

USING ADVANCED TECHNOLOGIES FOR IMPROVING PATIENT ENGAGEMENT IN GYNECOLOGY PRACTICES



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Introduction

Patient engagement is increasingly important in a patient-centered healthcare model.¹ Patient experience has been positively associated with patient safety and clinical effectiveness across a range of diseases and settings.² Advances in technology, such as video- and tablet-based educational interventions and telehealth modalities, have provided new opportunities for increasing patient education, satisfaction, and engagement.³⁻⁶ In obstetrics and gynecology practices, examples supporting the potential role of technology in improving patient engagement include the use of

integrated technology platforms as an adjunct to outpatient prenatal care and the introduction of office hysteroscopy, which allows the patient to observe the procedure in a monitor.^{4,5,7-9} Similarly, technological advances in colposcopy provide new avenues to improve the patient experience and engagement, potentially leading to better outcomes.¹⁰⁻¹² This article will review the importance of patient engagement and ways in which incorporating emerging technologies can improve patient engagement in gynecology practices.



Importance of Patient Engagement

The concept of patient engagement has become increasingly important as contemporary healthcare shifts from a disease-centered model to a patient-centered one.¹ This broad concept generally refers to the levels of patient involvement in their care according to their individual desires and capabilities, increasing their confidence and skills while partnering with healthcare providers and institutions.¹ Patient engagement and patient experience are intertwined concepts, and patient engagement is a term commonly used to denote aspects of patient experience.^{1,2} As demonstrated in a systematic review, patient experience is consistently positively associated with patient safety and clinical effectiveness across a range of diseases and settings, and all three concepts are central to quality in healthcare.²

The purposes of patient engagement are to maximize outcomes and/or experiences of care.¹ A supportive healthcare provider-patient relationship and health literacy, which is impacted in part by patient access to information and resources, play key roles in patient engagement.¹ In patients with asymptomatic conditions, increasing patient knowledge and clarifying misconceptions are particularly important in order to emphasize the importance of adherence to treatment plans.¹³

Studies have demonstrated how patient education can increase compliance to follow-up recommendations in gynecology settings.^{14,15} For instance, adherence to follow-up recommendations is key for cervical cancer screening programs to be successful, but lack of understanding on the implications of abnormal results may lead to low adherence rates.^{15,16} Patient adherence to colposcopy and follow-up recommendations



are typically low, and greater levels of self-efficacy are associated with adherence.¹⁷

In a study that evaluated the impact of patient education on compliance to treatment recommendations, patients who received education on the implications of human papillomavirus (HPV) infection prior to colposcopy had greater adherence to follow-up recommendations compared with patients who did not receive such education.¹⁴

A different, retrospective study evaluated the impact of a nurse-led telephone counseling and multifaceted patient support program on patient adherence to colposcopy visits in Toronto, Ontario.¹⁸ This care model addressed various known contributors to non-adherence, including anxiety and lack of patient knowledge about colposcopy.¹⁸ Non-attendance to colposcopy clinic was reduced by two thirds following the incorporation of the program, which included pre-procedure nurse telephone counseling tailored to the patient needs.¹⁸

Patient engagement requires adaptation to the individual needs and expectations of the patient.¹ The patient-clinician relationship is shaped by the degree of shared decision making desired by the patient, and incorporating a patient-centered communication approach is needed to optimize patient outcomes.^{1,19} Patient decision aids, which can be delivered in a variety of formats, can improve patient knowledge and facilitate shared decision making.²⁰ As stated by the American College of Obstetricians and Gynecologists' Committee Opinion on patient-physician communication, "physicians' ability to effectively and compassionately communicate information is key to a successful patient-physician relationship."¹⁹ Effective communication with increased patient involvement impacts clinical outcomes, as open communication may facilitate counseling and potentially improve adherence to treatment plans.¹⁹

The Impact of Technology in Increasing Patient Engagement

Advances in technology have created new opportunities for increasing patient engagement.^{4,5} For example, the use of video-based tools for providing patient information and education continues to grow.³ Accumulating data suggest that the use of targeted video-based education can contribute to an improved patient experience and potentially better outcomes.³

A study evaluated the feasibility of a tablet-based educational program as a strategy to improve patient knowledge about cervical cancer in a low resource setting.⁶ The intervention resulted in significant improvements in post-test scores compared with pre-test scores.⁶ Although most participants had limited experience using technology, they found the device easy to use and expressed a desire to learn about additional health topics using a similar approach.⁶ A different study evaluated the impact of a tablet-based education

module on increasing knowledge about HPV among patients presenting to an academic colposcopy clinic.²¹ Participants completed a pretest, followed by a tablet-based education module, and then a post-test.²¹ Substantial improvements in patient knowledge were demonstrated following the educational intervention, with most participants ranking the activities as “extremely” or “very” helpful.²¹

