

ELECTRONIC LETTER

Continuous medical education approaches for clinical genetics: a postal survey of general practitioners

N Qureshi, R Hapgood, S Armstrong

J Med Genet 2002;39:e69(<http://www.jmedgenet.com/cgi/content/full/39/11/e69>)

The Human Genome Project has begun reporting its findings and it is anticipated that genomic medicine will be incorporated into many aspects of medical practice, including primary care.¹ Increasing numbers of patients are approaching their general practitioners (GPs) with concerns regarding their familial breast cancer risk.² GPs readily identify a role for themselves in cancer genetics services, but admit to a lack of confidence in this area.³ They also lack the appropriate educational knowledge and skills to provide prenatal genetic advice.⁴

A traditional educational approach to improve GPs' knowledge is through the distribution of clinical guidelines. It is still unclear which is the most useful approach for primary care based genetics. A recent scenario based study showed that guidelines can improve the appropriateness of referral but educational outreach visits do not make the referrals any more appropriate.⁵ However, outreach genetic facilitators can improve health care professionals' knowledge and uptake of screening for haemoglobin disorders.⁶ Evidence from other specialities suggests the effectiveness of such outreach and liaison visits in improving GPs' performance and appropriateness of referral.⁷

There is currently no research indicating British GPs' preferences for continuing genetic medical education. This survey was designed to investigate GPs' views on how appropriate training should be provided. Determining which GPs' attributes are associated with which method of education may help postgraduate general practice tutors to tailor genetic continued medical education to the needs of particular groups of GPs.

METHODS

A questionnaire was constructed to ask GPs to rate how useful they found six different methods of delivering clinical genetic education (meetings, day courses, educational outreach visiting, hospital derived referral guidelines, joint hospital/general practice derived referral guidelines, or written educational material). GPs were also asked about their attitudes towards methods for dealing with two case scenarios. These were (1) prenatal genetic risk and (2) breast cancer genetics. The survey questions were constructed from themes that emerged in analysis of focus groups with GPs.⁸ Data on the characteristics of GPs and their practices, and self-reported adequacy of previous training in clinical genetics were also collected.

The questionnaire was sent with a covering letter from a local GP (NQ) to all 644 GP principals in 388 practices in the Nottinghamshire area. Reminder questionnaires were sent at six weeks and 10 weeks and a postcard reminder at 12 weeks. GP and practice attributes on the self-completed questionnaire were validated against publicly available databases.

The data were analysed in SPSS version 9. There were six approaches offered for the primary care management of family history of breast cancer. These were in order, from least to most primary care orientated, refer direct to hospital, ask

Key points

- Postgraduate meetings and joint hospital/general practice derived guidelines were the continuous genetic education approaches most favoured by the surveyed British general practitioners (GPs).
- Whole day courses on genetics were the least favoured approach, particularly among female GPs
- The self-reported adequacy of genetic teaching fell dramatically between medical school and the postgraduate years.
- Younger GPs reported better undergraduate teaching, suggesting medical school genetic teaching is improving.

patient to complete a family history questionnaire then refer to hospital, draw a pedigree then refer, send pedigree to geneticist for advice, phone geneticist and counsel as advised, and finally to obtain information and counsel as appropriate.

These six approaches were converted into a single score indicating the GP's attitude to primary care management of familial breast cancer. GPs were asked to rate each approach on a six point Likert scale ranging from "not useful at all" to "very useful" and these were then converted into a score from 1 to 6 where 1 indicated the most negative attitude to primary care genetics and 6 indicated the most positive attitude to primary care genetics. GPs with a positive attitude, for example, would regard referral direct to hospital as "not at all useful" while regarding phoning a geneticist or obtaining advice and counselling as "very useful" approaches. An overall attitude score was then calculated by summing scores for the individual questions answered and dividing by the maximum score attainable from the questions answered. This gave a continuous scale ranging from 0 to 1 with 0 indicating a negative attitude to primary care genetics, and 1 indicating a positive attitude.

