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ORIGINAL ARTICLE

Analysis of Intraosseous Training Videos on Youtube: Cross-Sectional Content Analysis Study

YouTube'daki İntraosseöz Eğitim Videolarının Analizi: Kesitsel İçerik Analizi Çalışması

[1]Nida KIYICI, [1]Gülşah KAYA, [2]Yeşim ANDIRAN ŞENAYLI

[1] Department of Medical Services and Techniques, Vocational School of Health Services, Yozgat Bozok University, Yozgat, Türkiye

[2] Department of Anesthesia and Reanimation, School of Medicine , Kırklareli University, Kırklareli, Türkiye

Correspondence

Nida KIYICI,
Yozgat Bozok University, Vocational School of Health Services, Yozgat/Turkey 66900

E-Mail: nidakyc@hotmail.com

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ABSTRACT

Aim: This study was conducted to evaluate the quality, content, and reliability of intraosseous intervention videos on YouTube and the accuracy of their use in training.
Methods: In this study, the keyword "Intraosseous Vascular Access" was searched on YouTube on 2/20/2023, and the first 73 videos in English were included. Two independent European Research Council trainers assessed the video characteristics, video category, whether it was useful or misleading, video quality, and whether the intraosseous route steps were correctly applied. Analyses were performed using the IBM SPSS Statistics 26 package.
Results: Of the 73 videos included in the study, 71.2% were deemed useful by the first expert, and 90.9% of the useful videos were uploaded by a nonprofit organization. The mean and standard deviation of the Global Quality Scale score was 3.33±1.61, and 32.9% of the videos were of excellent quality. 68.5% were deemed worthwhile by the second expert, and 83.3% of the useful videos were uploaded as individual videos. The mean and standard deviation of the Global Quality Scale score was 3.15±1.61, and 28.8% of the videos were of poor quality.
Conclusions: When the intraosseous intervention steps were examined, the most correct method was found to be "Positioning the patient appropriately for the procedure". In this study, a qualitative analysis of intraosseous educational videos on YouTube revealed that the videos were generally useful, especially those uploaded by nonprofit organizations and individuals.

Keywords: Global quality scale, intraosseöz vasculer access, internet, video analysis, youtube

ÖZ

Amaç: Bu çalışma, YouTube'da yer alan intraosseöz girişim videolarının kalitesini, içeriğini, güvenilirliğini ve eğitimlerde kullanılmasının doğruluğunu değerlendirmek amacıyla yürütülmüştür.

Gereç ve Yöntemler: Bu çalışmada "Intraosseöz Vasculer Access" anahtar kelimesi kullanılarak 20.02.2023 tarihinde YouTube araması yapılmış ve ingilizce olan ilk 73 video araştırmaya dahil edilmiştir. Video özellikleri, video kategorisi, yararlı veya yanıltıcı olup olmadığı, video kalitesi, intraosseöz yol basamaklarının doğru uygulanıp uygulanmadığı 2 bağımsız Avrupa Resüsitasyon Konseyi eğitimcileri tarafından değerlendirilmiştir. Analizler IBM SPSS Statistics 26 paket programı kullanılarak yapılmıştır.
Bulgular: Araştırmaya dahil edilen 73 videonun 1. Uzman tarafından %71.2'si yararlı bulunup, yararlı videoların %90.9'u kar amacı gütmeyen kuruluş tarafından yüklenmiştir. Küresel Kalite Ölçeği skor ortalaması ve standart sapması 3.33±1,61 ve videoların %32.9'u Mükemmel kalite olarak belirlendi. 2. Uzman tarafından %68.5'i yararlı bulunup, yararlı videoların %83.3'ünü bireysel videolar olarak yüklenmiştir. Küresel Kalite Ölçeği skor ortalaması ve standart sapması 3.15±1.61 ve videoların %28.8'i düşük kalite olarak belirlendi.
Sonuçlar: İntraosseöz girişim basamakları incelendiğinde en yüksek doğru uygulandığı gözlenen yol "Hastaya işlem için uygun pozisyon verme" olarak bulundu. Bu çalışmada YouTube'da yer alan intraosseöz eğitimi videolarının niteliksel analizine bakıldığında genel olarak videoların yararlı olduğu, özellikle de video kategorisi kâr amacı gütmeyen kuruluşlar ile bireysel olarak yüklenen videoların daha yararlı olduğu saptandı.

