

Teaching family practice residents breast cyst aspiration

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ABSTRACT

OBJECTIVE To conduct the first study of teaching family practice residents the technique of breast cyst aspiration (BCA) using the Toronto Breast Cyst Aspiration Model (TBCAM) in a workshop. To determine whether this training increases their likelihood of performing the procedure in the future. To discover how residents evaluate the workshop as a teaching method.

DESIGN Prospective parallel-group trial from August to November 1997. Baseline questionnaires were given to both experimental and control groups in August. The experimental group was given a 1.5-hour workshop and a postworkshop questionnaire. Both groups were then given 3-month follow-up questionnaires.

SETTING Family practice residency program at the University of Toronto.

PARTICIPANTS The experimental group consisted of 15 family practice residents from one university-affiliated hospital site. The control group consisted of 54 family practice residents selected from the remaining sites.

MAIN OUTCOME MEASURES Confidence score, likelihood of performing BCA, and effectiveness of the workshop rated on a Likert scale ranging from 1—low to 5—high; and knowledge of BCA rated from 0 to 7.

RESULTS Three months after the workshop, 62% of study subjects and 31% of controls were above the median confidence score of 3.2 (χ^2 3.4, $P > .05$); 76% of subjects but only 11% of controls were above the median knowledge score of 4 (χ^2 16.67, $P < .001$); and 75% of subjects and 34% of controls were above the median likelihood to perform score of 3 (χ^2 5.37, $P < .05$). Most (95%) workshop effectiveness scores were 4s or 5s.

CONCLUSIONS Workshop training resulted in higher confidence, greater knowledge, and more likelihood of performing BCA. The workshop using the TBCAM was evaluated as a highly effective way to teach BCA.

RÉSUMÉ

OBJECTIF Réaliser la première étude sur l'enseignement aux résidents en pratique familiale de la technique de la ponction à l'aiguille fine des kystes mammaires, dans le contexte d'un atelier, à l'aide du modèle élaboré par l'University of Toronto. Déterminer si cette formation augmente la probabilité que les résidents exécutent cette intervention à l'avenir. Faire ressortir comment les résidents évaluent l'atelier à titre de méthode pédagogique.

CONCEPTION Des essais prospectifs à l'aide de groupes parallèles d'août à novembre 1997. Des questionnaires de référence ont été distribués à la fois au groupe expérimental et au groupe de contrôle en août. Le groupe expérimental a suivi un atelier d'une heure et demie et rempli un questionnaire à la suite de l'atelier. Les deux groupes ont ensuite rempli un questionnaire de suivi 3 mois après.

CONTEXTE Le programme de résidence en médecine familiale à l'University of Toronto.

PARTICIPANTS Le groupe expérimental se composait de 15 résidents en pratique familiale de l'un des hôpitaux affiliés à l'université. Le groupe de contrôle était formé de 54 résidents en pratique familiale choisis dans les autres établissements hospitaliers.

PRINCIPALES MESURES DES RÉSULTATS Le degré de confiance, la probabilité d'effectuer l'intervention et l'efficacité de l'atelier cotée sur une échelle de Likert de 1 (faible) à 5 (élevé); et la connaissance de la technique cotée de 0 à 7.

RÉSULTATS Trois mois après l'atelier, 62% des sujets étudiés et 31% des personnes du groupe contrôle se situaient au-dessus du degré de confiance médian de 3,2 (χ^2 3,4, $p > ,05$); 76% des sujets étudiés, mais seulement 11% des personnes du groupe contrôle avaient une cote médiane de connaissance de plus de 4 (χ^2 16,67, $p < ,001$); et 75% des sujets de l'expérience et 34% des sujets de contrôle dépassaient la cote de probabilité médiane de 3 (χ^2 5,37, $p < ,05$) d'exécuter l'intervention. La majorité des cotes (95%) attribuées à l'efficacité de l'atelier étaient de 4 ou de 5.

