EDUCATION AND TRAINING

Training physiotherapists to use the Pelvic Organ Prolapse Quantification System

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Abstract
The Pelvic Organ Prolapse Quantification System (POP-Q) is an outcome measure used mainly by gynaecologists that has no standardized training package. It was hypothesized that one formal and several clinical training sessions would allow physiotherapists to independently complete the POP-Q. As part of another study, a training package was designed with the aim of teaching physiotherapists how to use this outcome measure. Six participants with a range of experience in women's health attended a formal training session, and three or four supervised clinical training sessions. Their progress through these sessions was observed, as were instances of additional training; for example, informal discussions with colleagues, repeated viewing of the American Urogynecologic Society POP-Q training DVD and self-development of three-dimensional (3D) models. A focus group was conducted to explore the training package from the point of view of the physiotherapists, and descriptive themes were reported. The focus group revealed that the participants had successfully learned how to use the POP-Q and gained a good conceptual understanding of the system, but were not always confident when performing the examination. They would have appreciated additional clinical training, and also an opportunity for discussion with more-experienced colleagues.

Keywords: pelvic organ prolapse, Pelvic Organ Prolapse Quantification System, physiotherapists, POP-Q, training.

Introduction

The Pelvic Organ Prolapse Quantification System (POP-Q) (Bump *et al.* 1996) is a standardized outcome measure of pelvic organ prolapse (POP) that is primarily used by gynaecologists. Physiotherapists routinely deliver pelvic floor muscle (PFM) training to treat women with POP (Hagen *et al.* 2016). However, no common outcome measure is used for assessment, and the POP-Q is not routinely taught to physiotherapists. The POP-Q examination measures nine site-specific points (six internal vaginal locations, Aa, Ap, Ba, Bp, C and D, and three external ones, gh, pb and TVL), tracing the anterior, apical and posterior profile of the POP, and provides instructions on calculating a categorical prolapse stage (range = 0–IV).

Despite being a recommended standardized tool, the POP-Q is underused by gynaecologists in clinical practice because it is perceived as being time-consuming and difficult to understand (Scotti *et al.* 2000; Auwad *et al.* 2004). Training is likely to be a key component in allowing this outcome measure to become accepted and used by gynaecologists and other clinicians. There is no standardized and accepted method of teaching individuals to use the POP-Q. The paper that originally described the system (Bump *et al.* 1996) is regarded as a poor starting point: the language used by the authors has been criticized for being impenetrable (Scotti *et al.* 2000); and

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reading the article did not affect medical students' final comprehension of the POP-Q (Steele *et al.* 1998).

The three papers on teaching the POP-Q (Steele *et al.* 1998; Scotti *et al.* 2000; Geiss *et al.* 2007) all concur that it needs to be adequately envisioned by the trainee, and suggest different non-verbal, non-written methods to enable that conceptualization: a diagram (Scotti *et al.* 2000); a video (Steele *et al.* 1998); and a three-dimensional (3D) model (Geiss *et al.* 2007). A revised conceptual system to visualize the vagina and its surrounding support structures, presented as a diagram, removes the need to use the lettering system of the POP-Q (Scotti *et al.* 2000). The use of this analogy has been informally reported to have received positive feedback from those to whom it has been presented (Flora 2014). Fifty-four medical students were trained in three stages (Steele *et al.* 1998): reading the original article; observing the American Urogynecologic Society (AUGS) POP-Q training DVD; and using a brief visual memory aid. After an assessment involving a questionnaire that tested the participants' level of comprehension, the DVD was found to be the most effective component of the training. The 3D model (Geiss *et al.* 2007) was based on an inverted "Santa Claus" cap, with the tassel representing the cervix, and buttons sewn on to the material denoting two site-specific points (Aa and Ap). The cap was fixed to a wooden embroidery frame that represented the hymen. The 82 participants' mean level of satisfaction with the training workshops that used this tool was 1.3 on a scale from (1) very satisfactory to (5) not satisfactory.

