Evaluating Video-Based Instruction for Third-Year Medical Students Rotating in Obstetrics and Gynecology Based on a Standardized Checklist

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Abstract

Background: There is currently no standard recommendation among osteopathic medical schools for appropriate obstetrics and gynecology (OB/GYN) surgical procedure videos for third-year medical students (OMS III) in preparation for their OB/GYN rotations. OMS III student doctors will very likely participate in an OB/GYN procedure on their very first day of clinical rotations. In an effort to adequately prepare medical students for the procedural portion of their clinical rotations, video-based instruction is necessary. According to a recent study, YouTube is the most frequently accessed educational video source when students are preparing for surgical-based rotations and procedures. We hypothesized that there is a lack of ideal surgical videos to sufficiently prepare the third-year medical student for two common OB/GYN procedures.

Methods: Utilizing input from two faculty OB/GYN physicians and four OMS II medical students, a checklist of essential components of the ideal instructional video for a third-year medical student was developed for two common procedures, cesarean section and robotic hysterectomy. Upon completion of the checklist, YouTube videos were selected by entering the search phrase, "Step by step cesarean section procedure" and, "Step by step robotic laparoscopic total hysterectomy procedure". The top 20 instructional videos to appear upon entering the search criteria for each procedure were selected for evaluation. Binary data was collected on whether each video met each checklist item (yes or no).

Results: No single video met all checklist items. Every video lacked two or more critical elements. 30/40 videos (75%) met less than 50% of the checklist items.

Conclusion: The hypothesis that there is a lack of ideal videos for a third-year medical student entering their OB/GYN rotation was true based on our ideal video checklist. Our findings suggest that students are unlikely to find the ideal resource on the commonly accessed video platform which may have a negative impact on student preparation for clinical rotations. Our checklist can provide a guideline for the development of OB/GYN procedural videos for OMS III students.

Keywords: OBSTETRICS AND GYNECOLOGY, VIDEO-BASED INSTRUCTION, CLINICAL ROTATIONS, MEDICAL EDUCATION, YOUTUBE, CESAREAN SECTION, ROBOTIC HYSTERECTOMY, OMS III, THIRD-YEAR MEDICAL STUDENT

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Introduction

Today's medical student prefers a multi-media approach to his or her medical education and training, with textbooks largely being replaced

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with easy-access videos and other online resources. The article, "YouTube is the most frequently used educational video source for surgical preparation," describes this change (1). The authors explain how YouTube has become the main platform in which medical students are learning surgical techniques. The student of today wants fast and easily accessible videos and YouTube has made this possible. Medical students on rotation at a hospital now have phones in hand and are scrolling through online literature and videos as they await their next case. Books have become a cumbersome obsolete resource which has largely been replaced by the smartphone. In addition to multimedia education being easily accessible, Friedl et al. explain how technology is replacing print media and improving student learning and student performance (2). Their data suggests that the current generation of students not only prefer multimedia technology for learning, but technology has also improved learning. Additionally, the authors found that student performance improved with the use of multimedia technology and the students required less time to study. Using online resources saves time and allows for a more rapid means of accessing specific information. Thus, the available research suggests that resources for video-based learning for the third-year medical student entering rotations are crucial and that utilizing technology during procedure teaching has a positive impact on student's learning and overall patient outcomes (3).

The objectives for the study are as follows:

- Create a checklist of essential components that define an "ideal" educational video for two common OB/GYN procedures that is appropriate for third-year medical students.
- Identify the top twenty videos to appear using the search criteria for those two OB/GYN surgical procedures.
- Quantify the adequacy of each educational video based on our checklist.
- Determine if there is a need to develop an ideal instructional video to prepare third-year medical students for their OB/GYN rotation.

The hypothesis for this study was that there is a lack of ideal videos which meet the checklist to sufficiently prepare the third-year medical student for OB/GYN rotations. Our literature review has identified that this research project is the first of its kind.

Methods

Study Design

Two commonly observed surgical procedures on OB/GYN rotations were identified through consultation with the two Discipline Co-Chairs for Obstetrics and Gynecology (cesarean section and robotic hysterectomy). The question was posed, "What characteristics define the ideal OB/GYN video-based surgical instruction for third-year medical students?" A checklist of essential components was then created for each procedure (Figures 1 & 2).

