How well are general practice trainees prepared for paediatric prescribing?

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WHAT IS ALREADY KNOWN ABOUT THIS SUBJECT

- Children make up a significant proportion of a general practitioner's (GP's) prescribing workload.
- The realisation that children cannot be assumed to be little adults and may require specialized prescribing and therapeutic knowledge is relatively recent.
- Off-label medicines, which have been associated with an increased frequency of adverse drug reactions, are commonly prescribed by GPs to children.

WHAT THIS STUDY ADDS

- The majority of GP trainees believe that their undergraduate and postgraduate training in paediatric therapeutics is insufficient for their coming requirements in primary care.
- Approximately one-third of GP trainees do not undertake any paediatrics training prior to starting work as a GP.
- Off-label and unlicensed prescribing are the most poorly covered areas of paediatric therapeutics in universities/university hospitals.
- Those trainees who do undergo paediatric training during their vocational years report increased paediatric prescribing confidence.

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Keywords

primary care, general practice vocational training, education, paediatrics, prescribing

Received

15 July 2008

Accepted

30 October 2008

AIMS AND METHODOLOGY

We invited 232 General Practice Trainees to complete an on-line questionnaire to assess how they rated their training for the task of paediatric prescribing and therapeutics in the community.

RESULTS

Of the 166 (71%) respondents who completed the questionnaire, 26.5% recalled specific teaching about paediatric prescribing and 59.6% covering one or more relevant topic during their undergraduate years. Undertaking a paediatric post during vocational training was associated with greater prescribing confidence ($P < 0.001$); however, 35% of respondents were not intending to undertake such a post.

CONCLUSION

This study suggests that many GP trainees perceive their paediatric prescribing training as inadequate.

Introduction

In the UK 65% of children aged 0–16 years are issued with at least one prescription by their general practitioner (GP) each year [1], and by necessity many of these medicines are either unlicensed or used off-label.

The use of off-label medicines in the UK is high, affecting 70–90% of children admitted to paediatric or neonatal intensive care units [2–5] and 26% of children in the community [1, 6]. Because off-label medicines use has been associated with increased levels of adverse drug reactions (ADRs), and drug-related fatalities [7–11], we have previously investigated the knowledge, attitudes and experiences of UK GPs, hospital-based paediatricians and community pharmacists towards this pattern of prescribing [12–14]. These surveys identified that a significant minority of GPs and pharmacists (25%) admitted to being unaware of the concept of off-label or unlicensed prescribing, and over half of those who did know about off-label prescribing underestimated the size of the problem and the potential detrimental effects [12]. We therefore sought to assess the level of awareness and knowledge among GP vocational trainees of the issues that affect paediatric prescribing, and their opinions and views on the adequacy of their training in this area.

Methods

Following piloting in 15 general practices, an anonymous on-line, 24-part questionnaire covering demographics, undergraduate and postgraduate training, and views, attitudes and experiences of off-label and unlicensed prescribing was sent to the four Scottish deaneries for distribution to GP trainees. The questionnaire was converted into a web-based format using the SNAP-8 Professional survey software (Snap Surveys, London, UK) and published on the internet. The questionnaire together with the web link and a letter of invitation was then disseminated to all GP trainees with an e-mail address on file. This procedure was repeated twice at 8-weekly intervals. Responses were automatically stored for analysis at a later stage. Statistical analysis was performed using SPSS 14 software (SPSS Inc., Chicago, IL, USA). As most questions were categorical variables, the χ^2 statistical test was used to demonstrate associations between variables, taken at the 5% significance level. The Grampian Joint Ethical Committee did not consider that ethical submission or approval was required for this anonymous questionnaire survey.

Results (Tables 1 and 2)

A total of 232 e-mailed invitations to participate were sent to GP trainees with a known e-mail address in the four

Table 1

The number of respondents who replied positively to the following question: 'Were the following aspects of paediatric drug therapy covered in your undergraduate education? Please tick whichever is applicable?'

	<i>n</i>	Percent
Selection of drug therapy in children	42	25.3
Effect of age on dosing	83	50.0
Effect of age on choice of formulation	49	29.5
Age-specific issues	47	28.3
Adverse drug reactions in children	38	22.9
Off-label prescribing in children	14	8.4
Unlicensed drug use in children	20	12.0
Compliance issues in children	35	21.1
None of the above	67	40.4

Table 2

The number of respondents who replied positively to the following question: 'Were the following aspects of paediatric prescribing and therapeutics covered during your vocational training/postgraduate education?'

	<i>n</i>	Percent
Selection of drug therapy in children	94	56.6
Effect of age on dosing	100	60.2
Effect of age on choice of formulation	81	48.8
Age-specific issues	75	45.2
Adverse drug reactions in children	59	35.5
Off-label prescribing in children	36	21.7
Unlicensed drug use in children	46	27.7
Compliance issues in children	76	45.8
None of the above	50	30.1
Total number of respondents	166	100.0

Note that the data for this variable are mutually exclusive and therefore each category is calculated base on the total 166 respondents as 100%.

Scottish deaneries, and 166 completed questionnaires were returned giving a response rate of 71% (95% confidence interval 65.75, 77.35).

Of the 166 respondents, 57% (95) were female, 84% were aged 25–34 years, 83.1% had been qualified for >3 years (35.5% >5 years) and 35% were in the final year of their vocational training. The majority, 86%, reported some practical paediatric prescribing experience and 14% none.

