

Use of Manikins to Improve Confidence of Core Surgical Trainees Performing Digital Rectal Examinations

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Abstract

Background: DRE is an important skill across a variety of medical and surgical specialties. Previous research has shown that structured teaching and practice on mannequins is of benefit when teaching the skill to medical students. The current literature does not demonstrate any research into post-graduate teaching and assessment of doctors.

Methods: New core surgical trainees from within the Health Education East of England post-graduate surgical school attended a regional induction day, which included a clinical skills circuit. One station focussed on DRE, where participants were asked to complete a pre-teaching survey, they then received a brief teaching session which included simulation with manikins, and subsequently completed a post-teaching survey.

Results: 48 core surgical trainees participated in the training session and completed the survey. All but one had had formal teaching on DRE previously, however only 5 had had teaching on the subject at postgraduate level. After teaching/simulation the mean self perceived competency level rose from 6.25 to 8.92 (of 10) $p < 0.001$.

Discussion: Survey findings indicated that participants were likely to overestimate their competence at DRE, but that a brief structured teaching session including practice on manikins was effective in improving confidence. Written feedback was positive and highlighted previously poorly taught/understood aspects of a neurological DRE.

Background

Digital rectal examination (DRE) is an important examination across a variety of medical and surgical specialties. It is an important examination which aids diagnosis of pathologies of the anus, rectum, and prostate, as well as gynaecological and spinal pathologies. Effective technique is particularly important in the setting of spinal injuries and Cauda Equina Syndrome (CES). One paper states "It is possible that a proportion of established CES may be avoidable with appropriate and timely management."¹ Which is ultimately guided by a proper examination. Furthermore, adequate documentation can prove important medico-legally, particularly in the context of CES and delayed diagnosis/treatment. A number of papers have looked at attitudes of medical students towards intimate examinations finding they are generally very anxious about such examinations, and that anxiety impedes learning²⁻⁵. As such, teaching techniques have been developed to reduce anxiety levels, these include the use of lectures/seminars, mannequins, and some schools have used live models. These teaching methods have generally proven to be successful in reducing anxiety levels in medical students.

There appears to be very little evidence of ongoing teaching of DRE after medical school. Anecdotally, teaching is in the form of informal bedside teaching (where the clerking junior doctor may perform the intimate examination, and subsequently a more senior doctor will repeat the examination and compare

findings). In this way junior doctors will examine a breadth of pathologies and with time gain confidence in their ability to accurately make a diagnosis.

This paper looks at the previous DRE teaching experience of new core surgical trainees at Norfolk and Norwich University Hospital (NNUH), and goes on to assess the efficacy of a further structured teaching session with practice on mannequins.

Methodology

A prospective cross sectional study was conducted at Norfolk and Norwich University Hospital, United Kingdom. The participants were a cohort of new core surgical trainees (typically 2 + years post-graduation from medical school) attending an induction event organised by the Local Education Training Board (Health Education East of England) on 13th August 2019. There were 48 participants, who were split into groups of 4–5 and rotated around a variety of clinical stations, one of which focussed on DRE.

On entering the DRE station, participants were first given a short anonymous survey; which collected a mixture of qualitative and quantitative data, including; previous DRE teaching methods; any formal teaching on DRE as a post-graduate; perceived importance of DRE as a skill; and the frequency with which participants currently perform DRE in clinical practice. Finally they were asked to put a numerical value on self-perceived competency at DRE (0–10).

Participants then had a 25-minute structured teaching session on DRE, beginning with indications (with a focus on CES), communication skills and consent, technical aspects, and interpretation of findings (particularly regarding neurology). Participants then practiced the examination on 2 manikins. The first manikin was able to simulate anal sphincter contraction (with manual input) and so was used to practice neurological DRE and simulate abnormal findings. The second manikin simulated a variety of normal and abnormal prostates.

After the teaching session, participants were given a further survey (Appendix 1B), asking them to review their pre-teaching DRE competency level, and to estimate competency post-teaching. They were also asked to provide feedback on the most useful parts of the teaching session and what they had learnt. Finally they were asked a simple yes/no question on whether they thought the teaching session was useful, and they had the opportunity to provide general feedback.

The survey was developed by the faculty following 3 iterations. It was made clear to participants that by completing the survey they were consenting to their data being used for research, however it was not compulsory that they do so.

