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Video-based education about systemic corticosteroids enhances patient knowledge more than verbal education: A randomized controlled trial

Christina M Correnti[1] MD MS, Suephy C Chen[2,3] MD MS, Benjamin K Stoff[2,3] MD

Affiliations: [1]Department of Dermatology, University of Maryland, Baltimore, Maryland, [2]Division of Dermatology, Atlanta VA Medical Center, Decatur, Georgia, [3]Department of Dermatology, Emory University, Atlanta, Georgia

Corresponding Author: Benjamin K. Stoff MD, Department of Dermatology, 1525 Clifton Road, 1st Floor, Mailstop: 1525-001-1CC, Atlanta, GA 30322, Email: BSTOFF@emory.edu

Abstract

Background: Video-based patient education about long-term systemic corticosteroid treatment has not been assessed.

Objective: To compare video-based versus verbal education in patient knowledge gained and satisfaction.

Methods: English-speaking adults (≥18 years) were recruited from March-August 2013 from medical dermatology clinics. Study provider clinics were the unit of randomization. Verbal subjects heard a script based on the standard discussions of two top systemic corticosteroid prescribers at Emory. Video subjects viewed a video developed by the investigators. A 12-item survey created by the the investigators assessed baseline and post-education knowledge (immediate, one-, three-, and six-month).

Results: Baseline knowledge scores averaged 7.2±2.2 correct answers with no between-group differences. Post-education, the video group's (N=39) mean paired score difference was 0.9±2.0 higher than the verbal group's ($p<0.04$). After 1 month, most scores maintained gains with no between-group differences. 97% of patients in each group were satisfied (none were unsatisfied) with their education.

Limitations: Our cohort was more literate than the general public, and a minority of subjects completed long-term follow up assessments.

Conclusion: Video education enhanced near-term patient knowledge more than verbal education and maintained patient satisfaction.

Keywords: video patient education, systemic corticosteroids, randomized controlled trial, patient satisfaction

Introduction

Systemic corticosteroids are potent anti-inflammatories often used to manage skin disorders. Long-term (>6 weeks) systemic corticosteroids also cause serious immunosuppression. To maintain patient safety, systemic corticosteroids require appropriate dosing, tapering, dietary supplementation, monitoring of blood pressure, blood glucose, bone density and vision, and sick contact precautions. Even with preventative measures, systemic corticosteroid may cause adverse effects such as cataracts, hypertension, infection, or even adrenal crisis on withdrawal.

Patient understanding of risks, benefits, and monitoring is crucial for systemic corticosteroid effectiveness and safety. Standard education typically involves verbal instruction from the physician or staff to the patient at the point of care. This may come with or without written materials. Studies have shown that video education may offer an effective means to educate patients in a standardized manner [1-11]. In clinical trials, video education alone or as a supplement to standard disclosure outperformed standard education in a variety of settings [3, 4, 6]. This effect has been demonstrated among renal transplant patients being educated at discharge, primary care patients receiving asthma education, and in educating the general public about melanoma [3, 4, 6]. A melanoma video was also rated higher by patients in terms of usefulness

and satisfaction compared to written materials [4]. In two meta-analyses of randomized controlled trials, audiovisual interventions for informed consent for invasive medical procedures improved patients' immediate recall [2], and increased the likelihood of smoking cessation among patients compared with no intervention or generic self-help materials [1].

Use of audiovisuals for patient education regarding long-term systemic corticosteroid treatment has not been assessed. Video education is more standardized and also has the potential to save physicians valuable clinic time. Investment in video education tools is likely to be cost-effective [1], especially given the potential to prevent adverse outcomes and save time.

A multi-part study was designed to: 1) assess baseline knowledge of medical dermatology patients about long-term system corticosteroid treatment; 2) compare video versus verbal education in terms of knowledge gained and patient satisfaction; 3) for patients who would subsequently be treated with long-term corticosteroids, determine time saved in clinic, as well as track the long-term effects of video education on treatment adverse effects and compliance. The results of first part of the study—the assessment of baseline medical knowledge—were reported previously (as a poster abstract at the American Academy of Dermatology 72nd Annual meeting in 2014). Briefly, among 102 subjects, we found that knowledge of adverse effects (including osteoporosis and infection) was low, even though half the subjects had been treated previously with systemic corticosteroids (short or long-term). After correction for multiple comparisons, higher knowledge scores among prior corticosteroid users were driven by their awareness of the risk of osteoporosis. Most lacking was knowledge of cataract risk and the corollary need for ophthalmology follow-up with the use of long-term corticosteroids.

