

Publisher's Disclaimer. E-publishing ahead of print is increasingly important for the rapid dissemination of science. **Journal of Public Health Research** is, therefore, E-publishing PDF files of an early version of manuscripts that undergone a regular peer review and have been accepted for publication, but have not been through the copyediting, typesetting, pagination and proofreading processes, which may lead to differences between this version and the final one. The final version of the manuscript will then appear in print on a regular issue of the journal. E-publishing of this PDF file has been approved by the authors.

J Public Health Res 2021 [Epub ahead of print]

Citation

Comer AR, Salven J, Torke A. **An educational video improves physician knowledge of a health care law that affects patient care during hospital clinical practice**

J Public Health Res 2021;xx:1983

doi: 10.4081/jphr.2021.1983

An educational video improves physician knowledge of a health care law that affects patient care during hospital clinical practice

Manuscript Type: Brief Report

Corresponding Author:

Amber R. Comer
Indiana University
School of Health and Human Sciences
RG 3034
1050 Wishard Blvd
Indianapolis, IN 46202
comer@iu.edu

James Salven
Indiana University School of Medicine
Department of Biostatistics
Fairbanks Hall 6200
340 West 10th Street
Indianapolis, IN 46202

Alexia Torke
Indiana University School of Medicine
Department of Internal Medicine
Regenstrief Institute
1101 West 10th St.
Indianapolis, IN 46202

Acknowledgments: None

Funding: None

Conflicts of Interest: None

Abstract

When public health laws are passed that affect clinical practice within hospitals, it is important to educate physicians about best practices in implementing these laws into routine patient care in hospitals. An educational video was developed to inform physicians about a new state public health care law. This study sought to determine whether an educational video about a new state public health care law improves physicians' knowledge of the law and how to implement the law during clinical practice. A total of n=33 internal medicine physicians participated in this study. This study found that an educational video was successful in increasing physician knowledge about a new public health care law that affects clinical practice. The utilization of validated educational videos may provide a useful resource when attempting to provide education about new public health laws that effect the provision of medical care.

Background

When public health laws are passed that affect hospital clinical practice, it is important to educate physicians about best practices in implementing these laws into routine patient care. Only showing physicians the language of the law or a summary of the law may not provide sufficient information about how the law should be practically applied during clinical practice. In order to provide the most information, in the shortest timeframe, to the greatest number of physicians, utilizing videos to educate physicians has become an increasingly popular method of instruction (1-3). Although the use of instructional videos is becoming a common occurrence in medical education, many of the videos being produced are not validated for their educational content (3).

Furthermore, limited research exists on whether video education actually results in physician knowledge acquisition during continuing medical education. However, there is evidence that video education does work to increase knowledge during medical school education (4-6). In the limited research done on video education in the realm of clinical practice and continuing medical education, very few educational videos have been validated and these videos were made to train physicians in specific practice areas, such as surgical technics (7-9). There are no studies which validate an educational video about the implementation of a new public health law that affects clinical practice.

One area of clinical practice which requires the implementation of a law in every day clinical practice is the identification of the appropriate surrogate decision maker for an incapacitated patient. In order to obtain information about the patient's health history, goals, values, and preferences and to make decisions about medical treatments, physicians must be able to identify the correct surrogate, often in urgent or emergent situations (10-13). A change in a state public health law for identifying surrogate decision makers provided the opportunity to conduct a study examining whether an educational video about a new state level health care law would improve both physicians' knowledge of the law and how to implement the law during clinical practice. This study validated the use of a video to educate physicians about how to apply a new state law during clinical practice.

Methods

An educational video was developed to inform physicians about a new state surrogate health care consent law. In order to obtain content validity, the video content and script underwent expert review by physicians, lawyers, and communication experts. The resulting video consisted of a narrator reviewing the characteristics of the new law, how the new law will effect patient care, and how to apply the law during clinical practice. The video used simple graphics to highlight important parts of the new law. The video was recorded in a professional studio on the university campus and lasted three minutes and thirty seconds.

In order to validate the video as an educational intervention, internal medicine physicians working within a statewide health care organization were invited via email to participate in the study during October of 2018. Internal medicine physicians were selected for this study as they are the physicians who are most impacted by the new law. Physicians were asked to complete a pretest which consisted of seven questions about the new law prior to watching the video. The questions were part of a validated survey regarding physician knowledge of the health care law that had been used in a previous study (13). The questions posed hypothetical vignettes which asked physicians to identify the legal surrogate medical decision maker from a list of options. The questions had one objectively correct answer based on the law. At the conclusion of the video, physicians were then asked the same seven questions about the new law. The study was conducted using REDCap, a secure survey administration application. All physicians were deidentified and assigned an individual study identification number. The university IRB approved this study.

