Received: 26 September 2016 | Revised: 19 December 2016 | Accepted: 3 February 2017 | First published online: 27 February 2017

DOI: 10.1002/ijgo.12115

EDUCATION AND TRAINING

Obstetrics

WILEY International Journal of Gynecology Obstetrics

Evaluation of an animated instructional video as a training tool for manual perineum support during vaginal delivery

Hadil Y. Ali[1,2,3*] | Åse Vikanes[2] | Marit Anti[4] | Sahar Hassan[5,6] | Khaled M. Ismail[7] | Kaled Zimmo[2,3,8] | Mohammed Zimmo[2,3,9] | Erik Fosse[2,3] | Katariina Laine[10]

[1]Department of Obstetrics, Palestine Medical Complex, Ramallah, Palestine

[2]Intervention Center, Oslo University Hospital, Rikshospitalet, Oslo, Norway

[3]Faculty of Medicine, University of Oslo, Oslo, Norway

[4]Inland Norway University and Applied Science, Oslo, Norway

[5]Institute of Community and Public Health, Birzeit University, Ramallah, Palestine

[6]Faculty of Pharmacy, Nursing and Health Professions, Birzeit University, Ramallah, Palestine

[7]Institute of Metabolism and Systems Research, College of Medical and Dental Sciences, University of Birmingham, Birmingham, UK

[8]Department of Obstetrics, Al Aqsa Martyrs Hospital, Gaza, Palestine

[9]Department of Obstetrics, Al Shifa Hospital, Gaza, Palestine

[10]Department of Obstetrics, Oslo University Hospital, Ullevål, Oslo, Norway

***Correspondence**
Hadil Y. Ali, Department of Obstetrics, Palestine Medical Complex, Ramallah, Palestine; Faculty of Medicine, University of Oslo, Oslo, Norway.
Email: had_yousif@yahoo.ca

Funding Information
Norwegian Research Council

Abstract

Objective: To explore attitudes to an animation-based bimanual perineum-support technique (bPST) training video, and to investigate factors affecting the acceptability of the animation as a teaching modality.

Methods: A quantitative study conducted between November 1, 2014, and January 1, 2015, included obstetricians and midwives of any age and experience from relevant Norwegian professional organizations, and obstetrics and gynecology experts selected by the authors. Participants completed an anonymous online-survey evaluating the accuracy and clarity of the animation, and assessing knowledge of bPST and clinical practice. Factor and reliability analyses were conducted and the survey results were stratified based on the profession of the participants.

Results: The online survey was completed by 124 participants. There were 6 (5.4%) participants who reported using bPST before the study and 102 (92%) who described themselves as willing to use it afterwards, a significant increase (Z=−9.42; P<0.001). Having prior knowledge of bPST was associated with having a positive opinion of the video (t=6.43; P<0.001) and with intending to learn the technique (t=11.6; P<0.001). Participants who provided comments were more likely to evaluate the video negatively (t=−2.88; P<0.001) and to report not intending to learn the technique (t=−3.71; P<0.001).

Conclusion: Animation-based training for bPST was feasible. The prior provision of information regarding the effectiveness of bPST could potentially increase user satisfaction with the animation.

KEYWORDS

Animation; Childbirth; Perineum support; Technique; Training

1 | INTRODUCTION

Obstetric anal sphincter injuries (OASIS) represent a serious adverse event of vaginal delivery. The incidence varies from 1% to 6% both within and between different countries.[1–5] Sexual dysfunction and urinary and fecal incontinence are more common in women with a history of OASIS compared with those without.[6–8] Several studies have evaluated intrapartum interventions (e.g. use of vacuum instead of forceps, mediolateral instead of midline episiotomy, or warm compresses and perineal support) that have aimed to reduce the incidence of OASIS.[9,10] The bimanual perineum-support technique (bPST) is an enhanced form of perineal support designed to slow down the delivery of the fetal head while concomitantly protecting the posterior part of the perineum.[11] Interventional studies in Norway [11–13] have demonstrated that the implementation of bPST can result in 50% reductions in the rate of OASIS.

