

TikTok: An Opportunity for Antibiotic Education?

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Abstract

Health information and misinformation on social media have become a growing concern for the medical community. Antimicrobial resistance continues to advance, threatening public health and safety. TikTok, a popular social media platform, provides an avenue for providers to educate patients on clinical topics and medication use. As leaders in patient education and counseling, pharmacists are equipped to provide trustworthy information on TikTok and other platforms. Pharmacists can thus advance the practice of pharmacy and build rapport with patients through a new medium. Current health-related videos on TikTok have not been robustly evaluated for quality and reliability. This study evaluates antibiotic-related content from healthcare providers and non-healthcare providers on TikTok for balance, reliability, and quality using the DISCERN score.

Introduction: Antimicrobial resistance is increasing at an alarming rate. Patient education is a critical component of both stewardship and combating health misinformation. TikTok is a video-sharing social media platform with 1 billion monthly users and contains videos that discuss health information. The objective of this study was to evaluate antibiotic-themed TikTok videos for their validity and reliability.

Methods: In March 2021, a search on TikTok using the term “antibiotics” was performed and the top 300 consecutive videos were identified. The following data was collected for each video: number of likes, associated disease state, medications, educational aim, mention of COVID-19, and if performed by a healthcare professional (HCP). Non-English language videos were excluded. The DISCERN score was used to evaluate all videos for reliability. Chi-square and Mann-Whitney U were used for statistical analysis. A p-value less than .05 was considered statistically significant.

Results: The first 300 consecutive videos were assessed using the DISCERN score for validity. Of the 300 videos, the majority (n=224) were created by non-health care professionals (non-HCPs). The number of “likes” per video ranged from 1 like to 2 million likes with a mean of 34,949 ± 143,482. Videos produced by HCPs were significantly more valid and reliable (mean DISCERN score of 1.65 vs 1.17, p < 0.00001) than non-HCPs. They were found to be more relevant (p < 0.00001), have clearer aims (p < 0.00001), and were more balanced/unbiased (p = 0.00188). Videos created by HCPs were more likely to have an educational focus (p < 0.0001). There was no difference between groups in clarity of sources utilized or risk/benefits discussed of each treatment. Across all videos, the most common disease states mentioned were urinary tract infection, skin and soft tissue infection, upper respiratory tract infection, and dental infection. Herbal or supplement products, penicillins, and sulfa antibiotics were the most commonly discussed medications.

Conclusions: Videos created by HCPs were significantly more valid and reliable than those created by non-HCPs. The videos created by HCPs were also more likely to have clear aims and be more relevant. However, the majority of the videos evaluated were created by non-HCPs. It may be beneficial for HCPs to provide informative TikTok videos that are valid and reliable for patient education.

Keywords: Social Media, TikTok, Antibiotics, Education

Introduction

As bacterial resistance increases rapidly around the globe, preventing misuse of antibiotics is a priority for all health care providers.¹ Patient education should be prioritized, as it is a critical component of antibiotic stewardship. Social media is an accessible resource for individuals and can be a source for health information. Over 80% of patients search the internet for health information and 56% would prefer that health care providers use social media.² Of pharmacists surveyed in 2019, 78% checked social media daily and over 70% would recommend a social media page if it was maintained by a healthcare professional (HCP).³ This is an opportunity for HCPs to share useful and accurate information with the public,

combating misinformation. Misinformation circulating on the internet has the potential to negatively impact patient health outcomes. For example, inaccurate information available regarding the COVID-19 vaccine correlated with a decline in patient vaccine intention, putting these individuals at a higher risk of contracting the virus.⁴ TikTok is a video-sharing social media platform with 1 billion monthly active users and contains billions of videos related to health information.^{5,6} However, the quality of health information on social media platforms such as TikTok is largely unknown.

