




ARTICLE



Is Reddit a reliable source for information on erectile dysfunction treatment?

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Patients may turn to social media websites, such as Reddit, for information on erectile dysfunction prior to seeking care from a physician. We sought to identify, characterize, and assess the quality of the erectile dysfunction treatments discussed on the highly influential Reddit website. We assessed 2634 comments from two subreddits, r/AskMen and r/ErectileDysfunction, for positive and negative statements regarding treatments for erectile dysfunction. A total of 45 unique treatments were discussed and consisted of changes in sexual behavior (30%), lifestyle changes (29%), medical interventions (23%), talking with a partner about ED (10%), and use of supplements (8%). Only 24.4% of all treatments discussed are in line with current American Urological Association guidelines. Only 43.8% of all positive statements made endorsed a guidelines-based treatment, indicating a high rate of self-proclaimed success with alternative therapies. Our results indicate that there is active discussion of erectile dysfunction treatment on Reddit with a wide range of therapies recommended, however, the majority of the recommendations are not supported by strong clinical evidence.

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INTRODUCTION

Erectile dysfunction (ED) affects an estimated 18.4% of men above the age of 20 within the US [1]. Young men, specifically those between 19 and 24 years old, represent the fastest growing demographic to seek urologic care for ED [2]. In addition, young men prefer consulting online sources for health information over in-person visits [3], and this demographic also represents the highest rate of uninsured men, further emphasizing the value and importance of the internet as a free, accessible resource [2].

Patient inquiries for medical information often involve online resources as both primary and supplementary sources, especially with the COVID-19 induced paradigm shifts in health care access and delivery [4]. An analysis of Health Information National Trends Survey data between 2013 and 2017 showed that up to 80% of US adults have used the internet to seek health information for themselves [2]. A majority of these sources are derived from non-medical peers through social media or un-validated or peer reviewed online forums [5].

One such forum is Reddit, a popular website with over 52 million registered users and 1.7 billion monthly views [6]. Reddit provides a platform for patients, colleagues, friends, and strangers to anonymously interact and discuss content openly across a wide range of topics, including many urologic conditions and ED. The site consists of millions of topic-based communities described as “subreddits”, and over 191 documented health related subreddits exist. Subreddits allow for anonymous discussion amongst all users, and advice from other users is commonly sought. Subreddits have previously been utilized to evaluate accuracy


and medical fidelity within the realm of sexually transmitted infections, male infertility, and suicide [7].

There is a paucity of literature related to erectile dysfunction discussions on Reddit. One study conducted by Jiang et al. analyzed themes of discussion of Reddit posts in r/ErectileDysfunction, and found that hypogonadism, masturbation, sex, alternative therapies, partner factors, pornography, and pharmacotherapy were some of the common themes in the subreddit discussions. Only 28% of the individuals reported seeing a health professional. In a limited analysis of self-reported interventions for ED, treatments utilized by this cohort included consultation with a healthcare provider, phosphodiesterase type 5-inhibitor (PDEi) therapy, abstinence from pornography, masturbation, and orgasm, over-the-counter supplements, and non-PDE5i inhibitors [8].

Prior studies have also illustrated the impact of social media and the often unreliable content shared and published. An analysis of YouTube, a popular online video streaming service, found that as much as 37% of video content related to ED was not posted by medical professionals, and 28% contained misinformation [9]. Several studies have found that medical misinformation is rampant on social media. A study looking at the dissemination of articles pertaining to urologic oncology found that misleading articles were 28 times as likely to be shared than factual article on social media site including Reddit [10].

Through this study, we aim to identify and characterize the ED treatments being discussed on Reddit to assess the type of information that may be encountered by an individual with concerns for ED who turns to the popular social media site for

