A patient education program is cost-effective for preventing failure of endoscopic procedures in a gastroenterology department
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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
The use of a patient education programme aimed at preventing the failure of endoscopic procedures. The patients were given an explanatory brochure, and were then contacted by the attending nurse who explained the specific aspects of the endoscopic procedure and answered all questions in a designated room. A telephone number for last-minute questions was also given.

Type of intervention
Diagnosis and patient care management.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients referred for endoscopic procedures such as colonoscopy, sigmoidoscopy and gastroscopy. Patients with mental impairment and those younger than 18 years of age were excluded.

Setting
The setting was secondary care. The economic study was carried out at the Gastroenterology Department of Rabin Medical Center at Beilinson Campus, Petach-Tikva, Israel.

Dates to which data relate
The effectiveness and resource use data were gathered from October to December 1998. The price year was not reported.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was carried out prospectively on the same sample of patients as that used in the effectiveness study.

Study sample
Power calculations to determine the sample size were not reported. All consecutive patients who underwent endoscopic procedures at the study hospital from October to December 1998 were included in the effectiveness study. There were 142 patients. Ninety-one patients received the educational programme (group 1), 38 did not receive any educational programme (group 2), and 13 did not receive any educational programme, but contacted the nurse before the
intervention (group 3). The mean age was 59 (+/- 16) in group 1, 59 (+/- 18) years in group 2 and 55 (+/- 14) years in group 3. The proportion of men was 53% in group 1, 45% in group 2 and 31% in group 3.

Study design
This was a prospective, randomised controlled trial, which was carried out in a single centre (the Gastroenterology Department of the Rabin Medical Center). Randomisation depended on the availability of a specially trained nurse on the day of patient referral. This resulted in different numbers of patients in the groups. The patients were not followed after the procedure was performed. No method of blinding for the outcome assessment was adopted.

Analysis of effectiveness
It seems that all the patients included in the initial study sample have been accounted for in the analysis of effectiveness. The outcomes used in the analysis were:

- the level of anxiety,
- satisfaction with brochure instruction,
- complete or cancelled examination for the three endoscopic procedures,
- the reasons for a cancelled examination, and
- patient cooperation.

Factors that correlated significantly with the outcomes were also identified. The study groups were comparable at baseline in terms of their demographic characteristics and other aspects, such as education level and type of endoscopic procedure.

Effectiveness results
The high, moderate and low anxiety scores were, respectively, 25%, 33% and 43% in group 1, 39%, 10% and 50% in group 2, and 31%, 23% and 46% in group 3, (p not significant).

High, moderate and low satisfaction with the brochure instruction was expressed by 87%, 7% and 6% of group 1 patients, 79%, 18% and 3% of group 2 patients, and 70%, 23% and 8% of group 3 patients, (p not significant).

The rates of complete and cancelled examination were, respectively:

- 98% and 2% in group 1, 88% and 12% in group 2, and 100% and 0 in group 3 for gastroscopy;
- 90% and 10% in group 1, 50% and 50% in group 2, and 67% and 33% in group 3 for colonoscopy; and
- 100% and 0 in group 1, 60% and 40% in group 2, and 80% and 20% in group 3 for sigmoidoscopy, (p not significant).

Examination were cancelled due to failed preparation and technical problems in, respectively 4% and 1% of group 1 patients, 26% and 2% of group 2 patients, and 15% and 0% of group 3 patients, (p=0.005).

Patient cooperation was complete or partial in 84% and 16% of group 1 patients, 68% and 32% of group 2 patients, and 85% and 15% of group 3 patients, (p not significant).

In terms of predicting factors, male gender, prior endoscopy, and preliminary explanation by the physician were associated with a lower level of anxiety.

There was a positive correlation between years of education and satisfaction score. Patients with a low level of education demonstrated a preference for an accompanying relative during the education session.
There was a positive relationship between attendance in the education programme and the success of the endoscopy. Women had a higher non completion rate than men. The interval between the patient education session and the endoscopy being performed showed a positive correlation with the failure of the examination.

