

Quality and Content Analysis of Pes Planus Exercises Videos on YouTube

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ABSTRACT

Objective: Youtube is a highly preferred platform for searching health-related information due to its visually supported content. The aim of this study was to evaluate the quality and content of flat foot exercise videos available on Youtube.

Methods: All videos related to exercises for flat foot on Youtube were evaluated. The videos were assessed based on their main features, described exercises, content narrator, and content publisher. The quality of the videos was evaluated using GQS, JAMA, and DISCERN.

Results: This study evaluated 111 videos and found that the exercise most commonly described was the short foot exercise (14.85%). Videos with doctors as content narrators received higher JAMA scores compared to personal trainers/healthy lifestyle coaches ($p = .004$) and independent users ($p = .03$). The videos produced by healthcare websites had a shorter duration compared to those produced by independent individuals ($p = .008$) and professional organizations ($p = .019$). Additionally, professional organizations had more subscribers than personal accounts ($p < .001$). A positive correlation was found between video duration and GQS ($r = .366$, $p < .001$), JAMA ($r = .261$, $p < .001$), and DISCERN ($r = .556$, $p < .001$) scores.

Conclusions: The study found that the quality of exercise videos on flat foot on Youtube was medium. To obtain more accurate information on the subject of flat foot, healthcare professionals with expertise should share high-quality and reliable videos to guide patients.

Keywords: Flat foot, Pes planus, Quality, Content, Youtube, Exercise.

1. INTRODUCTION

Flat foot is a common deformity foot, characterized by a decrease in the height of the medial longitudinal arch accompanied by hindfoot eversion, forefoot abduction, and dorsiflexion (1). While structural alterations and arch complex degradation may not always cause symptoms, in some cases they can lead to biomechanical changes in the lower extremities and spine (2). Previous research has shown that these changes may lead to increased fatigue, Achilles tendinopathy, knee osteoarthritis, patellofemoral pain syndrome, and hip pain (3, 4). Managing flat foot requires restoring the normal medial arch height to establish optimal lower extremity alignment (5). Treatment modalities such as exercises, insoles, or surgical interventions may allow for normal medial arch height (6). Exercises aimed at enhancing the medial longitudinal arch height are a commonly employed approach (7).

In today's world, social media platforms serve not only as entertainment hubs but also as pivotal sources of information.

The internet and social media have become significant resources in healthcare (8). They can complement healthcare professional guidance and empower patients in their psychosocial well-being (9). However, their pervasive use has also created challenges. The unrestricted availability of information on various topics has led to information overload and the possibility of misinformation (10). This is particularly prevalent on social media platforms, which can have a negative impact on patients (10). Therefore, it is essential for healthcare professionals and patients to be aware of the quality and accuracy of information circulating on these platforms.

Youtube is one of the most commonly used internet tools in this regard. Established in 2005, Youtube has over one billion users and is a social platform where millions of videos are watched daily (11). Youtube is the second largest search engine in the world and the third most visited website after Google and Facebook (12). In addition, it experiences rapid growth,

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with 400 hours of video content uploaded every minute (13). Youtube is a preferred platform for seeking health-related information due to its visual-centric approach. Several studies have analysed the scientific accuracy and content of health-related videos on Youtube (14, 15, 16, 17, 18). However, this study is the first to evaluate the quality and content of videos that demonstrate exercises for flat foot on the platform.

The primary aim of this study was to evaluate the quality and content of flat foot exercise videos on YouTube in order to guide both patients and healthcare professionals in accessing reliable resources. From a clinical perspective, the findings are expected to help clinicians recommend trustworthy video-based educational materials to patients, thereby improving exercise adherence and supporting more effective management of flat foot. Based on the current literature and clinical rationale, the following hypotheses were formulated: (i) the overall quality of the videos would be moderate, (ii) videos narrated by doctors would have higher quality scores than those narrated by others, (iii) videos published by professional organizations or healthcare websites would be of higher quality than those uploaded by individuals, and (iv) video duration would be positively correlated with quality scores.