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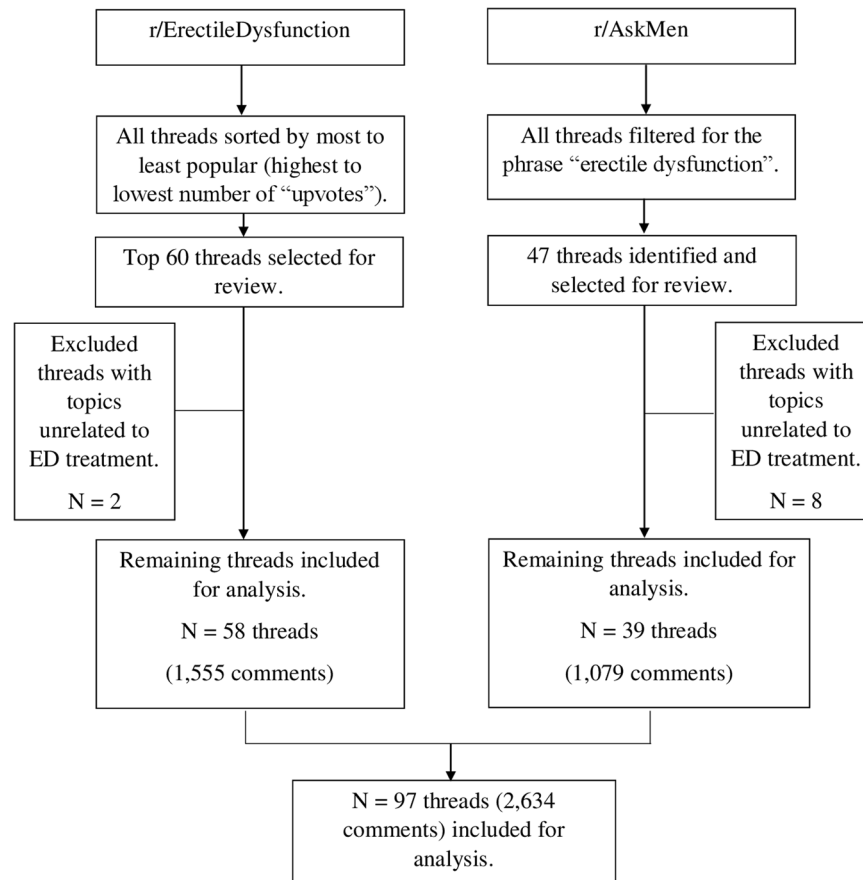


Fig. 1 Outline of research methods. Prisma diagram depicting the methods of including and excluding Reddit threads in the analysis.

advice. Additionally, we compare these online treatment discussions to published American Urologic Association (AUA) guidelines for the treatment of ED, to better understand if public recommendations mirror professional consensus. We hypothesize that the majority of treatment recommendations on Reddit will not be consistent with the AUA guidelines. Understanding the specifics and overall quality of the recommendations shared online can be a useful tool in the decision-making process when these patient present for counseling.

METHODS

Two subreddit pages, "Erectile Dysfunction" (<https://www.reddit.com/r/ErectileDysfunction/>) and "Ask Men" (<https://www.reddit.com/r/AskMen/>) were chosen for analysis and accessed in March 2022. Each subreddit contains numerous "threads", which consist of an initial statement by a single user and any comments made by other users to create an ongoing discussion. For the purposes of this paper, a "comment" will refer to any of the initial statements or additional comments made within a thread. Of note, Institutional Review Board approval was not required as all analyzed information is publicly available.

The r/ErectileDysfunction subreddit was chosen because the focus of the group is directed at "curing ED". The group's self-made description is as follows:

"Here you will find men who used to struggle and those who are struggling now with Erectile Dysfunction, men who visited a doctor and were offered some treatments for ED, and those who preferred to seek for possible solutions by themselves."

It is therefore felt to represent a relevant sampling of what may be encountered by a man with concern for erectile dysfunction who turns to Reddit for advice. All threads within the r/ErectileDysfunction subreddit were first sorted by most popular to least popular by selecting the "top"

feature over "all time" within the subreddit. This sorts all threads within the subreddit by number of "upvotes" which are assigned to threads by users who like the content. After sorting by popularity over all time, the top 60 threads were reviewed for inclusion in the study.

The r/AskMen subreddit was chosen in addition to the r/ErectileDysfunction subreddit to broaden our search. Because this subreddit is expansive and encompasses many topics aside from ED, all threads were first filtered to include the words "erectile dysfunction". This yielded a total of 47 threads, all of which were reviewed for inclusion in the study.

The 60 r/ErectileDysfunction threads and the 47 r/AskMen threads were reviewed independently by two separate authors (EJ and RE) for inclusion in the study. Threads were excluded if ED treatment was not the topic of the thread (Fig. 1). All threads were unanimously excluded by both authors ($\kappa = 1$). Examples of included and excluded threads are listed in Supplementary Table 1.

All included threads were then reviewed for phrases with either positive or negative themes. Positive themes included phrases in which a user made a recommendation for a specific therapy or stated that a specific therapy gave them a benefit. Negative themes included phrases in which the user recommended against a specific treatment or stated the treatment did not give them a benefit (Table 1). Positive and negative themes were tallied. The most commonly discussed treatments were determined by comparing the total number of positive and negative statements for each treatment.