Results

There were 48 new CT1 doctors at the induction day. All participants completed the survey in full. There was an average 2.5 years practice (range 2–5 years) post medical school. Their intended specialties were

as follows: Trauma & Orthopaedics 15, general surgery/breast 11, Ear Nose & Throat 7, Plastic surgery 6, Urology 4, Vascular 3, Other/unsure 2.

65% (31/48) of participants recalled having structured seminars/lectures on DRE while at medical school, 90% (43/48) had been taught on manikins, 23% (11/48) had been taught using live models. One participant recalled no formal teaching on DRE whatsoever. Only 10% (5/48) reported any formal teaching on DRE after medical school, however 98% (47/48) of participants considered DRE to be an important skill. 81% (39/48) of participants performed DRE at-least weekly prior to the teaching session, with the mean estimate being 3 times per week (range of 0–15).

95% (45/48) confirmed that after the teaching, their competency at DRE had improved, again, Fig. 1 shows the mean improved from 6.25 to 8.92/10, $p < 0.001$.

100% of participants considered the teaching session to be useful. 88% (42/48) of participants confirmed they had learned something new. Qualitative feedback was utilised to expound upon the teaching elements that were considered most useful. The most common positive themes mentioned were the use of simulation and emphasis on the neurological DRE.

Discussion

The majority of participants had previously had teaching on manikins during medical school, however very few had received formal teaching after graduating medical school. Most participants performed DRE regularly in clinical practice, and thought it to be an important skill.

When considering participant's self-reported competency levels, results suggest that they were over confident in initial estimates, indicating a degree of unconscious incompetence. This notion was reinforced when reviewing the feedback comments; in particular the neurological DRE was frequently mentioned as a new or improved skill.

It is clear that the teaching session improved participant competency levels (as evidenced by improved mean competency pre teaching and post teaching), and that the participants thought it to be beneficial.

Limitations

The main limitation of this study is the lack of objective measure of competency. Unfortunately the short time allowed for each rotation of doctors meant that formally assessing each doctor was impossible, and so not within the scope of this study.

One other limitation was the survey, which we drafted, but was not externally validated. However we were unable to find any validated alternative surveys.

A limitation of the qualitative data was its brevity, with each reply generally being very short sentence or one-word answers. More useful information could have been gathered using a focussed questionnaire,

semi structured or structured interviews. This however would not have been feasible within the time constraints of the session.

Additionally the manikin simulation was a medium fidelity simulation. Anal tone was easy to simulate, however lack of anal tone (to the degree seen in CES) was not possible to accurately simulate with the rectum manikin available. High fidelity simulations are superior to medium fidelity; however there were no high fidelity manikins available to us, and other higher fidelity simulation methods such as cadavers or animal tissue were not within the scope of the teaching session.

Conclusions

DRE remains an important clinical examination, and while efforts have been made in medical schools to improve teaching, it is still imperfectly taught and understood. The aim of this study was to assess the need for ongoing teaching of DRE at a post-graduate level, and we have demonstrated that structured teaching in small group sessions, and practice on manikins is effective in improving the confidence of junior surgical trainees at DRE, particularly regarding the more in-depth neurological DRE. Feedback was overwhelmingly positive and confirmed that junior surgical trainees perceived the session to be of benefit.

Declarations

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Ethics Approval and Consent to Participate

Research and Ethics approval was not required according to the NHS REC review tool, and confirmed by the Norfolk and Norwich Hospital Research and Development Office.

All participants consented to completing the survey and were informed of our intent to publish.

Author Contributions

Mr Thomas Barker: study design, delivered the teaching session, major contributor in writing the manuscript.

Mr Alexander Durst: study design, assisted in delivering teaching session, designed participant survey.

All authors read and approved the final manuscript.

Competing Interests

The authors declare they have no competing interests.

Consent for Publication

Not applicable

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Figures

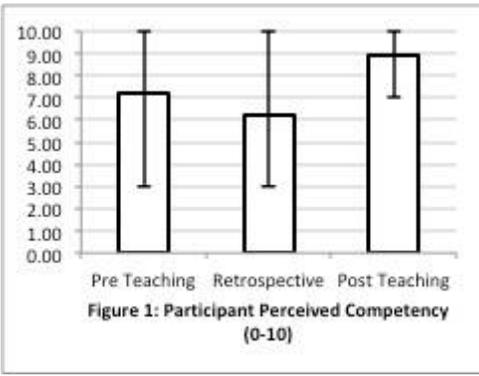


Figure 1

Participant Perceived Competency (0-10)