ARTICLE

The broad reach and inaccuracy of men's health information on social media: analysis of TikTok and Instagram

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Social media (SoMe) offers great potential to expand access to health information, but a significant proportion of users consume its content instead of consulting a physician. We sought to quantify the volume and characterize the accuracy of men's health-related content on TikTok and Instagram. We searched TikTok and Instagram for the terms: testosterone, erectile dysfunction, male infertility, semen retention, Peyronie's disease, and vasectomy. The top 10 hashtags for each term were used to estimate the total impressions for each term on each platform, and posts were then characterized by creator type, content type, and accuracy (1 to 5 scale). TikTok had 2,312,407,100 impressions and Instagram had 3,107,300 posts across all topics. Semen retention had the most impressions on TikTok (1,216,074,000) and posts on Instagram (1,077,000). Physicians created only a small portion of total TikTok and Instagram posts (10.3% and 12.9%, respectively). Across all topics, the accuracy of content was poor (2.6 ± 1.7), however, physician posts were more accurate than non-physician posts (mean 4.2 ± 1.2 vs 2.3 ± 1.6, $p < 0.001$, respectively). Men's health content is popular on TikTok and Instagram but is not accurate. We recommend that physicians actively engage in SoMe to address misinformation.

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INTRODUCTION

Social media (SoMe) is a computer-based technology that facilitates the sharing of content and networking with others. In 2021, 72% of US adults used at least one SoMe site, including 66% of all adult men [1]. The coronavirus disease 2019 (COVID-19) pandemic and its subsequent global recommendations of social distancing dramatically changed the landscape of SoMe use. Compared to pre-pandemic, there has been a 40–70% increase in users seeking information via digital or online platforms [2, 3]. This increase has been accompanied by increasing concerns regarding the accuracy of information found online and the potential consequences of broad exposure to health misinformation [4]. While SoMe offers great potential to democratize and expand access to health information, a significant proportion of users consume this health information in lieu of consulting with a physician. For example, only 50% of parents who use SoMe for child health research verify the information with their doctors [5, 6].

Men's health issues such as sexual dysfunction, fertility, and testosterone deficiency are particularly ripe for coverage on SoMe, as these issues may be of high interest and importance to young adults, who comprise a large proportion of SoMe users. For example, Instagram (IG), the video and photo sharing application, is currently used by 71% of US adults aged 17–29 and has over 1 billion monthly active users [7]. Similarly, TikTok (TT) is an application for uploading short-form mobile videos and is currently the fastest growing SoMe platform in the world with over 1 billion monthly active users [8]. TikTok is a popular platform amongst younger people, with 28% of users under the age of 18 and 53% of users 19–39 years old [9]. However, the extent to which men's health topics are represented on these platforms is unknown.

In addition to the paucity of data examining the volume and reach of men's health information on SoMe platforms, the accuracy of this content is also unknown. Multiple studies have demonstrated a large volume of low-quality urologic information relating to prostate cancer and other disease processes across SoMe platforms such as YouTube, Facebook, and Twitter [10, 11]. However, the accuracy of men's health-related content in SoMe is not well established, particularly with regard to TT and IG, the two SoMe platforms with the most rapid growth.

We hypothesized that there is a high volume of men's health-related content on SoMe and that the accuracy of this content is generally poor. As such, we sought to characterize the presence of men's health-related information on SoMe in two ways. First, we quantified the volume of men's health-related content on TT and IG. Second, we assessed the accuracy of health-related content contained on these sites.

MATERIALS/SUBJECTS AND METHODS

Selection of men's health topics

Given the broad range of men's health conditions, we narrowed the scope of our search to include those topics deemed most important and of greatest interest to the general adult SoMe

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consumer. We utilized a consensus approach among the authors, incorporating informal assessment of non-IG and non-TT SoMe and internet sources to identify issues most frequently discussed in men's health forums. Based on these common concerns, six men's health topics were selected: testosterone, erectile dysfunction (ED), male infertility, semen retention, Peyronie's disease (PD), and vasectomy.

Evaluation of topic interest

Assessment of SoMe user interest in each topic was quantified by searching for the topic in both platforms. In TT, the search bar enables users to insert the topic of interest (ex: "testosterone") and then select associated topic "hashtags" – words or phrases proceeded by the pound (#) symbol indicating that content with this label relates to a specific topic or category. Each of these hashtag labels can be further selected, thereby directing the user to content specifically associated with this more selective label. TT also provides data regarding the volume of users who have viewed content associated with each hashtag.