Anahtar Kelimeler: İnternet, kemik içi damaryolu erişimi, küresel kalite ölçeği, video analiz, youtube,

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INTRODUCTION

In pre-hospital emergency medical services (EMS) and emergency departments, the intraosseous (IO) route is preferred when the peripheral venous route cannot be established in cases requiring rapid absorption of the drug or solution. Especially in cases such as cardiopulmonary resuscitation or decompensated shock and trauma, it is not always possible to establish peripheral venous access because of peripheral vascular collapse. All fluids, drugs, blood, and blood products that can be administered intravenously (IV) can be administered safely via the IO route. Drugs and fluids administered via the intraosseous route enter the veins from the bone marrow sinusoids and into the central circulation (1).

Intraosseous sets, which have been developed in recent years and offer a very simple, fast, and reliable application, have become an essential application in all prehospital and emergency department settings. Effective access reduces mortality and morbidity. Intraosseous drug delivery sites include the proximal tibia, distal femur, distal tibia-fibula, proximal humerus, distal end of radius and ulna, calcaneus, anterior superior spina iliac, and manubrium sterni (2,3).

Because intraosseous route application is a procedure that can be completed in seconds, it saves time in emergencies and allows for rapid intervention. The success rate is quite high. There are manual, electrical, and pistol IO devices for intraosseous access. To perform the application successfully, it is necessary to know the preparation before the procedure, the application steps during the procedure, and the complications that may occur after the procedure (3,4,1). Intraosseous intervention application steps;

- If the patient is conscious, provide information and obtain consent.
- Preparation of materials and wearing of gloves
- Position the patient appropriately for the procedure
- Determine the site for opening an intraosseous route
- For unconscious patients, apply 1-2 mL of 1% or 2% lidocaine to this area
- Apply antisepsis to the skin over the area where the intraosseous route will be opened with gauze soaked in disinfectant solution in a circular motion from the inside to the outside in one direction
- Set the appropriate needle depth on the device by removing the Intraosseous Puncture Set from the box
- Apply to the correct site at a 90-degree angle
- Remove the guide from inside the needle
- Confirming that the needle is in the bone and the application is successful
- To ensure the safety of the intraosseous needle, the safety latch is secured to the skin, and the patient is fitted with a wristband to indicate that an intraosseous route has been established
- Remove the Intraosseous Set by rotating the Intraosseous Set clockwise while completing the Intraosseous Route intervention
- Dispose of the intravenous set and gloves in the waste bin

IO application, which is very important for health professionals, is very important

for health academicians and students studying in the field of health. Access to IO devices is not always possible in intraosseous intervention training. In this context, YouTube videos can also be utilized in the application part after the theoretical information is explained (5). YouTube is a social media that shares information on various topics (5-8). YouTube is used as an effective and powerful scientific tool in the field of health due to its rich access network (9). The use of YouTube videos to access educational materials has increased, especially during the Covid 19 pandemic (10-12). Although the use of social media in health communication gives users different and new opportunities, there is no peer review that investigates the scientific validity, reliability, or accuracy of the published videos (9,10). There may be misleading and inaccurate information among the published videos (9,13).

In the literature review, the quality of content in YouTube videos on different health topics was evaluated. The reliability and accuracy of some video content were analyzed, and it was found that the information provided by these videos was not homogeneous (9,13-15). The quality and content of IO intervention videos on YouTube have not been evaluated. No study on this topic was found in the literature review. This is the starting point of this study. This study will answer the question of whether YouTube can be used as a reliable source of information for IO initiatives.

MATERIALS AND METHODS

The research was conducted by searching all English language videos on YouTube (http://www.Youtube.com) on February 20, 2023, by entering the keyword "intraosseous (IO) vascular access." Results showed that researchers usually scrolled up to 60 videos (first three pages) on the topic they searched on YouTube (8,16,17). All videos (159 in total) were analyzed according to the number of views from the YouTube ranking filter for the keyword, and the analysis continued with a total of 73 videos after 26 videos were removed for being off-topic, eight videos were not in English, and 52 videos were removed for duplication. The videos were evaluated simultaneously and independently within one month by two expert doctors E.Y. and A.A., who are experts in their field, European Research Council (ERC-European Resuscitation Council) trainers authorized to provide and implement IO training since February 25, 2023. When the scientific studies were reviewed, it was found that the evaluation of the videos by 2 experts was sufficient (14,18,19). Similar to other studies, the number of experts in this study was set at 2.

