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Radiographer mammographers' attitudes towards implementing new techniques for imaging the augmented breast, after viewing a training DVD or receiving cascade training: A survey

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ABSTRACT

Introduction: Mammographers in the NHSBSP are required to implement the Eklund ('Pushback') technique after viewing a training DVD or receiving cascade training. This study aims to evaluate Radiographers' attitudes towards imaging the augmented breast following viewing the training DVD or receiving cascade training.

Methodology: Questionnaires containing both open and closed questions collected quantitative and qualitative data across three breast screening units. A total of 60 radiographers were targeted. Their responses were analysed using Pearson's Chi−Square. An evaluation of likelihood and association of variables was performed using inferential statistics.

Results: Of the 60 mammographers targeted, 38 (63%) completed the questionnaires. Quantitative results indicated that most mammographers (78%) had watched the DVD. Of these responders, (51.14%) found the DVD somewhat helpful in raising their confidence to attempt the new techniques. When inferential statistics was used to evaluate if confidence was associated with location or level of qualifications, these showed no significance ('p' = 0.085 and 0.312 respectively). Results indicated that longer years of practice had an association with ability to attempt techniques, however, this was not statistically significant ($\chi^2 = 3.939$, df = 6, p = 0.685). Qualitative responses indicated that cascade training increased confidence more than viewing the DVD. Both qualitative and quantitative data indicated that cascade training in addition to the DVD is required.

Conclusion: Although the DVD was a helpful training tool, it did not sufficiently raise confidence for all viewers. Cascaded training in addition to the DVD was required to effectively raise confidence.

Introduction

From the onset of National Health Breast Screening Program (NHSBSP) in the U.K. (United Kingdom), training of mammographers and provisions of national guidelines has formed the bedrock to ensuring that all women screened receive standardised practice wherever they choose to have their mammogram.[1,2] Post-qualification, radiographer mammographers are required to carry out standard four view mammograms on women attending for screening.[1,2] However, women with implants may pose an additional imaging challenge to these mammographers[3] since additional techniques may be required to fully visualise the breast tissues.[4]

Clinical observations made whilst working in various Breast Screening Units revealed that some radiographers lacked confidence in imaging the augmented breast. Despite the availability of local guidelines in some of these units, various reasons ranging from lack of technical knowledge to fear of bursting the implants were given as valid excuses for not adding additional views to routine mammographic views. O'Toole and Caskey[5] concluded their research on imaging the augmented breast by pointing out the litigation associated with implants having a major impact on investigating this subject fully.

Although, O'Toole and Caskey's[5] research included mammographic compression as one of the potential factors that could cause trauma to implants, an older study by Eklund et al.[4] indicated that

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using additional views such as the Eklund 'push back' technique provided additional visualisation of the breast tissue and aids better interpretation of the augmented breast. More recent research suggests that despite the benefits of the Eklund technique, there were inconsistencies in attempting the technique both before and after training.[6] Observing the clinical environment at the onset of this study revealed that these inconsistencies still exist in some units.

An audit of current practice among radiographers revealed that the standards of practice varied across breast screening units as well as individual mammographers.[7] This study suggested the development of a national standard of practice for all radiographers.[7] Since the publication of these studies a training video (DVD-Digital Versatile Disc) and draft guidelines aimed at standardising practice for all radiographers have been developed and circulated to breast screening units across England.[8] Also, in addition to this DVD, Public Health England (PHE) published mandatory guidelines for imaging implants while this research was ongoing.[9] The need for this change is to increase cancer detection in women with implants[9]

Few studies promoting the benefits of implementing this new technique were available, and these were undertaken outside the UK.[10–12] Although Hills' recent study was UK based, it was localized to a single Breast Screening Unit.[13] Further research relating to augmented breasts have focused on implant insertion and reconstruction, the Poly Implant Prostheses (PIP) implant scandal and survival rates in relation to cancer detection, without focusing on mammography as an imaging tool.[14–17]

Guidelines encouraged viewing the DVD and receiving cascade training for the breast screening workforce.[8] However, no available studies have demonstrated that this training method would be adequate for radiographers. Harnett et al.[18] demonstrated the benefit of DVDs as a training tool while Zordan et al.[19] said it required further evaluation. Studies relating to cascade training were carried out mainly among teachers.[20–22] When health workers received similar cascaded training, warnings to evaluate its effectiveness were included to ensure evidence based practice.[23,24]

In view of the above background and rationale, this study aims to critically evaluate if radiographers' attitudes towards imaging the augmented breast, following the availability of the training DVD, have now changed and if the guidelines in this training DVD are now being implemented. An inference will be performed to review if further training is needed and if current available training has any pitfalls. To achieve this, the following hypothesis would be tested:

Hypothesis: Radiographers are not yet undertaking the Eklund view in all cases where it would be advised, despite having viewed the training DVD.