Accordingly, the study addressed three main research questions:

- What is the content and quality of the flat foot exercise videos on YouTube?
- Which exercises are recommended for the management of flat foot?
- How does the content and quality of videos vary depending on the content narrator and the content publisher?

2. METHODS

2.1. Study design

The study was designed as a retrospective comparative study. Ethics committee permission was not necessary because the study did not include any human participants or animals, and the videos were made public.

2.2. Collection of data

The keywords used to find videos associated with flat foot were determined using Google Trends (www.trends.google.com). The keywords found, "Flat foot, exercises", "pes planus, exercises", "pes planus, physiotherapy", "flat foot, physiotherapy", "pes planus, rehabilitation", "flat foot, rehabilitation", "pes planus, foot-ankle exercises", "flat foot, foot-ankle exercises", "pes planus" and "flat foot" were scanned together and separately. Keywords were entered into the Youtube search bar using the filtering feature and all videos were evaluated. In this search carried out in March 2022, 244 videos were found.

The inclusion criteria were as follows:

- Videos in English language.
- Videos that visually demonstrated or described at least one exercise for flat foot.
- Videos accessible to the public without restrictions.

The exclusion criteria were as follows:

- Videos in languages other than English (n=76).
- Videos without exercise description or demonstration (n=33).
- Music videos without explanatory content (n=18).
- Videos without sound (n=3).
- Video categories with fewer than three examples in the narrator classification (n=2).
- Duplicate videos (n=1).

The detailed flow of inclusion and exclusion is presented in Figure 1.

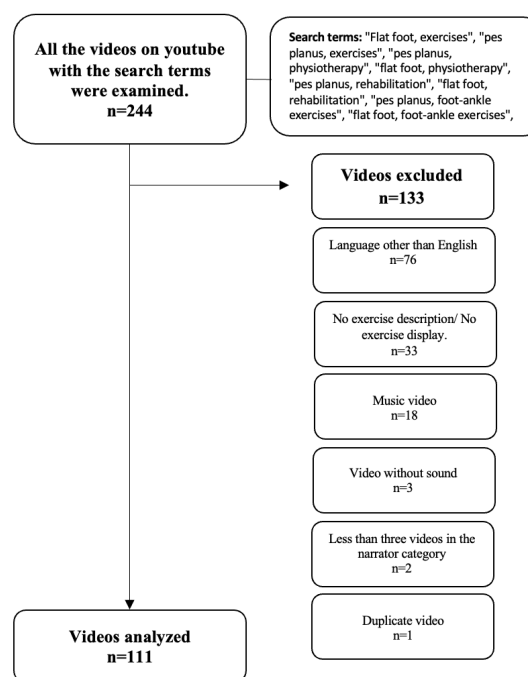


Figure 1 .Flow chart of the evaluated videos

2.3. Evaluation of videos

We recorded the upload date, total views, likes, comments, video duration, and subscriber count of the evaluated videos. The content publishers were categorized based on whether they were individuals or organizations. Corporate or official accounts of health institutions and organizations were classified as 'professional organizations'; health-related websites were classified to as 'healthcare website'; and, personal accounts were classified as 'individual'. The content narrators were defined as individuals observed and recognized within the video content. The professional categorization of these individuals was based on the information provided in the videos or their accompanying descriptions. The narrators' occupational backgrounds in the videos were classified as doctor, physiotherapist, personal trainer/healthy lifestyle

coach, or chiropractor. Narrators not affiliated with these specified occupations were categorized as independent users. Furthermore, the exercises were categorised as follows: short foot exercises (19), proprioceptive neuromuscular facilitation (PNF) (20), toe-tap exercises (21), toes spread out exercises, toes extension exercises, toe curl exercises, tibialis posterior strengthening exercises (22), gastrocnemius strengthening exercises, functional training, and others based on their respective types.