Following adequate conceptualization, the successful development of a practical skill requires physical practice. In a commentary appended to Steele *et al.*'s (1998) paper, Dr Ellen Wells stated that, after a POP-Q training programme using the original article and video, mastery of the POP-Q was only achieved when it was employed in a clinical setting. The results of a questionnaire assessing the use of the original article, a training video and a question-and-answer session to train medical students demonstrated that their understanding improved immediately after the training, but was lower, although still better than the baseline, 5 months after training (Peterson & Amin 2014).

In preparation for a study to assess the reliability of physiotherapists using the POP-Q, a package was assembled that was designed to guide the trainee examiners from first concepts through to clinical practice. The aim of the present article is to describe that training package, and to report on its implementation and evaluation as part of the reliability study. The present authors hypothesized that a package consisting of a formal training session, including a non-verbal, non-written method of conceptualization, followed by clinical training sessions would allow physiotherapists to be taught to perform the POP-Q independently and with confidence.

Participants and methods

Background

The development, implementation and evaluation of the POP-Q training package took place within the context of a reliability study investigating the inter- and intra-rater reliability of the POP-Q (Stark *et al.* 2010). Two gynaecologists who were experienced in performing POP-Q evaluations acted as the gold standard, while six physiotherapists participated as POP-Q examiners and were trained in its use. Women, who would have had a vaginal examination as part of their routine care, were recruited from urogynaecology and gynaecology outpatient clinics in two hospitals in Glasgow, UK. Four POP-Q examinations were performed on each patient during two clinical visits by three different POP-Q examiners. The study was approved by the South Glasgow Research Ethics Committee on 1 March 2006 (REC reference number 06/S0702/9).

The POP-Q training package

The training programme, which was based on the available literature, was designed and implemented in 2006. It consisted of a formal training session to allow conceptualization of the POP-Q and then a period of practical training.

Formal training session

The formal training session, which was led by a subspecialist registrar in urogynaecology, was 1.5 h in duration and involved:

(1) a verbal explanation of the POP-Q system, augmented by a diagram from the original article (Bump *et al.* 1996) showing a side-profile view of the vagina, and the nine site-specific measurement points;
(2) a viewing the AUGS POP-Q training DVD;
(3) the provision of information about standardizing conditions for the reliability study, including examination protocols, equipment and data collection (a recording chart was developed for the study that allowed the

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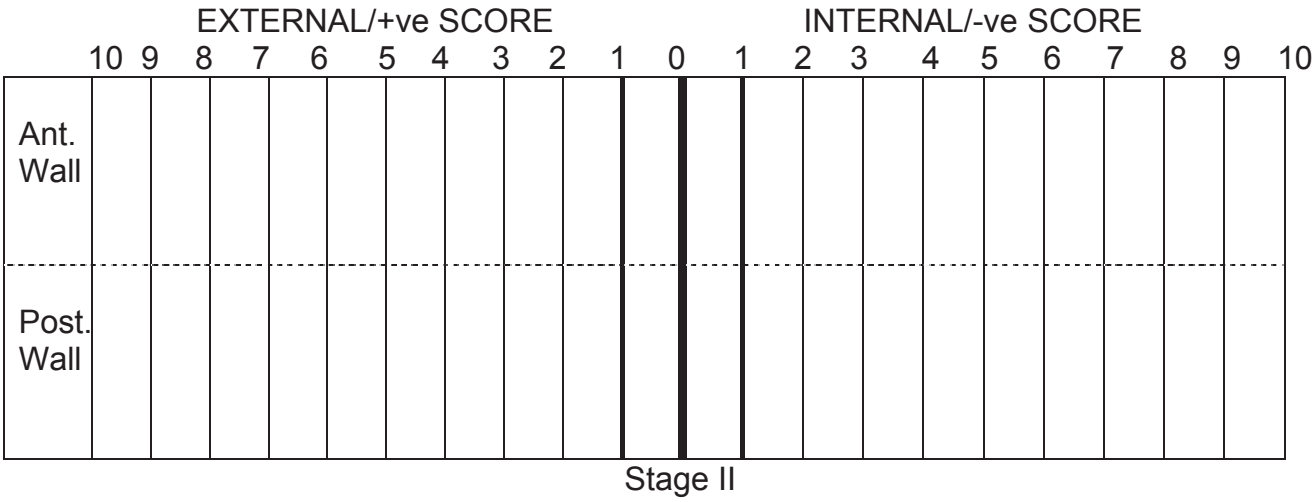
POP-Q Recording Form