A technology-enhanced health care framework, with telehealth modalities such as telemedicine and connected/digital health applications, is increasingly used in obstetrics and gynecology practices.²² These modalities can improve patient engagement and satisfaction, while leading to similar or potentially better health outcomes when compared with traditional methods of health care delivery.^{4,5,22,23} Data from a systematic review of the impact of telehealth interventions in obstetric and gynecologic outcomes suggest some benefit from certain interventions, such as text messaging and remote monitoring.²³



A study evaluated patient satisfaction and experience with the use of a mobile connected health platform as an adjunct to prenatal care among low-risk pregnant patients.⁴ Overall patient satisfaction was rated as high by survey respondents, and 93% felt that the platform saved time in the clinic.⁴ Additionally, patients rated highly the educational value of the platform.⁴ In a different study, an alternative prenatal care schedule supplemented with an integrated technology platform led to an increased in patient satisfaction compared with routine prenatal care, while being associated with high engagement rates with the platform.⁵ Fivefold more data points for weight and blood pressure were generated per patient with the use of connected devices.⁵ The alternative prenatal care schedule plus remote monitoring resulted in less in-clinic visits than the routine care schedule, while no adverse clinical outcomes were observed in either group.⁵ These studies highlight the potential role of mobile/digital technology in improving patient satisfaction and engagement.^{4,5}

Office hysteroscopy, where the procedure is performed in an outpatient- or clinic-based setting instead of the operating room, represents another advance in technology associated with high patient satisfaction and an opportunity for greater patient engagement.^{7-9,24} In a survey study among patients undergoing office hysteroscopy, 93% were satisfied with the procedure, stating that they would undergo the same procedure again if clinically needed in the future, and 97% would recommend it to a friend.²⁵ In a randomized trial among patients undergoing endometrial polypectomy, 95% of those undergoing outpatient hysteroscopy and 82% of those undergoing hospital-based hysteroscopy stated a preference for outpatient hysteroscopy should they

require a repeat procedure.²⁶ In addition to the convenience, avoidance of general anesthesia, and faster recovery, office hysteroscopy provides the patient with the opportunity to observe the procedure in a monitor, leading to greater patient involvement and potentially improving their understanding of the condition.^{7-9,24}

Increasing Patient Engagement During Colposcopy

Colposcopy plays a key role in cervical cancer screening programs, but the procedure is frequently associated with high levels of anxiety and psychological distress.²⁷⁻³⁰ Incorporating interventions to reduce colposcopy-related anxiety and psychological distress is important, as high anxiety levels may lead to negative consequences, such as non-adherence to recommended follow-up.^{27,28,31}

Patients often find colposcopy stressful, reporting high levels of worry in relation to the exam.²⁸

Patients with specific concerns, such as fear of cancer and concerns about future fertility, the procedure itself, or potential embarrassment, have been noted to have higher colposcopy-related anxiety levels than patients not reporting such concerns.²⁸

In a study evaluating psychosocial factors predictive of distress in patients about to undergo their first colposcopy, anticipated pain and discomfort were among the variables associated with anticipatory anxiety while awaiting colposcopy.²⁹ A different study



found that in addition to pain experienced during the procedure, pre-colposcopy anxiety levels, trait anxiety, and the severity of colposcopic assessment were predictors of post-colposcopy psychological distress levels.³²

Ensuring that patients are fully informed about colposcopy and potential after-effects may help reduce associated anxiety and provide reassurance.³³ Patients report receiving insufficient information throughout the diagnostic and therapeutic journey following abnormal cervical cytology results, including lack of information regarding colposcopy.³⁰ Proactive patient participation is needed during follow-up, and improving patient education, and thus, their understanding of the condition, could

positively impact their psychosocial state, quality of life, and willingness to adhere to additional recommendations.³⁰

Different strategies have been studied as interventions to reduce colposcopy-related anxiety levels and improve patient satisfaction with the procedure.^{10,27,34} A 2011 Cochrane review compared the efficacy of various strategies aimed at reducing anxiety during colposcopy.²⁷ Data suggested that playing music during the procedure significantly reduced anxiety levels.²⁷ Providing patients information leaflets increased their knowledge levels and contributed to improved quality of life by reducing psychosexual dysfunction, although the strategy did not reduce anxiety levels.²⁷