**Clinical conclusions**

The effectiveness analysis showed that the education programme was effective in improving the success of the endoscopic procedures. However, it did not affect patient satisfaction and anxiety scores statistically.

**Measure of benefits used in the economic analysis**

The health outcomes were left disaggregated and no summary benefit measure was used in the economic evaluation. In effect, a cost-consequences analysis was performed.

**Direct costs**

Discounting was irrelevant because the costs were incurred during a short time. The unit costs were reported separately from the quantities of resources used. The health services in the economic evaluation were endoscopic procedures and nurse time to administer patient education. The cost of failed procedures was also considered. The cost/resource boundary of the study was that of the third-party payer. Resource use and the number of failed endoscopies were derived from actual data estimated alongside the clinical trial from October to December 1998. The unit costs came from official data of the Israeli Ministry of Health. The price year was not reported.

**Statistical analysis of costs**

The costs were treated deterministically.

**Indirect Costs**

The indirect costs were not included.

**Currency**

US dollars ($).

**Sensitivity analysis**

Sensitivity analyses were not conducted.

**Estimated benefits used in the economic analysis**

See the 'Effectiveness Results' section.

**Cost results**

The total cost of failure per 100 endoscopies was $2,709 with gastroscopy, $3,600 with colonoscopy and $1,794 with sigmoidoscopy.

The cost of the education programme per 100 procedures (only nurse time included) was $125 with gastroscopy, $250 with colonoscopy and $125 with sigmoidoscopy. Therefore, the money saved per 100 procedures was $2,584 (8.6%) with gastroscopy, $3,350 (8.9%) with colonoscopy and $1,669 (5.5%) with sigmoidoscopy.

**Synthesis of costs and benefits**
Not relevant because a cost-consequences analysis was performed.

**Authors’ conclusions**
The pre-endoscopy patient education programme was effective in improving patient compliance and in reducing both the failure rate and the overall procedural costs.

**CRD COMMENTARY - Selection of comparators**
The authors appropriately compared the new education programme with the standard care provided at the study hospital. A description of the comparator was provided. An intermediate comparator (corresponding to group 3 patients) was also considered due to the pragmatic design of the study. You should decide whether it represents a valid comparator in your own setting.

**Validity of estimate of measure of effectiveness**
The analysis of effectiveness used a randomised controlled trial, which was appropriate for the study question. The methods of randomisation and sample selection were reported. The inclusion criteria used to select the study participants were fairly wide. The study participants were likely to represent the overall study population of patients undergoing endoscopic procedures. The study groups were shown to have been well balanced at baseline. The role played by prognostic factors was estimated by running several analyses of correlation, which were crucial to assess the real impact of the study intervention on the clinical outcomes. These issues tend to enhance the internal validity of the analysis. However, it has to be noted that power calculations were not carried out to justify the size of the sample.

**Validity of estimate of measure of benefit**
No summary benefit measure was used in the analysis so, in effect, a cost-consequences analysis was conducted.

**Validity of estimate of costs**
The authors stated explicitly the perspective adopted in the study and listed the cost categories considered in the analysis. Details of the resource use and unit costs were provided. This enhances the replication of the analysis. The source of the cost data was provided. However, the cost estimates were specific to the study setting and sensitivity analyses were not carried out. The costs were treated deterministically. The price year was not reported, thus making reflation exercises in other settings difficult.

**Other issues**
The authors compared their findings with those from other studies. Agreement was found in terms of the correlation between patient satisfaction and education level. However, results contrasting with the literature were found for the degree of anxiety associated with endoscopic procedures and the company of a close friend or relative during the education sessions. The issue of the generalisability of the study results to other settings was not addressed and sensitivity analyses were not conducted. Thus, the external validity of the analysis was low. Further, the data came from a single centre and caution is therefore required when interpreting the results of the analysis.

**Implications of the study**
The study results suggested that an education programme for patients undergoing endoscopic procedures may lead to cost-savings due to the lower failure rate.

**Source of funding**
None stated.
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