CESAREAN-SECTION CHECKLIST (10 items)

- Live operation on a human subject
- Audio or closed captioning
- States 3 Indications for the procedure
- States 3 Contraindications for the procedure
- States 3 Complications of the procedure
- Identifies relevant anatomical structures
- Identifies critical maneuvers
- Identifies all instruments/tools used
- Time efficient (<15 minutes)
- Adequate view of the procedure throughout the video

Figure 1: Checklist of essential criteria for which each cesarean section video was assessed

Sampling Methods

The top 20 videos for each procedure were identified by entering the search phrase, "Step by step cesarean section procedure" for cesarean section and "Step by step robotic laparoscopic total hysterectomy procedure" for robotic hysterectomy. The first 20 videos to appear for each procedure were assumed

ROBOTIC HYSTERECTOMY CHECKLIST (11 items)

- Live operation on a human subject
- Audio or closed captioning
- States 3 Indications for the procedure
- States 3 Contraindications for the procedure
- States 3 Complications of the procedure
- Identifies relevant anatomical structures
- Identifies critical maneuvers
- Identifies all instruments/tools used
- Time efficient (<15 minutes)
- Description of proper trocar placement
- Dual screen display of both surgeon and laparoscopic view

Figure 2: Checklist of essential criteria for which each robotic hysterectomy video was assessed.

to be the videos that a medical student would likely view.

Sample Size

A total of 40 videos were analyzed, with 20 being from each of the two assessed procedures.

Data Collection

Binary data was then collected by the students based on whether each video met the checklist item (yes) or did not-meet the checklist item (no).

Outcome Measures

Data Analysis

Each video was scored based on the number of checklist items that it fulfilled. The data was collected and organized using an excel spread sheet by each researcher. The total number of checklist items met by each video was plotted using excel graphs in order to make comparisons between videos. The popularity of each video, judged by the number of views, was then compared against the number of criteria each video met.

Results

The 20 cesarean section videos and the 20 robotic hysterectomy videos reviewed were all (100%) devoid of a minimum of 2 checklist items, with the majority (90%) lacking 4 or more. When reviewing cesarean section videos, 13 out of 20 videos (65%) lacked over half of the checklist items (Figure 3). For robotic hysterectomy, 17 out of 20 videos (85%) lacked over half of the checklist components (Figure 4). Thus, 30 out of 40 videos (75%) met less than 50% of the necessary components to adequately prepare third-year medical students for OB/GYN rotations as defined by experts in the field. There did not seem to be any correlation between the popularity of video, as determined by the number of views, and number of criteria met (Figures 5 & 6).

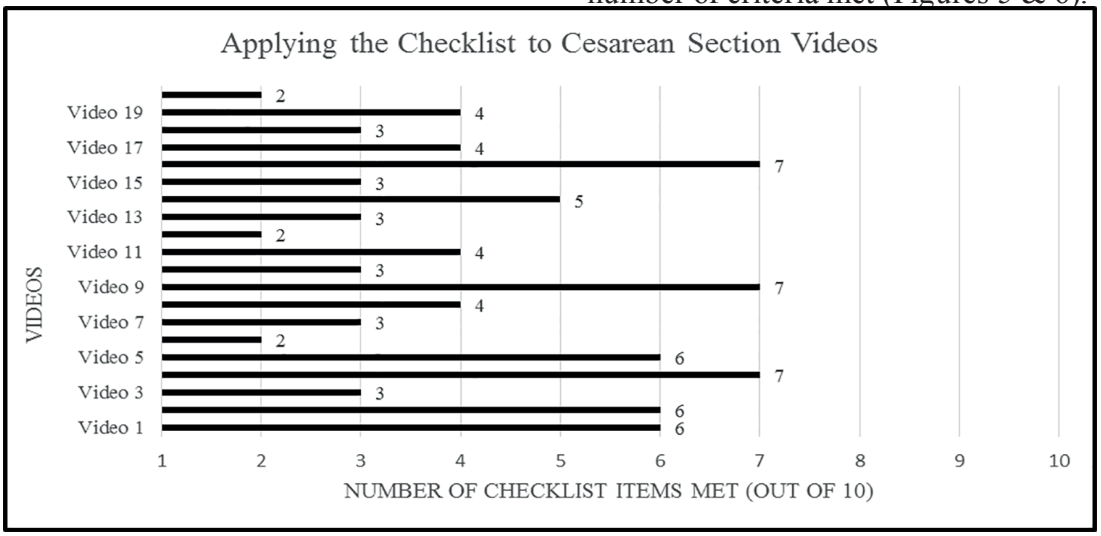

Figure 3: Number of checklist items met for each of the 20 cesarean section videos.