The Impact of Video Colposcopy on Patient Experience and Engagement

Video colposcopy, which allows the patient to view the procedure on a monitor, has also been studied as an anxiety-reducing strategy during colposcopy.^{10,34} A randomized trial enrolled 81 patients requiring repeat colposcopy for laser treatment or a normal recheck and assigned them to either video colposcopy or a control group.¹⁰ While all patients experienced a decreased anxiety from one visit to the next, patients in the video colposcopy groups had greater reductions in anxiety compared with patients in the control groups.¹⁰ Additionally, patients in the video colposcopy groups rated the procedure as less painful compared with patients in the control groups.¹⁰ Although patient satisfaction was similar between groups, most patients (93%) who underwent video colposcopy felt reassured about the treatment being successful by being able to observe the area of abnormality before, during, and after removal.¹⁰ All patients reported feeling a greater sense of involvement and control during the visit and most reported having a greater understanding of their condition and the procedure by being able to watch the monitor.¹⁰

A different randomized trial assessed situation-specific anxiety with video colposcopy versus no video colposcopy among patients undergoing their first colposcopy.³⁴ Video colposcopy failed to demonstrate an anxiety-reducing effect when compared with the use of colposcopy without video.³⁴ However, the use of video colposcopy was not harmful and was rated highly by patients as an important adjunct tool for understanding the disease.³⁴ Thus, study authors concluded that while video colposcopy is not an effective anxiety-reducing strategy, it is reasonable to offer it

as a potential demonstrative and educational tool that patients may appreciate.³⁴

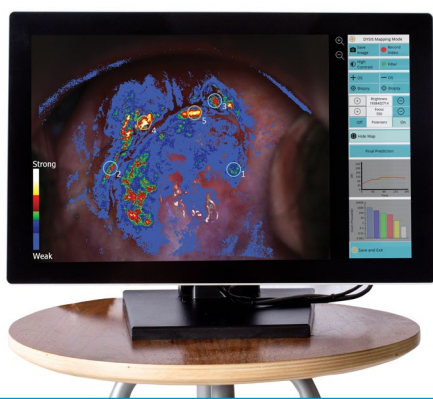
The impact of video colposcopy on adherence to follow-up recommendations was evaluated in a randomized trial.³⁵ Sixty patients with abnormal cervical cytology results were randomized to undergo video or regular colposcopy, and all were given the same follow-up instructions.³⁵ The rate of adherence to follow-up appointment was significantly higher in the video colposcopy group (80%) compared with the regular colposcopy group (50%).³⁵

Based on multivariate analyses, patients undergoing video colposcopy were almost five times more likely to keep their follow-up appointment than patients undergoing regular colposcopy.³⁵

Improving Patient Engagement With DYSIS Colposcopy

Based on prior data, technology can potentially improve the patient experience during colposcopy, resulting in greater patient engagement.^{11,12} DYSIS® is a digital video colposcope that integrates dynamic spectral imaging (DSI), which quantifies acetowhitening and enables the calculation of DYSISmap™, an intuitive and innovative computer-aided color-coded map that is overlaid on the live image of the cervix.³⁶ The DYSISmap is used adjunctively to standard visual colposcopic assessment, supporting the identification of cervical lesions and helping the clinician select potential biopsy sites.^{36,37}

Early clinical trials of DYSIS colposcopy conducted in Europe demonstrated that the use of the DSI color-coded map helped clinicians achieve a significant increase in sensitivity for the detection of high-grade cervical disease compared to conventional colposcopy alone, with one study showing an increased in sensitivity from 55% to 88%.^{38,39} The benefits of the DYSISmap in detecting high-grade cervical disease have also been demonstrated in real-world settings.^{37,40} In a study evaluating the performance of DYSIS colposcopy in routine clinical practice in Wales, the sensitivity for identifying cervical intraepithelial neoplasia (CIN) grade 2 or worse increased from 51.5% with conventional colposcopy to 84.8% with the adjunctive use of the DYSISmap.³⁷ In the subgroup of patients referred for low-grade abnormal cervical cytology, the sensitivity for CIN2 or worse increased from 27.3% to 86.4% with the addition of the DYSISmap.³⁷



DYSISmap

During the use of DYSIS, high-resolution images and video are taken, allowing for playback of the exam.³⁶ A patient report is also generated, which can then be provided to the patient in addition to it being stored in the electronic health record.³⁶ Patients may find a color map easier to understand than a standard monitor view of acetowhitening and explanation by the clinician.¹¹ Thus, in addition to helping

clinicians select potential areas to biopsy, the use of the DYSISmap can help educate the patient and improve their understanding of colposcopy findings.^{11,12,36} Healthcare providers with experience using the DYSISmap have highlighted its benefits as a patient educational tool.³⁶ Additionally, providers have noted how DYSISmap facilitates patient involvement in the process, improves their understanding of the procedure, and can help in providing reassurance, reducing anxiety, and empowering patients.³⁶

