



Use of YouTube as an Information Source for Radioactive Iodine Therapy: Do YouTube Videos Have High Quality?

YouTube'un Radyoaktif İyot Tedavisi için Bilgi Kaynağı Olarak Kullanılması: YouTube Videoları Yüksek Kaliteye Sahip mi?

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Abstract

Objectives: Radioactive iodine (RAI) therapy is a radionuclide treatment for hyperthyroidism and well-differentiated thyroid cancer. One of the most popular sources of information for patients on the internet is YouTube. This study aimed to examine the quality of videos about RAI treatment.

Methods: This cross-sectional study was performed by using videos in YouTube. The terms “radyoaktif iyot tedavisi” and “radioactive iodine treatment” were used to search related videos in June 2021. The quality of the videos was assessed by using the Journal of the American Medical Association (JAMA) benchmark criteria, the DISCERN scale, and the global quality scale (GQS).

Results: Of the total 88 videos evaluated, 56 videos (30 in English, 26 in Turkish) were analyzed according to the inclusion and exclusion criteria. Seven (12.5%) videos were assigned to the high-quality group, 16 (28.58%) to the intermediate quality group, and 33 (58.92%) to the low quality group. The findings of this study showed that the most popular videos with the highest video power index (VPI) scores and the highest number of video likes and comments belonged to the intermediate quality group. Contrarily, popularity level, number of video likes, and number of video views were the lowest in the high-quality group. The analysis of video sources revealed that viewers most preferred non-physician-sourced videos, with average total views of 59307.80 [standard deviation (SD): 122554.13]. The most liked videos were non-physician-made videos, with average total likes of 424.35 (SD: 639.41). The mean VPI scores were the highest in non-physician-made videos, with 25.18 (SD: 25.69). The average JAMA (1.92, SD: 0.50), DISCERN (34.31, SD: 14.33), and GQS scores (2.61, SD: 0.99) were the highest in physician-made videos.

Conclusion: Although high-quality videos on YouTube may inform and encourage patients positively, unprofessional, incorrect, and incomplete information can be also uploaded on YouTube and may mislead patients.

Keywords: Video, radioactive iodine, treatment, internet

Öz

Amaç: Radyoaktif iyot (RAI) tedavisi, hipertiroidizm ve iyi diferansiyeli tiroid kanseri için bir radyonüklid tedavisidir. İnternette hastalar için en popüler bilgi kaynaklarından biri YouTube'dir. Bu çalışma, RAI tedavisi ile ilgili videoların kalitesini incelemeyi amaçlamaktadır.

Yöntem: Bu kesitsel çalışma YouTube kullanılarak gerçekleştirilmiştir. Haziran 2021'de ilgili videoların aranmasında “radyoaktif iyot tedavisi” ve “radioactive iodine treatment” terimleri kullanıldı. Videoların kalitesi, Amerikan Tıp Derneği Dergisi (JAMA) benchmark kriterleri, DISCERN ölçeği ve küresel kalite ölçeği kullanılarak (GQS) değerlendirildi.

Bulgular: Toplam 88 video değerlendirildi ve toplam 56 video (30 İngilizce, 26 Türkçe) dahil edilme ve hariç tutulma kriterlerine göre analiz edildi. Yedi video (%12,5) yüksek kaliteli grup, 16 video (%28,58) orta kaliteli grup ve 33 video (%58,92) düşük kaliteli grup olarak sınıflandırıldı. Çalışmamızın bulguları, en yüksek video güç indeksi puanına sahip en popüler videolar ile en fazla beğeni ve yorum sayısına sahip videoların orta

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kalite grubundaki videolar olduğunu gösterdi. Aksine, popülerlik düzeyi, video beğeni sayısı ve video izlenme sayısı yüksek kaliteli video grubunda en düşük bulundu. Video kaynaklarının analizinde; izleyiciler tarafından en çok tercih edilen videoların, ortalama 59307,80 [standart sapma (SS): 122554,13] izlenme sayısı ile hekim kaynaklı olmayan videolar olduğu saptandı. En çok beğenilen videolar ise ortalama 424,35 (SS: 639,41) beğeni ile hekim olmayanlara aitti. Video güç indeksi puanlarının ortalaması en yüksek 25,18 (SS: 25,69) olarak saptanmış ve hekim olmayanlara ait videolarda bulunmuştur. Doktorlara ait videolarda ortalama JAMA (1,92, SS: 0,50), DISCERN (34,31, SS: 14,33) ve GQS puanları (2,61, SS: 0,99) en yüksek olarak saptanmıştır.