Null Hypothesis (H0): Radiographers can confidently undertake the Eklund technique after viewing the training DVD.

Method

Ethics

Research and Development (R&D) permission to undertake this study within local units was granted. Using the Health Research Authority (HRA) decision tool, it was ascertained that this study is not considered research. They classified this research as 'Service Evaluation' which required no further ethical approval as only National Health Service (NHS) staffs were involved. Three NHSBSP units confirmed interest, willingness to participate and provided approval. To ensure confidentiality of participants, an anonymised data collection tool called ''Survey Monkey'' was used to collect responses.

Study design

Post ethical approval, questionnaire design was commenced. Data collection by questionnaire was selected due to the widespread geographical location of participants, and quantitative data being the major focus anticipated from the research.[25] As this research was classed as 'Service Evaluation', using self-administration questionnaires is an appropriate method of data collection for this type of study.[26] A semi-structured questionnaire design with both closed and open question which allows for quantitative and qualitative responses was employed as the main survey tool for this research. Each unit manager confirmed that their units had at least 20 radiographers within their breast team, thus the questionnaire design was aimed at a sample size of 60 ($n = 60$), targeting 20 radiographers across the three breast screening units. The participating Breast Screening Units (BSU) varied in their use of Eklund technique as follows:

Unit A- BSU that had never performed Eklund technique prior to DVD training.

Unit B- BSU had always performed Eklund technique.

Unit C- Training unit (technique taught in unit- some used technique while some did not).

All radiographers had equal chance of being selected for the study. The online data collection tool "Survey Monkey"[27] was used to send questionnaires to all participating units via the clinical lead/superintendents.

Statistical analysis

Responses from the questionnaire were grouped into quantitative and qualitative prior to analysis.

Quantitative approach

After collecting data and grouping them as described above, the Statistical Package for Social Sciences (SPSS) software was used for analysis of all quantitative data collected.[28] All data collected and imputed into SPSS were Nominal. This allowed for relationships between discrete variables to be tested, hence the non-parametric test tool, Chi-square, was employed for their analysis. Pearson's Chi–Square test was deemed appropriate for this analysis because the variables within the dataset allowed for frequency and relationships to be evaluated, hence fulfilling the criteria for goodness-to fit test (likelihood of occurrence) and association between variables to be tested.[29] Inferential statistics using 95% confidence intervals was used to demonstrate the significance of the relationships and likelihood of occurrences. Here the null hypothesis was tested with the 'p' value ($p = 0.05$). The significance levels will be demonstrated in the results section using the Chi–Square formula. Here χ^2 = Pearson's Chi–Square value, df = degree of freedom and p = significance level.

Qualitative data approach

Open ended questions revealed some qualitative responses. Since the data set from these emanated from three questions, only descriptive statements will be used to represent the results.

Results

Of the 60 radiographers targeted, 38 completed the questionnaire hence a 63% response rate was achieved. The results indicate that responders were mostly radiographers holding a post graduate qualification in mammography (50%) and Advanced Practitioner Radiographers (36.8%). Other responders were radiographers

currently studying for Post graduate awards in mammography (7.9%), Consultant Practitioner Radiographers (2.6%) and one trainer (2.6%). Both the quantitative and qualitative results were reviewed and presented as follows:

Quantitative results

The quantitative responses reviewed indicates that majority of radiographers (78.9%) from across the three sites had viewed the DVD or received a form of Cascade training (10.5%). Very few of the radiographers indicated that they 'were not aware of DVD' (7.9%), 'heard about the DVD but not yet viewed it' (5.3%) or 'not sure if they have viewed the DVD' (2.6%). Fig. 1 below shows these responses.