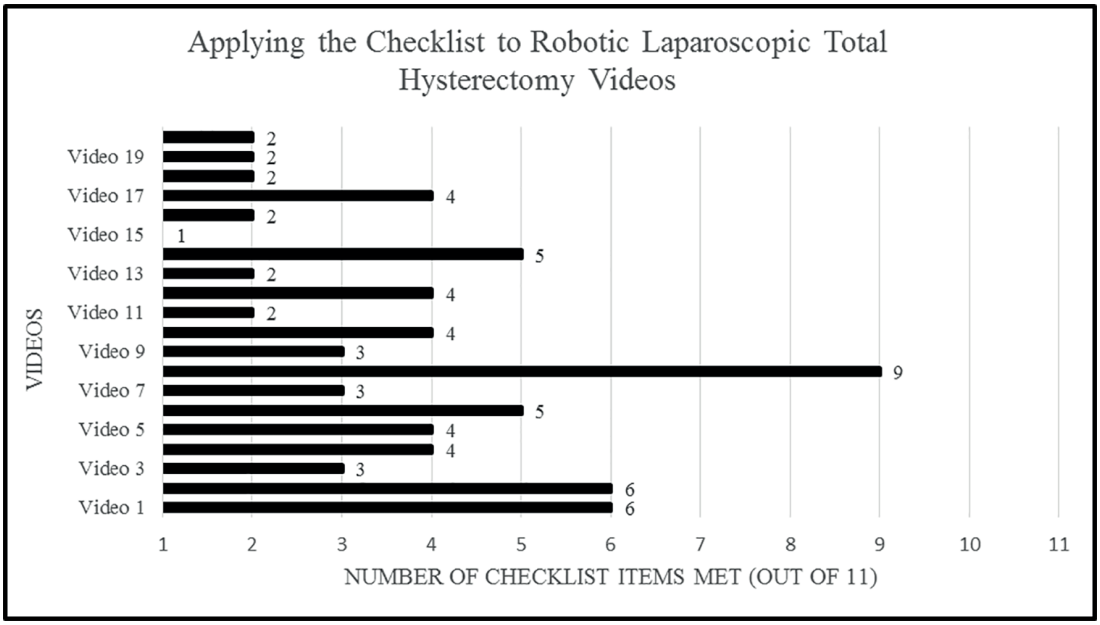

Figure 4: Number of checklist items met for each of the 20 robotic laparoscopic total hysterectomy videos.