Sonuç: Her ne kadar YouTube'deki yüksek kaliteli videolar, hastaları olumlu yönde bilgilendirebilmekte ve teşvik edici olabilmekte ise de; yanlış ve eksik bilgilendirmelerin de bu platforma yüklenebileceği ve hastaları yanıltabileceği unutulmamalıdır.

Anahtar kelimeler: Video, radyoaktif iyot, tedavi, internet

Introduction

Radioactive iodine (RAI) was the first radiopharmaceutical of clinical importance in nuclear medicine (1). RAI treatment has been used to treat hyperthyroidism and well-differentiated thyroid carcinoma (2,3), and the basic term "radiotheranostics" has been used in clinical practice since 1940s (4). RAI treatment remains the main treatment strategy, especially in well-differentiated thyroid cancer of intermediate- and high-risk features. Moreover, RAI treatment in hyperthyroidism is safe, cost-effective, and efficient (5,6,7). Detailed verbal and written information about RAI treatment, side effects, and radiation protection precautions before, during, and after treatment preparations or requirements is always given to the patient, and signed informed consent is inevitably taken. Despite the provision of adequate information, some patients may be hesitant, anxious, and curious about RAI treatment. Thus, patients use social media websites and search engines to reach information easily. Social media websites and search engines have great potential to provide free and easy access to targeted information; however, data received can be neither accurate nor free of bias and sometimes irrelevant and incomplete (8).

At present, by the increasing access to the Internet, patients tend to utilize YouTube to obtain medical information. In a study by Yoon et al. (9) of 17.704 adults, approximately 40% used the internet for health information. YouTube is one of the most important online sources used by people for medical purposes. YouTube is a worldwide video-sharing service that provides free access to videos and is an alternative platform to deliver health-related information (10). However, the advertisement and non-scientific content uploaded on YouTube raise concerns about the quality and accuracy of medical videos (10). This study aimed to evaluate the quality of contents on "radioactive iodine treatment" and "radyoaktif iyot tedavisi" by analyzing YouTube videos. To the best of our knowledge, this is the first study to evaluate the quality of YouTube videos about "radioactive iodine treatment." Results from this study

can help provide reliable and scientifically accurate video content about RAI treatment.

Materials and Methods

This cross-sectional study was performed using YouTube, a video-sharing website. For video selection, the terms "radioactive iodine treatment" and "radyoaktif iyot tedavisi" were used to search for related videos on June 2021. The options "video" and "sort by the number of views" were selected as filters. All URLs retracted were recorded in an Excel sheet and assessed by a nuclear medicine specialist experienced in RAI treatment. A total of 88 videos (44 in English, 44 in Turkish) were assessed, and 56 videos (30 in English, 26 in Turkish) were included in the study according to the inclusion and exclusion criteria. The inclusion criteria were as follows: English videos on "radioactive iodine treatment" and Turkish videos on "radyoaktif iyot tedavisi." The exclusion criteria were as follows: Duplicate videos, inaccessible videos, contents unrelated to RAI treatment, and videos in a language other than English and Turkish.

Video duration (seconds), time passed since video upload (days), total views, total comments, number of comments per year, number of likes and dislikes, video like ratio [$\text{like}/(\text{like}+\text{dislike}) \times 100$], and video view ratio (number of views/days) were recorded during the evaluation procedure. Video power index (VPI) ($\text{like ratio} \times \text{view ratio}/100$), which is used to determine the video popularity level, was also calculated for each video.

The contents of the videos were categorized as "RAI treatment for thyroid cancer," "RAI treatment for hyperthyroidism," "patient experience of hyperthyroidism treatment with RAI," "patient experience of thyroid cancer treatment with RAI," "RAI treatment for thyroid cancer and hyperthyroidism," and "against RAI treatment." Video sources were analyzed into five categories as physician, patient, nuclear medicine physicist, nurse, and nutritionist. Video quality was assessed by using the Journal of the American Medical Association (JAMA) benchmark criteria, DISCERN Scale, and global quality scale (GQS).