The few studies that have evaluated health-related videos on TikTok and YouTube indicate that the reliability of the content is highly variable.⁷⁻¹¹ A 2020 YouTube analysis demonstrated that videos about plastic surgery produced by board certified plastic surgeons showed significantly less bias and higher quality than videos from other content creators. However, this study noted that even content produced by health care

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professionals scored poorly overall in terms of bias, with many videos being used to advertise plastic surgery services.⁷ This bias, while present in both content from health care professionals and non-health care professionals, is critical when it comes to patient education as it can sway patients' opinions on treatments and impact therapeutic adherence. It is important to further evaluate the accuracy and objectivity of social media content from both HCP and non-health care professionals (non-HCP). Previous studies analyzing the reliability of social media videos used the DISCERN score, a validated tool for assessing the quality of health information.^{7,9,12,13} The information available on TikTok describing medications, including antibiotics, is currently unknown. Exploring the strengths and weaknesses of current health-related content could improve future patient education through social media. This study used the DISCERN score to evaluate antibiotic-themed TikTok videos for their validity and reliability.

Methods

In March of 2021, a search on TikTok using the term "antibiotics" was performed. The top 300 consecutive videos as organized by the TikTok algorithm were identified and divided evenly among three researchers. The following data was collected for each video: number of likes, associated disease state, specific medications mentioned, educational aim of the video, mention of COVID-19, and if the content was produced by a healthcare professional (HCP). Non-English videos were excluded from the study. The DISCERN score was used to evaluate all videos for reliability (Table 1). This score, ranging on a scale from 1-5 for each statement, provides a framework for evaluating the quality of health information. A lower score of 1 indicates low quality, unreliable content, while a higher score of 5 indicates that the content is balanced and trustworthy.^{12,13} The Chi-square and Mann-Whitney U tests were utilized for statistical analysis. A p-value of less than .05 was considered statistically significant. The study was found to be IRB exempt by the University of Wyoming Institutional Review Board.

Table 1. DISCERN Scoring System

DISCERN Scoring System					
Questions	No		Partially		Yes
1. Explicit aims	1	2	3	4	5
2. Achievement of aims	1	2	3	4	5
3. Relevant to patients	1	2	3	4	5
4. Presence of sources	1	2	3	4	5
5. Date of information/sources	1	2	3	4	5
6. Balance/Lack of bias	1	2	3	4	5
7. Additional sources of information	1	2	3	4	5
8. Areas of uncertainty	1	2	3	4	5
9. Treatment mechanism of action	1	2	3	4	5
10. Treatment risks	1	2	3	4	5
11. Treatment benefits	1	2	3	4	5
12. Results of no treatment	1	2	3	4	5
13. Quality of life	1	2	3	4	5
14. Discussion of other treatment options	1	2	3	4	5
15. Shared decision making	1	2	3	4	5

Results

The first 300 consecutive videos which appeared based on the TikTok algorithm were assessed using the DISCERN score for validity. Of the 300 videos, 224 (75%) were created by non-health care professionals (non-HCPs). The number of likes per video ranged from 1 like to 2 million likes with a mean of 34,949 ± 143,482. Videos produced by HCPs were significantly more valid and reliable (mean DISCERN score of 1.65 vs 1.17, $p < 0.00001$) than non-HCPs (Table 2). A comparison of each statement of the DISCERN score can be seen in Figure 1. They were also found to be more relevant with a mean relevance

score of 2.8 vs. 1.4 ($p < 0.00001$), have clearer aims (score of 2.8 vs. 1.6, $p < 0.00001$), and were more balanced/unbiased (score of 1.8 vs. 1.1, $p = 0.00188$). Videos created by HCPs were more likely to have an educational focus ($p < 0.0001$). There was no difference between groups in clarity of sources utilized or risk/benefits discussed of each treatment. Across all videos, the most common disease states mentioned were urinary tract infection (UTI), skin and soft tissue infection, upper respiratory tract infection, and dental infection (Table 3). Herbal or supplement products, penicillins, and sulfa antibiotics were the most commonly discussed medications.