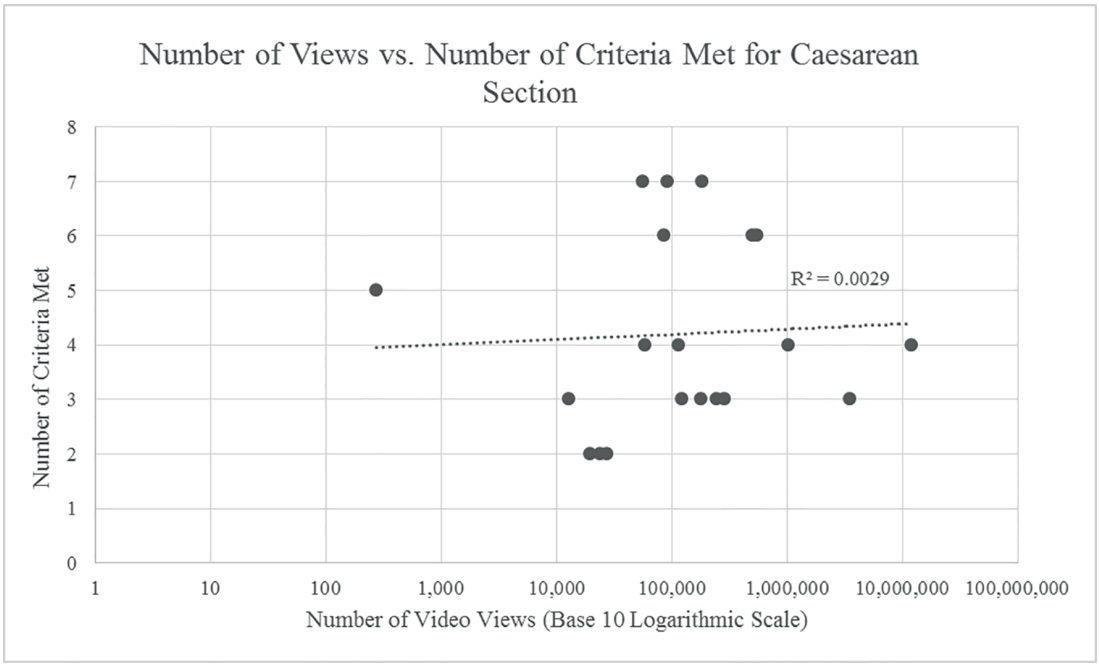

Figure 5: Popularity of videos compared to number of criteria met for caesarean section.

Discussion

Medical students have widely come to rely on videos for educational instruction during their third-year clinical rotations. When our surgical preceptors were seeking recommended videos for the OB/GYN rotation they found none. When they viewed popular OB/GYN videos, they were commonly disappointed by the quality. Although a third-year medical student may participate in a cesarean section or laparoscopic hysterectomy on their initial day of their OB/GYN rotation, we were unable to identify any educational videos that were generally recommended for this

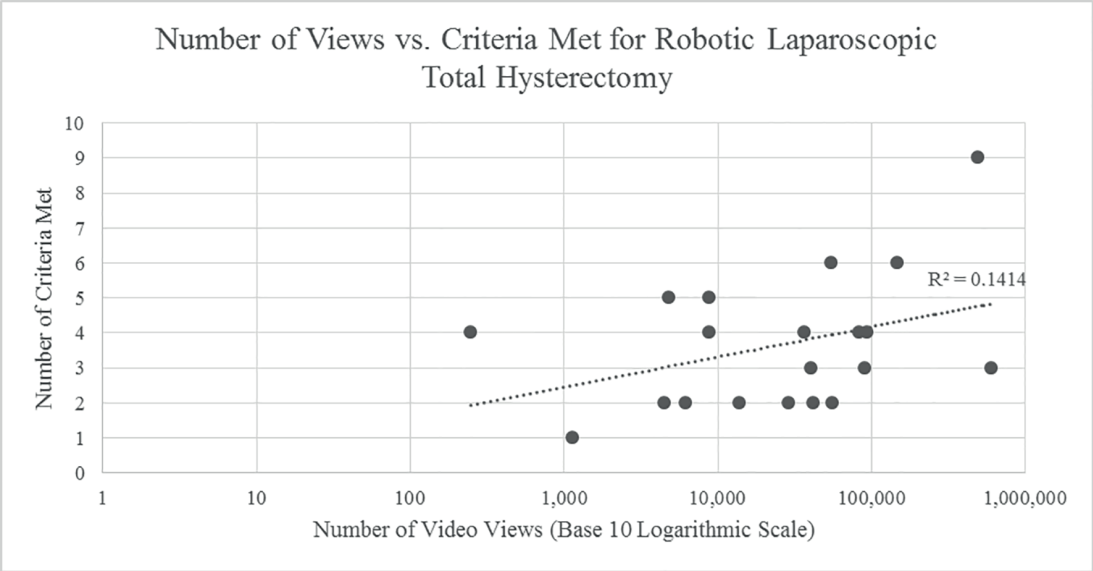

Figure 6: Popularity of videos compared to number of criteria met for robotic laparoscopic total hysterectomy.