We searched for the top ten associated hashtag terms for each of the primary six topics, documenting the hashtag terms and their associated viewer volume. The sum of all views across ten hashtags for each topic was determined. A similar search and analysis were performed for IG, with one modification: due to the specific search mechanism within IG, the hashtag was included along with the initial search terms (ex: "#testosterone") to identify similar hashtags involving the men's health topic of interest. Whereas impressions on TT were defined as topic views, IG does not provide view data, and as such, impressions could not be quantified. Instead, we quantified the total number of posts as a surrogate endpoint for IG.

Data characterization and accuracy

We further characterized the top 40 posts for each topic (top 20 posts x top 2 hashtag terms). After determining a consensus regarding criteria for post characterization and accuracy assessment among all authors, all posts were reviewed by two authors (JAA and JMD). Post accuracy was determined by a single author (JMD). In instances where post characterization or accuracy were equivocal, a third author (JAH) reviewed the post for adjudication. Each post was characterized by type of post (educational, promotional, testimonial, personal, entertainment). The account from which the post was created was further characterized by account type (personal, creator, business, healthcare worker, physician), account verification, and number of followers. We also determined the number of likes, comments, and shares for each post on TT; however, IG does not provide these data. Posts from both platforms were excluded from analysis if the accompanying text, audio, or narration was not in English.

Accuracy assessment was performed for all TT posts. We did not perform accuracy assessment for IG posts due to a high prevalence of non-video, static content among the IG posts, which contained limited information. Within TT, we restricted accuracy analysis to educational posts only. Each post was reviewed for accuracy and scored to the extent of misinformation on a scale from one to five, based on previously reported methods for characterization of misinformation on prostate cancer on YouTube, which was deemed the misinformation index score [11]. A score of one indicated a complete lack of accurate information (i.e., most inaccurate), whereas a score of five indicated a complete lack of inaccurate information (i.e., most accurate).

Statistical analysis

Descriptive statistics were reported. A 2-sided *T*-test was used to compare the averages of continuous variables. We used STATA, version 17 (StataCorps LLC, College Station, Texas) to perform all statistical analysis and considered statistical significance as $p < 0.05$.

Table 1. Men's health content reach on TikTok (views) and Instagram (posts).

Topic	TikTok Views, *N* (%)	Instagram Posts, *N* (%)
Testosterone	703,480,600 (30.4%)	958,200 (30.8%)
Erectile Dysfunction	42,235,000 (1.8%)	138,400 (4.5%)
Male Infertility	30,113,000 (1.3%)	898,800 (28.9%)
Semen Retention	1,216,074,000 (52.6%)	1,077,000 (34.7%)
Peyronie's Disease	1,753,200 (0.1%)	7000 (0.2%)
Vasectomy	318,751,300 (13.8%)	27,900 (0.9%)
Total	2,312,407,100	3,107,300

RESULTS

Content reach and engagement

Overall, TT had 2,312,407,100 impressions and IG had 3,107,300 posts across all six major men's health topics. Among all topics, semen retention had the most impressions on TT (1,216,074,000; 52.6%) and posts on IG (1,077,000; 34.7%) (Table 1).

Men's health content on TT received 47,142,691 likes, 679,443 comments, and 1,338,473 shares from accounts with a total of 36,302,656 followers (Table 2). The topic of semen retention had the most engagement, comprising 34.2% of all likes, 47.8% of all comments, and 37.1% of all shares.

General characteristics

The majority of posts on both TT and IG were educational in nature, accounting for 50.9% and 32.5% of total content, respectively. Healthcare workers generated 15.5% and 17.3% of all posts about men's health on TT and IG, respectively. Physician posts were not prevalent, comprising only 10.3% and 12.9% of total TT and IG posts, respectively. Only 16.8% of educational posts on TT were created by physicians. Verified account posts on men's health topics were rare, comprising only 3% and 0.8% of total TT and IG posts, respectively (Table 3). Even though there were far fewer posts by physicians, on average, physician accounts had significantly more followers than non-physicians accounts (716,450 vs 193,605, $p = 0.01$, respectively). The average physician-created post had similar overall engagement (likes, comments, and shares) to posts created by non-physicians.