2.4. Video quality analysis

The evaluation and analysis of the videos were conducted by 3 expert physiotherapists. The videos were analyzed using the Global Quality Score, DISCERN, and Journal of the American Medical Association (JAMA) Benchmark Criteria. The Global Quality Score (GQS) is a rating system developed by Bernard et al.(23) to evaluate a video’s educational value for patients. GQS is a likert-type scale with five options created to evaluate the overall quality of a video’s content. The quality of the video is represented by a score ranging from one to five, with one indicating the lowest quality and five indicating the highest (Table 1).

Table 1. JAMA Benchmark Criteria and GQS

JAMA Benchmark Criteria	
Criteria	Description
Authorship	Author and contributor credentials and their affiliations should be provided.
Attribution	All copyright information should be clearly listed, and references and sources for content should be stated.
Currency	The initial date of posted content and dates of subsequent updates to content should be provided.
Disclosure	Conflicts of interest, funding, sponsorship, advertising, support, and video ownership should be fully disclosed.
GQS Criteria	
Criteria	Description
1	Poor quality and unlikely to be of use for patient education
2	Poor quality and of limited use to patients because some information is present
3	Suboptimal quality and flow; somewhat useful to patients, important topics are missing; some information is present
4	Good quality and flow; useful to patients because most important topics are covered
5	Excellent quality and flow; highly useful to patients

The JAMA Benchmark Criteria was created by Silberg et al. to evaluate the quality of health information on the Internet (24). The criteria consist of four components: authorship, attribution, disclosure, and currency. Each criterion receives 1 point if met, with a maximum score of 4 indicating higher quality (Table 1).

DISCERN is a scoring system developed by Charnock et al. (25), aims to evaluate the reliability of a video and present the quality of information on treatment options. It includes 15 questions, each rated on a scale of 1 to 5, and assesses the objectivity and comprehensiveness of medical data, particularly in terms of treatments. The assessment tool is divided into three sections: Section 1 evaluates reliability,

Section 2 evaluates the quality of treatment options, and Section 3 evaluates the overall quality of the information. The tool has five categories: excellent (75-63), good (62-51), fair (50-39), poor (38-27), and very poor (26-15) (Table 2).

Table 2. Discern Scoring Criteria

Question Number	What Is Investigated?	Question Rating				
		No	Partially	Yes		
Section 1	Is the Publication Reliable?	1	2	3	4	5
1	Are the aims clear?	1	2	3	4	5
2	Does it achieve its aims?	1	2	3	4	5
3	Is it relevant?	1	2	3	4	5
4	Is it clear what sources of information were used to compile the publication (other than the author or producer)?	1	2	3	4	5
5	Is it clear when the information used or reported in the publication was produced?	1	2	3	4	5
6	Is it balanced and unbiased?	1	2	3	4	5
7	Does it provide details of additional sources of support and information?	1	2	3	4	5
8	Does it refer to areas of uncertainty?	1	2	3	4	5
Section 2	How good is the quality of information regarding treatment choices?	1	2	3	4	5
9	Does it describe how each treatment works?	1	2	3	4	5
10	Does it describe the benefits of each treatment?	1	2	3	4	5
11	Does it describe the risks of each treatment?	1	2	3	4	5
12	Does it describe what would happen if no treatment is used?	1	2	3	4	5
13	Does it describe how the treatment choices affect overall quality of life?	1	2	3	4	5
14	Is it clear that there may be more than 1 possible treatment choice?	1	2	3	4	5
15	Does it provide support for shared decision-making?	1	2	3	4	5
Section 3	Overall rating of the publication	1	2	3	4	5
16	Based on the answers to all of these questions, rate the overall quality of the publication as a source of information	1	2	3	4	5

2.5. Statistical analysis

The data were analyzed using IBM’s Social Sciences 22 Statistical Package (Armonk, NY, USA). The Shapiro-Wilk test was used to determine the data’s normality. As descriptive statistics, mean, standard deviation, frequency, percentage, minimum, and maximum were utilized. To evaluate the correlations among the general features of Youtube videos, a Spearman’s correlation test was used. To assess statistically significant differences between more than two groups of an independent variable, the Kruskal-Wallis test was used. For pairwise comparison, the Mann-Whitney U test was utilized after a significant Kruskal-Wallis test. Statistical significance was set at $p < .05$.