student population. This is an important gap in resources because adequate preparation for a given surgical procedure prior to participation has the potential to increase student confidence and decrease student anxiety, thus improving performance. This is seen in a study conducted by Jang and Kim which concluded that utilizing online resources for medical school education is advantageous to a medical student's self-study and self-efficacy in preparation for clinical rotations (4). Self-efficacy refers to a person's confidence in performing a task (5). Throughout clinical rotations, students will often be asked to perform tasks for the first time in their life. As stated by Jacobs *et al*, self-efficacy is critical when something is unfamiliar or new (6). Psychologist Albert Bandura defined self-efficacy as the "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (7). According to Bandura, an increase in self-efficacy can result from several sources including personal mastery of experiences, vicarious experiences, and verbal persuasion from others. Video-based instruction of surgical procedures for third-year medical students can utilize the vicarious experience principle to increase self-efficacy and thus assist in performance and confidence in new tasks. If a video highlights a medical student assisting in the procedure that is similar to the medical student viewer, this can serve as a way to raise viewer's self-efficacy in that they too possess the capabilities to master the skill. The lack of adequate and accessible videos not only leads to third-year medical students being less prepared for cesarean sections and robotic hysterectomies during rotations, it also likely has an impact on the amount of time they are able to spend in the operating room and get hands on learning. If a student comes to a procedure unprepared, they are less likely to be successful in their rotations. Based off the checklists created by the obstetrics and gynecology medical experts, preceptors have certain expectations of their students during rotations and if these expectations are not able to be met, that student is will likely not get as much hands-on experience. It is important for a preceptor to trust the medical student and this requires that the student show proficiency in their understanding of tasks and procedures. The study was designed in such a way that videos accessed by our researchers were likely to be those first discovered by a medical student aiming to learn about the procedure while on rotation. Adequacy of the 40 identified videos

was based on achieving all of the criteria set forth by the respective procedure checklist (Figures 1 & 2). No video reviewed, for either procedure, was deemed completely adequate to prepare a third-year medical student on their first day of rotations in OB/GYN based on our checklist. Interestingly, we found that the most commonly viewed videos for both procedures were not the videos that we found met the greatest number of our criteria. This finding suggests that selecting videos based on the number of views has little to no correlation to the quality of the video as an educational resource for rotations.

This study is significant in that for the first time a checklist was developed for the ideal OB/GYN surgical video to educate a third-year medical student, and then concluded that there is a lack of ideal videos. The developed checklist can serve as a guideline for the creation of videos which can help provide the foundation of knowledge necessary for these future physicians to thrive in rotations. Thus, the implications for future projects include creating the ideal video and disseminating it to medical schools, determining if there is a need for videos for other procedures and specialties in medicine, and studying the change in proficiency in skills after utilizing the videos developed.

The limitations of this study are that only 40 videos (20 for each respective procedure) were analyzed, and there was only one video-based education platform accessed, YouTube. In addition, the first 20 videos in the search were those that were analyzed. The videos which come up in the search may vary with small changes to the search phrase or with timing of when the video is posted. In addition, the YouTube search engine relies on user inputted data, which means that the person who posts the video develops the title, description, thumbnail and tags for the video. Thus, the degree that the video content matches your search can be largely dependent on how the person who uploaded it, described it. This all means that more ideal videos which match more, if not all, checklist items could be potentially on YouTube, but not accessed by the search.

Conclusion

Medical students commonly utilize YouTube to prepare for clinical rotations, yet a thorough review of the literature has identified no recommended videos for third-year medical students starting their OB/GYN rotation. Utilizing an expert panel, we created a checklist of the essential components of an ideal third-year medical student OB/GYN video. We applied that checklist to the most commonly viewed You Tube videos of a cesarean section and robotic hysterectomy. Based on our criteria, we found no YouTube videos that we feel are completely adequate for the third-year medical student preparing for the most common OB/GYN procedures. We feel that the availability of higher quality educational videos for viewing by third-year medical students will better prepare them for their OB/GYN rotation, decrease student anxiety about participating in surgical procedures and improve student performance. Our checklist provides a guideline for the creation of an ideal educational video for third-year medical students entering their OB/GYN rotation.

Conflict of Interest Statement

The authors certify that they have no partnership or affiliation, either financial or non-financial, and no involvement with any entity that would have the potential to influence the results. Thus, all authors confirm that there is no conflict of interest to declare. There was also no funding required for this project, and no IRB approval required.

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