Randomised controlled trial comparing cost effectiveness of general practitioners and nurse practitioners in primary care
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Nurse practitioners working as part of primary care teams alongside general practitioners as first point of contact in primary care for patients requesting an appointment on the same day.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients requesting an appointment the same day who were able to come to the experimental session. This group of patients was chosen because a high proportion would be likely to agree to randomisation as they would not have a strong preference for one practitioner who was already involved in their ongoing care. The exclusion criteria were as follows: patients who were temporary residents or not yet registered with the practice, any patient with language or reading problems, any patient who was too ill, and unaccompanied children under 16 years of age.

Setting
Primary care. The economic study was carried out in the UK.

Dates to which data relate
No dates were given.

Source of effectiveness data
The evidence for final outcomes was based on a single study.

Link between effectiveness and cost data
Costing appears to have been conducted prospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
Power calculations were not used to determine the sample size. It was only reported that randomisation continued until a minimum of 60 patients in each practice had been allocated to the clinician groups. 1,716 patients were eligible for randomisation, of whom 298 declined to enter the study and 102 were excluded. As a result, a total of 1,316 were randomised to either the nurse practitioner group (n=651) or the general practitioner (n=665). The age distribution of
the 641 patients in the nurse group was as follows: 64.6% of patients were over 16 years of age, 17.8% were between 5 and 15 years of age, and 17.5% were under 5 years. The age breakdown of the 651 patients in the general practitioner group were 69.4% (over 16), 13.2% (aged 5-15), and 17.2% (under 5).

Study design
This was a multicentre, randomised, controlled trial, carried out in 20 geographically dispersed practices in England and Wales. The duration of the follow-up appears to have been for two weeks after initial consultation. Loss to follow-up in the nurse group consisted of 6 patients who did not attend the appointment and 4 who withdrew from the study. The corresponding values in the general practitioner group were 7 and 7, respectively. Each practice employed a nurse who had completed a nurse practitioner training programme at diploma, BSc, or MSc level. The median length of time for which nurses had been qualified as nurse practitioners was 3 (range: 1 - 5) years and the median time as registered nurses was 22 (range: 9 - 35) years. Each nurse practitioner had been seeing patients as a first point of contact for at least two years. A method of coded block randomisation was developed which meant that neither the receptionist nor the patient could determine the group to which a patient was allocated at the time of booking.

Analysis of effectiveness
The principle used in the analysis of effectiveness appears to have been treatment completers only. The health outcome measures were consultation process (length of consultation, examinations, prescriptions, referrals), patient satisfaction, health status, and return clinic visits over two weeks. An electronic time stamp was used to record the time of each consultation. Patients completed health status measures (SF-36 scale) before the initial consultation and by post two weeks later. After the consultation, patients completed the medical interview satisfaction scale or its paediatric version, and the patient enablement instrument. The comparability of the study groups was not explicitly discussed. Adjustments were made for the effects of being treated by the same health professional (intracluster correlation), and age and sex of the patients.

Effectiveness results
Nurse practitioners’ consultations were significantly longer than those of the general practitioners (11.57 versus 7.28 minutes; adjusted difference 4.20, 95% CI: 2.98 - 5.41), and nurses carried out more tests (8.7% versus 5.6% of patients; odds ratio 1.66, 95% CI: 1.04 - 2.66) and asked patients to return more often (37.2% versus 24.8%; OR 1.93, 95% CI: 1.36 - 2.73). There were no significant differences in patterns of prescribing or health status outcome for the two groups. Patients were more satisfied with nurse practitioner consultations (mean score 4.40 versus 4.24 for general practitioners; adjusted difference 0.18, 95% CI: 0.092 - 0.257). This difference remained after controlling for consultation length.

Clinical conclusions
In many respects the behaviour of the nurses was similar to that of general practitioners, but some important differences existed. Nurse practitioners spent more time with patients and were more likely to ask patients to return. There were no differences in health outcome, although the study did not have sufficient power to detect a differences in rare serious events.

Measure of benefits used in the economic analysis
No summary benefit measure was identified in the economic analysis, and only separate clinical outcome were reported.

Direct costs
Costs were not discounted due to the short time frame of the cost analysis. Some quantities were reported separately from the costs. Cost items were not reported separately. Cost analysis covered the health service costs including the basic salary costs of each health professional plus the costs of prescriptions, tests, referrals, and the costs of return consultations in the following two weeks. The perspective adopted in the cost analysis appears to have been that of the
NHS. The source of the costs of general practitioners’ and nurse practitioners’ time was a study published in 1998, which used the actual grades on which the study nurses were employed. Costs of prescriptions were derived from the British National Formulary, and costs for investigations and referrals were supplied by the individual provider units associated with the practices. The price year was not given.

**Statistical analysis of costs**
In cost comparisons between the groups, adjustments were made for the effects of age, sex, and intracluster correlation. As some of the cost data were highly skewed, estimates for costs were compared with estimates based on non-parametric clustered bootstrap to check the robustness of the analysis. Both estimates gave similar results and so only the direct estimates were presented.

**Indirect Costs**
Not considered.

**Currency**
UK pounds sterling (£).

**Sensitivity analysis**
No sensitivity analysis was conducted.

**Estimated benefits used in the economic analysis**
Not applicable.

**Cost results**
There was no significant difference in health service costs (nurse practitioner 18.11 versus general practitioner 20.70; adjusted difference 2.33, 95% CI: -1.62 to -6.28).

**Synthesis of costs and benefits**
Costs and benefits were not combined.

**Authors’ conclusions**
The clinical care and health service costs of nurse practitioners and general practitioners were similar. If nurse practitioners were able to maintain the benefits while reducing their return consultation rate or shortening consultation times, they could be more cost-effective than general practitioners.

**CRD COMMENTARY - Selection of comparators**
A justification was given for the choice of the comparator (the general practitioner as first point of contact in primary care). It was the standard practice in the context in question. You, as a database user, should consider whether this is widely used in your own setting.

**Validity of estimate of measure of effectiveness**
The effectiveness results are likely to be internally valid given the randomised nature of the study design. However, the comparability of the study groups was not addressed. Adjustments were made for the effects of age, sex, and intracluster correlation. The study sample appears to have been representative of the study population.
Validity of estimate of measure of benefit
The authors did not derive a measure of health benefit. The study may therefore be regarded as a cost-consequences analysis.

Validity of estimate of costs
Some quantities were reported separately from the costs. Adequate details of the methods of cost estimation were not given although it was mentioned that further details of costing were available on request. The price year was not given. The perspective adopted in the cost analysis was not explicitly reported, but appears to have been that of the NHS. The effects of different procedures on indirect costs (productivity loss) were not addressed. Statistical analysis was performed on cost data and on some resource use data. It was noted that the study did not have sufficient power to detect significant cost differences and the authors were unable to conduct power calculations for cost before the study because none of the British studies of nurse practitioners have compared cost of consultations for general practitioners and nurse practitioners. It was also noted that if lifetime training costs were included in the cost analysis the general practitioner costs would be higher.

Other issues
The authors' conclusions appear to be justified given the uncertainties in the data. Regarding the issue of generalisability to other settings or patient populations, it was noted that the study results do not relate to nurse practitioners who are working independently, and cannot necessarily be generalised to other institutions (since the study results relate to patients requesting a same day appointment). The study sample consisted of patients requesting a same day appointment and, because of that, the limited scope of the study was appreciated in the study comments.

Implications of the study
A larger study with greater power to detect cost differences is needed.

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