Interactive "hands-on" training using plastic simulators or real patients requires skilled personnel and, consequently, is costly and time consuming. Technology, such as e-learning, can be incorporated in alternative teaching methods and has become an important tool in medical education.[14] Such teaching modalities can offer time- and effort-efficient means of reaching larger groups of health professionals, ensuring that training quality is standardized and up to date.[15]

In view of the above potential benefits, an animated video was developed showing instructions for incorporating bPST into clinical practice and to offer practical perineal-protection training.

The aim of the present study was to assess if obstetricians and midwives considered the animation-based teaching method acceptable. Further, the present study explored if participants' prior knowledge of bPST influenced acceptance of the animation.

2 | MATERIALS AND METHODS

The present quantitative study was conducted between November 1, 2014 and January 1, 2015, using an anonymous online survey. All members of the Norwegian Society of Obstetricians and Gynecologists and the Norwegian Midwifery Association received electronic invitations to participate in the survey. Additionally, 100 international experts were invited in the same manner; these experts were selected by the authors based on their academic and clinical experience in the development of training programs and on obstetric perineal trauma publications. No limits were set to participants' age or length of experience; therefore, retired professionals and trainees were included.

All potential participants received electronic invitations that included links allowing access to the animated video and the relevant survey. The invitation included a brief presentation of the study, a confidentiality agreement, and confirmation of voluntary participation. This study was reviewed by the Regional Committee for Medical and Health Research Ethics in south-eastern Norway; it was considered to be a healthcare quality control research project and, consequently, did not require ethical approval (REK 2014/1727). However, all participants provided informed consent to participate and confidentiality was ensured for all participants.

The animated video (Data S1) was 4 minutes and 43 seconds in duration, and included a voiceover that explained details of the animation, including an introduction to vaginal delivery-related perineal traumas and their classification. English-language and Arabic-language versions were made available.

After watching the video, each participant was asked to answer a 30-item questionnaire (Video S1). The theme of the questions was based on the instructional video evaluation instrument described by Beaudin and Quick.[16] The questionnaire was in English and contained five sections. The first section included three questions on the usefulness, accuracy, and clarity of purpose of the animation. The second section contained 18 questions evaluating the practical and technical details of the video. The third section (three questions) assessed participants' existing knowledge, practice, and attitudes regarding bPST. Answers to these three sections were recorded using a Likert scale of agreement and disagreement (1=disagree, 5=agree, and 6=I do not understand). The fourth section included five demographic data questions (answers were recorded using free text or check boxes), and the final section (one optional question) allowed participants to add comments and suggestions to improve the animation. This is a common approach in psychology research to distinguish low involvement (not leaving comments) and high involvement (leaving comments).

The survey was developed and the animated video was uploaded using an online survey tool (Qualtrics, Provo, UT, USA). The survey permitted each participant to answer the questions only once; participants were able to save their responses so they could complete the survey later if interrupted but they were not allowed to review previously saved answers. Each potential participant was sent three reminders during the study period.

All statistical analyses were performed using SPSS version 21.0 (IBM, Armonk, NY, USA). The survey was validated using factor analysis; correlations between a set of variables were analyzed to compose a domain factor influencing other observed variables. Reliability was tested by measuring the internal consistency across questionnaire items using the Cronbach α test. Answers to the first three sections of the survey were classified based on agreement or disagreement; scores of four or five indicated agreement, and scores of two or below indicated disagreement. Answers from doctors and midwives were analyzed separately and in pooled analyses. The Mann–Whitney *U* test was used to compare the answers of midwives and doctors, and the answers of different subgroups of doctors were compared using the Kruskal–Wallis test. The Wilcoxon signed rank test was used to analyze the significance of participants' intentions to use bPST after watching the animation. In the factor analysis, the correlated questions (obtained from the first three sections) with the highest factor coefficients were used to compose a new variable, "Evaluation". Ordinary least squares regression analysis was performed to test associations between the "Evaluation" variable and previous knowledge of bPST. Another variable, "Learning", was composed of participants' intention to use bPST and previous knowledge of the technique. The association between previous knowledge, and the "Evaluation" and "Learning" variables was evaluated using multiple regression analysis. Further, associations between adding comments and the "Evaluation" and "Learning" variables were tested using the Hayes[17] method of mediation analysis. $P<0.05$ was considered statistically significant for all analyses.

