Assessing the quality of YouTube videos as a source of information on mild cognitive impairment

Ozlem Bizpinar Munis[a,*], Leyli Can Aynal Olcucuoglu[a]

[a]Etlik City Hospital, Department of Neurology, Ankara, Türkiye

Abstract

Aim: Mild Cognitive Impairment (MCI) describes a clinical profile between healthy aging and pathological aging. Accordingly, individuals with MCI exhibit mild impairment in cognitive functions, such as memory and attention, that do not significantly affect daily life activities compared to healthy individuals of the same age. However, this condition does not meet the criteria for dementia. MCI can progress to dementia, remain stable, or return to normal cognitive status. Individuals diagnosed with MCI may develop a fear of developing dementia, leading them to search for information. YouTube is currently one of the largest and most popular databases worldwide and has become an important source of health-related information. However, the uncontrolled nature of YouTube has made its reliability controversial. Therefore, in this study, we aimed to examine YouTube videos on MCI in terms of their usefulness.

Materials and Methods: The first 200 videos containing the phrase 'Mild Cognitive Impairment' were watched by two expert neurologists. These videos were examined based on their source, content, duration, and usefulness levels. The usefulness level was determined using GQS, DISCERN, and JAMA scores. Popularity analyses were conducted using VPI.

Results: Out of the 200 videos screened, 130 were included in the analysis. Of these videos, 68% were found to be very useful. The leading source of these videos was health information portals. When analyzed according to their content, videos related to the clinic of MCI were at the forefront.

Conclusion: The significant number of useful videos demonstrates that the use of YouTube is an important opportunity for the dissemination of accurate and useful health information. This suggests that trust in YouTube may continue to increase.

Introduction

Mild Cognitive Impairment (MCI) is an intermediate clinical process between normal aging and dementia [1]. In this situation; cognitive functions are more impaired in individuals than in healthy individuals of the same age; however, it is a clinical picture in which the criteria for dementia are not met and the daily life activities of the person are not affected [2]. MCI may be a part of a neurodegenerative process such as Alzheimer's Disease (AD), or it may be due to a reversible or irreversible medical condition (nutrition disorders, head trauma, diabetes mellitus, etc.) [3, 4]. Depending on the underlying cause; people diagnosed with MCI may experience different outcomes. They can return to normal, this rate was found to be 25% in a population-based meta-analysis. They may stay in the same state or progress to dementia. So MCI can be a harbinger of dementia. The annual conversion rates of people with MCI to dementia are shown to be between 10 and 21.8% in studies [5,6]. This is what makes MCI important to society, and what made it stand out. Because the possibility of catching Alzheimer's Disease, which has not yet been found a definitive solution, creates serious anxiety in people.

The prevalence of dementia is increasing with the aging of the population [7]. Recent studies; show that while the prevalence of MCI is 6.7% between the ages of 60-64, it increases to 25% between the ages of 80-84 [8]. It is projected that the global number of dementia patients will increase to 46.8 million by 2030, and to 135.5 million by 2050 [9]. This is a significant problem in terms of the quality of life for patients and their families [10-12]. For this reason, dementia is an important issue both from a medical and socioeconomic point of view [4,12,13].

The difference and unclear transitions between cognitive

*Corresponding author:
Email address: bizpinar@gmail.com (Ozlem Bizpinar Munis)

complaints and MCI due to normal aging, as well as the differences between MCI and dementia, are not fully known in the population. A study conducted among individuals with a tendency towards forgetfulness has revealed that almost half of them experience anxiety and fear related to the possibility of developing dementia due to their forgetfulness [14]. In addition, since there is no definitive medical or pharmacological treatment for the treatment of MCI or AD, approaches such as compensatory cognitive strategies, "brain games" and other lifestyle changes (ie nutrition, exercise, etc.) are tried to slow down the progression [10, 15-17]. This situation puts society, which has concerns about the disease process, in search of it.

