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Original Research

Evaluating the Quality and Reliability of Total Knee Arthroplasty Rehabilitation Exercises on the Social Media Platform TikTok

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ABSTRACT

Background: The utilization of social media for health-related purposes has surged, especially during the COVID-19 pandemic. TikTok, a short-form video platform, has seen substantial growth, becoming a prominent medium for health information dissemination. However, the lack of regulation poses challenges in evaluating the validity of TikTok content.

Methods: This cross-sectional study assesses TikTok videos related to total knee arthroplasty rehabilitation exercises. Search terms identified 84 videos, with 64 meeting the inclusion criteria. Engagement metrics and quality scores were analyzed, utilizing the DISCERN tool and the Total Knee Replacement Exercises Education Score.

Results: The analyzed videos accumulated nearly 6 million views, with a median of 10,293.5 (interquartile range = 4139.3-26,100.0). Health-care professionals contributed 48% of the content. Despite higher engagement metrics for health-care professional videos, the overall quality, as indicated by DISCERN and Total Knee Replacement Exercises Education scores, remained poor. No videos achieved an "excellent" rating, with the majority categorized as "poor."

Conclusions: This study underscores TikTok's substantial role in total knee arthroplasty rehabilitation information dissemination but reveals a critical deficit in content quality and reliability. Health-care professionals marginally outperformed general users but displayed overall inadequacy. The study emphasizes the necessity for improving the quality of health-related content on emerging social media platforms, especially within the realm of orthopaedic surgery.

Level of Evidence: Level III, Cross-sectional study.

Introduction

In the wake of the COVID-19 pandemic, social media became extensively used for health-related purposes [1], with 74.4% of adults choosing the internet as their primary source of obtaining health information [2]. Specifically, a short-form video-based platform, TikTok, experienced a significant uptick, [3,4] rising from 381 million users in 2019-700 million users by the end of 2020. TikTok now boasts over 1.5 billion users worldwide, making it a prime medium to disseminate health information. However, due to the lack of regulation of medical information on the platform, the validity of the videos related to health-care advice has come under question [5,6].

While TikTok's primary user base traditionally consists of individuals aged 18-24 [7], the COVID-19 pandemic led older adults and even geriatric populations to engage with social media platforms for the consumption of health information [8,9]. TikTok now reaches demographic groups more likely to undergo total knee arthroplasty (TKA) [10]. Thus, it has become increasingly relevant to scrutinize the quality of health-related information available on

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TikTok related to TKA. This becomes pertinent as more patients opt for remote methods of information acquisition in lieu of traditional in-person therapy sessions [1]. Proper rehabilitation has been shown to be essential for success following TKA, particularly in the short term [11]. Thus, the purpose of this study is to assess the quality, reliability, and educational benefits of the information presented on TikTok in relation to TKA rehabilitation exercises.

Material and methods

Search and data collection

The social media platform TikTok was queried to find videos related to postoperative total knee replacement exercises on July 31, 2023. The search was conducted by using the search terms "total knee rehab," "total knee replacement rehab," and "total knee replacement exercises" without any search filters. Thus, our intent was to analyze the videos that a TikTok user would be most likely to encounter if searching the platform for exercises related to TKA. The search yielded a large number of total videos (n = 84). We then performed an initial screening of the videos and eliminated those that were not related to total knee replacement (n = 17) and advertisements (n = 3). After full screening, 64 videos remained after the data analysis. Of these videos, 29 videos remained for the keyword #totalkneerehab" (Fig. 1a), 15 videos remained for the keyword #totalkneereplacementrehab" (Figs. 1b), and 20 videos remained for the keyword "#totalkneereplacementexercises" (Fig. 1c).

For each of the videos included in the analysis, we recorded the creator of the video's data (username and video), the number of views, likes, shares, comments, and favorites. The majority of these videos were educational videos made by health-care professionals such as physical therapists, doctors of chiropractic medicine, and medical doctors. This study did not require any human participants or animals; thus, ethics committee approval was not required.