3 | RESULTS

Invitations to participate were sent to 1076 members of the Norwegian Society of Obstetricians and Gynecologists, 2419 members of the Norwegian Midwifery Association, and the 100 selected international experts. Owing to internet-access restrictions at their working places, only 124 healthcare professionals where able to activate the link and participate in the study. This technical difficulty was random in nature and was not thought to have resulted in any systematic bias. Further, the sample size was considered sufficient to proceed with the analyses and to generalize the findings, and all variables had a Cronbach α value above 0.80.

TABLE 1 Characteristics of survey respondents (n=124).

Variable	No. (%)
Age, y (n=102)	
28–41	29 (28.4)
42–55	43 (42.2)
56–83	30 (29.4)
Occupation/education (n=110)	
Midwife	32 (29.1)
OBGYN doctor	78 (70.9)
Length of experience, y (n=100)	
1–10	33 (33)
11–21	28 (28)
22–32	24 (24)
33–54	15 (15)
Gender (n=108)	
Male	30 (27.8)
Female	75 (69.4)
No answer provided	3 (2.8)
Nationality (n=102)	
American	1 (1.0)
British	6 (5.9)
Bulgarian	1 (1.0)
Danish	2 (2.0)
Dutch	1 (1.0)
Egyptian	2 (2.0)
Finnish	2 (2.0)
Georgian	1 (1.0)
German	3 (2.9)
Norwegian	74 (72.5)
Palestinian	5 (4.9)
Polish	1 (1.0)
Swedish	2 (2.0)
Turkish	1 (1.0)

Of the 124 participants, 110 (88.7%) provided information about their occupation; 32 (29.1%) were midwives and 78 (70.9%) were doctors. Of the doctors participating, 22 (28%) were trainees, 46 (59%) were consultants, and 10 (13%) were professors.

The mean age and experience were 49.8 years and 19.2 years among doctors and 48.5 years and 18.9 years among midwives, respectively (Table 1). All 124 (100%) participants completed the first section of the survey and the second and third sections were each completed by 111 (89.5%) participants (Table 2). The demographic section was completed by 100 (80.6%) participants, and comments were provided by 52 (41.9%) participants in the fifth section; of these participants, 16 (31%) were midwives and 36 (69%) were doctors. There were 2 (1.6%) participants who selected the Arabic version of the video.

The animation was considered an accurate education tool by 107 (86.3%) participants. Further, 114 (91.9%) participants agreed that the objective of the animation was clear and 111 (89.5%) agreed that the animation was useful. The answers to these survey questions were also stratified by respondent profession (Table 3).

With regard to the 111 participants who gave answers to questions detailing knowledge and practice, 93 (83.8%) participants reported having already been familiar with bPST; however, only 6 (5.4%) participants reported using bPST at the time of the study (two midwives and four doctors). There were 102 (92%) participants who reported that they would be willing to use bPST after having watched the animation (28 midwives and 73 doctors). This represented a significant increase compared with the number who included bPST in their practice prior to seeing the video ($Z=-9.42$; $P<0.001$); notably, this increase in intentions to use bPST was observed when both midwives ($Z=-5.05$; $P<0.001$) and doctors ($Z=-7.91$; $P<0.001$) were considered separately.

No significant differences were detected with regard to prior knowledge of bPST, practice of bPST, and the evaluation of the animation when midwives and doctors were compared, or when different groups of doctors were compared (trainees, consultants, or professors).

Participants' evaluations of the animation were not influenced by occupation, experience, gender, or age. A significant association was found between having prior knowledge of bPST and evaluating the animation positively ($t=6.43$; $P<0.001$), and between prior knowledge of bPST and with intending to learn and use bPST in the future ($t=11.6$; $P<0.001$). Additionally, increasing familiarity with bPST was associated with increasingly positive evaluations of the animation (moderate to strong association; standardized β coefficient 0.53).

Having pre-existing knowledge of bPST seemed to be a confounding factor for the association between evaluation of the animation and learning receptiveness. Prior to testing for confounders, the association between a participant's evaluation of the animation and intention to learn bPST was moderate (standardized β coefficient 0.46). However, this association was negligible (standardized β coefficient 0.08) when previous knowledge of bPST (standardized β coefficient 0.70) was taken into account.