Data Collection Tools

Three forms were used as data collection tools in the study.

Video General Information

This form was developed by the researchers in accordance with the literature (5,8,9,16,18-20) and consists of a total of 13 questions about YouTube videos, including video number, video name, URL, search ranking, video upload date, video length, number of views, number of comments on the video, number of likes and dislikes, video category (ministry of health, non-profit organization, for-profit organization, independent health sites/websites, individual videos), and video rating (useful, misleading, not useful-misleading, or if not useful, the reason).

Global Quality Scale (GQS)

The Global Quality Scale by Bernard et al. (21) consists of 5 criteria that measure the quality and educational value of the videos. The GQS scores range from 1 to 5, with 1 point indicating poor quality, 2 points indicating generally poor quality, 3 points indicating moderate quality, 4 points indicating good quality, and the highest possible score of 5 points indicating excellent video quality and information flow (Table 1).

Table 1: Global Quality Scale (GQS)

Score	Description
1	Low quality, poor video flow, lots of information missing, not useful at all
2	Generally low quality, poor video flow, some information available but many important topics missing, very limited use
3	Moderate quality, insufficient flow, some important information adequately discussed but others insufficient, partially useful
4	Good quality, good flow overall, most relevant information discussed but some topics not covered, useful
5	Excellent quality, top quality and flow, complete and clear information, very useful

Statistical Method

The study data consisted of the characteristics of 73 videos. Analyses were performed using the IBM SPSS Statistics 26 package program. Frequencies (number (n), percentage (%)) were used for categorical variables, and descriptive statistics (mean, standard deviation, median, minimum, maximum) were used for numerical variables.

The normality assumption of the numerical variables was tested using skewness and kurtosis coefficients, and results showed that the assumption of normal distribution was met as the skewness kurtosis coefficients were within the range of ±1.5. Therefore, parametric statistical methods were used in the study.

The relationship between two independent numerical variables was analyzed by Pearson's correlation coefficient. The relationship between two independent categorical variables was analyzed by chi-square analysis, and the agreement was analyzed by the kappa coefficient of agreement. The agreement between two independent numerical variables was interpreted with the intraclass correlation coefficient. Differences between more than two independent groups were tested by one-way analysis of variance (ANOVA). The significance level was accepted as 0.05 in all statistical analyses used in the research.

Ethical Approval

The research was ethically approved by the Yozgat Bozok University Social and Human Sciences Ethics Committee with decision number 34/33 dated June 24, 2022, and was conducted in accordance with the Declaration of Helsinki.

RESULTS

When examining the results obtained from the research, the distributions related to the general information of the videos were analyzed. Looking at Table 2, we see that 53.4% of the videos included in the study were uploaded in the 2018-2022 year group, 37.0% in the 2013-2017 year group, and 9.6% in the 2008-2012 year group, 76.7% of the videos received likes, 52.1% of the videos were found in the category of for-profit organizations, 16.4% as individual videos, 15.1% as non-profit organizations, 8.2% were independent health sites/websites, 5.5% in the category of universities and 2.7% in the category of ministry of health, and

when the for-profit organizations were examined, we determined that brands produced IO training videos on the YouTube platform with 97.4%. The mean and standard deviation of the video length is 4.43±4.68 minutes. The mean and standard deviation of the number of impressions are 68419.849±166474.015. The mean and standard deviation of the number of likes for the videos that received likes was 348.77±846.52 (Table 2).

Looking at Table 3, the first expert rated 71.2% of the 73 videos as useful and 28.8% as misleading/not useful, while the second expert rated 68.5% as useful and 31.5% as misleading/not useful. As a result of the Chi-square analysis, there is a statistically significant relationship between the video ratings of the two experts ($p<0.05$). When the kappa coefficient of agreement between the two experts' ratings was examined, we saw a statistically significant agreement between the experts' ratings ($p<0.05$). Accordingly, it was determined that there was 80.5% agreement between the two experts' 73 video ratings (Kappa=0.805) (Table 3).