Herein, we present the results of the second part of the study: a non-blinded randomized controlled trial of video versus verbal education among general dermatology patients. Some also participated in the first part of the study of baseline medical knowledge. Due to the low frequency of corticosteroid naïve patients being started on long-term corticosteroids during the enrollment period, no patients were enrolled in the third part of the study assessing educational intervention for naive patients starting long-term corticosteroid treatment.

Methods

Patient Selection

English-speaking and reading adults (≥18 years) who arrived for an appointment during a study physician's clinic session were screened by study personnel. Recruitment took place from March-August 2013 at an academic dermatology department in general dermatology clinics. Subjects had the option of participating in the baseline knowledge assessment portion only (first part), or also participating in the randomized intervention trial of video-based versus verbal education (first and second part). Subjects in the trial were allocated to video or verbal education using study provider clinic as the unit of randomization. One provider clinic occurred per day, and either verbal or video patients were recruited for that day. Study personnel assessed health literacy for each subject by administering the rapid evaluation of adult literacy in medicine short form (REALM-SF).

Sample Size

We estimated that there would be a 2-question score difference between video and verbal groups. A sample size of at least 68 patients (34 in each group) was calculated to be necessary to detect that difference with 90% power. Given that the clinic session rather than the individual patient was the unit of randomization, and that the subjects could choose whether to only participate in the first part of the study or both the first and seconds parts, we oversampled the number of patients for the first part of the study until 100 baseline subjects were recruited. Thereafter, recruitment was only for the second part of the study (education intervention) until the sample size in each intervention group was met.

Verbal and Video Education Tools

Verbal subjects were educated with a script developed from the standard disclosure of two top systemic corticosteroid prescribers at Emory University Dermatology Department. Research personnel orally delivered the verbal script or played the video or

offered a link to view the video at home. The content of the video was developed by the investigators in accordance with physiological, therapeutic, and adverse effects of systemic corticosteroid use [12, 13]. The video can be viewed online through the Emory Dermatology Department's homepage at the following web address: http://www.dermatology.emory.edu.

Survey and Scoring

As no validated assessment tool for knowledge about corticosteroids exists, a 12-item survey was created by the investigators (**Table 1**). The survey assessed baseline knowledge, immediate post-education knowledge, and knowledge at one, three, and six months of follow-up. The survey consisted of 12 multiple choice and true/false items with a single correct answer. Subjects earned one point for each correct answer (a maximum possible score of 12 or 100% correct). Content validity for the knowledge assessment survey was established through iterative review by three experienced corticosteroid prescribers. Face validity was established by lay personnel with subsequent revisions made based on those reviews. As part of the baseline survey, subjects reported on patient factors including: age, sex, ethnicity, education, first language, and prior corticosteroid use (either short or long-term use).

Follow-Up

Follow-up assessments were performed by study personnel via online survey or over the telephone. At each follow-up interval, at least three attempts to contact subjects were made before a subject was considered lost to follow-up.

Statistical Analysis

The main outcomes were the 'between-groups' score difference at baseline by Student's t-test, 'within-groups' pre-post score differences by paired t-tests, and 'between-groups' difference in paired pre-post scores by Student's t-test. Secondary outcomes were 'between-groups' comparisons of score differences on 7 adverse effect items, 'within-' and 'between-groups' score differences after one, three, and six months, and overall patient satisfaction with the

Table 1. Characteristics of Dermatology Cohort for Education Intervention (N=75)

Patient factors	Verbal (N=36)	Video (N=39)	P-value
Mean Age (Standard Deviation)	52.4	51.1	0.76[a]
Race (N)			
White	30 (40.0%)	29 (38.7%)	
Black	4 (5.3%)	9 (12.0%)	0.16[b]
Other	2 (2.7%)	1 (1.3%)	
Gender (N)			
Female	18 (24.0%)	20 (26.7%)	1.00[c]
Male	18 (24.0%)	19 (25.3%)	
Education (N)			
Four-year college or lower	21(28.0%)	24 (32%)	0.98[b]
Masters Degree or higher	15(20.0%)	15 (20.0%)	
Prior Corticosteroid Use (N)			
No (50) or Uncertain (2)	15 (20.0%)	20 (26.6%)	0.19[b]
Yes	21 (28.0%)	19 (25.3%)	
English as First Language			
No	2 (2.7%)	1 (1.3%)	0.60[b]
Yes	34 (45.3%)	38 (50.7%)	
Health Literacy (N)			
4-6th Grade	0 (0.0%)	0 (0.0%)	
7-8th Grade	1 (1.3%)	2 (2.7%)	1.00[b]
≥9th Grade	35 (46.7%)	37 (49.3%)	