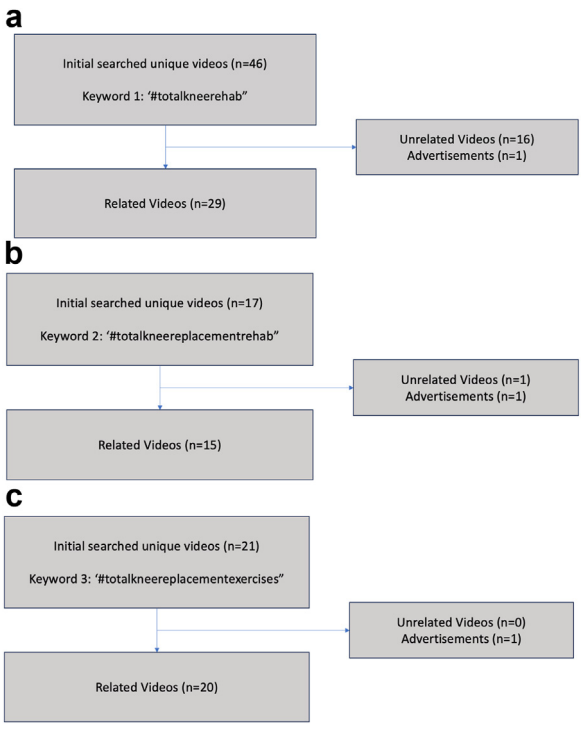

Figure 1. Flowcharts of the search process for videos related to TKA rehabilitation exercises for search terms (a) "#totalkneerehab," (b) "totalkneereplacementrehab," and (c) "totalkneereplacementexercises."

Scoring system

Four different scoring systems were employed to assess the videos' quality and educational merit. These included DISCERN, a validated tool for evaluating the reliability and quality of treatment approaches [12]; the Total Knee Replacement Exercise Education Score (TKREES), designed to gauge the educational suitability of the information in each video; the Global Quality Scale (GQS), which utilizes a 5-point grading scale to determine video quality; and the Journal of American Medical Association (JAMA), employed for evaluating video quality and reliability. It is important to note that the JAMA grading scale is distinct from the popular medical journal with the same name. Additionally, the TKREES score was adapted from a similar scale developed for assessing scoliosis exercise video quality in previous work by Jang et al [13]. All these scales are regarded as respectable metrics for the appraisal of educational merit and have been used in numerous prior studies [14-16].

DISCERN for reliability and quality assessment

The DISCERN questionnaire serves as a reliable and accurate tool for researchers to evaluate the quality of information regarding treatment choices for health issues. Established in the late 1990s, this well-validated instrument consists of 16 questions [12]. The first 8 questions (DISCERN 1) focus on assessing the publication's reliability, while the subsequent 7 questions (DISCERN 2) scrutinize the quality of the author's information sources. The final question (DISCERN 3) rates the publication's overall quality as an information source. Originally designed for written information, DISCERN has been successfully applied as a scoring test to assess the quality of videos in previous research [17]. DISCERN scores are classified as follows: scores ranging from 63 to 75 points are considered excellent, 51-62 points are deemed good, 39-50 points are categorized as fair, 27-38 points are labeled poor, and scores between 16 and 26 points are classified as very poor.

TKREES for educational suitability assessment

To assess the educational merit of the videos, we introduced TKREES, a modified version derived from the work of Jang et al [13]. This evaluation examines the viewers' ability to comprehend and execute exercises after watching the video. TKREES employs a 5-point grading system, covering aspects such as "exercise cycle" (whether the video outlines the exercise cycle), "target" (clarifying the target area of the exercise), "effect" (explaining the expected impact of the exercise), "safety" (addressing precautions and safety elements), and "rationale" (providing the rationale behind the exercise). Each grading criterion is assigned a score between 0 and 5, with higher scores indicating superior quality. The cumulative score of all 5 criteria constitutes the final TKREES score, ranging from 0 to 25, where a score of 0 reflects the lowest quality, and a score of 25 signifies the highest quality achievable.

GQS for assessing the overall quality

The evaluation of video quality was conducted using the GQS scale, which aids in distinguishing between low- and high-quality videos. The GQS employs a 5-point grading scale, where videos scoring 1-2 are considered low quality, a score of 3 is classified as medium quality, and scores ranging from 4 to 5 are deemed high quality [18].

Journal of American Medical Association (JAMA)

The JAMA benchmark criteria comprise a 4-point scale designed to assess the quality and reliability of medical information. This scale involves evaluating 1) the credentials and affiliations of the authors, 2) the sources and references provided, 3) the disclosure of sponsorships and endorsements, and 4) the posting dates of the content [19].

Assessment

Two authors (S.W. and K.B.) collected the videos, which were then independently assessed by our orthopaedic research team. Following the collection of data on video distribution metrics for each video, the content was evaluated using the DISCERN and TKREES tools. Two trained reviewers separately graded each video, with any discrepancies between them resolved by a third author (M.B.). The background of this team included medical students, orthopaedic residents, and an orthopaedic attending physician.