Undergraduate medical training (Table 1)

When asked about undergraduate medical training, 3.6% recalled comprehensive coverage of issues affecting paediatric therapeutics and prescribing, 26.5% (44) having been taught specifically about paediatric therapeutics and prescribing, and 59.6% having been taught on one or more topics relevant to paediatric therapeutics. Forty percent (67) of respondents reported no exposure to issues affecting paediatric therapeutics such as drug formulation, age,

ADRs and compliance/adherence to therapy (Table 1). Off-label and unlicensed prescribing were the most poorly covered topics, with only 8.4% and 12.1% of respondents, respectively, reporting teaching in these areas. When asked whether the paediatric therapeutics content of their undergraduate course was sufficient for their prescribing needs as a GP, only 9% (15) responded yes [59% (97) no]. Not surprisingly, 65% (107) of respondents considered that their undergraduate training should be broadened to permit a more informed approach to paediatric prescribing and therapeutic issues. Suggested areas for improvement included more emphasis on problem-based solving with ward-based therapeutics teaching, dosage guidelines in children, and paediatric therapeutics teaching guidelines for medical schools to ensure standardized content.

Vocational training (Table 2)

Overall, of the 55% (92) of respondents who had undertaken a paediatrics attachment during their vocational training, 89% (82) believed that it had equipped them suitably to prescribe for children (11% (10) no or unsure). Similar levels of confidence were also expressed by the 55 respondents who had reported insufficient undergraduate training but had gone on to complete a postgraduate paediatric post. Of these 55 respondents, 90% reported that they believed that their postgraduate training had equipped them to prescribe safely for children as a GP ($P < 0.001$).

Of the 45% (74) of respondents who had not undergone any paediatric attachment, less than one-third (31%, 23) believed that this would disadvantage their young patients, and only one-fifth (15) planned to undertake such a post during their vocational training.

The majority of respondents (93%, 154) reported that they had not attended any training days relevant to paediatric prescribing.

When asked to indicate, from a list of topics, which areas of paediatric therapeutics had been covered during postgraduate training, 19% of final year trainees and 30.1% overall (Table 2) reported covering none of the key issues. Off-label [21.7% (36)] and unlicensed prescribing [27.7% (46)] were most poorly covered, although 60.8% (101) of respondents claimed to be familiar with the concepts from their own (68.3%) or colleague prescribing experiences (60.4%). Familiarity with the concept of off-label prescribing was significantly more likely if the respondents had undertaken formal paediatric training during their vocational years ($P = 0.004$).

The importance of postgraduate paediatrics training can not be overestimated, as demonstrated by those 50 respondents, who despite reporting significant deficiencies in their undergraduate training, were able to report that undertaking a postgraduate paediatrics post had equipped them to prescribe safely for children as a GP ($P < 0.001$).

Discussion

Although children only make up one-fifth of the population, the prescribing workload they generate for a GP is high. This is especially true in the youngest age groups (0–4 years), in which annual GP contact rates are similar to those of patients aged ≥ 65 years. It is also well recognized that ADRs are more frequent and potentially more severe in these two age extremes, and the potential consequences of uninformed paediatric prescribing significant.

Paediatric prescribing is further complicated by the use of off-label medicines, a practice that is common in UK primary care [15], and which has been associated with increased ADRs and possibly drug-related death [7–11].

In this study the majority of GP trainees reported a lack of undergraduate and postgraduate education and training in paediatric therapeutics. Less than 5% of respondents reported comprehensive coverage and 40% no coverage at all of relevant key therapeutic issues during their undergraduate years. However, undertaking a paediatric post during vocational training appeared to ameliorate any perceived deficiencies in undergraduate training. Despite this fact, more than one-third of trainees were not intending to undertake any paediatric training prior to starting work in the community.

Despite the evidence that off-label and unlicensed prescribing is associated with a high rate of ADRs and possible deaths, <10% of respondents recalled undergraduate training in these areas, and the majority of respondents (85%) believed that these patterns of prescribing did not disadvantage children.

Like their more senior colleagues in general practice [12], trainees also reported reliance on self and colleague experience to inform their therapeutic decisions rather than on knowledge of the underlying principles of clinical pharmacology and therapeutics as they relate to children.

Like all questionnaire-based studies, this survey also has several potential methodological weaknesses. First, we were unable to contact those trainees whose e-mail address was unknown or who were self-constructing their training programme. However, the total numbers of trainees missed in this way were small. Second, such surveys rely on subject recall. Although this is less than ideal, until undergraduate and postgraduate medical training follows a national programme, personal recall is one of the best methods to gain a picture of what the trainee has actually been taught during the undergraduate and postgraduate years.

Conclusion

Although every doctor training for general practice will gain significant experience of paediatrics during their final year in a general practice and may have had previous hospital experience in paediatrics, this study suggests that

current paediatric prescribing training is inadequate at both undergraduate and postgraduate levels. To optimize patient safety, specific additional training in aspects of paediatric prescribing and therapeutics should be targeted at all undergraduates, be part of routine postgraduate hospital or general practice paediatric education, and be included within the core educational modules supporting the Royal College of General Practice curriculum delivered during vocational/speciality training for general practice [16].

Competing interests

None to declare.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Appendix S1

General Practice Vocational Trainee Questionnaire

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