CONCLUSIONS La formation dispensée dans l'atelier s'est traduite par une plus grande confiance, un savoir plus grand et une plus forte probabilité de pratiquer la technique de la ponction à l'aiguille fine. L'atelier prodigué selon le modèle de l'University of Toronto a été évalué comme étant une méthode très efficace pour enseigner cette technique.

This article has been peer reviewed.

Cet article a fait l'objet d'une évaluation externe.

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Approximately 10% of Canadian women will develop one or more breast cysts.¹ Of all palpable breast lumps in women aged 35 to 54, about 32% are breast cysts. Breast cysts are easily diagnosed and treated in the office by simple aspiration,² a procedure that had its origins in the work of Martin and Ellis in 1930.³

Today, breast cyst aspiration (BCA) is accepted as a standard therapeutic procedure. It is cost-effective, can be completed in an ambulatory care setting, conserves expensive medical resources, and, most of all, provides prompt resolution of the problem for many patients.⁴ It eliminates waiting times for surgical referral and for the results of ultrasound and mammographic examinations. It can allay patient anxiety when a benign cyst is confirmed.

Because most patients with breast lesions present first to primary care physicians, it is reasonable that these physicians learn this simple technique. A Wisconsin survey showed that 54% of all family physicians used BCA,⁵ and a survey of family practice residents at McGill University indicated that more than 90% wanted to learn and do more varied office procedures.⁶ The Canadian Association of General Surgeons has recognized the need for family physicians to aid in quick and efficient management of patients with breast cysts. They have developed guidelines for additional surgical skills for family physicians that have been approved by the College of Family Physicians of Canada and the Royal College of Physicians and Surgeons of Canada.⁷

Teaching residents procedural skills is difficult, and there are no published studies of how to teach family practice residents BCA. The Toronto Breast Cyst Aspiration Model (TBCAM) is an innovative tool that can help residents to learn the BCA technique.⁸ The model contains two cysts that can be immediately refilled with water. Each cyst can be aspirated about 200 times. Cost of the model is approximately \$1000 (US).

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This study aimed to determine whether family practice residents' confidence and knowledge of BCA were increased after attending a workshop and using the TBCAM. We also wanted to determine the effectiveness of the workshop as a teaching method.

METHOD

This prospective, parallel-group trial ran from August to November 1997 in the Department of Family and Community Medicine at the University of Toronto. Fifteen of 20 residents at St Michael's Hospital participated in a workshop using the TBCAM (experimental group). The control group consisted of three first-year and three second-year residents from each of the nine other teaching hospitals selected by choosing every second resident on a list provided by the departmental office.

The experimental group attended a 1.5-hour workshop in August 1997. The workshop consisted of a talk on BCA followed by hands-on practice palpating breast-lump palpation models, aspirating oranges, and finally using the TBCAM. Before the workshop, participants in the experimental group each filled out a questionnaire assessing their current level of confidence, knowledge, and likelihood of performing BCA. A Likert scale (1—low to 5—high) was used to assess comfort level in six components of the procedure, overall confidence, and likelihood of performing BCA (**Table 1**). Knowledge was assessed using seven multiple-choice questions. The same questions were asked after the workshop and 3 months later. Questionnaires were coded to compare responses immediately after the workshop and 3 months later. The workshop was evaluated through questions on the effectiveness and usefulness of workshop components, again using a Likert scale.

Each resident in the control group was mailed the same questionnaire before the workshop and 3 months after it. A modified Dillman technique⁹ was used, with questionnaires being mailed out on two occasions in both August and November. Only residents who had filled out the August questionnaire were mailed the 3-month follow-up questionnaire.

The questionnaires asked about sex, year of training, whether they had previously aspirated cysts, and from which sources they had previously heard of BCA. Also, overall confidence, likelihood that they would perform BCA in practice, and whether they thought BCA should be included in the curriculum were questioned. Ethical approval for this study was obtained from the University of Toronto Ethics Committee.

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Table 1. Baseline characteristics of experimental and control subjects: A) Demographics, B) Likert scale scores (1—low to 5—high).

