A search for the evidence supporting community paediatric practice


Abstract

Aim—Controversy exists regarding the evidence base of medicine. Estimates range from 20% to 80% in various specialties, but there have been no studies in paediatrics. The aim of this study was to ascertain the evidence base for community paediatrics.

Methods—Twelve community paediatricians working in clinics and schools in Yorkshire, Manchester, Teesside, and Cheshire carried out a prospective review of consecutive clinical contacts. Evidence for diagnostic processes, prescribing, referrals, counselling/advice, and child health promotion was found by searching electronic databases. This information was critically appraised and a consensus was obtained regarding quality and whether it supported actions taken.

Results—Two hundred and forty seven consultations and 1149 clinical actions were performed. Good evidence was found from a randomised controlled trial or other appropriate study for 39.9% of the 629 actions studied; convincing non-experimental evidence for 7%; inconclusive evidence for 25.4%; evidence of ineffectiveness for 0.2%; and no evidence for 27.5%. Prescribing and child health promotion activities had the highest levels of quality evidence, and counselling/advice had the lowest.

Conclusions—An encouraging amount of evidence was found to support much of community paediatric practice. This study improved on previous research in other specialties because actions other than medications and surgery were included. (Arch Dis Child 1999;80:257–261)

Keywords: evidence based medicine; community practice; randomised controlled trials

The office of technology assessment of the US Congress published a report in 1978 stating that: “only 10–20% of all procedures currently used in medical practice have been shown to be efficacious by controlled trial”.1 Since then, this figure has been challenged by a number of disciplines.2–4 Claims have been made that 82% of interventions in inpatient general medicine are evidence based5 and 81% in general practice.6

On a recent evidence based paediatric course at the University of Leeds, these figures generated much discussion. “Guestimates” were made as to how clinically effective paediatric practice might be. The hospital paediatricians estimated that 49% of their work was evidence based, whereas the community paediatricians felt that only 20% of their work was likely to be so.7

The reason behind the community paediatricians’ lack of confidence was evident. Community paediatrics has evolved only over the last 20 years to become a consultant led specialty in its own right. As a relative newcomer, it was not likely to have developed the body of research and resources that underpin other specialties.

Therefore, with some apprehension that community paediatrics might prove to be at the bottom of the evidence based medicine league table, the community paediatricians decided to set out to ascertain the evidence base for this specialty.

In planning our study, the limitations of the previous studies were taken into account.8–1 In these studies, only the primary diagnosis and intervention (determined from retrospective review of notes) had been searched—a limitation of particular importance in the community setting. Moreover, it was not clear that evidence found had been rigorously critically appraised for quality. Finally, an overly broad definition of convincing non-experimental evidence had been used by the general practice paper.2

Therefore, our study design was structured so that all aspects of clinical activity undertaken by community paediatricians were studied, and efforts were made to ensure that all evidence was appraised for both quality and relevance to community paediatric patients.

Methods

In May 1997, a pilot study was undertaken to highlight any difficulties with data gathering and to develop the format of the clinical diary used. Nine paediatricians recorded every clinical action they undertook on patients over a two day period. From this pilot study, it was determined that there were 10 categories of clinical activity: clinical evaluation, investigations, prescriptions, referrals, monitoring, liaison, counselling/advice (including reassurance), child health promotion, statutory items, and multidisciplinary work.

### Table 1 Criteria used to determine the quality of evidence found

<table>
<thead>
<tr>
<th>Grade</th>
<th>Quality of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Good systematic review, randomised controlled trial or other appropriate study design</td>
</tr>
<tr>
<td>A2</td>
<td>Convincing non-experimental evidence (see definition in text)</td>
</tr>
<tr>
<td>B1</td>
<td>Inconclusive evidence. A good quality study where the results could not be assumed to apply to the patient in the community paediatric setting</td>
</tr>
<tr>
<td>B2</td>
<td>Inconclusive evidence. Poor study design or inadequate study power</td>
</tr>
<tr>
<td>C</td>
<td>Evidence of ineffectiveness</td>
</tr>
<tr>
<td>D</td>
<td>No evidence found</td>
</tr>
</tbody>
</table>

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Accepted 19 October 1998
Table 2  Numbers of questions posed and clinical actions investigated according to category of clinical activity

<table>
<thead>
<tr>
<th>Category</th>
<th>Clinical evaluation</th>
<th>Investigations</th>
<th>Prescriptions</th>
<th>Counselling/advice</th>
<th>Referrals</th>
<th>Child health promotion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical actions asked (n)</td>
<td>186</td>
<td>63</td>
<td>30</td>
<td>106</td>
<td>72</td>
<td>245</td>
</tr>
<tr>
<td>Questions asked (n)</td>
<td>17</td>
<td>28</td>
<td>26</td>
<td>17</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>Clinical actions addressed by questions asked (n)</td>
<td>93</td>
<td>53</td>
<td>30</td>
<td>68</td>
<td>24</td>
<td>243</td>
</tr>
</tbody>
</table>

Questions and searches were not carried out for the following categories: monitoring (174 actions), liaison (132 actions), statutory work (22 actions), and multidisciplinary work (0 actions).