POP-Q point	Description	Meas (cm)
gh	genital hiatus:middle external urethral meatus to post. midline of hymen	
pb	perineal body:posterior margin of genital meatus to mid-anal opening	
Aa	midline anterior vaginal wall 3cm proximal to externalurethral meatus	
Ba	distal position of remainder of upper anterior vaginal wall	
C	distal edge cervix/vaginal cuff scar	
D	posterior fornix (if cervix present)	
Ap	midline posterior vaginal wall 3cm proximal to the hymen	
Bp	distal portion of remainder of posterior vaginal wall	
TVL	depth of vagina when point C or D is reduced to normal position	

POP-Q Graph



Prolapse Stage (Please circle) **0 I II III IV**

Figure 1. The Pelvic Organ Prolapse Quantification System (POP-Q) recording form. Developed for the present study, this lists the nine site-specific measurement points of the POP-Q in the order that these are determined, and provides a space to draw the vaginal profile.

physiotherapists to record the POP-Q points in the order that these were measured and allowed space for them to draw the vaginal profile; Fig. 1);

(4) a question-and-answer session led by the subspecialist registrar; and

(5) a second viewing of the AUGS POP-Q training DVD.

Information regarding the use of 3D models (Geiss *et al.* 2007) was not available at the time of the design and implementation of the training, and the AUGS POP-Q DVD was selected as a commercially available method of teaching the POP-Q and helping the participants to conceptualize it. Although the physiotherapist examiners were provided with the original POP-Q article before the training session, they were not otherwise encouraged to read it before attendance. The additional explanation and discussion during the training session served to cement the conceptualization of the POP-Q, and to provide standardized practice for the reliability study.

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Practical training

The practical training consisted of the physiotherapists observing experienced gynaecologists performing POP-Q examinations at outpatient clinics, followed by the participants performing examinations themselves while supervised by medical staff. The practical training sessions took place in the clinics used in the reliability study, which were not dedicated POP clinics, and thus, not all patients involved in the present study had clinically relevant prolapse.

Implementation and continued development of the training package

Attendance at the training sessions was recorded, as were the number of cases observed and examined by the physiotherapist during the reliability study. The principal investigator of the reliability study (D.S.), a physiotherapist, attended all study clinics, and observed the ongoing development of skills and understanding of the POP-Q by the physiotherapist examiners.

Evaluation and feedback

The POP-Q examiners were invited to attend a focus group feedback session 6 months after the training programme. Moderated by two researchers (D.S. & P.M.D.), the focus group was semi-structured, which allowed the participants to discuss various aspects of the study. The focus group was recorded using a digital voice recorder and the participants contributions were transcribed. Emerging themes relating to training in the use and implementation of the POP-Q were developed from repeated readings of the transcript, and a basic descriptive analysis was conducted.

Results

Implementation of the training package

Six physiotherapists and two gynaecologists participated in the reliability study (Table 1). Each participant attended the formal training session, and three or four clinics for the practical training. Once all of the physiotherapists felt able, they performed POP-Q examinations, and received supervision and feedback from the experienced medical staff at the clinic. In addition, since they were initially unfamiliar with vaginal examination, the two staff-grade physiotherapists, who each had 4 months of experience, also observed several vaginal examinations by gynaecologists and PFM assessments performed by more-experienced physiotherapists before beginning their practical training for the POP-Q examinations.