3. RESULTS

Of the total 244 videos screened, 111 that met the inclusion criteria were evaluated by 3 physiotherapists. Videos on flat foot exercises uploaded to Youtube between 2011 and 2022 were analyzed.

3.1. The Main Features of the Evaluated Videos

The main features of the evaluated Youtube videos are summarized in Table 3. GQS score had weak to moderate significant correlations with "Views" ($r = .366$, $p < .001$), "Like" ($r = .415$, $p < .001$), "Comment" ($r = .396$, $p < .001$), "Video Duration" ($r = .366$, $p < .001$), and "Subscriber" ($r = .328$, $p < .001$). JAMA score had a significant weak correlation with "Comment" ($r = .219$, $p = .021$), "Video Duration" ($r = .261$, $p = .006$), and "Subscriber" ($r = .330$, $p < .001$). DISCERN score had a significant moderate correlation with "Views" ($r = .471$, $p < .001$), "Like" ($r = .482$, $p < .001$), "Comment" ($r = .493$, $p < .001$), "Video Duration" ($r = .556$, $p < .001$), and "Subscriber" ($r = .419$, $p < .001$).

Table 3. The main features of the evaluated videos

	Mean±SD	Min	Max
Time since upload (months)	36.44±31.60	1	128
Views (Total)	116599.39±252499.06	10	1432643
Like (Total)	2223.88±5424.57	0	42000
Comment (Total)	110.61±249.90	0	2012
Video Duration (minute)	7.05±5.73	.45	35.11
Subscriber (Total)	507573.77±1633194.46	0	12500000
Like/Views	.03±.03	0	.17
Views/Time since upload	2969.41±9601.63	1.5	95509.53
JAMA Score	1.89±.88	1	4
GQS Score	3.27±1.18	1	5
DISCERN Score	48.68±11.67	20	75

3.2. Exercises

The exercises used in the evaluated videos are given in Table 4. It was determined that 14.85% of the published videos were related to short foot exercise, 13.17% of tibialis posterior strengthening, and 10.08% of foot curls.

Table 4. Exercises used in the evaluated videos

Exercises	N	%
Short Foot Exercise	53	%14.85
Tibialis Posterior Strengthening	47	%13.17
Toe Curls Exercise	36	%10.08
Gastrocnemius Stretching	34	%9.52
Self Myofascial Release	28	%7.84
Heel Raise/Calf Raise	26	%7.28
Toes-Extension Exercise	21	%5.88
Functional Training	15	%4.20
Toe Tap Exercise	10	%2.80
Strengthening the Hip Muscles	9	%2.52
ROM Exercises	8	%2.24
Toes-Spread Out Exercise	7	%1.96
Pen-Penny Exercise	6	%1.68
PNF Exercises	2	%0.56
Others	55	%15.41

3.3. Content Narrator

The comparison of the videos according to their content narrator is given in Table 5. The videos featuring doctors as content narrators were more recent than those featuring personal trainers/healthy lifestyle coaches ($p < .001$) and physiotherapists ($p = .04$). Furthermore, the study revealed that videos featuring doctors as content narrators received higher JAMA scores compared to those with personal trainers/healthy lifestyle coaches ($p = .004$) and independent users ($p = .03$).

3.4. Content Publisher

The comparison of the videos according to their content publisher is given in Table 6. The videos produced by healthcare websites had a shorter duration compared to those produced by independent individuals ($p = .008$) and professional organizations ($p = .019$). Additionally, when comparing video content publishers, professional organizations had more subscribers than personal accounts ($p < .01$).