A		
VARIABLE	EXPERIMENTAL GROUP (N = 15) N (%)	CONTROL GROUP (N = 37) N (%)
Sex*		
• Male	3 (20)	21 (57)
• Female	12 (80)	16 (43)
Residency year		
• R1	7 (47)	21 (57)
• R2	8 (53)	16 (43)
Heard of BCA†		
• Yes	15 (100)	37 (100)
• No	0	0
Aspirated any cysts?		
• Yes	4 (27)	19 (51)
• No	11 (73)	18 (49)
Sources of learning‡		
• Family medicine residents	3 (20)	9 (24)
• Surgery rotation	11 (73)	26 (70)
• Observing	9 (60)	24 (65)
• Performing BCA	4 (27)	10 (27)
• Reading	9 (60)	23 (62)

* $P < .05$ based on χ^2 statistic.

†Breast cyst aspiration.

‡Percentage adds to more than 100 because more than one source could be chosen.

B		
VARIABLE	EXPERIMENTAL GROUP MEDIAN SCORE	CONTROL GROUP MEDIAN SCORE
Comfort level with BCA*		
• Indications	2	3
• Complications	3	3
• Locating cyst	3	3
• Inserting needle	3	3
• Aspirating cyst	3	3
• Referral and follow up	3	3
Overall confidence	2	2
Confidence score†	2.3	2.6
Likelihood of performing BCA	2	3
Include instruction of BCA in curriculum (1—strongly agree to 5—strongly disagree)	1	1
Knowledge score (0—low to 7—high)	2	4

*Breast cyst aspiration.

†Mean of comfort levels (0.4) plus overall confidence (0.6).

Table 2. Median values of main study outcomes for experimental group at baseline and 3-month follow up: Rated on Likert scales.

VARIABLE	GROUP MEDIAN AT BASELINE	GROUP MEDIAN AT 3 MONTHS	Z STATISTIC*	P VALUE
Confidence score [†] (1—low to 5—high)	2.3	3.9	-3.06	.002
Likelihood of performing BCA [‡] (1—low to 5—high)	2	4	-2.97	.003
Knowledge of BCA score (0—low to 7—high)	2	6	-3.07	.002

*Wilcoxon signed-rank test.

[†]Mean of comfort levels (0.4) plus overall confidence (0.6).[‡]Breast cyst aspiration.

Data were analyzed using SPSS 7.0 software for Windows. Distributions for the main study outcomes (confidence to perform BCA, likelihood of performing BCA, and knowledge of BCA) were not normal. The median test (χ^2 statistic) was used to compare experimental subjects with controls, and the Wilcoxon signed-rank test (z statistic) was used to compare paired data within the study groups. The study had sufficient statistical power to detect a change of 1 point on each of the three main outcome scales at the 3-month follow up ($P = .05$, $1-\beta = 0.8$). Confidence scores were calculated by taking the mean of the comfort-level scores on the six components of BCA and combining it with the overall confidence score. Overall confidence was considered more important and, therefore, was weighted 0.6; the mean of the comfort-level scores on the six components was rated 0.4. The knowledge score ranged from 0 to 7 and was calculated using the number of correct answers to the multiple-choice questions.

RESULTS

Of the 15 residents in the experimental group, two were lost to follow up in November. In the control group, 37 of 54 students (69%) answered after two mailings in August and 26 of these (70%) responded in November, again after two mailings. Therefore, the response rate was 13/15 (87%) in the experimental group and 26/54 (48%) in the control group.

Before the workshop

Experimental and control groups were roughly comparable at baseline (Table 1). The control group, however, had a higher proportion of men and higher baseline knowledge scores. Although the difference was not statistically significant, control subjects were also more likely to have aspirated other cysts.

After the workshop

The experimental group had significant increases in scores on the main outcome measures immediately following the workshop. Before the workshop, the median knowledge score was 2; after, it increased to 7 ($z = -3.44$, $P = .001$). The median confidence score increased from 2.3 to 4.33 ($z = -3.41$, $P = .001$), and the likelihood of performing BCA score increased from 2 to 5 ($z = -3.33$, $P = .001$). The data suggest that the training session had a dramatic effect on the three main study outcomes.