[a] By Student's T-Test
[b] By Fisher's exact test
[c] By Chi-squared test

Figure 1. CONSORT 2010 Flow Diagram

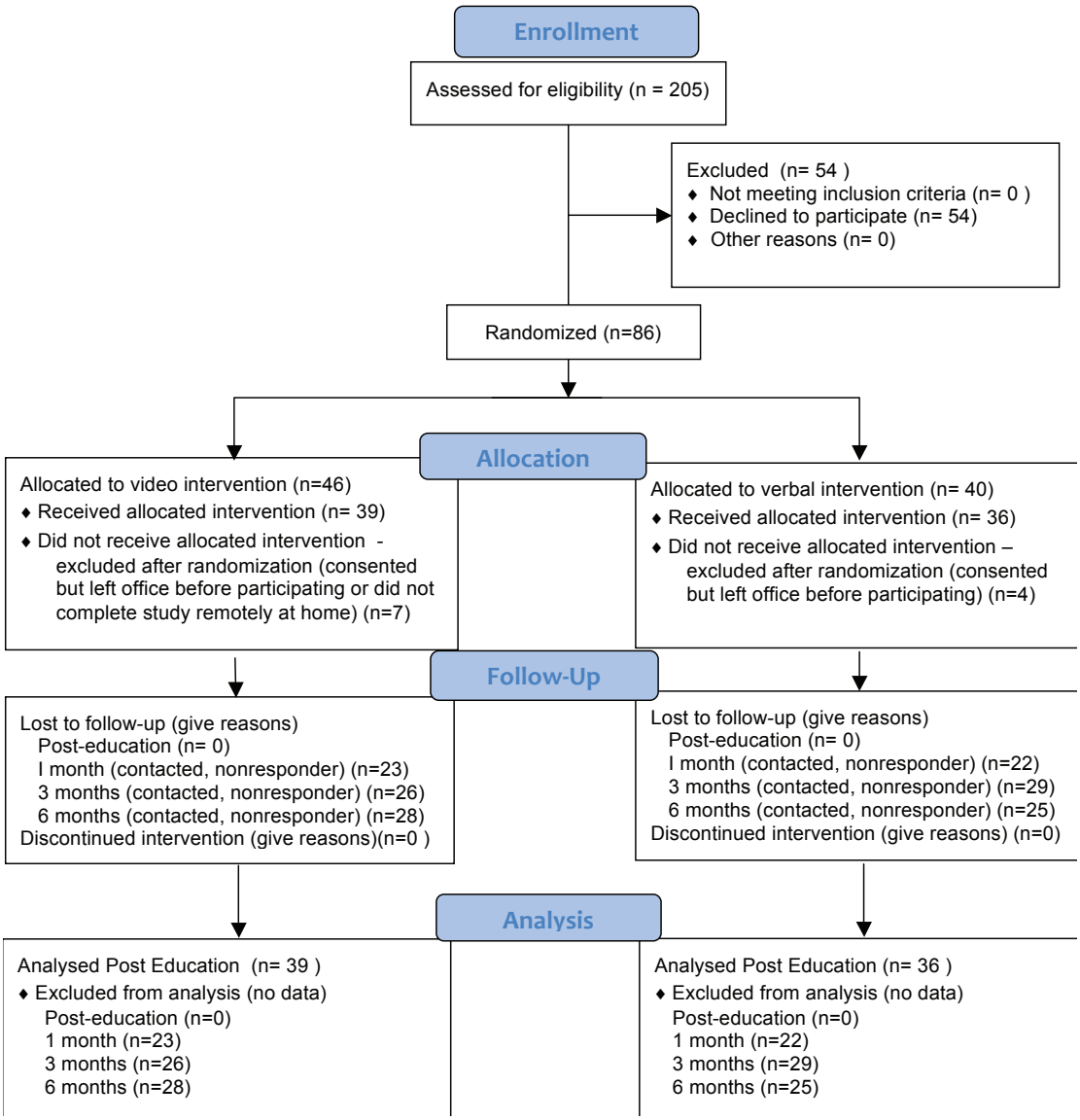

Figure 1 *Legend: CONSORT clinical trial flow diagram.*

video educational intervention. Patient factors included age, health literacy by Rapid Evaluation of Adult Literacy in Medicine, short form (REALM-SF), English as a first language, sex, race, education level, and history of prior corticosteroid use.