The clinical group for the full study consisted of two consultants, two senior clinical medical officers/associate specialists, one senior registrar, and seven staff grade doctors/clinical medical officers. The children were seen in a variety of settings: schools/nurseries, special schools, hospital clinics, secondary referral clinics, health centres, child development centres, and at home.

During a two week period in June 1997, the 12 community paediatricians recorded data on every patient they saw during the first four days that they had patient contact. This time scale for recording allowed work done by part-time doctors to be represented as equally as the full timers. Details of all the child’s problems and clinical actions taken were recorded and classified according to the categories determined in the pilot study.

Questions were then developed—designed to test the efficacy of the clinical actions. Of the 10 categories, only six were considered to contain clinical actions suitable for posing questions of efficacy and literature searching. An attempt was made to investigate as many of the clinical actions as feasible, focusing on the more frequent and important actions. Evidence for efficacy was then sought by carrying out computerised data searches using MEDLINE, and in some instances CINAHL, psychology, and the Cochrane databases as well. Further evidence was found by hand searching recent articles, obtaining references from relevant articles, consulting experts in the field, and personal communication with colleagues.

Relevant articles identified were critically appraised, using the JAMA guidelines, by the individual doing the search. The group then discussed each article both for the quality of the research and its relevance to the patients concerned. The article was graded by consensus according to quality criteria developed by the group (table 1). In all cases where evidence from a good systematic review, a randomised controlled trial or other appropriate design was found (A1 evidence) the article was independently critically appraised by three members of the group. A1 status was only applied if all three agreed that the study was of good design and directly relevant to community paediatrics.

Clinical actions were only classified as having convincing non-experimental evidence (A2) if: (1) in the case of prescriptions, a randomised controlled trial with a placebo arm would be unethical; or (2) in the case of clinical evaluation, a study would essentially be impossible, either because the clinical evaluation itself is the gold standard for diagnosis (for example, obesity) or because the definitive study would involve children undergoing hazardous, expensive investigations to ascertain the accuracy of diagnosis, which would also be unethical.

Table 3  Quality of evidence found by category of clinical activity

<table>
<thead>
<tr>
<th></th>
<th>A1</th>
<th>A2</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescriptions</td>
<td>16</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>Child health promotion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunisations</td>
<td>118</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>118</td>
</tr>
<tr>
<td>Surveillance</td>
<td>96</td>
<td>0</td>
<td>6</td>
<td>39</td>
<td>0</td>
<td>102</td>
<td>243</td>
</tr>
<tr>
<td>Counselling/advice</td>
<td>0</td>
<td>9</td>
<td>12</td>
<td>0</td>
<td>47</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>Referrals</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>Investigations</td>
<td>10</td>
<td>0</td>
<td>31</td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>53</td>
</tr>
<tr>
<td>Clinical evaluation</td>
<td>4</td>
<td>42</td>
<td>13</td>
<td>29</td>
<td>0</td>
<td>5</td>
<td>93</td>
</tr>
<tr>
<td>Total (%)</td>
<td>251(39.9)</td>
<td>44(7)</td>
<td>61(9.7)</td>
<td>99(15.7)</td>
<td>1(0.2%)</td>
<td>173(27.5%)</td>
<td>629(100%)</td>
</tr>
</tbody>
</table>

See table 1 for definitions of the different grades of quality of evidence.

Results

During the study period, 247 children were seen with 446 problems and a total of 1149 clinical actions were carried out. One hundred and forty questions were posed, which addressed 629 clinical actions. Table 2 shows the numbers of questions by category and the corresponding numbers of clinical actions. Table 3 shows the quality of evidence determined for each category.

There was good evidence from a randomised controlled trial, systematic review, or another appropriate study for 39.9% of the clinical actions studied, and convincing non-experimental evidence for 7%. A further 9.7% of evidence was of good quality but was classed as inconclusive until the research findings could be confirmed in the community paediatric setting. Table 4 details the A1 evidence.