The videos were then categorized based on the uploader into 3 groups: general users, health-care providers, and health organizations. The health-care provider category included individuals identifying as health-care professionals such as chiropractors, physicians, physical therapists, and nurses.

Statistical analysis

Data on scoring and characteristics are presented as mean (standard deviation), median (interquartile range [IQR]), and percentage. A 2-sample *t*-test was employed to compare the 2 types of uploaders, utilizing the mean, standard deviation, and sample size for each continuous and categorical variable. The interobserver reliability of the DISCERN and TKREES grading scales was assessed using the class 3 model intraclass correlation coefficient (ICC). To calculate the ICC, a 2-factor analysis of variation without replication model was applied, along with a 95% confidence interval. ICC values were benchmarked based on prior research, with classifications as follows: less than 0.50 indicating poor reliability, 0.50-0.75 indicating moderate reliability, 0.76-0.90 indicating good reliability, and values exceeding 0.90 indicating excellent reliability [20]. Statistical significance was set at $P < .05$ for comparisons other than interobserver reliability. All analyses were conducted using Microsoft Excel (Redmond, Washington).

Results

Basic characteristics

In total, 84 videos were identified utilizing the search terms "total knee rehab," "total knee replacement rehab," and "total knee replacement exercises." Following the application of the exclusion criteria and a randomization protocol, 64 videos were ultimately included in the final analysis, amassing a total of 5,960,995 views. The median view count of these videos was 10,293.5 views (IQR = 4139.3-26,100.0) as outlined in Table 1.

The cumulative engagement metrics for these videos included 330,506 likes, 2873 comments, 107,252 favorites, and 44,033 shares, each with a median of 209.0 (IQR = 87.8-686.3), 13.0 (IQR = 4.0-31.5), 30.0 (IQR = 8.8-149.8), and 17.5 (IQR = 5.8-82.3), respectively (Table 1).

Type of uploaders

General users uploaded a slightly higher portion of videos (52%), in contrast to health-care professionals (48%). Of the videos uploaded by health-care professionals, doctor of physical therapy (16) contributed the majority, followed by physical therapists with a bachelor's or master's degree (11), doctor of medicine (2), physician assistant (1), and chiropractors (1). There were no significant differences between the general vs health-care professional upload groups (Table 2).

Table 1
Characteristics of included videos.

Characteristics, median (IQR)	Total (n = 64)
Number of views	10293.5 (4,139.3-26,100.0)
Likes	209.0 (87.8-686.3)
Comments	13.0 (4.0-31.5)
Favorites	30.0 (8.8-149.8)
Shares	17.5 (5.8-82.3)
Scoring, mean (SD)	
DISCERN 1	17.66 (4.35)
DISCERN 2	16.25 (4.86)
DISCERN 3	2.93 (0.87)
Total DISCERN	36.84 (9.61)
TKREES	13.83 (3.53)
JAMA	1.58 (0.52)
GQS	3.04 (0.75)

SD, standard deviation.

Videos by health-care professionals also scored higher in the tabulated DISCERN 1, DISCERN 2, DISCERN 3, Total DISCERN, TKREES, and GQS; however, these scores were statistically insignificant when compared to general user videos (Table 2). Thus, indicating low quality of information provided by both health-care professionals and general users. The JAMA Benchmark Criteria was statistically significant ($P < .001$), which indicates health-care videos contained more information, transparency, and reliability (Table 2).

Total DISCERN scores can be divided into 5 separate tiers based on the overall quality and summary of the video. The tiers are as follows: "very poor" ranging from 16 to 26 points, "poor" ranging from 27 to 38 points, "fair" ranging from 39 to 50 points, "good" ranging from 51 to 62 points, and "excellent" ranging from 63 to 75 points. Health-care professionals had more videos deemed "good" (9.7%), "fair" (35.5%), and "poor" (45.2%) in comparison to general users (Table 3). General users had more videos graded as "very poor" (21.2%) in comparison to health-care professionals (Table 3). Neither health-care professionals nor general users had any videos scored as "excellent" quality (Table 3). In general, the majority of videos uploaded by both health-care professionals and general users were graded as "poor."

Interobserver reliability

Interobserver reliability approximations for DISCERN, TKREES, JAMA, and GQS grading scales were 0.95 (95% CI, 0.91-0.97), 0.80 (95% CI, 0.67-0.88), 0.94 (95% CI, 0.91-0.97), and 0.86 (95% CI, 0.74-0.92), respectively. These DISCERN and JAMA findings correlate with an "excellent" reliability, while TKREES and GQS correspond to a "good" reliability.