Statistical Methods

Basic frequencies and percentages were calculated for each of the demographic variables. The seven questions were scored on whether the physicians' knowledge improved (i.e. whether the physicians' answers went from incorrect to correct). A summation score based off those seven improvement outcomes was then generated, giving a final score that indicates how many of the seven were improved upon, with a possible range of 0 to 7. Demographic variables were also analyzed to determine if there was a significant difference in the summation score between categories using rank-sum tests, due to the ordinal nature of the data. Frequencies and percentages were also generated to show the number of correct responses for each of the seven questions before the video and after the video, using McNemar's test for paired dichotomous variables to determine if there was a significant increase in the seven knowledge questions. Summation scores for the seven questions were also calculated for pre-video and post-video, with the non-parametric paired signed-rank test being used to see if there was a significant change. All analytic assumptions were verified and analyses were performed using SAS v9.4 (SAS Institute, Cary, NC).

Results

A total of n=33 internal medicine physicians participated in this study. Almost all of the physicians were attending or staff physicians (n=31, 94%), and 97% of these physicians work primarily in the inpatient setting (Table 1). Participating physicians were primarily white, males, who have been practicing medicine for less than 10 years. There were no significant differences in change scores between categories for any demographic variables.

Table 1. Demographics (n=33).

	Frequency (Percentage)	Median (range); Rank-sum p-value
Specialty		
Internal Medicine	33 (100)	3 (0, 6); p=n/a
Current Professional Status		
Attending/Staff Physician	31 (93.9)	3 (0, 6); p=.2996
Resident	1 (3.0)	2 (2, 2)
Other	1 (3.0)	0 (0, 0)
Setting		
Inpatient	32 (97.0)	3 (0, 6); p=.1654

Outpatient	1 (3.0)	5 (5, 5)
Years Licensed Physician		
0-10	21 (63.6)	2 (0, 6); p=.4837
11-20	10 (30.3)	3.5 (0, 6)
>20	2 (6.1)	2.5 (0, 5)
Gender		
Male	21 (63.6)	2 (0, 6); p=.1710
Female	12 (36.4)	3 (0, 6)
Race		
White	18 (54.6)	2 (0, 6); p=.5541
Black	1 (3.0)	3 (3, 3)
Asian	13 (39.4)	3 (0, 6)
Chose not to respond	1 (3.0)	2 (2, 2)

Values are frequencies (percentages) with p-values from McNemar's test for paired categorical data.

Each of the seven questions saw an improvement in correct answers post-video, with five (questions 1, 2, 3, 5, and 6) reaching statistical significance with McNemar's test and one (question 7) being marginally non-significant (Table 2). The proportion of increased ranged from 0.46 (95% CI: 0.26 – 0.67) for question 7 to 1.00 (95% CI: 0.03 – 1.00) for question 4, although only one participant missed it pre-video. The next highest was question 2, with 0.92 (95% CI: 0.62 – 1.00) (Table 3).

Table 2. Overall correct responses (all 33 participants)

	Pre-Video	Post-Video	McNemar's p-value
Q1	8 (24.2)	22 (66.7)	.0010
Q2	21 (63.6)	32 (97.0)	.0009
Q3	12 (36.4)	30 (90.9)	<.0001
Q4	32 (97.0)	33 (100)	1.0000
Q5	17 (51.5)	28 (84.9)	.0023
Q6	13 (39.4)	31 (93.9)	<.0001
Q7	9 (27.3)	16 (48.5)	.0707

Table 3. Improvement from pre- to post-video

	Those that answered incorrectly 1 st time that answered correctly 2 nd time	95% Confidence interval for proportion
Q1 improvement	16/25 (0.64)	(0.43 – 0.82)
Q2 improvement	11/12 (0.92)	(0.62 – 1.00)
Q3 improvement	19/21 (0.91)	(0.70 – 0.99)
Q4 improvement	1/1 (1.00)	(0.03 – 1.00)
Q5 improvement	12/16 (0.75)	(0.48 – 0.93)
Q6 improvement	18/20 (0.90)	(0.68 – 0.99)
Q7 improvement	11/24 (0.46)	(0.26 – 0.67)

Discussion

The results of this study show that an educational video was successful in increasing physician knowledge about a new public health law that affects patient care during clinical practice. In the case of surrogate health care consent laws, not applying the law correctly during clinical practice has been shown to result in both legal and ethical violations as well as a delay in patient care (10-12). The negative impacts on clinical practice could potentially be alleviated through the use of validated educational videos about new laws and how to implement new laws during clinical practice. Additionally, this study shows that acquiring the requisite knowledge necessary to apply new laws in clinical practice does not need to be a time consuming and daunting task as it may be accomplished through a short educational video. Short videos are easy to produce and disseminate and can reach physicians around the state or country through online resources such as social media platforms and professional organization message boards.