Continued development of training

Further self-learning was optional; however, most of the participants took part in some form of continuing training while using the POP-Q during the reliability study. Four of the physiotherapist examiners reread the original POP-Q article (Bump *et al.* 1996), and most watched the AUGS POP-Q training DVD one or more additional times during the course of the study. Each time the DVD was viewed, there was an improvement in knowledge that confirmed the use of the correct technique and enhanced comprehension. For example, during a repeat viewing, one physiotherapist realized that she had not been encouraging patients to bear down in order to enable her to complete the gh and pb measurements. Because these points do not contribute to prolapse staging, the study continued with that participant using the corrected technique.

Two 3D models were developed without external prompting by two of the physiotherapists in order to assist them with visualizing the POP-Q points. One of these used flexible garden wire to represent the vaginal profile, and moveable coloured beads to denote each POP-Q point (Fig. 2). The other employed a rigid plastic tube to represent the vagina, and flexible plastic sides and a top (part of a rubber glove) were placed within the tube to represent moveable vaginal walls. The operator moved the flexible walls from

Table 1. Professional designation and experience of the Pelvic Organ Prolapse Quantification System examiners

Grade	Time spent working in obstetrics and gynaecology	Gynaecology clinics attended for practical training (*n*)
Staff-grade physiotherapist	4 months	4
Staff-grade physiotherapist	4 months	4
Senior women's health physiotherapist	6 years	3
Senior women's health physiotherapist	8 years	3
Clinical specialist in pelvic floor dysfunction	16 years	3
Superintendent physiotherapist	14 years	4
Gynaecologist	15 years	–
Gynaecologist	16 years	–

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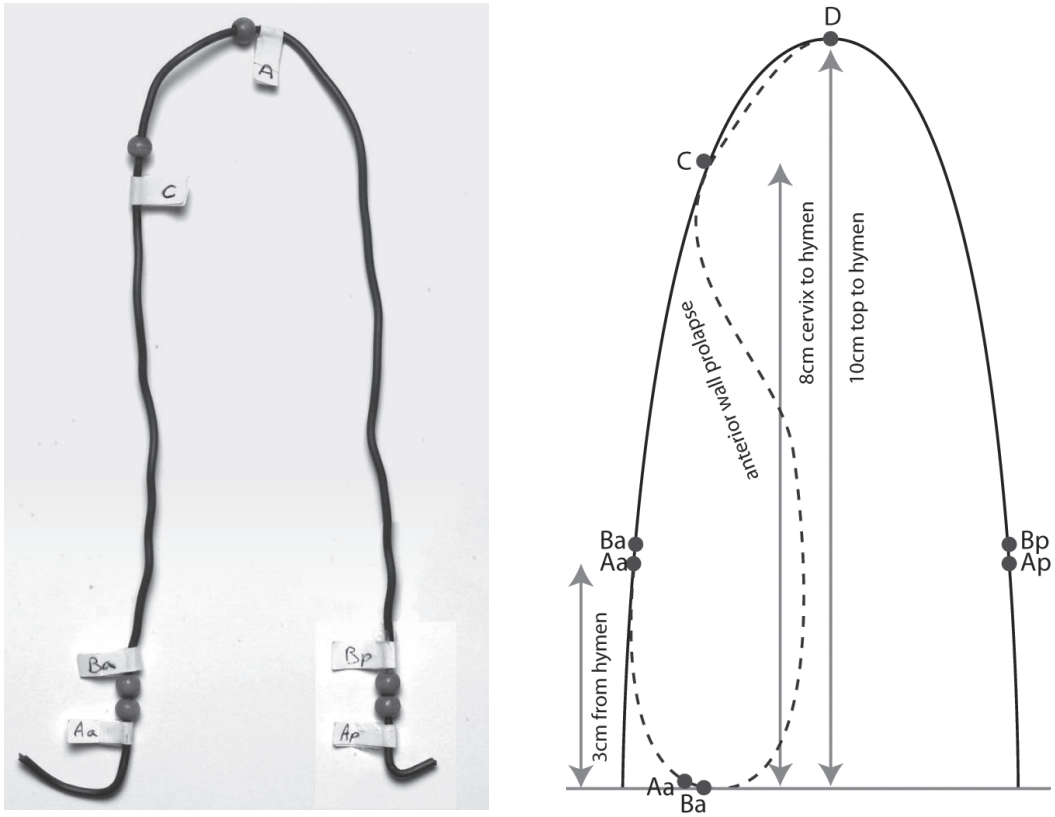