Content accuracy

Across all men's health topics on TT, educational posts had a mean misinformation index score of 2.6 ± 1.7. Among educational posts, physician posts were significantly more accurate than non-physician posts (4.2 ± 1.2 vs 2.3 ± 1.6, $p < 0.001$, respectively). The most accurate topic discussed on TT was vasectomy with an average score of 5 ± 0, whereas the least accurate topic was semen retention with an average score of 1.5 ± 1.2. Of note, semen retention was the only topic that did not have at least 1 physician post (Table 4). By men's health topic, physicians were significantly more accurate than non-physicians in TT posts about ED (5.0 ± 0 vs $2.4 +/- 1.8$, $p = 0.02$ and male infertility (4.1 ± 1.4 vs 2.6 ± 1.7, $p = 0.02$) There was no difference between accuracy of posts discussing testosterone, PD or vasectomy. Figure 1 provides a composite description of the interplay between impressions, accuracy, and engagement across all men's health topics.

DISCUSSION

With the increasing popularity of SoMe a large number of men utilize these outlets as a source of health information. This is the first study to characterize the volume and accuracy of men's health content on both TT and IG.

Table 2. Characteristics of men's health content engagement on TikTok, according to physician vs non-physician posts.

	Total (%)	Non-Physicians (%)	Physicians (%)
Audience, *N* (%)			
Followers	36,302,656 (100%)	25,555,908 (71.1%)	10,746,748 (29.6%)
Content shares, *N* (%)			
Testosterone	224,947 (100%)	220,340 (98.0%)	4,606 (2.0%)
Erectile Dysfunction	83,872 (100%)	79,173 (94.4%)	4,698 (5.6%)
Male Infertility	67,824 (100%)	23,605 (34.8%)	44,219 (65.2%)
Semen Retention	497,234 (100%)	497,233 (100%)	0 (0%)
Peyronie's Disease	2,237 (100%)	707 (31.6%)	1,530 (68.4%)
Vasectomy	462,362 (100%)	358,540 (77.5%)	103,821 (22.5%)
Total	1,338,473 (100%)	1,179,598 (88.1%)	158,874 (11.9%)
Content likes, *N* (%)			
Testosterone	13,799,676 (100%)	13,777,676 (99.8%)	22,000 (0.2%)
Erectile Dysfunction	1,211,163 (100%)	1,162,102 (95.9%)	49,061 (4.1%)
Male Infertility	1,056,871 (100%)	580,726 (54.9%)	476,145 (45.1%)
Semen Retention	16,120,900 (100%)	16,120,900 (100%)	0 (0%)
Peyronie's Disease	26,923 (100%)	10,196 (37.9%)	16,727 (62.1%)
Vasectomy	14,927,158 (100%)	13,125,240 (87.9%)	1,801,918 (12.1%)
Total	47,142,691 (100%)	44,776,840 (95.0%)	2,365,851 (5.0%)
Content comments, *N* (%)			
Testosterone	177,461 (100%)	176,268 (99.3%)	1,193 (0.7%)
Erectile Dysfunction	19,413 (100%)	18,437 (95.0%)	976 (5.0%)
Male Infertility	16,076 (100%)	9,370 (58.3%)	6,706 (41.7%)
Semen Retention	324,554 (100%)	324,554 (100%)	0 (0%)
Peyronie's Disease	573 (100%)	66 (11.5%)	507 (88.5%)
Vasectomy	141,366 (100%)	120,341 (85.1%)	21,025 (14.9%)
Total	679,443 (100%)	649,036 (95.5%)	30,407 (4.5%)

Table 3. Men's health content characteristics on TikTok and Instagram.

	Instagram	TikTok
Account Types, *N* (%)		
Personal	34 (20.2%)	65 (41.9%)
Creator	79 (47.0%)	49 (31.6%)
Business	26 (15.5%)	17 (11.0%)
Healthcare Worker	29 (17.3%)	24 (15.5%)
Content Category, *N* (%)		
Educational	78 (32.5%)	119 (50.9%)
Promotional	46 (19.2%)	21 (9.0%)
Testimonial	3 (1.3%)	32 (13.7%)
Personal	63 (26.3%)	45 (19.2%)
Entertainment	43 (17.9%)	17 (7.3%)
Other	7 (2.9%)	0 (0.0%)
Total	240 (100%)	234* (100%)
Physician Posts, *N* (%)	31 (12.9%)	24 (10.3%)
Non-Physician Posts, *N* (%)	209 (87.1%)	210 (89.7%)
Verified User Posts, *N* (%)	2 (0.8%)	7 (3.0%)

*Only 34 posts were available for Peyronie's disease, so we were not able to evaluate 40 posts for that topic.