The final section of the survey was an open question, providing participants with the opportunity to leave a comment. Comments were added by 52 (41.9%) participants, who were considered the high-involvement group. Approximately 15% of the comments received were related to alternatives to bPST. Adding comments was associated with participants providing a more negative evaluation of the animation ($t=-2.88$; $P<0.001$) and this was associated with a decreased intention to learn bPST ($t=-3.71$; $P<0.001$) compared with participants who did not provide comments. However, 48 (92%) of the commenting participants expressed an interest in learning bPST overall.

4 | DISCUSSION

In the present study, a majority of participants agreed that the animation was accurate, clear, and could be useful as a teaching tool. More than 90% of participants confirmed that they were interested in using bPST after having watched the animation, which supports the use of animated instructions as an alternative training method. Viewing the

TABLE 2 Participant responses to the survey sections assessing the perceived usefulness and accuracy of the animation, the practical and technical details of the animation, and participants' existing knowledge of the material included.[a]

Question	Disagree[b]	Agree[c]	Neutral[d]	I do not understand[e]	Missing responses
Section 1					
The animation was accurate	6/124 (4.8)	107/124 (86.3)	10/124 (8.1)	1/124 (0.8)	0
The animation was useful	5/124 (4.0)	111/124 (89.5)	7/124 (5.6)	1/124 (0.8)	0
The objective of the animation was clear	4/124 (3.2)	114/124 (92.0)	4/124 (3.2)	2/124 (1.6)	0
Section 2					
The voiceover explaining how the left hand is applied was understandable	4/122 (3.3)	108/122 (88.5)	8/122 (6.6)	2/122 (1.6)	2
The voiceover explaining degrees of perineal tears was not understandable	98/124 (79.0)	13/124 (10.5)	10/124 (8.1)	3/124 (2.4)	0
The fingers were flexed and placed in an understandable way	5/115 (4.3)	102/115 (88.7)	5/115 (4.3)	3/115 (2.6)	9
The fingers were shown in a correct way	5/111 (4.5)	97/111 (87.4)	7/111 (6.3)	2/111 (1.8)	13
The thumb was placed accurately	2/115 (1.7)	109/115 (94.8)	3/115 (2.6)	1/115 (0.9)	9
The explanation of how to apply the thumb was clear	8/115 (7.0)	98/115 (85.2)	8/115 (7.0)	1/115 (0.9)	9
The index finger was placed accurately	3/115 (2.6)	108/115 (93.9)	3/115 (2.6)	1/115 (0.9)	9
Explanation of how to apply the index finger was not accurate	66/115 (57.4)	40/115 (34.8)	7/115 (6.1)	2/115 (1.7)	9
The middle finger was placed accurately	9/115 (7.8)	87/115 (75.7)	18/115 (15.6)	1/115 (0.9)	9
Explanation of how to apply the middle finger was sufficient	26/115 (22.6)	69/115 (60.0)	18/115 (15.7)	2/115 (1.7)	9
The timing for use of both hands when the baby's head is crowing was explained in a clear way	7/111 (6.3)	95/111 (85.6)	8/111 (7.2)	1/111 (0.9)	13
Slowing down the baby's head was shown in an understandable way	6/122 (4.9)	107/122 (87.7)	8/122 (6.6)	1/122 (0.8)	2
The perineum was shown accurately	5/111 (4.5)	99/111 (89.2)	6/111 (5.4)	1/111 (0.9)	13
How to communicate with the mother was made clear	5/111 (4.5)	92/111 (82.9)	12/111 (10.8)	2/111 (1.8)	13
The end of the film that shoed the mother and the baby were fine	9/111 (8.1)	91/111 (82.0)	10/111 (9.0)	1/111 (0.9)	13
I was not interrupted while watching this animation	6/111 (5.4)	100/111 (90.1)	1/111 (0.9)	4/111 (3.6)	13
I had problems understanding the language	96/111 (86.5)	7/111 (6.3)	7/111 (6.3)	1/111 (0.9)	13
Section 3					
I was previously familiar with perineum support technique	3/111 (2.7)	93/111 (83.8)	13/111 (11.7)	2/111 (1.8)	13
I use the perineum support technique frequently	97/111 (87.4)	6/111 (5.4)	7/111 (6.3)	1/111 (0.9)	13
I will use the technique in the future	3/111 (2.7)	102/111 (92.0)	2/111 (1.8)	4/111 (3.6)	13

[a]Values are given as number/number available for analysis (percentage) or number.
[b]Indicated by a score of ≤2 on the video assessment scale.
[c]Indicated by a score of 4 or 5 on the video assessment scale.
[d]Indicated by a score of 3 on the video assessment scale.
[e]Indicated by a score of 6 on the video assessment scale.

animation positively was not associated with the age, education, or experience of participants, and the results supported the assertion that awareness of the importance of bPST in preventing OASIS was an important factor effecting how participants viewed the animation.