In addition to anecdotal evidence, study data also suggest that DYSIS is well received by patients.^{11,12} Patient questionnaires conducted as part of a substudy of the DYSIS validation trial revealed that most patients were comfortable with DYSIS colposcopy and not bothered by the extra time the procedure might have taken.⁴¹

A survey study assessed the patient experience with DYSIS colposcopy among 763 patients presenting to four NHS colposcopy clinics in the UK that had adopted the DYSIS colposcope.¹¹ Two questionnaires were designed, one for patients undergoing their first colposcopy and a different one for patients who had previously undergone colposcopy.¹¹ Using a scale of 1 (not at all) to 10 (definitely or extremely), patients graded anxiety before, during, and after examination, perception of the duration of the procedure, and feedback and recommendations on having colposcopy with DYSIS.¹¹ Key results included:¹¹

- Patients undergoing their first colposcopy felt that colposcopy with DYSIS did not take much longer than their previous cervical cytology smear (median score of 4)
- Patients with prior colposcopy experience felt that colposcopy with DYSIS did not take longer than their previous colposcopy (median score of 1)

- Both groups of patients denied finding the DYSIS colposcope intimidating
- For all patients, the self-reported level of anxiety present prior the appointment dropped substantially after the procedure
- Patients reported that they would recommend DYSIS colposcopy to a friend or family member needing colposcopy (median score of 10 for both groups)

When asked to evaluate on the scale of 1 (not at all) to 10 (definitely) their reaction to the DYSIS and the DYSISmap,

- Patients felt that they could understand the DYSISmap (median score of 9 for both groups) and that seeing the map was reassuring (median score of 9 for both groups)
- Patients reported that if they were to need colposcopy again in the future, they would prefer to have it with DYSIS (median score of 10 for both groups)

A similar survey study assessed the patient experience with DYSIS colposcopy among 515 patients presenting to six private community-based clinics in the US.¹² Similar to the UK study, patients graded anxiety before, during, and after colposcopy, perception of the duration of the procedure, and feedback and recommendations on having colposcopy with DYSIS, using a scale of 1 to 10 (not at all to definitely or extremely).¹² Main findings included the following:¹²

- Patients undergoing their first colposcopy felt that DYSIS colposcopy did not take much longer than their cervical cytology smear (median score of 5)



- Patients who had previously undergone colposcopy felt that colposcopy with DYSIS did not take longer than their previous colposcopy (median score of 1)
- Patients denied finding the DYSIS colposcope intimidating
- The self-reported level of anxiety present prior the appointment dropped substantially after the procedure for both groups of patients

When asked to evaluate on the scale of 1 (not at all) to 10 (definitely) their reaction to the DYSIS and the DYSISmap,

- Patients undergoing their first colposcopy and those with prior colposcopy experience felt that they could understand the DYSISmap (median score of 8 and 9, respectively)
- Patients reported that seeing the map was reassuring (median score of 9 for both groups)
- Patients reported that they would prefer to have colposcopy with DYSIS if they were to need colposcopy again in the future (median score of 10 for both groups)
- Patients indicated that they would recommend DYSIS colposcopy to a friend or family member needing colposcopy (median score of 10 for both groups)

Based on these studies, colposcopy with DYSIS is received well by patients.^{11,12} Findings suggest that DYSIS improved the patient experience and that the use of digital imaging and mapping improved their understanding of their condition.^{11,12} This positive impact could potentially increase patient engagement, which may lead to higher attendance rates at colposcopy clinics, maximizing patient outcomes.^{11,12}

As noted by US-based obstetrician-gynecologist Dr. Maria R. Keanchong: “Outside of the obvious benefits of the DYSISmap the system helps make the patients an integral part of the process. It allows me to explain to the patient exactly what is occurring during their colposcopy. Many patients find this helpful to calm their nerves and that it gives them a better understanding of the procedure.”³⁶

Conclusions

Advances in technology have revolutionized patient care and created new opportunities to improve patient engagement.^{4,5,22} Following an abnormal cervical cytology result, proactive patient participation is needed to optimize outcomes.^{11,12,30} Prior studies have demonstrated the positive impact of patient education on compliance to follow-up recommendations in gynecology settings.^{14,15} Improving patient education, and thus, their understanding of the condition, could positively impact their psychosocial state, quality of life, and willingness to adhere to additional recommendations.³⁰

In addition to helping clinicians select potential areas to biopsy during colposcopy, the use of the DYSISmap can help educate the patient.^{11,12,36} DYSIS is well received by patients, with the DYSISmap improving their understanding of their condition, which could potentially lead to higher adherence to follow-up recommendations.^{11,12} Thus, incorporating technological advances, such as DYSIS colposcopy, has the potential to improve the patient experience and lead to greater patient engagement, ultimately resulting in better outcomes.^{11,12}

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