Looking at Table 4, the mean and standard deviation of the GQS score of the first specialist was 3.33±1.61, while the mean and standard deviation of the second specialist was 3.15±1.61. As a result of the correlation analysis, a statistically significant strong positive correlation was found between the GQS scores of the two specialists (r=0.918) (Table 4).

Table 2. Distribution of video general information (n=73)

	n	%
Uploaded Year		
2008-2012	7	9.6
2013-2017	27	37.0
2018-2022	39	53.4
Received Likes		
Yes	56	76.7
No	17	23.3
Received Dislikes		
Yes	0	0.0
No	73	100.0
Video Category		
Ministry of Health	2	2.7
Universities	4	5.5
Non-Profit Organizations	11	15.1
For-Profit Organizations	38	52.1
Independent Health Sites/ Websites	6	8.2
Individual Videos	12	16.4
Video Category Ministry of Health (n=2)		
Hospital	2	100.0
Provincial Health Directorates	0	0.0
Other	0	0.0
Video Category Universities (n=4)		
State	1	25.0
Foundation	3	75.0
Video Category Non-Profit Organizations (n=11)		
Associations	10	909
Project Community	1	9.1
Video Category For-Profit Organizations (n=38)		
Producer	37	97.4
Community	1	2.6
	Avrg±SD	**Median (Min-Max)**
Video Length (minute)	4.43±4.68	3.16 (0.37-29.37)
Number of Views	68419.84± 166474.01	11184.00(55-1208554)
Number of Likes (n=56)	348.77±846.52	77.50 (1-5700)

Avrg: Average, SD: Standard Deviation Min: Minimum, Max: Maximum

Table 3. Distribution of Video Evaluations by Experts

	Expert 1		Expert 2		(Chi-Sqaure) Kappa	p (Kappa p)
	n	%	n	%		
Video Evaluation						
Useful	52	71.2	50	68.5	0.805	**0,000*** **(0,000*)**
Misleading/Not Useful	21	28.8	23	31.5		
Misleading/If Not Useful, Reason						
Not misleading, but not useful either	1	5.0	1	4.3	-	-
Steps Incompletely Explained	1	5.0	12	52.2		
In the form of Storytelling	4	20.0	1	4.3		
Not Understandable	10	50.0	2	8.7		
Only IO Trainer Model Image Available	1	5.0	0	0.0		
Device Not Showing	3	15.0	2	8.7		
Unethical	0	0.0	2	8.7		
Failed IO Intervention	0	0.0	1	4.3		
IO Rules Not Followed	0	0.0	1	4.3		
No Simulation	0	0.0	1	4.3		

p=Significance Level *:p<0,05

Table 4. GQS Scores According to Experts

	Avrg	SD	Median	Min	Max	r	p
Expert 1	3.33	1.61	4.0	1	5	0.98	**0.000***
Expert 2	3.15	1.61	4.0	1	5		

Avrg: Average, SD: Standard Deviation Min: Minimum, Max: Maximum , r:Pearson Correlation Coefficient , *:p<0,05

When Table 5 is examined, according to the intraclass correlation coefficient, there is a statistically significant very good agreement between the GQS scores of the two experts (ICC=0,957) (Table 5).

Table 5. Intraclass Correlation Coefficient between GQS Scores

	ICC	95% Confidence Interval for ICC Lower-Upper	p
GQS	0.95	0.93-0.97	**0.000***

*:p<0,001
ICC=İntraclass Correlation Coefficients
p= Significance Level

According to Table 6, when the GQS scores of the 1st expert were analyzed, 26% answered 1p-Low Quality, 5.5% answered 2p-General Poor Quality, 11% answered 3p-Moderate Quality, 24.7% answered 4p-Good Quality, and 32.9% answered 5p-Excellent Quality. When the GQS scores of the second expert were analyzed, 28.8% answered 1p-Low Quality, 8.2% answered 2p-Generally Poor Quality, 9.6% answered 3p-Moderate Quality, 26.0% answered 4p-Good Quality, and 27.4% answered 5p-Excellent Quality (Table 6).