The workshop was also rated as highly effective. Almost all scores (95%) were 4 or 5. All workshop participants rated the effectiveness of the TBCAM as 5, the highest possible score.

Follow up

As might be expected, the very high confidence, knowledge, and likelihood of performing BCA scores measured in the experimental group immediately after the workshop had declined 3 months later. Still, in relation to their baseline scores, the experimental group scored significantly higher on confidence, knowledge, and likelihood of performing BCA 3 months after the workshop (Table 2).

More importantly, the experimental group scored significantly higher than the control group for two of the three main study outcomes at 3 months. Although the experimental group's knowledge scores were lower than the control group's at baseline, a significantly higher proportion of them scored above the combined groups' median 3 months later ($\chi^2 16.67$, $P < .001$). Also, the likelihood of performing BCA was higher in the experimental group at 3 months ($\chi^2 5.37$, $P = .02$). The difference in confidence scores was not statistically significant, but the trend was in the same direction (Figure 1).

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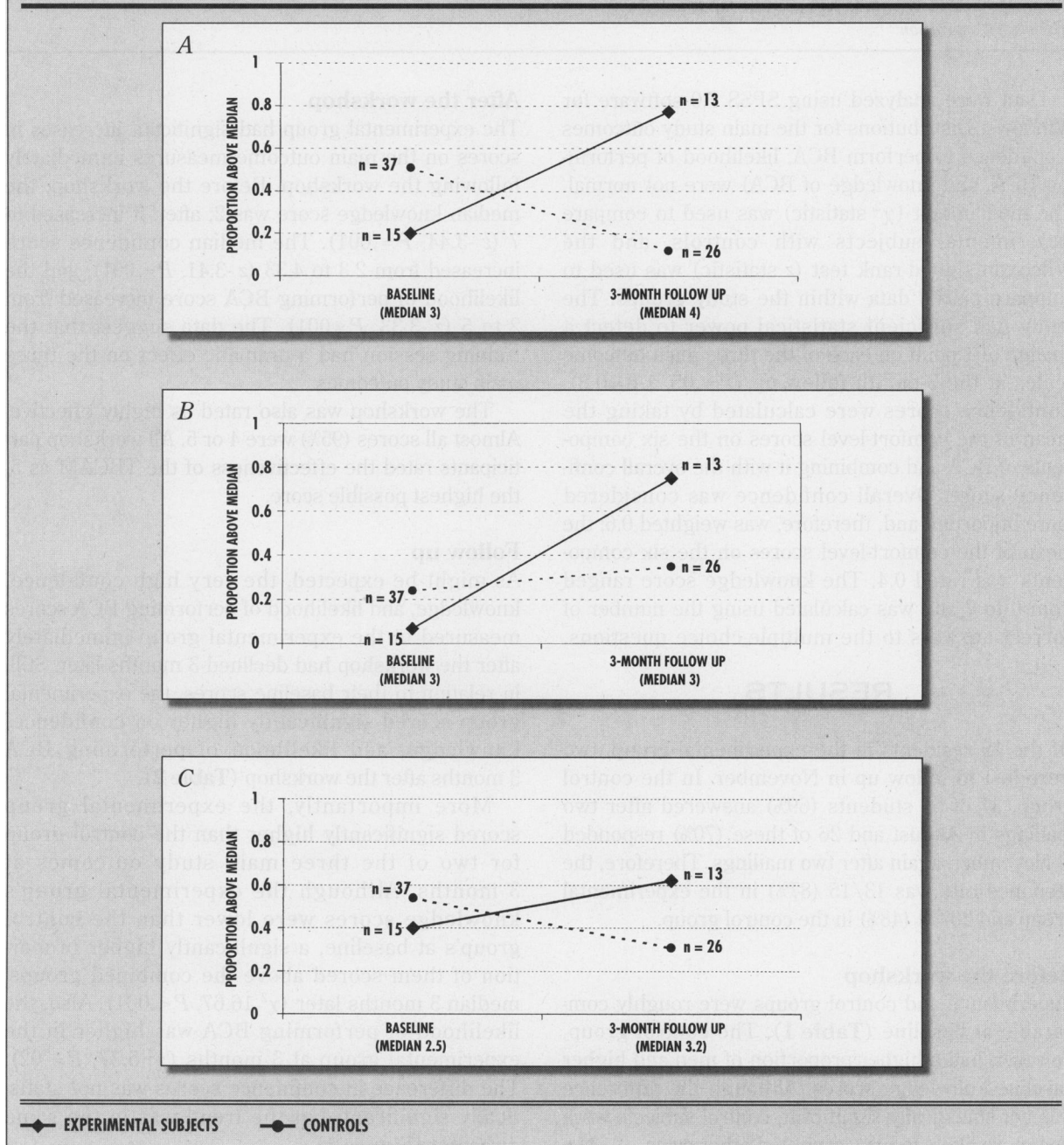
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DISCUSSION