Figure 2. (a) One of the three-dimensional (3D) models developed during the training sessions: the garden wire represents the vaginal wall and can be bent into different profiles; and the beads denote the internal site-specific points Aa, Ba, Ap, Bp, C and D. (b) Diagram explaining the use of the 3D model.

above to illustrate where points, accessed from beneath, should be measured. These were developed and used by the physiotherapists with the least experience of gynaecology to explain the POP-Q to colleagues. Peer discussion, although retrospective and limited by the constraints of the reliability study, was particularly helpful for the staff-grade physiotherapists.

Evaluation and feedback

The focus group was attended by one of gynaecologists involved in the study, and all six of the physiotherapist examiners. The predominant theme that emerged from the focus group, one that was reported by all the physiotherapist examiners and recurred throughout the discussion topics, related to confidence: the personal confidence of the physiotherapists about performing the POP-Q examination after training, and things that mediated that confidence, with specific reference to ongoing feedback and learning.

The personal confidence of the examiners was mediated by their exposure to recent training. The two physiotherapists on 4-month training rotations stated that learning new skills was a continuous part of their professional lives, and therefore, a familiar experience:

> "We have the advantage of . . . trying to do new skills every 4 months . . . so the POP-Q isn't really out of the ordinary." (Physiotherapist E)

However, three of the four physiotherapists with long-standing experience of women's health reported that they had reached stages in their careers where a lack of confidence in a professional skill was an unfamiliar situation experienced as a loss of control:

> " . . . and it completely threw me because I never feel like that." (Physiotherapist C)

In contrast, the gynaecologist examiner, who had experience of both women's health and using the POP-Q, demonstrated complete confidence in his ability to perform the POP-Q, while acknowledging the difficult technical aspects of the examination without feeling any lack of personal confidence:

> "I'm confident of my uncertainty." (Gynaecologist 2)

Two participants reported that their levels of personal confidence were mediated by how frequently and how recently the skill had been performed:

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> "I had a couple of clinics . . . which were all quite close together . . . and I took a lot of confidence from that." (Physiotherapist E)

All six physiotherapist examiners reported that their levels of personal confidence were affected by feedback and informal discussion during the reliability study, but this was a variable experience. Generally, the reliability study was believed to limit their access to feedback and continued learning, leading to a lack of growth in personal confidence about performing the POP-Q:

> "I'm sure we're all at that stage where we're doing it and thinking, *Yeah*, but we'd like that reassurance." (Physiotherapist E)

By contrast, those physiotherapist examiners who did receive informal feedback, or who participated in informal discussion during the study, associated this with an increase in personal confidence about performing the POP-Q:

> "I must be feeling it correctly because we're the same, and I think I took a lot of confidence from that." (Physiotherapist E)

It is evident that the artificial constraints on continued learning and practice imposed by the reliability study had an impact on the participants' capacity for continued learning, sometimes leading to frustration:

> "You would think, *Oh, I wish I could ask somebody about that*." (Physiotherapist A)

Despite repeated statements that emphasized a lack of personal confidence when performing the POP-Q, the physiotherapist examiners demonstrated considerable conceptual knowledge of it during the focus group. There was sustained discussion with the gynaecologist throughout the focus group about concepts and issues relating to the POP-Q. These discussion topics included different models and methods of explaining fascial support to patients, and the demonstration of the 3D models developed during the study by the physiotherapist examiners to conceptualize the POP-Q.