Finally, each treatment identified was evaluated for congruence with the 2018 AUA guidelines statements for the treatment of ED [11]. Therapies were then divided into categories based on the type of intervention. Categories included changes in sexual habits, lifestyle changes, use of supplements, engaging in a discussion regarding ED with a partner, and medical interventions.

RESULTS

The "r/ErectileDysfunction" and "r/AskMen" subreddit forums consist of 12,400 and 3.5 million members respectively at the

Table 1. Examples of positive and negative phrases used for classification of user statements.

	Positive	Negative
Description:	<i>User makes a recommendation or states that a specific treatment worked for them.</i>	<i>User recommends against a specific treatment or states that a specific treatment did not result in a personal benefit.</i>
Examples:	<p>"If you jerk off a lot, without lube, or too rough - stop for a few weeks."</p> <p>"2 months ago I started taking raw garlic cloves 2X a day ... I recently started noticing that I woke up in the morning with a hard on regularly again ... I suggest everyone look into it.. garlic has a TON of benefits."</p> <p>"See a urologist. Get all your blood tests done. Get an ultrasound on your penis, etc. For 90% of guys this will rule out a severe physical cause or low t levels."</p> <p>"I got a once daily 5 mg Cialis prescription and really never looked back. It changed my life and saved the relationship."</p> <p>"[After the] 4th week of using the [testosterone] gel ... I finally got spontaneous erections, something which I've not experienced in years."</p> <p>"I believe my issues (since solved) were all about lack of protein, so just watch the diet!"</p> <p>"If you want a long term solution, just get done with a penile implant from a top us surgeon."</p>	<p>"I was using viagra, but I felt like I never got quite hard enough on the stuff."</p> <p>"I did not masturbate or look at porn for 83 days, and the first time I got into bed ... the same [thing] happened again", referring to difficulty maintaining an erection."</p> <p>"I quit porn for 3 months... I still couldn't maintain an erection or get hard enough for intercourse."</p> <p>"29, had issues for years, doctor just prescribed sildenafil little effect."</p> <p>"The older you get, the less you benefit from things like exercises, kegels etc."</p> <p>"Viagra is probably whats going to cause you issues and make ed worse."</p> <p>"Don't do the [platelet-rich plasma] injections, they'll cause scarring over time and you'll end up losing length and get a severe curve"</p>

RECOMMENDED ED THERAPIES BY CATEGORY

- Changes in sexual behaviors
- Lifestlye Changes
- Medical interventions
- Talking with partner about ED
- Supplements

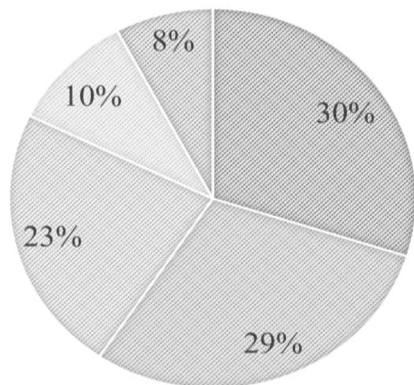


Fig. 2 Recommended ED therapies by category. Pie chart depicting the distribution of therapies by category including changes in sexual behaviors, lifestyle changes, medical interventions, talking with partner about ED, and supplements.

time of analysis. In total, 105 threads and 2634 comments were selected for analysis. A positive or negative phrase regarding a specific therapy for ED was made in 849 comments. The most commonly discussed categories of treatment were changes in sexual behavior (30%) and lifestyle changes (29%), followed by medical intervention (23%), talking with a partner about ED (10%), and use of supplements (8%) (Fig. 2). The treatments within each category as well as the number of positive and negative statements made for each treatment are depicted in Fig. 3.

The most commonly discussed treatment was PDE5i with 68% of statements being positive. Other commonly discussed treatments included talking with a partner about ED (88% positive statements), reducing pornography (75% positive statements), talking with a doctor (83% positive statements), and reducing stress and anxiety (100% positive statements).