Figure 1 shows the good quality evidence by category. A substantial amount of good quality evidence was found for child health promotion and prescriptions, whereas least evidence was found to support counselling and advice. Even when immunisations were excluded from the analysis of child health promotion, 40% of actions were graded A1.
Evidence of ine
tal hypothyroidism, and protective helmets for children with problematic epilepsy. There was good

In addition there was convincing non-experimental evidence for the use of thyroxine in congeni-

quality experimental evidence; A2, Convincing non-experimental evidence; B1, Good
evidence but not clearly translatable to the community paediatric patient.

Figure 1 Level of good evidence found for each category of clinical activity. A1, Good
quality experimental evidence; A2, Convincing non-experimental evidence; B1, Good
evidence but not clearly translatable to the community paediatric patient.

Discussion

Most of the interventions evaluated in general practice and inpatient general medicine were
prescribed medications. Good experimental evidence was found for 53% of interventions in the
general medicine paper and 31% of interventions in the general practice paper. Our
study has shown that there is good experimental evidence for 53% of the prescriptions issued
during the study period in community paediatrics. On a very simplistic basis it would be easy
to state that there is as much good experimental evidence for community paediatric practice
as the other specialties who have studied their evidence base.

However, our study was a refinement on the previously mentioned studies. In our study
every clinical action carried out on patients was recorded, not just the action which on review
seemed to be the principal one. Second, the quality of the evidence accepted was carefully
assessed. Experimental evidence of effective-
ness was only accepted if the study was
methodologically sound and where the results
were directly translatable to patients in a com-

munity paediatric setting.

Interestingly, because all clinical actions
were recorded in our study, it was apparent
that prescriptions accounted for only 3.7% of
clinical actions performed during the study
period. Clearly, stating that a specialty is

evidence based when only the evidence of the
effectiveness of treatments has been consid-
ered does not give the whole picture. There
should also be clear evidence that diagnostic
processes are effective (both clinical evaluation
and relevant investigations), and for other
components of the consultation, such as
dvice or reassurance given and referral to other
professionals.

Community paediatrics involves more than
seeing and treating acutely unwell children and
making them well. Child health promotion,
counselling and advice, and referral to other
professionals are as important. They are
included in the calculation that there is good
evidence of effectiveness for 47%, and some
evidence of effectiveness for a further 25% of
the clinical actions in this community paediat-

ric study.

In some areas disappointingly little evidence
was found. Only 4% of the clinical evaluations
made and 19% of the investigations carried
out had clear evidence of accuracy or effective-
ness in the community paediatric setting.
Furthermore, the study highlighted the diffi-
culties involved in assessing the accuracy of
these diagnostic processes where studies
would essentially be impossible to design.
Further areas lacking in evidence were
counselling/advice and referrals to other
professionals.

It must be emphasised, however, that
absence of evidence is not evidence of
ineffectiveness, and the conclusion should
therefore be that further research is required,
rather than that these aspects of community
paediatric practice are not worthwhile. Moni-
toring, liaison, multidisciplinary work, and
statutory work are also an important part of
community paediatrics. They were not evalu-
ated in our study, and it is likely that the e-
effectiveness or value of this type of work may best
be answered by qualitative rather than quanti-
tative research methods.

It was clear that overall there was a paucity of
evidence from studies that had been carried out
in the community or ambulatory paediatric
setting. This meant that some good evidence
was not given A1 status because we could not
deem that the results were applicable to our
patients. Examples included studies where
counselling had been provided by a psycho-
ologist, or clinical evaluations had been carried
out by tertiary specialists and where it

Table 4 Actions supported by evidence from good systematic reviews, randomised
controlled trials or good evidence from another appropriate type of study

<table>
<thead>
<tr>
<th>Category</th>
<th>Actions</th>
<th>Actions (n)</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescriptions*</td>
<td>Alarm for enuresis</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Changing insulin regimens to improve diabetic control</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Treatment of asthma (via spacer devices, atrovent, and pulmicort)</td>
<td>2</td>
<td>12, 13</td>
</tr>
<tr>
<td></td>
<td>Rhinocort for rhinitis</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Calpol for toddler temperature control</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Epilim effective treatment for epilepsy</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Methyl phenidate in attention deficit disorder</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Hyosine to reduce drooling in cerebral palsy</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Child health promotion</td>
<td>Efficacy and safety of immunisations</td>
<td>118</td>
<td>19–26</td>
</tr>
<tr>
<td></td>
<td>Growth screening (height)</td>
<td>6</td>
<td>27, 28</td>
</tr>
<tr>
<td></td>
<td>Examination for congenital heart disease, congenital dislocation of the</td>
<td>42</td>
<td>29–32</td>
</tr>
<tr>
<td></td>
<td>hip, and testicular descent</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neurodevelopmental assessment at school entry as predictor for learning</td>
<td>48</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>difficulties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counselling/advice</td>
<td>Referral for specialist visual testing in development delay</td>
<td>7</td>
<td>34</td>
</tr>
<tr>
<td>Referrals</td>
<td>Tympanometry and detection of glue</td>
<td>4</td>
<td>35</td>
</tr>
<tr>
<td>Investigations</td>
<td>Hip x ray in diagnosing subluxation/dislocation of hip in cerebral palsy</td>
<td>4</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Thyroid function tests in asymptomatic children with Down’s syndrome</td>
<td>2</td>
<td>37</td>
</tr>
<tr>
<td>Clinical evaluation</td>
<td>Dyspraxia</td>
<td>4</td>
<td>33</td>
</tr>
</tbody>
</table>