Two participants stated that the duration of training was too short, although these comments were mediated by feelings of low personal confidence:

> " . . . but I could have trained for 3 months and not have been sure." (Physiotherapist B)

One participant, a staff-grade physiotherapist, stated that additional learning was associated with unfamiliar equipment, meaning that a longer training period would have been useful:

> "I was too busy getting the basic stuff, and not even particularly the POP-Q stuff at that stage." (Physiotherapist F)

There was an informal extension of the training period during the reliability study that included repeated viewing of the AUGS DVD and the creation of the 3D models.

One physiotherapist examiner stated that the quality of the training was good, while two said that it was variable. The inconsistencies reported referred specifically to the practical sessions, where learning took place under different medical staff who did not always perform the POP-Q in the same manner:

> "I was with different consultants and they all do it in a slightly different way . . . which was good for our learning but . . . that can be a bit confusing as well." (Physiotherapist B)

The variability of the training was also mentioned with reference to the clinics, where there was not always an opportunity to see a range of patients with POP, leading to unfamiliar presentations during the reliability study:

> "My problem was, at clinics, the only people [. . .] I saw had absolutely minimal prolapse." (Physiotherapist C)

It was suggested that having a model for practice, which would allow feedback on examination technique to be provided, would help with consistency.

There were some aspects of the training that the physiotherapist examiners found unfamiliar. One participant reported that the visualization involved in performing the POP-Q (e.g. the cervix) was a less-familiar way of working than using touch:

> "The fundamental difference for me, I think, [is] that, as [. . .] physiotherapist[s], we are used to feeling things and trusting our hands." (Physiotherapist D)

Another participant observed that a lot of physiotherapy training is facilitated by performing the procedure on a fellow trainee, which allows for a high level of feedback about technique, and that the POP-Q training was not accompanied by normal levels of peer support and feedback.

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Discussion

A POP-Q training programme was developed that consisted of a formal session with a verbal description of the POP-Q and a viewing of the AUGS POP-Q training DVD, followed by clinical observation and supervised performance. Six physiotherapists with a wide range of experience were successfully trained to use the POP-Q system, including two who had had no prior experience of examining the PFMs via internal examination.

The focus group discussions indicated that conceptual understanding of the POP-Q system was achieved by all the physiotherapists. The use of the AUGS POP-Q training DVD and the development of 3D models were important teaching aids during this learning process. Repeated viewing of the training DVD led to improvements in comprehension, such as realizing that the gh and pb measurements should be undertaken when the woman was bearing down. Similar misunderstandings have been reported elsewhere (Ali-Ross *et al.* 2009). The process of creating a 3D model and explaining it to others helped participants to develop an in-depth understanding of the methodology of the POP-Q, which was reinforced by demonstrating the model to other study participants and colleagues. Conceptual understanding of the POP-Q was also demonstrated during the focus group, when all the physiotherapist examiners took part in an extensive, technical discussion with the gynaecologist.

The models created by the physiotherapists to enhance their learning and understanding of the POP-Q had several elements in common. In both cases, there was a flexible component that could be shaped to form a range of vaginal profiles, and a fixed part representing the hymen. In addition, there were components representing some POP-Q points (Aa and Ap at the very least) that allowed the prolapse to be visualized by moving these items. These components are also found in the 3D teaching tool developed by Geiss *et al.* (2007), which had not been published when the present study was conducted. The inclusion of these common elements in independently produced models indicates that there is a shared need to conceptualize the POP-Q, and it is possible that the interaction between the model and the trainee may help to cement the concepts behind the POP-Q. The visualization of the POP-Q as analogous to a house (Scotti *et al.* 2000; Flora 2014) may operate in a similar way, underscoring the need to transfer unfamiliar concepts into a familiar framework. However, the lack of a physical model that can be manipulated limits interaction to that which can already be conceptualized.