The JAMA benchmark criteria, which are used to evaluate video reliability and accuracy, include the following parameters: Authorship, attribution, disclosure, and currency, with 1 point assigned for the presence of each criterion (11). A score of 0 demonstrated poor reliability and accuracy, whereas four points shows higher reliability and accuracy (11).

The DISCERN scale is an instrument consisting of questions on the quality of information about treatment options, reliability, and quality of the overall content (12). The score ranges from 0 to 80 points, with higher scores indicating the advanced level of quality (12). GQS is a 5-point instrument used to evaluate the quality, flow, and ease of use of the video content, with 1-2 points indicating low quality, three points intermediate quality, and 4-5 points high quality (13). As our study did not include any animal or human participants and the videos analyzed were accessible for everyone, the study did not require ethics committee approval. There are similar studies with the same protocol (10,14).

Statistical Analysis

Statistical analyses were performed using SPSS software version 26.0 (IBM Corp., Armonk, NY, USA). The Kolmogorov-Smirnov test was used to determine whether the obtained parameters conformed to a normal distribution. Descriptive analyses were used, and values were presented as mean \pm standard deviation (SD). The Kruskal-Wallis and Mann-Whitney U tests were used to compare continuous variables. While investigating the associations between non-normally distributed or ordinal variables, the correlation coefficients (r) and their significance (p) were calculated using the Spearman test. A probability value of $p < 0.05$ was considered significant.

Results

We have evaluated a total of 88 videos. Of these videos, 31.81% ($n=28$) had unrelated content, and 4.5% ($n=4$) were videos uploaded in languages other than English and Turkish. We have analyzed a total of 56 videos according to the inclusion and exclusion criteria. The videos were uploaded by physicians, patients, nuclear medicine physicists, nurses, and nutritionists, and the distribution of videos according to these sources were 64.28% ($n=36$), 30.35% ($n=17$), 1.79% ($n=1$), 1.79% ($n=1$), and 1.79% ($n=1$), respectively. According to the GQS score, videos were categorized into high-quality ($n=7$, 12.5%), intermediate quality ($n=16$, 28.58%), and low quality ($n=33$, 58.92%) groups. The categorization of video qualities according to their sources is shown in Table 1.

The specialties of the physicians were nuclear medicine ($n=13$, 36.11%), general surgery ($n=9$, 25%), endocrinology ($n=4$, 11.11%), oncology ($n=2$, 5.54%), radiology ($n=1$, 2.77%), and unknown ($n=7$, 19.44%). Moreover, 50% (9/18) of the physicians who uploaded videos in Turkish and 22.22% (4/18) who uploaded videos in English were nuclear medicine specialists.

Video contents were categorized as RAI treatment for thyroid cancer, RAI treatment for hyperthyroidism, patient experience of hyperthyroidism treatment with RAI, patient experience of thyroid cancer treatment with RAI, RAI treatment for thyroid cancer and hyperthyroidism, and against RAI treatment. The corresponding rates were 28.57% (16/56), 17.85% (10/56), 8.92% (5/56), 26.78% (15/56), 16.07% (9/56), and 1.78% (1/56), respectively.

The average duration of videos was 455.07 (SD: 410.11) seconds. The average time that has passed since video upload was 1820.16 (SD: 1193.86) days. The average total view was 36,856.52 (SD: 78591.75). The average number of comments was 47.30 (SD: 99.43). The average number of comments per year was 14.72 (SD: 32.79). The average number of video likes was 228.27 (SD: 428.29), and the average number of video dislikes was 12.95 (SD: 21.59). The average video like ratio was 85.21 (SD: 26.21). The average video view ratio was 24.08 (SD: 45.64). The average VPI was 17.04 (SD: 22.05) (Table 2).