Social media has emerged as the most commonly used and rapidly growing source of information. Social Media is advantageous for both patients and their relatives or caregivers in terms of being easily accessible and allowing the mutual exchange of information [18,19]. YouTube is one of the largest video databases in the world and one of the most popular websites on the Internet [20]. At least one-third of older adults use the Internet to access health-related information [21]. Searching for health-related information was found to be the third most common activity in an online search [18]. It is increasingly used by patients with chronic diseases for many reasons, such as the need for a second opinion, seeking support, and the desire to increase personal information about the disease [22]. MCI is one of the first diagnoses that come to mind for people with amnesia, which is very common in society. Social media, and especially You Tube, is a rich source of information in this regard, raising awareness and offering solution alternatives. However, the reliability of the available videos is subject to significant variability and lacks adequate content quality control or institutional oversight by experts [23]. Consequently, the popularity of this platform has given rise to concerns about the accuracy and usefulness of the information disseminated, as sharing information without proper verification and oversight is facile.

The purpose of our study is to examine the quality of YouTube™ videos as a general source of information about MCI and by which producers they are shared, and to evaluate the viewing patterns of related videos.

Materials and Methods

Because this study involved the use of publicly available data only, it was exempted from the institution's ethics committee approval. The study was designed as a cross-sectional study.

YouTube search

On March 6, 2023, a search was made on https://www.youtube.com/ with the keyword "Mild Cognitive Impairment". The first 200 videos were downloaded, and sorted by relevance, which is the default sorting option on YouTube. Only videos in English and videos with the term "Mild cognitive impairment" in the title were included in the review. Videos shorter than 3 minutes and longer than 1 hour, videos in languages other than English and without sound were excluded. All searches were independently reviewed by two neurologists

on our team for reliability and comparison. Evaluations that had a difference of opinion were re-examined and finalized.

Video evaluation

Information about the title, the length of the video (in minutes), the total number of views, the upload date, likes, and dislikes are listed. It is divided into 6 categories determined before the study as a video source. 1-Clinician, 2-Health information portal, 3-Professional Organization, 4-Independent user, 5- Organizations containing advertisements, 6-Academic. Clinicians were included in the first group only when they shared videos on their behalf. Those who were not in the first five groups were considered as independent users. The contents of the videos were classified as 1-Epidemiology, 2-Pathogenesis, 3-Clinical features, 4-Diagnosis 5-Support approaches after diagnosis.

Like rate and video power index (VPI) were used in the popularity analysis of the videos [24]. Like rate ([likes/likes + dislikes] × 100), and VPI was calculated as likes x views/100. The parallelism between title and content; The title-content consistency index (TCCI) was used [25]. Accordingly, the videos were evaluated with the TCCI index ranging from 1-weak consistency to 5-high consistency.

The Global Quality Scale (GQS) and DISCERN were used to assess the overall quality of all selected videos [26, 27]. GQS; It is a scale that rates the quality of the video, the flow, information content and ease of use of the video offered online, from 1 to 5. DISCERN, on the other hand, was developed to assess the quality of information from patients and providers, consisting of 15 questions and an overall quality rating. It includes 3 sections that assess the reliability (section 1), quality of information about treatment options (section 2), and overall quality of information (section 3). There are 8 questions in the first part, 7 questions in the second part, and the third part contains an overall rating. Each question was scored on a 5-point (minimum 1-highest 5 for quality) scale according to whether the video met the quality criteria [26]. The DISCERN guide contains detailed information for each question, including instructions and examples. Since there is no standardized and approved treatment option currently used for MCI, and therefore, treatment content is not included in most of the videos, Section 2 was excluded and an evaluation was made on 9 items. The total DISCERN score was calculated by summing the scores for 9 questions. It was categorized as excellent (39-45), good (32-38), moderate (25-31), poor (18-24), and very poor (<17). The general usefulness of the videos was evaluated according to the sum of the GQS and DISCERN scores. This was rated as very useful (43-50), useful (35-42), less useful (27-34), and useless (<26).

JAMA benchmarks were used to assess the quality of internet information on healthcare. It evaluates 4 criteria, including authorship, attribution, description, and validity. 1 point is awarded for each criterion, with a maximum of 4 points representing the highest quality [28]. The criteria are as follows: (1) authorship (authors and contributors, their links, and relevant identification information must be provided), (2) attribution (references and sources

for all content must be listed and all relevant copyright information noted), (3) disclosure (conflicts of interest, video ownership, funding, sponsorship, advertising, and support must be fully disclosed) and (4) currency (the dates when the content was published and updated should be specified).