A repeated measures mixed model assessed for possible effects of group (video versus verbal), time (baseline, immediate post-education, one, three and six months), and interaction between group and time on the follow-up scores while controlling for all patient factors (age, sex, health literacy, English as first language, race, and history of prior corticosteroid use). Differences of least squares mean scores were estimated with Tukey-Kramer adjustment for multiple comparisons of 'within-' and 'between-groups' follow-up scores. For all statistical analyses, $p<0.05$ was considered significant.

Results

Of 205 subjects screened, 151 subjects agreed to participate in one or more parts of the study. Of 54 who declined participation, 27 did not have time surrounding their clinic appointment, 25 were not interested, one declined due to visual impairment, and one declined due to Alzheimer's disease. Eighty six subjects participated in the second part (education intervention trial).

Of 86 subjects randomized to video (n=46) or verbal (n=40) education, 11 signed the consent form but left the office after completing their dermatology appointment without participating in the study surveys. While they were already randomized due to clinic day being the unit of randomization, they were considered to be missing at random. They did not receive the intervention and could not be followed. For these 11 subjects health literacy was above 9th grade except for one subject at the 7-8th grade level.

An efficacy subset analysis was performed for the 75 subjects receiving educational intervention (**Figure 1**). There were no significant differences for patient factors between video and verbal groups (**Table 2**). Baseline knowledge scores averaged 7.2±2.2 (of 12)

Table 2. Results for Video versus Verbal Education Intervention (N=75)

	Overall	Verbal (N=36)	Video (N=39)	P-value
Education Intervention Outcomes, Video versus Verbal (N=75)				
Mean Baseline Overall Score, Out of 12 (SD)		7.2 (2.1)	7.2 (2.3)	0.93[a]
Mean Baseline Adverse Effect Score, Out of 7 (SD)		3.1 (1.5)	3.2 (1.7)	0.74[a]
Mean Paired Score Change, Pre-Post-Education (SD) Verbal		2.8 (1.8)		<0.01[c]
Mean Paired Score Change, Pre-Post-Education (SD) Video			3.7 (2.2)	<0.01[c]
Mean Paired Score Difference Post-Education, Video-Verbal (SD)	0.9 (2.0)			<0.04[a]
Mean Paired Adverse Effects Score Difference Post-Education, Video-Verbal (SD)	0.8 (2.2)			<0.02[a]
Correctly Identified Hypotensive Crisis as a Risk of Stopping Corticosteroids		33.0%	72.0%	<0.01[b]
Least Squares Mean Score Differences (95% Confidence Intervals)[e] of Repeated Measures Mixed Model: Score = Group + Time + Group x Time + Patient factors (N=75)				
Verbal Immediate Post-Education – Baseline (N=75)		2.8 (1.8-3.9)		<0.01[f]
Verbal 1 Month - Baseline (N=14)		1.8 (0.3-3.3)		<0.01[f]
Verbal 3 Month - Baseline (N=7)		1.5 (-0.4-3.5)		0.27[f]
Verbal 6 Month - Baseline (N=11)		1.9 (0.3-3.5)		<0.01[f]
Video Immediate Post-Education – Baseline (N=75)			3.6 (2.6-4.6)	<0.01[f]
Video 1 Month - Baseline (N=16)			2.3 (0.9-3.7)	<0.01[f]
Video 3 Month - Baseline (N=13)			1.9 (0.4-3.4)	<0.01[f]
Video 6 Month - Baseline (N=11)			2.5 (0.9-4.1)	<0.01[f]
Baseline Video – Verbal	0.2 (1.0-1.5)			0.99[f]
Immediate Post-Education Video – Verbal	2.0 (0.4-3.7)			<0.01[f]
1 Month Video - Verbal	0.7 (1.2-2.6)			0.97[f]
3 Month Video - Verbal	0.6(1.8-3.0)			0.99[f]
6 Month Video - Verbal	0.9 (-1.3-3.0)			0.96[f]
Satisfaction Survey (N=75)				
Satisfied with Education		97.1%	97.2%	--
Neutral with Education		2.9%	2.8%	--
Unsatisfied with Education		0%	0%	--

[a] By student's t-test

[b] After Bonferroni Correction for proportion of each group with correct answer choice comparing all survey items

[c] By paired t-test

[d] In logistic regression modeling Score controlling for Age, Health Literacy (Grade 7-8 versus 9th or greater), English First Language (Yes or No) Sex (Male or Female), Race (White v. Black or Other), Education (Graduate Education v. ≤4 Years of College), and Prior Corticosteroid Use (Yes v. No or Unknown)