Table 6. GQS Distributions According to Experts

	Expert 1		Expert 2	
	n	%	n	%
GQS				
1p-Poor Quality	19	26.0	21	28.8
2p-Generally Poor Quality	4	5.5	6	8.2
3p-Moderate Quality	8	11.0	7	9.6
4p-Good Quality	18	24.7	19	26.0
5p-Excellent Quality	24	32.9	20	27.4

Looking at Table 7, the IO pathway steps that were observed to be performed correctly at the highest rate were: "Position the patient appropriately for the procedure (1st expert 69.9%; 2nd expert 65.8%)", "Apply to the correct site determined at a 90-degree angle (1st expert 67.1%; 2nd expert 64.4%)", "Remove the guide from the needle (1st expert 65.8%; 2nd expert 63.0%)". The IO pathway steps that were observed to be performed incorrectly at the highest rate were "To ensure the safety of the intraosseous needle, fix the safety catch to the skin with a band-aid and wear a wristband to show the patient that the intraosseous pathway has been opened (1st expert 30.1%; 2nd expert 23. 3%), "applying antisepsis to the skin in the area where the intraosseous pathway will be opened with gauze with a disinfectant solution in a circular manner from the inside to the outside in one direction (1st expert 11.0%; 2nd expert 9.6%)", and "checking that the needle is in the bone and the application is successful (1st expert 5.5%; 2nd expert 4.1%)", respectively. Our study found that "Removing the intraosseous set by turning it clockwise at the end of the intraosseous route intervention (1st Expert 89.0%; 2nd Expert 87.7%)" was not observed (Table 7).

When Table 8 is examined, the first expert rated the relationship between video category and video rating of 83.3% of the videos from the Ministry of Health/Universities/Independent Health Sites, 90.9% of the videos from nonprofit organizations, 60.5% of the videos from for-profit organizations, and 75.0% of the individual videos as useful; the second expert rated 75.0% of the videos from the Ministry of Health/Universities/Independent Health Sites, 81.8% of the videos from nonprofit organizations, 57.9% of the videos from for-profit organizations, and 83.3% of the individual videos as useful. Chi-square analysis revealed that there was no statistically significant relationship between video category and expert video rating ($p>0.05$) (Table 8).

According to Table 9, when examining the differences in GQS scores by video category and expert, results showed that the mean and standard deviation of GQS scores of videos with Ministry of Health/Universities/Independent Health Sites according to expert 1 were 3.75±1.42, 3.82±1.54 for nonprofit organizations, 3.00±1.71 for for-profit organizations, and 3.50±1.45 for individual videos. Differences in GQS Scores by Video Category According to the second expert, the mean and standard deviation of the GQS scores of the Ministry of Health/Universities/Independent Health Facilities videos were 3.50±1.51, 3.82±1.54 for nonprofit organizations, 2.71±1.68 for for-profit organizations, and 3.58±1.31 for individual videos. As a result of one-way analysis of variance (ANOVA), there is no statistically significant difference between video categories and GQS scores, according to experts ($p>0.05$) (Table 9).