Family practice residents frequently complain that they are taught too few procedural skills during training. Our results demonstrate that hands-on training with the TBCAM resulted in greater knowledge of the procedure and a higher likelihood that

residents would practise BCA in the future. A difference of approximately one magnitude on the Likert scale was considered clinically significant. More than 80% of subjects in this study agreed or strongly agreed at 3-month follow up that workshop training in BCA should be included in the curriculum.

Figure 1. Comparison of experimental and control groups showing proportion of groups above combined median score: A) Knowledge scores; B) Likelihood of performing breast cyst aspiration; C) Confidence scores.



Our control group's response rate of 69% in August and 70% in November after two mailings was consistent with usual rates using the Dillman technique.⁹ An analysis of subjects in the control group, where the response rate was lowest, revealed no systematic difference between those who responded both times and those who were lost to follow up in November. Respondents and those lost to follow up were similar in sex, residency year distribution, and scores in baseline knowledge and confidence to perform BCA. Those lost to follow up, however, indicated at baseline that they were more likely to perform BCA than respondents indicated (χ^2 3.8, $P = .05$). Apart from this, no selection bias appears in the data.

The design of this study could be improved through random assignment of residents to control and experimental groups, regardless of their training-site affiliation. Residents were assigned to study groups primarily for convenience and to limit dissemination of knowledge gained in the workshop to potential control subjects. Despite the nonrandomized design, no detectable differences at baseline would have biased the results in favour of the workshop group.

The experimental group was 80% female compared with only 43% in the control group. Although sex was a potentially confounding variable, it was not statistically related to any of the experimental group's outcomes at follow up. Aspiration of other cysts and knowledge score at baseline was higher for the control group, which might have led to a smaller difference between the two groups being detected, when, in fact, even greater learning took place in the experimental group. At 3 months, there were no significant differences among those who had considered, observed, or performed BCA. Three months might be too short a time for residents to have had an opportunity to actually perform BCA. Future studies should try to determine whether increased confidence and knowledge are retained over time and whether they translate into practice.

Conclusion

Family practice residents who had workshop training with the TBCAM had more knowledge of BCA than controls did 3 months after the workshop. They also reported a greater likelihood of performing BCA than controls did. The workshop was considered a highly effective way to teach BCA, and the TBCAM was ranked most useful as a teaching tool. This simple office procedure, if widely

Key points

- This study compared changes in residents' confidence, knowledge, and likelihood of performing breast cyst aspiration following a 1.5-hour teaching session.
- The teaching session used the Toronto Breast Cyst Aspiration Model (TBCAM).
- The experimental group demonstrated clinically and statistically significant improvements in learning up to 3 months after the teaching session.
- A short teaching session, using the TBCAM, might encourage residents to do breast cyst aspiration in practice, thereby offering an important clinical service to their patients.

performed by family physicians, could reduce costs and use of health care resources and alleviate some patients' anxiety. ❁

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