After reviewing the responses above, the respondents' attitudes were evaluated from several variables: confidence before and after viewing the DVD, how helpful they found the DVD and how other confounding variables such as years of practice or level of training affected their attitude.

To ascertain how confident they felt in the Eklund technique in relation to their training experience, their confidence before and after viewing the DVD were analysed (see Fig. 2). Results indicated that 60% of radiographers felt confident after viewing the DVD while only 16% were already confident. The pie chart below (Fig. 2) shows the distribution of these responses.

The relationship between confidence after viewing the DVD was evaluated in association with other variables like 'level currently employed', location of breast unit and years of mammography practice. The association between confidence and level currently employed indicated that radiographers with Pg award in mammography had the highest confidence in attempting the technique after viewing the DVD. However, when this association was tested with Chi Square, it was not statistically significant since $p > 0.05$ ($\chi^2 = 7.095$, df = 6, $p = 0.312$).

To decipher if confidence level had any association with the breast screening unit in which the radiographers work, Pearson's Chi- square (χ^2) was used to test this relationship. Result showed that confidence increased for all units after watching the DVD. Hence, there was no significant association between confidence and the breast unit since 'p' value was greater than 0.05 ($\chi^2 = 8.175$, df = 4, $p = 0.085$).

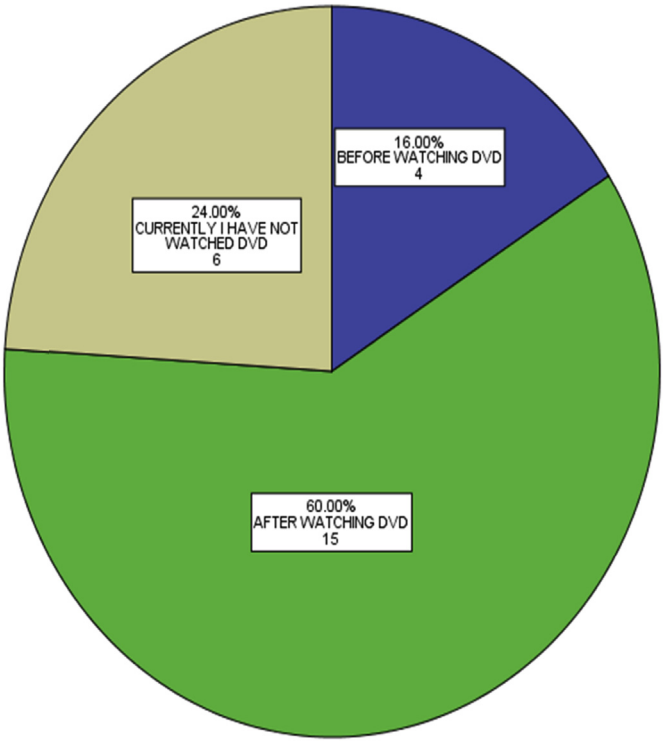

Figure 2. Pie chart showing confidence level related to DVD viewing.

Again, to ascertain if other confounding variables like years of mammography practice improved their ability to undertake the Eklund technique, Chi-square was used to test this relationship. Although, these responses indicated that the longer years of practice were related to ability to attempt the technique, these had no statistical significance: $p > 0.05$ ($\chi^2 = 3.939$, df = 6, $p = 0.685$).

An inference into the usefulness of the DVD was ascertained (see Table 1 below):

Although most radiographers found the DVD somewhat helpful (See Table 1 above), Chi- Square analysis showed that there was no