Table 7. Distribution of Intraosseous (IO) Access Steps According to Experts

	Expert 1		Expert 2	
	n	%	n	%
Informing and obtaining consent if the patient is conscious				
Observed - Correct	13	17.8	9	12.3
Observed - Incorrect	0	0.0	2	2.7
Not observed	60	82.2	62	84.9
Prepare materials and wear gloves				
Observed - Correct	36	49.3	35	47.9
Observed - Incorrect	2	2.7	1	1.4
Not Observed	35	47.9	37	50.7
Position patient appropriately for procedure				
Observed - Correct	51	69.9	48	65.8
Observed - Incorrect	0	0.0	0	0.0
Not Observed	22	30.1	25	34.2
Determine a location for opening an intraosseous route				
Observed - Correct	47	64.4	46	63.0
Observed - Incorrect	0	0.0	1	1.4
Not observed	26	35.6	26	35.6
1-2 mL of 1% or 2% lidocaine in this area in conscious patients				
Observed - Correct	11	15.1	12	16.4
Observed - Incorrect	1	1.4	1	1.4
Not observed	61	83.6	60	82.2
Apply antisepsis to the skin in the area where the intraosseous route will be opened with gauze soaked in antiseptic solution in a circular motion from the inside to the outside in one direction.				
Observed - Correct	32	43.8	31	42.5
Observed - Incorrect	8	11.0	7	9.6
Not observed	33	45.2	35	47.9
Set the appropriate needle depth on the device by removing the Intraosseous Puncture Set from the box.				
Observed - Correct	24	32.9	32	43.8
Observed - Incorrect	0	0.0	0	0.0
Not Observed	49	67.1	41	56.2
Apply to the correct site as determined by a 90-degree angle				
Observed - Correct	49	67.1	47	64.4
Observed - Incorrect	0	0.0	1	1.4
Not observed	24	32.9	25	34.2
Guide removed from inside of the needle				
Observed - Correct	48	65.8	46	63.0
Observed - Incorrect	0	0.0	0	0.0
Not Observed	25	34.2	27	37.0
Confirm needle is in bone and application is successful				
Observed - True	38	52.1	35	47.9
Observed - Incorrect	4	5.5	3	4.1
Not Observed	31	42.5	35	47.9
To ensure the safety of the intraosseous needle, the safety latch is secured to the skin, and the patient is provided with a wristband to indicate that an intraosseous route has been established.				
Observed - Correct	10	137	15	20.5
Observed - Incorrect	22	30.1	17	23.3
Not observed	41	56.2	41	56.2
Remove the Intraosseous Set by rotating the Intraosseous Set clockwise while completing the Intraosseous Route procedure.				
Observed - Correct	7	9.6	7	9.6
Observed - Incorrect	1	1.4	2	2.7
Not Observed	65	89.0	64	87.7
Disposing of the intraosseous set and gloves in the waste bin				
Observed - Correct	44	60.3	34	46.6
Observed - Incorrect	0	0.0	1	1.4
Not Observed	29	39.7	38	52.1

Table 8. Examining the Relationship between Video Category and Video Evaluation by Experts

	Video Category Ministry of Health/Universities/ Independent Health Websites		Non-Profit Organizations		For-Profit Organizations		Individual Videos		Chi Square	P
	n	%	n	%	n	%	n	%		
Expert 1										
Useful	10	83.3	10	90.9	23	60.5	9	75.0	5.61	0.151
Misleading/Not Useful	2	16.7	1	9.1	15	39.5	3	25.0		
Expert 2										
Useful	9	75.0	9	81.8	22	57.9	10	83.3	4.50	0.248
Misleading/Not Useful	3	25.0	2	18.2	16	42.1	2	16.7		

p=Significance Level *:p<0,05

Table 9. Investigating the Differences of GQS Scores by Video Category and Experts

	GQS Score			
	Expert 1		Expert 2	
	Avrg	SD	Avrg	SD
Ministry of Health/Universities/Independent Health Websites	3.75	1.42	3.50	1.51
Non-Profit Organizations	3.82	1.54	3.82	1.54
For-Profit Organizations	3.00	1.71	2.71	1.68
Individual Videos	3.50	1.45	3.58	1.31
F;p	1.199;0.317		2.144;0.103	

F: One-Way Analysis of Variance (ANOVA) Avrg: Average, SD: Standard Deviation

DISCUSSION

The YouTube platform has recently become a very popular tool for health professionals and students studying in health-related departments to access information. However, due to the fact that the videos uploaded for users are uncontrolled, content producers can easily upload videos, and the information in the field of health changes over time, the reliability of video content on YouTube in accessing complete and accurate information decreases.

In this study, which was conducted to determine the qualitative analysis of IO educational videos on YouTube, we saw that 52.1% of the evaluated videos were profit-oriented. In support of our research findings, Öztürk and Gümüş (15) compared the content analysis of YouTube videos about dental treatment in children and found that 66.66% of the videos were commercial videos.

In this study, 71.2% of the videos were rated useful, and 28.8% were rated as useless by the first expert, while 68.5% of the videos were rated as useful and 31.5% were rated as useless by the second expert. It was found that the main reason for rating the videos as not useful was that 50.0% of

the videos were not understood by the first expert, and 52.2% of the videos were incompletely explained by the second expert. The results of this study were similar to other content analysis studies of YouTube videos (22,23). In contrast to the findings of this study, Tanwar et al. (24) reported that 63% of the videos were useless in their study evaluating YouTube videos on prostate hyperplasia, and Atilla and Öztürk (25)

reported that the number of videos with good information content was very low in their study evaluating YouTube videos on maxillary expansion. This may be due to the different categories of videos uploaded.