The average durations of low-, intermediate-, and high-quality videos were 385.55 (SD: 360.34), 483.69 (SD: 519.76), and 716 (SD: 256.63) seconds, respectively. The average time that has passed since video upload of low-, intermediate-, and high-quality videos were 1743.09 (SD: 1200.74), 1809.81 (SD: 1288.07), and 2207.14 (SD: 1009.98) days, respectively. The average total views of low-, intermediate-, and high-quality videos were 41,926.70 (SD: 98,390.66), 35,159.69 (SD: 41,172.20), and 16,832.71 (SD: 11,583.25), respectively. The average numbers of comments in low-, intermediate-, and high-quality videos were 41.48 (SD: 65.518), 73.13 (SD: 160.387), and 15.71 (SD: 17.49), respectively. The average numbers of comments per year in low-, intermediate-, and high-quality videos were 11.62 (SD: 22.85), 25.69 (SD: 51.10), and 4.40 (SD: 6.93), respectively. The average numbers of likes of low-, intermediate-, and high-quality videos were 199.36 (SD: 352.34), 349.56 (SD: 615.85), and 87.29 (SD: 64.76), respectively. The average numbers of dislikes of low-, intermediate-, and high-quality videos were 13.15 (SD: 21.77), 16.38 (SD: 25.31), and 4.14 (SD: 4.81), respectively. The average video like ratios of low-, intermediate-, and high-quality videos were 81.93 (SD: 29.53), 86.92 (SD: 23.76), and 96.78 (SD: 3.45),

respectively. The average view ratios of low-, intermediate-, and high-quality videos were 25.39 (SD: 55.32), 27.49 (SD: 31.14), and 10.10 (SD: 8.87), respectively. The average VPI scores of low-, intermediate-, and high-quality videos were 14.77 (SD: 19.23), 24.92 (SD: 29.35), and 9.67 (SD: 8.56), respectively (Table 2).

The mean JAMA, GQS, and DISCERN scores of the low, intermediate-, and high-quality videos were 1.75±0.54, 2.43±0.91, and 30.66±13.36, respectively. The mean JAMA and DISCERN scores were 1.55±0.5, 1.94±0.25, and 2.29±0.75 and 22.58±6.35, 35.25±6.43, and 58.29±3.45,

respectively. The mean JAMA, GQS, and DISCERN scores of Turkish videos were 1.69±0.47, 2.42±0.90, and 30.65±13.87, respectively. The mean JAMA, GQS, and DISCERN scores of English videos were 1.80±0.61, 2.43±0.93, and 30.67±13.14, respectively (Table 2).

The analysis of video sources revealed that viewers most preferred non-physician-made videos, with average total views of 59,307.80 (SD: 122554.13). Similarly, non-physician-made videos were the most commented videos, with average total comments of 102.95 (SD: 149.29). In addition, the most liked videos were uploaded by non-

Table 1. Categorization of video quality and language according to sources, n (%)

		Video language						Total
		English			Turkish			
		Low quality	Intermediate quality	High quality	Low quality	Intermediate quality	High quality	
Video source	Physician	8 (14.285%)	7 (12.499%)	3 (5.357%)	10 (17.856%)	4 (7.142%)	4 (7.142%)	36 (64.285%)
	Patient	8 (14.285%)	2 (3.571%)	0 (0%)	5 (8.928%)	2 (3.571%)	0 (0%)	17 (30.357%)
	Nutritionist	0 (0%)	0 (0%)	0 (0%)	1 (1.785%)	0 (0%)	0 (0%)	1 (1.785%)
	Nuclear medicine physicist	0 (0%)	1 (1.785%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1.785%)
	Nurse	1 (1.785%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1.785%)
	Total	17 (30.357%)	10 (17.857%)	3 (5.357%)	16 (28.571%)	6 (10.714%)	4 (7.142%)	56 (100%)