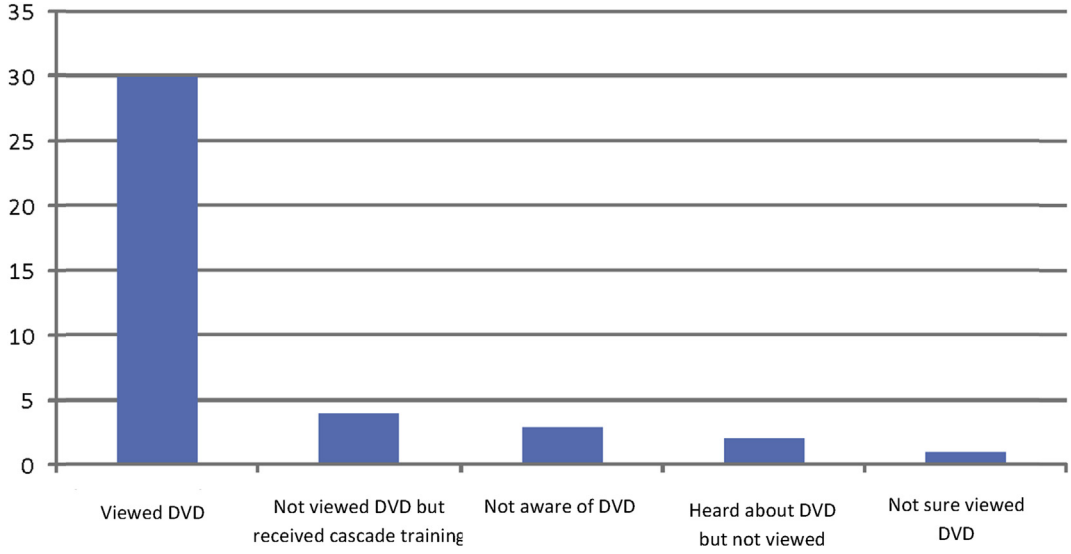

Figure 1. Responses of the radiographers to viewing the DVD and receiving cascade training.

Table 1
Helpfulness of the viewed DVD.

	DVD Helpful			Total
	Very helpful	Somewhat helpful	Neither helpful Nor unhelpful	
Training for Pg award in Mammography	1	1	0	2
Radiographer with Pg award in Mammography	3	10	2	15
Advanced Practitioner Radiographers	1	4	4	9
Consultant Radiographer	0	1	0	1
Total	5	16	6	27

significant difference among all the respondents- $p > 0.05$ ($\chi^2 = 5.521$, df = 6, $p = 0.479$).

A further evaluation was performed to review the extent to which the DVD has improved the ability of the radiographers undertaking the technique. This was tested in association with level of employment and years of practice (see Figs. 3 and 4 below).

Only six respondents (22.2%) out of the 27 respondents indicated that the viewed DVD has improved their ability considerably. 18 (66.7%) indicated that the viewed DVD has improved their ability a little while only three (11.1%) responded that it has not improved their ability. Of those who indicated that their ability had improved since viewing the DVD, those holding a Pg award in mammography formed the largest group (see Fig. 3 above). However, the Chi Square analysis showed that there was no significant difference among all the respondents-$p>0.05$ ($\chi^2 = 4.86$, df = 6, $p = 0.561$).

The extent to which the viewed DVD improved the ability of the radiographers in relation to years of practice was also determined. Fig. 4 above shows that radiographers with longer years of practice indicated that viewing the DVD has improved their ability the most.

The radiographers were also asked if they required or preferred additional training to viewing the DVD. The results were reviewed to see how these training needs were related to qualification levels (see Fig. 5 below).

Results indicate that majority of the radiographers would prefer additional training. However, Chi Square analysis does not reflect any significant differences in the responses of the radiographers in terms of the current level of employment- $p > 0.05$ ($\chi^2 = 0.763$, df = 3, $p = 0.858$).

The length of training required varied; 89% suggested needing a few weeks, 6% required 3 months and 4% requiring other types of training (details of some of these training needs are represented in the qualitative result section below).

Qualitative results

It was difficult to extract qualitative information from responders due to low response rate and poorly completed questionnaires. However, a few open-ended questions elicited some interesting comments. When asked how much the DVD/receiving cascade training improved their ability to undertake Eklund technique, one responder said, '*hands-on training has improved my confidence rather than the DVD*'. This indicated that the DVD did not necessarily improve the responder's confidence level. Sadly, only one response was received from this question.

Another open question, regarding training needs showed that of the 15 radiographers who required additional training, 6 indicated that they would require between 1 and 2 cases, 8 radiographers suggested 1 session/clinic or up to 6 clients, while 1 responder specified 10 clients, and 1 suggested a week's additional training.

The final open question designed to allow responders to air their views, showed diverse responses ranging from training needs to individuals'/units' perceptions on technique confidence. Examples of these responses include:

'A mentor is always helpful for those without such training. I have been trained by a mentor 4 years ago in Eklund technique and one to one guidance is always best. A DVD is good as a refresher for CPD purposes'.