In this study, the mean GQS score was determined as 3.33±1.61 by the first expert and 3.15±1.61 by the second expert. According to the correlation coefficient of GQS scores between the two experts, it was determined that the statistical agreement between the experts was very good (ICC=0.957). In support of the research findings, the GQS score was 3.54±1.34 in Turhan and Ekici's (26) study; GQS score was 3.16±0.91 in Kaşıkçı and Yıldırım's (18) study; GQS score was 3.45±0.8 in Yılmaz and Kalkan's (27) study; GQS score was 3.55±1.51 in Esen et al., (7) 's study; Tosun and Tosun (9) reported a GQS score of 3.08±1.53.

In our study, when the distribution of GQS scores was examined according to experts, similar results were found. In the study of Gerundo et al. (28), when GQS score distributions were examined, 8.3% reported 1p-poor quality, 14.6% reported 2p-generally poor quality, 22.9% reported 3p-moderate quality, 30.6% reported 4p-good quality and 23.6% reported 5p-excellent quality. In the study of Tosun and Tosun (9), when GQS score distributions were examined, 27.0% were found to be poor quality, 9.6% were generally poor quality, 15.7% were moderate quality, 25.2% were good quality, and 22.6% were excellent quality.

The IO pathway steps observed in our study were evaluated, and it was noted that the step of "removing the intraosseous set by turning it clockwise while terminating the intraosseous pathway" was not performed. Supporting the research findings, Cicolini et al. (29) conducted a study on nurses and found that 96.5% of nurses had never performed an IO procedure, 91.0% had never terminated an IO procedure, 48% did not have sufficient knowledge about IO procedures, 71.5% reported that there were no IO devices in their unit, and 8.6% preferred to receive training through video lessons. Bilge et al. (30) reported that emergency medicine residents had never performed IO procedures in their study. In a study by Kwon et al. (31) on the pedagogical effectiveness of IO intervention in medical education, it was reported that the most successful IO steps for students were "ability to combine drill and needle" and "ability to find the appropriate angle," while the most unsuccessful IO step was "disinfection of the insertion site." The fact that there are similar results in the literature supporting our research data on this topic is thought to be due to the low success rate of IO intervention, insufficient access to IO intervention devices, and some videos on social media that are inaccurate/misleading.

In our study, when we examined the differences in GQS scores by video category and expert, we found that nonprofit organizations had the highest GQS scores for both experts. In support of our findings, Singh et al. (23) examined YouTube videos related to rheumatoid arthritis and reported that for-profit videos had the highest percentage of misleading videos (73.9%). Duran and Kizilkan (32) evaluated YouTube videos related to testicular cancer and found that videos uploaded by universities/professional organizations/nonprofit physicians had the highest GQS score (4(1-5)).

CONCLUSION

In this study, the qualitative analysis of intraosseous educational videos on YouTube revealed that the videos were generally useful, especially those uploaded by nonprofit organizations and individuals. The results showed that the GQS scores of nonprofit organizations were higher. A review of the literature did not identify any studies that examined the content and quality of intraosseous videos. YouTube is one of the most widely used platforms for health professionals, health academics, and health students to access IO injection information. As a free and easily accessible platform, YouTube carries the risk of disseminating inaccurate/misleading medical information or content of poor educational quality. As the use of social media continues to grow worldwide, there will be a greater need for useful and high-quality videos to meet the demand for health information. Therefore, it is recommended that organizations and individuals with expertise in the field upload videos.

•YouTube is one of the most used platforms by health professionals, health academics, and students studying in the field of health to access IO initiative information.

•Since YouTube is a free and easily accessible platform, it carries the risk of disseminating inaccurate/misleading medical information or content of low educational quality.

• As the use of social media continues to increase around the world and YouTube etc. are used to meet the need for health-related information. It is thought that the use of platforms will increase.

Limitations of the Study

A limitation of this study is that only English videos were included in the pool while analyzing intraosseous access videos on the YouTube platform. In future studies on this subject, we recommend that intraosseous video content uploaded in different languages also be included in the study.

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