The participants who provided comments were more likely to give a negative evaluation of the animation. Although the majority of participants confirmed their interest in using bPST, the results of the open question suggested that some of these were clinicians who did not

TABLE 3 Stratification of respondents who agreed with the statements from sections one and three based on profession and experience.

Features of the animation	Midwives (n=32)	Doctors (n=78)	Experience level among doctors completing the survey		
			Trainee (n=22)	Consultant (n=46)	Professor (n=10)
Section 1					
Accurate	26 (81)	68 (87)	17 (77)	43 (93)	8 (80)
Useful	27 (84)	73 (94)	20 (91)	44 (96)	9 (90)
Clear objective	28 (88)	75 (96)	21 (95)	44 (96)	8 (80)
Section 3					
Prior knowledge of bPST	25 (78)	67 (86)	18 (82)	41 (89)	8 (80)
Previous application of bPST	2 (6)	4 (5)	1 (5)	3 (7)	0
Intends to use bPST in the future	28 (88)	73 (94)	20 (91)	43 (93)	10 (100)

Abbreviation: bPST, bimanual perineum-support technique.

favor bPST in their practice. It is possible that this difference in opinion reflects competing views about the effect of bPST in reducing the incidence of OASIS[18] rather than actual dissatisfaction with the quality of the animation. The variation in participant attitudes could represent existing equipoise amongst some doctors and midwives in terms of the optimal method to protect the perineum.[18] Nevertheless, there appears to be consensus among experts in this field that hands-on perineum support during the second stage of labor should be standard practice unless solid evidence favoring a hands-off approach is produced.[19]

Educating birth attendants in effective techniques for manual perineum support during vaginal delivery could help to reduce the global incidence of OASIS. Conventional hands-on training in bPST requires economic resources and, therefore, large-scale delivery is challenging. Other challenges include access to trainers, an inflexible working schedule for both trainers and trainees, and busy clinical duties. The introduction of e-learning to the medicine and healthcare arenas has resulted from the wide spread of internet access and smart devices. A systemic review[20] demonstrated that up to 70% of physicians use handheld computers for professional purposes. Moreover, a pilot study[21] reported that trainees and medical students recommend that technology skills should be integrated in their training programs. Openness to e-learning has been described across several different medical fields. A previous survey among primary healthcare nurses[22] reported an acceptance of, and an intention to use, mobile teledermoscopy for education in the diagnosis of skin lesions. In a study in Kenya,[23] two different training methods for the management of postpartum hemorrhage were compared; the conventional hands-on method and a mobile-mediated training method. The study concluded that the two methods were equally effective and that the mobile-mediated method had an advantage of being highly feasible for use in rural areas.[23] A recent literature review[24] reported the presence of growing evidence indicating a positive impact of mobile health interventions on treatment compliance, data collection, and the construction of health-support systems in low- and middle-income countries. With this in mind, the distance-learning package described in the present study could potentially be a cost-effective method for delivering bPST training, and could be introduced and adopted by practitioners around the world relatively easily.

Animations can be viewed on mobile devices such as laptops and smart phones and, once downloaded, an internet connection is no longer necessary to view them. Animations can also be installed on tablets in labor rooms to provide an immediate ongoing-learning resource. This is similar to the concept of "just-in-time" learning, which has the aim of providing training for a precise skill, or knowledge tailored to trainees' needs, enabling them to develop the skill quickly and competently within the clinical setting.[25]

The potential easy availability of the animation would allow flexibility in the time available to watch it, and presents the possibility of watching the animation repeatedly and in any location, including in resource-constrained settings.