The score was then divided into positive and negative attitudes using the median score as the cut off point. Values greater than the median were regarded as more positive attitudes whereas those equal to or less than the median were regarded as more negative attitudes. The process was repeated to generate a second score from items measuring attitudes to a prenatal genetic risk scenario. The internal validity of the scores was estimated using Cronbach's alpha.⁹ An alpha of greater than 0.6 indicates that more than 60% of the measured variance is reliable and that the items constituting the scale are likely to belong to the same conceptual domain.

Continued medical education preferences were grouped from a six point Likert scale into two categories: "useful" and "not useful/neutral opinion". Chi-squared tests were used to assess the univariate relationships between GP/practice attributes (table 1) and continued medical education preferences. Associations between GPs' attitudes towards case

Table 1 Attributes of respondents and their practices (n=397)

Attribute	Frequency (%)
General practitioner/practice characteristics	
Male	246 (62.4)
Less than 50 years of age	308 (77.6)
Possession of higher qualifications*	285 (71.8)
Adequate undergraduate genetics teaching†	142 (35.8)
Adequate postgraduate genetics teaching†	68 (17.1)
Rural practice	61 (15.4)
Single handed practice	30 (7.6)
Clinical assistant at hospital	63 (15.9)
GP postgraduate tutor	85 (21.4)
Undergraduate tutor	51 (12.9)
Attitudes towards case scenarios	
Confident with prenatal genetics‡	155 (39.0)
Competent in breast cancer genetics§	41 (10.3)
Confident with breast cancer genetics¶	146 (36.8)
Positive attitude to providing a primary care based breast cancer genetics service**	180 (45.3)

*At least one of DRCOG, DCH, MRCGP, MRCP.

†Self-reported.

‡The variable is dichotomous: more/as or less confident at explaining prenatal diagnosis to a couple at risk of having a child with cystic fibrosis or thalassaemia compared to explaining prenatal diagnosis to a couple at risk of having a child with Down's syndrome.

§Ability correctly to assess a low risk breast cancer pedigree (two first degree relatives on opposite sides of the family with post-menopausal breast cancer).

¶More/as or less confident at explaining breast cancer risk than explaining the risk of the combined oral contraception.

**Cronbach's alpha of 0.69; dichotomised by its median value (range 0.17–1.00, median 0.56, mean 0.56; more positive attitude=0.57–1.00, more negative attitude=0.17–0.56).

scenarios and continued medical education preferences were also assessed. Stepwise backwards multivariate logistic regression was used to assess the independent effects of the GP/practice attributes on the continued medical education preferences. This gives results in the form of odds ratios (OR) where an OR of 1.5 indicates that GPs possessing the characteristic in question are one and a half times as likely to regard the chosen continued medical education approach as useful than those who do not, and an OR of 0.5 indicates that they are half as likely to regard it as useful.

RESULTS

The response rate was 62% (n=397). The attributes of respondent GPs and the practices they belonged to are shown in table 1. Responders were younger and more likely to be female than non-responders (78.4% of responders were aged 50 years and under compared to 66.9% of non responders ($\chi^2=10.173$, $p=0.001$) and 36.6% of the responders were females compared to 24.7% of non-responders ($\chi^2=9.733$, $p=0.002$). There was no difference between responders and non-responders in terms of practice size ($\chi^2=0.995$, $p=0.608$). Adequate postgraduate genetics teaching was reported by only 17% of GPs whereas 36% reported adequate teaching

while an undergraduate. Younger GPs (less than 50) were more likely than older GPs (over 50) to report adequate undergraduate teaching (43% versus 18%: $\chi^2=14.60$, $p<0.000$).