Statistical analysis

Programming language Python (version of 3.10.6) and it's data analytics libraries Pandas (version of 1.4.4) and Numpy (1.23.1) were used for the analysis of the data. Mean, SD, frequency, minimum, and maximum were used as descriptive methods. Chi-Square and Spearman's Rank Correlation tests were used to determine statistically significant differences.

Results

A total of 200 videos were scanned, of which 130 met the inclusion criteria. The total duration of the examined material was 1,962 minutes. The total number of views of all videos was 383,135. The average duration of the videos

was 15.6 ± 16.03 min and an average of 2,947 ($\pm$ 5,612) views per video. The general evaluation of the examined videos is presented in Table 1. Reviewed videos; 89 (68.45%) were found very useful, 36 (27.69%) useful, and 5 (3.84%) less useful. No useless video was detected (Table 2). When the video sources are examined; With 42 videos, the health information portal was the source with the most content. This was followed by academic sources with 23 videos and professional organizations with 19 videos. Independent users were the least reviewed video source, with 16 videos.

When the contents of the videos were examined, it was seen that MCI's clinic was examined the most with 45 videos. 36 of them included preventive and supportive activity, nutrition, and lifestyle recommendations for people with MCI. 12 videos talked about the epidemiology, pathogenesis, and clinical and supportive approaches of MCI. There was no significant difference in the number of views of the videos according to the source content and video duration (Table 3). The videos that are in the very useful and useful groups and at the same time have the highest number of views consist of videos that are shorter in duration (Table 4).

Table 1. Distribution of general features of Youtube videos.

Video Sources	n	%
Clinician	13	10%
Heatlh information portal	42	32%
Professional Organization	26	20%
Independent user	9	7%
Organizations containing advertisements	17	13%
Academic	23	18%

Video contents	n	%
Epidemiology	3	2%
Pathogenesis	3	2%
Clinical features		
MCI*	17	13%
MCI-Dementia	26	19%
Support after diagnosis	36	28%
All topics	12	9%
Clinical features and managment		
MCI	18	14%
MCI-Dementia	17	13%

Video features	Mean ± SD	Min-Max
Video duration (min)	15.09±15.88	1.6-59.25
Views	2947.19 ± 5611.95	6-33917
Time since publication (days)	1499.25± 1281.26	44-5381
Number of likes	54.05± 164.42	0-1400
Number of dislikes	0	0
Number of comments	4.72± 14.46	0-99
JAMA Score avg	3.61± 0.62	2-4
DISCERN	40.52± 4.06	31-45
GQS	4.25± 0.75	2-5
Target audience		
Healthcare professionals and clinicians	58	45%
Patients and caregivers	72	55%

* MCI Mild Cognitive Impairment.

Discussion

Mild cognitive impairment (MCI) describes individuals in the transition period between normal cognition and dementia. The presence of a cognitive complaint reported by the person or caregiver in MCI is defined by the presence of impairment in one or more cognitive areas, normal activities of daily living, and the absence of dementia [29]. For people with MCI; Problems such as what causes this condition, whether it will turn into dementia, and what can be done to prevent it are primary concerns. In this case, people refer to YouTube as the easiest source of information [22]. The quality of information varies greatly on YouTube [25, 29]. Considering the aging world population, it is thought that MCI is an important problem based on society and its importance will gradually increase. It is thought that this will push people to the easiest source of information. For this reason, the information quality of the videos is of great importance.

68.45% of the videos were found very useful, 27.69% useful, and a very small portion such as 3.8% was found to be less useful. No useless or misleading videos were found. This shows that YouTube™ is an important tool for useful information dissemination. The percentage of useful videos was found to be higher in our study compared to previous studies on videos with different medical content [30-32]. This may be because there is less awareness of MCI in society and therefore fewer non-professional video sources. Or it may be because content producers focus on more useful information due to the goal of getting more likes and views over time.

After scanning for MCI, videos with MCI in the title were included in our study. Both MCI and dementia were discussed in 41 of these videos. Here, too, the progression of MCI to dementia is primarily addressed. This has been the most viewed content. Another remarkable issue is that the number of views of the videos about the supportive approach and treatment alternatives after diagnosis to MCI

Table 2. Evaluation of the usefulness of videos according to video source and features.