Table 5. Comparison of the videos main features, JAMA, GQS and DISCERN scores of the videos according to content narrator

	Personal Trainer/Healthy Lifestyle Coach n=34	Physiotherapist n=33	Doctor n=32	Chiropractor n=6	Independent User n=6	p
	Median (Q1,Q3)	Median (Q1,Q3)	Median (Q1,Q3)	Median (Q1,Q3)	Median (Q1,Q3)	
Time since upload(month)	31.5(22.75-73.5)	25(14-53)	13.5(10.25-26.75)	30(17.25-90.25)	45.5(9.5-61.75)	.006*
Views	39329.5(523-138755)	5022(418-235099)	3513(230.25-32920)	16028.5(350.5-77589.25)	31466.5(117.75-208244)	.571
Like	464.5(14.25-2800)	81(14-4200)	80.5(11.5-969.75)	511(3.75-1875)	501.5(0.75-2725)	.756
Comment	22.5(3.25-201.75)	4(.5-150)	7.5(1-49.75)	0(0-234.25)	7.5(0-61.25)	.297
Video Duration	6.46(4.93-11.83)	5.39(2.54-9.48)	4.47(3.28-10.04)	3.51(2.23-9.06)	3.02(2.01-4.44)	.051
Subscriber	3720(296.5-78725)	6920(336-369000)	5630(415-134750)	2633(252.25-249525)	352(0-56250)	.552
JAMA	1(1-2)	2(1-3)	2(2-3)	1.5(1-2)	1(1-1.25)	.001*
GQS	3(2-3)	3(2.5-4.5)	4(3-4)	3.5(2.75-4.25)	3(1.75-3.25)	.168
DISCERN	48(41-55)	47(41.5-59)	48(43-57.25)	49(40-57)	40.5(33.5-44.5)	.301

*Significant difference at $p < .05$.

Table 6. Comparison of the video main features, JAMA, GQS and DISCERN scores of the videos according to content publisher

	Personal n=60	Healthcare Web Site n=31	Professional Organization n=20	p
	Median (Q1,Q3)	Median (Q1,Q3)	Median (Q1,Q3)	
Time since upload(month)	22(11-52)	27(15-51)	31.5(13-87.5)	.295
Views	1538.5(214.25-63855.25)	70171(2168-226260)	13230(471.5-32974.5)	.053
Like	64.5(11.25-1500)	1000(14-5700)	234(2.5-576.5)	.084
Comment	8.5(1-133)	29(0-215)	7.5(0-33.25)	.575
Video Duration	6.18(3.53-10.1)	6.24(3.29-10.51)	3.4(1.45-4.92)	.021*
Subscriber	2640(220-20400)	77300(1560-351000)	2840(321.5-124750)	.005*
JAMA	2(1-2.75)	2(1-3)	2(1-2)	.960
GQS	3(3-4)	3(2-5)	3(3-4)	.681
DISCERN	47(42.25-55)	49(42-59)	44(35.75-52.5)	.266

*Significant difference at $p < .05$.

4. DISCUSSION

The study found that videos on Youtube demonstrating flat foot exercises were viewed an average of 116599 times. The results obtained suggest that the videos about flat foot exercises on Youtube are approximately of medium quality. A statistically significant positive correlation was found between the video duration and quality. The Short Foot exercise was the most commonly described exercise in the videos. While personal trainers/healthy lifestyle coaches constituted the most frequent narrators of the video content, videos narrated by physicians demonstrated higher overall quality. Furthermore, the majority of the video content was produced and published by individual users rather than by professional organizations or institutions. Additionally, there was no significant difference in video quality between content publishers.

The average number of views for the flat foot exercise videos examined on Youtube was 116599, indicating that Youtube is a popular source of information for flat foot. Comparatively, average viewership was reported as 35165 for lymphedema rehabilitation (27), 9876 for Alzheimer's-related videos (28) and 6969 for Ankylosing spondylitis exercises (29). These findings highlight the popularity of flat foot as a topic on Youtube and emphasize the need to assess the content and quality of related videos.