The attitudes of the GPs towards the two case scenarios are also given in table 1. The score for attitude to providing a primary care based cancer genetics service had a Cronbach's alpha of 0.69 and was dichotomised by the median value (median=0.56, range 0.17–1.00). The maximum alpha for the score for attitude to providing a primary care based prenatal genetic service was 0.44 and so it was not used in any further analysis, since this indicates a poor level of internal validity.⁹

The frequencies of GPs' opinions regarding the usefulness of different continued medical education approaches are shown in table 2. Very few GPs considered any approach not useful. Whole day courses were considered to be the least useful (36% regarded these as useful), while joint GP and hospital specialist drawn up guidelines were the most popular approach (77% regarded these as useful).

Univariate associations between GP/practice attributes and continued medical education preferences and multivariate associations after adjusting for the confounding effect of other attributes were as follows.

- For meetings, no significant associations were found in either the univariate or the multivariate analyses. The majority of GPs (70%), however, considered these to be useful (table 2).
- For whole day courses, in the univariate analysis, the approach was only significantly more popular in the male subgroup ($\chi^2=8.179$, $p=0.004$) and this was retained in the multivariate analysis, where males were twice as likely as females to regard whole day courses as useful (OR=1.93, 95% CI 1.24 to 3.02, $p<0.01$).
- For educational outreach visits, in the univariate analysis rural GPs were less likely to favour educational outreach visits ($\chi^2=4.258$, $p=0.039$). Further, in the multivariate analysis, rural GP were half as likely as urban/inner city GPs to regard educational outreach visits as useful but this failed to reach statistical significance (OR=0.56, 95% CI 0.31 to 1.00, $p=0.05$). Also in the multivariate analysis, GPs with a positive attitude to providing a primary care based breast cancer genetics service just failed to reach statistical significance (OR=0.66, 95% CI 0.44 to 1.00, $p=0.05$).
- For hospital guidelines in the univariate analysis, this approach was popular among GP undergraduate tutors ($\chi^2=4.627$, $p=0.03$). In the multivariate analysis, tutors appeared one and a half times more likely to regard guidelines as useful than non-tutors but this again failed to reach statistical significance (OR=1.56, 95% CI 0.94 to 2.59, $p=0.09$).
- There were no significant associations between GP/practice attributes and joint hospital and GP derived guidelines, although this was the most popular continued medical education approach.

Table 2 Frequencies of general practitioners' opinions regarding the usefulness of different continuing medical education approaches for genetics (n=397)

Educational approach [missing data]	Useful (%)	Neither useful nor unuseful (%)	Not useful (%)
Meeting [13]	267 (70)	101 (26)	16 (4)
Whole day course [11]	139 (36)	155 (40)	92 (24)
Educational outreach visiting [11]	194 (50)	143 (37)	49 (13)
Hospital drawn up guidelines [12]	225 (58)	125 (33)	35 (9)
Joint GP and hospital guidelines [11]	304 (79)	74 (19)	8 (2)
Educational material [13]	212 (55)	143 (37)	29 (8)

[Missing] refers to the number of missing cases rather than the percentage.

- For educational materials, GPs with a positive attitude to providing a primary care based breast cancer genetics service were significantly less likely to favour this approach in the univariate analysis ($\chi^2 = 6.039$, $p=0.01$). However, this approach was popular among GP postgraduate tutors ($\chi^2 = 5.360$, $p=0.02$). Multivariate analysis retained these two variables; GPs with a positive attitude towards providing a primary care based breast cancer genetics service were half as likely to regard educational materials as useful (OR=0.60, 95% CI 0.38 to 0.91, $p=0.02$) and GP postgraduate tutors were two and a half times more likely than non-tutors to regard educational materials as useful (OR=2.65, 95% CI 1.41 to 4.94, $p<0.01$).

DISCUSSION

Principal findings

GPs were anticipated to be a heterogeneous group of medical doctors with varied continued medical education requirements. However, each approach was found to be useful by at least a third of GPs and on multivariate analysis very few GP attributes were significantly associated with any of the six identified CME methods. The approaches giving the highest usefulness scores were joint hospital/general practice guidelines and meetings. Female GPs generally did not favour whole day courses, which could be attributed to their family commitments. A positive attitude towards familial breast cancer management was associated with GPs' scoring educational material as less useful. However, GP educators scored educational material as useful. These educators may have found them a useful teaching resource.