We found that men's health content was extremely popular on both TT and IG, with over 2.3 billion impressions on TT and 3 million posts on IG. Since the start of the pandemic, TT has become the premiere source for public health information and has been a valuable tool for physicians to share accurate information to the general public [12]. Fowler et al. showed that TT has become a popular source for sexual education amongst teens with the more frequently searched topics including female anatomy, sexual pleasure and sexual health [13]. Our data reinforce these findings, indicating a large presence of men's health content on these platforms.

Despite a very high volume of posts related to men's health content on both TT and IG, overall accuracy of these posts was low. These data are consistent with prior studies examining urologic content accuracy across SoMe platforms. Babar et al. examined video content addressing ED on SoMe, comparing TT and YouTube. The authors found higher engagement (likes and views) but significantly lower accuracy among the TT posts. Moreover, TT posts were more likely to recommend supplements for ED treatment, an approach not supported by the American Urological Association (AUA) guidelines [14, 15]. Likewise, multiple studies have examined the accuracy of information regarding prostate cancer on SoMe, finding a high degree of misinformation across platforms [11, 16].

The accuracy pitfalls of health content on SoMe are best depicted by our findings on the topic of semen retention. Semen retention is the male practice of avoiding ejaculation by either abstaining from sexual activity, discontinuing sexual activity prior to ejaculation, or the practice of achieving orgasm without ejaculation. Semen retention is an ancient practice, similar to celibacy, motivated by the belief that ejaculation weakens a man's overall health. Those who practice semen retention ascribe various health benefits such as improved fertility, testosterone levels, and mental and physical health. More recently, the concept of "NoFap" has emerged. Similar to semen retention, NoFap advocates for

Table 4. Mean accuracy of men's health content according to misinformation index (1–5, where 5 is most accurate) on TikTok among non-physician versus physician content creators.

Misinformation Indices	Overall (SD)	Non-Physicians (SD)	Physicians (SD)	*p*-value
Testosterone	2.3 (1.6)	2.3 (1.7)	3.0 (0)	n/a
Erectile Dysfunction	2.8 (1.9)	2.4 (1.8)	5.0 (0)	0.02
Male Infertility	3.0 (1.7)	2.6 (1.7)	4.1 (1.4)	0.02
Semen Retention	1.5 (1.2)	1.5 (1.2)	–	–
Peyronie's Disease	3.6 (1.3)	3.6 (1.3)	3.6 (1.3)	0.97
Vasectomy	5.0 (0)	5.0 (n/a)*	5.0 (0)	–
Total	2.6 (1.7)	2.3 (1.6)	4.2 (1.2)	<0.001

SD standard deviation
*Only one observation ($N = 1$) in this group

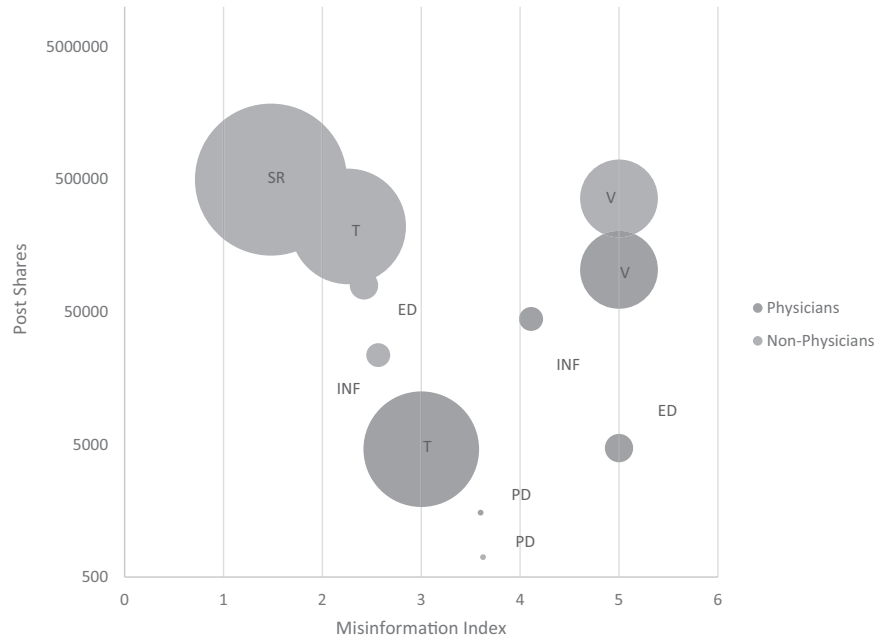

Fig. 1 Description of the relationship of men's health topics, their engagement, and accuracy (1–5, where 5 is most accurate) by topic and content creators (non-physicians vs physicians). T testosterone, ED erectile dysfunction, INF male infertility, SR semen retention, PD Peyronie's disease, V vasectomy.