In the clinical situation, it is accepted that one can ask more-experienced colleagues for assistance with an unfamiliar clinical presentation or the learning of a new skill. This is a very important part of the ongoing learning process involved in acquiring proficiency in a new area (Steele *et al.* 1998), and one which was limited in the present research because of the constraints of the reliability study. The physiotherapist examiners were able to perform the POP-Q examinations, but did not express complete personal confidence in their ability to do so. Perhaps this demonstrates that the mastery described by Wells (Steele *et al.* 1998) had not been achieved through clinical practice. In terms of exposure to cases, the practical training was not consistent across the clinics, and it was suggested that volunteers with known ranges of types and severity of prolapse could facilitate consistent training.

There are five main recommendations for the future composition of a training package that can be drawn from this experience. First, sufficient time should be provided before POP-Q training commences to allow trainees to gain familiarity with vaginal examination and the equipment involved. Secondly, while the formal training session provided for the present study was adequate, the addition of 3D models that the trainees can interact with would probably improve conceptualization of the POP-Q prior to clinical experience. Thirdly, clinical practice is crucial to the confident performance of the POP-Q, and there is a need to ensure that clinical training encompasses a range of POP presentations, whether by attendance at clinics where a range of women with prolapse are evaluated, or by use of volunteers with particular presentations of prolapse. Fourthly, there should be sufficient clinical support in the early stages of performing the POP-Q to allow for discussions with and additional input from peers and clinically experienced colleagues. Finally, the present authors recommend continuing learning after the POP-Q has begun to be used. Repeated viewings of the AUGS DVD by physiotherapist examiners were accompanied by increases in their knowledge. This may also help to counteract a reduction in knowledge over time, such as that experienced by medical students 5 months after their initial instruction (Peterson & Amin 2014).

A limitation of the present study was that evaluation of the training package was not the

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primary aim of the reliability study. Although set up with mechanisms to allow the review of the training process, the reliability study occasionally constrained the ability of the authors to evaluate the training, most noticeably by limiting clinical training and discussion. Only a small number of physiotherapists who were committed to the research process were taught. It is not clear if the training package could be rolled out effectively to a larger and potentially less motivated group of clinicians.

The POP-Q is perceived as a difficult system to learn how to use, but there is a pressing need for a common outcome measure to allow effective interdisciplinary communication about the severity and progression of POP for both clinical and research purposes. In response to the perceived difficulty in training individuals to perform examinations with the POP-Q and its limited clinical use, a simplified version has been developed (Parekh *et al.* 2011), but there is debate about whether this adequately covers all the information required from a prolapse examination (Bump 2014). Additionally, little attention has been given to the training that is required for individuals to be able to use the simplified version successfully. Whichever version of the POP-Q becomes standard in future, there is a need for additional large-scale research into the content and effectiveness of a standardized training programme to take trainees from first principles to clinical mastery of the POP-Q.

Conclusion

A training package consisting of one formal, and three or four clinical training sessions successfully taught six physiotherapists to use the POP-Q with a good level of conceptual understanding. This process was supported by the self-development of 3D models, a feature that should be incorporated into future training packages. The participants' confidence about performing the POP-Q was restricted by limited opportunities for clinical practice and discussion with colleagues, and methods of extending this training should be considered in future packages.

Acknowledgements

This study was funded by the Physiotherapy Research Foundation and the Chartered Society of Physiotherapy Charitable Trust (grant number PRF/05/3). Dr Mohammed Abdel-Fattah was a grant holder for the reliability study, and led the formal training session. The authors would like to thank him for his contributions to the reliability study and the training package described in this paper. They would also like to thank the POP-Q examiners and the nurse chaperone who participated in this study.

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