In our study, JAMA, GQS, and DISCERN scores revealed that the assessed videos were of a medium quality. Similarly, an examination of Youtube videos concerning clubfoot and fibromyalgia-related videos yielded findings indicating medium-quality content (30). Unlike our findings, investigation into rotator cuff rupture videos and Femoroacetabular impingement syndrome videos similarly reported low quality (31). Based on our study and others, it can be concluded that Youtube videos should be used as a source of information only after careful selection. Videos uploaded to YouTube should undergo an editorial process. Additionally, it has been observed that competent healthcare professionals produce more relevant content, which in turn increases the quality of the information available.

The duration of the videos was positively correlated with the GQS, DISCERN, and JAMA score. Similarly, a statistically significant positive correlation was found between video duration and video quality in the studies on rotator cuff repair and fibromyalgia videos on Youtube (30). According to this finding, it is thought that as the video duration increases, the quality of the videos increases because the content narrator has more time to inform the viewers.

The short foot exercise was the most frequently demonstrated exercise for flat foot in the evaluated videos. It has been reported that short foot exercises were effective in treating flat foot in patients with this condition (19, 32). It is not surprising that short foot exercises, which have been shown to be effective in the treatment of flat foot, are popular today. These exercises are often demonstrated in videos, but it is important, based on other results, that they are taught by knowledgeable and competent healthcare professionals. The correct inclusion of the Short Foot exercise in the video content will be instructive for both healthcare professionals and patients.

While personal trainers/healthy lifestyle coaches were the most common narrators, the videos narrated by doctors exhibited higher average quality scores compared to other groups. This finding is consistent with similar studies which also demonstrated superior quality in videos with doctor narrators (30, 33, 34). Therefore, videos narrated by healthcare professionals are a superior source in terms of both quality and content. Individuals who seek information about flat foot prefer content narrated by professionals who have received relevant education and training in their respective fields. This ensures that the information provided is accurate and reliable. For this reason, YouTube should prioritise videos created by certified health experts for users seeking information about diseases.

In our study, it was found that there was no significant difference between publishers in terms of video content and quality. Similarly, no significant difference was found in the content publisher and video quality when examining pelvic floor muscle training exercises on Youtube (35). However, contrary to our results, some studies have showed that

high-quality videos have been published by professional organizations, while low-quality videos have been published by healthcare websites or individual content publishers (34, 36). Our findings suggest that the lack of significant difference between the content publisher and video quality may be attributed to the fact that professional organizations and healthcare websites related to flat foot posted fewer videos than individual accounts.

The study has several limitations. Firstly, it only evaluated English language videos. Secondly, due to the dynamic nature of Youtube's content, current videos could not be evaluated. Thirdly, videos without keywords related to flat foot exercises were excluded from the evaluation. Fourthly, videos without visuals were not considered, even if they described the exercise. Fifthly, the videos had a duration of between 0.45 and 35 minutes. Using the same scales for short and long videos may have been a methodological limitation, but the content-focused nature of the scales partially mitigated this. Lastly, the evaluation was limited to videos on Youtube and did not include videos from other websites.

5. CONCLUSION

As a result, individuals with flat foot often turn to Youtube videos as a source of information. To meet this demand, numerous videos are shared daily. To ensure accurate information regarding flat foot, healthcare professionals with expertise should share high-quality, reliable videos to guide patients. In this regard, experts should be selected and encouraged by reputable institutions such as the Ministry of Health. Furthermore, it is imperative that Youtube is subject to editorial moderation to ensure the quality and accuracy of its content. This will prevent patients from accessing misleading information and bolster their self-efficacy. Additionally, the availability of trustworthy videos that healthcare professionals can recommend to their patients will streamline their work.

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Author Contributions:

Research idea: AA, MTT, ST

Design of the study: AA, MTT, ST

Acquisition of data for the study: AA, MTT, ST

Analysis of data for the study: AA, ST

Interpretation of data for the study: AA, MTT, ST

Drafting the manuscript: AA, MTT, ST

Revising it critically for important intellectual content: AA, MTT, ST

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