Validation of this video was important. Although the video worked to educate physicians overall, validation revealed places of both strength and weakness in the effectiveness of the educational video. For instance, physicians scored higher on knowledge questions associated with parts of the video that provided practice vignettes for how to apply the law during clinical practice. Conversely, the validation showed that the video needed to either provide more information or refine the way in which information was provided about question number one, as

evidenced by 33% of physicians answering this question incorrectly in the post-video test. The results of the validation suggest that adding an additional clinical vignette that physicians can use to practice the application of the law during clinical practice would be helpful for the information presented in question number 1. The majority of videos used in medical education appear to lack the step of validation. The results of this study show that taking the extra time to validate educational videos is important for ensuring that the information conveyed is appropriately reaching physicians and resulting in true knowledge acquisition.

This study has two limitations. First, physicians' knowledge acquisition of the health care law was assessed immediately after watching the video and therefore, it is unknown whether the physicians maintained this knowledge long term. Second, this study did not assess whether the video helped physicians implement the new law during clinical practice; however, the assessment questions did include hypothetical situations which would commonly be found during clinical practice and knowledge of the new law was needed to correctly resolve.

Significance for Public Health

As the world of medicine and public health expand their online footprints, new ways are needed to provide knowledge of new public health laws. To our knowledge, this is the first study which sought to validate an educational video about a health care law that affects the provision of medical care. Although further studies are needed, this study is important because it shows educational videos may provide a useful resource as a way to improve understanding about how to interpret and apply new public health laws.

Declarations

Ethics approval and consent to participate: The Indiana University IRB approved this research study. IRB# 1809495704

Consent for publication: Not applicable

Availability of data and materials: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

Funding: Indiana University School of Health and Human Sciences funded this study. The funding body played no role in the design of the study, data collection, analysis, interpretation of data, or in writing the manuscript.

Authors Contributions: Drs. Comer and Torke were responsible for the study design, data collection, interpretation of data, and writing the manuscript. Mr. Slaven was responsible for data analysis, interpretation of data, and writing the manuscript.

Acknowledgements: Not applicable

References

1. Prober CG, Heath C. Lecture halls without lectures – a proposal for medical education, *N Engl J Med* 2012;366:1657-9.
2. Dong C. Twelve tips for the effective use of videos in medical education, *Medical Teacher* 2014;37:140-145
3. Desai T, Shariff A, Dhingra V, et al. Is content really king? An objective analysis of the public's response to medical videos on YouTube. *PLoS One* 2013;8: e82469.
4. Ramnanan CJ, Pound LD. Advances in medical education and practice: student perceptions of the flipped classroom. *Adv Med Educ Pract*, 2017;8:63-73.
5. Cardall S, Krupat E. Live lecture versus video-recorded lecture: Are students voting with their feet. *Acad Med* 2008;83:1174-8
6. Orientale E, Kosowicz L, Pfeiffer C, et al. Using web-based video to enhance physical examination skills in medical students. *Fam Med* 2008;40:471-6
7. Summers AN, Rinehart GC, Simpson D, Redlich PN. Acquisition of surgical skills: a randomized trial of didactic, videotape, and computer-based training. *Surgery* 1999;126:330-6.
8. Stefanidi S, Korndorffer JR, Heniford T, Scott DJ. Limited feedback and video tutorials optimize learning and resource utilization during laparoscopic simulator training. *Surgery* 2007;142:202-6
9. Hergenroeder AC, Chorley JN, Laufman L. Two educational interventions to improve pediatricians' knowledge and skills in performing ankle and knee physical examinations. *Arch Pediatr Adolesc Med* 2002;156:225-9.
10. Comer AR, Gaffney M, Stone C, Torke A. The effect of a state health care consent law on patient care in hospitals: A survey of physicians. *J Hosp Admin* 2018;7:31-3.
11. Comer AR, Gaffney M, Stone C, Torke A. "What do you mean I cannot consent for my grandmother's medical procedure?": Key issues with state default surrogate decision making laws. *Indiana Health Law Review* 2016;14:2-28

12. Bartlett S, Fettig LP, Baenziger PH, et al. Indiana Medical Resident's Knowledge of Surrogate Decision Making Laws. *Int Q Community Health Educ* 2021;272684X211004737.
13. Comer AR, Gaffney M, Stone C, Torke AM. Physician Understanding and Application of Surrogate Decision Making Laws in Clinical Practice. *AJOB Empirical Bioethics* 2016;8:198-204.