philpott, 2011).

In summary, discussing sexual health information by providing sexual health education and discussing sexual health-related global and social issues does not significantly decrease the number of likes or comments on the social media accounts of pornography performers. Furthermore, relating sexual health to global and social issues is important because many social media users may not directly search for sexual health information. Instead, users may search for information on global and social issues such as female empowerment, BLM/AAPI, and LGBT and come across recommendations on sexual health information based on the platform's algorithm if the post contains a hashtag related to sexual health information. The global and social issue variables chosen in this study were trending issues on social media during data collection. Linking sexual health information to global and social issues provides a more holistic approach to public health. The *U.S. Surgeon General's Call to Action to Promote Sexual Health and Responsible Sexual Behavior* highlights the importance of connecting sexual health to broader issues in communities and the general society to better sexual health (Tolman et al., 2003). Connecting sexual health outside of information directly targeting the sexual health domain allows users to feel that their identities are recognized and find resources supporting their sexual health needs (Flanders et al., 2017; Stevens et al., 2017; Veale et al., 2015). Connecting global and social issues to sexual health may also help users have an easier time finding sexual health information, particularly those who are wary of directly searching for their sexual health questions online (Stevens et al., 2017).

Limitations

This study is not without limitations. We used nominal data (yes/no) for our categorization. People could simply like an image without engaging or reflecting critically on the message. This study is not able to find evidence of behavior change as likes do not reflect actual understanding or internalization of the message. The government-enforced lockdowns internationally in March 2020 may have resulted in higher social media usage during our study (Koeze & Popper, 2020). Additionally, the extent of an individual's sexual health consciousness cannot be solely attributed to the influence of social media platforms like Instagram, YouTube, and Twitter. The study does not speak to social media users, so it is not clear how the posts are engaged. The number of likes and comments may underestimate the actual reach of the pornographic performer accounts, as adults may not want their peers to know they follow and engage with this content. The ones that are engaging may be those who are more comfortable with their sexuality and sexual health. Although there were no negative responses, it does not speak to how the posts were engaged with or if they had any real effect. The lack of shaming is not necessarily the same as acceptance, and engagement is not a full measure of acceptance. Furthermore, it may be difficult to fully measure engagement as censorship and shadowbanning make it difficult for pornography performers/actors' accounts to be seen and limit how many followers/viewers can engage with them. Therefore, the sexual health information provided by pornography performers may not be reaching those most in need of this information. Furthermore, we recognize that the YouTube videos by Wood Rocket are run by a production studio and not the pornography performers' own accounts. The measurement of user engagement is limited for Instagram and Twitter as there were no sexual health education posts by pornographic performers on those platforms. Further research should test the impact of how Instagram, Twitter, and YouTube users would react if pornographic performers engaged with sexual health or related global and social issues more often and at a higher intensity. Finally, this study examines performers who work in both "gay" and "straight" porn. There are likely differences between sexual health messaging in these genres as production teams may have preconceived notions of who comprises their audience. Current research suggests that the audience for "gay" and "straight" porn is diverse and does not always align with the viewer's sexual orientation or gender-based attraction (Attwood et al., 2021; Corneau et al., 2021). For example, heterosexual women often consume "gay" male porn, and heterosexual men view porn featuring transwomen as these genres tend to portray greater connection between the actors than in "straight" porn (Attwood et al., 2021; Comella & Pezzutto, 2020; Corneau et al., 2021; Neville, 2018; Robinson, 2022). There should also be greater research on comparing the engagement and sexual health information receptivity

between "gay" and "straight" porn as well as porn featuring trans performers. Despite these limitations, this paper offers an additional lens to better understand the extent pornography performers disseminate sexual health information and its influence on social media users.

Conclusions

The purpose of this study was to document and analyze the extent to which various pornography performers provided sexual health information. We found that sexual health messages are pervasive on social media platforms, which are used daily by many adults. When pornography performers created posts that provided sexual information, there was no decrease in the number of likes compared to their standard brand promotional posts on any of their platforms. To obtain a greater sexual health reach, health stakeholders should partner with pornography performers to disseminate sexual health information. Previous research has found that for effective sexual health message implementation, health professionals should develop deep and lasting social media relationships with viewers of their messages (Byron, 2015).

Consequently, government organizations and non-profits need to partner with sexual health stakeholders, such as pornography performers, who already have deep relationships with their users, to provide the greatest sexual health reach. In sum, our findings suggest that sexual health education has a significant reach and positive reception when pornography performers explain these health concepts on social media. Future research and sexual health education campaigns should recognize and utilize the social media of pornography performers to better promote sexual health to a larger and more receptive audience.

Data Availability Data is available upon request.

Declarations

Conflict of Interest The authors declare no competing interests.

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