*In addition there was convincing non-experimental evidence for the use of thyroxine in congeni-
tal hypothyroidism, and protective helmets for children with problematic epilepsy. There was good
evidence of ineffectiveness in prescribing paracetamol to reduce recurrence of febrile fits.
could not be assumed that a community paediatrician would be similarly effective. Much research from hospital settings must be substantiated in the community setting before it can be considered applicable to community paediatricians and our broad spectrum of patients.

It is worthy of mention that so much of the clinical work of community paediatricians (identified by the process of keeping diaries) was found to be very similar to the work conventionally thought to be the province of hospital paediatricians. This suggests that the results of our study might well be extrapolated to the specialty of paediatrics as a whole.

The design of our study, which followed that of the studies in inpatient general medicine and general practice has both strengths and limitations. Using clinical encounters as the basis for searching for evidence ensures that common and important questions are answered. Reassuringly higher levels of evidence were found in all studies based on this design than those figures based on assessments of interventions that are high tech, high profile, and general practice has both strengths and limitations. Using clinical encounters as the basis for searching for evidence ensures that common and important questions are answered. Reassuringly higher levels of evidence were found in all studies based on this design than those figures based on assessments of interventions that are high tech, high profile, and expensive.

However, limitations were identified. Community child health tends to be seasonal and, because all the data collection for our study was carried out towards the end of the academic year, statutory work in school was underrepresented. Also underrepresented, by chance, were child protection and multidisciplinary work, both important aspects of community paediatrics. Our study also highlighted the need to ensure that clinical questions are well thought out and appropriate before searching databases.

Our study emphasises the need to ascertain the evidence underpinning all clinical actions, not simply “principal” interventions, which are often the easiest to search or indeed research. It should also be noted that searching for evidence can be time consuming. In preparing this paper 151 hours were spent doing clinical analysis. 

The authors are community paediatricians working in Yorkshire, Manchester, Teesside, and Cheshire. They are all students of the University of York. The elimination of indigenous measles mumps and rubella from Finland by a single dose programme in term and preterm infants. Lancet 1989;1:75:298–303.


Iodine, selenium, and joints: Kashin–Beck disease

In parts of China, Siberia, North Korea, and Tibet children and adolescents are prone to a strange joint disease called Kashin–Beck disease (named after those who described it in Siberia in the last century). It is a necrotising osteoarthritis that affects the fingers, hands, elbows, ankles, and knees, usually starting at between 5 and 15 years of age. The regions in which it occurs have in common the fact that both iodine and selenium are in short supply. Now a study in Tibet (Rodrigo Moreno-Reyes and colleagues. New England Journal of Medicine 1998;339:1112–20; see also editorial by Robert D Utiger. Ibid, 1156–8) has suggested that this combined deficiency could be the cause of the problem.

They studied 575 5–15 year old children in 12 villages; only one village did not have endemic Kashin–Beck disease. Severe selenium deficiency was present in all the villages, mean serum concentrations being some 15–20% of the lower limit of normal. Almost half of the children studied had Kashin–Beck disease, a similar proportion were goitrous, and two thirds had very low urinary iodine concentrations. The findings that distinguished those with Kashin–Beck disease from those without were low urinary iodine, high serum thyrotropin, and low serum thyroxine binding globulin, but not serum selenium.

Selenium is an important component of two enzymes, glutathione peroxidase and iodothyronine deiodinase. It is postulated that combined deficiency of selenium and iodine could result in tissue oxidative damage because of lack of the first of these enzymes and this together with tissue thyroid hormone deficiency could produce joint damage. The hypothesis seems reasonable although it is as yet unproved.
A search for the evidence supporting community paediatric practice

M C J Rudolf, N Lyth, A Bundle, G Rowland, A Kelly, S Bosson, M Garner, P Guest, M Khan, R Thazin, T Bennett, D Damman, V Cove and V Kaur

Arch Dis Child 1999 80: 257-261
doi: 10.1136/adc.80.3.257

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