Table 2. General characteristics of videos according to quality and language

	Mean (SD)							
	Video quality				Video language			All videos
	Low	Intermediate	High	p value	Turkish	English	p value	
Video duration (second)	385.85 (360.347)	483.69 (519.762)	716 (256.635)	0.026	427.92 (473.74)	478.60 (352.52)	0.165	455.07 (410.11)
Number of video views	41926.70 (98390.66)	35159.69 (41172.20)	16832.71 (11583.25)	0.592	19724.77 (25625.95)	51704.3 (103233.05)	0.010	36856.52 (78591.75)
Number of video likes	199.36 (352.344)	349.56 (615.858)	87.29 (64.76)	0.576	190.15 (404.00)	261.30 (452.50)	0.027	228.27 (428.29)
Number of video dislikes	13.15 (21.775)	16.38 (25.319)	4.14 (4.81)	0.289	10.58 (22.41)	15.00 (21.03)	0.078	12.95 (21.59)
Number of comments	41.48 (65.51)	73.13 (160.38)	15.71 (17.49)	0.335	29.96 (64.12)	62.33 (121.26)	0.005	47.30 (99.43)
Number of comments per year	11.62 (22.85)	25.60 (51.10)	4.40 (6.93)	0.234	13.47 (27.69)	15.79 (37.08)	0.028	14.72 (32.79)
VPI	14.77 (19.23)	24.92 (29.35)	9.67 (8.56)	0.366	16.42 (22.34)	17.57 (22.16)	0.411	17.03 (22.05)
JAMA score	1.55 (0.5)	1.94 (0.25)	2.29 (0.75)	0.002	1.69 (0.47)	1.80 (0.61)	0.607	1.75 (0.54)
DISCERN score	22.58 (6.35)	35.25 (6.43)	58.29 (3.45)	0.001	30.65 (13.87)	30.67 (13.14)	0.573	30.66 (13.36)
GQS score	1.79 (0.41)	3 (0)	4.14 (0.37)	0.001	2.42 (0.90)	2.43 (0.93)	0.951	2.43 (0.91)

VPI: Video power index, JAMA: Journal of American Medical Association, GQS: Global quality scale, SD: Standard deviation

physicians, with average total likes of 424.35 (SD: 639.41). The mean VPI scores were the highest in videos made by non-physicians, with an average score of 25.18 (SD: 25.69). The average JAMA (1.92, SD: 0.50), DISCERN (34.31, SD: 14.33), and GQS scores (2.61, SD: 0.99) were highest in physician-made videos.

The results of this study revealed a positive and intermediate correlation between JAMA and DISCERN ($p < 0.001$, $r = 0.535$) scores and between JAMA and GQS ($p < 0.001$, $r = 0.521$) scores. In addition, a positive and high correlation was found between DISCERN and GQS scores ($p < 0.001$, $p = 0.833$).

No significant difference was found ($p > 0.05$) between Turkish and English videos in terms of JAMA, DISCERN, and GQS scores, duration, like ratio, view ratio, number of dislikes, and VPI. The difference between Turkish and English videos was significant ($p < 0.05$) with respect to the number of views, number of likes, number of comments, and number of comments per year (Table 2).

The difference between physician-made and non-physician-made videos was significant in terms of duration ($p = 0.001$), total number of comments ($p < 0.001$), number of likes ($p = 0.006$), number of comments per year ($p < 0.001$), JAMA score ($p = 0.001$), DISCERN score ($p = 0.012$), view ratio ($p = 0.017$), VPI ($p = 0.044$), number of views ($p = 0.037$), and number of dislikes ($p = 0.025$) (Table 3).

Table 3. General characteristics of videos according to sources

	Mean (SD)		p value
	Video source		
	Physician	Non-physician	
Video duration (sec)	315.08 (277.29)	707.05 (491.17)	0.001
Number of video views	24383.58 (33236.73)	59307.80 (122554.13)	0.037
Number of video likes	119.33 (179.27)	424.35 (639.41)	0.006
Number of video dislikes	8.81 (14.406)	20.40 (29.168)	0.025
Number of comments	16.39 (26.188)	102.95 (149.29)	<0.001
Number of comments per year	4.19 (8.38)	33.66 (48.93)	<0.001
VPI	12.51 (18.62)	25.18 (25.69)	0.044
JAMA score	1.92 (0.5)	1.45 (0.51)	0.001
DISCERN score	34.31 (14.33)	24.10 (8.24)	0.012
GQS score	2.61 (0.99)	2.1 (0.64)	0.056

VPI: Video power index, JAMA: Journal of American Medical Association, GQS: Global quality scale, SD: Standard deviation

Discussion

The development of technology and the increase in the use of computers, tablets, and smartphones has boosted internet access. Individuals have started to prefer to search for information over the internet in almost every aspect of life. Additionally, patients have recently started to use the Internet to obtain information about diseases and treatment procedures. Many studies have reported that 80% of Internet users have obtained medical information from the Internet (15,16,17). YouTube is one of the most popular sources of information for patients (17). Studies have also shown that new videos are constantly being uploaded to YouTube (17,18,19). YouTube is watched by approximately two billion daily, and internet users spend approximately 15 min a day watching videos from this site (17,18,19). The results of three studies by Fox (20,21,22,23) have revealed that the decisions of 75% of Internet users were influenced by online information when searching about their diseases and treatment. Online platforms, particularly YouTube, have a significant potential to share medical information among users (17,20,21,22,23). However, given the minimum regulatory mechanisms for uploading videos to YouTube, doubts have arisen about the accuracy, reliability, and quality of the content and information provided (17).