'I would be interested in watching the DVD'.

'Eklund views have always been part of practice at this unit so it is not a new technique for us'.

'I would like both the opportunity to view the DVD and to receive additional support from a trainer'.

These comments indicate that most responders would appreciate additional training despite viewing the DVD. It also showed that some radiographers are yet to view the DVD even though it has been circulated to all units. Also, units or responders who had previously undertaken Eklund technique required no further assistance.

Discussion

After reviewing the responses from the results above, it was evident that the majority of radiographers had viewed the DVD

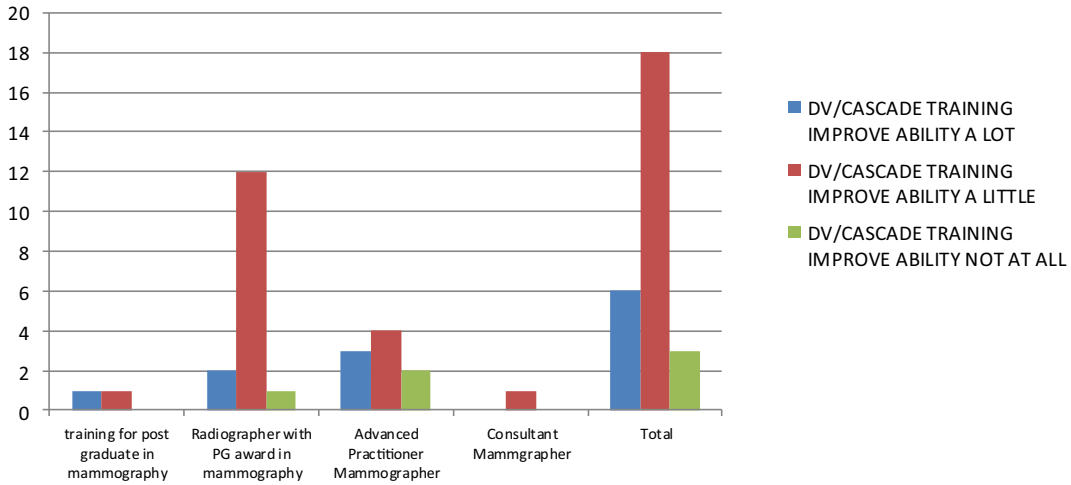

Figure 3. Improvement in ability of the radiographers by level of employment.

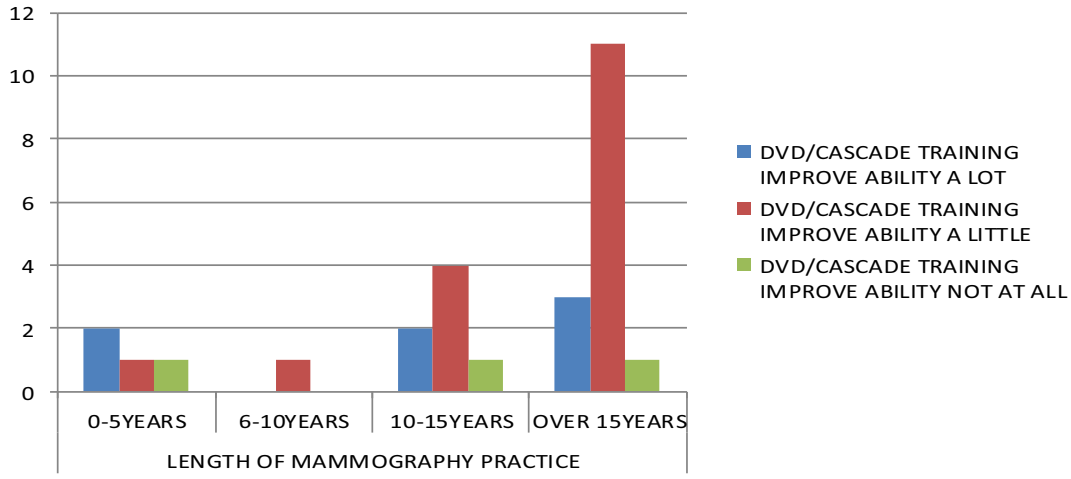

Figure 4. Length of practice and ability to practice technique.