Only 11 (24.4%) of the 45 discussed therapies were in line with current AUA guidelines for the treatment of ED. Of all positive statements made across the study, 43.8% were for a treatment in line with the AUA guidelines. In order of most to least commonly discussed, these included PDE5i (68% positive statements), seeking therapy from a physician (83% positive statements), reducing anxiety/stress (100% positive statements), cardiovascular exercise (93% positive statements), following a healthy diet (100% positive statements), testosterone therapy (72% positive statements), weight lifting (77% positive statements), seeking specialized care from a urologist (92% positive statements), reducing alcohol intake (91% positive statements), smoking cessation (80% positive statements), and penile implant surgery (50% positive statements) (Fig. 4).

DISCUSSION

Patients are increasingly turning to online sources for health-related information and care. Our study is consistent with published literature showing that the sharing of medical misinformation is a common occurrence on social media.

With only 24.4% of the discussed therapies aligning with the AUA guidelines, our analysis illustrates that public discussion boards and forums on Reddit fall short of professional recommendations. This could be detrimental, as inaccurate content could lead to utilization of invalidated, ineffective, or dangerous treatments, and ultimately delay effective patient care.

Current AUA treatment guidelines start with initial counseling on lifestyle modifications, which were recommended on several Reddit posts in the form of following a healthier diet, increasing exercise, reducing alcohol consumption, and quitting smoking. The overall rate of positive comments for these lifestyle changes were high, indicating Reddit may be a reliable source to this type of information. Guidelines also recommend discussions surrounding other evidence-based treatments like oral therapies and penile implant surgeries, which was discussed rarely in comparison to