[e] Controlling for all patient factors including age, health literacy, English as first language, sex, race, education level, and prior corticosteroid use

[f] Tukey-Kramer Adjusted p-values and 95% Confidence Intervals

overall and 3.1±1.6 (of 7) for adverse effects, with no 'between-group' differences. Immediately post-education, video group scores increased by 3.7±2.2 ($p<0.01$) compared to 2.8±1.8 for verbal group scores ($p<0.01$). Between-groups, the video group's mean paired score difference was 0.9±2.0 higher than the verbal group's ($p<0.04$). On adverse effects items, the video group's mean paired score difference was 0.9±1.1 higher than the verbal group's ($p<0.01$). After Bonferroni correction, more video subjects identified a hypotensive crisis as a risk of stopping corticosteroids (72.0% vs. 33.0%, $p<0.01$). Overall, over 97% in both video and verbal groups were satisfied, less than 3% felt neutrally in both video and verbal groups, and none were unsatisfied with either educational intervention (**Table 2**).

At one month, 16 video subjects and 14 verbal subjects completed the post-education questionnaire. At three months, 13 video subjects and 7 verbal subjects completed the questionnaire. At six months, 11 video subjects and 11 verbal subjects completed the questionnaire. The last follow-up was completed in February 2014. The repeated measures mixed model determining whether type of educational intervention predicted better immediate and sustained knowledge acquisition after adjusting for patient factors (including health literacy) demonstrated that the video group scored 2.0 (95% CI 0.4-3.7, $p<0.01$) higher than the verbal group on immediate post-education testing (there were no differences between video and verbal group scores at baseline, $p>0.05$). There were no differences between video and verbal group scores at one, three, or six months of follow up (all $p>0.05$, **Table 2**) Two subjects who had elected to participate in the second part of the study at home (video intervention and surveys) completed two of the long-term follow ups (one at one-month and one at six-months).

Discussion

Video education imparts more knowledge than a typical provider's verbal education for immediate recall and maintains patient satisfaction. The video imparted greater knowledge of potential adverse effects of long-term corticosteroid use. Specifically, the video educated regarding the risk of adrenal crisis when stopping corticosteroids too quickly. This information was not included in the typical provider's verbal education. Conclusions from long-term follow up data at one, three and six months were limited by insufficient sample size. More research is needed, but the data suggest that knowledge gains were equivalent between the video and verbal education methods over time. Since the beneficial effect of the video may wane with time, it may be desirable to have patients re-watch the video at certain intervals.

A limitation of our study was the lack of retention of subjects over time leaving it underpowered for analysis of long-term follow up. Subjects may have been less motivated to participate long-term since they were not actually started on long-term systemic corticosteroids. Another limitation to our study was that our subjects were more educated than the general public; over 90% had at least a 9th-grade reading level. It is estimated that twenty percent of adults read at less than a 5th-grade level and most adults read at the 8th-grade level [14]. Meanwhile most healthcare information is written at the 10th-grade level [14]. Lower health literacy can be a barrier to healthcare access, compliance with physician instructions, and adherence to the correct medication regimen [14]. The latter is of particular importance for those beginning long-term corticosteroid treatment. Older adults, many with hearing and vision impairment, are an especially vulnerable population. One study has shown that many older adults have difficulty remembering even direct verbal instructions conveyed during clinical encounters [15]. The ease of accessing video media, even at home after the clinic visit, may make video education an appealing solution.

Since subjects were not actually being placed on long-term systemic corticosteroid treatment, the third part of the study was not completed. Therefore we were unable to capture the endpoints of time saved in clinic or study physician satisfaction with the education interventions. However, video education has been shown to have time-saving potential [16]. After reviewing the results of this study, the Emory Department of Dermatology made this video available for use in clinic. It is used adjunctively during initial patient education and follow-up visits to save providers time in clinic. Future studies of corticosteroid video education should attempt to include patients with less education, measure time

saved in clinic, and measure changes in long-term clinical outcomes such as medication adherence and side effects of treatment. The results of this study may help inform future patient education efforts, not only regarding long-term systemic corticosteroid treatment in dermatology, but also across broader health disciplines.

Conclusion

Video education enhances near-term knowledge more than verbal education and maintains patient satisfaction. Further research is needed to compare knowledge gains between the video and verbal education methods over time. Since the beneficial effect of the video may wane with time, it may be desirable to have patients re-watch the video at certain intervals.

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