Table 2. Comparison of DISCERN Scores

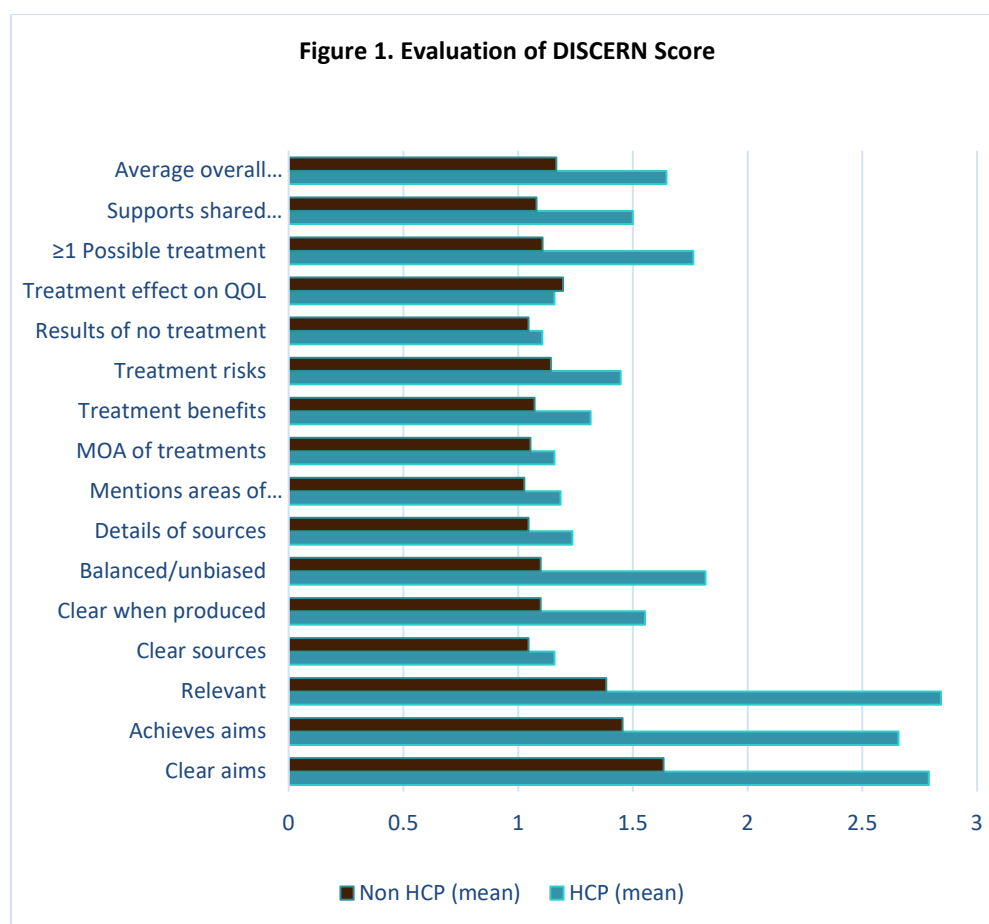
DISCERN Score Item	Healthcare Professionals	Non Healthcare Professionals	P value
Overall DISCERN Score	1.65	1.17	<0.00001
Relevance	2.84	1.38	<0.00001
Clear Aims	2.79	1.63	<0.00001
≥1 possible treatment	1.76	1.11	<0.0001
Achieves Aims	2.66	1.46	<0.00001
Balanced and Unbiased	1.82	1.10	0.0019

Table 3. Most Common Disease States and Medications

Most Common Disease States*	Most Common Medications†
UTI	Penicillins
Skin Infection	Sulfa Antibiotics
Upper Respiratory Infection	Natural Products
Dental Infection	Tetracyclines

*None/not specified in 173 videos

†None/not specified in 267 videos



Discussion

TikTok videos created by health care professionals were significantly more valid and reliable than those created by non-HCPs. The videos created by HCPs were also more likely to have clear aims and be more relevant. The most common disease states of UTI, skin infection, upper respiratory infection and dental infection are frequently managed in the outpatient setting. This implies that a possible target for patient education is in primary care or ambulatory care. As pharmacists are frontline HCPs, they provide education to the public and other HCPs on emerging medical evidence to prevent the spread of

misinformation.¹⁴ Pharmacists have a unique opportunity for leadership on social media platforms. Social media is one of the many ways HCPs may provide education that is valid and reliable. Based on these results, HCPs could reach a global audience if they produced reliable and relevant patient education regarding these disease states. This could be beneficial for young adult patients as 41% of TikTok users are between the ages of 16 and 24 years.⁶ Specifically, educational content on the proper use of antibiotics could contribute to antimicrobial stewardship in the community setting.