Previous research

From previously published reports, we know that educational outreach visits to professionals at their sites of work are recognised as effective, while traditional meetings and written guidelines to health professionals do not appear to have an impact on professional performance.^{10 11} In this study, the "less effective" approaches were particularly popular, with a mixed response to the more effective educational outreach visits. Rather than pushing the effective continued medical education approaches, it would appear reasonable to adopt the popular continued medical education approaches and modify their format to make them more effective. For instance, the overall popularity of the traditional meeting could be used. On the surface this appears to be a passive learning process, but within such a structure active small group formats could be introduced.¹² Meetings may provide an opportunity to discuss locally developed guidelines and other written educational material. However, as there is some evidence that guidelines presented at meetings only lead to a transient increase in their use, then this teaching method may need to be combined with a recognised practice based approach to ensure continued use of guidelines, for instance, incorporating patient specific reminders.¹³

Previous research has shown that undergraduate teaching has improved since the early 1960s.¹⁴ This study confirms this, as GPs aged less than 50 years considered that they had had better teaching than older GPs. In more recent years, the teaching has become more clinically orientated and the impact of these changes needs evaluating. However, a deficiency in postgraduate genetic teaching was also highlighted in the survey. Although 36% of respondents felt that they had had adequate undergraduate teaching, this fell to 17% feeling that they had adequate postgraduate teaching. Postgraduate deans will need to consider strategies to maintain the adequacy of clinical genetic education after qualification through locally sensitive continued medical education programmes.

Strengths and weaknesses

We attempted to improve the content validity of the survey by constructing the questionnaire using themes derived from qualitative work with GPs on their attitude to genetics.⁸ Further, this was administered in an English county with a wide spectrum of practices of difference sizes and from various localities. This enhanced the generalisability of the project.

There was a non-response bias for age and gender. This was taken account of in the multivariate analysis. However, there remains the possibility that non-responders may be less enthusiastic about genetics. Lack of immediate clinical relevance may deter GPs from replying to genetic surveys,¹⁵ but starting the questionnaire with a discussion of a prenatal and a familial cancer scenario should have increased the survey's relevance to general practice.

Future research

A recent survey indicates that practice nurses have similar genetic educational needs to GPs.¹⁶ In the future, general practice teams' genetic skills and knowledge may be improved by in practice multidisciplinary "education groups" facilitated by appropriate written material and genetic liaison nurse input.¹⁷ Research projects should aim to develop and test such educational interventions for improving genetic education in primary care. In particular, this research should include clinical endpoints to ensure that the intervention is having an effective impact on professional practice. Design and implementation of this intervention should take account of both quantitative surveys, such as this one, and qualitative work. Further qualitative research will be required both to explain some of the results obtained from survey responders and to attempt to explore the views of unenthusiastic and non-responding GPs.¹⁸

ACKNOWLEDGEMENTS

This work received a proportion of its funding from the NHS Research and Development levy; the views expressed in this publication are those of the authors and not necessarily those of the NHS executive. The paper is based on work submitted for a Masters in Health Service Research at the Medical Research Care Unit, University of Sheffield. We would like to thank all of the course tutors and especially Ms Kate Thomas and Dr Gareth Parry. We would also like to thank Professor Sandy Raeburn, Ms Amanda Butler, and Mrs Jane Bethea.