	Useless	Less useful	Useful	Very useful	p
	n (%)	n (%)	n (%)	n (%)	
Video Sources					
Clinician			4 (4%)	9 (7%)	
Heatlh information portal		2 (2%)	10 (8%)	30 (23%)	
Professional Organization			9 (7%)	17 (13%)	0.29*
Independent user			3 (2%)	6 (5%)	
Organizations containing advertisements		2 (2%)	6 (5%)	9 (7%)	
Academic		1 (1%)	3 (2%)	19 (15%)	
Video contents					
Epidemiology			1 (1%)	2 (2%)	
Pathogenesis			2 (2%)	1 (1%)	
Clinical features					
MCI		1 (1%)	6 (5%)	10 (8%)	
MCI-Dementia		2 (2%)	9 (7%)	13 (10%)	0.30*
Support after diagnosis		2 (2%)	9 (7%)	25 (19%)	
All topics				12 (9%)	
Clinical features and managment					
MCI			3 (2%)	15 (12%)	
MCI-Dementia			6 (5%)	11 (8%)	
Mean video duration (min)	NaN	24.97 ±26.33	10.16 ±12.42	16.54±16.10	**0.00****
Mean number of views	NaN	150.40 ±101.57	2531.61±5400.50	3272.41 ±5826.22	0.41**
JAWA BC	NaN	2.8 ±0.4	3.1±0.7	3.8±0.4	**0.00****

*chi square,**spearman.

Table 3. Distribution of video views by video source, content and duration

Number of views	<1000	1-5000	5000-10000	>10 000
	n (%)	n (%)	n (%)	n (%)
Video Sources				
Clinician	7 (5%)	3 (2%)	1 (1%)	1 (1%)
Heatlh information portal	24 (18%)	6 (5%)	8 (6%)	4 (3%)
Professional Organization	9 (7%)	4 (3%)	4 (3%)	2 (2%)
Independent user	8 (6%)	4 (3%)	2 (2%)	2 (2%)
Organizations containing advertisements	11 (8%)	5 (4%)	2 (2%)	0
Academic	19 (15%)	4 (3%)	0	0
Video contents				
Epidemiology	1 (1%)	1 (1%)	1 (1%)	0
Pathogenesis	2 (2%)	1 (1%)	0	0
Clinical features				
MCI	7 (5%)	2 (2%)	0	1 (1%)
MCI-Dementia	16 (12%)	6 (5%)	5 (4%)	4 (3%)
Support after diagnosis	24 (18%)	7 (5%)	4 (3%)	1 (1%)
All topics	7 (5%)	2 (2%)	2 (2%)	1 (1%)
Clinical features and managment				
MCI	8 (6%)	3 (2%)	1 (1%)	0
MCI-Dementia	13 (10%)	5 (4%)	3 (2%)	2 (2%)
Video duration mean (min)	15.90±16.26	10.92±11.76	9.21±5.44	17.07±16.08

* MCI; mild cognitive impairment.

cases stands out at 37.39% in the video content. Epidemiology and pathogenesis took less places in the videos. When the videos were evaluated according to their publishers, academic sources and the health information portal produced the most useful content. Against this; Organizations and occupational groups containing advertisements

Table 4. The relationship between video duration and usefulness and the number of views.

Usefulnes	Number of Views	Mean Duration (min)
Useless	0-1000	0.00
	1000-5000	0.00
	5000-10000	0.00
	> 10000	0.00
Less useful	0-1000	36.46
	1000-5000	0.00
	5000-10000	0.00
	> 10000	0.00
Useful	0-1000	11.57
	1000-5000	9.64
	5000-10000	12.91
	> 10000	5.97
Very useful	0-1000	16.37
	1000-5000	11.70
	5000-10000	19.31
	> 10000	9.68

were found to be less useful. The date of production of the videos and the time elapsed to date is not associated with the degree of usefulness and the number of views of the videos.

When the durations of the videos are examined; it was found to be 16.5 ± 15.6 minutes in the very beneficial group, and 24.5 ± 22.5 minutes in the less beneficial group, surprisingly. While it was expected that videos with more detailed reviews would be more useful, they were found to be different from previous studies here [21]. In the first target group consisting of healthcare professionals, the duration of the video did not affect the number of views, while the videos of 7-15 minutes were the most watched in the second target group consisting of patients and their relatives. In other words, time is not effective in professional follow-ups, and the importance of attention span for patients and caregivers has come to the fore. Another evaluation that shows the importance of attention span is that videos that are short and that are in the useful and very useful group are in the most watched video group (Table 4).