Health education on social media has been evaluated on a variety of platforms. Eghtesadi et al suggested that the efficacy of health education could be measured by boosting (or paying to promote a post) on social media targeting a specific audience and region, then measuring an outcome (such as reduction of disease transmission) in the targeted population.⁸ As TikTok is a platform which allows for such promotions, this is a viable avenue for further studies. However, providers should take caution with such promotions for personal use. Previous studies have shown that these platforms can be used by HCPs to advertise services, but these advertisements show a high degree of bias and do not provide a balance of treatment options.^{8,10} Our results demonstrate similar findings; while videos from HCPs show significantly less bias and are more likely to include multiple treatment options, the individual scores for HCPs remain quite low (1.82 and 1.76, respectively). This may be due to time limits established by TikTok which dissuade lengthy explanations. However, our study illuminates that videos from HCPs have potential to be balanced, unbiased, and informative, even with limited time. Efforts should be made by both health institutions and individual HCPs to provide comprehensive education, rather than marketing, in social media.

The majority of the videos evaluated were created by non-HCPs. According to their DISCERN scores, these videos were less reliable, relevant and clear, and overall were rated lower in quality than those produced by HCPs. This aligns with the results of a study published by Zheng et al, which evaluated TikTok videos on acne. In this study, dermatology videos produced by physicians had a mean DISCERN score of 2.41 versus the non-physician score of 1.99.¹¹ Of note, a total of 100 videos were evaluated in this study, with only 9 produced by HCPs. With 300 total videos, 76 of which were created by HCPs, our study adds more robust results on the difference in overall social media content quality between health care providers and non-health care providers.

Our study had several limitations. The first was that we were unable to verify the legitimacy of HCP content creators. These individuals self-identified as HCPs, and the quality of the videos documented by their DISCERN score indicates that their creators possessed clinical knowledge. Additionally, due to the subjectivity of the DISCERN criteria, there is potential for differences in evaluations among researchers. However, all researchers reviewed the criteria together in advance and were encouraged to discuss any discrepancies within the research group. Given the substantial differences in DISCERN scores between study groups, it is unlikely that intersubject variability was a significant concern. Another limitation is the time constraints of the platform. At the time of our study, TikTok limited the length of videos to 60 seconds, thus limiting a video's ability to meet all the DISCERN criteria. In spite of this, content produced by HCPs reached a statistically significant difference in five of the DISCERN criteria and in the overall DISCERN score. Of note, content creators are able to add

captions and hashtags on TikTok, and it would be prudent to include references in captions if time does not allow for them in videos. TikTok has now increased their video time to 10 minutes, which enables content creators to meet more DISCERN criteria.

In light of this time constraint, the authors would like to note a dichotomy in health education on social media. It has been documented in YouTube studies that while videos from HCPs earned higher DISCERN scores, they had significantly less views and likes.¹⁰ Our study maintains continuity within this area, with a mean of 41,110 likes for non-HCPs versus 16,788 likes for HCPs. Yurdaisik posits that this may be due to lower health literacy among non-health care providers.¹⁰ It is unlikely that viewers would watch a video they perceive as confusing or boring. A platform like TikTok could prove more inviting as the lower average video time mitigates the presence of in-depth explanations, so patients may be more inclined to view content from HCPs.

This study demonstrates that there is a niche for HCPs to provide accessible, high quality information to patients on TikTok. To our knowledge, this is the first study to evaluate antibiotic health information on the global TikTok platform. We propose that it is possible for HCPs to achieve higher DISCERN scores in limited time by constructing their videos carefully; providing a balanced snapshot of information and including sources that patients can further explore at their leisure. Based on the results of this study, areas of improvement for educational videos include providing clear sources and discussing risks vs. benefits of treatments. In an era when health-related information is virulent on social media, it is imperative that patients can access balanced and dependable content from reliable sources. It may be beneficial for HCPs to provide TikTok videos that are valid and reliable for patient education.

The opinions expressed in this paper are those of the authors.

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Treatment of human subjects: IRB exempt.

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