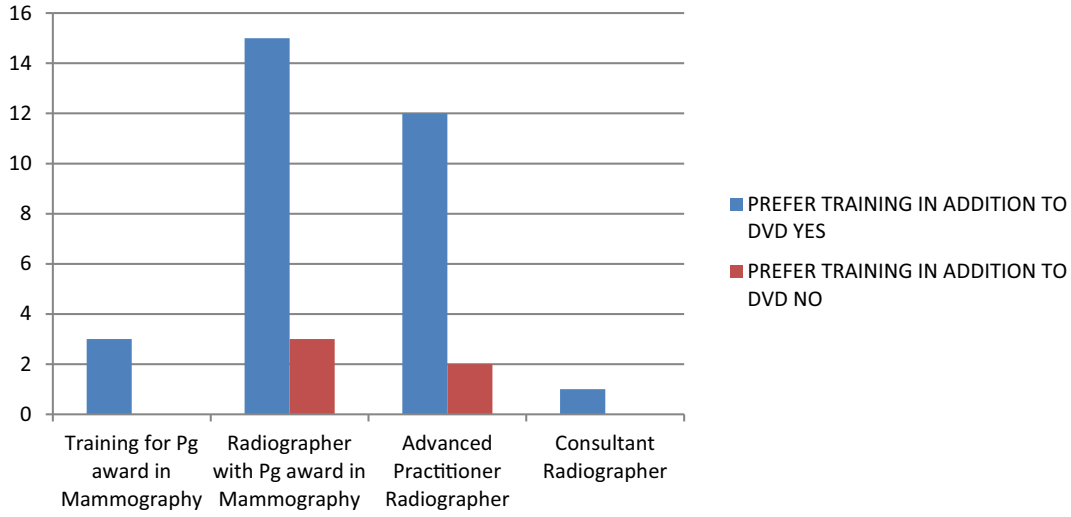

Figure 5. Preferred additional training to DVD viewing.

(78%) and most of them found it somewhat helpful (51.14%). Since the main objective of this study was to critically evaluate attitudes after availability of DVD/cascade training, two major pointers (confidence and usefulness of DVD) were used to decipher attitude:

Attitude

It was evident from the results that radiographer's confidence in attempting the technique improved after viewing this DVD. However, it seems that the training unit felt more confident in attempting the technique after viewing the DVD than the other two units. It was difficult to ascertain why this was, due to the limited size of this study. One of the other two units had always performed Eklund technique (see qualitative comments above), yet their response indicates that confidence was not raised with the addition of DVD. Perhaps this response may have been impacted by the low response rate from this particular unit (36.8%). Rumsey[30] stated that the validity of outcome from a particular study may not be truly reliable if response rate falls below 70%. Although there were confidence level disparities in attempting the technique after training, overall, responses indicate that providing the DVD/cascade training has improved their confidence and abilities in attempting the Eklund technique. From this, it appears that progress has been made from previous research prior to providing the DVD and national guidelines.[6,7] The results indicated that factors such as length of practice and level of mammography qualification were helpful in raising confidence to attempt the technique. However, these showed no significant association when statistically tested. This outcome was a bit puzzling and the possible reason for this may be due to the small study sample.

The DVD appeared a helpful training tool as confidence increased and most respondents found it somewhat helpful. Sadly, the DVD alone has not necessarily been a sufficient training tool since both the quantitative and qualitative responses indicate that not all radiographers can confidently attempt the technique after viewing it. Due to these findings, the Null hypothesis for this study was rejected.

Workforce training needs

A critical appraisal of training needs of the workforce was inferred from the results. Both quantitative and qualitative responses indicate that the DVD alone was not enough in training the workforce for the task ahead. Most radiographers wanted cascade

training in addition to a mentors' support while building their confidence. This confirms what has been noted previously in the literature: although DVD training resources were useful for providing knowledge,[18] further research is required to truly ascertain its significance[19]

Possible pitfalls mitigating against attempting technique

To appraise pitfalls associated with attempting the Eklund technique, an inference into the reason why everyone was not yet confident despite the availability of the DVD was ascertained. First it was noted that only 28 out 38 responders had viewed the DVD even though it was available in all participating units (see Fig. 1 above). A small percentage was not sure if they had heard of the DVD whilst others indicated they had not seen it. It was difficult to clearly understand why this was the case; were all unit members informed about it or were these groups slipping through the net? The researcher hoped that this information may be provided in the open-ended comments sections however, no response clearly explained these pitfalls. Obviously, providing the DVD is not sufficient if there is no mechanism in place to ensure every team member has viewed it. Adopting Harnett et als'[18] approach where the DVD was viewed in a training setting may alleviate this situation.