For MCI, the question of whether this is normal aging, reversible, or a progressive process to dementia, and the fine line here is important for both clinicians and patients and caregivers. In addition, the importance of lifestyle adjustments and supportive approaches that can be made after diagnosis is undeniable. For this reason, it is inevitable for society to search for these issues and to use YouTube as the most accessible information source. In this study, the usefulness of the videos about MCI was examined and pleasingly the ratio of useful and reliable videos was found to be high. However, when it comes to the present and the future, social media tools such as You Tube should also aim to make the presentations more quality and reliable. In order to achieve this, the number of likes created by experts or non-professionals should not be the only criterion. A rating of the videos to be created by the experts

of the subject should also be specified. In addition to the recommendations on YouTube's personal interests, videos on important topics such as public health should also be presented among the priority suggestions.

One limitation of this study is; the reason is that there is not yet a fully validated scale for evaluating video data. In addition, evaluation parameters may vary according to the subject and content of health-related videos. For example, while different evaluations are required for surgical content, different criteria will be important for a degenerative disease [20,32,33]. In addition, the visual content of the videos, their quality, and whether they are supported by an animation will affect the comprehensibility and rate of appreciation of the video, so they should be included in the evaluation.

Ethical approval

Since this study only involves the use of publicly available data, it does not require an ethics committee decision.

References

1. Petersen RC. Clinical practice. Mild cognitive impairment. The New England journal of medicine. 2011;364(23):2227-34.
2. Etgen T, Sander D, Bickel H, Förstl H. Mild cognitive impairment and dementia: the importance of modifiable risk factors. Deutsches Ärzteblatt International. 2011;108(44):743.
3. Petersen RC, Stevens JC, Ganguli M, Tangalos EG, Cummings J, DeKosky S. Practice parameter: Early detection of dementia: Mild cognitive impairment (an evidence-based review) Report of the Quality Standards Subcommittee of the American Academy of Neurology. Neurology. 2001;56(9):1133-42.
4. Ölçücüoğlu LCA, Munis ÖB, Güven HH, Eraslan N, Celikay O, Çomoğlu SS. Retinal neurodegeneration in patients with mild cognitive impairment and alzheimer's disease an optical coherence tomography study. Turkish Journal of Geriatrics/türk geriatri dergisi. 2021;24(2).
5. Bruscoli M, Lovestone S. Is MCI really just early dementia? A systematic review of conversion studies. International psychogeriatrics. 2004;16(2):129-40.
6. Mitchell AJ, Shiri-Feshki M. Rate of progression of mild cognitive impairment to dementia–meta-analysis of 41 robust inception cohort studies. Acta psychiatrica scandinavica. 2009;119(4):252-65.
7. Parlak MM, Altan E, Saylam G. Dysphagia in Individuals with Dementia. Journal of Ear Nose Throat and Head Neck Surgery. 2022(30(2)):88-96.
8. Salzman T, Sarquis-Adamson Y, Son S, Montero-Odasso M, Fraser S. Associations of multidomain interventions with improvements in cognition in mild cognitive impairment: A systematic review and meta-analysis. JAMA Network Open. 2022;5(5):e226744-e.
9. Organization WH. Global action plan on the public health response to dementia 2017–2025. 2017.
10. Parlak MM, Bizbinar Ö, Köse A. The Effect of Holistic Therapy in Alzheimer's Disease. Alternative therapies in health and medicine. 2023:AT7591.
11. Munis ÖB, Parlak MM, Köse A. Analysis of the consistency of information received from Alzheimer's disease patients and their families in the quality of life and depression scales. Turkish Journal of Clinics and Laboratory. 2021;12(4):372-8.
12. Parlak MM, Tokgöz SA, Bizbinar Ö, Saylam G, Köse A. Investigation of cognition, nutrition, independence and swallowing difficulty, relationship with quality of life, and effect levels in elderly people with Alzheimer's disease living with their families. Neurology Asia. 2022;27(3):701-8.
13. Parlak MM, Babademez MA, Tokgöz SA, Bizpınar Ö, Saylam G. Evaluation of Swallowing Function according to the Stage of Alzheimer's Disease. Folia Phoniatrica et Logopaedica. 2022;74(3):186-94.
14. Hamm MP, Chisholm A, Shulhan J, Milne A, Scott SD, Given LM, et al. Social media use among patients and caregivers: a scoping review. BMJ open. 2013;3(5).