Since RAI treatment is not well known by patients, this topic has been searched many times on YouTube, and many videos about RAI treatment have been uploaded and watched. To the best of our knowledge, no studies have reported the quality and reliability of videos about RAI treatment.

In our study, YouTube videos related to RAI treatment were categorized according to the GQS score. Most of the videos were of low quality, and the number of high-quality videos was the lowest. This is related partly to the fact that uploaded videos contain patient experiences and are uploaded by physicians, other than nuclear medicine specialists, and non-physician health care workers.

In our study that the most viewed and commented videos, the most liked, and the most popular videos (highest VPI scores) were made by non-physicians. In addition, videos with the highest quality based on JAMA, DISCERN, and GQS scores were physician-made videos. This occurs because patients receiving RAI treatment directly describe their individual treatment-related experiences more understandably and simply. Although physician-made videos were watched and commented less because of possibly complicated scientific terms used, they were better than non-physician-made videos in terms of the scientific quality of the content.

The findings of our study showed that intermediate quality videos were the most popular with the highest VPI scores, likes, and comments. By contrast, high-quality videos had the lowest popularity level (VPI scores) and number of likes and views. This is because the number of high-quality videos is considerably lower than that of intermediate- and low quality videos. In all circumstances, the most popular YouTube videos of RAI treatment may not always include the highest quality of information based on our results. In addition, patients should choose videos that are beneficial to them, and it is thought that the most watched, liked, and commented videos may not provide accurate information to the patients.

In our study, Turkish and English videos of RAI treatment were not significantly different in terms of video quality and VPI. Approximately 50% of the physicians who uploaded videos in Turkish and 22% of the physicians who uploaded videos in English were nuclear medicine specialists. RAI treatment is specific to nuclear medicine, as it includes radiation safety issues for patients and their relatives. Nuclear medicine specialists should provide accurate information to the patients about the subject and clinical practice regarding RAI treatment. Therefore, more widespread use of YouTube by nuclear medicine specialists may be beneficial. It would be more appropriate to prepare videos about RAI treatment for online publication under the supervision of nuclear medicine specialists.

Although Turkish and English videos were not different in terms of quality, a significant difference was observed in the number of video views, likes, comments, and comments per year. This finding is considered to be due to the finding that English videos reached and are preferred by more YouTube users worldwide.

Study Limitations

This study has several limitations. In this study, we only included videos in Turkish and English. In addition, not all YouTube videos about RAI treatment in English and Turkish were included in this study. Inclusion of videos in other languages and all videos in English and Turkish about RAI treatment may change our findings, although not highly likely. Finally, GQS, which was used to evaluate video quality, is a subjective assessment scale.

Conclusion

Since RAI therapy is a specific radionuclide treatment of nuclear medicine for hyperthyroidism and well-differentiated thyroid cancer, patients should receive high-quality, and accurate information from reliable sources for their disease and treatment. Although high-quality videos on YouTube may inform and encourage patients positively,

unprofessional, inaccurate, and incomplete information can be also uploaded to this platform and may mislead patients. Thus, physicians should provide detailed verbal and written information to patients about their disease and treatment and refer patients to scientific sources which they can obtain reliable information. Therefore, under the guidance of the Turkish Society of Nuclear Medicine, it is essential to prepare an official, comprehensible, illustrative, and guiding video about RAI treatment in Turkish with English subtitles. In addition, similar videos may be prepared for other radionuclide treatments and diagnostic imaging procedures of nuclear medicine and can be delivered as QR codes to patients who applied to nuclear medicine clinics.

Ethics

Ethics Committee Approval: This study does not require an ethics committee.

Informed Consent: This study does not require patient consent.

Peer-review: Externally peer-reviewed.

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