Discussion

Our investigation substantiates the widespread use of TikTok for accessing TKA rehabilitation exercises, as indicated by the nearly 6 million views generated from the 64 included videos. However, our data analysis reveals a notable deficiency in the quality and reliability of these videos. Only 5 of the analyzed videos were categorized as "good," and no videos were deemed "excellent" on the DISCERN scoring system. Furthermore, the average DISCERN score

Table 2
Characteristics of the videos across the type of uploaders.

Characteristics, median (IQR)	General users (n = 33)	Health-care professionals (n = 31)	*P*-value
Number of views	7213.0 (2,854.0-20,100.0)	14200.0 (6,192.0-35,500.0)	.506
Likes	171.0 (86.0-671.0)	254.0 (117.0-710.5)	.802
Comments	11.0 (4.0-22.0)	19.0 (6.0-42.0)	.308
Favorites	26.0 (7.0-349.0)	32.0 (14.5-137.0)	.587
Shares	13.0 (4.0-63.0)	24.0 (9.0-104.5)	.193
Scoring, mean (SD)			
DISCERN 1	17.26 (4.21)	18.08 (4.53)	.456
DISCERN 2	16.02 (5.21)	16.50 (4.53)	.696
DISCERN 3	2.91 (0.85)	2.95 (0.90)	.856
Total DISCERN	36.18 (9.85)	37.53 (9.46)	.579
TKREES	13.79 (3.54)	13.87 (3.58)	.929
JAMA	1.35 (0.54)	1.82 (0.38)	**<.001**
GQS	2.92 (0.70)	3.16 (0.80)	.206

SD, standard deviation.
Bold value indicates statistical significance ($P < .05$).

was 36.86, which categorizes these videos as falling into the "poor" category. In addition to the notably low DISCERN scores, the average Total Knee Replacement Educational Exercise Score (TKREES), which grades educational quality, only marginally surpassed half of the maximum achievable score at 55.3%. These findings collectively indicate the short-form videos on TikTok are inadequate in describing exercise components, target rationale, desired outcomes, and safety considerations.

Our findings are particularly concerning considering the escalating use of social media as a significant resource for obtaining medical advice without direct interaction with health-care professionals. As the prevalence of social media usage continues to increase, it becomes crucial to scrutinize health-related information on these platforms to protect patients from consuming poor-quality information. Despite the assessment of information quality on social platforms in other health-care fields, the field of orthopaedics is lagging on the evaluation of relevant topics [6,21].

Although health-care professionals consistently received higher user engagement metrics, this study demonstrated the quality of TKA exercise videos was not statistically improved when compared to content generated by general users. This aligns with prior investigations on YouTube for TKA rehabilitation exercises. Wong et al. characterize the YouTube platform as a "poor educational source" [22] for patients seeking information about TKA. Utilizing the DISCERN tool, Ng et al. determined the average scoring of YouTube TKA videos as "fair," with physician videos demonstrating slightly better-quality scores than general users [23].

Additionally, a study by Mitchell et al. concluded that individuals undergoing 1 week of rehabilitation experienced a decline in exercise performance at their 2-week appointment despite receiving take-home instructions [24]. These 2 studies elucidate the importance of proper supplemental material to optimally inform patients about procedures Consequently, if appropriately utilized and monitored, TikTok could be an excellent source of supplemental instruction for visual learners. Unfortunately, without proper regulation of the information disseminated on TikTok, patients may be exposed to the risk of adverse health outcomes [25,26].

Table 3
Percentage of DISCERN grades across the 2 types of uploaders.

Grading	General users	Health-care professionals	Total
	N (%)	N (%)	N (%)
Very poor	7 (21.2)	3 (9.7)	10 (15.6)
Poor	13 (39.4)	14 (45.2)	27 (42.2)
Fair	11 (33.3)	11 (35.5)	22 (34.4)
Good	2 (6.1)	3 (9.7)	5 (7.8)
Excellent	0 (0.0)	0 (0.0)	0 (0.0)

One initial measure to enhance the quality of content shared by both general users and health-care professionals is the incorporation of source citations. This minor adjustment not only offers viewers supplementary, dependable information but also elevates the objective reliability of the content, reflected in improved DISCERN and JAMA scores. Additionally, to augment the caliber of short-form video content, it would be beneficial to address safety precautions concerning rehabilitation exercises. Providing insights into safety measures can enhance the execution of exercises by patients, potentially reducing the risk of adverse health outcomes.