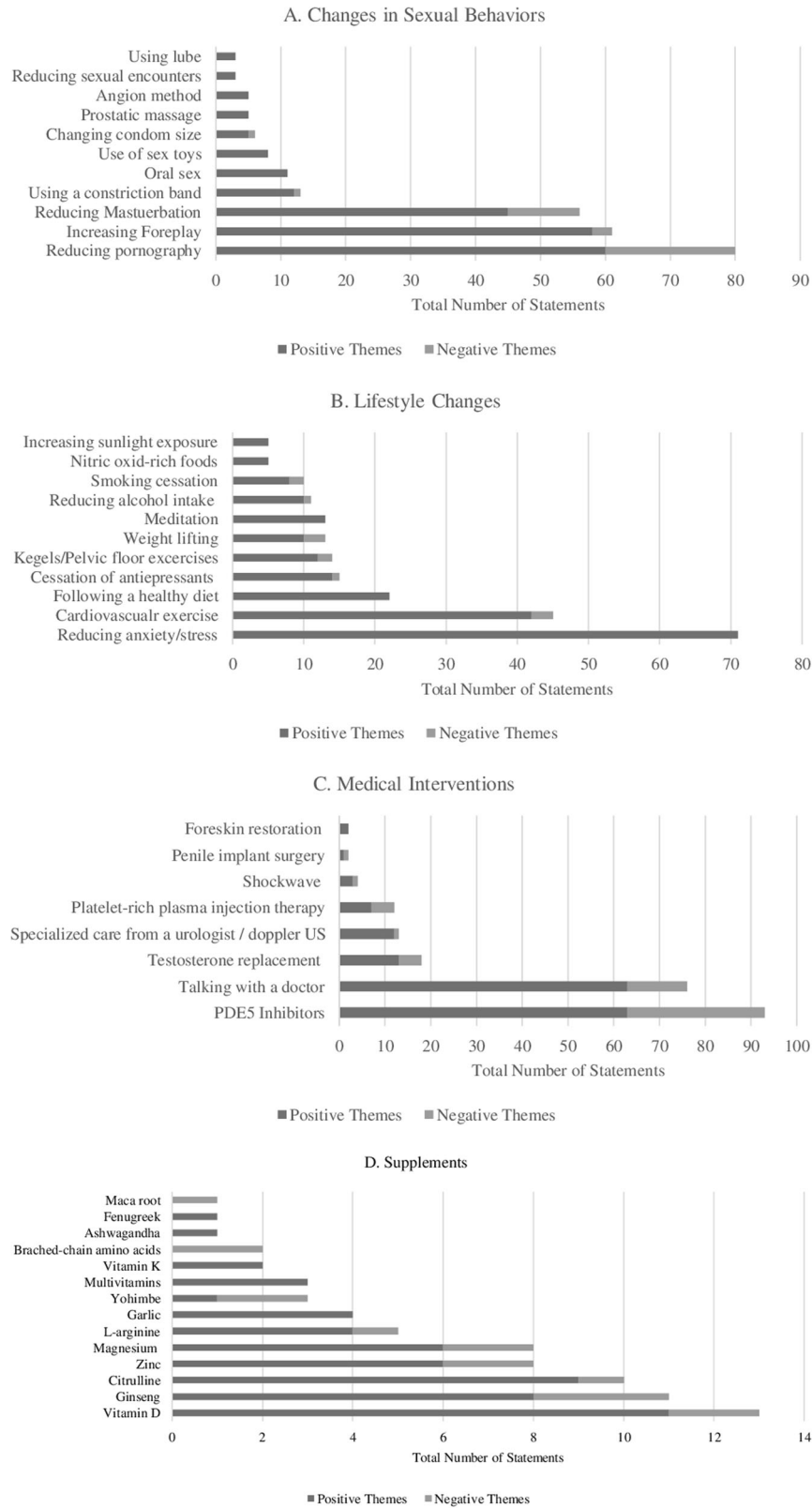


Fig. 3 Positive and negative theme distribution and relative frequency of treatment discussions by category. Bar graphs depicting the relative positive and negative theme distribution of each treatment mentioned in the Reddit threads. **A** Changes in sexual behavior, **B** Lifestyle changes, **C** Medical interventions, and **D** Supplements.

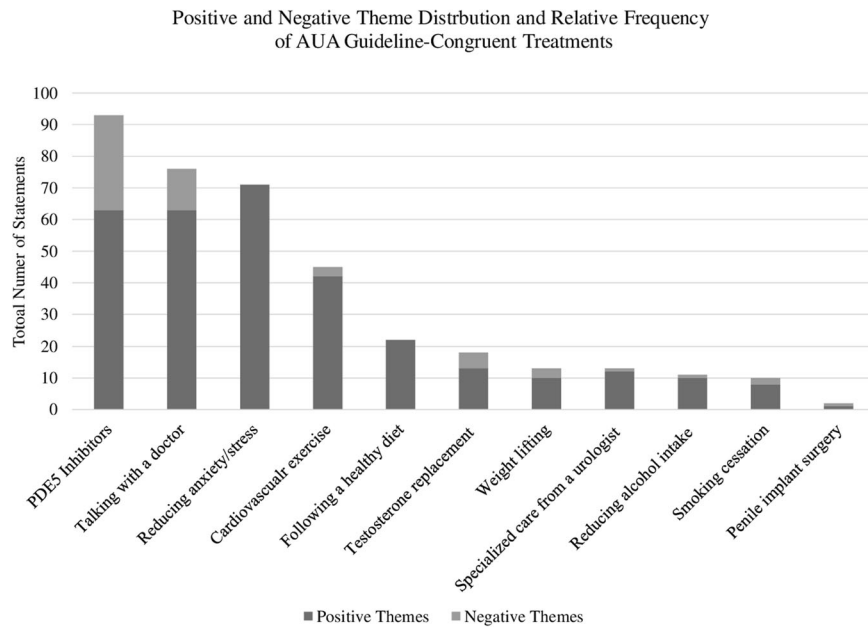


Fig. 4 Positive and negative theme distribution and relative frequency of AUA Guideline-Congruent Treatments. Bar graph depicting the relative positive and negative theme distribution of each treatment mentioned in Reddit threads that were congruent with the AUA guidelines.

other therapies. Urethral alprostadil and intracavernosal injections may be offered per the AUA guidelines, however these treatments were not described in any Reddit post analyzed. Physicians are also urged to consider a mental health evaluation in cases that may include a psychosocial component to their ED, and interestingly, reducing anxiety or stress was among the most commonly discussed treatments, with 100% of statements being positive. Treatments such as low-intensity shock wave therapy and stem cell therapy are labeled as investigational and not yet recommended [11]; these treatments were discussed much less frequently than other medical interventions and had 58% and 73% positive statements, respectively.

The most common category of recommendations found online was a change in sexual habits consisting of 30.0% of posts. This predominantly included comments regarding limiting pornography exposure and increasing or reducing masturbation, both frequently mentioned as contributors towards ED. Peer-reviewed literature, however, offers little to no evidence of a causal relationship between either pornography or masturbation and ED [12, 13]. Another tactic mentioned that has not specifically been shown to improve male sexual dysfunction is the use of lubricant, while there is some evidence that the use of a construction band can aid in sustaining an erection and decrease sexual anxiety during intercourse [14]. Finally, the use of sexual-themed toys was mentioned in several posts, and while not evaluated as specific treatment for ED, men who use vibrators have previously been reported to score higher on the International Index of Erectile Function [15].