It was beyond the scope of this study to fully evaluate the content of the information provided in the DVD training, hence it was difficult to appropriate how content aided viewers training. Also, since the new guideline was released[9] post circulating questionnaires to units, it was challenging to decipher if radiographers attitudes changed after the guidelines were available. The guidelines emphasised that radiographers undertaking Eklund technique should have been trained using the DVD and cascade training from colleagues. It further recommended that internal training records should be maintained by service managers.[9] A comparative study of attitudes pre and post the publications of these guidelines may have been informative. Additionally, a follow-up study looking at radiographers attitudes to the recommended training method, (DVD & Cascade Training) since publication of this recommendation in the guidelines, is suggested.

This study has identified that although the DVD is helpful as a training aid, adding additional 'hands-on' training from colleagues or mentors improved the confidence in attempting the Eklund technique among mammographers. If these additional training needs are not addressed among individual team members, inconsistency in attempting the new technique noted in previous studies[6,7] may linger despite provision of a training DVD and national guidelines.

Implication for practice

From the outcome of this study, it was noted that some radiographers have not viewed the DVD despite its availability in all BSUs for at least a year prior to the onset of this study. These outcomes have some important lessons to offer for the future.

When circulating similar training tools, efforts should be made to recommend the setting where it is viewed, possibly including documentation such as signatures and feedback sent to the national portal (NHSBSP) from where the training tools were disseminated. This may ensure that everyone in the unit is well informed.

Also, since most units have designated Trainers/Mentors, liaising with them when disseminating new training techniques may ensure that each person is confident and duly signed off prior to practicing independently.

Limitations

Of the over 80 breast screening units in the U.K., only three breast screening units participated in the study. The study may have been more robust if more or all screening units had participated. At the onset of piloting and seeking units' participants, four units were contacted which included two training units. Unfortunately, one training unit declined from participation at the approval stage. Had they participated, the attitude of mammographers in two training units could have been compared to other units.

Secondly, had interviews been included they could have provided more qualitative information. Also, the questionnaires used to collect quantitative data were reduced to only 10 sets of questions to enhance response. Additional questions which may have provided more information were removed.

In summary, a mixed data (quantitative and qualitative) analysis, from a larger sample size could have boosted this study.

Conclusion

Findings from this research have established that more workforce training is required to fully enforce the new implant techniques nationally.

The hypothesis: 'Radiographers are not yet undertaking the Eklund view in all cases where it would be advised, despite having viewed the training DVD' is correct while rejecting the Null hypothesis which says that 'Radiographers can confidently undertake the Eklund technique after viewing the DVD'.

Although, further research is required nationwide to fully evaluate if all units have adopted the Eklund technique, providing the DVD and national guidelines have proven to be a step in the right direction.

Recommendations

Moving forward, rolling out this research nationally is highly recommended. This may help the NHSBSP evaluate if the findings of this research can be applied to all units.

A follow up study across a larger cohort of women could be undertaken to evaluate the patients' experience after the introduction of the Eklund technique and the roll out of training as recommended in the PHE document.[9] Additionally the information provided for women with augmented breasts, explaining how much of the breast is imaged when Eklund views are additional used, may provide useful information for the workforce. Finally, research is essential to ensure that widespread use of the Eklund technique results in improved cancer detection rates at acceptable increases in radiation dose.

Since the results indicate that most radiographers would appreciate cascade training along with viewing the DVD, providing designated trainers in each unit that will cascade training to colleagues is highly recommended. Here a logbook of progress may be kept until the individual radiographer feels confident and is subsequently deemed competent or signed off. The financial implications of this are outside the scope of this study but could constitute an important area for future research.

Also, incorporating implant training in all College of Radiographers approved postgraduate awards in Mammography, as a key practical section, will help ensure that newly qualified radiographer mammographers are ready for the task ahead of the post-qualification.

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Conflict of interest

None.

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