Our investigation highlights a significant disparity in the quality and reliability of TKA rehabilitation exercises available on TikTok. This is not an isolated issue confined to TikTok alone but rather reflective of broader challenges faced by remote rehabilitation methods. Compared to telerehabilitation, which typically involves live interactions with health-care professionals and personalized feedback or structured rehabilitation videos from reputable sources, TikTok's short-form, user-generated content falls short. This inadequacy may be partly due to the inherent limitations of the video medium itself, such as the difficulty in clearly demonstrating and explaining exercises within the platform's format constraints. Furthermore, the content on TikTok often lacks the professional oversight and detailed instructional quality found in dedicated telerehabilitation programs and professionally produced rehab videos. Therefore, the subpar performance of TikTok videos might be attributed to a combination of improper content creation and the constraints of the video medium, emphasizing the need for more structured, regulated, and professionally guided remote rehabilitation resources.

TikTok has proven to be a significant platform for disseminating videos on TKA rehabilitation exercises, evident in the collective 5,960,995 views garnered by the 64 videos included in our final analysis. It is important to note that these videos constitute only a fraction of the broader collection of TikTok related to TKA rehabilitation exercises, with the analyzed ones representing the top performers as determined by the TikTok algorithm. Given the generally low health literacy among young people in the United States [27], it therefore becomes paramount to highlight this fact to the broader population and implement measures to address these knowledge gaps.

Limitations

Several limitations were identified in our effort to assess the quality and validity of TikTok videos concerning TKA rehabilitation

exercises. Firstly, the TikTok platform relies heavily on an algorithm driven by individual user preferences and engagement history, leading to multiple duplicates for each of the 3 included search terms. Secondly, during the data collection phase, we specifically focused on reviewing only the "top" performing videos. These "top" results were determined based on TikTok's algorithm and overall user engagement metrics, including views, likes, comments, favorites, and shares. Although this approach may introduce a lack of randomization, it was deliberately aimed to simulate the videos most likely to be discovered by a TKA patient searching TikTok utilizing one of the study's specified search terms. A final limitation presents with the potential for observer bias during the video grading process. To minimize intrarater reliability bias, grade-training was provided prior to assessing any of the 64 selected videos. To address and minimize interrater reliability bias, the DISCERN questionnaire was utilized, and 2 primary reviewers independently evaluated each of the selected videos. In instances of considerable discrepancies between the 2 primary reviewers, a third reviewer was consulted to evaluate the video in question.

Conclusions

Our study underscores the increasing significance of social media platforms, such as TikTok, in disseminating health-care-related information, especially in the context of TKA rehabilitation exercises. This study identifies a critical gap in the quality and reliability of this content. Our analysis consistently indicated a low overall quality of TikTok videos related to TKA rehabilitation exercises. Notably, none of the videos achieved an "excellent" rating, and only a small percentage were categorized as "good." Health-care professional-generated content exhibited marginally better quality but remained inadequate overall. Furthermore, while in general health-care professional videos were more transparent and reliable, there was substantial room for improvement across both categories. While the study provides valuable insights into the current landscape of TKA rehabilitation information on TikTok, the field of orthopaedics, as a whole, needs to address these shortcomings and actively participate in evaluating and improving the quality of health-related content on emerging social media platforms.

Conflicts of interest

A. T. Anastasio is a paid consultant for Qpix solutions. M. Bolognesi receives royalties from Smith & Nephew, TJO, and Zimmer; is a speaker bureau of TJO and Zimmer; is a paid employee of DePuy; is a paid consultant for Amedica; has stock options Amedica and TJO; receives research support from Biomet, DePuy, Exactech, Inc., and KCI; and is an editorial board member of the American Association of Hip and Knee Surgeons, Arthroplasty Today, Eastern Orthopaedic Association, Journal of Arthroplasty, and Orthopaedic Research and Education Foundation. All other authors declare no potential conflicts of interest.

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CRediT authorship contribution statement

Sarah Welch: Writing – review & editing, Writing – original draft, Investigation, Data curation. **Kian Bagheri:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Data curation. **Mikhail Bethell:** Writing – review & editing, Writing – original draft, Supervision, Formal analysis. **Albert T. Anastasio:** Writing – review & editing, Writing – original draft, Validation, Supervision, Conceptualization. **Troy Q. Tabarestani:** Investigation, Formal analysis. **Michael Bolognesi:** Writing – review & editing, Supervision.

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