There is a growing interest in the vast online marketplace for natural and alternative ED treatments [16]. Alternative therapies include those using physical energy, amino acids, herbal supplements, topical alprostadil, hyperbaric oxygen therapy, and penile vibratory stimulation. Supplements and herbal remedies made up 8% of the treatment recommendations in this series. These options tend to be easily accessible with low barriers to use as they do not require a visit to a physician to obtain. L-arginine was mentioned in several comments and may have some promise in the treatment of ED, but like most supplements, it is plagued by a paucity of high-quality research [16]. L-arginine may be an option for patients not seeking invasive treatment but is not currently an

AUA endorsed treatment. Vitamin D was the most commonly discussed supplement with 85% positive statements made. Evidence for a link between diminished vitamin D levels and erectile dysfunction are mixed, however, a recent meta-analysis suggests low vitamin D levels may be correlated with severe forms of ED [17]. A prior study has found that 19% of ingredients in the top 16 male testosterone and 16 ED supplements from A1 Supplements, Amazon, Vitamin Shoppe, and Walmart have two or more RCTs with net positive evidence [18]. However, another study found that the first six erectile dysfunction supplements on Amazon have no definitive human studies proving their efficacy. Additionally, after filtering out suspicious and incentivized reviews using ReviewMeta, the reviews on these supplements reporting an improvement in ability to maintain erection decreased by 83% [19].

The “angion method” was discussed by 5 users with 100% of statements being positive. The angion method is a physical maneuver that involves massaging the vasculature of the phallus and is theorized to promote angiogenesis and improve erectile response. Reddit features a community of over 15,000 users dedicated exclusively to information on the angion methods, which displays anecdotal claims that regular use of this method will lead to not only stronger erections but also a larger penis [20].

Reddit, as a public and anonymous online forum, has a multitude of benefits as well as limitations. There is a great sense of community, as many users share personal experiences and thank others for advice. Open discussion can be initiated by anyone, which reduces barriers related to embarrassment or shame in seeking help for ED. However, anonymity also has the potential to affect the quality and accuracy of information. Misinformation can be unknowingly passed along or knowingly promoted without consequence. As popularity is decided by the masses through “upvotes”, the most accurate information may not always be most highly promoted. Positive endorsements are given by anonymous users who may only have anecdotal data, as compared to evidence-based recommendations made by the AUA. These considerations highlight a changing landscape for contemporary providers to combat increasing misinformation online. We believe that our study provides a window into the online discussion regarding ED and identifies a unique

opportunity for providers to interject into the discussion to further guide potential patients towards medically appropriate therapies. Professional societies could also create authenticated accounts to provide trusted and accurate information in the future.

Finally, only 43.8% of all positive statements made endorsed a guidelines-based treatment, indicating a high rate of self-proclaimed success with alternative therapies. The majority of these alternative positive comments are related to changing sexual behaviors such as reducing pornography and masturbation or increasing foreplay – admittedly difficult areas to study. Various supplements were also commonly endorsed, which is another area lacking in-depth studies. Identifying such patterns via Reddit may identify important areas for future study, so that evidence-based medical advice can more completely address public curiosity and opinion.

This study has several limitations. First, the cross-sectional design and results are only representative of the moment in time that the data was collected. Due to the anonymity of Reddit, it is impossible to know the background of the users giving these recommendations. This can lead to questioning knowledge as well as the motives behind recommendations. It is also difficult to accurately describe the demographics of users viewing and contributing to the online content, further limiting this study.

CONCLUSION

Evaluating online sources of health information is becoming an increasingly essential part of patient care and management. In clinical practice, urologists should be familiar with the practices and therapies recommended online as their patients may have considered or tried them prior to seeing a professional. There is active discussion of ED treatment on Reddit with a wide range of therapies recommended, however, the majority of the recommendations are not supported by strong clinical evidence. Understanding this online landscape can allow for more open and productive patient counseling and therapy discussions.

DATA AVAILABILITY

Within the published article.

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AUTHOR CONTRIBUTIONS

NS, WM, and NT were responsible for research conceptualization. NS, MC, DH, RE, RP, and WM were responsible for data collection. NS, EJ, MC, and WM were responsible for data analysis and interpretation. NS, EJ, MC, and DH were responsible for writing the original draft. EJ was responsible for creating graphical representation of data. NS, EJ, and NT were responsible for final review and editing. RAG, AL, and NT were responsible for project administration and supervision.

COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

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