abstinence (from pornography, masturbation, and sexual activity) as a means of treating pornography addiction and pornography-induced sexual dysfunction. While semen retention and NoFap have different objectives, they both promote abstinence as a means of achieving these objectives, and as such, we included both within the same content category. Importantly, the benefits of semen retention and NoFap are not based on robust clinical evidence. Only two small studies have been cited in support of the practice of semen retention. Exton et al. ($N = 10$) found that men achieved significantly higher basal testosterone levels during and after sexual arousal in addition to more intense orgasms after a 3-week period of abstinence, whereas Jiang et al. ($N = 28$) found that men who abstained for 1 week had increased testosterone levels by 145.7% from their baseline but then had significantly declining testosterone levels starting day 8 of abstinence [17, 18]. Both studies were limited by small sample size and methodological concerns (ex. the impact of anticipatory cues). In contrast, multiple, rigorous studies have demonstrated the negative impact of delayed and/or infrequent ejaculation, particularly with respect to semen quality [19–21].

Despite the lack of clinical data to support the practice of semen retention, semen retention was by far the most popular men's health topic on TT and IG according to metrics of overall impressions, posts, and engagement. Not surprisingly, all posts on this topic were created by non-physicians, and these posts were associated with an overall misinformation index score of 1.5, the lowest of all topics. The high popularity of a practice that is both unsupported by the medical literature and potentially harmful indicates a need for interventions to improve the quality of content on SoMe.

In aggregate, these data suggest an important role for physicians and other healthcare workers in addressing misinformation on SoMe. Overall, physician-created content was significantly more accurate than non-physician content, indicating a potential avenue to increase overall content accuracy on SoMe through greater physician engagement. These efforts can occur not only at the level of the individual physician but also, more broadly, through physician organizations. For example, societies with interest in men's health such as the American Urological Association (AUA), the Sexual Medicine Society of North America (SMSNA), the Society for the Study of Male Reproduction (SSMR), the Society for Male Reproduction and Urology (SMRU), and others have begun to develop a SoMe footprint. These organizations should continue to expand upon their SoMe presence with the

goal of more actively disseminating accurate medical information based on rigorous medical literature.

Our study should be interpreted within the context of certain limitations. First, the video review was performed predominantly by two reviewers with adjudication by a third reviewer, as needed. While there is potential bias in the accuracy scoring from a single reviewer, this reviewer was a fellowship-trained urologist with expertise in both SoMe and men's health. Second, this was a cross-sectional study based upon the most popular videos and posts at a single point in time. Due to the nature of both IG and TT, the most popular videos and posts will constantly evolve, and the reported popularity and engagement statistics may be rendered obsolete in the future. Finally, the men's health topics were chosen based on author consensus, which inherently lends itself to selection bias. While semen retention is not considered a core men's health issue, many of the authors reported a high volume of patients asking about or espousing the concept of semen retention. Given that the stated objective was to evaluate search terms of greatest interest to the general consumer of SoMe and given the lack of scientific literature on semen retention, we determined that semen retention was an important topic that should be included among our search terms. In contrast, other core men's health topics were excluded (ex: small penis, premature ejaculation), and further studies are needed to assess volume and accuracy of information on these topics within SoMe.

CONCLUSIONS

We performed the first study to describe the broad reach and accuracy of men's health content on both IG and TT. We found a high level of engagement with men's health content on these platforms, but a low level of overall accuracy. Semen retention, a practice that is not supported by current literature and which has been shown to have potential adverse health effects, was the most popular men's health subject on both platforms. Given the higher accuracy of physician-created content, we recommend that physicians actively engage, on both individual and organizational levels, in SoMe to address misinformation.

DATA AVAILABILITY

Readers interested in additional information on the study's data please contact the corresponding author.

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AUTHOR CONTRIBUTIONS

All authors meet all four criteria for authorship, including. (1) Conceived and/or designed the work that led to the submission, acquired data, and/or played an important role in interpreting the results. (2) Drafted or revised the manuscript. (3) Approved the final version. (4) Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

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