The animation was evaluated for its feasibility as a bPST teaching method. Prior awareness of bPST was associated with a more positive opinion of the resource among participants and a greater reported likelihood of adopting the technique in practice. Consequently, it is envisaged that incorporating a theoretical component that provides scientific underpinning of the intervention would likely enhance its potential as a training tool. Further, a randomized controlled trial would offer the best means of assessing the effectiveness of the animation and could convince a larger number of healthcare professionals of the benefits of this education model.

Some prominent limitations of the present study were the restricted sample size and the technical limitations described that caused this, which were the result of the internet-access restrictions for email and IP addresses at the working places of the invited health professionals; it is likely that this negatively impacted on the response rate. However, technical difficulties such as those described in the present study can affect studies that rely on email responses from participants. It is thought that 124 participants were sufficient to conduct the necessary analyses and that the technical challenges did not result in systematic bias. Retesting the survey could increase the reliability of the results. However, the demographic-focused questions demonstrated that a wide variety of respondents were included in the present study and the descriptive statistics indicated that the animation was well understood.

Consequently, it is asserted that there should be no reason to believe that the results were biased by the discussed limitations. Typical of studies using surveys to collect data, the response rate decreased progressively throughout the survey sections, resulting in missing data for some variables; this could have resulted from the length of the survey or from service demands placed on respondents. The greatest incidence of incomplete data was recorded in the demographic section; data were missing from 19.4% of participants. The other survey sections were missing responses from only 10.5% of participants; owing to the substantial difference in the number of respondents that gave positive and negative evaluations of the animation, it is unlikely that the missing responses had a significant effect on the results.

Owing to the anonymous nature of the survey, the sub-analyses that could be performed were limited, and it was not possible to analyze the results of experts and generalists separately. It could be argued that the inclusion of experts could have introduced selection bias. However, given that a main goal of the present study was to evaluate the potential integration of the animation in bPST teaching, it was felt that it would be beneficial to reflect the views of professionals who could be drivers of change within the field.

AUTHOR CONTRIBUTIONS

HYA contributed to data analysis and manuscript writing. ÅV contributed to the design of the study, the development of the animation and the survey, data collection, and the revision of the manuscript. MA contributed to the design of the study, the development of the survey, data collection and analysis, and the revision of the manuscript. SH contributed to the development of the survey, the review of the animation, data collection, and the revision of the manuscript. KMI contributed to the review of animation, to survey development, and to the revision of the manuscript. KZ and MZ contributed to the collection of data and the revision of the manuscript revision. EF contributed to the development of the protocol, the design of the study, and to the revision of the manuscript. KL contributed to the design of the study, the development of the animation and the survey, and the revision of the manuscript. All authors approved the final manuscript.

ACKNOWLEDGMENTS

This study was funded by the Norwegian Research Council (grant number 234452). The video was developed by ÅV, KL, and Ahmad Shirbini, Department of Media and Mass Communication, October 6 University, Cairo, Egypt.

CONFLICT OF INTEREST

The authors have no conflicts of interest.