Authors' affiliations

N Qureshi, Division of General Practice, School of Community Health Sciences, Faculty of Medicine, University of Nottingham, Queen's Medical Centre, Nottingham NG7 2UH, UK

R Haggood, Sheffield Centre for Integrated Genetics, Section of Public Health, SchHARR, University of Sheffield, 30 Regent Street, Sheffield S1 4DA, USA

S Armstrong, Trent Institute for Health Services Research, School of Community Health Sciences, University of Nottingham, Queen's Medical Centre, Nottingham NG7 2UH, UK

Correspondence to: Dr N Qureshi, Division of General Practice, School of Community Health Sciences, University of Nottingham, Queen's Medical Centre, Nottingham NG7 2UH, UK; nadeem.qureshi@nottingham.ac.uk

REFERENCES

- 1 **Whittaker L**. Clinical applications of genetic testing: implications for the family physician. *Am Fam Physician* 1996;**53**:2077-84.
- 2 **de Bock**. Women worried about their familial breast cancer risk - a study on genetic advice in general practice. *Fam Pract* 1997;**14**:40-3.
- 3 **Fry A**, Campbell H, Gudmundsdottir H, Rush R, Porteous M, Gorman D, Cull A. General practitioners' views on their role in cancer genetics and current practice. *Fam Pract* 1999;**16**:468-74.
- 4 **Firth HV**, Lindenbaum RH. UK clinicians' knowledge of and attitudes to the prenatal diagnosis of single gene disorders. *J Med Genet* 1992;**29**:20-3.
- 5 **Watson EW**, Clements A, Yudkin P, Rose P, Bukach C, Mackay J, Lucassen A, Austoker J. Evaluation of the impact of two educational interventions on GP management of familial breast/ovarian cancer cases: a cluster randomised controlled trial. *Br J Gen Pract* 2001;**51**:817-21.

- 6 **Modell M**, Wonke B, Anionwu E, Khan M, Tai SS, Lloyd M, Modell B. A multidisciplinary approach for improving services in primary care: randomised controlled trial of screening for haemoglobin disorders. *BMJ* 1998;**317**:788-91.
- 7 **Daly MB**, Balshem M, Sands C, James J, Workman S, Engstrom PF. Academic detailing: a model for in-office CME. *J Cancer Educ* 1993;**8**:273-80.
- 8 **Watson EK**, Shickle D, Qureshi N, Emery J, Austoker J. The 'new genetics' and primary care: GPs' views on their role and their educational needs. *Fam Pract* 1999;**16**:420-5.
- 9 **Bland JM**, Altman DG. Statistic notes: Cronbach alpha. *BMJ* 1997;**314**:572.
- 10 **Thomson O'Brien MA**, Oxman AD, Davis DA, Haynes RB, Freemantle N, Harvey EL. Educational outreach visits: effects on professional practice and health care outcomes (Cochrane Review). In: *The Cochrane Library*. Issue 4. Oxford: Update Software, 2001.
- 11 **Davis DA**, Thomson MA, Oxman AD, Haynes RB. Changing physician performance. A systematic review of the effect of continuing medical education strategies. *JAMA* 1995;**274**:700-5.
- 12 **Teague KE**, Brown JA, Meyer JM, Khan MJ, Smith TJ, Kreutzer KO, Bodurtha JN. Teaching efficacy of a medical education module on genetic testing for cancer. *J Cancer Educ* 1996;**11**:196-202.
- 13 **Buntinx F**, Winkens R, Grol R, Knottnerus JA. Influencing diagnostic and preventive performance in ambulatory care by feedback and reminders: a review. *Fam Pract* 1993;**10**:219-28.
- 14 **Young ID**. Undergraduate teaching of genetics. *Med Educ* 1984;**18**:151-4.
- 15 **Fetters MD**, Doukas DJ, Phan KLD. Family physicians' perspectives on genetics and the human genome project. *Clin Genet* 1999;**56**:28-34.
- 16 **Bankhead C**, Emery J, Qureshi N, Campbell H, Austoker J, Watson E. New developments in genetics-knowledge, attitude and information needs of practice nurses. *Fam Pract* 2001;**18**:475-86.
- 17 **Shickle DA**, Hapgood R, Qureshi N. The genetics liaison nurse role as a means of educating and supporting primary care professionals. *Fam Pract* 2002;**19**:193-6.
- 18 **Geller G**, Holtzman NA. A qualitative assessment of Primary Care Physicians' perceptions about the ethical and social implications of offering genetic testing. *Qual Health Res* 1995;**5**:97-116.