15. Cai Y, Abrahamson K. How exercise influences cognitive performance when mild cognitive impairment exists: A literature review. Journal of psychosocial nursing and mental health services. 2016;54(1):25-35.

16. Curlik 2nd D, Shors T. Training your brain: do mental and physical (MAP) training enhance cognition through the process of neurogenesis in the hippocampus? Neuropharmacology. 2013;64:506-14.

17. Kivipelto M, Solomon A, Ahtiluoto S, Ngandu T, Lehtisalo J, Antikainen R, et al. The Finnish geriatric intervention study to prevent cognitive impairment and disability (FINGER): study design and progress. Alzheimer's & Dementia. 2013;9(6):657-65.

18. Hamm MP, Chisholm A, Shulhan J, Milne A, Scott SD, Given LM, et al. Social media use among patients and caregivers: a scoping review. BMJ open. 2013;3(5):e002819.

19. Al-Busaidi IS, Anderson TJ, Alamri Y. Qualitative analysis of Parkinson's disease information on social media: the case of YouTube™. EPMA Journal. 2017;8:273-7.

20. Braczynski AK, Ganse B, Ridwan S, Schlenstedt C, Schulz JB, Hoog Antink C. YouTube videos on parkinson's disease are a relevant source of patient information. Journal of Parkinson's Disease. 2021;11(2):833-42.

21. Flynn KE, Smith MA, Freese J. When do older adults turn to the internet for health information? Findings from the Wisconsin Longitudinal Study. Journal of general internal medicine. 2006;21(12):1295-301.

22. Ruiz-Roca JA, Martínez-Izquierdo A, Mengual-Pujante D, López EPF, López-Jornet P. Is YouTube a useful tool for oral care in patients with Parkinson's disease? Special Care in Dentistry. 2020;40(5):464-9.

23. Tripathi S, ReFaey K, Stein R, Calhoun BJ, Despart AN, Brantley MC, et al. The reliability of deep brain stimulation YouTube videos. Journal of Clinical Neuroscience. 2020;74:202-4.

24. Erdem MN, Karaca S. Evaluating the accuracy and quality of the information in kyphosis videos shared on YouTube. Spine. 2018;43(22):E1334-E9.

25. Moon H, Lee GH. Evaluation of Korean-language COVID-19–related medical information on YouTube: cross-sectional Infodemiology study. Journal of medical Internet research. 2020;22(8):e20775.

26. Charnock D, Shepperd S, Needham G, Gann R. DISCERN: an instrument for judging the quality of written consumer health information on treatment choices. Journal of Epidemiology & Community Health. 1999;53(2):105-11.

27. Charnock D. The DISCERN handbook. Quality criteria for consumer health information on treatment choices Radcliffe: University of Oxford and The British Library. 1998:7-51.

28. Silberg WM, Lundberg GD, Musacchio RA. Assessing, controlling, and assuring the quality of medical information on the Internet: Caveant lector et viewor—Let the reader and viewer beware. Jama. 1997;277(15):1244-5.

29. Ozsoy-Unubol T, Alanbay-Yagci E. YouTube as a source of information on fibromyalgia. International Journal of Rheumatic Diseases. 2021;24(2):197-202.

30. Delli K, Livas C, Vissink A, Spijkervet FK. Is YouTube useful as a source of information for Sjögren's syndrome? Oral diseases. 2016;22(3):196-201.

31. Strychowsky JE, Nayan S, Farrokhyar F, MacLean J. YouTube: a good source of information on pediatric tonsillectomy? International journal of pediatric otorhinolaryngology. 2013;77(6):972-5.

32. Castillo LI, Hadjistavropoulos T, Brachaniec M. The effectiveness of social media in the dissemination of knowledge about pain in dementia. Pain Medicine. 2021;22(11):2584-96.

33. Li M, Yan S, Yang D, Li B, Cui W. YouTube™ as a source of information on food poisoning. BMC Public Health. 2019;19:1-6.