REFERENCES

1. Räisänen S, Vehviläinen-Julkunen K, Gissler M, Heinonen S. Up to seven-fold inter-hospital differences in obstetric anal sphincter injury rates- A birth register-based study in Finland. *BMC Res Notes*. 2010;3:345.
2. Laine K, Gissler M, Pirhonen J. Changing incidence of anal sphincter tears in four Nordic countries through the last decades. *Eur J Obstet Gynecol Reprod Biol*. 2009;146:71–75.
3. Prager M, Andersson KL, Stephansson O, Marchionni M, Marions L. The incidence of obstetric anal sphincter rupture in primiparous women: A comparison between two European delivery settings. *Acta Obstet Gynecol Scand*. 2008;87:209–215.
4. Baghestan E, Irgens LM, Børdahl PE, Rasmussen S. Trends in risk factors for obstetric anal sphincter injuries in Norway. *Obstet Gynecol*. 2010;116:25–34.
5. Laine K, Rotvold W, Staff AC. Are obstetric anal sphincter ruptures preventable?– large and consistent rupture rate variations between the Nordic countries and between delivery units in Norway. *Acta Obstet Gynecol Scand*. 2013;92:94–100.
6. Sundquist JC. Long-term outcome after obstetric injury: A retrospective study. *Acta Obstet Gynecol Scand*. 2012;91:715–718.
7. Scheer I, Andrews V, Thakar R, Sultan AH. Urinary incontinence after obstetric anal sphincter injuries (OASIS)–is there a relationship? *Int Urogynecol J Pelvic Floor Dysfunct*. 2008;19:179–183.
8. Stedenfeldt M, Pirhonen J, Blix E, Wilsgaard T, Vonen B, Øian P. Anal incontinence, urinary incontinence and sexual problems in primiparous women – a comparison between women with episiotomy only and women with episiotomy and obstetric anal sphincter injury. *BMC Womens Health*. 2014;14:157.
9. Harvey MA, Pierce M, Alter JE, et al. Obstetrical Anal Sphincter Injuries (OASIS): prevention, recognition, and repair. *J Obstet Gynaecol Can*. 2015;37:1131–1148.
10. Asheim V, Nilsen AB, Lukasse M, Reinar LM. Perineal techniques during the second stage of labour for reducing perineal trauma. *Cochrane Database Syst Rev*. 2011;(12):CD006672.
11. Hals E, Øian P, Pirhonen T, et al. A multicenter interventional program to reduce the incidence of anal sphincter tears. *Obstet Gynecol*. 2010;116:901–908.
12. Laine K, Pirhonen T, Rolland R, Pirhonen J. Decreasing the incidence of anal sphincter tears during delivery. *Obstet Gynecol*. 2008;111:1053–1057.
13. Laine K, Skjeldestad FE, Sandvik L, Staff AC. Incidence of obstetric anal sphincter injuries after training to protect the perineum: Cohort study. *BMJ Open*. 2012;2(5). pii: e001649. doi:10.1136/bmjopen-2012-001649.
14. Jayakumar N, Brunckhorst O, Dasgupta P, Khan MS, Ahmed K. e-Learning in surgical education: A systematic review. *J Surg Educ*. 2015;72:1145–1157.
15. Cook DA, Levinson AJ, Garside S, Dupras DM, Erwin PJ, Montori VM. Internet-based learning in the health professions: A meta-analysis. *JAMA*. 2008;300:1181–1196.
16. Beaudin BP, Quick D. Instructional video evaluation instrument. *J Extension*. 1996;34:n3.
17. Hayes AF. Beyond Baron and Kenny: Statistical medical analysis in the new millennium. *Commun Monogr*. 2009;76:408–420. doi:10.1080/03637750903310360.
18. Bulchandani S, Watts E, Sucharitha A, Yates D, Ismail KM. Manual perineal support at the time of childbirth: A systematic review and meta-analysis. *BJOG*. 2015;122:1157–1165.
19. Ismail KM, Paschetta E, Papoutsis D, Freeman RM. Perineal support and risk of obstetric anal sphincter injuries: A Delphi survey. *Acta Obstet Gynecol Scand*. 2015;94:165–174.
20. Kho A, Henderson LE, Dressler DD, Kripalani S. Use of handheld computers in medical education. A systematic review. *J Gen Intern Med*. 2006;21:531–537.
21. Briscoe GW, Fore AL, Lin T, Johnson J, Rai A, Kollins K. Students' and residents' perceptions regarding technology in medical training. *Acad Psychiatry*. 2006;30:470–479.

22. Stratton D, Loescher LJ. The acceptance of mobile teledermoscopy by primary care nurse practitioners in the state of Arizona. *J Am Assoc Nurse Pract*. 2016;28:287–293.
23. Nilsson C, Sørensen BL, Sørensen JL. Comparing hands-on and video training for postpartum hemorrhage management. *Acta Obstet Gynecol Scand*. 2014;93:517–520.
24. Hall CS, Fottrell E, Wilkinson S, Byass P. Assessing the impact of mHealth interventions in low- and middle-income countries–what has been shown to work? *Global Health Action*. 2014;7:25606.
25. Kahn CE Jr, Santos A, Thao C, Rock JJ, Nagy PG, Ehlers KC. A presentation system for just-in-time learning in radiology. *J Digit Imaging*. 2007;20:6–16.

SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

Data S1. The animated bimanual perineum-support technique training video. The video is used with permission from Oslo University Hospital.

Video S1. The questionnaire completed by participants after viewing the animation.